THE USE OF SOIL INFORMATION SYSTEMS IN LAND PLANNING:

Procedures for generating information for

properties, depths and sites not recorded.

(VOL. 2)

Appendices

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by

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1987

Balliol College

Oxford

The logic of the world, which is shown in tautologies by the propositions of logic, is shown in equations by mathematics.

L.W.

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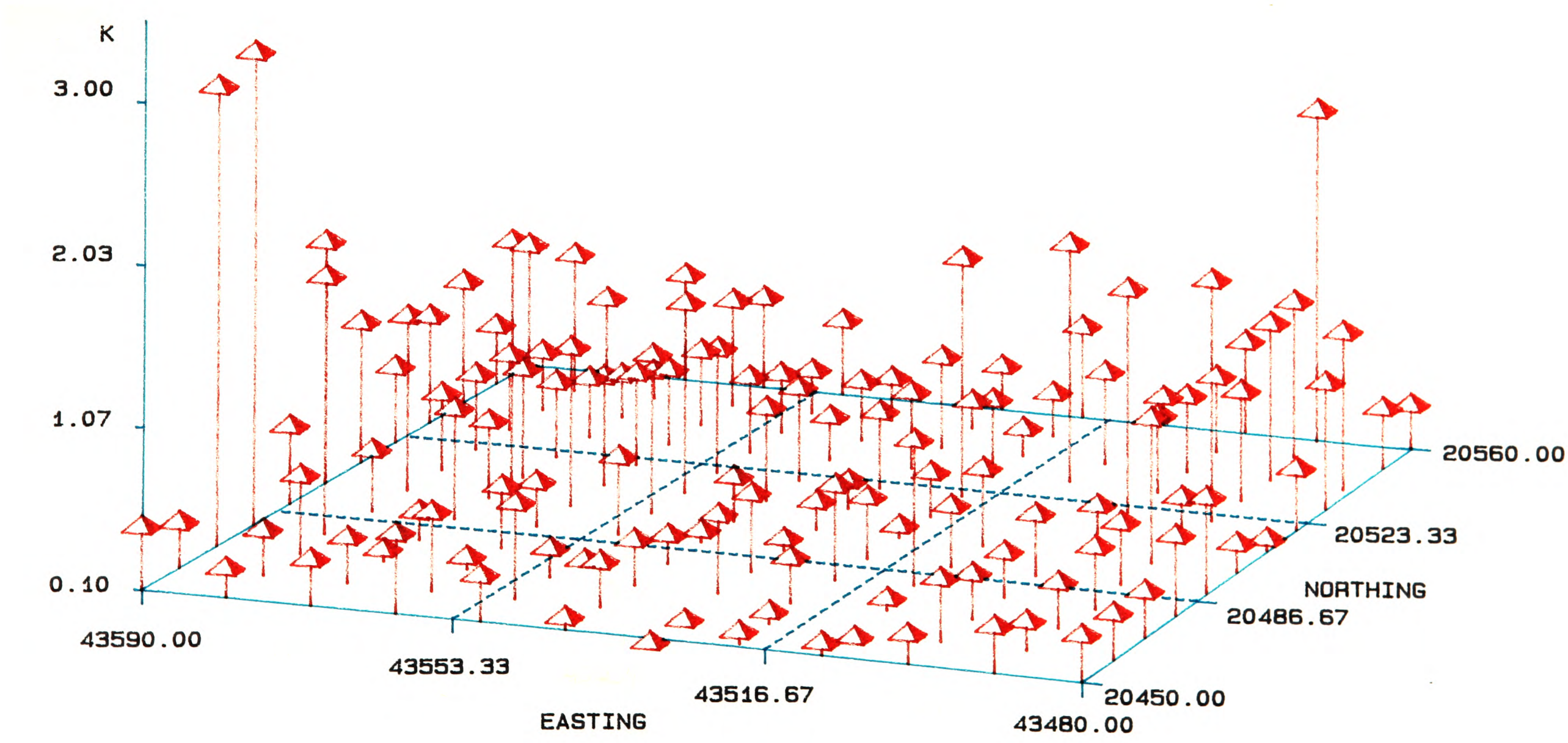
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APPENDIX 3

3-D plots depicting spatial variability of some soil properties at Yelford.

POTASSIUM

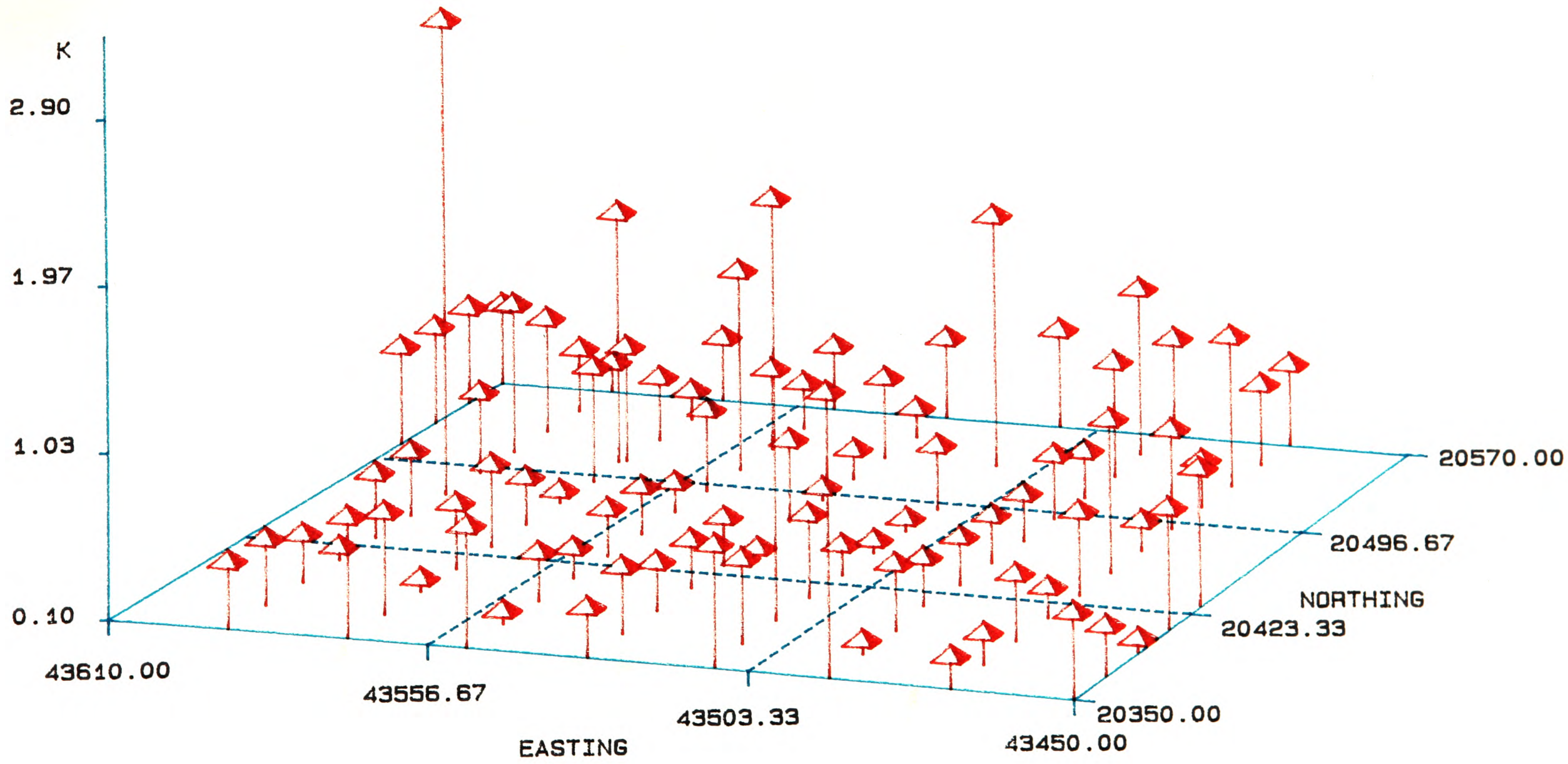
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100 m GRID, YELFORD

POTASSIUM

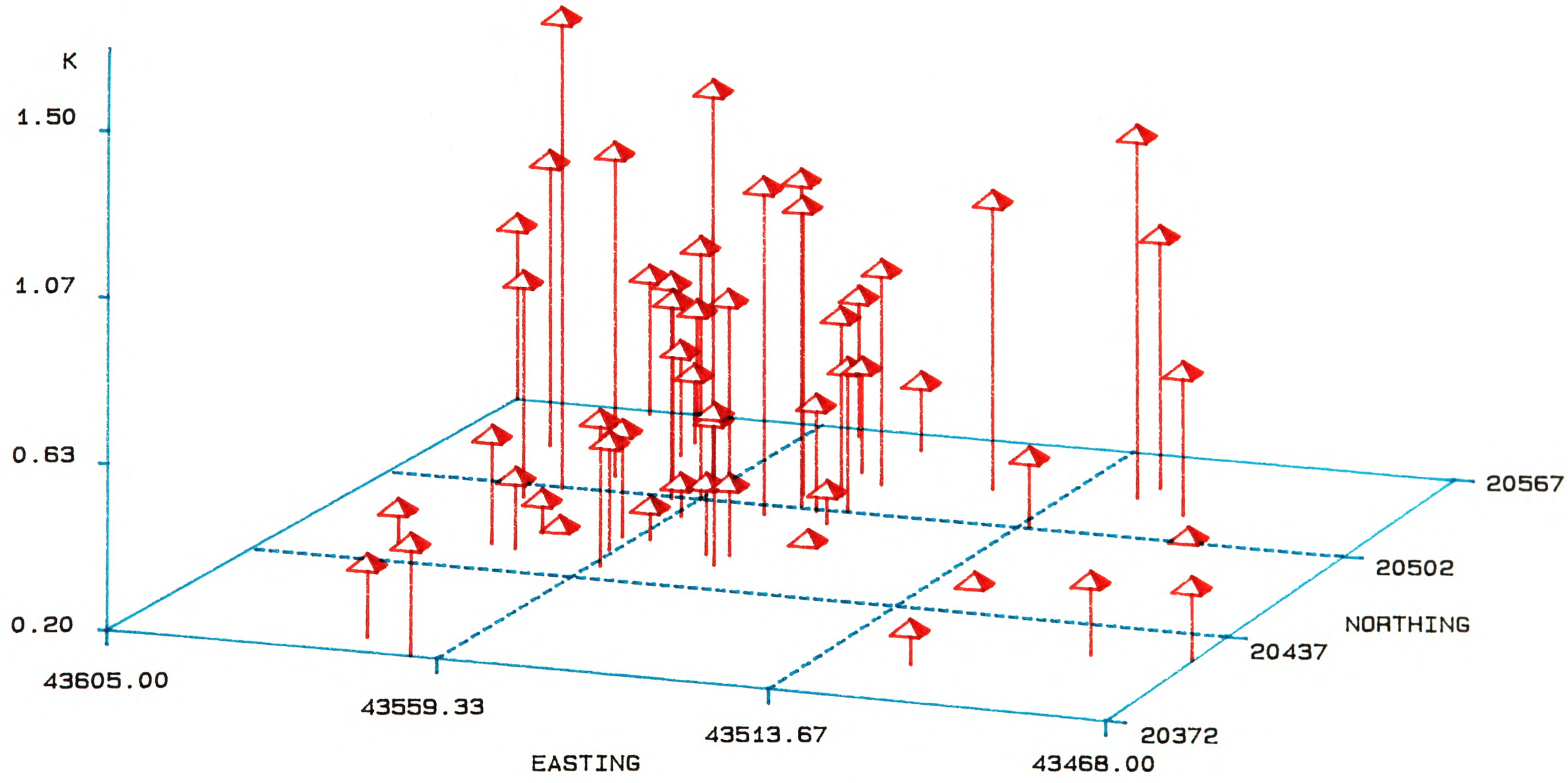
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200 m GRID, YELFORD

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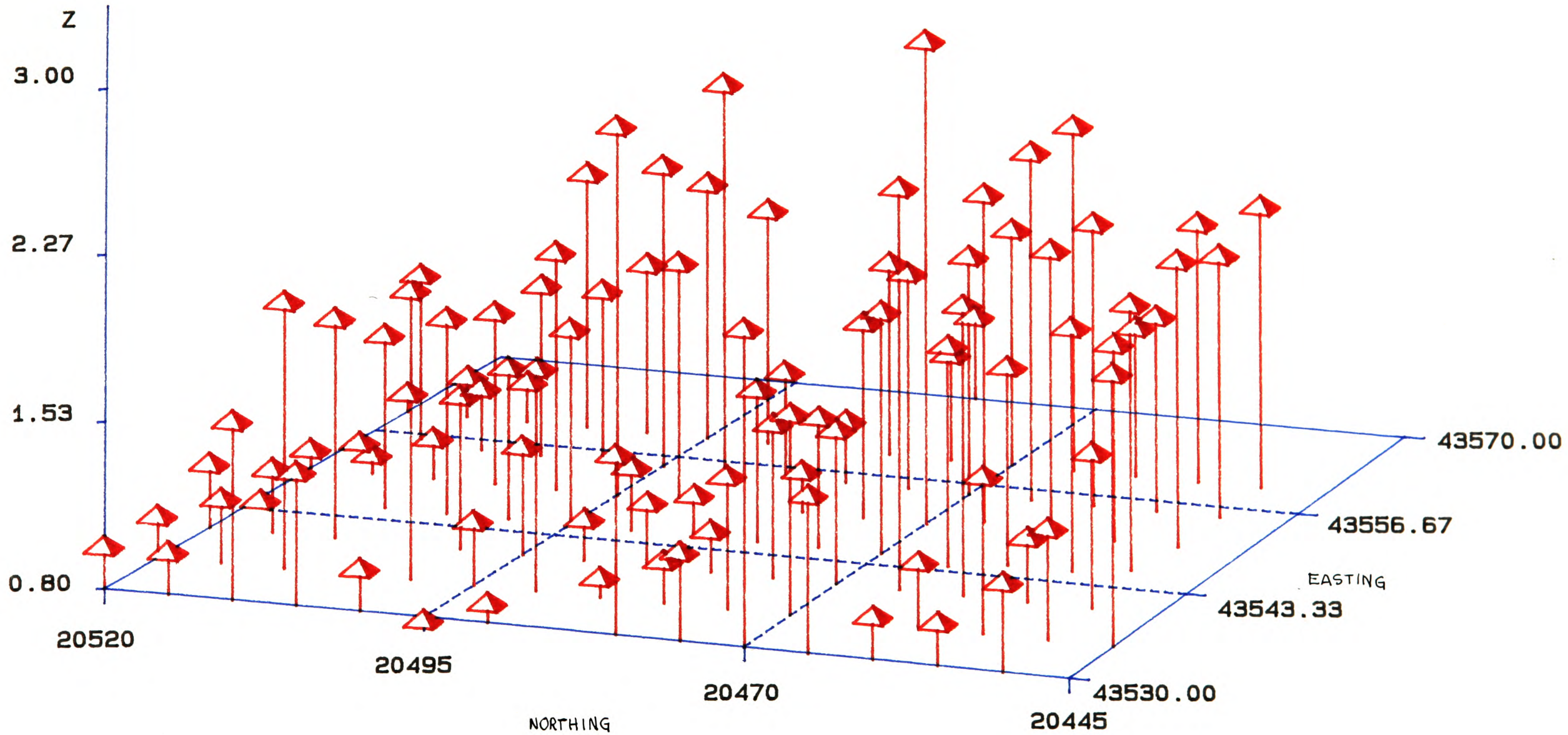
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CHECK POINTS

MAGNESIUM, EXCHANGE

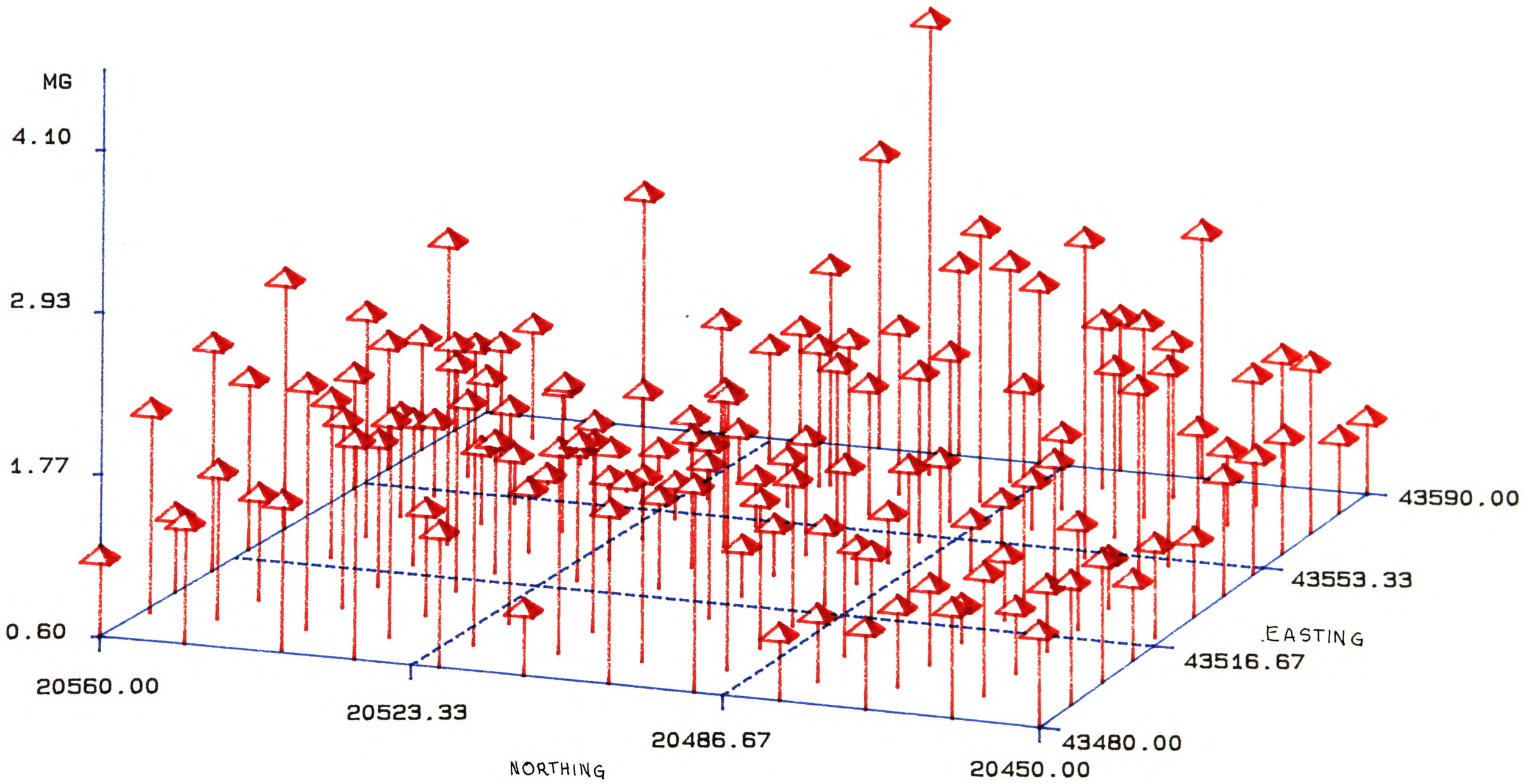
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YELFORD, 50m. GRID

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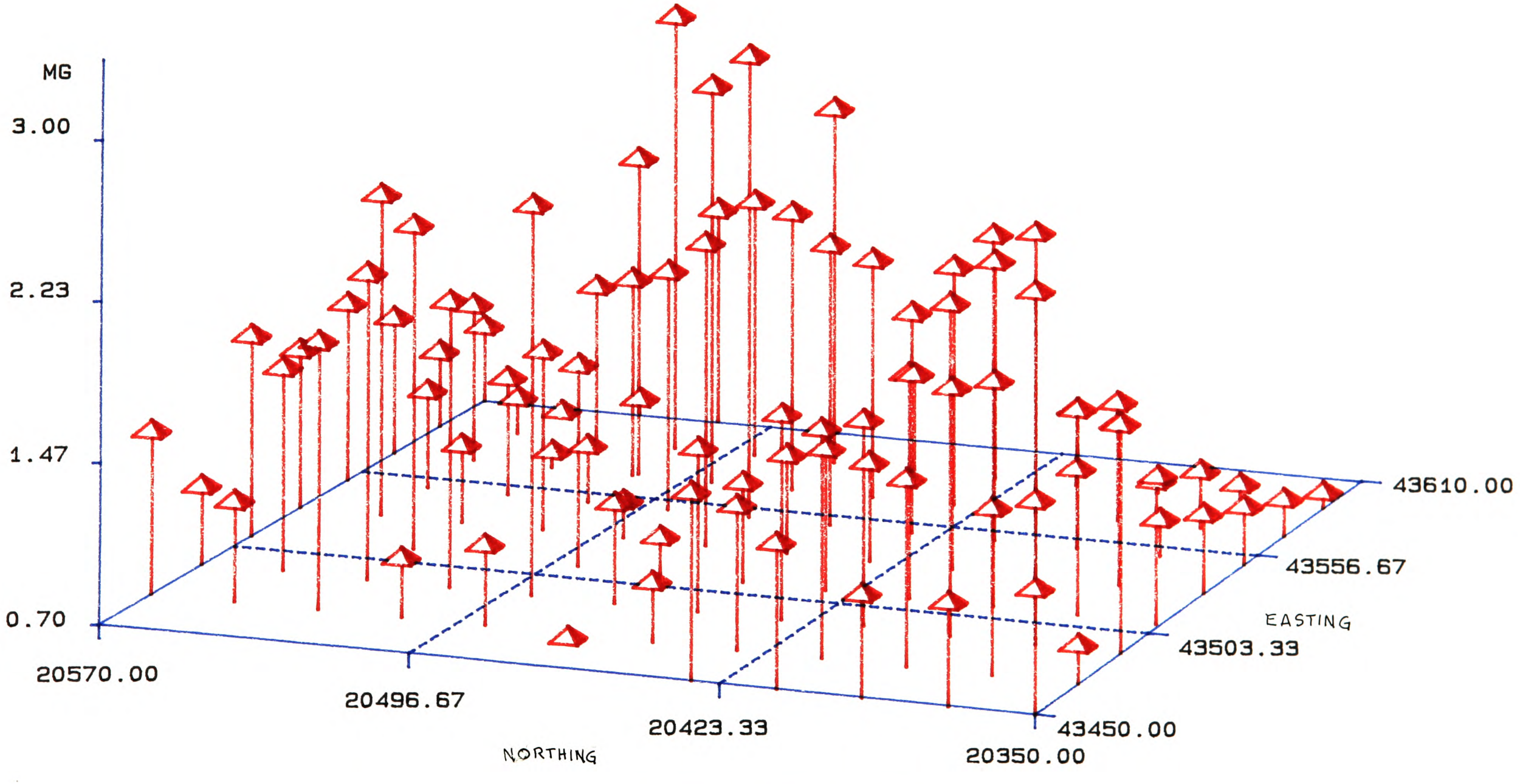
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YELFORD, 100 m GRID

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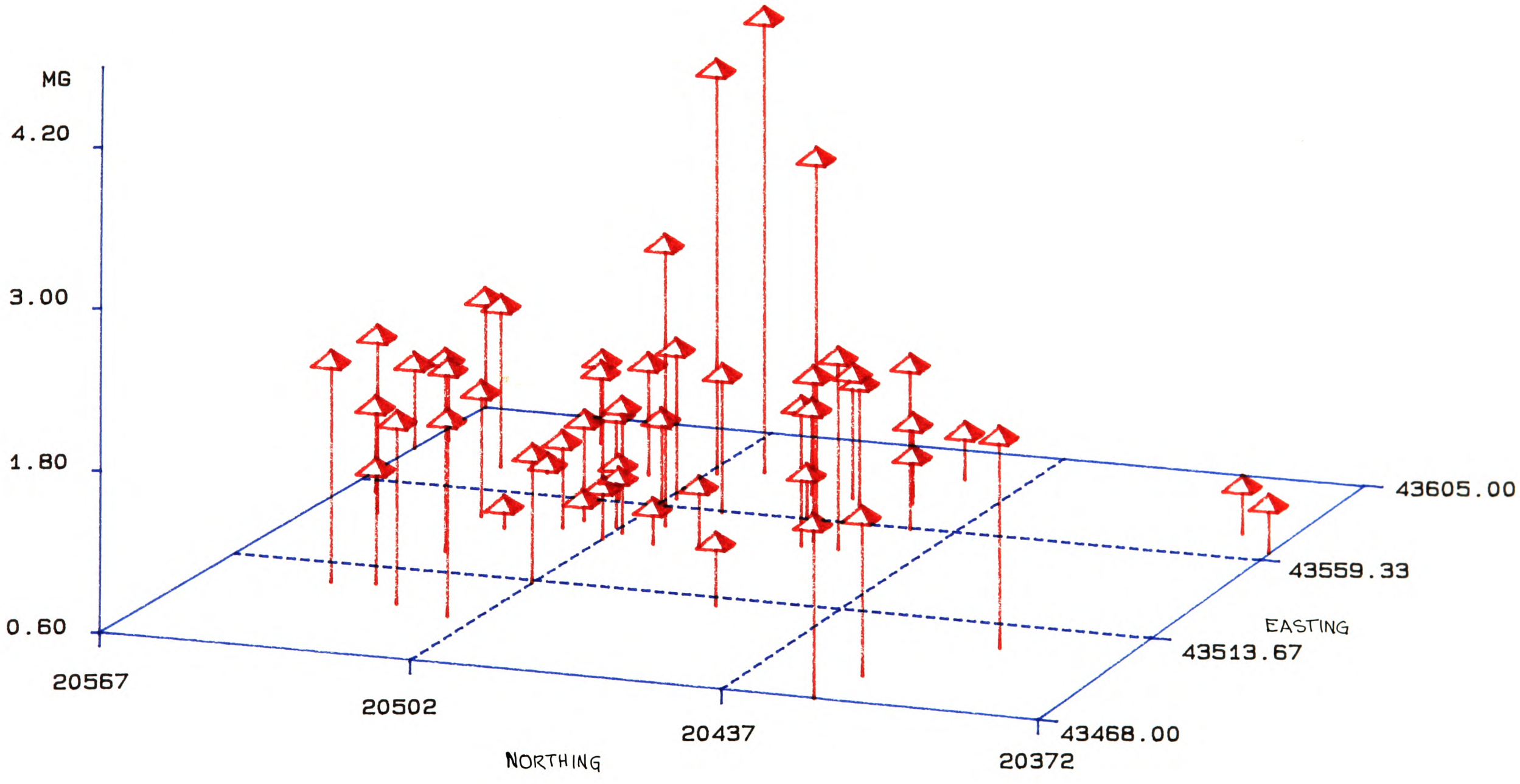
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YELFORD, 200 m GRID

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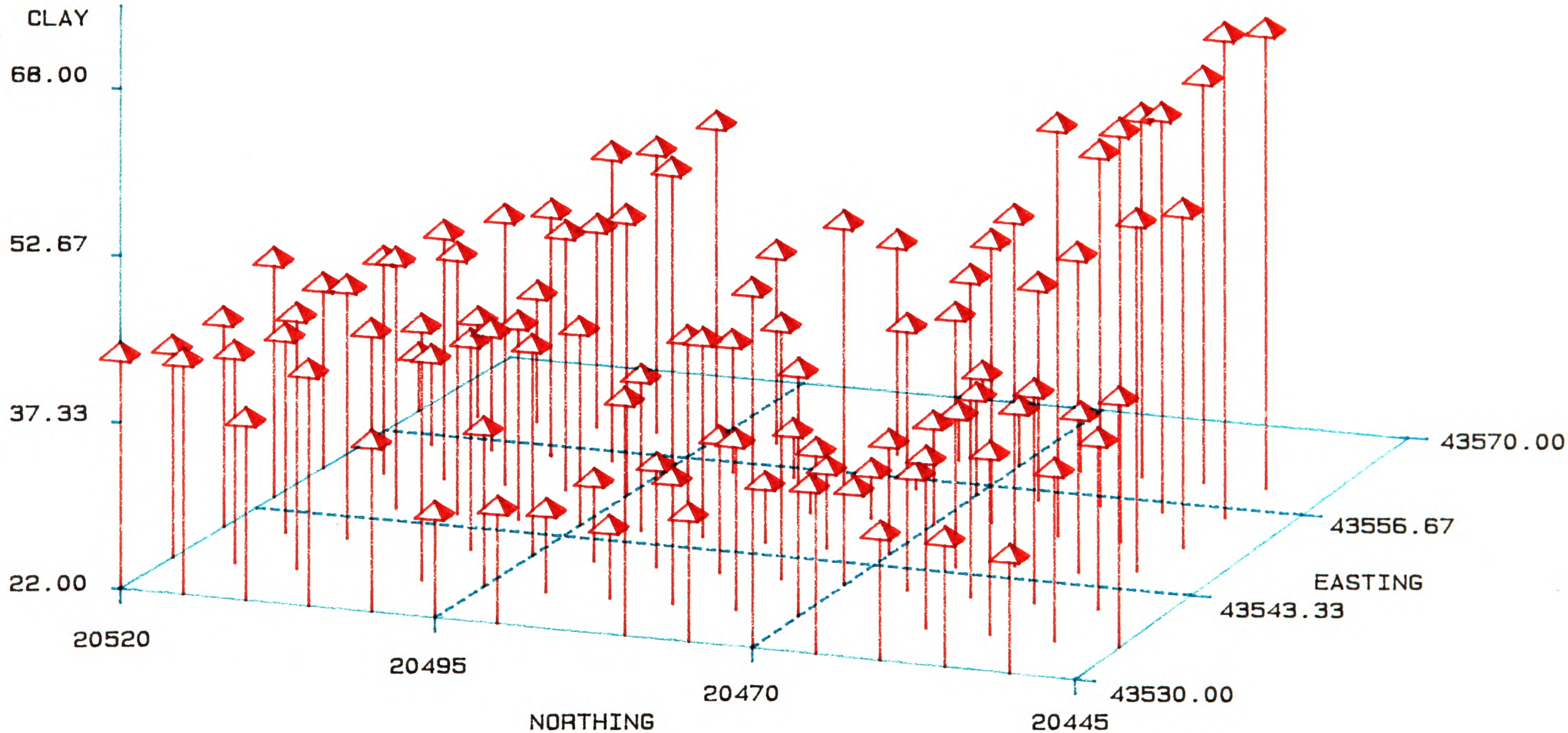
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CHECK POINTS

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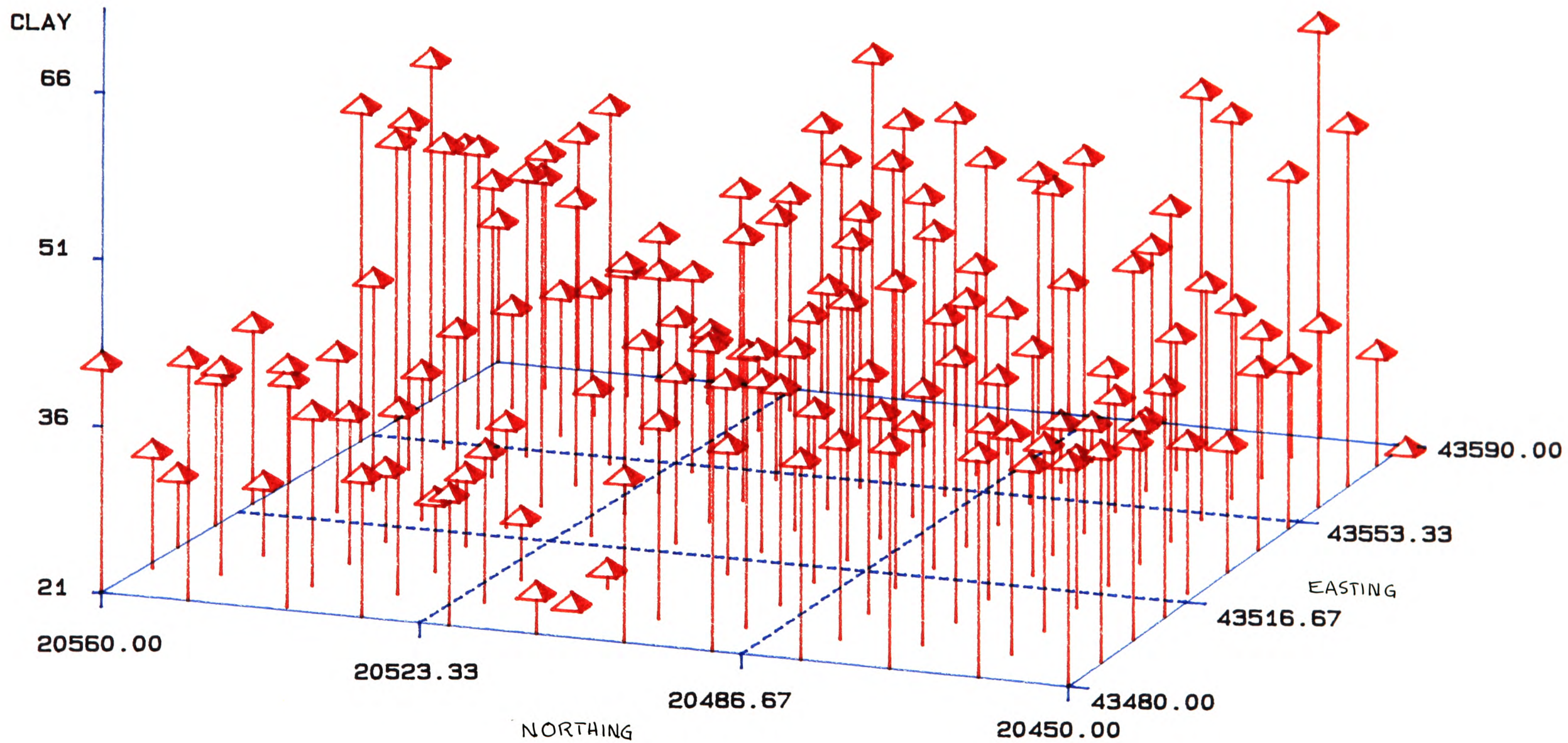
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50 m GRID, YELFORD

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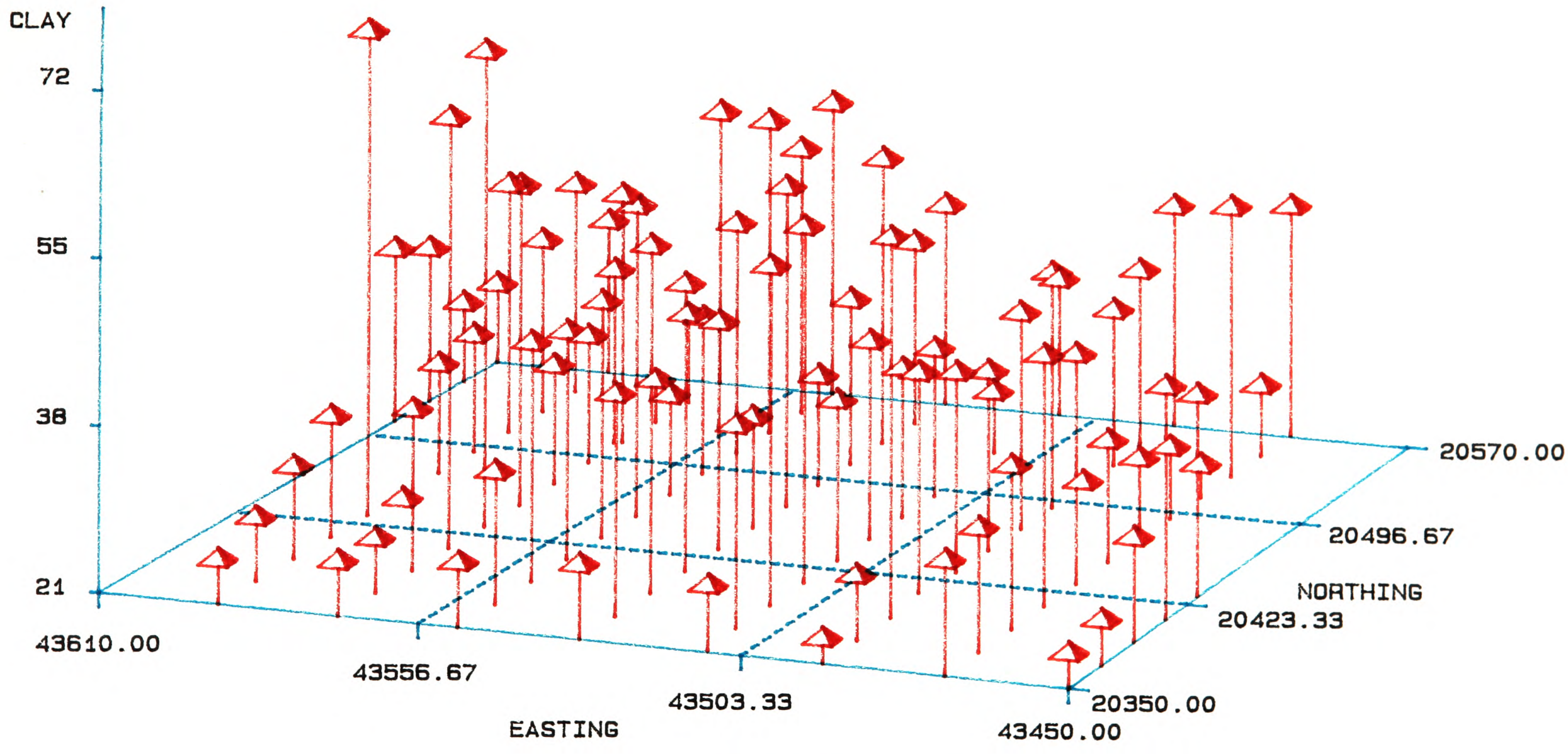
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100 m GRID

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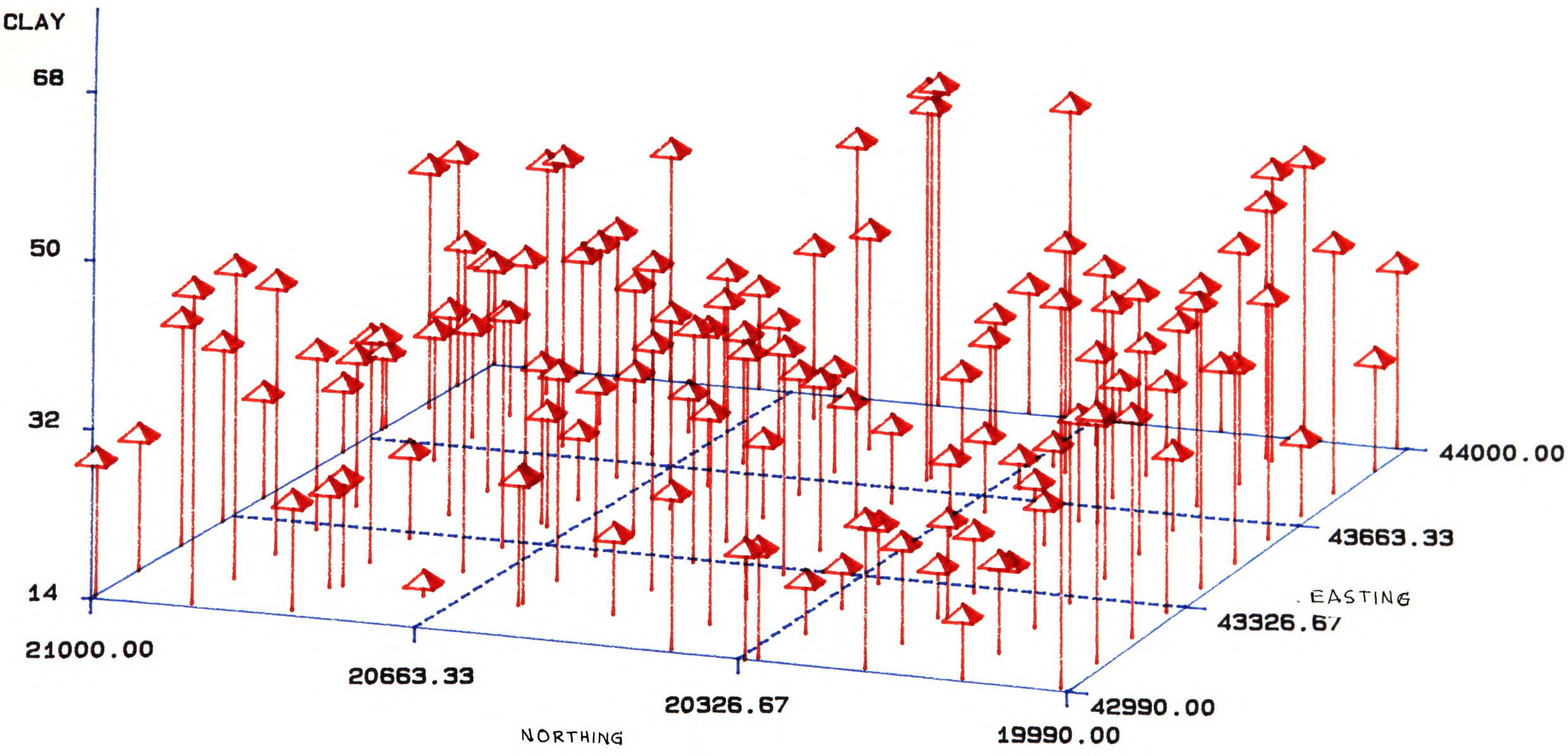
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200 m GRID, YELFORD

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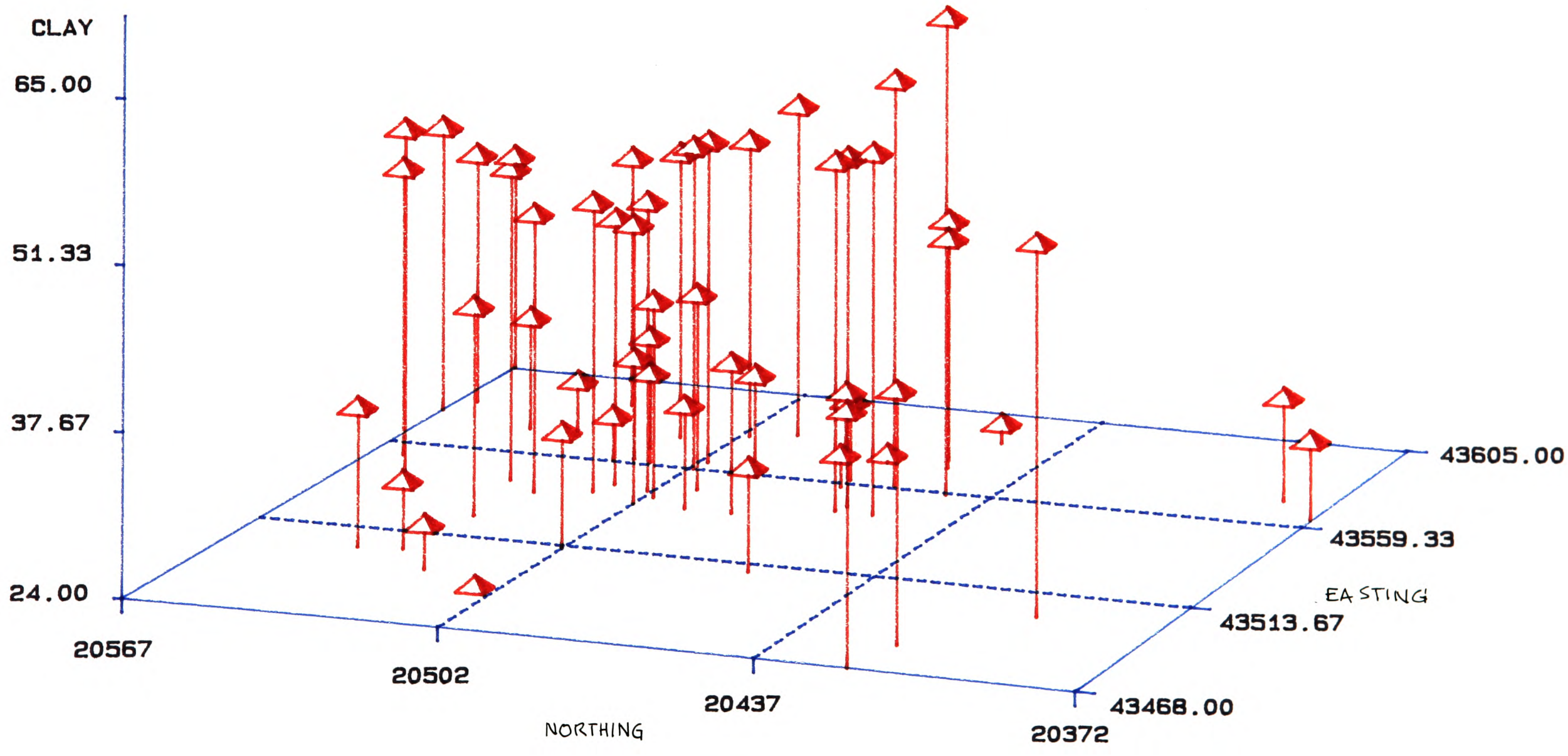
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SP30 SHEET, 1 Km GRID

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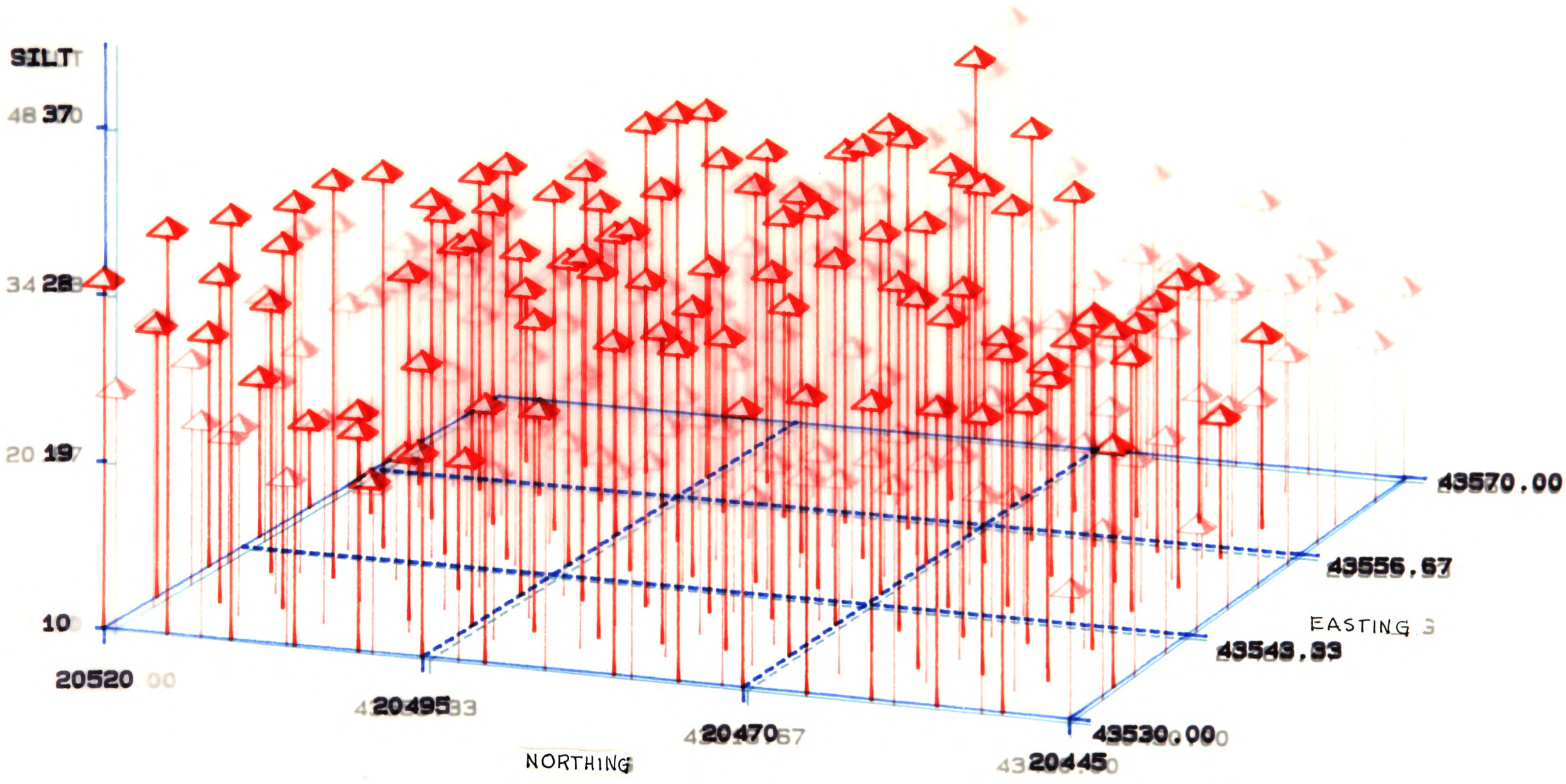
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CHECK POINTS

SILT

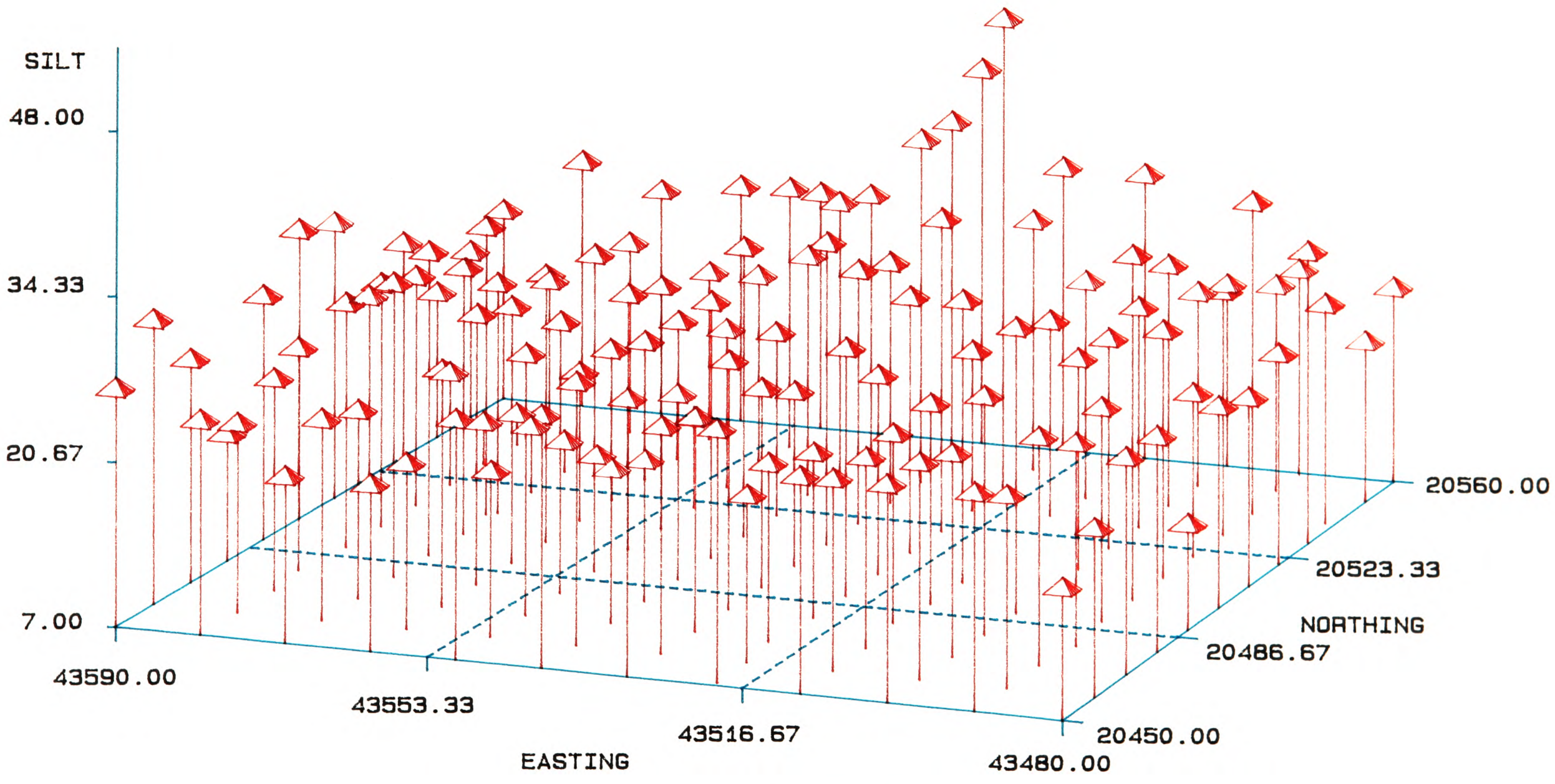
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YELFORD, 50 m GRID

SILT

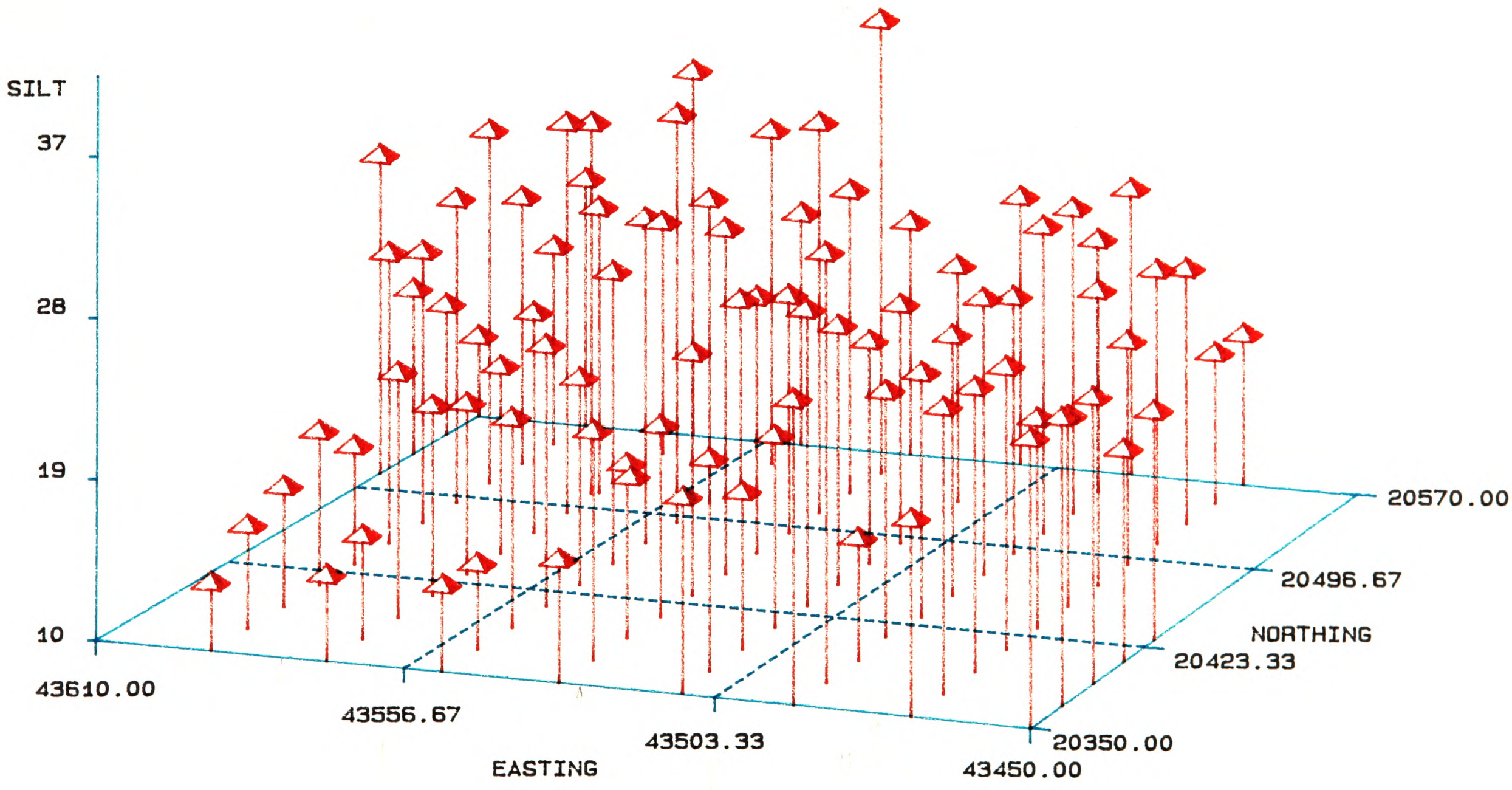
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100 m GRID, YELFORD

SILT

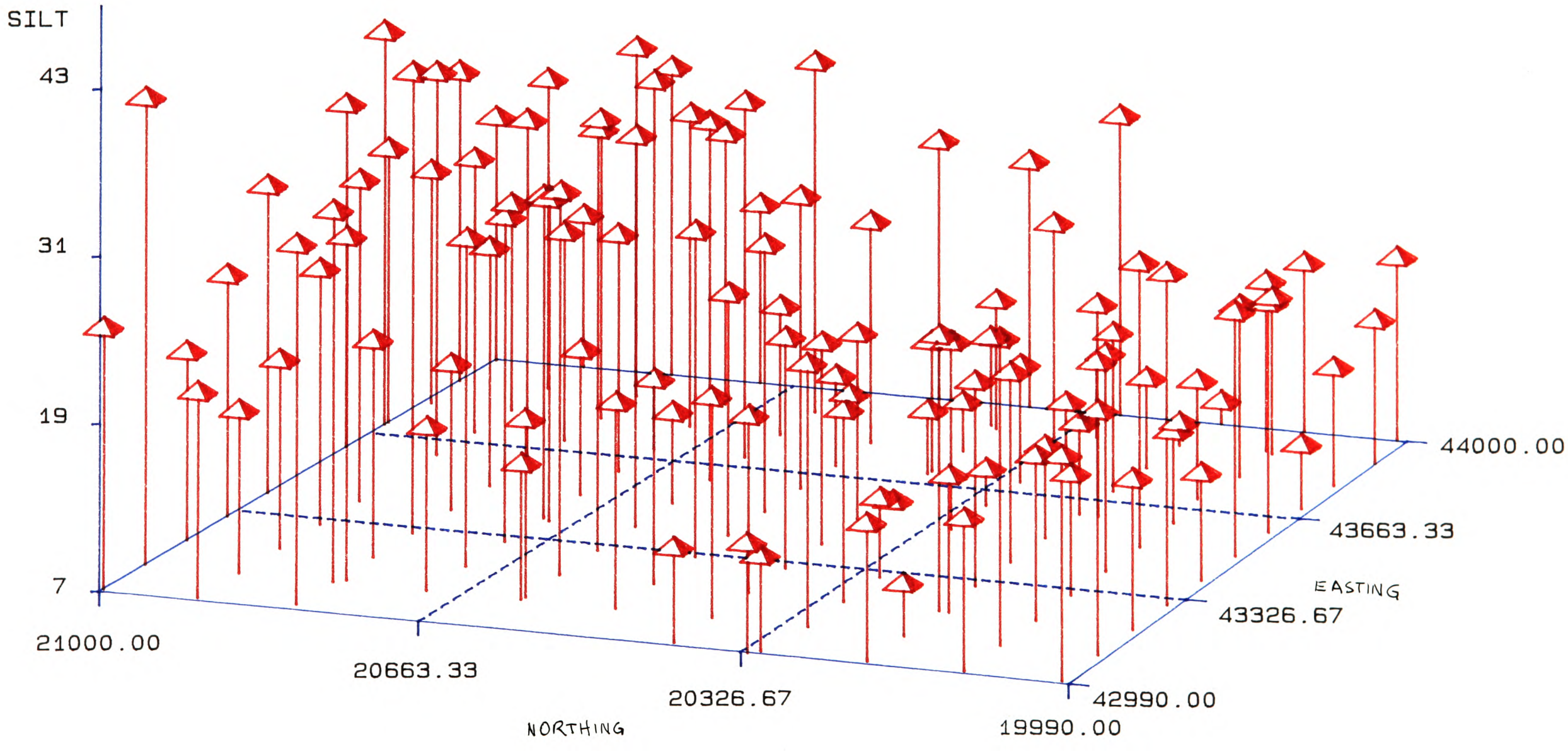
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200 m GRID, YELFORD

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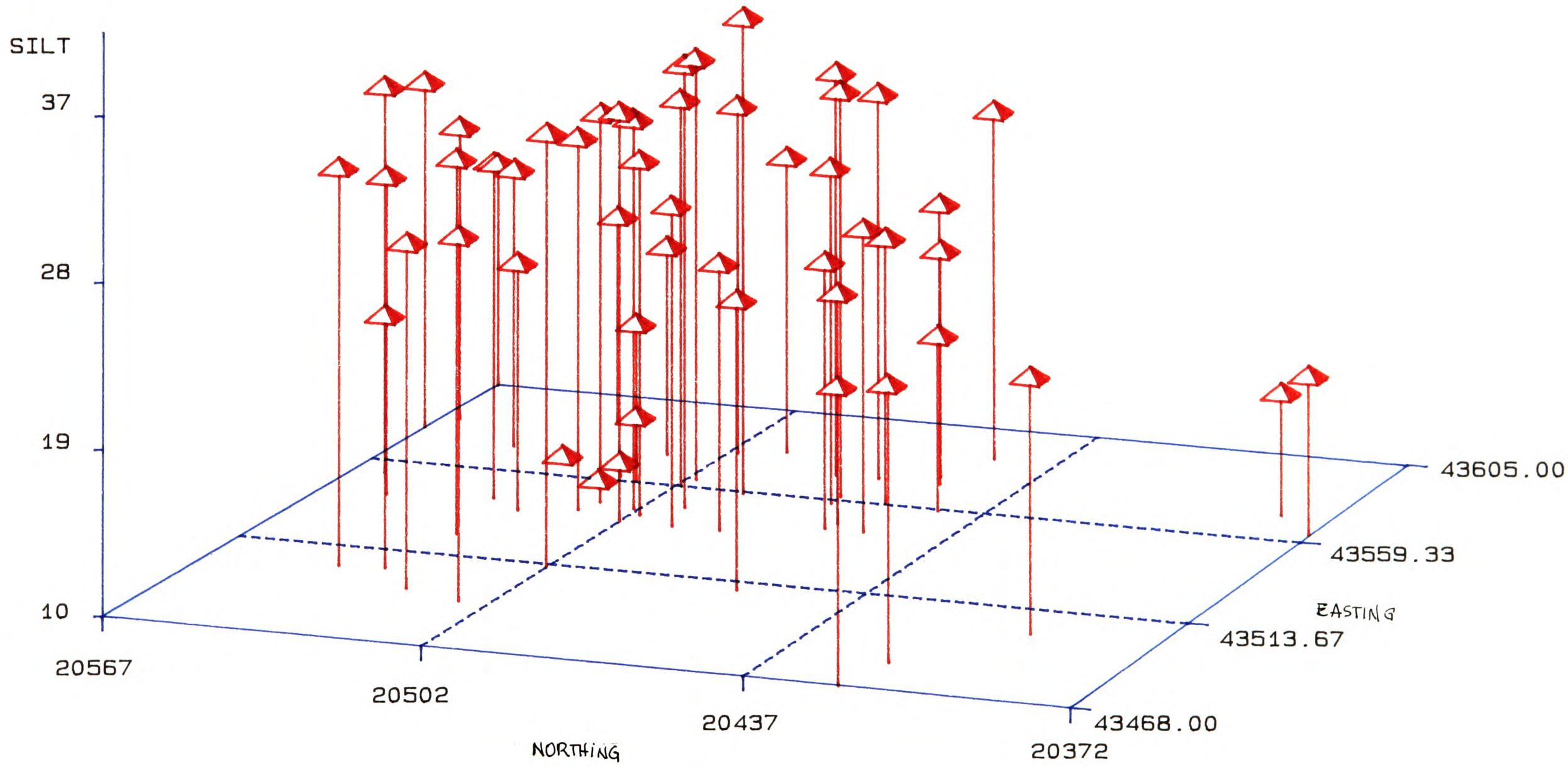
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SP30 SHEET, 1 Km GRID

SILT

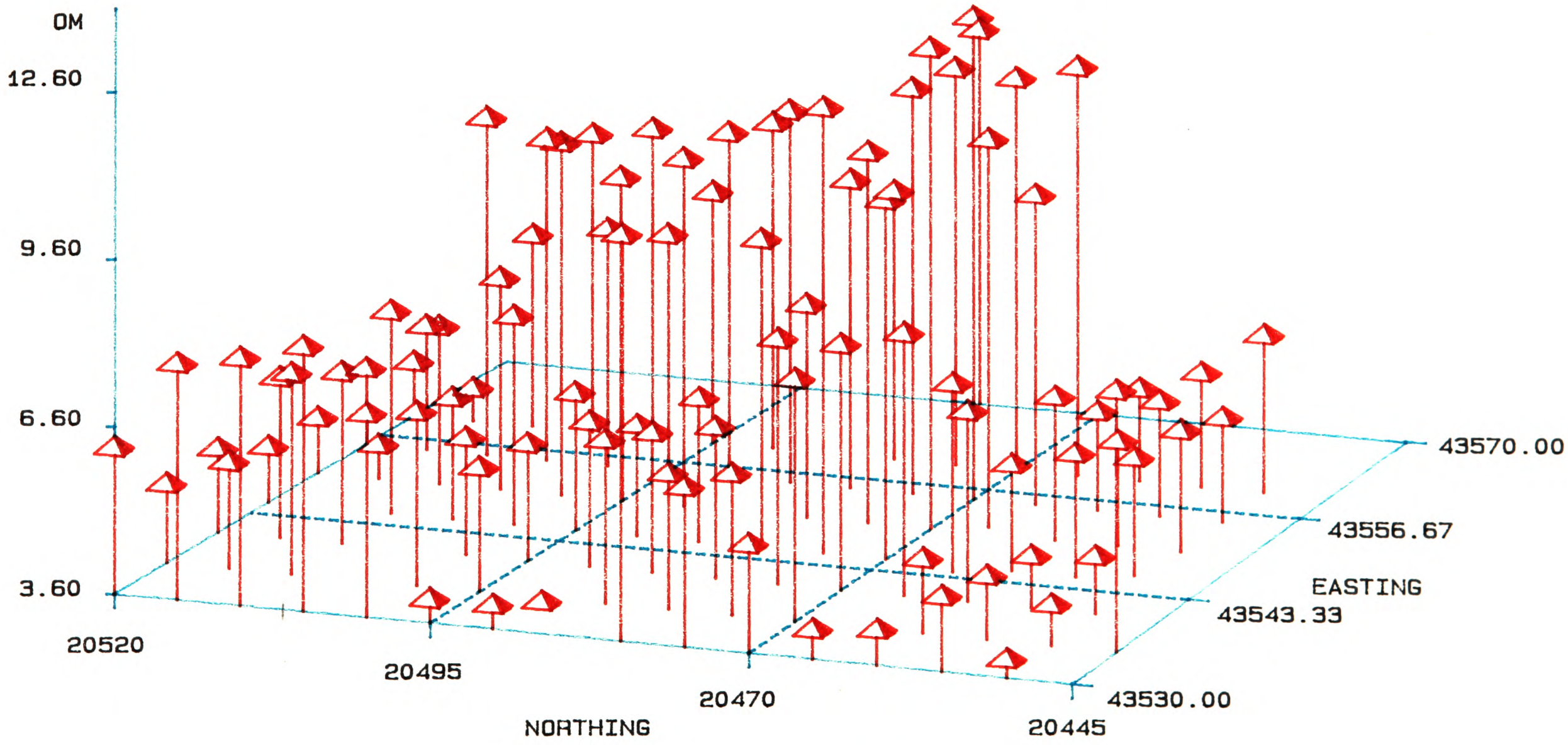
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CHECK POINTS

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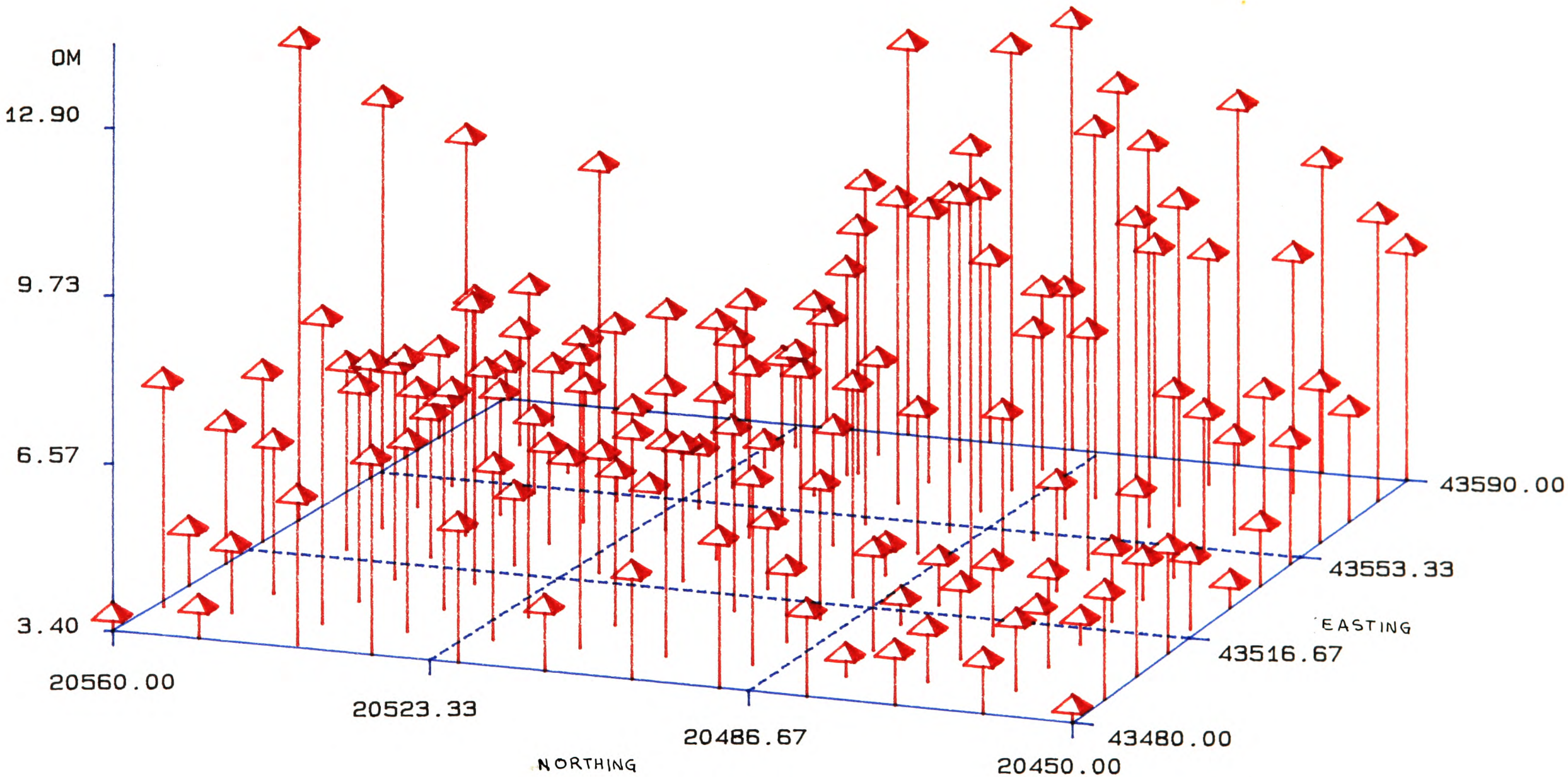
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50 m GRID, YELFORD

ORGANIC MATTER

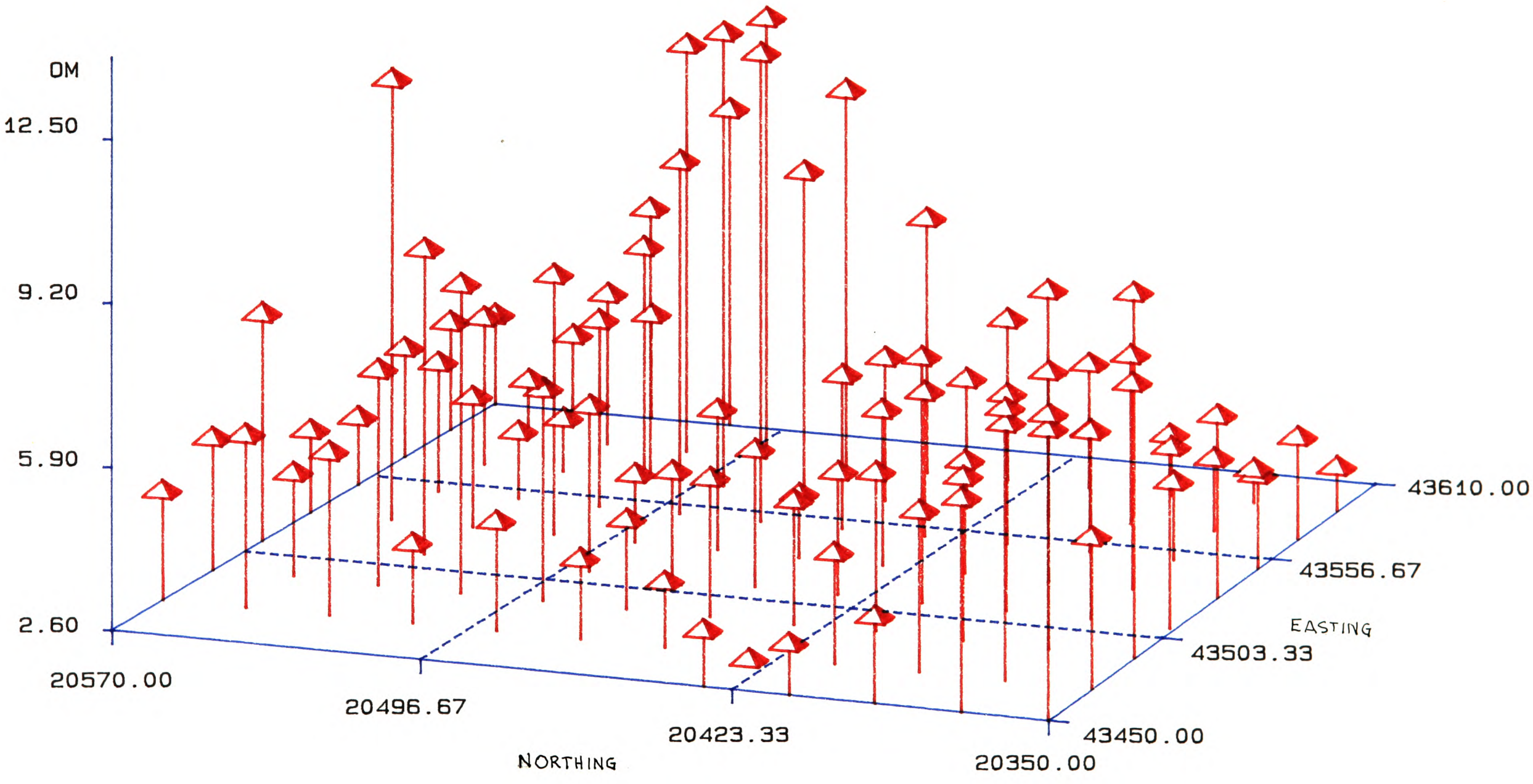
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YELFORD, 100 m GRID

ORGANIC MATTER

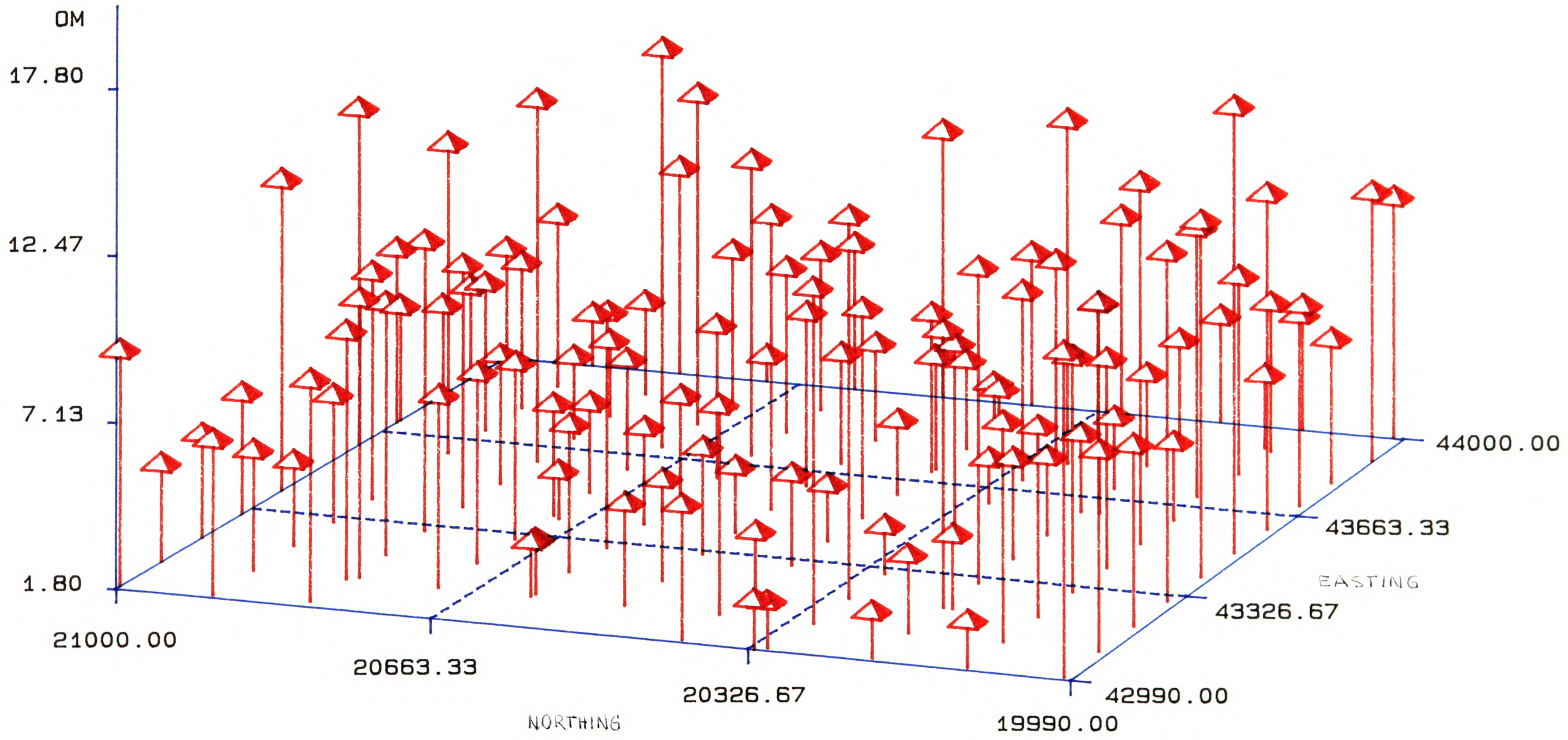
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YELFORD, 200 m GRID

ORGANIC MATTER

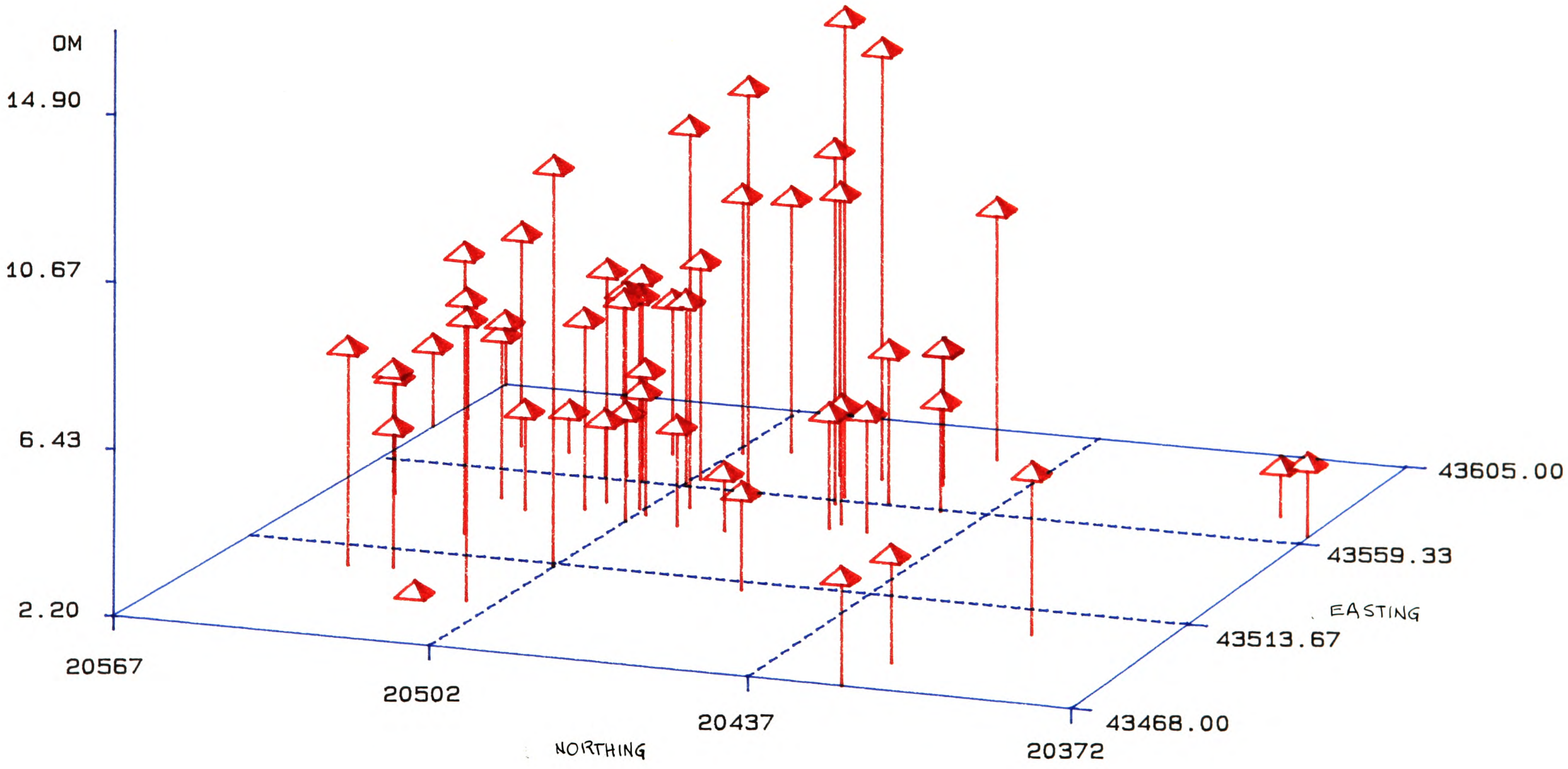
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SP30 SHEET, 1 Km GRID

ORGANIC MATTER

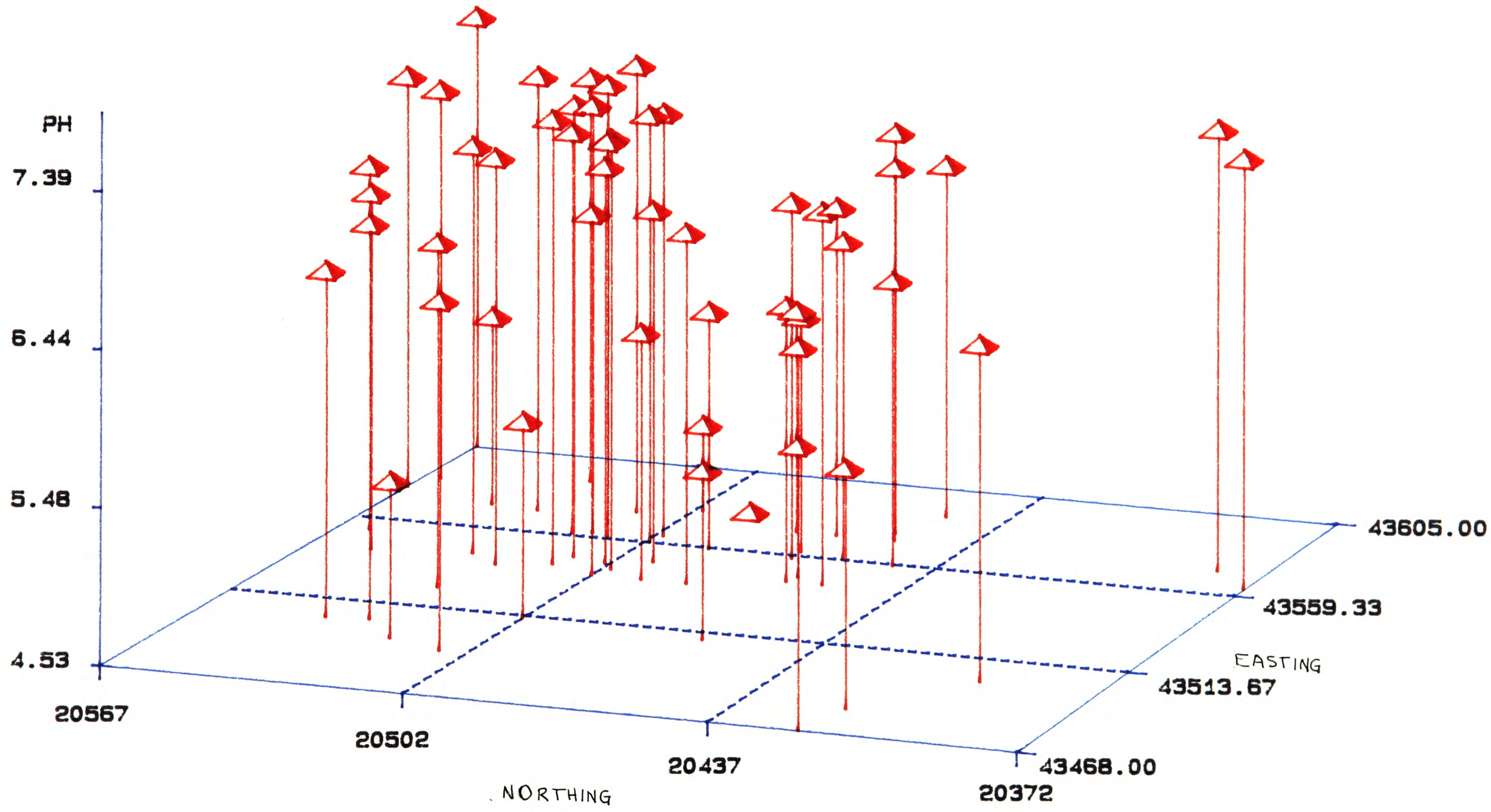
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CHECK POINTS

pH

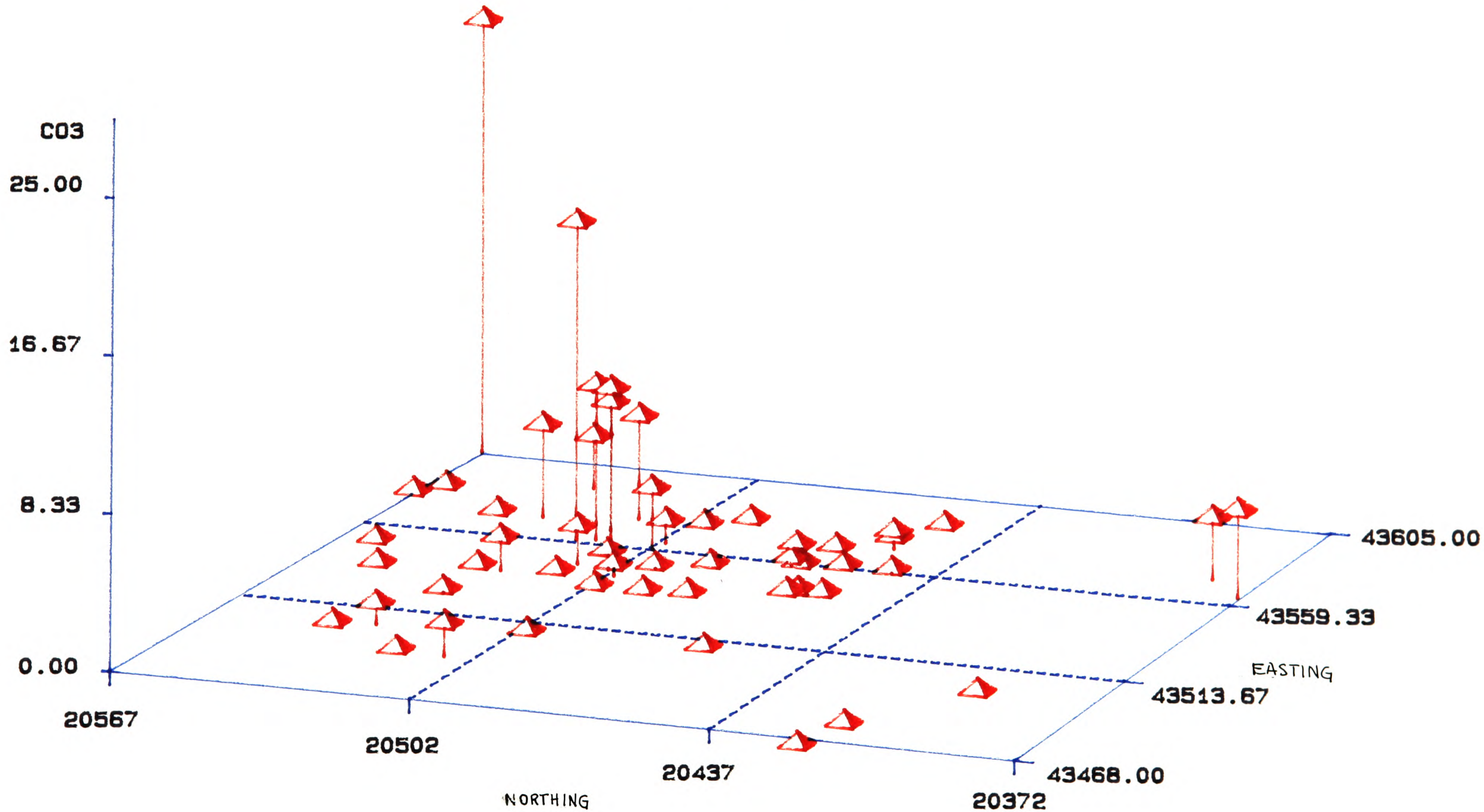
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CHECK POINTS

CARBONATE

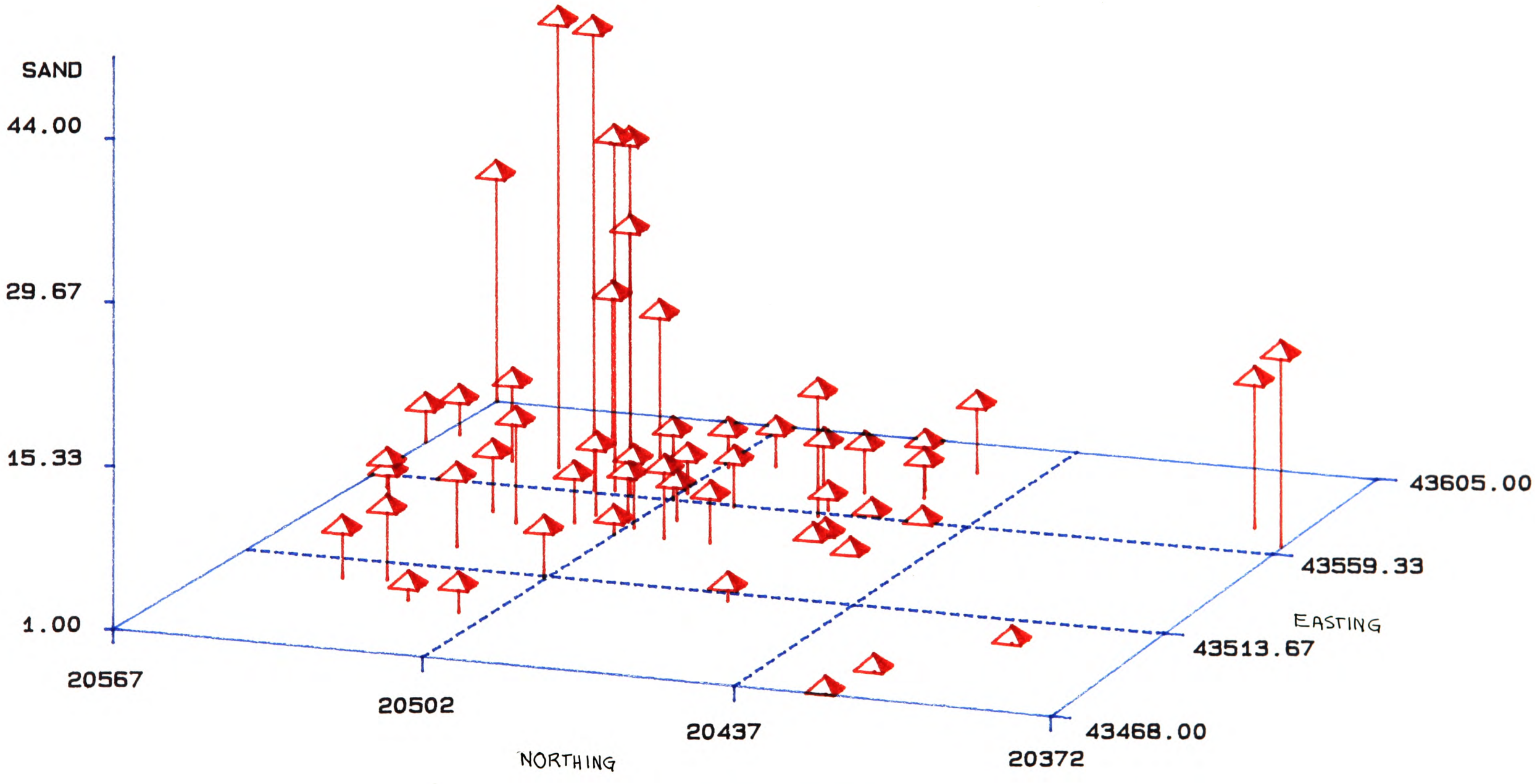
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CHECK POINTS

COARSE SAND

0–15cm.



CHECK POINTS

APPENDIX 5.1

Fully comprehensive list of soil properties and other variables on which OXSIS holds data.

ALTITUDE
ANALYST
APPROACH
CATION_EXCHANGE_CAPACITY
CLARITY_OF_BOUNDARY
COATS
COLOUR,_MATRIX
COLOUR,_MOTTLES
COLOUR,_PED_SURFACE
COLOUR,_ROOT_CHANNEL
CONDUCTIVITY,_ELECTRICAL
CONSISTENCE
CUTANS
DEPTH
DISTINCTNESS_OF_BOUNDARY
FINE_EARTH
GRADIENT
GRID_REFERENCE
HEIGHT
HORIZON
LABEL_FEATURE
LAND_COVER
MANIFOLD
MATRIX_COLOUR
MOTTLES,_COLOUR
MOTTLES,_DISTINCTNESS
NO._OF_HORIZONS
PARTICLE_SIZE_CLASS
PED_FACE_COLOUR
PENETRABLE_DEPTH
POROSITY
PROFILE_DRAINAGE
PROFILE_NO
RECORDER
ROOTS
ROOTS_CHANNEL_COLOUR
SAMPLING
SAND
SAND,_COARSE_INTERN.
SAND,_COARSE_SSEW
SAND,_COARSE_USDA
SAND,_FINE_INTERN.
SAND,_FINE_SSEW
SAND,_FINE_USDA
SAND,_MEDIUM_SSEW
SAND,_MEDIUM_USDA
SAND,_USDA
SECONDARY_MINLS.
SILT_INTERN.
SILT_SSEW
SILT_USDA
SITE_DRAINAGE
SITE_NUMBER
SLOPE
SOIL_WATER_STATE
STONES
STRUCTURE
STRUCTURE,_DEGREE
SURFACE_BOULDERS
SYNONYM
TEXTURE_CLASS,_SSEW

TEXTURE_CLASS,_USDA
VARIANT
ALUMINIUM,_TOTAL A
ALUMINIUM,_TOTAL A01
ASPECT A
ASPECT A01
ASPECT A01-M01
BARIUM,_TOTAL A
BARIUM,_TOTAL A01
C.E.C. A
C.E.C. A01
CALCIUM,_EXCHANGE. A
CALCIUM,_EXCHANGE. A01
CALCIUM,_EXTRACT. A
CALCIUM,_EXTRACT. A01
CALCIUM,_TOTAL A
CALCIUM,_TOTAL A01
CARBONATE A
CARBONATE A01
CARBONATE A01-M01
CARBONATE A02
CARBONATE A03
CARBONATE A04
CARBONATE,_SECONDARY,_ABUND. A
CARBONATE,_SECONDARY,_ABUND. A01
CARBONATE,_SECONDARY,_ABUND. A01-M01
CEMENTATION A
CEMENTATION A01
CEMENTATION A01-M01
CHROMIUM,_TOTAL A
CHROMIUM,_TOTAL A01

CLAY *
CLAY *01
CLAY *02
COBALT,_EXTRACT. A
COBALT,_EXTRACT. A01
COBALT,_TOTAL A
COBALT,_TOTAL A01
COLOUR,_MATRIX,_CHROMA A
COLOUR,_MATRIX,_CHROMA A01
COLOUR,_MATRIX,_HUE A
COLOUR,_MATRIX,_HUE A01
COLOUR,_MATRIX,_HUE A01-M01
COLOUR,_MATRIX,_VALUE A
COLOUR,_MATRIX,_VALUE A01
COLOUR,_PED_SURFACE,_CHROMA A
COLOUR,_PED_SURFACE,_CHROMA A01
COLOUR,_PED_SURFACE,_HUE A
COLOUR,_PED_SURFACE,_HUE A01
COLOUR,_PED_SURFACE,_HUE A01-M01
COLOUR,_PED_SURFACE,_VALUE A
COLOUR,_PED_SURFACE,_VALUE A01
COLOUR,_ROOT_CHANNEL,_CHROMA A
COLOUR,_ROOT_CHANNEL,_CHROMA A01
COLOUR,_ROOT_CHANNEL,_HUE A
COLOUR,_ROOT_CHANNEL,_HUE A01
COLOUR,_ROOT_CHANNEL,_HUE A01-M01
COLOUR,_ROOT_CHANNEL,_VALUE A
COLOUR,_ROOT_CHANNEL,_VALUE A01
CONSISTENCE A
CONSISTENCE B
CONSISTENCE C

COPPER,_EXTRACT. A
COPPER,_EXTRACT. A01
COPPER,_TOTAL A
COPPER,_TOTAL A01
CP001
CP002
CP003
CUTANS,_ABUNDANCE A
CUTANS,_ABUNDANCE A01
CUTANS,_ABUNDANCE A01-M01
CZ001
CZ002
CZ003
CZ004
DATE
DRAINAGE,_PROFILE A
DRAINAGE,_PROFILE A01
DRAINAGE,_PROFILE A01-M01
DRAINAGE,_PROFILE A01-M02
DRAINAGE,_SITE A
DRAINAGE,_SITE A01
DRAINAGE,_SITE A01-M01
E.C. A
E.C. A01
EASTING
ELEVATION
EXCHANGEABLE_CATIONS A
FRIABILITY A
FRIABILITY A01
FRIABILITY A01-M01
GALLIUM,_TOTAL A
GALLIUM,_TOTAL A01
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GYPSUM_SEGRE.,_ABUND. A01
GYPSUM_SEGRE.,_ABUND. A01-M01
HORIZON_BDY.,_CLARITY *
HORIZON_BDY.,_CLARITY *01
HORIZON_BDY.,_CLARITY *01-M01
HORIZON_BDY.,_FORM *
HORIZON_BDY.,_FORM *01
HORIZON_BDY.,_FORM *01-M01
HORIZON_DEPTH,_LOWER *
HORIZON_DEPTH,_LOWER *01
HORIZON_DEPTH,_UPPER *
HORIZON_DEPTH,_UPPER *01
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IRON,_EXTRACT. A01
IRON,_TOTAL A
IRON,_TOTAL A01
IRON/MANG._SEGRE.,_ABUND. A
IRON/MANG._SEGRE.,_ABUND. A01
IRON/MANG._SEGRE.,_ABUND. A01-M01
LAND_USE A
LAND_USE A01
LAND_USE A01-M01
LAYER
LAYER,_DEPTH,_LOWER *
LAYER,_DEPTH,_LOWER *01
LAYER,_DEPTH,_UPPER *
LAYER,_DEPTH,_UPPER *01
LEAD,_EXTRACT. A
LEAD,_EXTRACT. A01

ROOTS,_NATURE A01-M01
ROOTS,_SIZE A
ROOTS,_SIZE A01
ROOTS,_SIZE A01-M01

LEAD,_TOTAL A
LEAD,_TOTAL A01
LIME_REQUIREMENT A
LIME_REQUIREMENT A01
LITHIUM,_TOTAL A
LITHIUM,_TOTAL A01
LITHOLOGY,_PROFILE
MAGNESIUM,_EXCHANGE. A
MAGNESIUM,_EXCHANGE. A01
MAGNESIUM,_EXTRACT. A
MAGNESIUM,_EXTRACT. A01
MAGNESIUM,_EXTRACT. A02
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MAGNESIUM,_EXTRACT. A04
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MAGNESIUM,_TOTAL A01
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MANGANESE,_EXTRACT. A01
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MANGANESE,_TOTAL A01
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MOISTURE_STATE A01
MOISTURE_STATE A01-M01
MOTTLES,_ABUNDANCE A
MOTTLES,_ABUNDANCE A01
MOTTLES,_ABUNDANCE A01-M01
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MOTTLES,_COLOUR,_CHROMA A01
MOTTLES,_COLOUR,_HUE A
MOTTLES,_COLOUR,_HUE A01
MOTTLES,_COLOUR,_HUE A01-M01
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MOTTLES,_COLOUR,_VALUE A01
MOTTLES,_SHARPNESS A
MOTTLES,_SHARPNESS A01
MOTTLES,_SHARPNESS A01-M01
MOTTLES,_SIZE A
MOTTLES,_SIZE A01
MOTTLES,_SIZE A01-M01
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NITROGEN,_TOTAL A
NITROGEN,_TOTAL A01
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OBSERVER
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ORGANIC_MATTER,_ABUNDANCE A01-M01
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ORGANIC_MATTER,_ABUNDANCE A02
ORGANIC_MATTER,_ABUNDANCE A03
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PHOSPHORUS,_EXTRACT. A03
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PLASTICITY A01
PLASTICITY A01-M01
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PORES(FISSURES),_SIZE A01

PORES(FISSURES),_SIZE A01-M01
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PORES,_ABUNDANCE A01
PORES,_ABUNDANCE A01-M01
PORES,_ABUNDANCE B
PORES,_ABUNDANCE B01
PORES,_ABUNDANCE B01-M01
PORES,_SIZE A
PORES,_SIZE A01
PORES,_SIZE A01-M01
PORES,_SIZE A01-M02
POROSITY A
POROSITY B
POROSITY C
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POTASSIUM,_EXCHANGE. A01
POTASSIUM,_EXTRACT. A
POTASSIUM,_EXTRACT. A01
POTASSIUM,_EXTRACT. A02
POTASSIUM,_EXTRACT. A04
POTASSIUM,_TOTAL A
POTASSIUM,_TOTAL A01
POTASSIUM_INDEX A
PROFILE_STATE A
PROFILE_STATE A01
PROFILE_STATE A01-M01
REPLICATION
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ROOTS,_ABUNDANCE A01
ROOTS,_ABUNDANCE A01-M01
ROOTS,_NATURE A
ROOTS,_NATURE A01
ROOTS,_NATURE A01-M01
ROOTS,_SIZE A
ROOTS,_SIZE A01
ROOTS,_SIZE A01-M01

ROOTS,_FINE A01
ROOTS,_FINE A01-M01
SAND B
SAND B01
SAND,_COARSE A
SAND,_COARSE A02
SAND,_COARSE B
SAND,_COARSE C
SAND,_COARSE C02
SAND,_FINE A
SAND,_FINE A02
SAND,_FINE B
SAND,_FINE C
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SILICON,_TOTAL A01
SILT A
SILT A02
SILT B
SILT B01
SILT C
SITE_NO
SLOPE_FORM,_ACROSS A
SLOPE_FORM,_ACROSS A**
SLOPE_FORM,_ACROSS A**-M01

SLOPE_FORM,_DOWN A
SLOPE_FORM,_DOWN A**
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SLOPE_GRADIENT A
SLOPE_GRADIENT A01
SODIUM,_EXCHANGE. A
SODIUM,_EXCHANGE. A01
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SOIL_DEPTH A01
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STICKINESS A01
STICKINESS A01-M01
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STONES,_ABUNDANCE A01-M01
STONES,_ABUNDANCE A01-M02
STONES,_ABUNDANCE A01-M03
STONES,_ABUNDANCE A01-M04
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STONES,_SUBORD._SIZE A
STONES,_SUBORD._SIZE A01
STONES,_SUBORD._SIZE A01-M01
STRATIGRAPHY,_PROFILE
STRONTIUM,_TOTAL A
STRONTIUM,_TOTAL A01
STRUCTURE,_CULTIV._SOILS
STRUCTURE,_GRADE A
STRUCTURE,_GRADE A01
STRUCTURE,_GRADE A01-M01
STRUCTURE,_SECONDARY
STRUCTURE,_SECONDARY,_GRADE A
STRUCTURE,_SECONDARY,_GRADE A01
STRUCTURE,_SECONDARY,_GRADE A01-M01
STRUCTURE,_SECONDARY,_SHAPE A
STRUCTURE,_SECONDARY,_SHAPE A01
STRUCTURE,_SECONDARY,_SHAPE A01-M01
STRUCTURE,_SECONDARY,_SIZE A
STRUCTURE,_SECONDARY,_SIZE A01
STRUCTURE,_SECONDARY,_SIZE A01-M01
STRUCTURE,_SHAPE A
STRUCTURE,_SHAPE A01
STRUCTURE,_SHAPE A01-M01
STRUCTURE,_SIZE A
STRUCTURE,_SIZE A01
STRUCTURE,_SIZE A01-M01
SURFACE_BOULDERS,_LITH. A

SURFACE_BOULDERS,_LITH. A01
SURFACE_BOULDERS,_LITH. A01-M01
SURFACE_BOULDERS,_QUANT. A
SURFACE_BOULDERS,_QUANT. A01
SURFACE_BOULDERS,_QUANT. A01-M01
SURFACE_BOULDERS,_SIZE A
SURFACE_BOULDERS,_SIZE A01
SURFACE_BOULDERS,_SIZE A01-M01
SURFACE_MICRO-RELIEF
SURFACE_ROCK,_ABUNDANCE A
SURFACE_ROCK,_ABUNDANCE A01
SURFACE_SOIL,_CONDITION A
SURFACE_SOIL,_CONDITION A**
SURFACE_SOIL,_CONDITION A**-M01
SURFACE_SOIL,_FORM A
SURFACE_SOIL,_FORM A**
SURFACE_SOIL,_FORM A**-M01
TEXTURE_CLASS B
TEXTURE_CLASS B01
TEXTURE_CLASS B01-M01
TEXTURE_CLASS C
TEXTURE_CLASS C01
TEXTURE_CLASS C01-M01
TITANIUM,_TOTAL A
TITANIUM,_TOTAL A01
VANADIUM,_TOTAL A
VANADIUM,_TOTAL A01
VEGETATION A
VEGETATION A01
VEGETATION A01-M01
ZINC,_EXTRACT. A
ZINC,_EXTRACT. A01
pH A
pH A02
pH B
pH C
pH C01
pH D
pH D01

END OF LISTING OF FILE :SYSTEM.ICL9NSPOOLLIB(4,ICLS,1).ICL850607162311622G(1) FOR USER :

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APPENDIX 5.2

MEXLARIS: Mexican Land Resources Information System (An outline of design)

Appendix 5.2

MEXLARIS

Mexican Land Resources Information System.

(A proposal)

1. Justification.

In Mexico there is a continuously increasing demand for land resources and environmental information in various circles of specialized and non-specialized users. These comprise academic and research institutions as well as public and private sectors involving goverment planning and engineering bodies, consultant firms, producers associations, and more importantly, farmers. This information is of various kinds and sources and is required at various scales and levels of detail.

Much information about the several components of the land and the natural environment has alredy been collected and continues to be collected in the course of field surveys across the country.

Field surveys are expensive and, if possible, economies should be made by exploiting to the full the information already provided by past surveys. Mexico has already made a substantial investment in field soil, land and environmental surveys to gather information on the land and related resources for irrigation networks and other rural development projects. However, great part if not the totality of such information, once it has served the immediate goals of the project, remains idle, stored away in filing cabinets or in other printed forms in which it can not be exploited to the full.

Most of the land resources information available, however, is presented after having been through generalization processes and is in terms of mapping units or from values derived from classification or other forms of data generalization. Nevertheless, point-data exist in the memoirs or records of most field surveys and sampling schemes, and although their importance has been overlooked, such data are usable.

So, there is abundant information on land resources and the natural environment from records accumulated along the time in the form of point and map data, which are scattered throughout the country, and that ought to be put to use.

Printed information remains static and, to be useable, needs to be put in digital form to be made dynamic, and to take advantage of advanced computer technologies for information retrieval, data reapprisal, communication and broadcast.

Land-use planning and many other decisions involving land resources information could benefit from this. Computerized information retrieval of the land resources information available across the country could also have a great educational impact in academic and research institutions and with private individuals and land-users.

2. Aim.

The aim is to create a flexible and user-friendly computerized land resources information system for Mexico (MEXLARIS). Such system should provide the information needed for a range of users on the various attributes of the land, at various scales and with diferent levels of detail. At the core of the system and at the most detailed level, soil information in the form of point and map data should be provided for land evaluation, land-use planning and related activities.

Thus, MEXLARIS attempts to exploit the value of existent point-data but within a framework of land units.

MEXLARIS is to be developed by stages having as a final aim the development of a complete integrated information system for planning and decision support based on monitoring crop and other land-related activities.

3. Constraints.

i. The system has, by necessity, to be unexpensive.

ii. It has tobe suited to the technological and infrastructural level of the country.

iii. Above all, the system has to be flexible. It has to account for both the geopolitical and administrative organization of the country as well as for the great variety of formats in which data may have been collected reflecting regional and

local ideosyncracies and the broadest variability of environments, which range from the deserts of the north, to the tropical rain forests and jungle of the south east, and technologically, from the advanced intensive and highly mechanized agriculture in the irrigated areas to the subsistence rainfed agriculture and shifting cultivation. So, the system must be prepared to accept any data in any in any format, since any data is better than nothing.

iv. The system must be expandible.
It must be as flexible as to allow for growth in many directions incorporating technological advances in both hardware and software without considerable alteration in its functionality.

v. The system must be of national coverage.

4. Users of the system.

Primarily land-use planners, extention officers, academic and research institutions and individuals, road and civil engineers, farmers, and in general any user with some knowledge of the land attributes of his interest but not necessarily with a high degree of especialization.

5. Design.

MEXLARIS is designed as a collection of provincial or regional land resources information systems linked by an organizational structure, communications, and the sharing of data and procedures within a common operative policy.

A set of regional centres with headquarters in key provincial capitals within the country's regions, are linked to the main centre via telecommunication lines and administration. The main centre is strategically located.

Each regional centre has a set of periferal local information centres holding especific data of their locality and, uniformly, data on the region which is the domain of the regional centre they belong to.

In their turn each regional centre holds information on the the other regions in the country down to a certain level of detail. When the most detailed information (i.e. soil point-data) is required from a distant region, data is requested to the main

centre and from there it is transmited via the telephone line to the regional computer where data were requested.

Flexibility is then achieved through this hierarchical and organizational structure. Each regional centre is responsible for the local information centres and in matters of operational policy must obey the decisions from a board of managers based at the main centre, and in which they are represented.

5.1. Hardware.

The main centre has the computing facilities of a large computing centre as in some of the land-related government bodies or academic or research institutions. Ideally the main centre should have its own premises and computing facilities but if budget is too tight, any university computing centre or the computers of any of the federal government offices may serve as host, at least at the begining of operations.

Thus the system in the main centre is based on a main frame computer and a minicomputer with a good number of periferals, including a network of terminals, printers, map and graph plotters, digitizing workstation and storage media.

The regional centres are based on minicomputers. State university computing centres or any other provincial research institution or government office may host the regional centre too. The minicomputer, storage media, printers, plotters and network terminals are the minimum necessary hardware in the regional centres.

The local information centres are based on microcomputers and distributed in smaller towns or cities within the region. They could be host in Town Halls or in the institution of highest education in the locality, or in any local government office.

The feasibility of establishing a network of this sort depends on the reliability of telecommunications between the centres in the network. This is an important factor to consider for their location.

The microcomputer in the local information centre is supported by an attached printer and, where possible, by an unexpensive plotter. Floppy disks hold the data and procedures necessary to operate the system at the local information centre. A library of floppy disks comprising all the data in the area of the domain of

the regional centre constitutes the data-bank. The distribution of the MEXLARIS network is illustrated in figure Ap5.2.1.

5.2. Data structures.

The survey of Land Provinces and Land Regions of Mexico carried out by a team at the Colegio de Postgraduados, Chapingo, Mexico (Cuanalo, H.E., Ortiz-Solorio, C.A., Santos, A., and Ojeda, E., 1981, unpublished), provides with a suitable geographical framework in a hierarchical structure for data organization, storage and retrieval. The framework is also in agreement with the design of the network.

The survey aimed at definfing and characterizing the Land Provinces and Land Regions of the country. During the course of 5 years map, textual and punctual information on the main land attributes from a great variety of sources was compiled and used for the definition and mapping of land units. The mapping was aided by stereoscopic interpretation of LANDSAT images.

The Land Provinces and Land Regions were defined under the scheme of land units in table Ap5.2.1. with the intention of comleting the survey at greater scales, i.e. Land Systems and Land Facets.

Land Facets are the smallest land units for storage of soil point-data and map data. The framework and the data structures are illustrated in fig. Ap5.2.2.

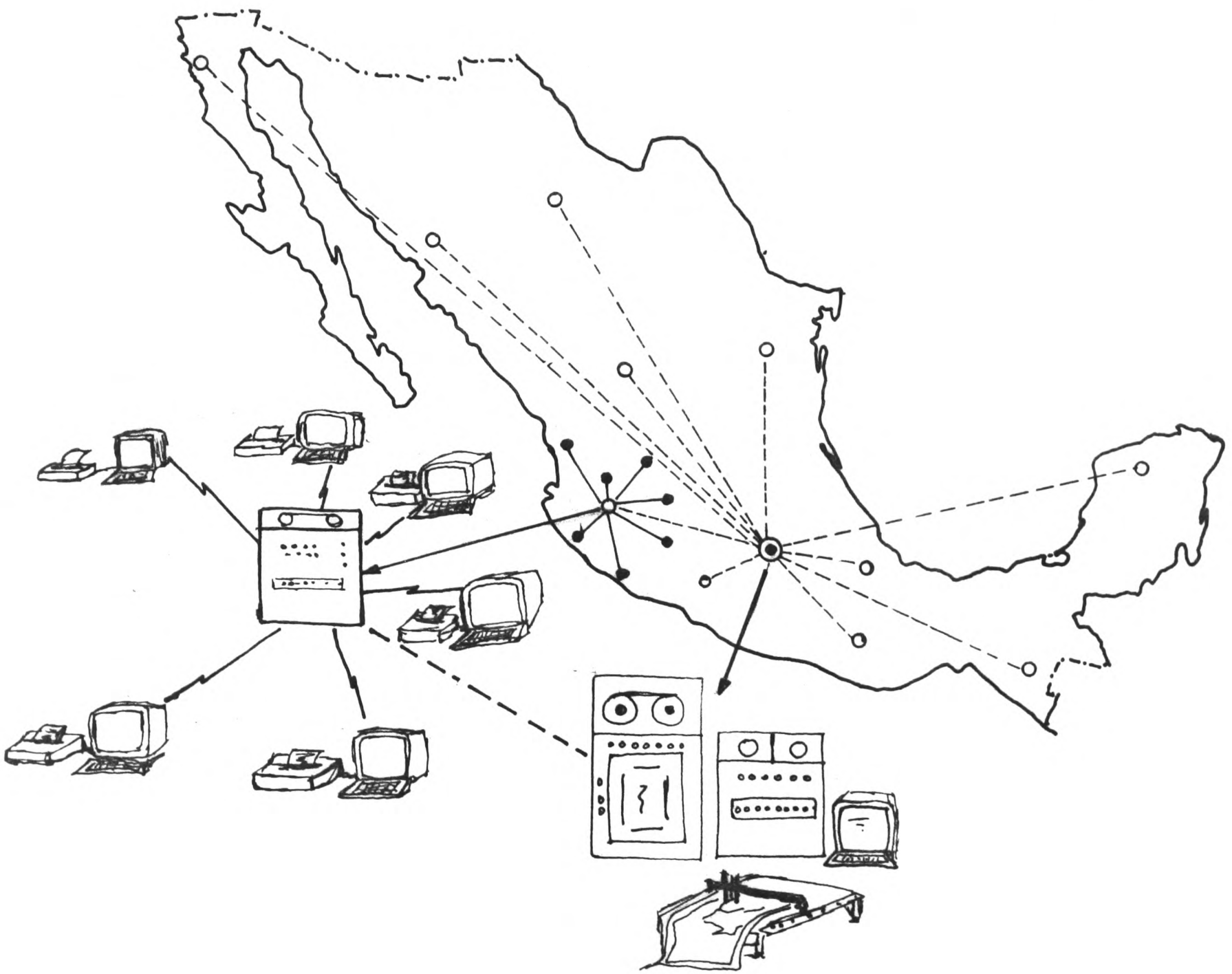
The resulting land units, when the hierarchic scheme of table Ap5. .1 is applied to Mexican conditions, is illustrated with an example in fig. Ap5.2.3 down to the level of Land Systems. The Land Province "Sudserranense" was chosen for this example. Its location on the map and the satellite view of the landscape are illustrated in figs. Ap5. .4 and Ap5.2.5.

The nature of the information provided by the Land Provinces and Land Regions survey is illustrated in the tables Ap5.2.2. and Ap5. .3 by 2 Subregions within Region G. The information listed in table Ap5.2.4 corresponds to Subregion Ga2.

To continue with the example of the framework, within Subregion Ga2 two Land Systems serve to illustrate the nature of the information at this level. Their location is given in fig. Ap5.2.6. The Land Facets in each of those Land Systems are mapped and their forms identified in the block diagrams of fig. Ap5.2.7.

Fig. Ap. 5.2.1 MEXLARIS

network



- NATIONAL CENTRE
- REGIONAL AND PROVINCIAL CENTRE
- LOCAL INFORMATION CENTRE (MICROCOMPUTERS)
- TELEPHONE LINE
- MAJOR TELECOMUNICATIONS LINE (ALSO DECISIONS AND ADMINISTRATIVE)

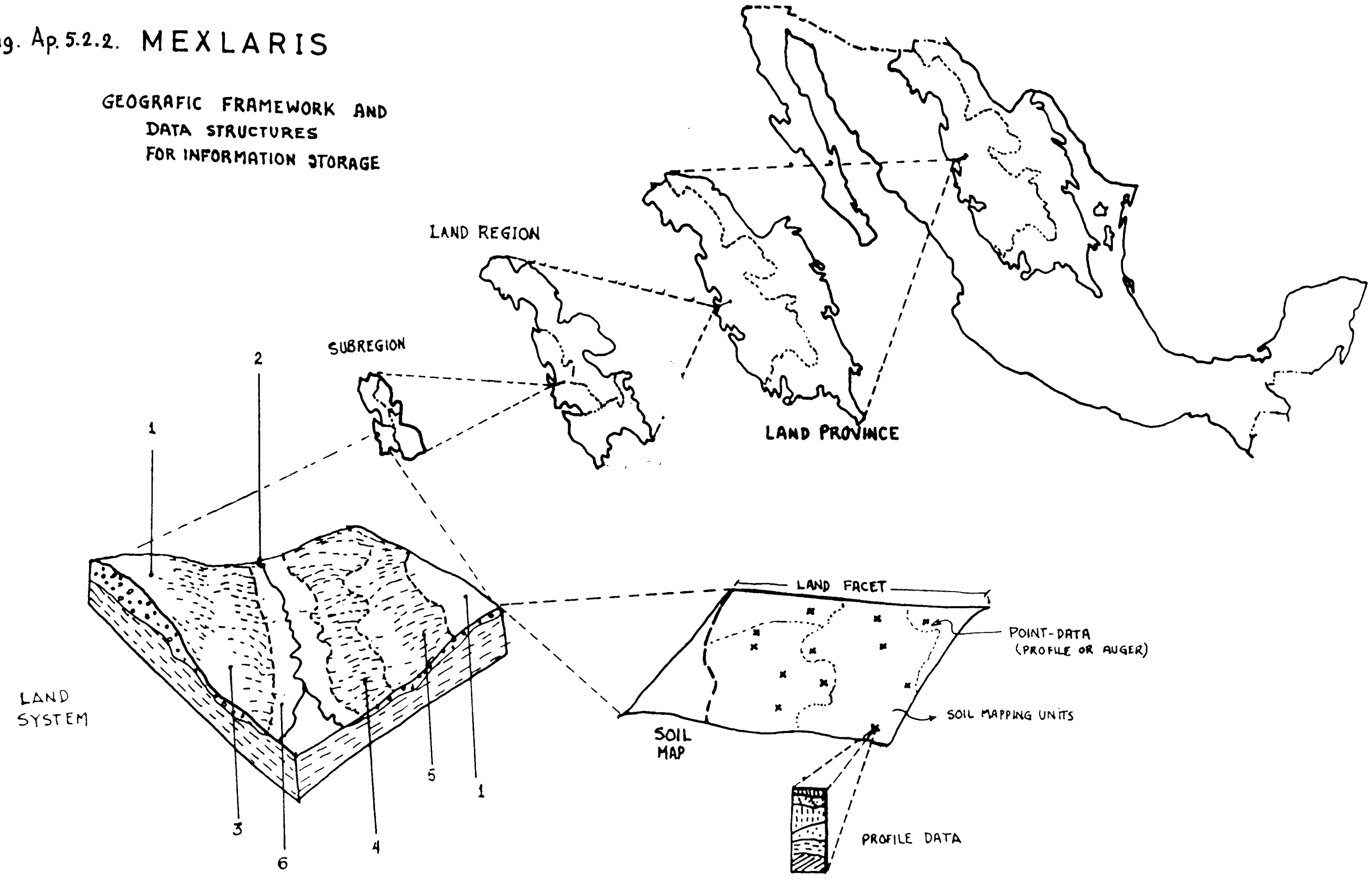
TABLE Ap. 5.2.1.

Summary definitions of terrain units

Name	*Definition*	*Map scale for display*
Land facet	A class of land sufficiently homogeneous that it can be managed uniformly. It may consist of one or more distinct parcels of terrain within a locality (a facet local form) or of all terrain with the definitive properties anywhere (an abstract facet)	1 : 10 000 to 1 : 80 000
Land system	A recurrent pattern of genetically linked land facets. Usually distinct and bounded in a locality as a local form. Abstract land systems consist of all occurrences of the same recurrent pattern.	1 : 250 000 to 1 : 1M
Land region	One or more land systems that are adjacent or in close proximity and are similar in lithology and surface form.	1 : 1M to 1 : 5M
Land province	One or more land regions, adjacent or in close proximity in the same large lithological association or second order structure.	1 : 5M to 1 : 15M
Land division	A single gross form, comprising one or more land provinces, expressing a continental structure within a single major climatic zone.	1 : 15M
Land zone	A major climatic zone consisting of one or more land divisions.	less than 1 : 15M

Fig. Ap. 5.2.2. MEXLARIS

GEOGRAFIC FRAMEWORK AND
DATA STRUCTURES
FOR INFORMATION STORAGE



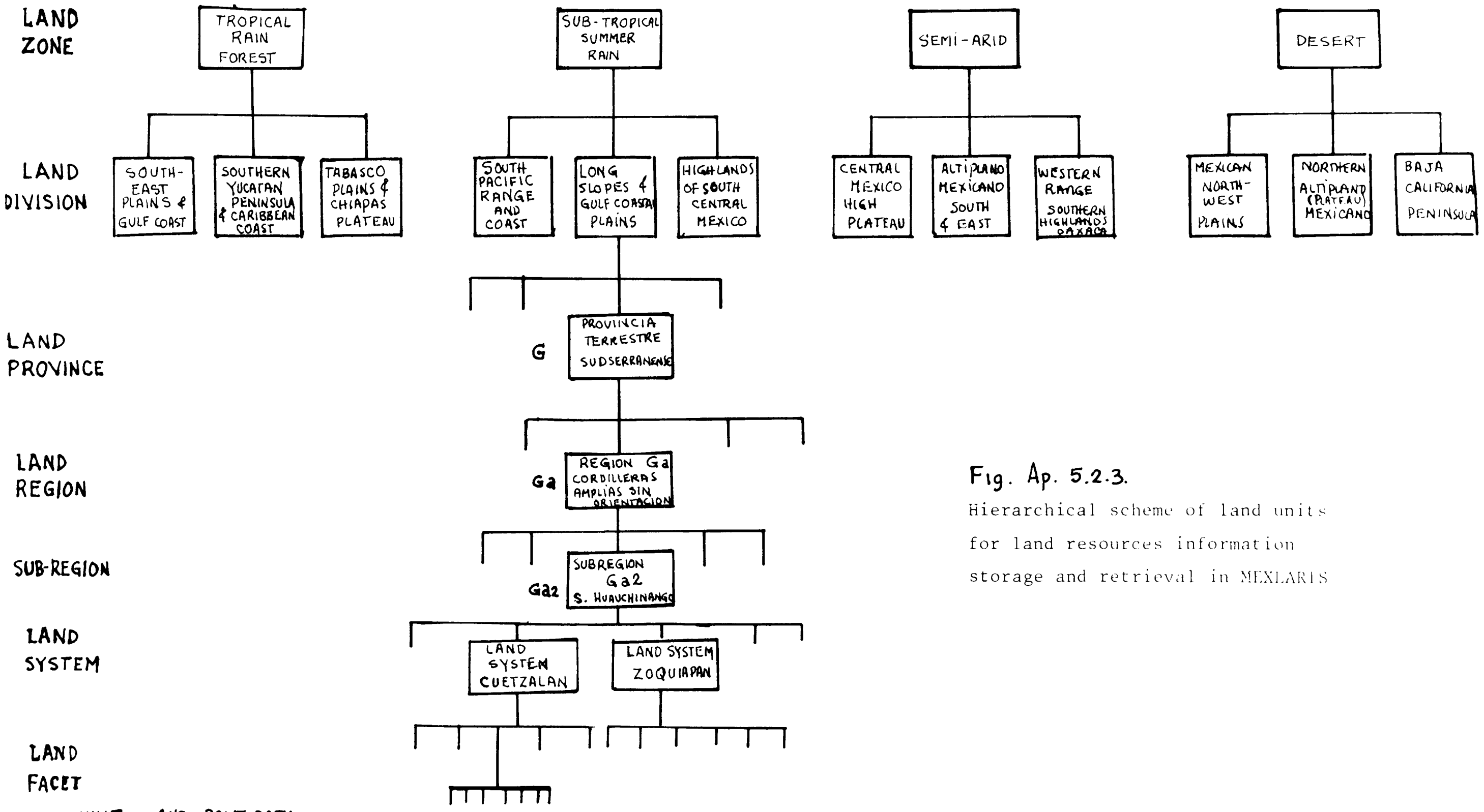


Fig. Ap. 5.2.3.

Hierarchical scheme of land units for land resources information storage and retrieval in MEXLARIS

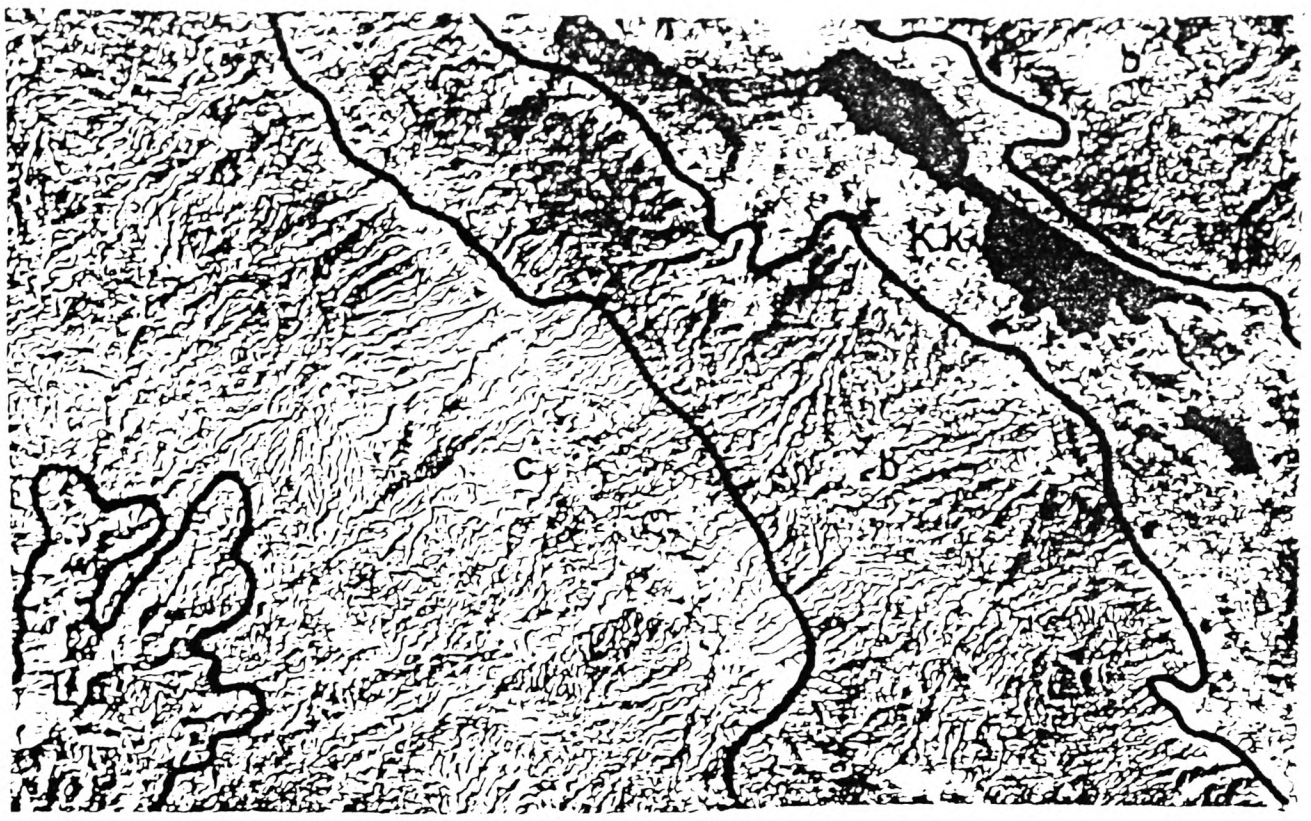
Fig. Ap. 5. 2.4.

G PROVINCIA TERRESTRE SUDSERRANENSE



ZONA COMPLEJA DE MATERIALES SEDIMENTARIOS, IGNEOS Y METAMORFICOS, FUERTEMENTE PLEGADOS.

Fig. Ap. 5.2.5



REGION



Vista parcial de las Cordilleras de la Región.

TABLE Ap.5.2.2.

REGION: Ga CORDILLERAS AMPLIAS SIN ORIENTACION.

Gal: Subregión Sierra Zongolica

FORMA: Montañas y cordilleras en bloques con crestas romas, algunas fuertemente y otras poco disectadas. Cañadas, valles estrechos y lomeríos

SUPERFICIE: 6 707 Km^2

ALTITUD: De 600 a 3 200 m s.n.m, Domina de 1 500 a 2 100 m s.n.m.

GEOLOGÍA: Eras: PALEOZOICA: Rocas del METAMORFICO; MESOZOICA: Epocas: TRIASICO-JURASICO, CRETACICO (superior, medio e inferior); CENOZOICA: Período TERCIARIO

ROCAS	TIPOS	DOMINANCIA (%)
SEDIMENTARIAS	Calizas, margas, rocas clásticas, areniscas	88
METAMORFICAS	Gneiss, esquistos, filitas, rocas verdes y mármoles.	12

HIDROLOGIA: Patrón de drenaje paralelo, subdendrítico y dendrítico. Densidad de drenaje de media a alta. Ríos Ixcuintepec, Algodón, La Trinidad, Sta. María, Cajones, Sn. Cristobal, Valle Nacional, Sto Domingo, Blanco.

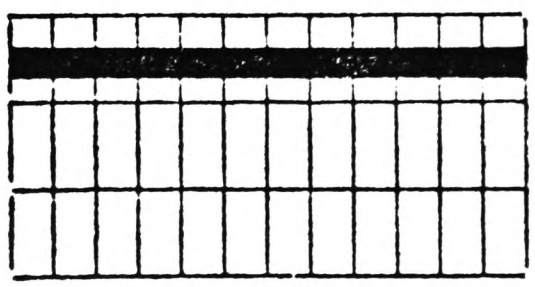
CLIMA:

TEMPERATURA (°C)	ANUAL	MES MAS CALIDO (1)	MES MAS FRIO (2)
Media	19.8 a 25.5	21.7 a 28.6	17.7 a 21.6
Promedio de Máxima	25.0 a 30.7	26.5 a 33.9	22.6 a 26.6
Promedio de Mínima	14.7 a 20.3	17.0 a 23.3	12.9 a 16.6

(1) Mayo o Junio (2) Enero

PRECIPITACION TOTAL:	2433.7 a 5106.3 mm
LLUVIA MAXIMA EN 24 HRS.:	234.1 a 294.2 mm

E F M A M J J A S O N D



PERIODO HUMEDO: 12 meses

MESES ECOSECOS: 0

DIAS CON HELADAS: 0

TABLE Ap 5.2.3. *Ga 2 : Subregión Sierra Huauchinango*

FORMA: Cordilleras y montañas amplias y estrechas, con crestas romas, cañadas y gran cantidad de lomeríos, fuertemente disectadas.

SUPERFICIE: 9 791 Km^2

ALTITUD: De 140 a 2 700 m s.n.m. Dominan de 900 a 1 100 m s.n.m.

GEOLOGIA: Eras: PRECAMBRICA: Rocas Metamórficas; PALEOZOICA: Rocas metamórficas; MESOZOICA: Epocas TRIASICO, JURASICO y CRETACICO (superior e inferior), rocas intrusivas; CENOZOICA: Período TERCIARIO: Epoca PALEOCENO, TERCIARIO (continental), y rocas del SUPERIOR VOLCANICO

ROCAS	TIPOS	DOMINANCIA (%)
IGNEAS	Rocas graníticas, lavas, brechas, tobas basaltos y andesitas	12
SEDIMENTARIAS	Lutitas, limonitas, calizas, areniscas, dolomitas y rocas clásticas	87
METAMORFICAS	Gneiss, esquistos, cuerpos graníticos, filitas, rocas verdes, cuarcitas	1

HIDROLOGIA: Patrón de drenaje paralelo, en algunas áreas no evidente. Corrientes permanentes. Afluentes de los Ríos Tecolutla, Cazones, Tuxpan, Pantepec, Vizcaino, San Marcos, Calabaza, Tempoal y algunas corrientes intermitentes.

CLIMA:

TEMPERATURA (°C)	ANUAL	MES MAS CALIDO (1)	MES MAS FRIO (2)
Media	12.7 a 20.4	16.4 a 23.8	9.3 a 15.6
Promedio de Máxima	20.7 a 25.3	24.7 a 29.3	16.7 a 20.1
Promedio de Mínima	4.8 a 15.6	7.2 a 18.4	2.0 a 11.1

(1) Mayo (2) Enero

PRECIPITACION TOTAL:	1577.1 a 4237.9 mm
LLUVIA MAXIMA EN 24 HRS.:	223.0 a 412.0 mm

PERIODO HUMEDO: Sin información

MESES ECOSECOS: 0

DIAS CON HELADAS: 0 a 27

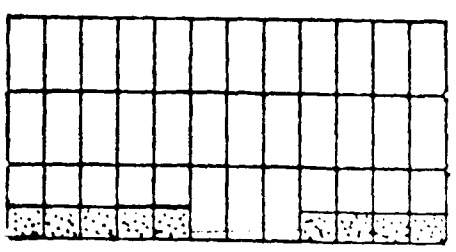
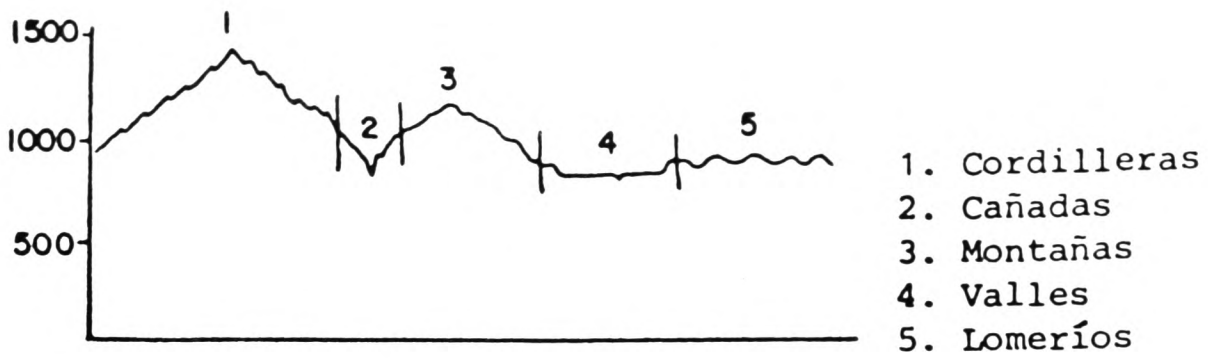


TABLE Ap. 5.2.4.

COMPONENTES:



SUELOS:

CARACTERISTICAS GENERALES:

Dominan suelos de texturas medias y profundos

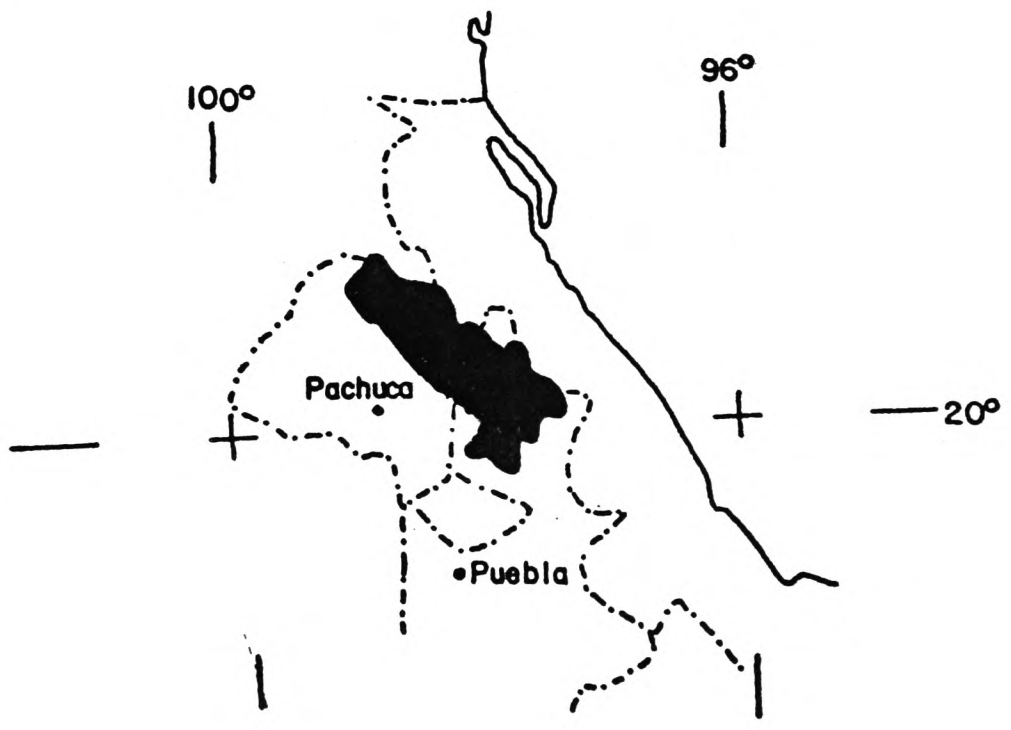
UNIDADES DEL SISTEMA FAO/UNESCO

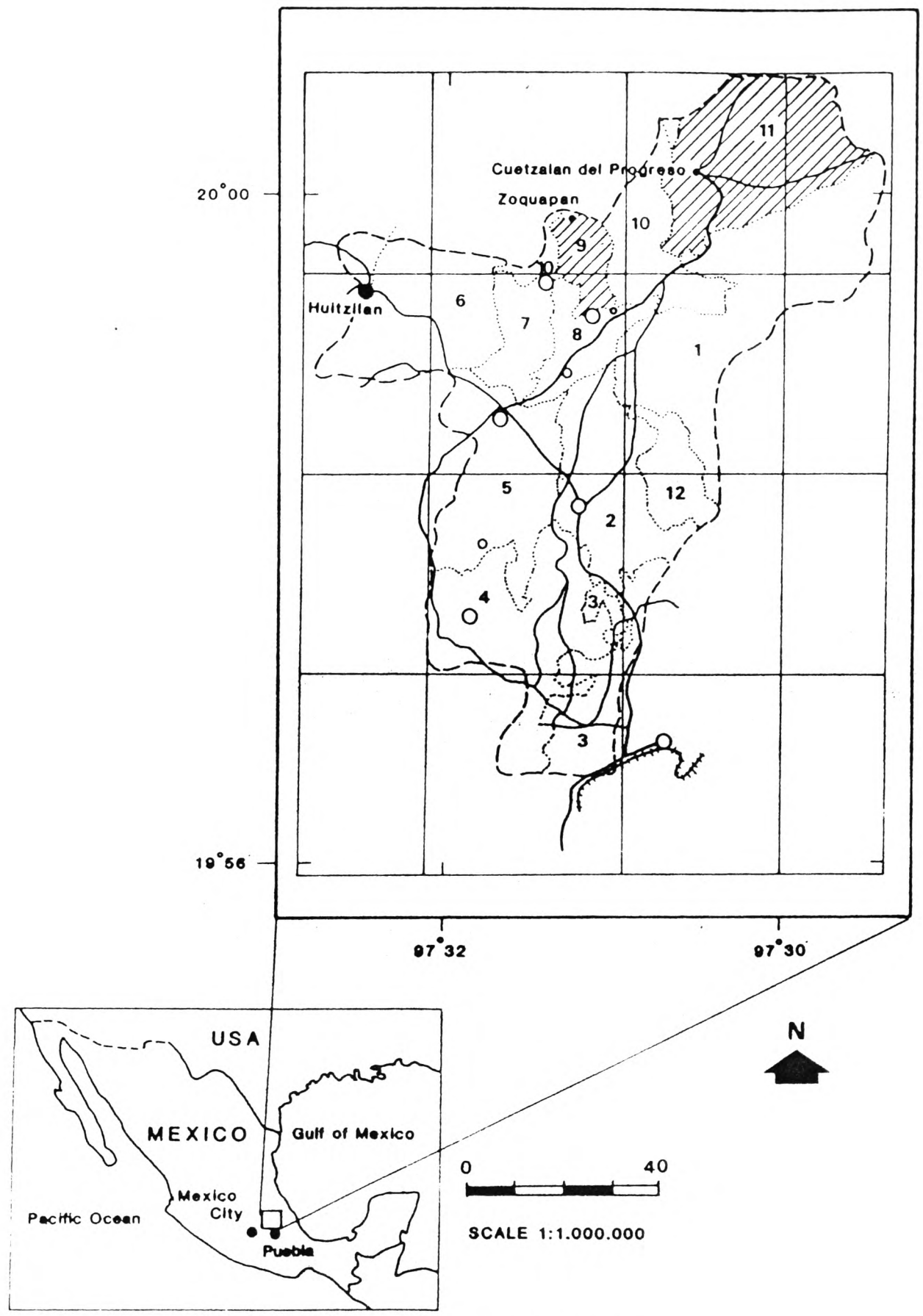
NOMBRE	EXTENSION (%)
Andosol vítrico	31
Litosol	18
Luvisol órtico	16
Andosol húmico	10
Andosol ócrico	6

VEGETACION:

TIPOS DE VEGETACION PRIMARIA	% DE LA SUPERFICIE
Selva mediana subperennifolia	37
Bosque caducifolio	32
Selva alta perennifolia	15
Bosque de pino encino	8
Matorral desértico rosetófilo	8

LOCALIZACION:

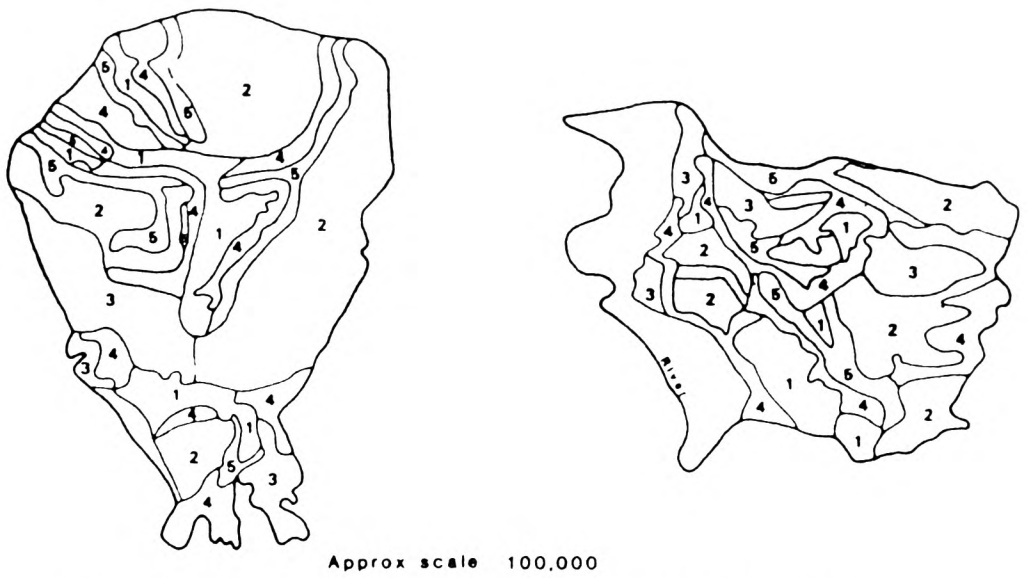




Location of the two Land System studied (dashed lines).

Fig. Ap. 5.2.6

Fig Ap 5.27



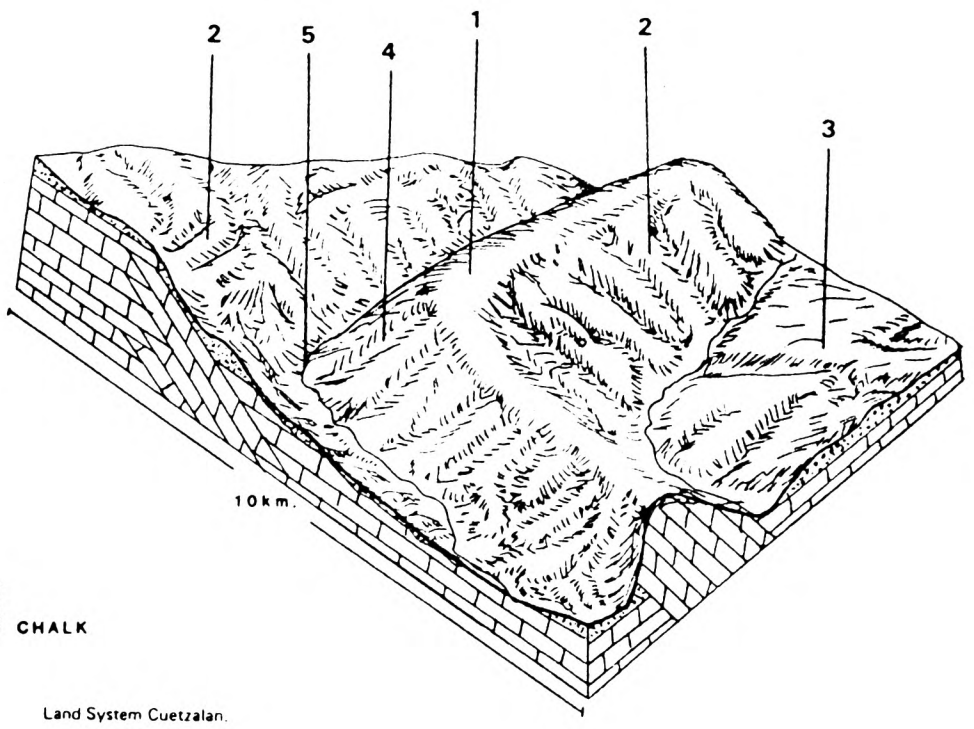
Approx scale 100,000

LAND SYSTEM CUETZALAN

LAND SYSTEM ZOQUIAPAN

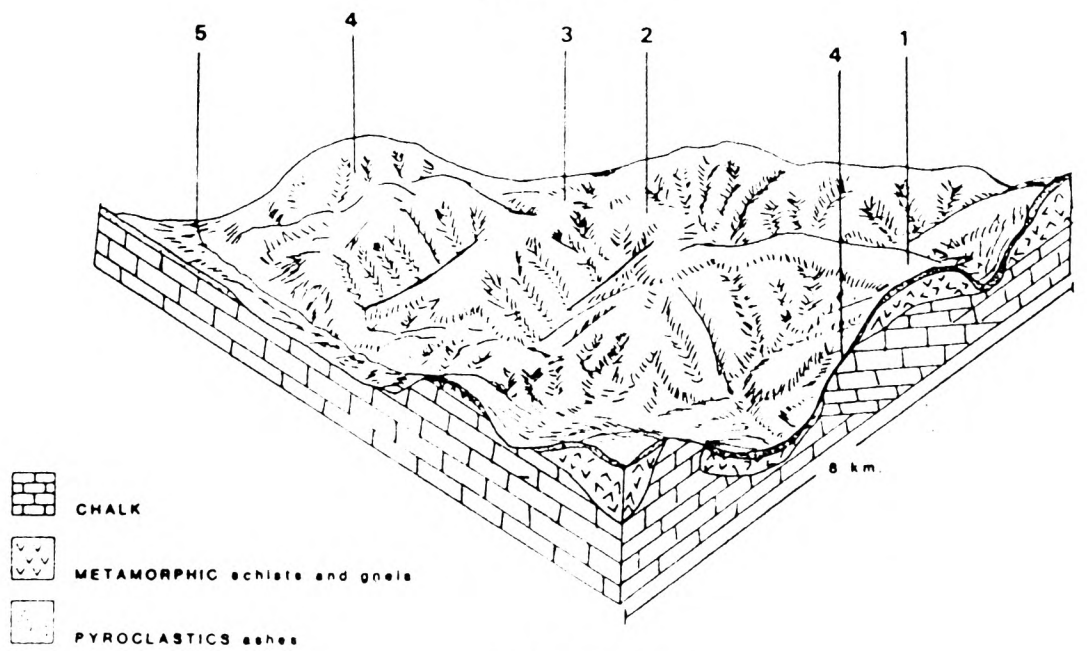
Land Facets mapped within the Land Systems

BLOCK DIAGRAM



Land System Cuetzalan.

BLOCK DIAGRAM



Land System Zoquiapan

The terms in which the Land System is described and its component Land Facets are described for each Land System in this example in tables Ap5.2.5 and Ap5.2.6.

6. Data Storage.

Given the structure of the data that MEXLARIS is to hold, three levels of information can be visualized, i.e. national, regional and local.

The totality of the data in MEXLARIS is to be stored in magnetic tapes in the main centre. Information from these tapes can be dump onto the diferent disc inits of the mainframe or minicomputer. A set of tapes will hold the information for each Land Province. The data base model and configuration has not been decided upon yet.

Similarly, each regional centre must hold at least the data of its Land Province as well as the toatality of the information of minor land units within its Land Region and the soil point-data and map information. This infromation is hold in tapes also and dumped in the memory of the minicomputer at the regional centre when required.

At the local information centres floppy discs contain information of national level, i.e. Land Provinces, but the core of the data they hold in floppy discs is on the minor land units, i.e. Land Systems and Land Facets within the Region and Subregion. A different set of floppy discs or, when possible, hard discs contain the soil point-data. Preferably all the soil point-data within one Land System is held in one single storage unit. So, a collection of these units make up the soil data bank at the local information centre.

Stored in this way, the information can be retrieved first by manual selection by choosing the appropriate storage unit, and then by using some retrieval algorithms once the right disc has been mounted on the machine. Information not available at any centre can always be transmited from a the next hierarchically higher centre via the telecommunications line. Storage in MEXLARIS is illustrated at the regional centre in fig. Ap5.2.8.

Table 5.2.5

Information on the physical attributes of Land Facets from: LAND SYSTEM ZOQUIAPAN.

Climate	Rainfall 1,600-2,000 mm; Annual Mean Temp. 15-27 C Rainy season in the summer but winter rainfall 5-10.2% of the total.
Rock	Early and Middle Cretacic calcareous rock (chalk), some places show incipient local metamorphism (schists and gneiss). In some localized places, later depositions of pyroclastics and ignimbrites over weathered chalk
Landscape	Plaits of chalk highly fractured and faulted, fault-plains and small basins filled with pyroclastics, long descending fault scarps following the general slope towards lowlands and distant coastal plain.
Soil	Moderately deep (around 1 m) but in some places shallow, loams and silty or clay loams, dark or light brown hues.
Vegetation	Low sub-perennifolious and perennifolious forests, sparse, orchards, grasslands and croplands.
Altitude	800-1,400 m.

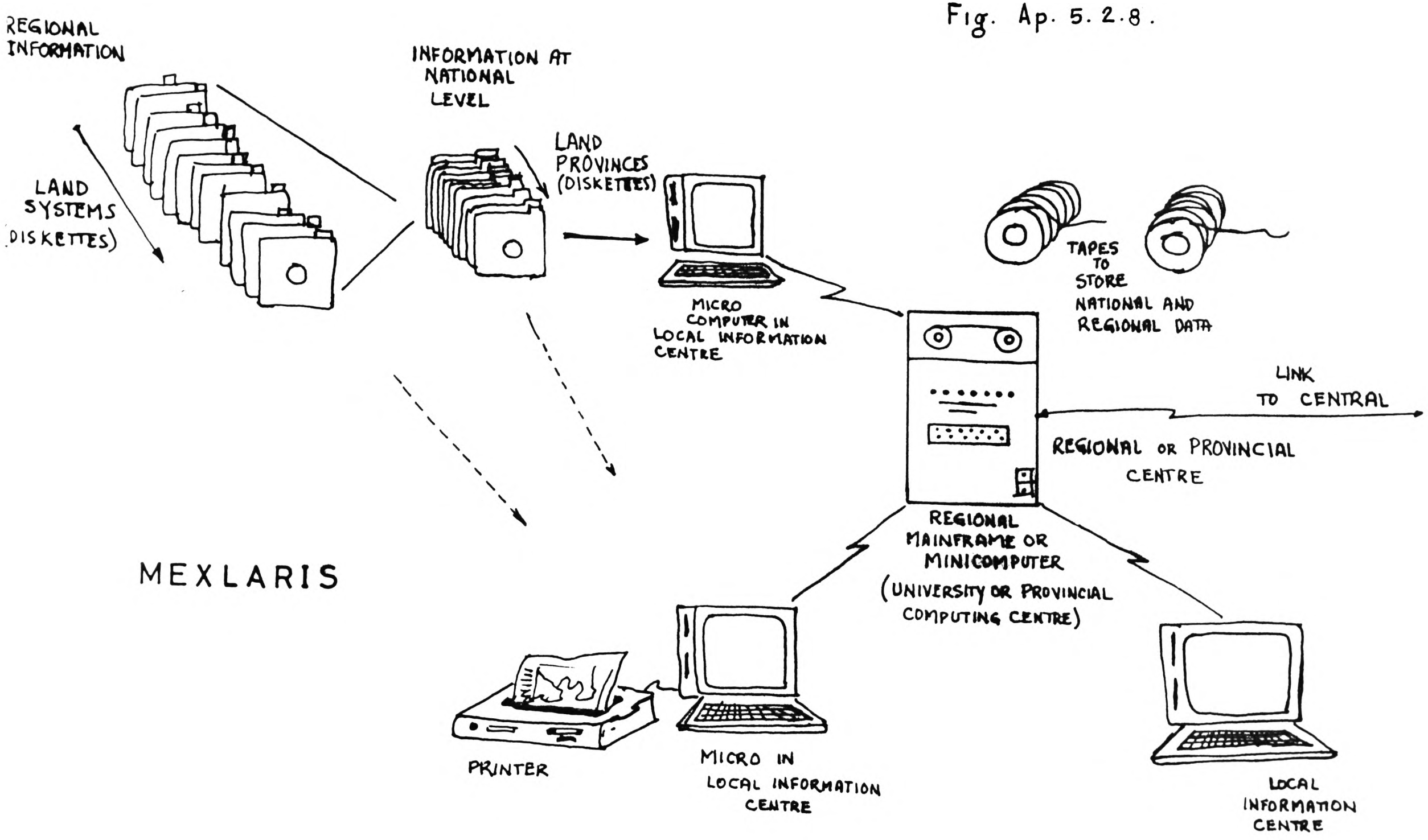
Land Facet	Form	Soils, Materials and Hydrology	Land Cover
1	Crests of faulted blocks and plaits, hill-tops, with convex margins towards scarps and slopes.	Predominantly silts and loams, not very deep (0-40 cm), highly stony (small stones) and high to moderate organic matter content, dark grey to dark brown. Donating sites.	Largely forest, some coffee plantations and orchards.
2	Long scarps and extended moderate slopes.	Loams and clay loams, deep (> 1 m) dark and light brown, few stones, good organic matter content. Highly moisture retentive, but well drained. Intermediate sites.	Largely cultivated (Zea mays and Phaseolus vulgaris). Some grasslands and orchards and coffee plantations.
3	Foot plains, small hills of smooth slope, lightly undulated lands.	Deep (> 1.20 m) loams and clay loams and silt loams with good organic matter content, few stones, over mixtures of chalk and metamorphics or chalk and pyroclastics. Well drained, good moisture retention capacity. Receiver sites.	Cultivated (Zea mays and Phaseolus vulgaris) and some grasslands.
4	Steep slopes and fault-planes, steep scarps of faulted blocks.	Shallow (> 40 cm) clay and clay loams very stony (small stones) chiefly over chalk and occasionally over schists. Dark brown, well drained. Donating sites.	Cultivated (Zea mays and Phaseolus vulgaris) in proportion to grasslands and few forests.
5	Flood plains aside run-offs and small streams, basins and alluvial sediments.	Very deep (> 1.50 m) clays and clay loams alternating with silty loams and sandy loams. Alluvial deposits, dark grey or dark brown. Eminently receiver sites, occasional water logging.	Largely cultivated (Zea mays and Phaseolus vulgaris) some woodlands and grasslands.

Table 5.2.6. Information on the physical attributes of Land Facets from: LAND SYSTEM CUETZALAN.

Climate	Rainfall 1,800-2,500 mm; Annual Mean Temp. 18-27°C.
Rock	Early and Middle Cretacic calcareous rock (chalk), moderately weathered and fractured.
Landscape	Rock highly plaited and fractured, faults slides and fault-plains, descending scarps towards the long distant coastal plain.
Soil	Mainly deep (> 1 m) dark brown and reddish-brown clays, thinner on steep slopes and hill-tops, good organic matter content, moderately stony in places.
Vegetation	Low sub-perennifolious forest, sparse, grasslands, orchards and croplands.
Altitude	650-1,200 m.

Land Facet	Form	Soil, Materials and Hydrology	Land Cover
1	Crests of faulted blocks and plaits, with convex margins deepening to steep or moderate slopes.	Shallow (0-40 cm) clay and silty clays, stony (small stones) high in organic matter, dark brown and reddish-brown soils over highly fragmented chalk moderately weathered. Donating site, well drained.	Largely coffee, orchards, and some cultivated (Zea mays), (Phaseolus vulgaris).
2	Long anticlinal scarps of extended and moderate slope.	Deep (> 1.50m) lightly stony, silty clays and silty soils, rich in organic matter, brown and light brown, over chalk rock, well drained but with good moisture retention capacity. Intermediate sites.	Mainly grasslands alternating with cultivated Zea mays and beans (Phaseolus vulgaris). Few coffee orchards, and sparse sugar cane plantations.
3	Very small hills and light plaits, plains and lightly undulated lands.	Very deep (> 2.00 m), loams and clay loams, rich in organic matter, dark brown and brown soils over thin and localized alluvial deposits but largely over chalk rock. Well drained but high moisture retention capacity, normal and receiver sites.	Largely cultivated (Zea mays) and beans (Phaseolus vulgaris) and grasslands, few sugar cane plantations and coffee orchards.
4	Steep slopes and scarps of slides, faults and fractures.	Shallow (40-50 cm) fine textures, predominantly clay, highly stony, occasional chalk outcrops. High in organic matter, brown and reddish-brown soils, very well drained but not excessively. Donating Sites.	Mainly coffee orchards alternated with cultivated plots (Zea mays and Phaseolus vulgaris).
5	Flooding plains and stream flow basins in low small valleys parallel along	Very deep (> 2.00 m) mixed fine and rough textures. Silty clay loams and sandy clay loams, very stony in some places. Abundant organic matter and alluvions. Dark gray and brown alluvial soils. High flooding risk, excess of moisture and some water-logging particularly during rainy season. Receiver sites.	Almost all cultivated (Zea mays and Phaseolus vulgaris). Some sugar cane plots.

Fig. Ap. 5.2.8.



MEXLARIS

7. Information Retrieval.

MEXLARIS can provide information at three levels, i.e. national,regional and local at any of its centres.

When the user knows the exact location of the area of interest and the type of information he wants, the first step is manual selection of the appropriate storage unit. When the user knows nothing about the system or only has partial information about the location of the data he whishes to retrieve, MEXLARIS guides him through a series of meus and questionaires so that he can ascertain the codes of the hierarchy of land units necessary for entry to a more detailed level of information. the process can be stoped at any time and the information retrieved at that stage if that is what is wanted. The end of the set of menus and questionaires is the ascertaining the code of the Land System that holds the information on the Land Facet(s) wanted or the sets of soil point-data of interest. This is illustrated in fig. Ap5.2.7.

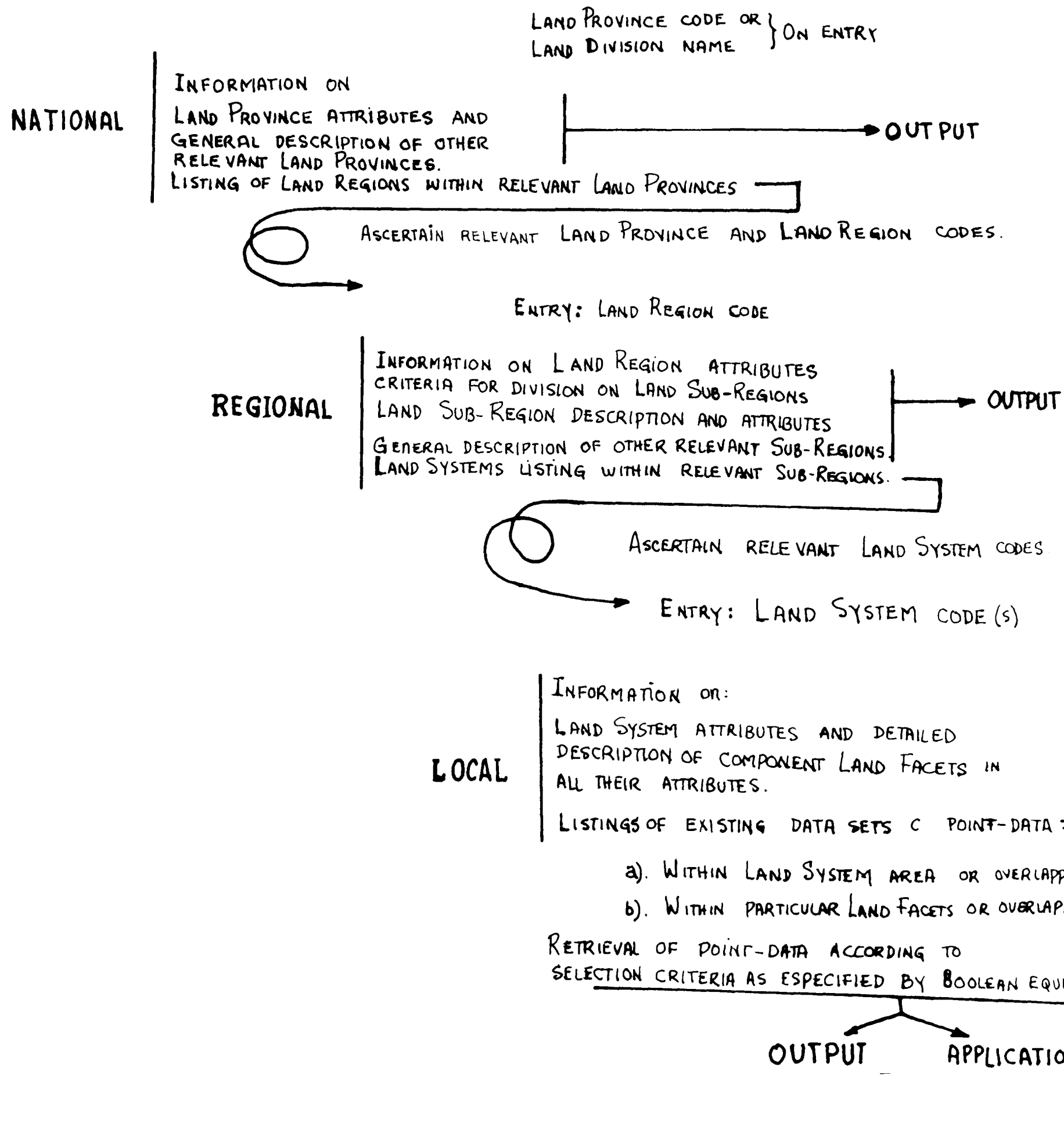
The result of the retrieval operation depends on the level in the hierarchical data structures at which it was decided to retrieve the information. For instance if it was at the level of Subregion, the information retrieved would be a printout and a plot similar to those shown in tables Ap5.2.3 and Ap5.2.4. If the retrieved information is at the level of Land System and Land Facet, then the output will be similar to that shown in tables Ap5.2.5 or Ap5.2.6 and possibly acompanied by a plot similar to that shown in fig. Ap5.2.7.

Much work remains to be done intackling data compatibility problems to make MEXLARIS as flexible a system as posible. Field proformas for data capture and for coding existing data need to be designed together with a more carefully planned data-base configuration.

The system is envisaged, in its late stages of development, as a collection of data bases holding point-data not only on soils but on meteorological information and on other types of land resources, or even multispectral digital information from satellite. Efficient interfaces between those large data-bases has to be designed and worked out. This proposal only attempts to outline the general structure of the system.

INFORMATION RETRIEVAL

(3 LEVELS :)



— mexlaris —

Fig. Ap. 5.2.7.

APPENDIX 5.3

The OXSIS **QUERY** procedure: Commands, interactive dialogue and information displayed on VDU for querying the system.

$ DATA

Data name :D014

Features	Out of ten recorded	not applicable
EASTING	10	0
NORTHING	10	0
SITE_NO	10	0
DATE	10	0
SLOPE_GRADIENT A01	9	0
SLOPE_FORM,_DOWN A**-M01	9	0
SLOPE_FORM,_ACROSS A**-M01	9	0
ASPECT A01-M01	9	4
CZ001	10	0
CZ002	9	0
SURFACE_BOULDERS,_QUANT. A01-M01	9	0
DRAINAGE,_PROFILE A01-M01	9	0
MOISTURE_STATE A01-M01	10	0
COLOUR,_MATRIX,_HUE A01-M01	10	0
COLOUR,_MATRIX,_VALUE A01	10	0
COLOUR,_MATRIX,_CHROMA A01	10	0
MOTTLES,_COLOUR,_HUE A01-M01	10	0
MOTTLES,_COLOUR,_VALUE A01	10	2
MOTTLES,_COLOUR,_CHROMA A01	10	2
TEXTURE_CLASS B01-M01	10	0
CLAY *01	9	0
SILT B01	9	0
SAND B01	9	0
ORGANIC_MATTER,_ABUNDANCE A01-M01	9	0
STONES,_ABUNDANCE A01-M01	2	0
STONES,_SIZE A01-M01	2	1
STONES,_SHAPE A01-M01	2	1
STONES,_LITHOLOGY A01-M01	2	1
STRUCTURE,_GRADE A01-M01	2	0
STRUCTURE,_SIZE A01-M01	2	0
STRUCTURE,_SHAPE A01-M01	2	0
FRIABILITY A01-M01	3	0
PLASTICITY A01-M01	6	0
CARBONATE A01-M01	10	0
CARBONATE,_SECONDARY,_ABUND. A01-M01	9	0
IRON/MANG._SEGRE.,_ABUND. A01-M01	9	0
HORIZON_DEPTH,_LOWER *01	10	0
LL014	10	0

—— INDICATES: ENTERED BY THE USER INTERACTIVELY

$ COVER

North : 20544
South : 20520
East : 43550
West : 43540

The following triad are relevant

D001	D003	D005	D007
D010	D011	D014	D015
D016	D017	D018	D029
D030	D038	D039	D041
D043	D048	D049	D050
D051	D052	D056	D064
D065	D067	D070	D071
D072	D073	D074	D075
D080	D082	D090	D091
D093	D098	D100	D103
D104	D106		

$ DEFINITION

Feature: CLAY #02

Particles with equivalent spherical diameter less than 2 microns.
Estimated in suspension of fine-earth dispersed in Calgon by plummet method. (Bannister, Tomlinson, Beckett 1974).
In percentage of air-dry fine earth.

$ DEFINITION

Feature: POTASSIUM,_EXCHANGE. A01

Potassium ions exchangeable to M. Amm. Acetate at pH 8.1.
(TOMLINSON et al 1977)
In me/100 g. air-dry soil

$ DEFINITION

Feature: COLOUR,_ROOT_CHANNEL,_HUE A01-M01

Hue of surface of root channels.
At recorded moisture-state; assessed with Fujihira colour book.
Coded.

1.	7.5	R
2.	10	R
3.	2.5	YR
4.	5	YR
5.	7.5	YR
6.	10	YR
7.	2.5	Y
8.	5	Y
9.	7.5	Y to 10 G
10.		BG to B
-3.		Neutral

Source: Beckett (1983)

$ FEATURE
Name of the feature :POTASSIUM,_EXCHANGE. A01

Feature POTASSIUM,_EXCHANGE. A01 is present in the following triads :

D046	D047	D048	D049	D050	D051
D052	D053	D054	D055	D056	D057
D058	D059	D060	D061	D062	D063
D064	D065	D066	D067	D068	D069
D070	D080	D081	D082	D084	D000

$ SPEC
 Data set :D001

Data file no.	D001
Raw data-set	R001
Original name	SP30 1 km. grid and twins
Formats	F0011 : F0012
Tape/back-up tape	Oxford archive store
Field recorder	AND : RW
Organization	SSEW
Year	1971
Treatment to produce these data	NONE
Sampling status	PROB.SYSTEM-PROB.RANDOM
Area of reference	1.
Method of examination	PIT
Object of record	SITE AND PEDOLOGICAL HORIZONS
Intended max. depth	100
not applicable conv.	"N"
missing value conv.	"*"
other conventions	" "
no. of blocks	182

TYPE C TO CONTINUE
$ C

Percent complete	95
site density	1.00
location code	LL001
Max. min. northing	2100 /1999
Max. min. easting	44000/43000
Extent	105

DEEPER THAN	50	60	70	110
PERCENTAGE	93	92	91	0

Depth in increments of 10 cm., omitted if percentage is 100 % or repeats previous depth.

Comment

Site and soil profiles to 100 m were described in detail at the 121 intersections of the 1 km (primary sites) of map sheet SP30, displaced by 100 m if the intereded site was inaccesible. In addition alternate sites to have 20 m or 200 m " twins ", located as if the sites of each pair had been within a square of 20 X 20 m or of 200 X 200 m. In the end many twins had to be omitted. For the label feature "STATUS" 0. = primary site; 1.0 = displaced primary site; 2.0 = 20 m twin; 3.0 = 200 m twin. The records were made by Webster and Dover, together and independently in the ratio 2:5.

In all 115 primary site, 40 20 m twins, and 29 200 m twins were recorded, with site no. in the range 00001 - 00243. Site density of 1.0 is for primary site. Note that a few profiles on D030 share the same grid reference: they were described and sampled indepently (see comments on D032). Soil samples were taken from 0 - 15 cm (pit and bulked within a 3 m circle) and 35 - 50 cm (pit) and analysed by OUDAS D046 by AGRIG for extractables D071 and total D100 trace elements. Beckett 1973

END

Name: SURROGATE
Name: CLAY #02

The dependent feature must be preceded by either:
"C " compound feature
"F " function
"M " manifold
"R " regression.

Name: RCLAY #02

The dependent feature must be preceded by either:
"C " compound feature
"F " function
"M " manifold
"R " regression.

APPENDIX 5.4

OXSIS RETRIEVAL procedure: interactive dialogue and pro-formas to collate information for data retrieval.

```
$ RETRIEVE

 Triad or Subset : TRIAD
  Triad's

 Name : D001

 Save result in : RD001

    Search area :


 CLASS Y/N :N

   Selection Y/N : Y

  Selection :

Condition A:
      >>CLAY *01 GT 15.0
Condition B:
      >>SLOPE_GRADIENT A01 LT 7.0
Condition C:
      >>ELEVATION GT 300.0
Condition D:
      >>END

  Boolean condition:A.AND.B.OR.C

Query : END
```

_____ INDICATES INFORMATION ENTERED INTERACTIVELY BY THE USER.

```
Name : RETRIEVE

Triad or Subset : SUBSET
 Subset's

Name : D051

Save result in : RD051

   Search area :


CLASS Y/N :N

  Selection Y/N : Y

  Selection :

 Condition A:
      >>CLAY *02 GT 20.0
 Condition B:
      >>END


  Boolean condition:A


  Query : END

Entry 175795 appended to transfer queue
Entry 175796 appended to transfer queue
Entry 175797 appended to transfer queue

    Jobs have been sent to  2988.
```

PRO FORMA

PRRTV RETRIEVAL PROCEDURE 1/2

IDENTIFICATION.
TRIAD/SUBSET (1)
SAVE RETRIEVED SUBSET UNDER FILE NAME : <_____>

IS RETRIEVAL LIMITED TO AN AREA, Y/N ? (2): <_>
IF "Y" THEN
NAME OF THE AREA OF INTEREST : <_____>

RETRIEVAL SELECTION SPECIFIED IN A PREVIOUS RETRIEVAL, Y/N ? (3) : <_>
IF "Y" THEN
NAME OF THE CATEGORY : <_____>

IS RETRIEVAL OF THE SUBSET SUBJECT TO A BOOLEAN SELECTION, Y/N ? <_>
IF "Y" THEN

STATEMENTS:	KEY (4)	NAME OF THE FEATURES (5)	LOGICAL OPERATORS (6)	VALUE (S)
A:=				
B:=				
C:=				
D:=				
E:=				
F:=				
G:=				
H:=				
I:=				

BOOLEAN EQUATION (7) : <_____>

APPENDIX 7.1

Building a surrogate function when the model is known: The non-linear regression approach in mathematical notation, and strategy flow-chart.

Appendix 7.1

The problem consists of fitting a suitable model for the "surrogate function" when such model is known in advance.

Most known models in nature tend to be of exponential form and usually complex. This type of models can only be fit to the data by non-linear least squares.

The problem of building a surrogate function from non-linear least squares can be presented as follows.

$$\text{Let} \quad \underset{\sim}{\xi} = (\xi_1, \xi_2, \xi_3, \ldots\ldots\ldots \xi_k)$$
$$\theta = (\theta_1, \theta_2, \theta_3, \ldots\ldots\ldots \theta_p)$$

be the set of independent variables or predictors. The set of parameters in the model to be estimated are:

$$\underset{\sim}{\xi} = \xi_1, \ldots\ldots\ldots \xi_k ; \qquad \theta = \theta_1, \ldots\ldots\ldots \theta_p$$

So the model to estimate can be written as

$$Y = f(\underset{\sim}{\xi}, \theta) + e$$

where $f(\underset{\sim}{\xi},0)$ is the function which is completely known by the analyst. Hence the expectetion of Y is $E(Y) = f(\underset{\sim}{\xi}, \theta)$.

The function can also be written as:

$$Y = f(\xi_1, \xi_2, \ldots\ldots, \xi_k; \ \theta_1, \theta_2, \ldots\ldots \theta_p) + e$$

with k number of predictors in the model and p parameters to estimate. When there are n observations of the form:

$$Y_u, \xi_{1u}, \xi_{2u}, \ldots\ldots\ldots \xi_{ku}$$

for u = 1,2,3,....n, available the model can be abreviated as

$$Y_u = f(\underset{\sim}{\xi}_u, \theta) + e_u$$

The assumptions are essentially the same as for the linear case;

$$e \sim N(0, \sigma^2), \quad E(e)^2 = \sigma^2, \quad E(e) = 0$$

The assumption of normality and independence can now be written as:

$$e \sim N(0, I\sigma^2)$$

where $e = (ev_1, e_2, \ldots e_n)$. The Sum of Squares of a nonlinear model can then be written:

$$S(\theta) = \sum_{u=1}^{n} [Y_u - f(\xi_u, \theta)]^2$$

Since ξ_u and Y_u are fixed observations the Sum of Squares is a function of 0. Hence the value of 0 that minimizes $S(\theta)$ is θ. We want to find the least squares estimate 0 by differentiating equation with respect to 0 which gives p normal equations:

$$\sum_{u=1}^{n} \{Y_u - f(\xi_u, \hat{\theta})\} [\partial f(\xi_u, \theta)/\partial \theta_i]_{\theta=\hat{\theta}} = 0$$

for i=1,2,3....p. The normal equations must be solved for 0 to estimate the parameters of the model.

Solving normal equations of this type is not easy even with one parameter and a comparatively simple non-linear model. With more parameters and a more complicated model the solution can be extremely difficult to obtain and iterative methods must be employed in almost all cases. Even so, multiple solutions may exist corresponding to multiple stationary values of $S(\theta)$.

Various methods have been used to estimate the parameters of nonlinear systems. Three of the most common are: (1) Linearization or Gauss-Newton modified,(2) Steepest descent, and (3) Marquadt's compromise.

These methods require from the analyst to suggest initial values $\theta_{10}, \theta_{20}, \ldots \theta_{p0}$, for the parameters $\theta_1, \theta_2, \theta_p$. These initial values may be "educated" guesses or preliminary estimates based on experience and knowlwdge.

Hopefully, they will be improved upon by the successive iterations until the solution converges.

Convergence is said to be reached when:

$$\left| \{\theta_{i(j+1)} - \theta_{ij}\}/\theta_{ij} \right| < d \; ; \; i=1,2....p$$

is less than a pre-especified quantity d. Some computer algorithms on these methods also require estimates of the partial derivatives of the model on the parameters to estimate.

The linearization method uses a Taylor series expansion of the function about the initial values. The results of linear least squares are used in a series of stages. The steepest descent method concentrates on the sum of squares function S(0) and uses an iterative process to find the minimum to this function.

Marquadt's method (Draper and Smith, 1981) is a compromise between the two previous methods combining the best features of both and avoiding their most serious limitations. It appears to work well in many circumstances and the most suitable for developing surrogate functions of soil properties when the model is known and is of such form that has to be estimated by non-linear least squares. The method almost always finds convergence, indirectly reducing the utilization of computer resources which for some problems can be expensive due to the number of iterations.

Providing good initial values for the parameters will require from the analyst to have some knowledge about the relationships between the soil properties in the model or some degree of intuition based on experience with the data in question. This may be a limitation and may also be expensive if knowledge experience or "flair" are lacking.

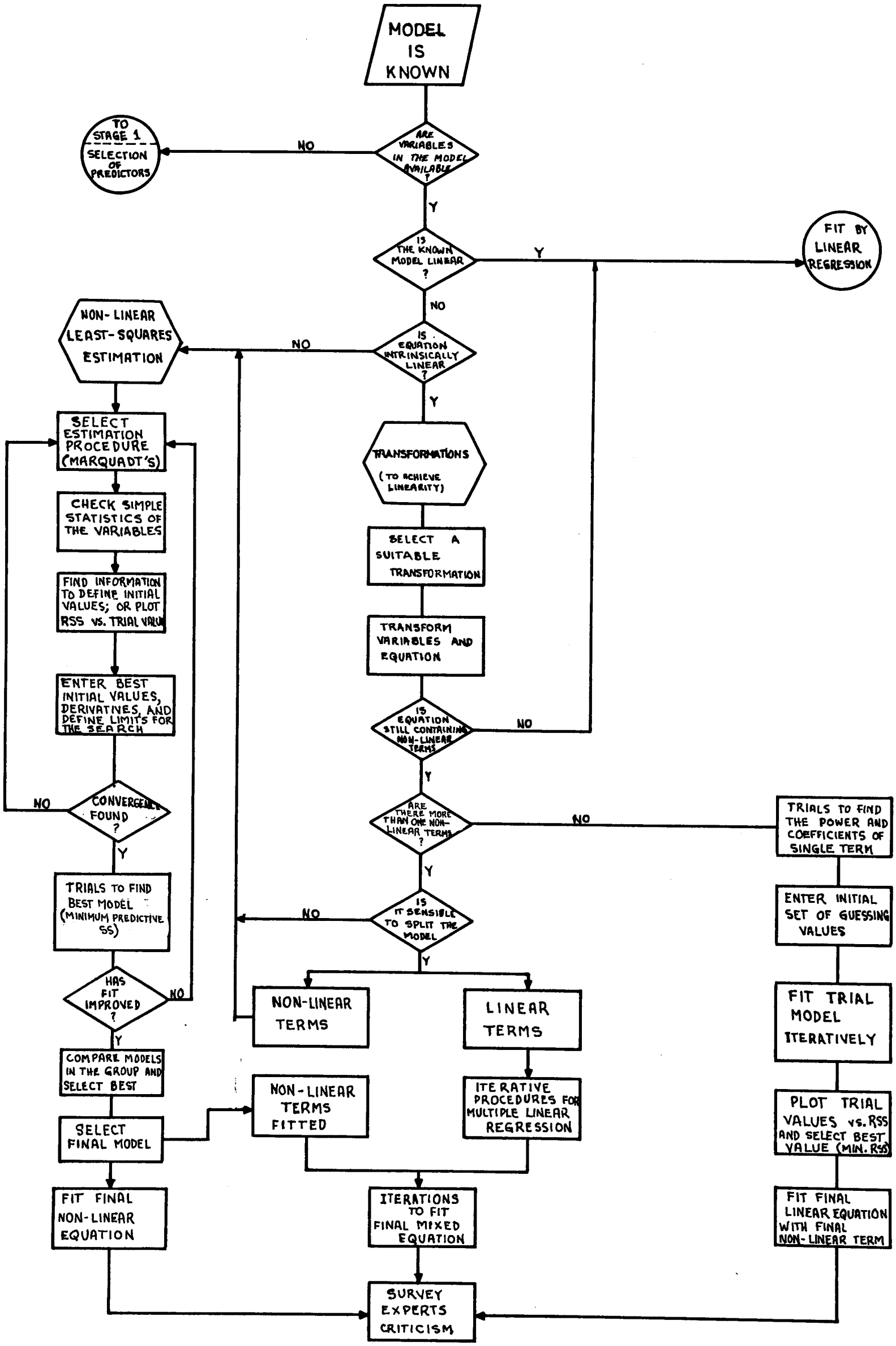
To overcome the problem of poor guesses of the initial values an iterative approach may be considered. Trials with various initial values for the required parameters can be carried out. The residual sum of squares from the model fitted in each trial then can be plotted against the various initial values of each of the parameters separately. The best initial value for each parameter is given by the minimum

point in the curve of RSS against its initial value. This algorithm for selecting best initial values can be automated in the form of a relatively small computer program and possibly become a sub-facility of the SIS, for building surrogate functions.

There is not a unique approach or standard procedure for fitting known curves to data. However, there are some steps that are common to many situations. The suggested steps to develp a surrogate function when the model is previously known are summarised in the flow chart of figure 7.1 in this appendix.

It can be seen from figure 7.1 that on the whole building a surrogate function even when the model is known in advance is a process full of iterations and successive approximations. It could be very difficult to account for all possible situations that may arise during the development stage. This may make the amount of programming required for automating the whole process something prohibitive. Expert systems may provide an answer later.

Fig. 7.1. STAGE 2 DEVELOPMENT



APPENDIX 7.2

An exercise in constructing a **surrogate function** for Cation Exchange Capacity: computer printouts and plots.

DATA

SITE	S_1	S_2	S_L	C_L	C_3	pH	Ca	Mg	K	Na	CEC	PB
1	29	25	30	16	4.4	7.8	36.5	0.3	0.14	0.20	37.6	99
2	26	15	34	24	9.5	6.1	11.3	1.4	0.21	0.31	19.9	66
3	25	18	38	69	*	6.2	*	*	*	*	*	*
4	28	15	32	25	0.6	7.5	17.1	0.5	0.20	0.21	19.5	92
5	26	25	31	18	0.2	5.7	3.1	0.4	0.14	0.10	8.7	43
6	47	27	17	8	0.0	6.5	4.7	0.2	0.15	0.03	8.6	59
7	23	54	15	8	0.6	4.2	1.1	0.3	0.31	*	*	*
8	53	27	14	5	*	4.1	0.3	0.3	0.15	0.14	11.5	8
9	16	23	45	17	0.2	5.9	10.0	0.8	0.10	0.23	17.0	65
10	9	17	50	25	0.1	6.1	12.1	0.8	0.21	0.38	19.0	71
11	15	18	44	24	0.3	4.3	0.2	0.3	0.17	0.09	11.1	6
12	26	14	38	22	0.0	5.4	8.0	0.7	0.14	0.07	23.6	38
13	40	27	22	11	3.1	5.6	0.5	0.2	0.04	0.02	7.9	10
14	19	22	46	14	1.6	6.3	8.3	0.6	0.57	0.08	15.7	61
15	6	11	26	58	2.4	5.5	3.9	0.5	0.13	0.27	11.5	42
16	6	26	47	21	0.2	6.8	11.5	0.9	0.13	0.12	16.3	78
17	10	12	59	20	0.4	4.3	0.5	0.2	0.07	0.11	16.7	5
18	37	16	28	19	0.0	5.9	9.9	1.2	0.08	0.26	17.3	66
19	37	11	31	22	0.0	5.8	15.1	1.6	0.13	0.22	23.5	73
20	21	12	40	27	0.1	5.7	13.9	4.2	1.71	0.58	33.2	61
'30)'												

END OF LISTINGS OF FILE :AGRIC.REGRES(3,*,1) FOR USER AGRIC AT 1982/07/29__16:56:42

FINE SAND — COARSE SAND — SILT — CLAY — CARBONATE — PERCENT BASE SATURATION.

```
1
 GENSTAT EMAS RELEASE 4.03 VERSION 1  01/09/80

 GENSTAT V    MARK 4.03
 (C)1980 LAWES AGRICULTURAL TRUST (ROTHAMSTED EXPERIMENTAL STATION)

    1  'REFERENCE'  REGTRIAL
    2  'UNIT'  SITE=1...20
    3  'INPUT' 2
    4  'VARIATE'  S1 $ 20
    5        :    S2 $ 20
    6        :    SL $ 20
    7        :    CL $ 20
    8        :    C3 $ 20
    9        :       PH $ 20
   10        :       CA $ 20
   11        :       MG $ 20
   12     :          K $ 20
   13        :       NA $ 20
   14        :       CEC $ 20
   15        :       PB $ 20
   16  'READ/P' SITE, S1, S2, SL, CL, C3, PH, CA, MG, K,  NA, CEC, PB
   17  'INPUT' 1
   18  'PRIN/P' SITE, S1, S2, SL, CL, C3, PH, CA, MG, K, NA, CEC, PB
   19  'TERMS/PRINT=C' S1, S2, SL, CL, C3, PH, CA, MG, K, NA, CEC, PB
   20  'Y' CEC
   21  'FOR' I=1...11
   22  'BEST/PRIN=CAU' S1, S2, SL, C3, PH, CA, MG, K, NA, PB
   23  'WORST/PRIN=CAU' S1, S2, SL, C3, PH, CA, MG, K, NA, PB
   24  'MINIMISE/PRIN=CAU' S1, S2, C3, PH, CA, MG, K, NA, PB
   25  'REPEAT'
   26  'FIT/PRIN=CAU' CA, PH, K ; FVAL=CA, PH, K
   27  'HEAD' H = ''P''
   28     :       HCEC = ''CATION EXCHANGE CAPACITY''
   29     :       HCA = ''CALCIUM''
   30     :       HPH = ''PH''
   31     :       HK = ''POTASIUM''
   32      :      HS1= ''COARSE SAND''
   33      :      HS2= ''FINE SAND''
   34      :      HSL= ''SILT''
   35      :      HCL= ''CLAY''
   36      :      HC3= ''CALCIUM CARBONATE''
   37      :      HMG= ''MAGNESIUM''
   38  'GRAPH/ATY=HCEC, ATX=HCA'  CEC;CA $ H
   39  'GRAPH/ATY=HCEC, ATX=HPH'  CEC;PH $ H
   40  'GRAPH/ATY=HCEC, ATX=HK'  CEC;K $ H
   41  'GRAPH/ATY=HCEC, ATX=HS1'  CEC;S1
   42  'GRAPH/ATY=HCEC, ATX=HS2'  CEC;S2
   43  'GRAPH/ATY=HCEC, ATX=HSL'  CEC;SL
   44  'GRAPH/ATY=HCEC, ATX=HCL'  CEC;CL
   45   'GRAPH/ATY=HCEC, ATX=HC3'  CEC;C3
   46  'GRAPH/ATY=HCEC, ATX=HMG'  CEC;MG
   47  'RUN'

    S1       MNMINMAX       24.9000        6.0000       53.0000    20  VALUES     0 MISSING
    S2       MNMINMAX       20.7500       11.0000       54.0000    20  VALUES     0 MISSING   **
    SL       MNMINMAX       34.3500       14.0000       59.0000    20  VALUES     0 MISSING
    CL       MNMINMAX       22.6500        5.0000       69.0000    20  VALUES     0 MISSING
    C3       MNMINMAX        1.3167        0.0000        9.5000    20  VALUES     2 MISSING   **
    PH       MNMINMAX        5.7850        4.1000        7.8000    20  VALUES     0 MISSING
    CA       MNMINMAX        8.8421        0.2000       36.5000    20  VALUES     1 MISSING   **
```

MG	MNMINMAX	0.8105	0.2000	4.2000	20	VALUES	1 MISSING	**
K	MNMINMAX	0.2516	0.0400	1.7100	20	VALUES	1 MISSING	**
NA	MNMINMAX	0.1900	0.0200	0.5800	20	VALUES	2 MISSING	
CEC	MNMINMAX	17.7000	7.9000	37.6000	20	VALUES	2 MISSING	
PB	MNMINMAX	52.3889	5.0000	99.0000	20	VALUES	2 MISSING	

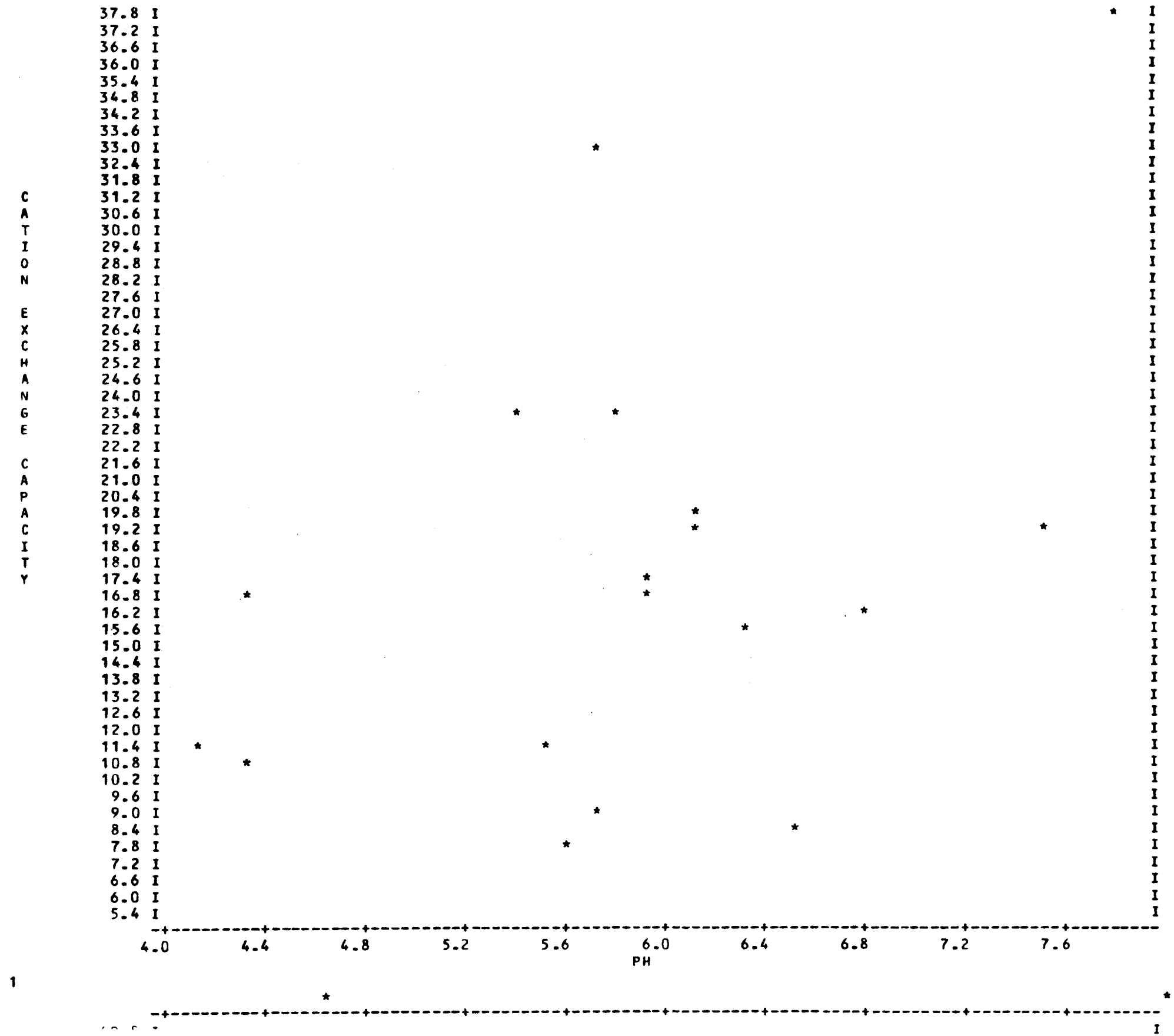
SITE		S1		S2		SL		CL		C3		PH		CA		MG		K
1	2.9000E	1	2.5000E	1	3.0000E	1	1.6000E	1	4.4000E	0	7.8000E	0	3.6500E	1	3.0000E	-1	1.4000E	-1
2	2.6000E	1	1.5000E	1	3.4000E	1	2.4000E	1	9.5000E	0	6.1000E	0	1.1300E	1	1.4000E	0	2.1000E	-1
3	2.5000E	1	1.8000E	1	3.8000E	1	6.9000E	1		*	6.2000E	0		*		*		*
4	2.8000E	1	1.5000E	1	3.2000E	1	2.5000E	1	6.0000E	-1	7.5000E	0	1.7100E	1	5.0000E	-1	2.0000E	-1
5	2.6000E	1	2.5000E	1	3.1000E	1	1.8000E	1	2.0000E	-1	5.7000E	0	3.1000E	0	4.0000E	-1	1.4000E	-1
6	4.7000E	1	2.7000E	1	1.7000E	1	8.0000E	0	0.0000E	0	6.5000E	0	4.7000E	0	2.0000E	-1	1.5000E	-1
7	2.3000E	1	5.4000E	1	1.5000E	1	8.0000E	0	6.0000E	-1	4.2000E	0	1.1000E	0	3.0000E	-1	3.1000E	-1
8	5.3000E	1	2.7000E	1	1.4000E	1	5.0000E	0		*	4.1000E	0	3.0000E	-1	3.0000E	-1	1.5000E	-1
9	1.6000E	1	2.3000E	1	4.5000E	1	1.7000E	1	2.0000E	-1	5.9000E	0	10.0000E	0	8.0000E	-1	10.0000E	-2
10	9.0000E	0	1.7000E	1	5.0000E	1	2.5000E	1	10.0000E	-2	6.1000E	0	1.2100E	1	8.0000E	-1	2.1000E	-1
11	1.5000E	1	1.8000E	1	4.4000E	1	2.4000E	1	3.0000E	-1	4.3000E	0	2.0000E	-1	3.0000E	-1	1.7000E	-1
12	2.6000E	1	1.4000E	1	3.8000E	1	2.2000E	1	0.0000E	0	5.4000E	0	8.0000E	0	7.0000E	-1	1.4000E	-1
13	4.0000E	1	2.7000E	1	2.2000E	1	1.1000E	1	3.1000E	0	5.6000E	0	5.0000E	-1	2.0000E	-1	4.0000E	-2
14	1.8000E	1	2.2000E	1	4.6000E	1	1.4000E	1	1.6000E	0	6.3000E	0	8.3000E	0	6.0000E	-1	5.7000E	-1
15	6.0000E	0	1.1000E	1	2.6000E	1	5.8000E	1	2.4000E	0	5.5000E	0	3.9000E	0	5.0000E	-1	1.3000E	-1
16	6.0000E	0	2.6000E	1	4.7000E	1	2.1000E	1	2.0000E	-1	6.8000E	0	1.1500E	1	9.0000E	-1	1.3000E	-1
17	10.0000E	0	1.2000E	1	5.9000E	1	2.0000E	1	4.0000E	-1	4.3000E	0	5.0000E	-1	2.0000E	-1	7.0000E	-2
18	3.7000E	1	1.6000E	1	2.8000E	1	1.9000E	1	0.0000E	0	5.9000E	0	9.9000E	0	1.2000E	0	8.0000E	-2
19	3.7000E	1	1.1000E	1	3.1000E	1	2.2000E	1	0.0000E	0	5.8000E	0	1.5100E	1	1.6000E	0	1.3000E	-1
20	2.1000E	1	1.2000E	1	4.0000E	1	2.7000E	1	10.0000E	-2	5.7000E	0	1.3900E	1	4.2000E	0	1.7100E	0

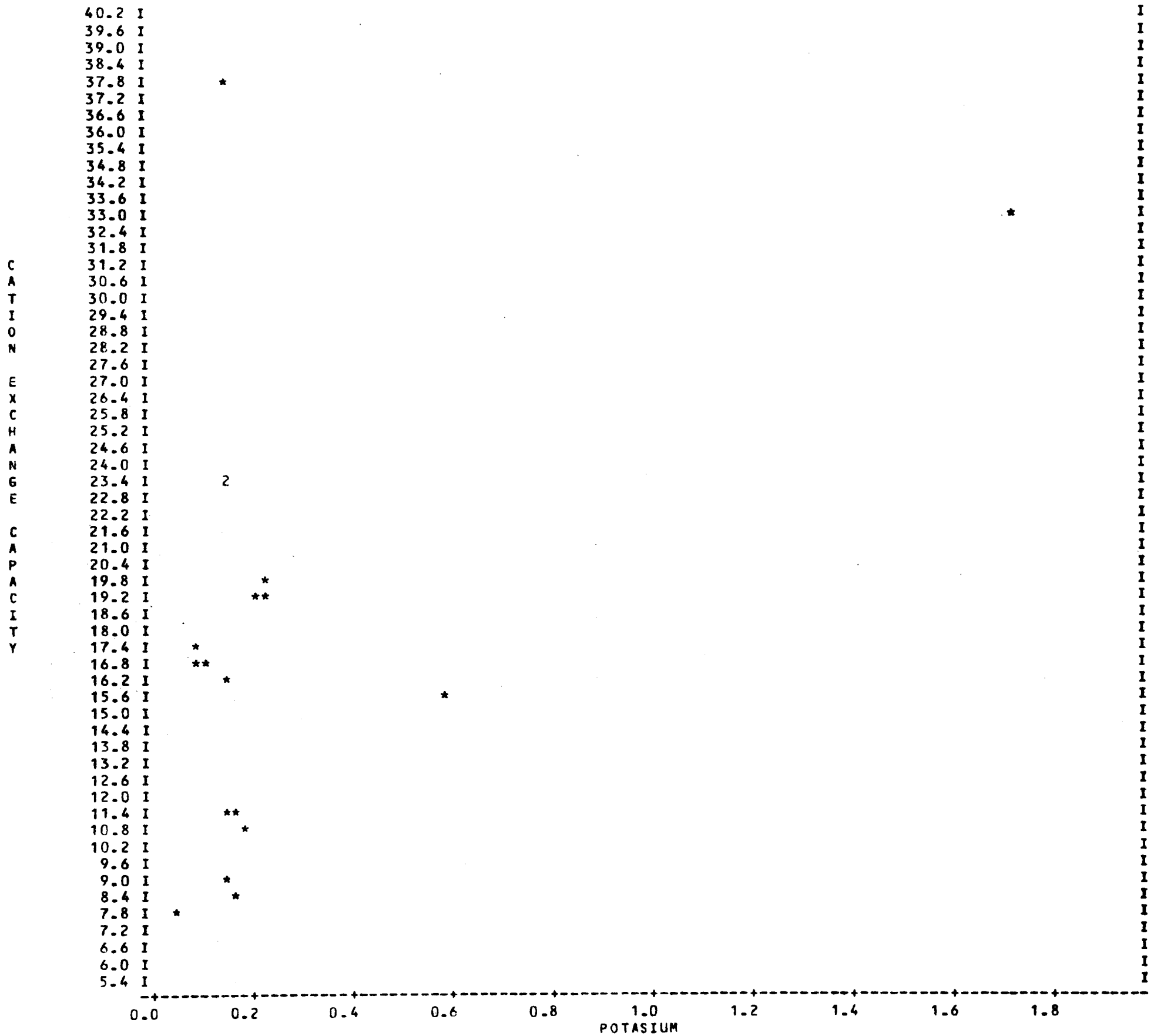
NA		CEC		PB	
2.0000E	-1	3.7600E	1	9.9000E	1
3.1000E	-1	1.9900E	1	6.6000E	1
	*		*		*
2.1000E	-1	1.9500E	1	9.2000E	1
10.0000E	-2	8.7000E	0	4.3000E	1
3.0000E	-2	8.6000E	0	5.9000E	1
	*		*		*
1.4000E	-1	1.1500E	1	8.0000E	0
2.3000E	-1	1.7000E	1	6.5000E	1
3.8000E	-1	1.9000E	1	7.1000E	1
9.0000E	-2	1.1100E	1	6.0000E	0
7.0000E	-2	2.3600E	1	3.8000E	1
2.0000E	-2	7.9000E	0	10.0000E	0
8.0000E	-2	1.5700E	1	6.1000E	1
2.7000E	-1	1.1500E	1	4.2000E	1
1.2000E	-1	1.6300E	1	7.8000E	1
1.1000E	-1	1.6700E	1	5.0000E	0
2.6000E	-1	1.7300E	1	6.6000E	1
2.2000E	-1	2.3500E	1	7.3000E	1
5.8000E	-1	3.3200E	1	6.1000E	1

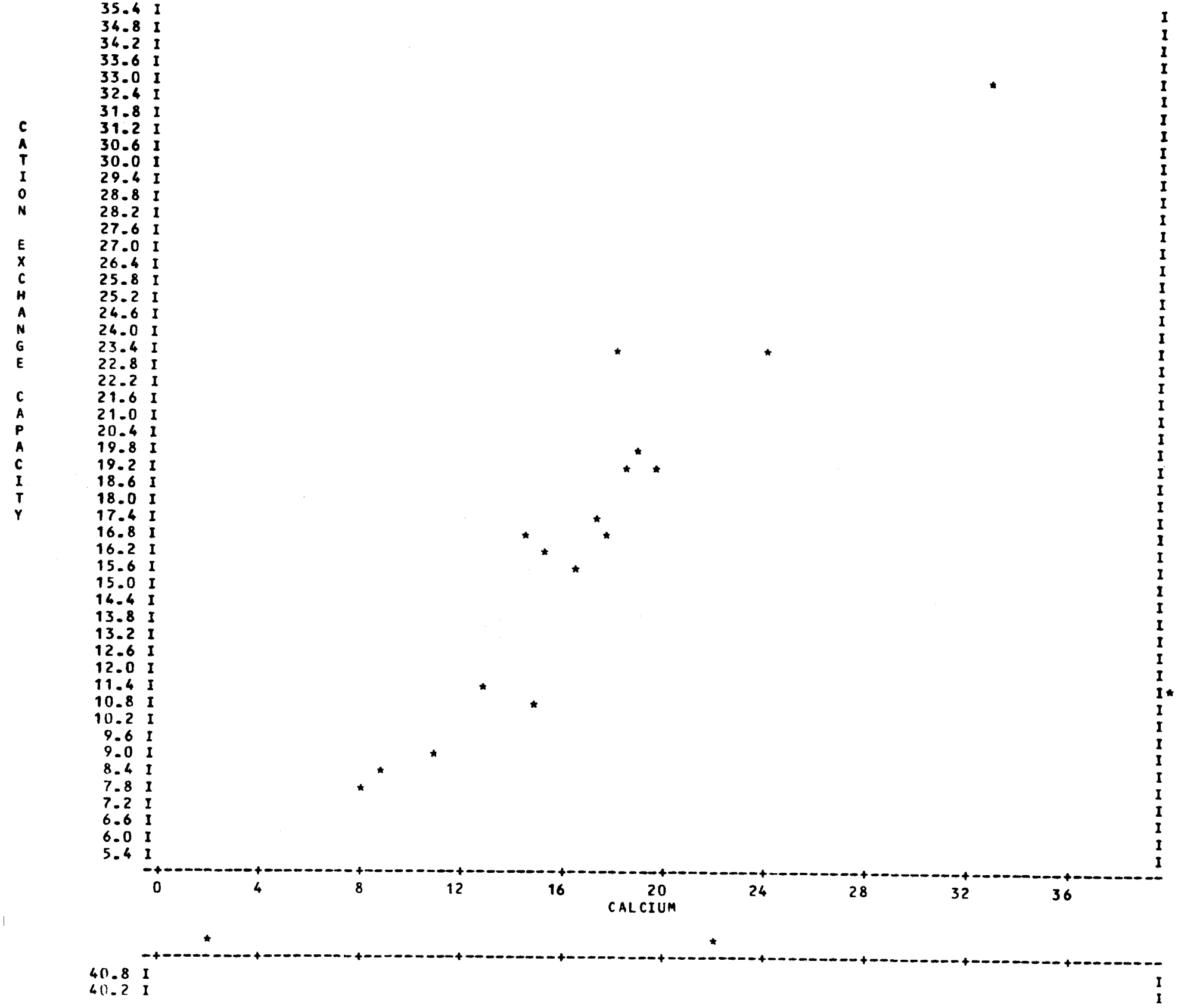
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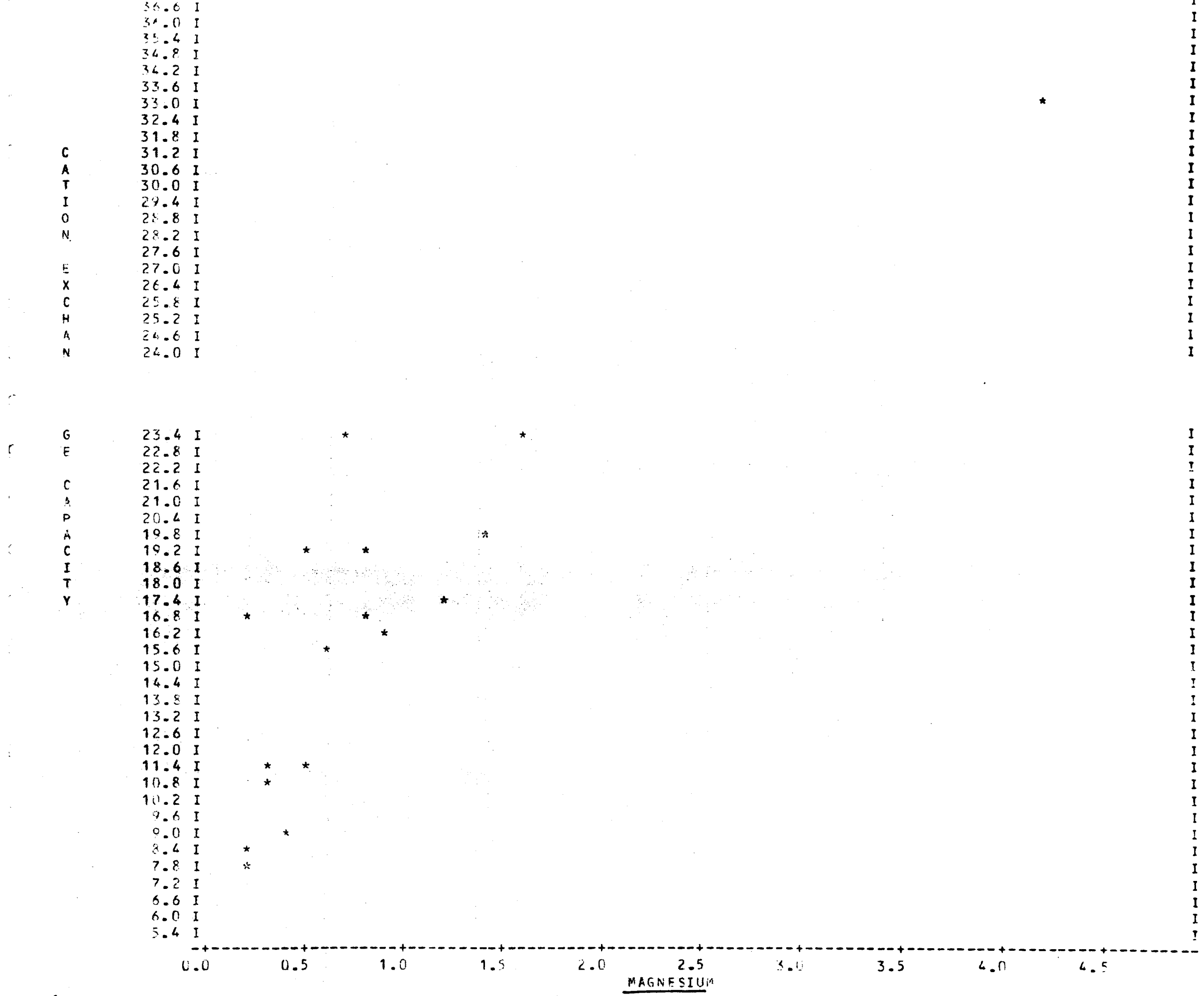
***** CORRELATION MATRIX *****

DF = 15


CATION EXCHANGE CAPACITY
37.8
37.2
36.6
36.0
35.4
34.8
34.2
33.6
33.0
32.4
31.8
31.2
30.6
30.0
29.4
28.8
28.2
27.6
27.0
26.4
25.8
25.2
24.6
24.0
23.4
22.8
22.2
21.6
21.0
20.4
19.8
19.2
18.6
18.0
17.4
16.8
16.2
15.6
15.0
14.4
13.8
13.2
12.6
12.0
11.4
10.8
10.2
9.6
9.0
8.4
7.8
7.2
6.6
6.0
5.4
4.0
4.4
4.8
5.2
5.6
6.0
6.4
6.8
7.2
7.6
PH
1

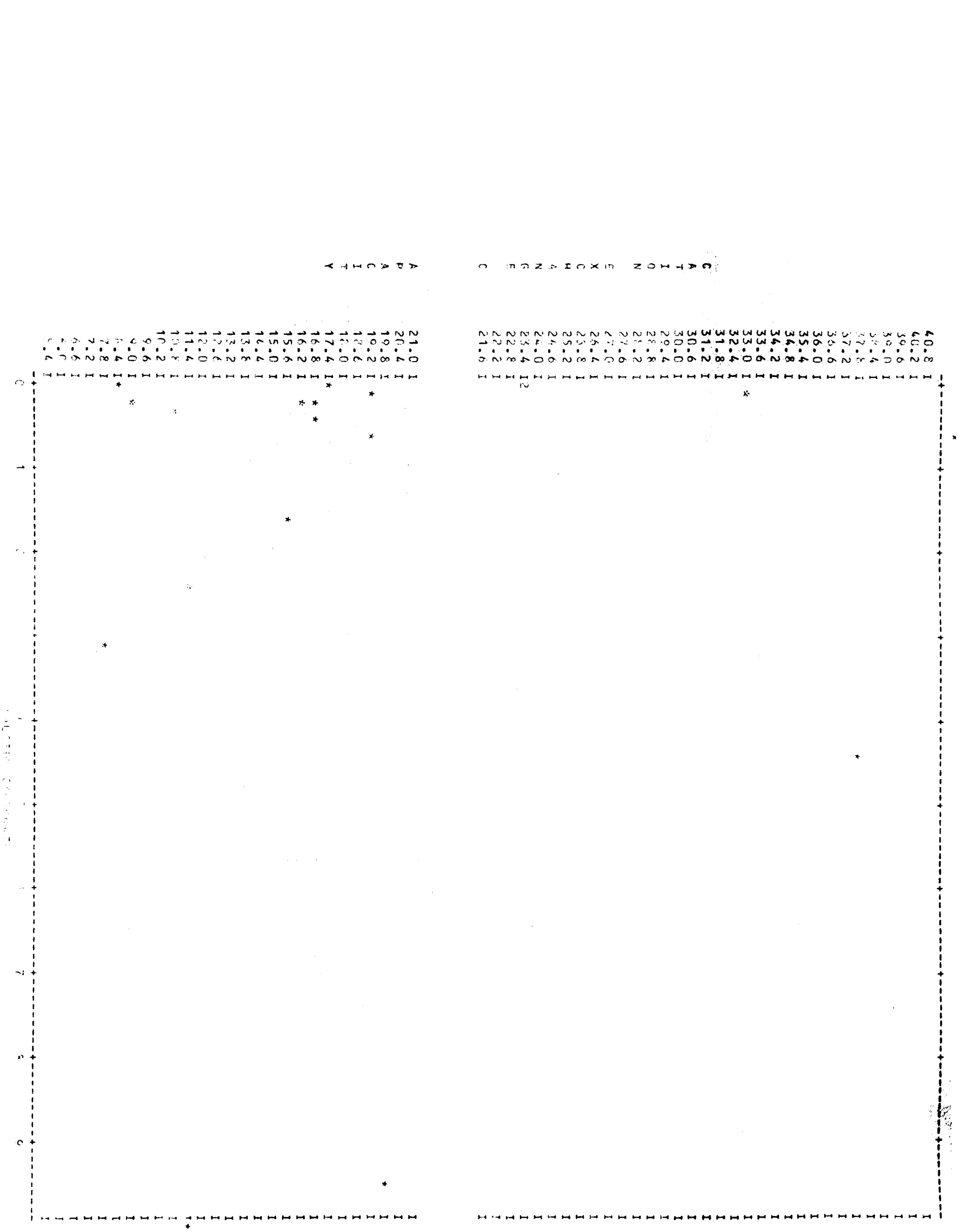

CATION EXCHANGE CAPACITY
40.2
39.6
39.0
38.4
37.8
37.2
36.6
36.0
35.4
34.8
34.2
33.6
33.0
32.4
31.8
31.2
30.6
30.0
29.4
28.8
28.2
27.6
27.0
26.4
25.8
25.2
24.6
24.0
23.4
22.8
22.2
21.6
21.0
20.4
19.8
19.2
18.6
18.0
17.4
16.8
16.2
15.6
15.0
14.4
13.8
13.2
12.6
12.0
11.4
10.8
10.2
9.6
9.0
8.4
7.8
7.2
6.6
6.0
5.4
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
POTASIUM

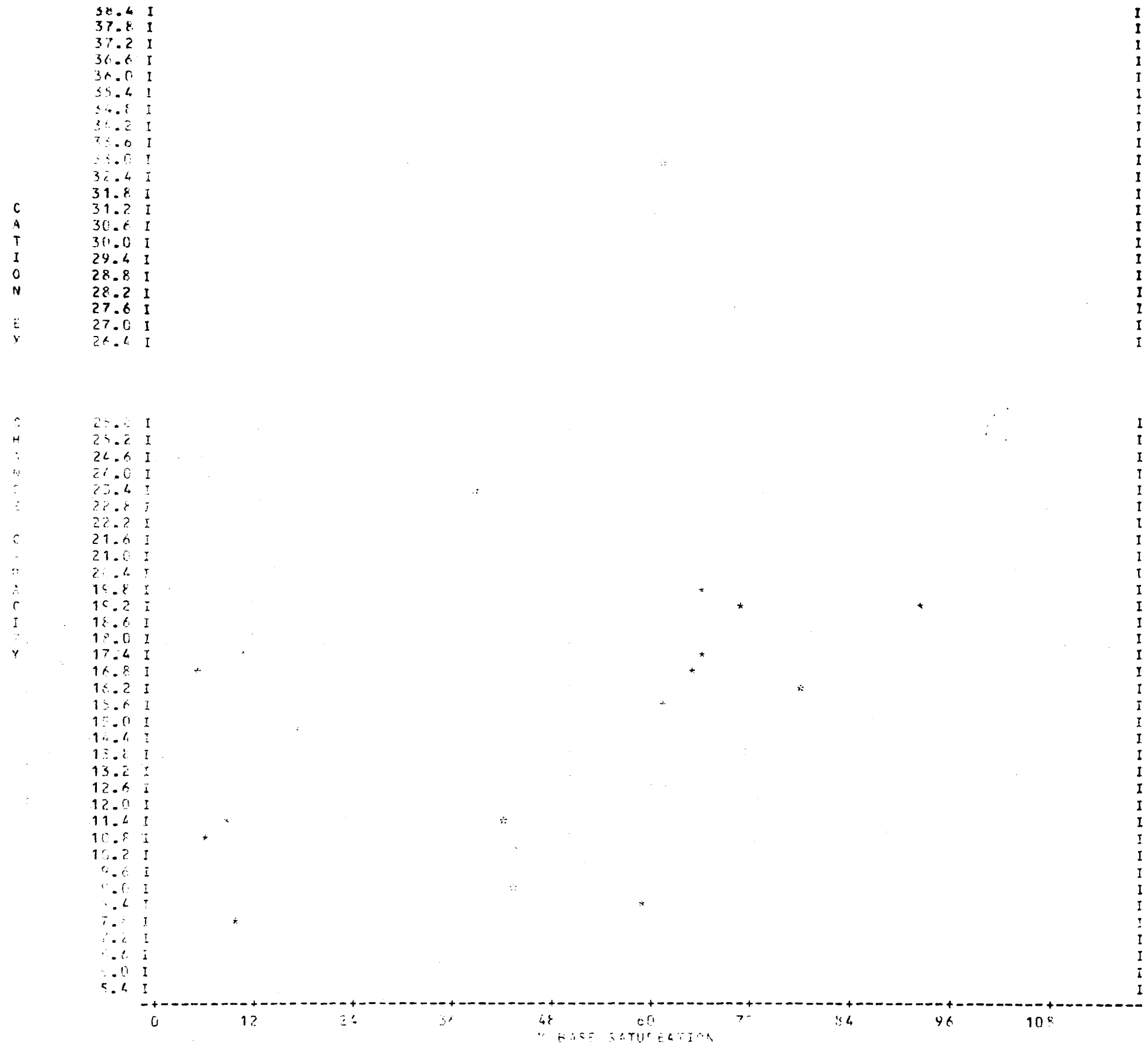

CATION EXCHANGE CAPACITY
35.4
34.8
34.2
33.6
33.0
32.4
31.8
31.2
30.6
30.0
29.4
28.8
28.2
27.6
27.0
26.4
25.8
25.2
24.6
24.0
23.4
22.8
22.2
21.6
21.0
20.4
19.8
19.2
18.6
18.0
17.4
16.8
16.2
15.6
15.0
14.4
13.8
13.2
12.6
12.0
11.4
10.8
10.2
9.6
9.0
8.4
7.8
7.2
6.6
6.0
5.4
0
4
8
12
16
20
24
28
32
36
CALCIUM
40.8
40.2

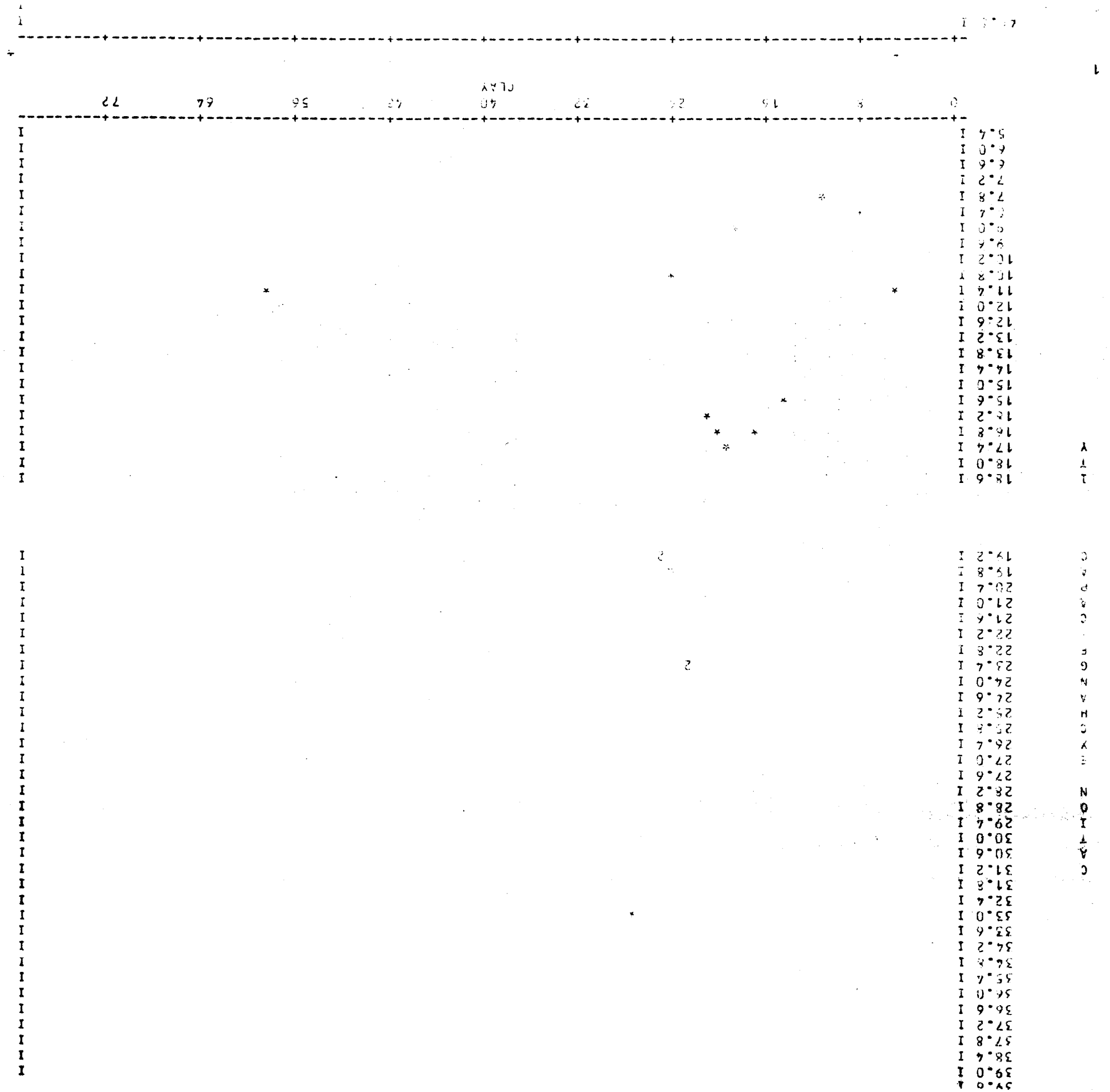

36.6 I
34.0 I
35.4 I
34.8 I
34.2 I
33.6 I
33.0 I
32.4 I
31.8 I
C 31.2 I
A 30.6 I
T 30.0 I
I 29.4 I
O 28.8 I
N 28.2 I
27.6 I
E 27.0 I
X 26.4 I
C 25.8 I
H 25.2 I
A 24.6 I
N 24.0 I
G 23.4 I
E 22.8 I
22.2 I
C 21.6 I
A 21.0 I
P 20.4 I
A 19.8 I
C 19.2 I
I 18.6 I
T 18.0 I
Y 17.4 I
16.8 I
16.2 I
15.6 I
15.0 I
14.4 I
13.8 I
13.2 I
12.6 I
12.0 I
11.4 I
10.8 I
10.2 I
9.6 I
9.0 I
8.4 I
7.8 I
7.2 I
6.6 I
6.0 I
5.4 I
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5
MAGNESIUM

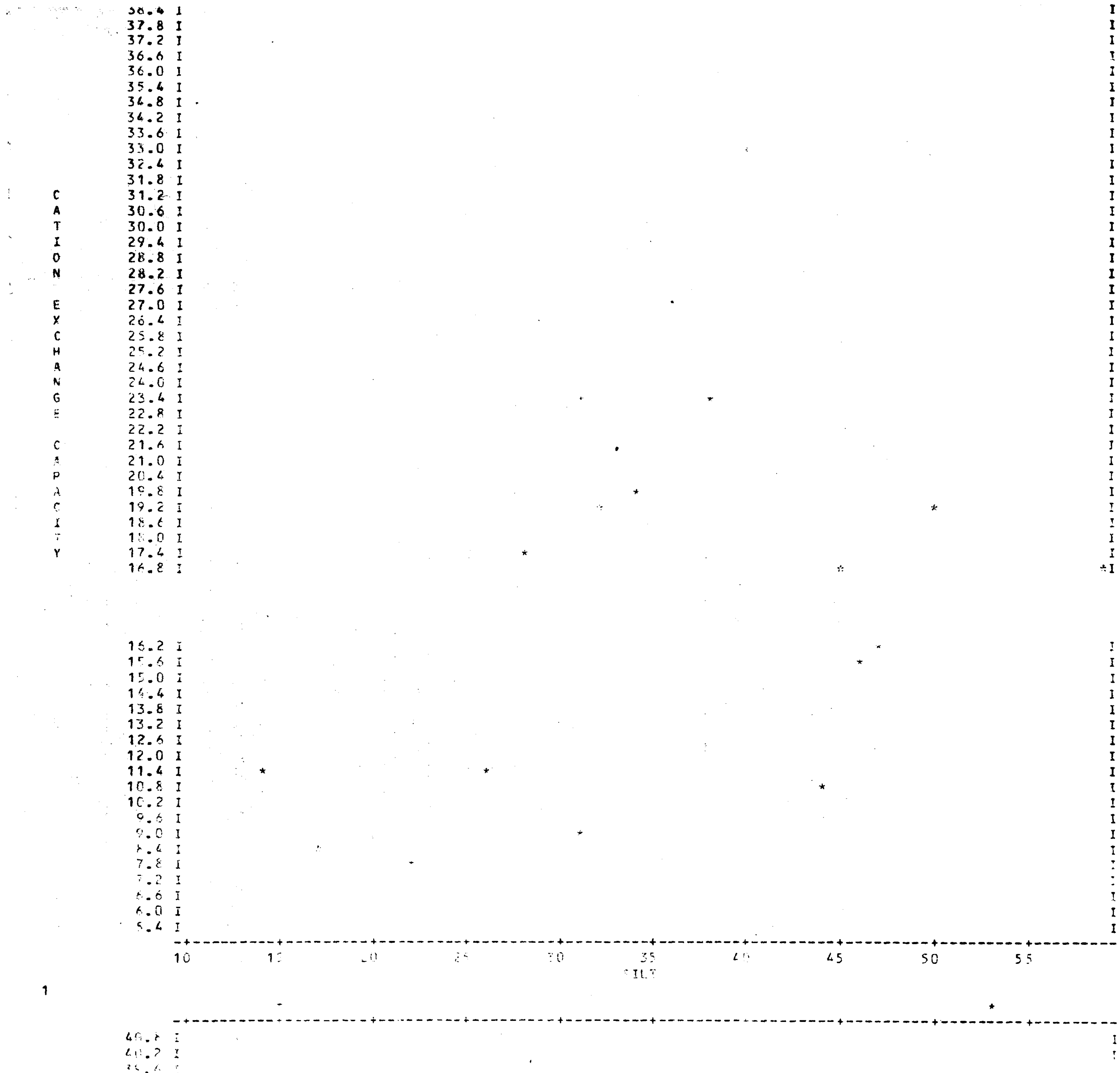
1

2

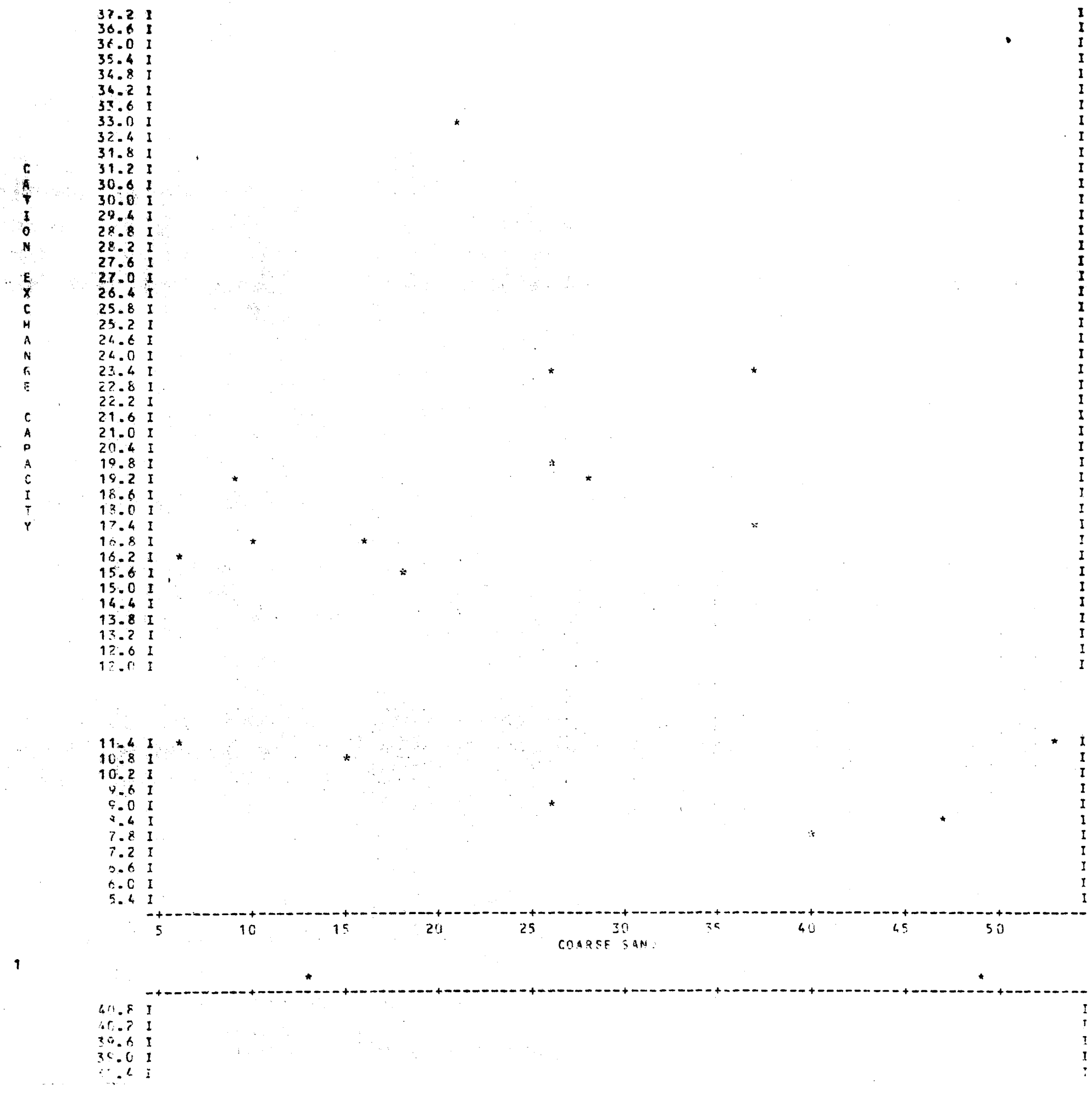

CAPACITY EXCHANGE
40.8 I
40.2 I
39.6 I
39.0 I
38.4 I
37.8 I
37.2 I
36.6 I
36.0 I
35.4 I
34.8 I
34.2 I
33.6 I
33.0 I
32.4 I
31.8 I
31.2 I
30.6 I
30.0 I
29.4 I
28.8 I
28.2 I
27.6 I
27.0 I
26.4 I
25.8 I
25.2 I
24.6 I
24.0 I
23.4 I2
22.8 I
22.2 I
21.6 I
21.0 I
20.4 I
19.8 I
19.2 I
18.6 I
18.0 I
17.4 I
16.8 I
16.2 I
15.6 I
15.0 I
14.4 I
13.8 I
13.2 I
12.6 I
12.0 I
11.4 I
10.8 I
10.2 I
9.6 I
9.0 I
8.4 I
7.8 I
7.2 I
6.6 I
6.0 I
5.4 I
0
1
2
3
4
5


CATION EY
0
12
24
36
48
60
72
84
96
108
% BASE SATURATION


CLAY
0
8
16
24
32
40
48
56
64
72
5.4
6.0
6.6
7.2
7.8
8.4
9.0
9.6
10.2
10.8
11.4
12.0
12.6
13.2
13.8
14.4
15.0
15.6
16.2
16.8
17.4
18.0
18.6


CATION EXCHANGE CAPACITY
38.4
37.8
37.2
36.6
36.0
35.4
34.8
34.2
33.6
33.0
32.4
31.8
31.2
30.6
30.0
29.4
28.8
28.2
27.6
27.0
26.4
25.8
25.2
24.6
24.0
23.4
22.8
22.2
21.6
21.0
20.4
19.8
19.2
18.6
18.0
17.4
16.8
16.2
15.6
15.0
14.4
13.8
13.2
12.6
12.0
11.4
10.8
10.2
9.6
9.0
8.4
7.8
7.2
6.6
6.0
5.4
10
45
50
55
SILT

1


37.2
36.6
36.0
35.4
34.8
34.2
33.6
33.0
32.4
31.8
CATION EXCHANGE CAPACITY
31.2
30.6
30.0
29.4
28.8
28.2
27.6
27.0
26.4
25.8
25.2
24.6
24.0
23.4
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19.2
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18.0
17.4
16.8
16.2
15.6
15.0
14.4
13.8
13.2
12.6
12.0
11.4
10.8
10.2
9.6
9.0
8.4
7.8
7.2
6.6
6.0
5.4
5
10
15
20
25
30
35
40
45
50
COARSE SAND

1	37.60	37.49	0.11
2	19.90	19.66	0.24
4	19.50	20.63	-1.13
5	8.70	9.11	-0.41
6	8.60	7.05	1.55
9	17.00	16.07	0.93
10	19.00	18.27	0.73
11	11.10	13.29	-2.19
12	23.60	20.08	3.52
13	7.90	8.54	-0.64
14	15.70	16.43	-0.73
15	11.50	11.82	-0.32
16	16.30	17.09	-0.79
17	16.70	16.19	0.51
18	17.30	16.99	0.31
19	23.50	25.43	-1.93
20	33.20	32.97	0.23

22----------

***** RESIDUAL MEAN SQUARES *****

3.5393E 0 NO CHANGE
3.9191E 0 ADDING S1
4.0349E 0 ADDING C3

***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: CEC

	ESTIMATE	S.E.	T
CONSTANT	14.57722	10.75075	1.36
CA	1.09297	0.10313	10.60
PH	-0.19623	2.21357	-0.09
K	1.14316	3.12391	0.37
S2	-0.26546	0.11914	-2.23
NA	-10.90007	6.90937	-1.58
MG	3.44765	1.58322	2.18
SL	0.10297	0.05525	1.86
PB	-0.11028	0.06704	-1.64

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	8	1033.36	129.170
RESIDUAL	8	28.31	3.539
TOTAL	16	1061.68	66.355
CHANGE	0	0.00	*

PERCENTAGE VARIANCE ACCOUNTED FOR 94.7

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL

CHANGE 1 0.51 0.508

PERCENTAGE VARIANCE ACCOUNTED FOR 95.7

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	37.60	37.43	0.17
2	19.90	19.87	0.03
4	19.50	20.48	-0.98
5	8.70	9.07	-0.37
6	8.60	6.86	1.74
9	17.00	16.22	0.78
10	19.00	18.28	0.72
11	11.10	13.20	-2.10
12	23.60	20.10	3.50
13	7.90	8.72	-0.82
14	15.70	16.03	-0.33
15	11.50	11.68	-0.18
16	16.30	17.34	-1.04
17	16.70	16.21	0.49
18	17.30	17.18	0.12
19	23.50	25.65	-2.15
20	33.20	32.78	0.42

22 STOP AT THIS ITERATION

BEST LINEAR ADDITIVE MODEL

$$CEC = 13.325 + 1.094\,Ca - 0.256\,S_2 - 10.723\,Na + 3.908\,Mg + 0.108\,S_L - 0.118\,Pb$$

***** RESIDUAL MEAN SQUARES *****

2.8850E	0	NO CHANGE
3.1349E	0	ADDING S1
3.1491E	0	ADDING K
3.1886E	0	ADDING C3
3.1987E	0	ADDING PH

***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: CEC

	ESTIMATE	S.E.	T
CONSTANT	13.32510	2.74052	4.86
CA	1.09474	0.08728	12.54
S2	-0.25667	0.09180	-2.80
NA	-10.72307	6.19421	-1.73
MG	3.90849	0.77207	5.06
SL	0.10867	0.04075	2.67
PB	-0.11846	0.02874	-4.12

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	6	1032.83	172.138
RESIDUAL	10	28.85	2.885
TOTAL	16	1061.68	66.355

1	37.60	37.49	0.11
2	19.90	19.66	0.24
4	19.50	20.63	-1.13
5	8.70	9.11	-0.41
6	8.60	7.05	1.55
9	17.00	16.07	0.93
10	19.00	18.27	0.73
11	11.10	13.29	-2.19
12	23.60	20.08	3.52
13	7.90	8.54	-0.64
14	15.70	16.43	-0.73
15	11.50	11.82	-0.32
16	16.30	17.09	-0.79
17	16.70	16.19	0.51
18	17.30	16.99	0.31
19	23.50	25.43	-1.93
20	33.20	32.97	0.23

23.....

***** RESIDUAL MEAN SQUARES *****

3.1491E	0	DROPPING PH
3.1987E	0	DROPPING K
3.5393E	0	NO CHANGE
4.1248E	0	DROPPING NA
4.2101E	0	DROPPING PB
4.5120E	0	DROPPING SL
5.0109E	0	DROPPING MG
5.0983E	0	DROPPING S2
4.7320E	1	DROPPING CA

***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: CEC

	ESTIMATE	S.E.	T
CONSTANT	13.66646	2.98683	4.58
CA	1.08999	0.09195	11.85
K	0.99245	2.47210	0.40
S2	-0.26999	0.10149	-2.66
NA	-10.83220	6.47729	-1.67
MG	3.52419	1.25179	2.82
SL	0.10570	0.04322	2.45
PB	-0.11546	0.03094	-3.73

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	7	1033.34	147.619
RESIDUAL	9	28.34	3.149
TOTAL	16	1061.68	66.355
CHANGE	1	0.03	0.028

PERCENTAGE VARIANCE ACCOUNTED FOR 95.3

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	37.60	37.47	0.13
2	19.90	19.69	0.21
4	19.50	20.70	-1.20
5	8.70	9.07	-0.37
6	8.60	7.01	1.59
9	17.00	16.04	0.96
10	19.00	18.26	0.74
11	11.10	13.23	-2.13
12	23.60	20.08	3.52
13	7.90	8.62	-0.72
14	15.70	16.41	-0.71
15	11.50	11.81	-0.31
16	16.30	17.14	-0.84
17	16.70	16.21	0.49
18	17.30	16.97	0.33
19	23.50	25.39	-1.89
20	33.20	32.98	0.22

24.....

***** RESIDUAL MEAN SQUARES *****

2.8850E	0	DROPPING K
3.1491E	0	NO CHANGE
3.4299E	0	ADDING S1
3.5312E	0	ADDING C3
3.5393E	0	ADDING PH
3.7150E	0	DROPPING NA
5.0629E	0	DROPPING S2
5.3303E	0	DROPPING MG
7.2191E	0	DROPPING PB
4.7085E	1	DROPPING CA

***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: CEC

	ESTIMATE	S.E.	T
CONSTANT	13.32510	2.74052	4.86
CA	1.09474	0.08728	12.54
S2	-0.25667	0.09180	-2.80
NA	-10.72307	6.19421	-1.73
MG	3.90849	0.77207	5.06
SL	0.10867	0.04075	2.67
PB	-0.11846	0.02874	-4.12

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	6	1032.83	172.138
RESIDUAL	10	28.85	2.885
TOTAL	16	1061.68	66.355

TRIALS WITH EXPONENTIALS OF ONE INDEPENDENT VARIABLE

```
1
 GENSTAT EMAS RELEASE 4.03 VERSION 1  01/09/8

 GENSTAT V    MARK 4.03
 (C)1980 LAWES AGRICULTURAL TRUST (ROTHAMSTED EXPERIMENTAL STATION)

    1  'REFERENCE/LINE=6000' REGTRIAL
    2  'UNIT'  SITE=1...20
    3  'INPUT' 2
    4  'VARIATE' S1 $ 20
    5         :  S2 $ 20
    6         :  SL $ 20
    7         :  CL $ 20
    8         :  C3 $ 20
    9         :     PH $ 20
   10         :     CA $ 20
   11         :     MG $ 20
   12      :        K $ 20
   13         :     NA $ 20
   14         :     CEC $ 20
   15         :     PB $ 20
   16  'READ/P' SITE, S1, S2, SL, CL, C3, PH, CA, MG, K,  NA, CEC, PB
   17  'INPUT' 1
   18  'PRIN/P' SITE, S1, S2, SL, CL, C3, PH, CA, MG, K, NA, CEC, PB
   19  'CALC'  LCE=LOG10(CEC)
   20    :       S2SQ=-1*(S2**2)
   21    :       LS2=LOG10(S2)
   22    :       LSL=LOG10(SL)
   23    :       MGSQ=MG**2
   24  'TERMS/PRINT=C'  LCE, LS2, LSL, MGSQ, S2SQ, CEC, CA, K, S2, SL, MG
   25  'Y'  LCE
   26  'FIT/PRIN=CAU' CA
   27        :        LS2
   28          :          SL
   29           :         LSL
   30  'Y' CEC
   31  'FIT/PRIN=CAU' CA
   32        :        K
   33        :        S2SQ
   34        :        MG
   35        :        MGSQ
   36  'RUN'

 S1       MNMINMAX      24.9000      6.0000     53.0000    20  VALUES    0 MISSING
 S2       MNMINMAX      20.7500     11.0000     54.0000    20  VALUES    0 MISSING   **
 SL       MNMINMAX      34.3500     14.0000     59.0000    20  VALUES    0 MISSING
 CL       MNMINMAX      22.6500      5.0000     69.0000    20  VALUES    0 MISSING
 C3       MNMINMAX       1.3167      0.0000      9.5000    20  VALUES    2 MISSING   **
 PH       MNMINMAX       5.7450      4.1000      7.6000    20  VALUES    0 MISSING
 CA       MNMINMAX       3.6521      0.2000     56.5000    20  VALUES    1 MISSING   **
 MG       MNMINMAX       0.8105      0.2000      4.2000    20  VALUES    1 MISSING   **
  K       MNMINMAX       0.2516      0.0400      1.7100    20  VALUES    1 MISSING   **
 NA       MNMINMAX       0.1900      0.0200      0.5800    20  VALUES    2 MISSING
CEC       MNMINMAX      17.7000      7.9000     37.6000    20  VALUES    2 MISSING
 PB       MNMINMAX      52.3999      5.0000     99.0000    20  VALUES    2 MISSING


 SITE          S1          S2          SL          CL          C3          PH          CA          MG          K
    1  2.9000E 1  3.4000E 1  5.0000E 1  1.6600E 1  4.4000E 0  7.3000E 0  3.0500E 1  3.0000E -1  1.4000E -1
    2  2.6000E 1  1.5000E 1  3.4000E 1  2.4000E 1  9.5000E 0  6.1000E 0  1.1300E 1  1.4000E 0  2.1000E -1
```

3	2.5000E	1	1.8000E	1	3.8000E	1	6.9000E	1		*	5.2000E	0		*		*		*	
4	2.8000E	1	1.5000E	1	3.2000E	1	2.5000E	1	6.0000E	-1	7.5000E	0	1.7100E	1	5.0000E	-1	2.0000E	-1	
5	2.6000E	1	2.5000E	1	3.1000E	1	1.8000E	1	2.0000E	-1	5.7000E	0	3.1000E	0	4.0000E	-1	1.4000E	-1	
6	4.7000E	1	2.7000E	1	1.7000E	1	8.0000E	0	0.0000E	0	6.5000E	0	4.7000E	0	2.0000E	-1	1.5000E	-1	
7	2.3000E	1	5.4000E	1	1.5000E	1	8.0000E	0	6.0000E	-1	4.2000E	0	1.1000E	0	3.0000E	-1	3.1000E	-1	
8	5.3000E	1	2.7000E	1	1.4000E	1	5.0000E	0		*	4.1000E	0	3.0000E	-1	3.0000E	-1	1.5000E	-1	
9	1.6000E	1	2.3000E	1	4.5000E	1	1.7000E	1	2.0000E	-1	5.9000E	0	10.0000E	0	8.0000E	-1	10.0000E	-2	
10	9.0000E	0	1.7000E	1	5.0000E	1	2.5000E	1	10.0000E	-2	6.1000E	0	1.2100E	1	8.0000E	-1	2.1000E	-1	
11	1.5000E	1	1.8000E	1	4.4000E	1	2.4000E	1	3.0000E	-1	4.3000E	0	2.0000E	-1	3.0000E	-1	1.7000E	-1	
12	2.6000E	1	1.4000E	1	3.8000E	1	2.2000E	1	0.0000E	0	5.4000E	0	8.0000E	0	7.0000E	-1	1.4000E	-1	
13	4.0000E	1	2.7000E	1	2.2000E	1	1.1000E	1	3.1000E	0	5.6000E	0	5.0000E	-1	2.0000E	-1	4.0000E	-2	
14	1.8000E	1	2.2000E	1	4.6000E	1	1.4000E	1	1.6000E	0	6.3000E	0	8.3000E	0	6.0000E	-1	5.7000E	-1	
15	6.0000E	0	1.1000E	1	2.6000E	1	5.8000E	1	2.4000E	0	5.5000E	0	3.9000E	0	5.0000E	-1	1.3000E	-1	
16	6.0000E	0	2.6000E	1	4.7000E	1	2.1000E	1	2.0000E	-1	6.8000E	0	1.1500E	1	9.0000E	-1	1.3000E	-1	
17	10.0000E	0	1.2000E	1	5.9000E	1	2.0000E	1	4.0000E	-1	4.3000E	0	5.0000E	-1	2.0000E	-1	7.0000E	-2	
18	3.7000E	1	1.6000E	1	2.8000E	1	1.9000E	1	0.0000E	0	5.9000E	0	9.9000E	0	1.2000E	0	8.0000E	-2	
19	3.7000E	1	1.1000E	1	3.1000E	1	2.2000E	1	0.0000E	0	5.8000E	0	1.5100E	1	1.6000E	0	1.3000E	-1	
20	2.1000E	1	1.2000E	1	4.0000E	1	2.7000E	1	10.0000E	-2	5.7000E	0	1.3900E	1	4.2000E	0	1.7100E	0	

NA		CEC		PB	
2.0000E	-1	3.7600E	1	9.9000E	1
3.1000E	-1	1.9900E	1	6.6000E	1
	*		*		*
2.1000E	-1	1.9500E	1	9.2000E	1
10.0000E	-2	8.7000E	0	4.3000E	1
3.0000E	-2	8.6000E	0	5.9900E	1
	*		*		*
1.4000E	-1	1.1500E	1	8.0000E	0
2.3000E	-1	1.7000E	1	6.5000E	1
3.8000E	-1	1.9000E	1	7.1000E	1
9.0000E	-2	1.1100E	1	6.0000E	0
7.0000E	-2	2.3600E	1	3.8000E	1
2.0000E	-2	7.9000E	0	10.0000E	0
8.0000E	-2	1.5700E	1	6.1000E	1
2.7000E	-1	1.1500E	1	4.2000E	1
1.2000E	-1	1.6300E	1	7.8000E	1
1.1000E	-1	1.6700E	1	5.0000E	0
2.6000E	-1	1.7300E	1	6.6000E	1
2.2000E	-1	2.3500E	1	7.3000E	1
5.8000E	-1	3.3200E	1	6.1000E	1

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***** CORRELATION MATRIX *****

DF = 16

LCE	1	1.0000										
LS2	2	-0.4418	1.0000									
LSL	3	0.4193	-0.3563	1.0000								
MGSQ	4	0.4689	-0.3771	0.1428	1.0000							
S2SQ	5	0.4770	-0.9783	0.4541	0.3399	1.0000						
CEC	6	0.9682	-0.8406	0.3034	0.5202	0.3558	1.0000					
CA	7	0.7918	-0.0321	0.1359	0.1726	0.0635	0.8415	1.0000				
K	8	0.4198	-0.2716	0.1869	0.9408	0.2588	0.4710	0.1535	1.0000			
S2	9	-0.4621	0.9939	-0.4074	-0.3597	-0.9952	-0.3497	-0.0474	-0.2659	1.0000		
SL	10	0.3505	-0.3011	0.9771	0.1034	0.3888	0.2277	0.0349	0.1616	-0.3469	1.0000	
MG	11	0.5542	-0.4596	0.2061	0.9571	0.4393	0.5573	0.2372	0.8635	-0.4514	0.1415	1.0000

RESIDUAL	16	962.8	60.1
TOTAL	17	1102.4	64.85
CHANGE	*	105.1	*

PERCENTAGE VARIANCE ACCOUNTED FOR 7.2

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	37.6	15.0	22.6
2	19.9	19.8	0.1
4	19.5	19.8	-0.3
5	8.7	15.0	-6.3
6	8.6	13.7	-5.1
8	11.5	13.7	-2.2
9	17.0	16.1	0.9
10	19.0	19.0	-0.0
11	11.1	18.6	-7.5
12	23.6	20.1	3.5
13	7.9	13.7	-5.6
14	15.7	16.7	-1.0
15	11.5	21.1	-9.6
16	16.3	14.3	2.0
17	16.7	20.8	-4.1
18	17.3	19.4	-2.1
19	23.5	21.1	2.4
20	33.2	20.8	12.4

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***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: CEC

	ESTIMATE	S.E.	T
CONSTANT	13.6817	2.2088	6.19
MG	4.7900	1.7841	2.68

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSION	1	342.4	342.39
RESIDUAL	16	760.0	47.51
TOTAL	17	1102.4	64.85
CHANGE	*	-202.9	*

PERCENTAGE VARIANCE ACCOUNTED FOR 26.8

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	37.6	15.1	22.5
2	19.9	20.4	-0.5
4	19.5	16.1	3.4

CEC = 13.687 + 4.79 Mg

5	8.6	14.6	-6.0
8	11.5	15.1	-3.6
9	17.0	17.5	-0.5
10	19.0	17.5	1.5
11	11.1	15.1	-4.0
12	23.6	17.0	6.6
13	7.9	14.6	-6.7
14	15.7	16.6	-0.9
15	11.5	16.1	-4.6
16	16.3	18.0	-1.7
17	16.7	14.6	2.1
18	17.3	19.4	-2.1
19	23.5	21.3	2.2
20	33.2	33.8	-0.6

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***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENT ***

Y-VARIATE: CEC

	ESTIMATE	S.E.	T
CONSTANT	16.1274	1.7913	9.00
MGSQ	1.0260	0.4211	2.44

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	1	298.3	298.27
RESIDUAL	16	804.1	50.26
TOTAL	17	1102.4	64.85
CHANGE	*	44.1	*

PERCENTAGE VARIANCE ACCOUNTED FOR 22.5

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	37.6	16.2	21.4
2	19.9	18.1	1.8
4	19.3	16.4	3.1
5	8.7	16.3	-7.6
6	8.4	16.2	-7.8
8	11.5	16.2	-4.7
9	17.0	16.8	0.2
10	19.0	16.8	2.2
11	11.1	16.2	-5.1
12	23.6	16.6	7.0
13	7.9	16.2	-8.3
14	15.7	16.5	-0.8
15	11.5	16.4	-4.9
16	16.3	17.9	-1.7
17	16.7	16.2	0.5
18	17.3	17.6	-0.3
19	23.5	18.8	4.7
20	33.2	34.2	-1.0

$$CEC = 16.127 + 1.026\ Mg^2$$

13	0.898	1.121	-0.224
14	1.196	1.278	-0.082
15	1.061	1.157	-0.096
16	1.212	1.282	-0.070
17	1.223	1.331	-0.108
18	1.238	1.172	0.066
19	1.371	1.194	0.177
20	1.521	1.248	0.273

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***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: CEC

	ESTIMATE	S.E.	T
CONSTANT	10.46756	1.56977	6.67
CA	0.78001	0.12518	6.23

*** ANALYSIS OF VARIANCE ***

	DF	SS	M
REGRESSN	1	780.7	780.6
RESIDUAL	16	321.7	20.11
TOTAL	17	1102.4	64.85
CHANGE	-1	-780.7	780.68

CEC = 10.467 + 0.78001 CA

PERCENTAGE VARIANCE ACCOUNTED FOR 69.0

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	37.6	36.9	-1.3
2	19.9	19.3	0.6
4	19.5	23.8	-4.3
5	8.7	12.9	-4.2
6	8.6	14.1	-5.5
8	11.5	10.7	0.8
9	17.0	18.3	-1.3
10	19.0	19.9	-0.9
11	11.1	10.6	0.5
12	23.6	16.7	6.9
13	7.9	10.9	-3.0
14	15.7	16.9	-1.2
15	11.5	13.5	-2.0
16	16.3	19.4	-3.1
17	16.7	10.9	5.8
18	17.3	18.2	-0.9
19	23.5	22.2	1.3
20	33.2	21.3	11.9

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***** REGRESSION ANALYSIS *****

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	1.575	1.179	0.396
2	1.299	1.201	0.098
4	1.290	1.190	0.100
5	0.940	1.184	-0.245
6	0.934	1.106	-0.171
8	1.061	1.089	-0.028
9	1.230	1.263	-0.033
10	1.279	1.291	-0.012
11	1.045	1.257	-0.212
12	1.373	1.224	0.149
13	0.898	1.134	-0.236
14	1.196	1.269	-0.073
15	1.061	1.156	-0.095
16	1.212	1.274	-0.062
17	1.223	1.342	-0.119
18	1.238	1.167	0.071
19	1.371	1.184	0.187
20	1.521	1.235	0.286

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***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: LCE

	ESTIMATE	S.E.	T
CONSTANT	0.46488	0.40449	1.15
LSL	0.48894	0.26466	1.85

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	1	0.1093	0.10927
RESIDUAL	16	0.5122	0.03202
TOTAL	17	0.6215	0.03656
CHANGE	*	-0.0329	*

PERCENTAGE VARIANCE ACCOUNTED FOR 12.4

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	1.575	1.187	0.388
2	1.299	1.214	0.085
4	1.290	1.201	0.089
5	0.940	1.194	-0.255
6	0.934	1.066	-0.132
8	1.061	1.025	0.035
9	1.230	1.273	-0.043
10	1.279	1.296	-0.017
11	1.045	1.268	-0.223
12	1.373	1.237	0.136

CONSTANT	1.[illegible]	[illegible]	[illegible].19
LS2	-0.58109	0.29580	-1.97

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	1	0.1213	0.12131
RESIDUAL	16	0.5002	0.03126
TOTAL	17	0.6215	0.03656
CHANGE	*	0.2683	*

PERCENTAGE VARIANCE ACCOUNTED FOR 14.5

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	1.575	1.127	0.449
2	1.299	1.256	0.043
4	1.290	1.256	0.035
5	0.940	1.127	-0.187
6	0.934	1.107	-0.173
8	1.061	1.107	-0.046
9	1.230	1.148	0.083
10	1.279	1.224	0.055
11	1.045	1.209	-0.164
12	1.373	1.273	0.100
13	0.898	1.107	-0.210
14	1.196	1.159	0.037
15	1.061	1.334	-0.273
16	1.212	1.117	0.095
17	1.223	1.312	-0.089
18	1.238	1.239	-0.001
19	1.371	1.334	0.037
20	1.521	1.312	0.209

$$CEC = 10^{1.9389 - 0.58(\log S_2)}$$

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***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: LCE

	ESTIMATE	S.E.	T
CONSTANT	1.0058906	0.1393737	7.25
SL	0.0342271	0.0237342	1.50

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	1	0.0763	0.07634
RESIDUAL	16	0.5452	0.03407
TOTAL	17	0.6215	0.03656
CHANGE	*	0.0450	*

PERCENTAGE VARIANCE ACCOUNTED FOR 6.[illegible]

CONSTANT	1.92892	[illegible]	[illegible].19
LS2	-0.58109	[illegible].29500	-1.97

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	1	0.1213	0.12131
RESIDUAL	16	0.5002	0.03126
TOTAL	17	0.6215	0.03656
CHANGE	*	0.2683	*

PERCENTAGE VARIANCE ACCOUNTED FOR 14.5

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	1.575	1.127	0.449
2	1.299	1.256	0.043
4	1.290	1.256	0.035
5	0.940	1.127	-0.187
6	0.934	1.107	-0.173
8	1.061	1.107	-0.046
9	1.230	1.148	0.083
10	1.279	1.224	0.055
11	1.045	1.209	-0.164
12	1.373	1.273	0.100
13	0.898	1.107	-0.210
14	1.196	1.159	0.037
15	1.061	1.334	-0.273
16	1.212	1.117	0.095
17	1.223	1.312	-0.089
18	1.238	1.239	-0.001
19	1.371	1.334	0.037
20	1.521	1.312	0.209

$$CEC = 10^{1.9289 - 0.58(\log S_2)}$$

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***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: LCE

	ESTIMATE	S.E.	T
CONSTANT	1.0098906	0.1393737	7.25
SL	0.0056271	[illegible]	1.50

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	1	0.0763	0.07634
RESIDUAL	16	0.5452	0.03407
TOTAL	17	0.6215	0.03656
CHANGE	*	0.0450	*

PERCENTAGE VARIANCE ACCOUNTED FOR [illegible]

1 2 3 4 5 6 7 8 9 10 11

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***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: LCE

	ESTIMATE	S.E.	T
CONSTANT	1.046509	0.042144	24.83
CA	0.017426	0.003361	5.19

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	1	0.3896	0.38965
RESIDUAL	16	0.2319	0.01449
TOTAL	17	0.6215	0.03656
CHANGE	-1	-0.3896	0.38965

PERCENTAGE VARIANCE ACCOUNTED FOR 60.4

$CEC = 10^{(1.046 + 0.0174\ CA)}$

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	1.575	1.683	-0.107
2	1.299	1.243	0.055
4	1.290	1.344	-0.054
5	0.940	1.101	-0.161
6	0.934	1.128	-0.194
8	1.061	1.052	0.009
9	1.230	1.221	0.010
10	1.279	1.257	0.021
11	1.045	1.050	-0.005
12	1.373	1.186	0.187
13	0.898	1.055	-0.158
14	1.196	1.191	0.005
15	1.061	1.114	-0.054
16	1.212	1.247	-0.035
17	1.223	1.055	0.167
18	1.238	1.219	0.019
19	1.371	1.310	0.061
20	1.521	1.289	0.232

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***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: LCE

	ESTIMATE	S.E.

1 2 3 4 5 6 7 8 9 10 11

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***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: LCE

	ESTIMATE	S.E.	T
CONSTANT	1.046509	0.042144	24.83
CA	0.017426	0.003361	5.19

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	1	0.3896	0.38965
RESIDUAL	16	0.2319	0.01449
TOTAL	17	0.6215	0.03656
CHANGE	-1	-0.3896	0.38965

PERCENTAGE VARIANCE ACCOUNTED FOR 60.4

$$CEC = 10^{(1.046 + 0.0174\ CA)}$$

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	1.575	1.683	-0.107
2	1.299	1.243	0.055
4	1.290	1.344	-0.054
5	0.940	1.101	-0.161
6	0.934	1.128	-0.194
8	1.061	1.052	0.009
9	1.230	1.221	0.010
10	1.279	1.257	0.021
11	1.045	1.050	-0.005
12	1.373	1.186	0.187
13	0.898	1.055	-0.158
14	1.196	1.191	0.005
15	1.061	1.114	-0.054
16	1.212	1.247	-0.035
17	1.223	1.055	0.167
18	1.238	1.219	0.019
19	1.371	1.310	0.061
20	1.521	1.289	0.232

27

***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: LCE

ESTIMATE S.E. T

	3	2.5000E	1	1.8000E	1	3.8000E	1	6.9000E	1		*	6.2000E	0		*		*		*
	4	2.8000E	1	1.5000E	1	3.2000E	1	2.5000E	1	6.0000E	-1	7.5000E	0	1.7100E	1	5.0000E	-1	2.0000E	-1
	5	2.6000E	1	2.5000E	1	3.1000E	1	1.8000E	1	2.0000E	-1	5.7000E	0	3.1000E	0	4.0000E	-1	1.4000E	-1
	6	4.7000E	1	2.7000E	1	1.7000E	1	8.0000E	0	0.0000E	0	6.5000E	0	4.7000E	0	2.0000E	-1	1.5000E	-1
	7	2.3000E	1	5.4000E	1	1.5000E	1	8.0000E	0	6.0000E	-1	4.2000E	0	1.1000E	0	3.0000E	-1	3.1000E	-1
	8	5.3000E	1	2.7000E	1	1.4000E	1	5.0000E	0		*	4.1000E	0	3.0000E	-1	3.0000E	-1	1.5000E	-1
	9	1.6000E	1	2.3000E	1	4.5000E	1	1.7000E	1	2.0000E	-1	5.9000E	0	10.0000E	0	8.0000E	-1	10.0000E	-2
	10	9.0000E	0	1.7000E	1	5.0000E	1	2.5000E	1	10.0000E	-2	6.1000E	0	1.2100E	1	8.0000E	-1	2.1000E	-1
	11	1.5000E	1	1.8000E	1	4.4000E	1	2.4000E	1	3.0000E	-1	4.3000E	0	2.0000E	-1	3.0000E	-1	1.7000E	-1
	12	2.6000E	1	1.4000E	1	3.8000E	1	2.2000E	1	0.0000E	0	5.4000E	0	8.0000E	0	7.0000E	-1	1.4000E	-1
	13	4.0000E	1	2.7000E	1	2.2000E	1	1.1000E	1	3.1000E	0	5.6000E	0	5.0000E	-1	2.0000E	-1	4.0000E	-2
	14	1.8000E	1	2.2000E	1	4.6000E	1	1.4000E	1	1.6000E	0	6.3000E	0	8.3000E	0	6.0000E	-1	5.7000E	-1
	15	6.0000E	0	1.1000E	1	2.6000E	1	5.8000E	1	2.4000E	0	5.5000E	0	3.9000E	0	5.0000E	-1	1.3000E	-1
	16	6.0000E	0	2.6000E	1	4.7000E	1	2.1000E	1	2.0000E	-1	6.8000E	0	1.1500E	1	9.0000E	-1	1.3000E	-1
	17	10.0000E	0	1.2000E	1	5.9000E	1	2.0000E	1	4.0000E	-1	4.3000E	0	5.0000E	-1	2.0000E	-1	7.0000E	-2
	18	3.7000E	1	1.6000E	1	2.8000E	1	1.9000E	1	0.0000E	0	5.9000E	0	9.9000E	0	1.2000E	0	8.0000E	-2
	19	3.7000E	1	1.1000E	1	3.1000E	1	2.2000E	1	0.0000E	0	5.8000E	0	1.5100E	1	1.6000E	0	1.3000E	-1
	20	2.1000E	1	1.2000E	1	4.0000E	1	2.7000E	1	10.0000E	-2	5.7000E	0	1.3900E	1	4.2000E	0	1.7100E	0

NA		CEC		PB	
2.0000E	-1	3.7600E	1	9.9000E	1
3.1000E	-1	1.9900E	1	6.6000E	1
	*		*		*
2.1000E	-1	1.9500E	1	9.2000E	1
10.0000E	-2	8.7000E	0	4.3000E	1
3.0000E	-2	8.6000E	0	5.9000E	1
	*		*		*
1.4000E	-1	1.1500E	1	8.0000E	0
2.3000E	-1	1.7000E	1	6.5000E	1
3.8000E	-1	1.9000E	1	7.1000E	1
9.0000E	-2	1.1100E	1	6.0000E	0
7.0000E	-2	2.3600E	1	3.8000E	1
2.0000E	-2	7.9000E	0	10.0000E	0
8.0000E	-2	1.5700E	1	6.1000E	1
2.7000E	-1	1.1500E	1	4.2000E	1
1.2000E	-1	1.6300E	1	7.8000E	1
1.1000E	-1	1.6700E	1	5.0000E	0
2.6000E	-1	1.7300E	1	6.6000E	1
2.2000E	-1	2.3500E	1	7.3000E	1
5.8000E	-1	3.3200E	1	6.1000E	1

7

27.....

***** CORRELATION MATRIX *****

DF = 16

LCE	1	1.0000					
CA1	2	0.6738	1.0000				
CA2	3	0.6727	1.0000	1.0000			
CA3	4	0.6709	1.0000	1.0000	1.0000		
CA4	5	0.6683	0.9999	0.9999	1.0000	1.0000	
CA5	6	0.6636	0.9997	0.9998	0.9999	0.9999	1.0000

```
GENSTAT 5 RELEASE 4.03 VERSION 1  01/09/80

GENSTAT V     MARK 4.03
(C)1980 LAWES AGRICULTURAL TRUST (ROTHAMSTED EXPERIMENTAL STATION)

    1  'REFERENCE/LINE=6000' REGTRIAL
    2  'UNIT'  SITE=1...20
    3  'INPUT' 2
    4  'VARIATE' S1 $ 20
    5         :  S2 $ 20
    6         :  SL $ 20
    7         :  CL $ 20
    8         :  C3 $ 20
    9         :  PH $ 20
   10         :  CA $ 20
   11         :  MG $ 20
   12      :     K $ 20
   13         :  NA $ 20
   14         :  CEC $ 20
   15         :  PB $ 20
   16  'READ/P' SITE, S1, S2, SL, CL, C3, PH, CA, MG, K,  NA, CEC, PB
   17  'INPUT' 1
   18  'PRIN/P' SITE, S1, S2, SL, CL, C3, PH, CA, MG, K, NA, CEC, PB
   19  'CALC'  LCE=LOG10(CEC)
   20     :       CA1=LOG10(1-(EXP(-0.0010*CA)))
   21     :       CA2=LOG10(1-(EXP(-0.0025*CA)))
   22     :       CA3=LOG10(1-(EXP(-0.0050*CA)))
   23     :       CA4=LOG10(1-(EXP(-0.0085*CA)))
   24     :       CA5=LOG10(1-(EXP(-0.015*CA)))
   25     :       CA6=LOG10(1-(EXP(-0.025*CA)))
   26     :       CA7=LOG10(1-(EXP(-0.035*CA)))
   27  'TERMS/PRIN=C' LCE, CA1,CA2,CA3,CA4,CA5,CA6,CA7
   28  'Y' LCE
   29  'FIT/PRIN=CAU' CA1
   30         :       CA2
   31         :       CA3
   32         :       CA4
   33         :       CA5
   34         :       CA6
   35         :       CA7
   36  'RUN'

    S1      MNMINMAX      24.9000      6.0000     53.0000    20  VALUES    0 MISSING
    S2      MNMINMAX      20.7500     11.0000     54.0000    20  VALUES    0 MISSING  **
    SL      MNMINMAX      34.3500     14.0000     59.0000    20  VALUES    0 MISSING
    CL      MNMINMAX      22.6500      5.0000     69.0000    20  VALUES    0 MISSING
    C3      MNMINMAX       1.3167      0.0000      9.5000    20  VALUES    2 MISSING  **
    PH      MNMINMAX       5.7550      4.1000      7.8000    20  VALUES    0 MISSING
    CA      MNMINMAX       8.8421      0.2000     36.5000    20  VALUES    1 MISSING  **
    MG      MNMINMAX       0.8105      0.2000      4.2000    20  VALUES    1 MISSING  **
     K      MNMINMAX       0.2516      0.0400      1.7100    20  VALUES    1 MISSING  **
    NA      MNMINMAX       0.1900      0.0200      0.5800    20  VALUES    2 MISSING
   CEC      MNMINMAX      17.7000      7.9000     37.6000    20  VALUES    2 MISSING
    PB      MNMINMAX      52.3889      5.0000     99.0000    20  VALUES    2 MISSING


 SITE          S1          S2          SL          CL          C3          PH          CA          MG          K
    1  2.9000E 1  2.5000E 1  3.0000E 1  1.6000E 1  4.4000E 0  7.8000E 0  3.6500E 1  3.0000E -1  1.4000E -1
    2  2.6000E 1  1.5000E 1  3.4000E 1  2.4000E 1  9.5000E 0  6.1000E 0  1.1300E 1  1.4000E 0  2.1000E -1
```

$$\log CEC = \log b_0 + b_1 \log\left[1 - \exp(-K \cdot CA)\right]$$

***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: LCE

	ESTIMATE	S.E.	T
CONSTANT	1.65787	0.12800	12.95
CA1	0.19288	0.05288	3.65

*** ANALYSIS OF VARIANCE ***

	DF	SS	MS
REGRESSN	1	0.2822	0.28217
RESIDUAL	16	0.3394	0.02121
TOTAL	17	0.6215	0.03656
CHANGE	-1	-0.2822	0.28217

PERCENTAGE VARIANCE ACCOUNTED FOR 42.0

*** OBSERVED AND FITTED VALUES ***

	OBSERVED	FITTED	RESIDUAL
1	1.575	1.379	0.196
2	1.299	1.282	0.017
4	1.290	1.316	-0.026
5	0.940	1.174	-0.234
6	0.934	1.209	-0.274
8	1.061	0.978	0.082
9	1.230	1.272	-0.041
10	1.279	1.288	-0.009
11	1.045	0.944	0.101
12	1.373	1.253	0.120
13	0.898	1.021	-0.124
14	1.196	1.256	-0.060
15	1.061	1.193	-0.132
16	1.212	1.283	-0.071
17	1.223	1.021	0.202
18	1.238	1.271	-0.033
19	1.371	1.306	0.065
20	1.521	1.299	0.222

$$\log CEC = 1.65787 + 0.19288 \log(1-\exp(-0.001 \cdot CA))$$

$$CEC = 45.4851\left(1-e^{-0.001 \cdot CA}\right)^{0.1928}$$

***** REGRESSION ANALYSIS *****

*** REGRESSION COEFFICIENTS ***

Y-VARIATE: LCE

	ESTIMATE	S.E.	T
CONSTANT	1.58233	0.10850	14.58
CA2	0.19321	0.05313	3.64

APPENDIX 7.3

The Equal-Area Spline: Mathematical solution for computing Equal-Area spline curves.

Appendix 7.3

The Equal-Area Spline algorithm fits a spline curve tothe mean values of each of the sequence of horizons that comprise the whole soil profile. Each horizon defines an interval and consequently the "knots" are placed exactly on the inter-horizon boundaries X_i, X_{i+1}, ... X_{n-1}, X_n.

The spline for each interval must meet the "equal-area" condition:

$$V_1(X_1 - X_0) = \int_{x_0}^{x_1} f(X)dX$$
$$V_2(X_2 - X_1) = \int_{x_1}^{x_2} f(X)dX$$

in general:

$$V_n(X_n - X_{n-1}) = \int_{X_{n-1}}^{x_n} f(X)d(X)$$

Thus the change in the value of the variable within interval i described by the curve is represented by an horizon mean Vi.

A cubic polynomial can be used to describe the area within each interval. The equal-area condition is then expressed as

$$V_i(X_i - X_{i-1}) = a_i + b_iX + c_iX^2 + d_iX^3$$

then we can write

$$\int_{x_{i-1}}^{x_i} f(X)d(X) = a_i + b_iX + c_iX^2 + d_iX^3$$

Hence, the spline function within each interval is described by a quadratic polynomial

$$f(X) = b_i + 2c_iX + 3d_iX^2$$

Thus, if we chose an interval defined by the horizon limits X_i and X_{i+1}, the equal-area condition is

$$b_i(X_{i+1} - X_i) + c_i(X_{i+1}^2 - X_i^2) + d_i(X_{i+1}^3 - X_i^3) = V_i(X_{i+1} - X_i)$$

The continuity condition is

$$b_i + 2c_iX_{i+1} + 3d_iX_{i+1}^2 = b_{i+1} + 2c_{i+1}X_{i+1} + 3d_{i+1}X_{i+1}^2$$

hence the curve has no breaks and has a continuous derivative

$$c_i + 3d_iX_{i+1} = c_{i+1} + 3d_{i+1}X_{i+1}$$

Now, if there are n horizons (i.e. intervals) in the profile with limits $0,X_1,X_2,\ldots X_n$; there are n equations of the first type, and n-1 of the second and third type, i.e. the continuity conditions. There are thus 3n-2 equations in 3n unknowns. By fitting two further end-conditions these equations may be solved. Notice that if cubic polynomials were fitted to each interval instead of quadratics this would have yielded 4n unknowns and only 4n-3 equations which would require 3 extra values. The two extra values will have to be guessed. For convenience in computation these values are calculated at the top and the bottom of the profile and thus inserted. Two suggested procedures to calculate top and bottom values are explained in detail in appendix 7.4

The algorithm for fitting Equal-Area Splines to data from soil profiles consists of solving a system of equations to calculate the coefficients b, c, and d for each piecewise polynomial.

The idea is to express b, c and d in terms of c and d only. It can be shown that b can be eliminated from the equation.

The first equation can then be written:

$$b_1 + c_1X_1 + d_1X^2 = V_1/X_1$$

We can then write:

$$\begin{bmatrix} b_1 \\ c_1 \\ d_1 \end{bmatrix} = A_1 \begin{bmatrix} 1 \\ c_1 \\ d_1 \end{bmatrix}$$

were A_1 is the matrix:

$$A_1 = \begin{bmatrix} O_{11} & P_{11} & Q_{11} \\ O_{12} & P_{12} & Q_{22} \\ O_{13} & P_{13} & Q_{33} \end{bmatrix}$$

used for storage of the three coefficients of each spline.

Similarly using the equation for the second horizon and the two continuity conditions we can write:

$$\begin{bmatrix} b_2 \\ c_2 \\ d_2 \end{bmatrix} = A_2 \begin{bmatrix} 1 \\ c_2 \\ d_2 \end{bmatrix}$$

and

$$U \times \begin{bmatrix} b_2 \\ c_2 \\ d_2 \end{bmatrix} \quad K \begin{bmatrix} b_1 \\ c_1 \\ d_1 \end{bmatrix} + \begin{bmatrix} V_2/X_2 - X_1 \\ 0 \\ 0 \end{bmatrix}$$

where:

$$U = \begin{bmatrix} 1 & X_2+X_1 & X^2+X_1X^2+X^2 \\ 1 & 2X_1 & 3X^2 \\ 0 & 1 & 3X_1 \end{bmatrix}$$

and

$$K = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 3X_1 & 3X^2 \\ 0 & 1 & 3X_1 \end{bmatrix}$$

Now, we can write:

$$K \begin{bmatrix} b_1 \\ c_1 \\ d_1 \end{bmatrix} = K A_1 \begin{bmatrix} 1 \\ c_1 \\ d_1 \end{bmatrix}$$

the set of equations can then be written:

$$U \begin{bmatrix} b_2 \\ c_2 \\ d_2 \end{bmatrix} = N \begin{bmatrix} 1 \\ c_1 \\ d_1 \end{bmatrix}$$

where N is the matrix:

$$N = K A_1 + \begin{bmatrix} F_2/X_2-X_1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

which is the transposed of the matrix:

$$\begin{bmatrix} M_1 & 0 & 0 \\ M_2 & W_2 & Z_2 \\ M_3 & W_3 & Z_3 \end{bmatrix}$$

then;

$$\begin{bmatrix} b_2 \\ c_2 \\ d_2 \end{bmatrix} = U^{-1} N \begin{bmatrix} 1 \\ c_1 \\ d_1 \end{bmatrix} = A_2 \begin{bmatrix} 1 \\ c_1 \\ d_1 \end{bmatrix}$$

is such that the elements of U^{-1} are $T_{ij}/(X_k-X_{k-1})^2$.

The procedure then continues to give:

$$\begin{bmatrix} b_k \\ c_k \\ d_k \end{bmatrix} = A_k \begin{bmatrix} 1 \\ c_1 \\ d_1 \end{bmatrix}$$

which provides the estimates of the b_k, c_k and d_k spline coefficients.

Thus, the steps in the algorithm are:

(i). Calculate the M, W, Z 's, the elements of

$$K\,A_{k-1} + \begin{bmatrix} F_k/(X_k - X_{k-1}) & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

(ii). Calculate the inverse of U; i.e U^{-1}).

(iii). Form the matrix $A_k = U^{-1}N$.

(iv). Estimate the spline coefficients b_k, c_k, and d_k by premultiplying the e elements $O_{k,1}, \ldots O_{k,3}$; $P_{k,1} \ldots P_{k,3}$; $Q_{k,1} \ldots Q_{k,3}$ of matrix A in each k interval by the vector $\begin{bmatrix} 1 \\ c_1 \\ d_1 \end{bmatrix}$.

The algorithm then fits, piecewise, a continuous smooth spline-like curve through the whole profile depth.

which provides the estimates of the b_k, c_k and d_k spline coefficients.

Thus, the steps in the algorithm are:

(i). Calculate the M, W, Z 's, the elements of

$$K\,A_{k-1} + \begin{bmatrix} F_k/(X_k - X_{k-1}) & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

(ii). Calculate the inverse of U; i.e U^{-1}).

(iii). Form the matrix $A_k = U^{-1}N$.

(iv). Estimate the spline coefficients b_k, c_k, and d_k by premultiplying the e elements $O_{k,1}, \ldots O_{k,3}$; $P_{k,1} \ldots P_{k,3}$; $Q_{k,1} \ldots Q_{k,3}$ of matrix A in each k interval by the vector $\begin{bmatrix} 1 \\ c_1 \\ d_1 \end{bmatrix}$.

The algorithm then fits, piecewise, a continuous smooth spline-like curve through the whole profile depth.

APPENDIX 7.4

An improved method for reconstructing soil profiles from a small number of samples. (Paper by Ponce-Hernandez, R., Marriot, F.H.C. and Beckett, P.H.T., 1986. J. Soil Sci. 37; 455-467. The paper shows the advantages of equal-area splines for profile reconstructions.

Journal of Soil Science, 1986, 37, 000–000

An improved method for reconstructing a soil profile from analyses of a small number of samples

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Soil Science Laboratory, Department of Agricultural Science, Parks Road, University of Oxford, OX1 3PF, U.K.

SUMMARY

Most soil properties vary down a soil profile. In nearly every case a graph of the value of the property against depth (the 'true' curve) is smooth. However, a soil sample is usually taken from the whole of a horizon so that its analysis is the mean value for the horizon, and a graph of analyses against horizon depth is a 'stepped' profile. It is possible to produce a smooth profile by attributing each analysis to the mid-depth of its horizon and fitting a polynomial or spline curve through these values, but the former may produce erratic results, and both of them produce curves in which the true maxima and minima may be considerably damped.

This paper explores the possibility of deriving a better reconstruction of the true profile from the same number of analyses by:

(a) taking the samples for analysis from narrow layers at depths that appear to correspond to maxima, minima, or points of inflexion on the true curve, and fitting spine curves through their values;

(b) fitting a modified 'equal-area' spline curve to conventional whole-horizon samples.

The latter is considerably superior and, in most cases, achieves a surprisingly close reconstruction of the true profile from which the samples were taken.

INTRODUCTION

Soil properties vary down the profile. The variation is usually continuous, in the sense that a graph of the values of a property (e.g. Fig. 1a) against depth may show maxima or minima, but rarely shows discontinuities except in the case that the original parent material consisted of highly contrasting layers.

Conventionally, a soil profile is divided into pedological horizons for description. Usually the whole depth of each horizon is sampled and mixed for analysis and the analysis is assumed to correspond to the mean value for the horizon. In effect the smooth profile of Fig. 1a is now represented by the discontinuous or *stepped profile* of Fig. 1b, where the divisions correspond to the pedological horizons.

For some purposes, however, it is too clumsy to represent vertical variation by a stepped profile. In particular it is not possible to estimate, with much confidence, the value of a soil property at a specified depth (*'point-depth'*), or its average value over a specified range of depths, from a stepped profile. Faced with such problems pedologists tend to reconstruct the original smooth profile by attributing the mean value of each horizon to its mid-point (and occasionally interpolating values for inferred transitional horizons, e.g. Moore *et al.*, 1972), and constructing a smooth curve through these points. Such curves are often drawn by eye. Russell & Moore (1968) fitted exponential decay functions. Colwell (1970) and Moore *et al.* (1972) constructed orthogonal polynomials

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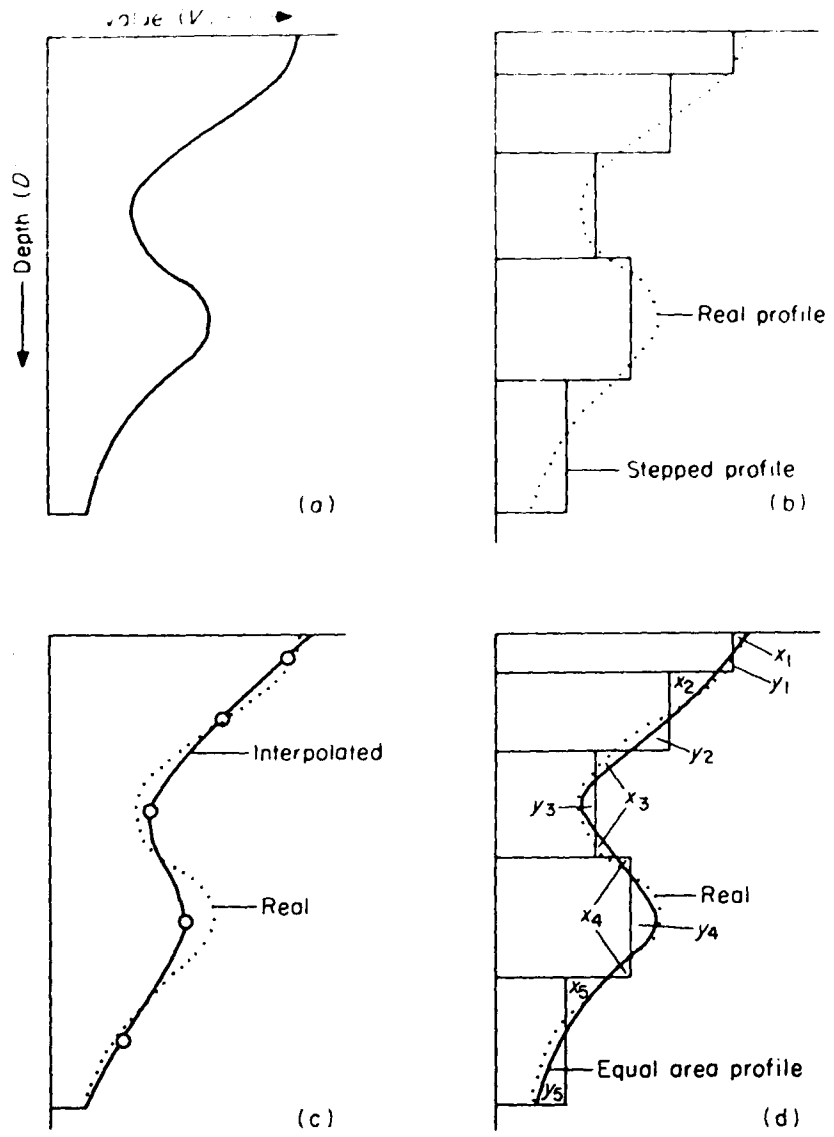


Fig. 1. (a) The 'true' profile of values (V) of a soil property against depth (D). (b) The 'stepped' profile that contains all the information in the analyses of five whole-horizon samples. (c) A smooth curve drawn through the mid-points of the horizons in (b). (d) An 'equal-area' curve, such that for each horizon $\Sigma X = \Sigma Y$.

by least-squares fitting. Both these procedures have the disadvantage that the value of the property at any depth affects the form of the fitted function at all depths, and as Webster (1978) showed, the closeness of their fit is very inconsistent. In contrast, a spline function, derived piece-wise over small sections of the profile without reference to other parts of it, will produce a smooth curve over the whole profile (Webster, 1978). This seems to be the best current procedure, and Webster suggests that cubic functions are usually sufficient.

However, all these procedures have the disadvantage that they fit curves through horizon averages—that is, they start from data in which the maxima and minima of the original profiles have already been 'damped' by averaging. Almost inevitably the profiles they reconstruct will be smoother than the originals (Fig. 1c). This may be a considerable disadvantage, particularly in context where it is the extreme values that matter. For example, it might be better to infer the permeability of an irrigated soil from the maximum of a graph of clay content against depth than from the mean analysis of the horizon of highest clay content.

There appear to be two possible ways of reconstructing better smooth profiles from a limited number of analyses. Firstly we might fit a smooth spline function through the horizon means, but with the extra condition that the area to the left of the fitted spline curve (Fig. 1d) for each horizon must be equal to the average analysis for the whole horizon. This would require that the sum of areas X in each horizon (Fig. 1d) shall equal the sum of areas Y in that horizon. As far as we know this has not been attempted previously. The smoothness criterion and the equal-area criterion are to some extent in conflict, so maxima and minima might still be partly damped.

Secondly, it might be better to collect samples from thin layers in the profile (point-depths), corresponding to supposed maxima or minima, or points of inflexion, of the values of important soil properties, than to sample whole horizons. Smooth spline curves could then be fitted through the point-depth values.

Spline functions

A spline is a draughtsman's tool, a flexible strip that forms a smooth curve of minimum energy when it is held down by weights so that it passes through a set of points. By analogy a spline function is a set of local (piece-wise) functions that describe a smooth curve through a set of points. We are concerned here with spline functions that describe figures like Fig. 1a where depth (D) is the independent, and the value of a soil property (V) is the dependent variable.

To construct a spline function, the sequence of points must be divided into groups along the direction of the independent variable. The groups or 'intervals' are separated by 'knots', which are specified by values of the indepenent variable. A knot need not correspond to a data-point.

A polynomial is then fitted to each interval with the conditions that the two polynomials that intersect at a knot shall have the same values there (obviously) and that the values of their first and second derivatives shall also be equal (i.e. same slope and same curvature). Together these ensure the smoothness of the whole curve. Ideally the knots would be spaced tentatively at intervals corresponding to the lag depth at which the autocorrelation function of the values of the property shows trends, and then adjusted interactivly to minimize the sum of squared residuals (Powell, 1967; Rice, 1969).

If there is a knot at every data-point then the 'exact-spline' produced passes through every point; if there are fewer knots a 'least squares spline' must be fitted through the data points. Webster (1978) comments that the 'curve may fluctuate in a quite unwarranted way if too close approximations are attempted to the data'. Other authors comment on the dangers of 'over-fitting' spline-curves.

Wold (1974) would limit exact-splines to sets of not less than 10–15 points with relatively uniform distribution. He recommends as few knots as possible: preferably each interval should contain four to five data points, and there should not be more than one 'extremum' (maximum or minimum) and one inflexion in each interval. If possible, the knots should lie as near as possible to inflexions and as far as possible from extrema.

Modified or 'equal-area' spline functions

The modified or 'equal-area' spline procedure proposed here starts from the mean values of each of the sequence of horizons that comprise the whole soil profile. Each horizon is taken as an interval and the knots of the piece-wise polynomials lie on the inter-horizon boundaries, i.e. D_1 to D_{n-1} on Fig. 2a. We use a cubic polynomial to describe the area within each interval,

$$V = a + bD + cD^2 + dD^3 \tag{1}$$

so the spline function within each interval is described by a quadratic polynomial,

$$V = b + 2cD + 3\mathrm{dD}^2. \tag{2}$$

Thus for horizon II, as an example, the quadratic polynomial must meet: (i) the equal-area condition:

$$\bar{V}_{II}(D_2 - D_1) = b_{II}(D_2 - D_1) + c_{II}(D_2^2 - D_1^2) + d_{II}(D_2^3 - D_1^3) \tag{3}$$

where $\bar{V}_{II}$ is the mean value for the horizon, and (ii) the conditions for continuity and equal slope at the upper and lower horizon limits:

$$\begin{aligned}
(b_{II} - b_I) + 2(c_{II} - c_I)D_1 + 3(d_{II} - d_I)D_1^2 &= 0 \\
(c_{II} - c_I) + 3(d_{II} - d_I)D_1 &= 0 \\
(b_{III} - b_{II}) + 2(c_{III} - c_{II})D_2 + 3(d_{III} - d_{II})D_2^2 &= 0 \\
(c_{III} - c_{II}) + 3(d_{III} - d_{II})D_2 &= 0
\end{aligned}$$

For a profile of n horizons there will be $3n-2$ equations and $3n$ unknowns (b, c, d for each horizon). To solve the equations it will be necessary to specify the horizon means and also two extra values. The use of quadratic polynomials does not allow conditions for constant curvature at the knots, so the fitted curve may show sharp changes in curvature. However, fitting cubic polynomials to each interval would introduce $4n$ unknowns and only $4n-3$ equations, which would require three extra values, so we have used quadratics. For convenience in computation we have chosen to enter the values (V_0 and V_n) at the top and bottom of the profile, or alternatively the first derivatives of the local polynomial at the top and bottom of the profile ($F(V_0)$ and $F(V_n)$).

Usually the two extra values will not have been measured, so they are arbitrarily calculated from the horizon means.

Top of the profile. For a cultivated profile with an effectively uniform topsoil the user may wish to enter the average value of the top horizon, or a zero value for the first derivative of the local polynomial. Otherwise we assume that the trend of the first two horizons (e.g. organic matter decreasing with depth, clay content increasing with depth) continues to the surface but less markedly than an extrapolation through the mid-points of the top two stepped horizons of Fig. 1b. Fig. 2b illustrates the empirical extrapolation used.

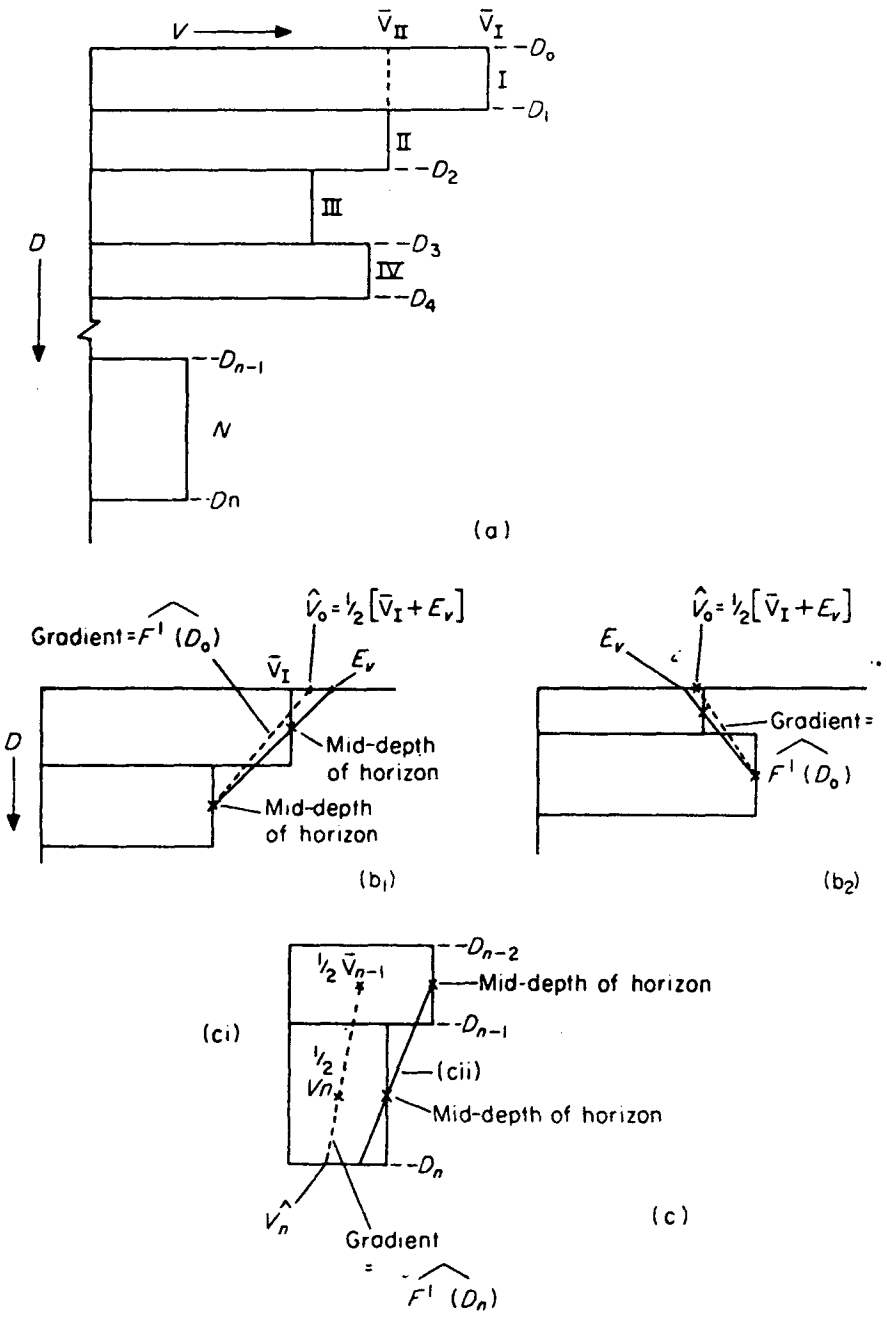


Fig. 2. (a) A stepped profile of whole-horizon analyses ($\bar{V}_1$ $\bar{V}_M$): D_1 D_n are horizon boundaries. (b) Arbitrary conventions for estimating approximate values of V_0 and $F(V_0)$ from whole-horizon values. (c) Arbitrary conventions for estimating approximate values of V_n and $F(V_n)$ from whole-horizon values: —— preferred.

Base of the profile. The values of most soil properties developed by weathering or soil genesis tend to decrease asymptotically to the values of the parent material. Fig. 2c presents simple empirical constructions to derive reasonable values at D_n.

Obviously there are properties such as the proportions of stones or coarse sand, representing unweathered fragments of parent material, or calcium carbonate or soluble salts accumulating at the base of the column or below the recorded part of a deep profile, that increase at the base of the profile. In such cases the user may wish to extrapolate through the mid-points of the two lowest horizons.

In practice, arbitrarily derived values of the first derivatives at D_0 and D_n usually lead to a better fit than arbitrarily derived values of V_0 and V_n.

THIS STUDY

The preceding sections have discussed three ways of reconstructing a smooth profile from incomplete data:

(a) sampling conventionally, to produce an average analysis for each horizon, and then producing a smooth profile by means of an *equal-area spline function;*
(b) sampling conventionally, then fitting a conventional spline function through horizon means at horizon mid-depths (*conventional procedure:* Webster, 1978);
(c) sampling at point depths in the profile and then fitting a conventional spline function through the points *(point-sample procedure)*.

This study compares the efficacy of these three procedures at reconstructing four smooth profiles of varied complexity, each of five horizons, that had been sampled either by whole horizons or at point-depths. Since it was the success of different procedures at reconstructing a true profile that was to be compared, the first stage was to construct plausible original profiles as curves on a graph. These curves were then sampled according to the various procedures below, and curves were fitted to the sample values. The mean-square error between a fitted curve and the original curve measures the extent to which that combination of sampling procedure and fitting procedure has been less than perfect.

METHODS

The profiles

To produce plausible profiles horizon analyses were extracted from four profiles in *Soil Taxonomy* (USDA, 1982) (Table 1) and smooth free-hand curves drawn through the horizon means (Fig. 3). These constructed curves were then regarded as the 'true' profiles to be sampled and reconstructed. Table 1 describes the profiles in order of increasing complexity. Note that we are not trying to reconstruct the actual profiles of the soils described in *Soil Taxonomy*, which are unknown to us, but to reconstruct the smooth curves of Fig. 3 from which the samples were taken.

Table 1. The original profiles derived from *Soil Taxonomy* (USDA, 1982), in order of increasing complexity

Profile no.	Profiles in *Soil Taxonomy*	Sub-group	Property selected
1	Pedon No. 4	Udic Argiustoll	Clay (%)
2	Pedon No. 64	Typic Paleorthid	Cation Exchange Capacity (CEC) (me/100g)
3	Pedon No. 4	Udic Argiustoll	Sand (2–0.05 mm) (%)
4	Pedon No. 73	Typic Eutrandept	Organic carbon (%)

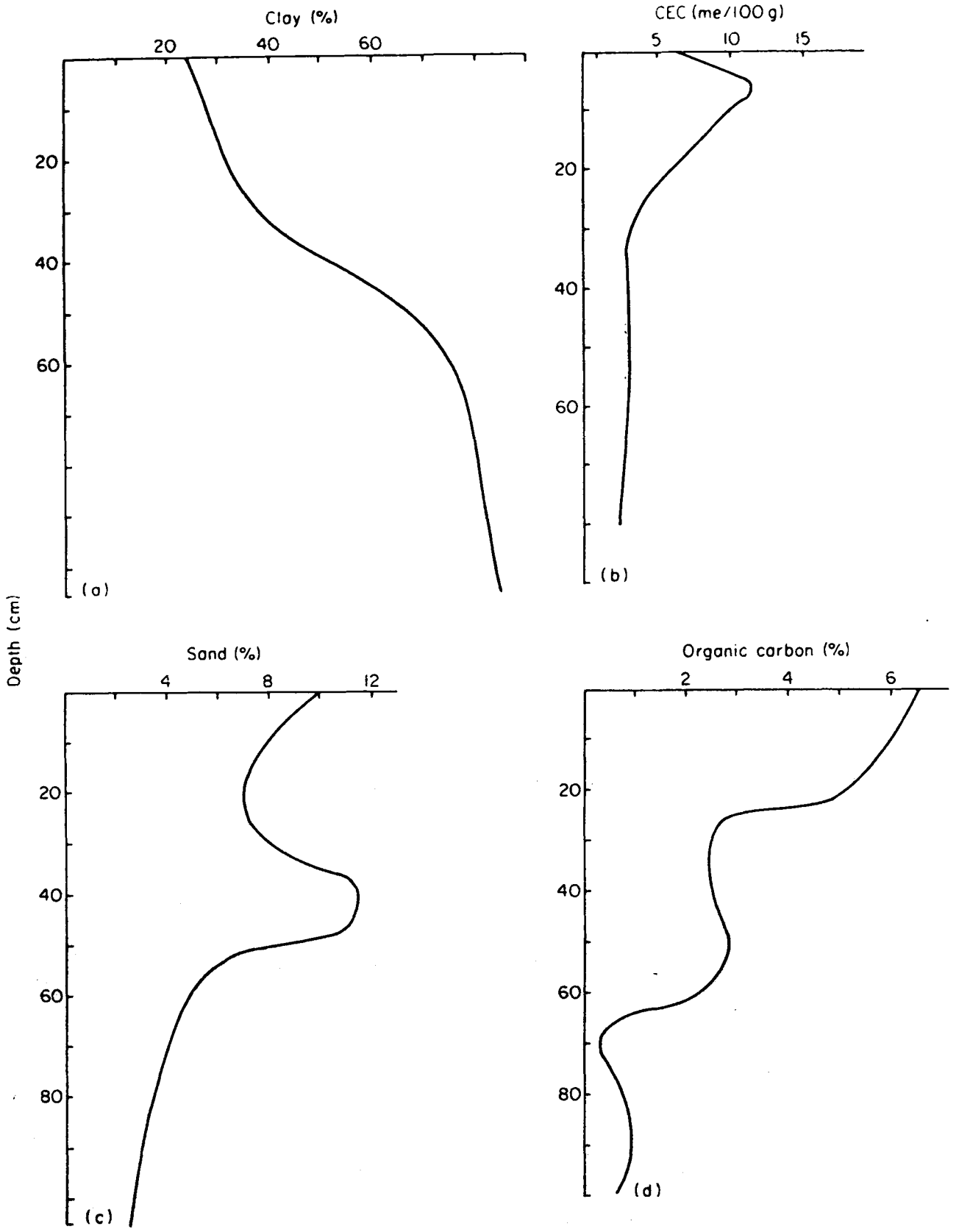


Fig. 3. Smooth free-hand plots of (a) clay (%) in Pedon No. 4, (b) CEC (me/100g) Pedon No. 64, (c) sand (%) Pedon No. 4, (d) organic carbon (%) No. 73 (USDA, 1982). These were the 'true' profiles sampled, and then reconstructed according to the procedures being compared.

The constructed 'true' profiles were sampled in two ways:

(a) Samples *bulked* for the whole of a horizon, or sub-horizon, to produce average values:
  (i) for each of the five horizons originally defined (B5 sampling);
  (ii) for the five horizons, and also point-depth samples at the top and base of the profile (B7 sampling);
  (iii) for (2 × 5) sub-horizons and also point-depth samples at the top and base of the profile (B12 sampling).

Table 2. Sample values for profile 3

No. of samples	Horizon or sub-horizon	B-sampling Depth range (cm)	B-sampling Value	P-sampling Point depth (cm)	P-sampling Value
	Top	0	(9.4(*; (9.7)†	0	(9.41)*; (9.94)†
5 and 7	1	0–13	8.7	6.5	8.62
	2	13–32	7.37	22.5	7.09
	3	32–50	10.75	41.0	11.57
	4	50–68	5.31	59.0	5.05
	5	68–105	3.28	86.5	3.19
	Bottom	105	(2.99*; (2.49)†	105.0	(2.99*; (2.49)†
	Top	0	(9.95)†	0	(9.95)†
	1	0–6.5	9.31	6.5	8.62
	2	6.5–13.0	8.1	13.0	7.55
	3	13.0–22.5	7.2	22.5	7.09
11 and 12	4	22.5–32.0	7.6	32.0	8.65
	5	32.0–41.0	10.6	41.0	11.55
	6	41.0–50.0	10.9	50.0	8.40
	7	50.0–59.0	6.1	59.0	5.05
	8	59.0–68.0	4.6	68.0	4.08
	9	68.0–86.5	3.7	86.5	3.19
	10	86.5–105.0	2.88		
	Bottom	105.0	(2.48)†	105.0	(2.49)†

*Value arbitrarily inferred for B5 and P5 sampling.
†Measured point-depth values for B7 and P7, B12 and P11.

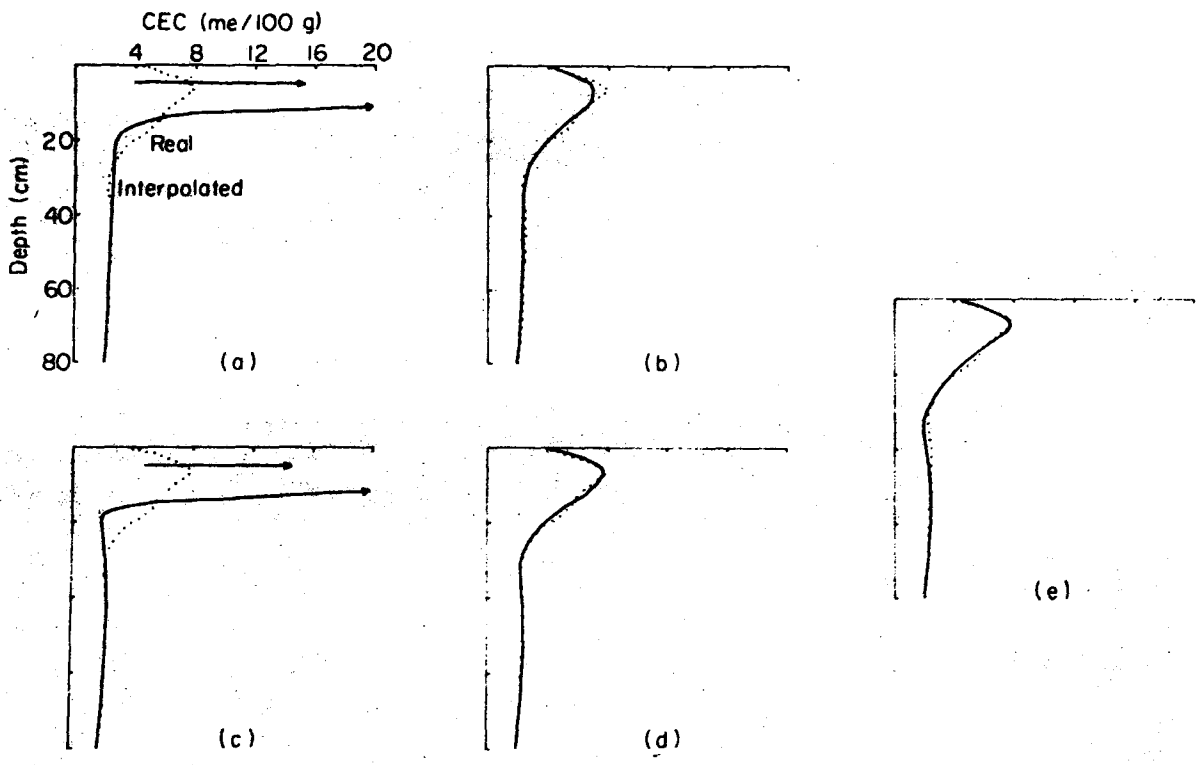


Fig. 4. Successive approximations to profile 2:
conventional procedure (two attempts) (a) three knots—5, 10, 20 cm, (b) three knots—10, 20, 40 cm.
point-sample procedure (two attempts) (c) three knots—5, 10, 20 cm, (d) three knots—10, 20, 40 cm.
equal-area procedure (one attempt) (e) three knots at horizon boundaries.

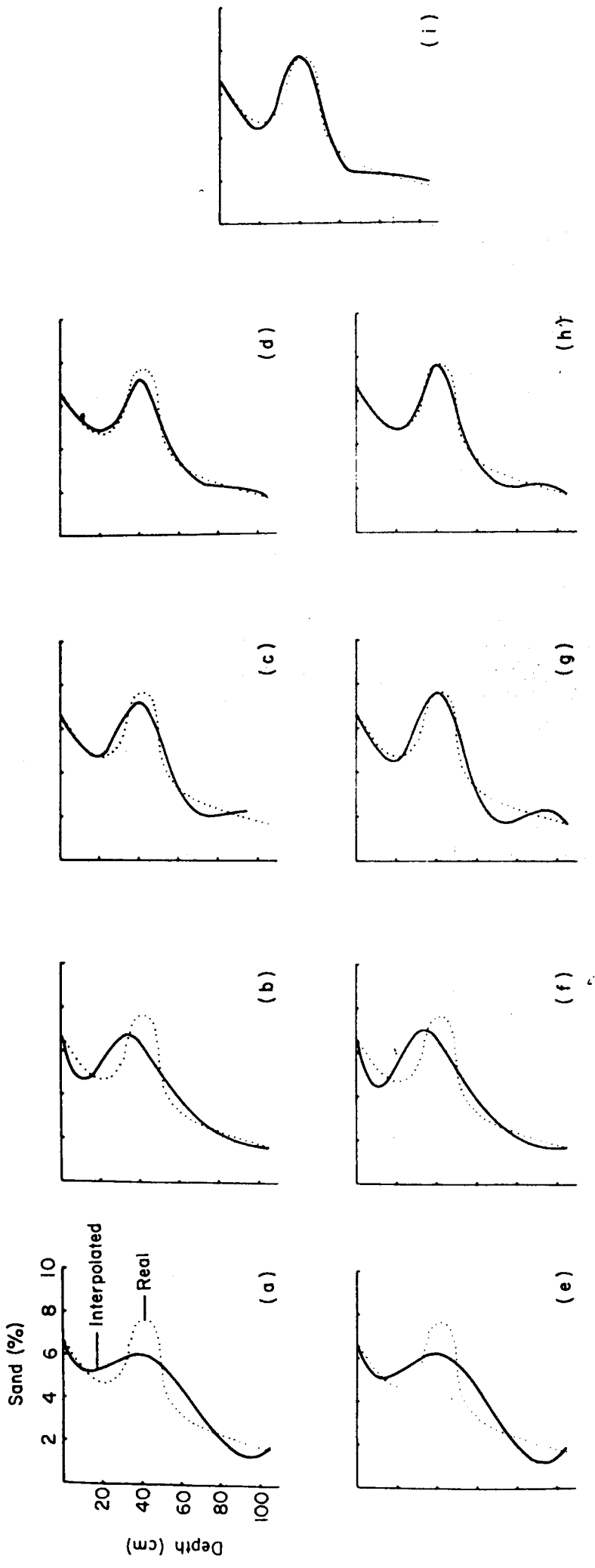


Fig. 5. Successive approximations to profile 3:
conventional procedure (four attempts) (a) two knots at 22.5, 41 cm, (b) two knots at 32, 50 cm, (c) three knots at 22.5, 41, 59 cm, (d) three knots at 32, 41, 50 cm.
point sample procedure (four attempts) (e–h) knots as above.
equal-area procedure (one attempt) (i) three knots at horizon boundaries.

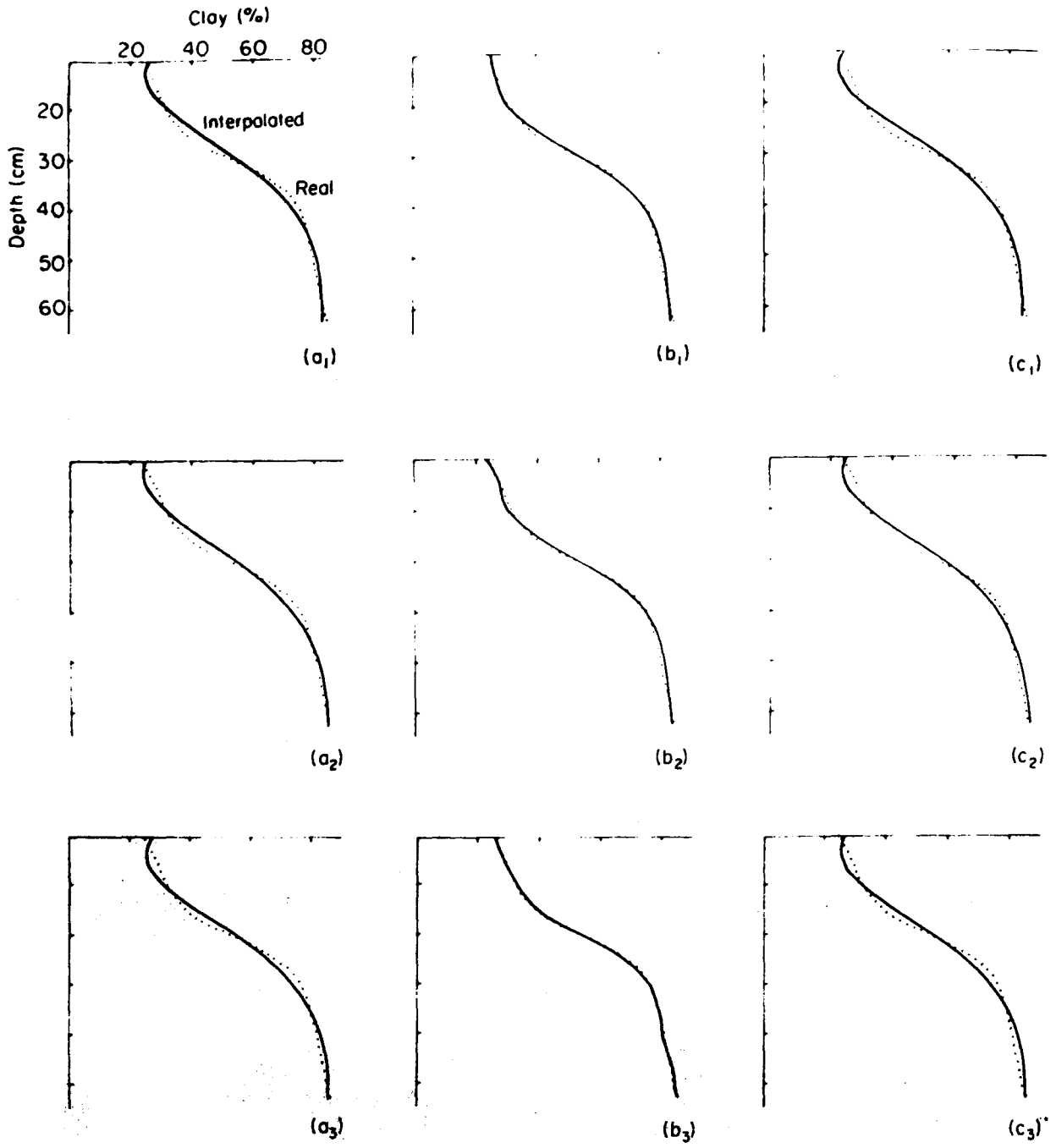


Fig. 6. *Profile No. 1.* Curves fitted by (a) conventional procedure, (b) equal-area procedure, (c) point-sample procedure, to (i) five horizon or point data and arbitrarily estimated values for $F'(V_0)$ and $F'(V_n)$ (ii) seven data; (iii) 11 or 12 data. 'True' profile dotted.

(b) *Point-depth* samples:

(i) at horizon mid-points (P5 sampling);
(ii) at horizon mid-points, and at the top and bottom of the profile (P7 sampling);
(iii) at horizon mid-points, and at all horizon limits including the top and bottom of the profile (P11 sampling).

Values at point-depths were measured off the graphs of the true profiles: average values for horizons or sub-horizons were determined by cutting them out from the drawn graphs and weighing them. Table 2 presents the sample values for profile 3.

Curve-fitting

'Equal-area' spline curves were fitted to the horizon means of the B series of samples. 'Least squares' spline curves were fitted to the B series of samples, and also to the P series of point-depth samples. The 'least squares' curves were fitted by NAG Library routines EO2 BAF and EO2 BBF,

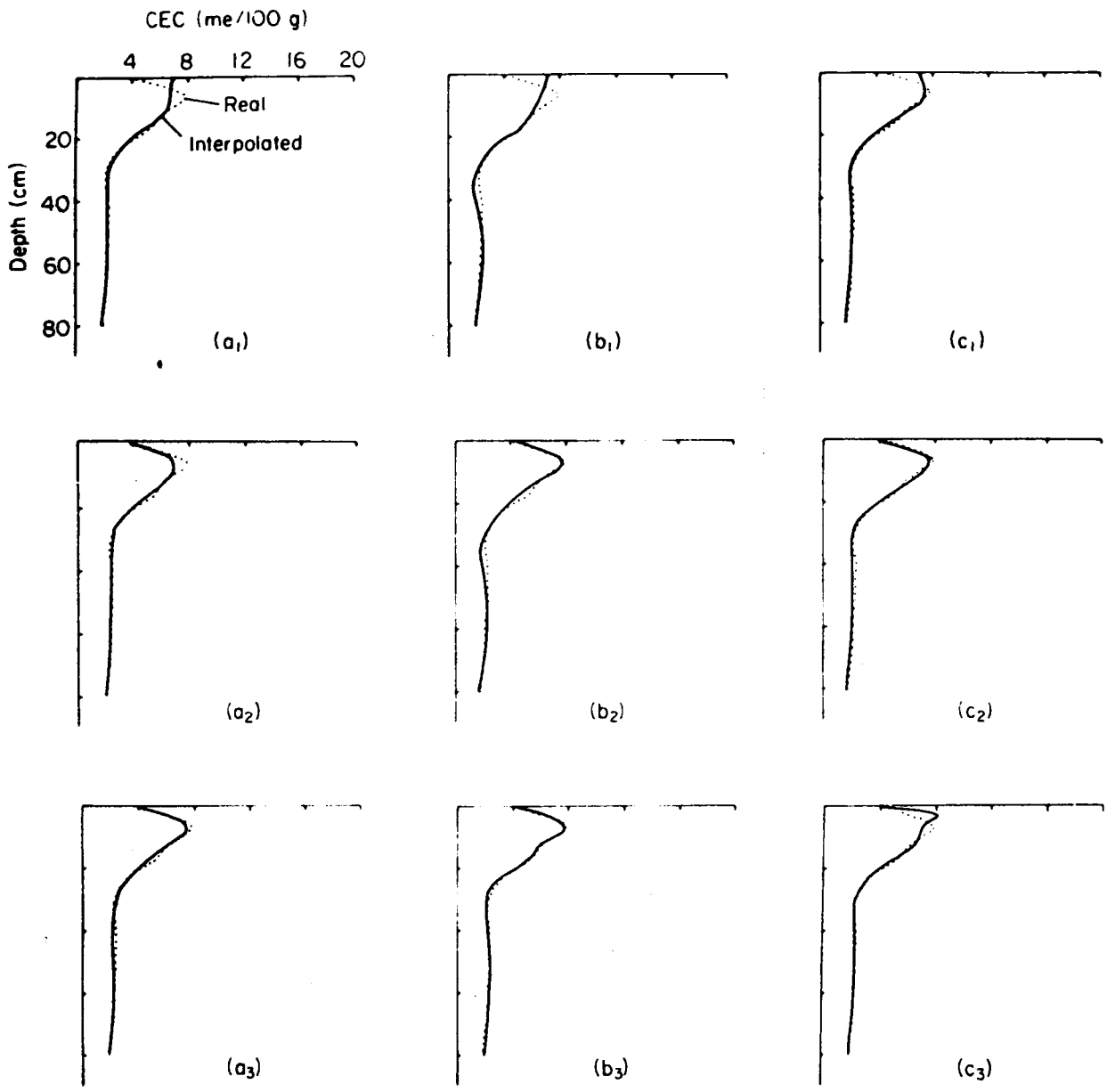


Fig. 7. *Profile No. 2.* 'Labelled as in Fig. 6.

(NAG, 1982). The EO2 BAF algorithm computes a weighted least-squares approximation to an arbitrary set of data points by a cubic spline with knots prescribed by the user. The EO2 BBF algorithm evaluates the cubic spline from its 'B-spline representation' (Cox, 1972). These two algorithms were 'called' by software written to facilitate as many interactive approximations as necessary. All data-points were assigned unit weight.

As indicated, the 'least squares' fitting of a spline curve requires that the user define a set of knots. He adjusts the position of the knots to optimize the result. In normal circumstances, of course, the pedologist knows the form of the smooth curve he is trying to reconstitute only in most general terms, and has little but a general impression by which to judge which of his attempts to select the best set of knots has produced the best result. He may try to minimize the mean square of the residuals of the data points from a reconstructed curve, but this can be misleading. For example, if there are only a few data-points, or if the knots were badly selected, parts of the curve may oscillate widely (as in Figs 4a and 4c), even though it goes through all the data-points with zero mean square residuals. So all he can do is to reject curves that show wild oscillations (usually because of over-fitting or badly chosen knots), or show maxima or minima that appear to be inconsistent with his field impressions.

Thus, in the case of profile 2 (Fig. 4), the user's first choices of knots for the P7 and B7 curves were obviously wrong, whereas his second choices produced sensible curves. When he tried four knots for the P7 and B7 data of profile 3 (Fig. 5), the maxima and minima were either much

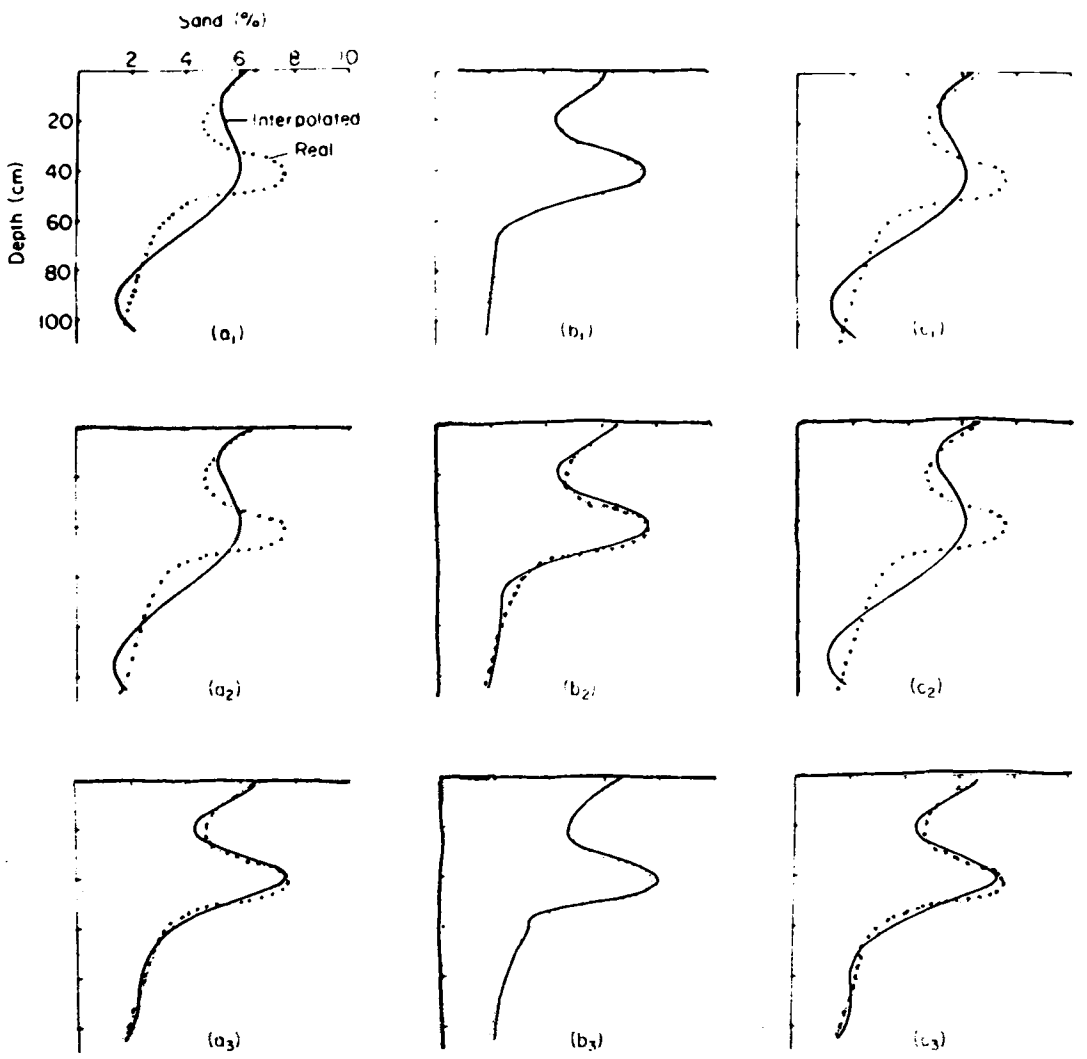


Fig. 8. *Profile No. 3.* Labelled as in Fig. 6: Table 2 lists the data to be fitted.

damped or at unlikely depths. They were notably less damped with three knots, and by further adjustment of their position he succeeded in reducing the oscillations in the lower part of the profile. On the other hand, 'equal-area' curves may be fitted automatically without user involvement as the number and positions of the knots are pre-determined at the horizon limits.

RESULTS AND DISCUSSION

Figs 6–9 and Table 3 present the curves reconstructed from five, seven and 11 (or 12) values from each profile by the equal-area, conventional and point-value procedures, and the mean squares of their residuals from the 'true' profiles at 1 cm depth intervals.

When the number of values was increased beyond 12, the equal-area procedure tended to produce large oscillations, whereas reconstructions by the other procedures continued to improve as the number of values was increased. For less than 12 values the equal-area procedure always produced a reconstruction that was significantly less damped, and as good or better than those produced by the other procedures even after several stages of trial and error. All four equal-area reconstructions from five values (that is one bulked sample for each of five horizons, with arbitrarily inferred values for the top and bottom of the profile) were acceptable approximations to the original true curves and were certainly more informative than the corresponding stepped profiles.

Briefly, the comparisons lead to two conclusions;

(a) there is little advantage in collecting point-depth samples rather than whole-horizon samples in order to be able to reconstruct the true profile more precisely,

(b) the equal-area procedure produces better reconstructions of true profiles from horizon mean values than does the conventional procedure.

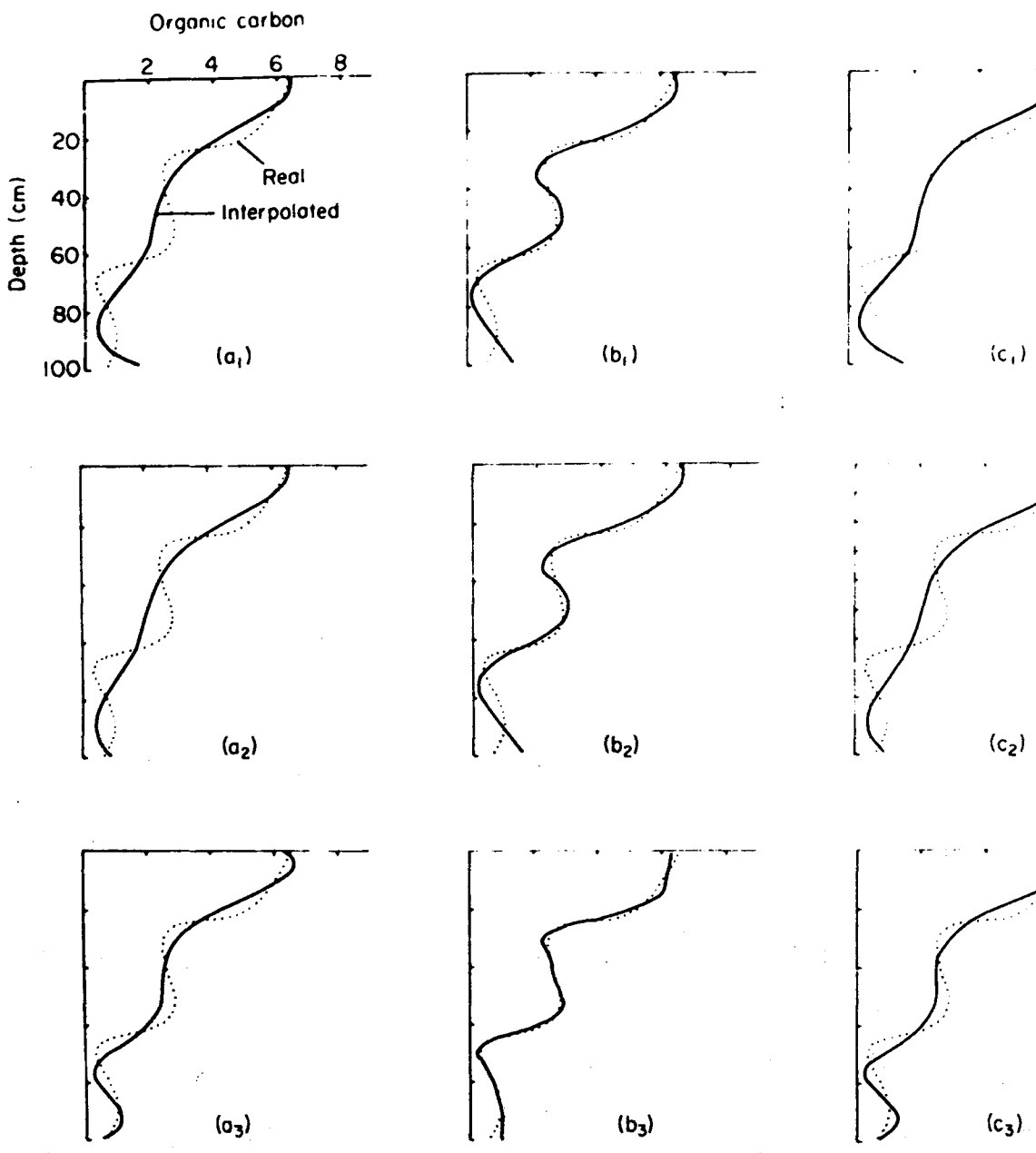


Fig. 9. *Profile No. 4.* Labelled as in Fig. 6.

Table 3. Mean squares of residuals from the true profiles

Profile	Sampling	Conventional spline	Equal-area spline	Point value spline
No. 1	n	4.6	1.4	4.4
	$n+2$	5.1	1.1	4.8
	$2n+2$	4.8	0.15	4.6
No. 2	n	0.63	0.79	0.64
	$n+2$	0.11	0.08	0.08
	$2n+2$	0.05	0.07	0.45
No. 3	n	1.4	0.19	1.4
	$n+2$	1.5	0.18	1.5
	$2n+2$	0.22	0.09	0.25
No. 4	n	0.28	0.1	0.29
	$n+2$	0.29	0.1	0.29
	$2n+2$	0.14	0.02	0.15

ACKNOWLEDGEMENTS

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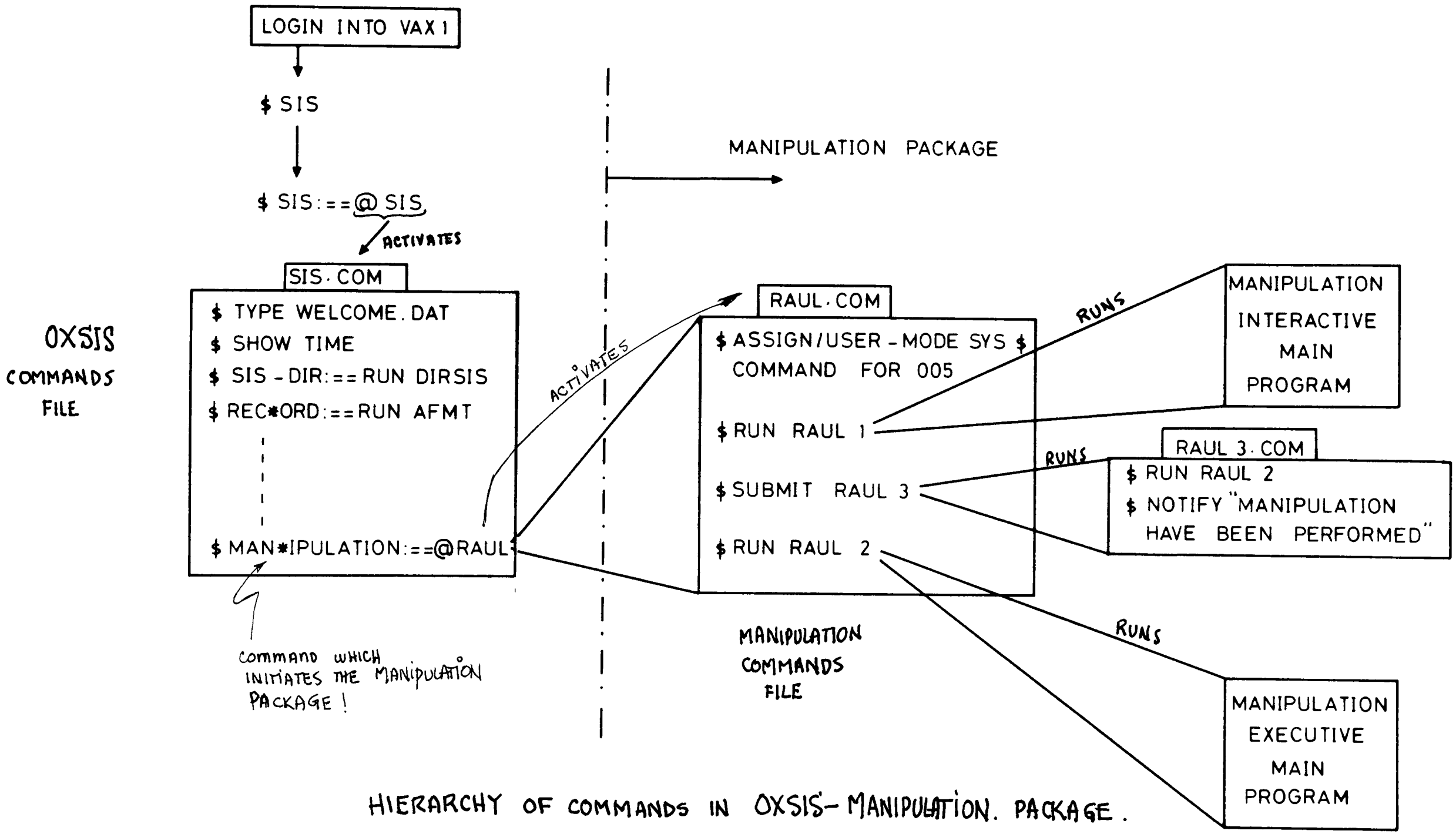
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(*Received 3 June 1985*)

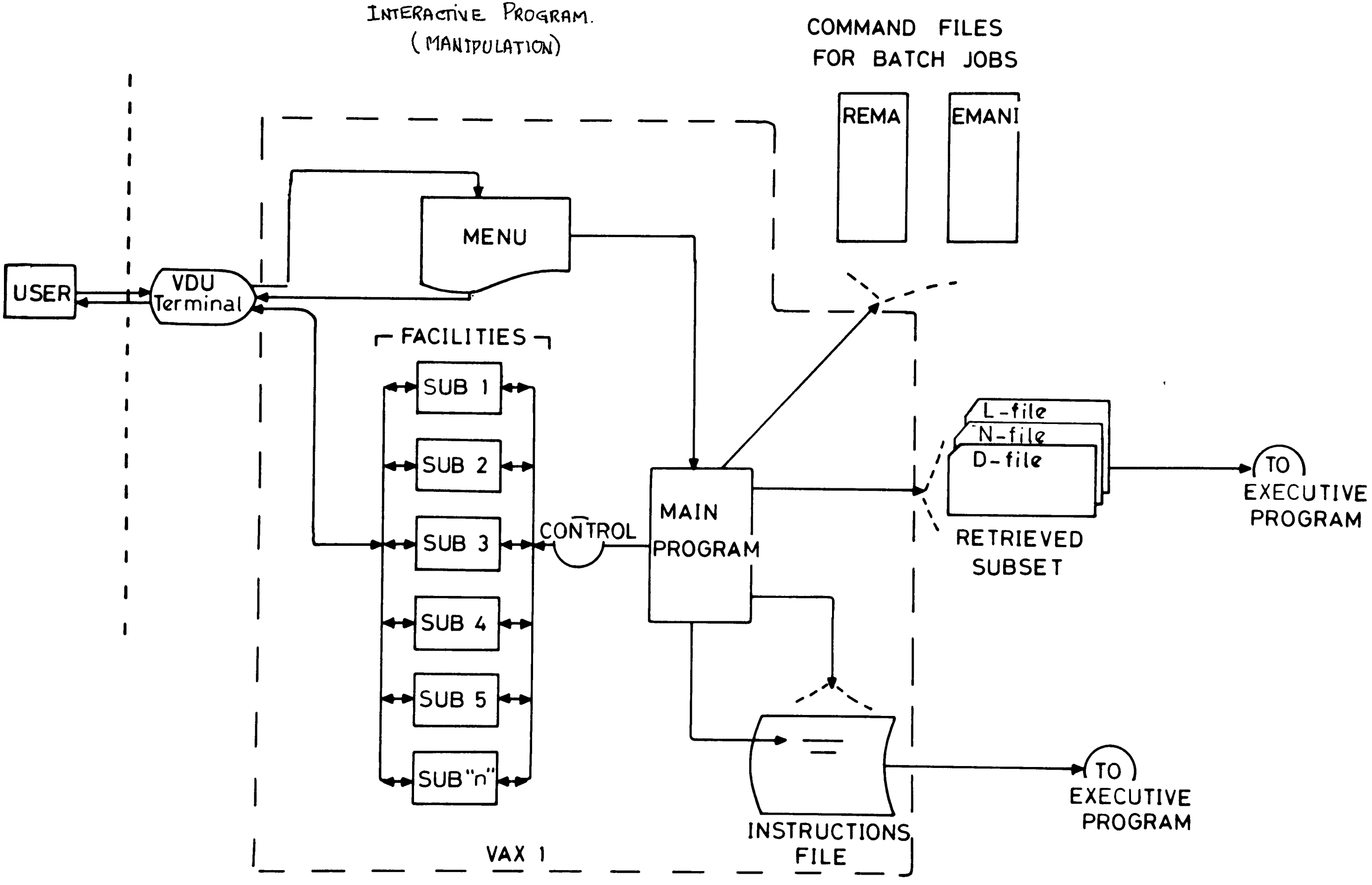
APPENDIX 8.

The OXSIS **MANIPULATION** package: description of the design and structure of the Interactive and Executive programs.

Hierarchy of commands, macros, subroutines and files. Separate description of individual facilities in the package with examples. Includes the complete set of programs and code for this procedure.



HIERARCHY OF COMMANDS IN OXSIS-MANIPULATION. PACKAGE.


INTERACTIVE PROGRAM.
(MANIPULATION)
COMMAND FILES
FOR BATCH JOBS
REMA
EMANI
MENU
USER
VDU
Terminal
FACILITIES
SUB 1
SUB 2
SUB 3
SUB 4
SUB 5
SUB "n"
CONTROL
MAIN
PROGRAM
L-file
N-file
D-file
TO
EXECUTIVE
PROGRAM
RETRIEVED
SUBSET
INSTRUCTIONS
FILE
TO
EXECUTIVE
PROGRAM
VAX 1

```
$ MANIP

======= WELCOME TO OXSIS-MANIPULATION PACKAGE =======

************** FACILITIES ********************

                ALLOCATION
                AVERAGE
                KRIGING
                 LISTING
                MERGE
                SELECTION
                SORT
                DEPTH FUNCTIONS
                STATISTICS
                SEMI-VARIOGRAMS

> Do you want more information from the MENU ? :  Y/N
>
Y

*****************  MENU  **********************

  Facility                        Description
============                  ==============================

 ALLOCATION                  Individual blocks of informa-
                             tion are allocated to classes
                             or mapping units. Records for
                             the classes or mapping units
                             may not be present in the
                             blocks

 AVERAGE                      Computes averages for a given
                              feature over a data subset.
                              Access: "AVERAGE"
TO CONTINUE TYPE  "C"  <Return>
```

$ C

KRIGING — Computes point and block Kriging of irregularly spaced 2-Dimensional data on to a square grid.
Requisites:The Semi-variogram model for the same data
Option: Contouring
Access: "KRIGING"

MERGE — Produces the merging of two known data subsets held in separate files into an output file in three optional ways
Sec.Facilities:"INTERDIGITATE
" ANNEXE", "APPEND".
Requisites: Names of the files to be merged
Access: "MERGE"

TO CONTINUE TYPE "C" <Return>

$ C

SELECTION — Performs the selection of data sub-subsets from retrie-subsets based upon areal or boolean selections.
Requisite: Output file name
Access: "SELECTION"

SORT & CLASSES — Executes the sorting of data according to the increasing values of a user-selected soil or site feature.
Classes and class limits may be user-defined to allocate blocks to classes.
Sec. Facilities: "SORTIN"
"CLASS"
Access: "SORT"

TO CONTINUE TYPE C <Return>

$ C

DEPTH FUNCTIONS

Interpolates values of soil properties down the soil profile by depth functions. Interpolation is performed by either of two algorithms :

1.Fitting EQUAL-AREA SPLINE CURVES through soil depth.

2.Using soil layers to draw the values wanted

Secundary facilities:

" VALUE AT","DEPTH FOR","AVERAGE OVER DEPTHS","DEPTHS AT WHICH VALUE GREATER THAN",___"LOWER THAN"

Mode: single/multiple block

Option: graphics

Access: "DEPTH"

TO CONTINUE TYPE C <RETURN>

$ C

STATISTICS

Interfaces the OXSIS STATIS -TICAL package.

1. DESCRIPTIVE STATISTICS

or

2. STATISTICAL ANALYSIS

are the two sub-packages available.

Modes: Automatic (OXSIS)
Interactive (SAS)

STATISTICAL ANALYSIS :

Facilities:

a.-Correlation.

b.-Analysis of Variance

c.-Regression Analysis & Model Fitting

d.-Multivariate Analysis

e.-Discriminant Analysis

f.-Cluster Analysis

ACCESS: "STATISTICS"

TO CONTINUE TYPE "C" <Return>

$ C

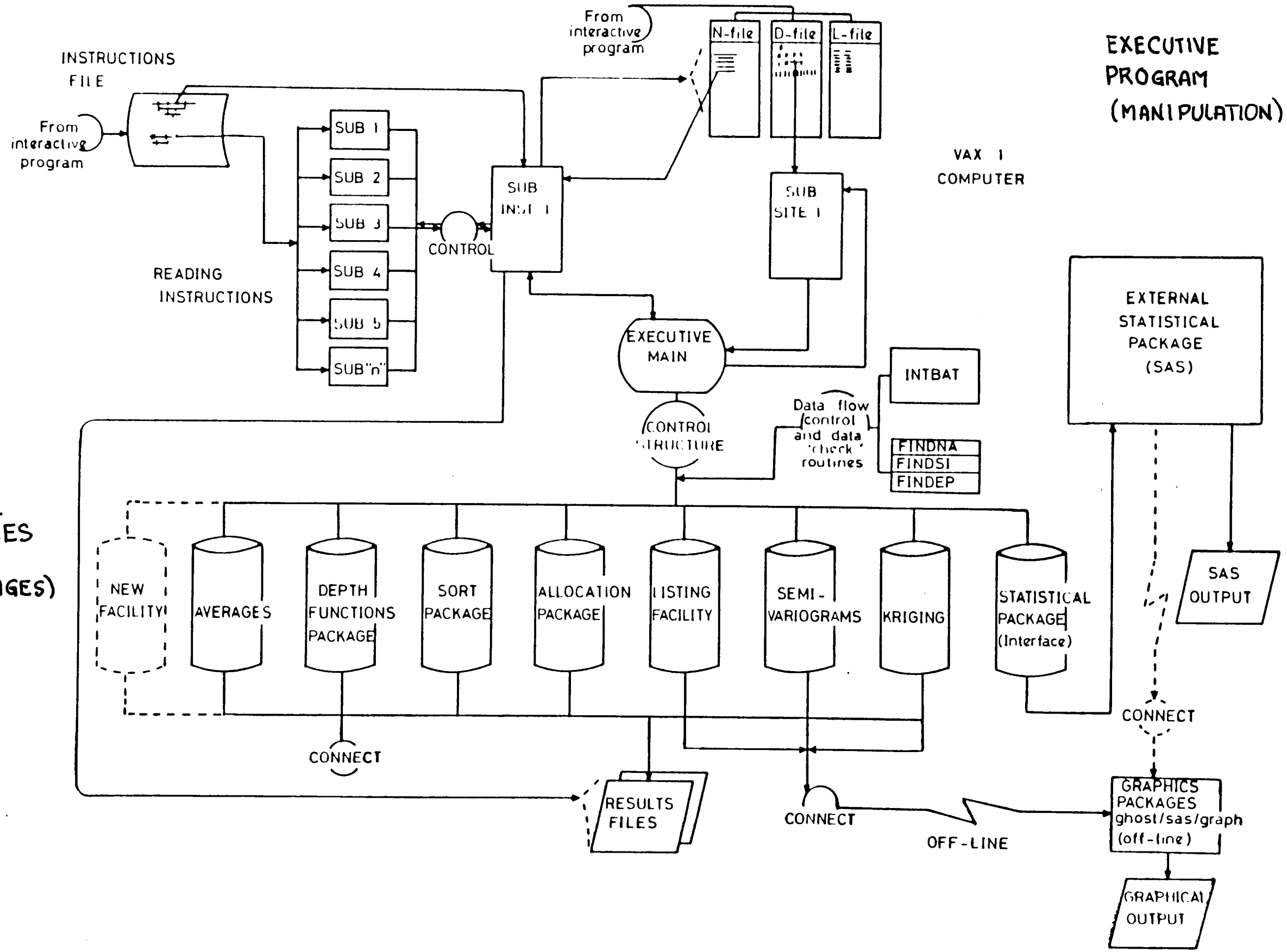
SEMIVAR — Computes the experimental Semi-Variogram from irregularly distributed samples in 2-dimensional space.
Requisites:Directions(theta) for the semi-variogram.
Options: Graphical representation of the semi-variogram
Access: "SEMIVAR"

TO CONTINUE TYPE C ⟨Return ⟩
$ C

WINDOWING & WEIGHTING FUNCTIONS — Defines a "moving" window in the geografical space around central points, with user-selected size and shape. Distance weighting functions may then be chosen to interpolate the value at the central point.The "target" pont may or may not be an existing point.Users may type in their own weighting functions if based upon distance.
Requisites: Grid reference for "empty" target points
Access: "WINDOW"

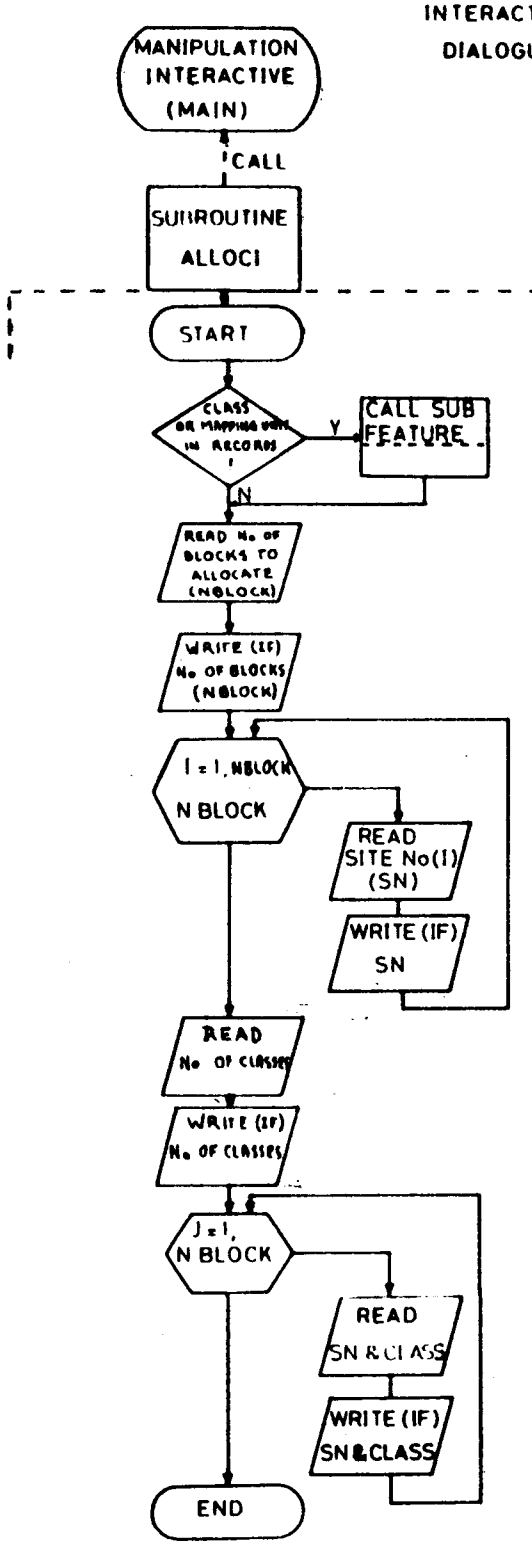
> Do you want more information from the MENU ? : Y/N
>

EXECUTIVE PROGRAM (MANIPULATION)

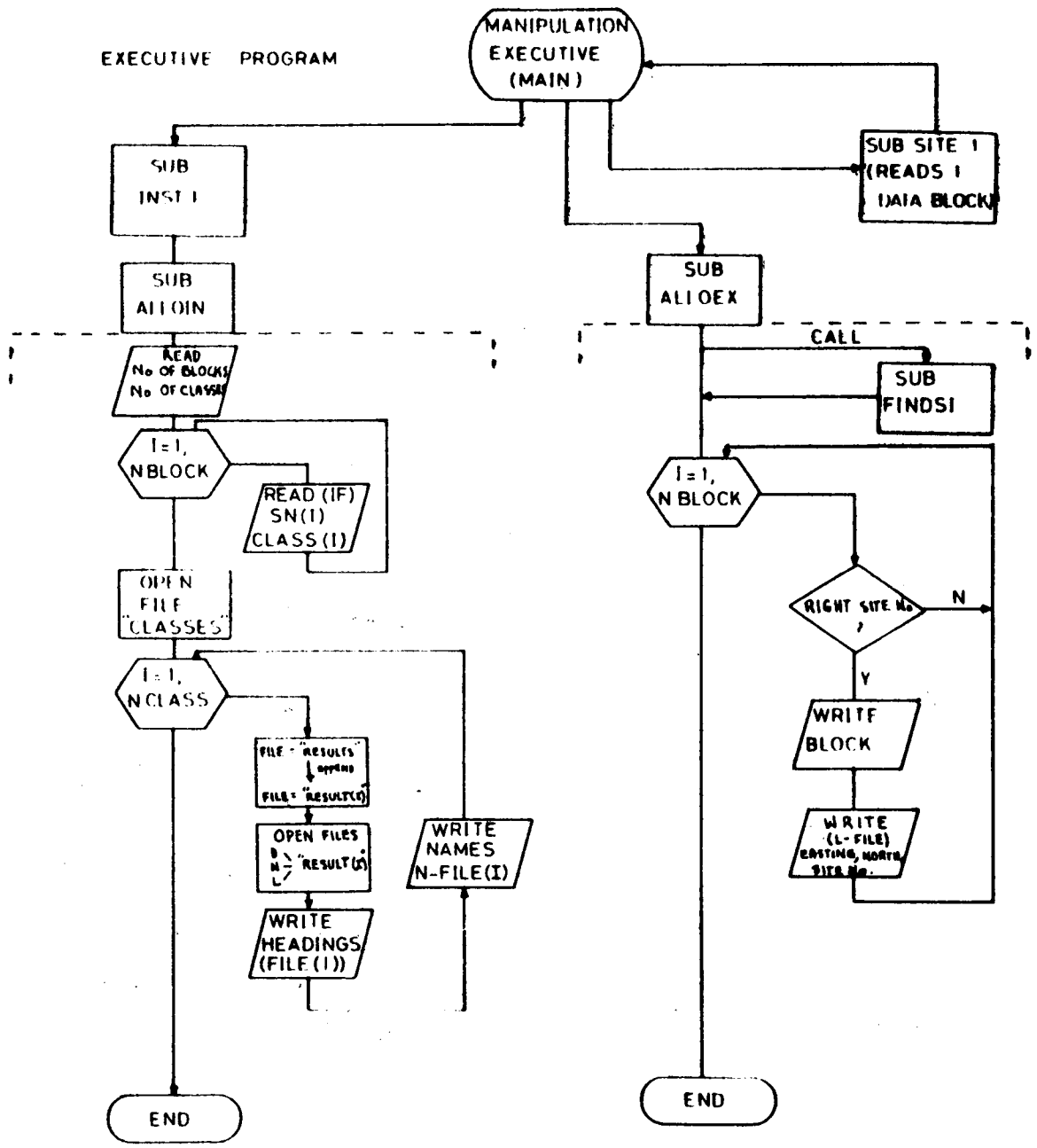


ALLOCATION FACILITY

INTERACTIVE DIALOGUE



EXECUTIVE PROGRAM



```
 Triad or Subset : SUBSET
  Subset's

 Name : RD050

 Save result in : MAP50R

   Selection Y/N : N

 Query : ALLOCATION
******* ALLOCATION  TO CLASSES OR MAPPING UNITS *****

 Individual blocks of information are allocated to
 classes or mapping units.

 Records for the class or mapping unit may not be
 present in the blocks.


 >CLASS OR MAPPING UNIT RECORDS ALREADY EXISTENT
           WITHIN THE BLOCKS IN THIS SUBSET?    : Y/N
N


 > NO. OF BLOCKS TO ALLOCATE :
5

> Enter no more than  20  classes or M.U.

> No. of different Classes or Map Units?:
>
3

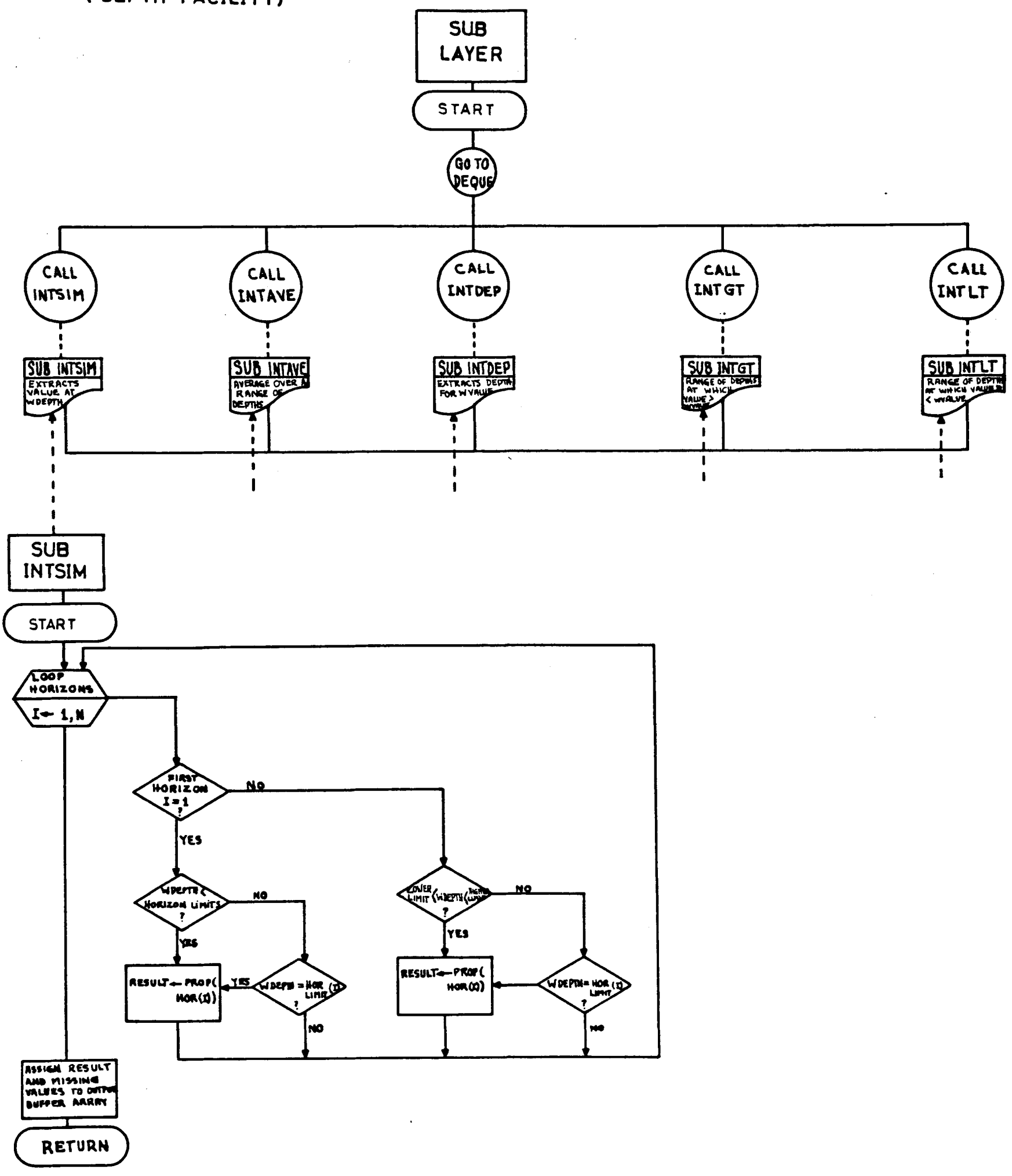
     Type paired values

  > SITE NUMBER          CLASS  OR  MAP UNIT
   -------------         ----------------------
>
95001                          1
>
95013                          3
>
95023                          1
>
95015                          2
>
95012                          3
 NOTICE: OUTPUT SAVED IN FILES:MAP50R 1,2..N
 Query : END
```

DEPTH FUNCTIONS Facility

LAYER ALGORITHM

(DEPTH FACILITY)



N

Triad or Subset : SUBSET
Subset's

Name : RD050

Save result in : MDEP50R

Selection Y/N : N

Query : DEPTH

FACILITY TO BE EXECUTED IN INTERACTIVE OR BATCH MODE: I/B

I

***** DEPTH FUNCTIONS, INTERPOLATION **

Iformation about properties varying down the soil
profile may be obtained by interpolation using either
of two algorithms :
1.- Fitting EQUAL-AREA SPLINE CURVES through the soil
depth
2.- Using soil layers as basis to draw the information
wanted.

**** INTERPOLATION BY SPLINE -or- LAYERS;

>> Type of Interpolation? : S/L
>
L
> SINGLE BLOCK OR MULTIPLE BLOCK: S/M
**** NOTE: In MULTIPLE BLOCK mode a facility for
interpolating more than one soil feature is
available.

>>
M

Depth interpolation can be computed for one or
more soil features on several blocks.

>SINGLE feature or MANY soil features? :(S/M)
>
S

```
> Soil   Feature:
CLAY *02

>ALL BLOCKS IN SUBSET? :  Y/N
Y

~~~~~~~~~~~~ DEPTH INTERPOLATION FACILITIES ~~~~~~~

            INTERPOLATION BY:

    1._ FIND FEATURES VALUE FOR AGIVEN DEPTH

    2._ AVERAGE OF A FEATURE OVER A RANGE OF DEPTHS

    3._ FIND DEPTH(S) FOR A GIVEN FEATURES VALUE

    4._ DEPTH TO WHICH FEATURE GREATER THAN A VALUE

    5._ DEPTH TO WHICH FEATURE LOWER THAN A VALUE


>  Depth  Query : (1-5)
1
***** INTERPOLATING THE VALUE OF A FEATURE *****
> Enter Depth (cm) :
15.0

****** NOTICE;   RESULTS SAVED IN FILE:  MDEP50R
Query : END
```

OUTPUT FROM "DEPTH" FACILITY

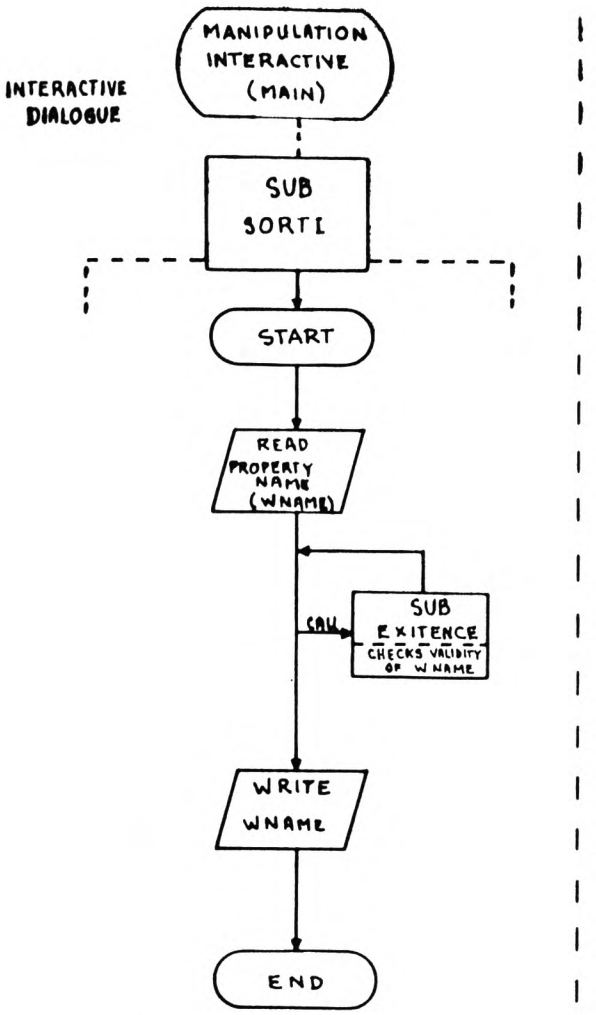
"LAYER" SUB-FACILITY.

```
 2
 4          7          0          0
 1          1          0          0
 20520.00   43530.00   15042.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 44.00000 <-- INTERPOLATED VALUE(S).
 1          1          0          0
 20520.00   43540.00   15043.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 42.00000
 1          1          0          0
 20520.00   43550.00   15044.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 40.00000
 1          1          0          0
 20520.00   43560.00   15045.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 28.00000
 1          1          0          0
 20510.00   43540.00   15052.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 46.00000
 1          1          0          0
 20510.00   43560.00   15053.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 35.00000
 1          1          0          0
 20500.00   43530.00   15059.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 38.00000
 1          1          0          0
 20500.00   43540.00   15060.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 42.00000
 1          1          0          0
 20500.00   43550.00   15061.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 47.00000
 1          1          0          0
 20500.00   43560.00   15062.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 50.00000
 1          1          0          0
 20490.00   43540.00   15069.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 30.00000
 1          1          0          0
 20490.00   43560.00   15070.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 41.00000
 1          1          0          0
 20480.00   43530.00   15077.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 44.00000
 1          1          0          0
 20480.00   43540.00   15078.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 35.00000
 1          1          0          0
 20480.00   43550.00   15079.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 25.00000
 1          1          0          0
 20480.00   43560.00   15080.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 27.00000
 1          1          0          0
 20480.00   43570.00   15081.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 25.00000
 1          1          0          0
 20470.00   43540.00   15087.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 56.00000
 1          1          0          0
 20470.00   43560.00   15088.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 28.00000
 1          1          0          0
 20460.00   43530.00   15095.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 34.00000
 1          1          0          0
 20460.00   43540.00   15096.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 52.00000
 1          1          0          0
 20460.00   43550.00   15097.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 61.00000
 1          1          0          0
 20460.00   43560.00   15098.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 57.00000
 1          1          0          0
 20450.00   43540.00   15105.00    1.000000   15.00000
-1.000000  -1.000000  -1.000000   -1.000000  -1.000000
 38.00000
 1          1          0          0
 20450.00   43560.00   15106.00    1.000000   15.00000
```

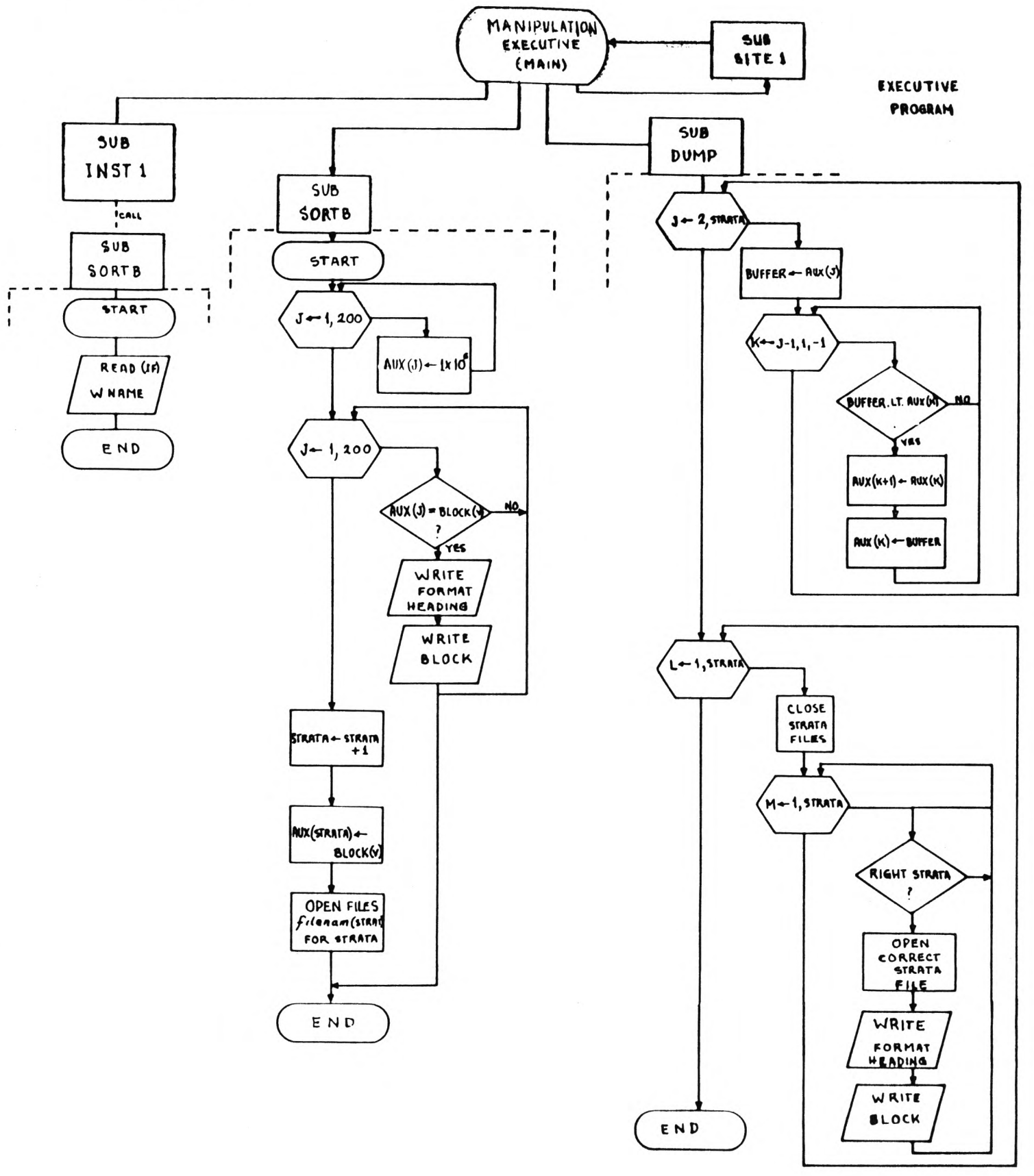
SORT Facility

SORT FACILITY

INTERACTIVE DIALOGUE



EXECUTIVE PROGRAM



Triad or Subset : SUBSET
Subset's

Name : RD050

Save result in : SORT50

Selection Y/N : N

Query : SORT

FACILITY TO BE EXECUTED IN INTERACTIVE OR BATCH MODE: I/B

I

*** Sort data by feature : NORTHING
Query : END

OUTPUT FROM "SORT" FACILITY

SORTING BY NORTHING

```
          2
         13
          1          25           0           0
  43950.00       23250.00    20577.00     5.000000     0.0000000E+00
  2.000000       1.000000    3.000000     1.000000      6.000000
  6.000000       772.0000    4.000000     27.00000      1.000000
  5.000000       5.000000    4.000000     5.000000      5.000000
  4.000000       10.00000    25.00000     40.00000      35.00000
0.0000000E+00  0.0000000E+00 0.0000000E+00 0.0000000E+00  2.000000
-2.000000       3.000000    2.000000     2.000000      9.000000
  2.000000      2.000000     5.000000     0.0000000E+00
          1          5           0           0
  44150.00       23250.00    20578.00     5.000000     0.0000000E+00
  4.000000       1.000000    1.000000     8.000000      6.000000
  4.000000       772.0000    3.000000     15.00000      2.000000
  6.000000       4.000000    4.000000     6.000000      4.000000
  4.000000       11.00000    20.00000     55.00000      25.00000
0.0000000E+00  0.0000000E+00 0.0000000E+00 0.0000000E+00  2.000000
-2.000000      0.0000000E+00 -1.000000    -1.000000     -1.000000
  2.000000       1.000000    5.000000     0.0000000E+00  35.00000
  2.000000       6.000000    5.000000     4.000000      5.000000
  5.000000       6.000000    13.00000     25.00000      45.00000
  30.00000     0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
  2.000000      -2.000000    -2.000000    -2.000000     -2.000000
-2.000000       -2.000000    -2.000000    -2.000000     0.0000000E+00
  100.0000       2.000000    1.000000     6.000000      4.000000
  5.000000       5.000000    4.000000     11.00000      20.00000
  65.00000       15.00000    0.0000000E+00 0.0000000E+00 0.0000000E+00
```

```
0.0000000E+00    2.000000    -2.000000    -2.000000     -2.000000
-2.000000      -2.000000     -2.000000    -2.000000     -2.000000
0.0000000E+00
          1          2           0           0
  43750.00       23250.00    20576.00     5.000000     0.0000000E+00
  6.000000       1.000000    1.000000     4.000000      7.000000
  4.000000       772.0000    4.000000     15.00000      2.000000
  4.000000       4.000000    4.000000     4.000000      4.000000
  4.000000       13.00000    30.00000     35.00000      35.00000
0.0000000E+00  0.0000000E+00 0.0000000E+00 0.0000000E+00  2.000000
-2.000000       2.000000    2.000000     2.000000      9.000000
  3.000000       2.000000    5.000000     0.0000000E+00  50.00000
  2.000000       5.000000    4.000000     4.000000      5.000000
  6.000000       6.000000    13.00000     25.00000      25.00000
  50.00000     0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
  2.000000      -2.000000    -2.000000    -2.000000     -2.000000
-2.000000       -2.000000    -2.000000    -2.000000     0.0000000E+00
          1          4           0           0
  43650.00       23350.00    20566.00     5.000000     0.0000000E+00
  7.000000       3.000000    3.000000     7.000000      6.000000
  5.000000       772.0000    3.000000     10.00000      2.000000
  5.000000       5.000000    4.000000     5.000000      5.000000
  4.000000       10.00000    30.00000     50.00000      30.00000
0.0000000E+00  0.0000000E+00 0.0000000E+00 0.0000000E+00  1.000000
-2.000000       1.000000    2.000000     2.000000      9.000000
  3.000000       2.000000    5.000000     0.0000000E+00  30.00000
  2.000000       5.000000    5.000000     5.000000      5.000000
  5.000000       5.000000    10.00000     25.00000      40.00000
  35.00000     0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
  2.000000      -2.000000    -2.000000    -2.000000     -2.000000
-2.000000       -2.000000    -2.000000    -2.000000     0.0000000E+00
  85.00000       2.000000    5.000000     5.000000      4.000000
  6.000000       6.000000    6.000000     13.00000      30.00000
  30.00000       40.00000    0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00    2.000000    -2.000000    -2.000000     -2.000000
-2.000000      -2.000000     -2.000000    -2.000000     -2.000000
0.0000000E+00    100.0000     2.000000    6.000000      6.000000
  4.000000       5.000000    6.000000     6.000000      13.00000
  30.00000       30.00000    40.00000     0.0000000E+00 0.0000000E+00
0.0000000E+00  0.0000000E+00 -2.000000    1.000000     -2.000000
-2.000000      -2.000000     -2.000000    -2.000000     -2.000000
-2.000000      0.0000000E+00
          1          3           0           0
  44050.00       23350.00    20568.00     5.000000     0.0000000E+00
  4.000000       1.000000    -2.000000    16.00000      6.000000
  6.000000       772.0000    4.000000     15.00000      2.000000
  5.000000       4.000000    2.000000     5.000000      4.000000
  2.000000       10.00000    20.00000     40.00000      40.00000
0.0000000E+00  0.0000000E+00 0.0000000E+00 0.0000000E+00  2.000000
-2.000000      0.0000000E+00 -1.000000    -1.000000     -1.000000
  2.000000       1.000000    5.000000     0.0000000E+00  50.00000
  2.000000       6.000000    4.000000     4.000000      6.000000
  4.000000       4.000000    12.00000     25.00000      25.00000
  50.00000     0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
-2.000000       1.000000    -2.000000    -2.000000     -2.000000
-2.000000      -2.000000     -2.000000    -2.000000     0.0000000E+00
  88.00000       2.000000    4.000000     5.000000      6.000000
  6.000000       4.000000    3.000000     12.00000      35.00000
  15.00000       50.00000    0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00  -2.000000     1.000000    -2.000000     -2.000000
-2.000000      -2.000000     -2.000000    -2.000000     -2.000000
```

1ST STRATA

2 BLOCKS

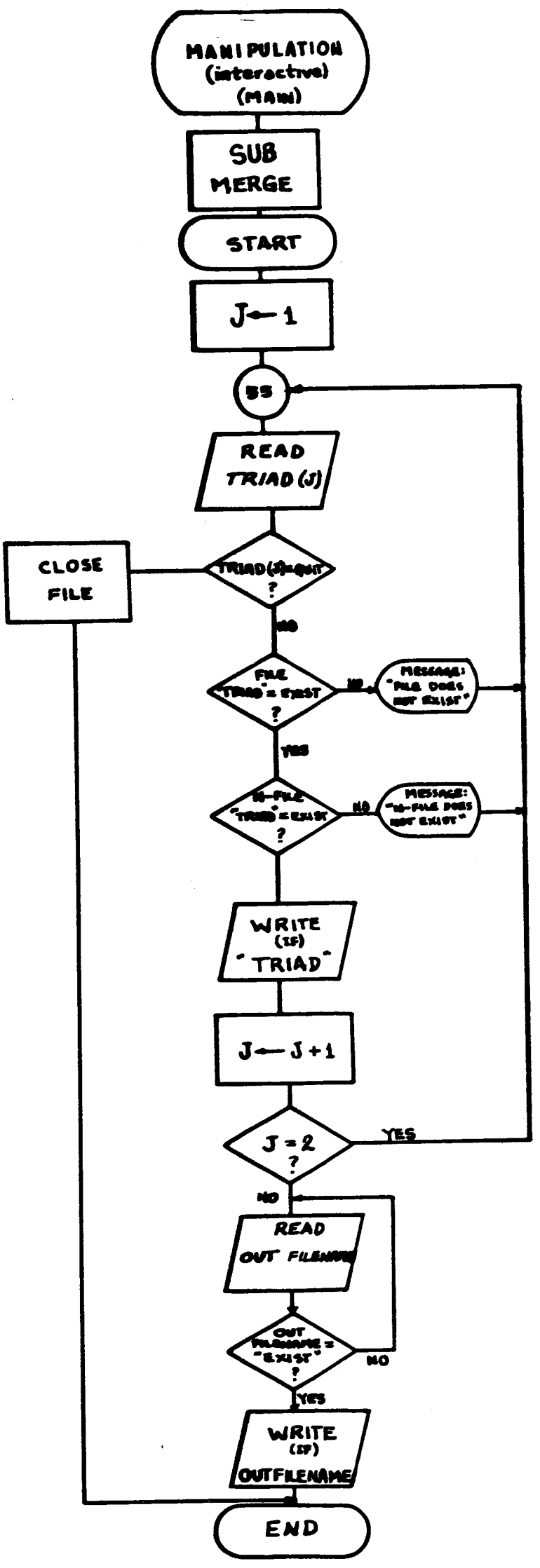
2ND STRATA

1

3D STRATA

2 BLOCKS

MERGE Facility


MANIPULATION
(interactive)
(MAIN)
SUB
MERGE
START
J ← 1
55
READ
TRIAD (J)
CLOSE
FILE
TRIAD(J)=QUIT
?
NO
FILE
"TRIAD" = EXIST
?
NO
MESSAGE:
"FILE DOES
NOT EXIST"
YES
IS-FILE
"TRIAD" = EXIST
?
NO
MESSAGE:
"IS-FILE DOES
NOT EXIST"
WRITE
(IF)
"TRIAD"
J ← J + 1
J = 2
?
YES
NO
READ
OUT FILENAME
OUT
FILENAME =
"EXIST"
?
NO
YES
WRITE
(IF)
OUTFILENAME
END

```
$ N

 Triad or Subset : SUBSET
  Subset's

 Name : RD050

 Save result in : MERGD50

   Selection Y/N : N

 Query : MERGE

   FACILITY TO BE EXECUTED IN INTERACTIVE  OR BATCH MODE:  I/B

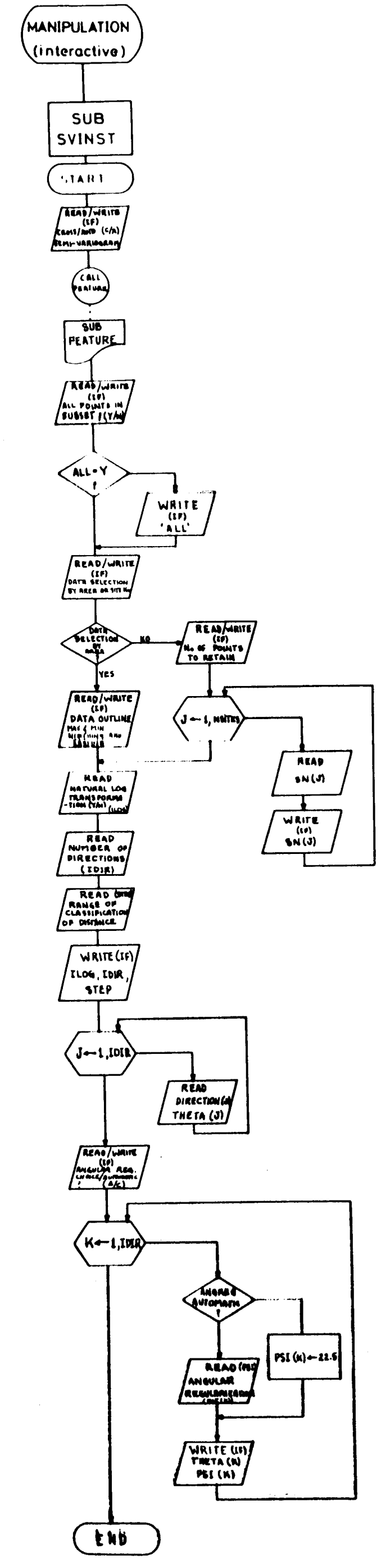
I
   >> Triad 1 : RD050
   >> Triad 2 : RD051
      >>    Output name : MERGD50

  Query : END
```

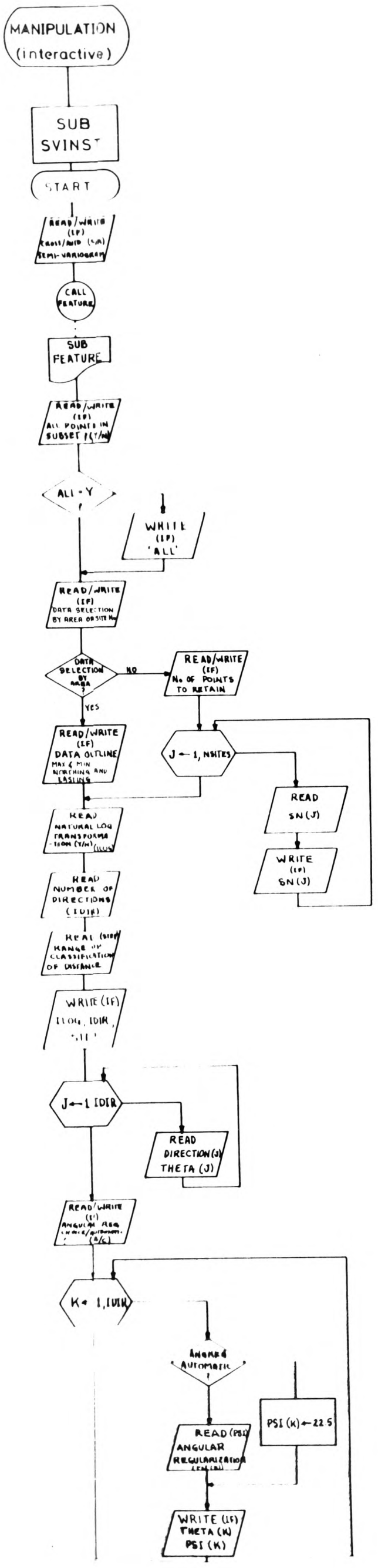
SEMI-VARIOGRAM Facility.

SEMI-VARIOGRAM FACILITY

(interactive)



SEMI-VARIOGRAM
FACILITY
(interactive)



SEMI-VARIOGRAM FACILITY (executive)

MANIPULATION (executive)

SUB INST1

SUB SVARIN

START

READ (IF) CROSE

READ (IF) WNAME

READ (IF) ALL

ALL='Y' ?

YES

NO

READ (IF) DATA SELECTION (PASEL)

PASEL=AMER ?

YES

READ (IF) MAX AND MIN EASTING, NORTHING

NO

READ (IF) NPOINTS

J ← 1, NPTS

READ (IF) SN (J)

READ (IF) ILOG, IDIR, STEP

I ← 1, IDIR

READ (IF) THETA (I) PSI (I)

END

SUB SITE1

SUB SVARIO

START

CALL FINDNA

SUB FINDNA

CALL FINDSI

SUB FINDSI

IFLAG ← 0

ALL='Y' ?

YES

IFLAG ← 1

NN ← NN+1

NO

THIS EASTING WITHIN DATA OUTLINE LIMITS ?

NO

YES

THIS NORTHING WITHIN DATA OUTLINE LIMITS ?

NO

YES

IFLAG ← 1

NN ← NN+1

USER SELECTION OF DATA NUMBERS (PASEL='NUM') ?

NO

LOOP ALL POINTS

J ← 1, NPTS

IS THIS DATA (J) WANTED ?

NO

YES

IFLAG ← 1

NN ← NN+1

IFLAG=1 ?

RETAIN EASTING AND NORTHING ASSIGN THEM TO X AND Y

LOOP FOR NFOR

J ← 1, NFOR

CALCULATE POSITION OF WANTED PROPERTY IN BLOCK

ASSIGN WPROP TO Z

Z ← IBL (WPROP)

SET CONVENTIONS FOR MISSING VALUES

END

GHOST OUTPUT

GHOST GRAPHICAL OUTPUT

END

SUB SVAREX

START

LOOP WHAT RETAINED N ← 1, NN

IS Z(N) A MISSING VALUE ?

YES

NO

WRITE (OUT) HEADINGS AND TITLES

PREPARE ARRAYS

CALL VARIO

SUB VARIO

COMPUTES THE SEMI-VARIOGRAM

SUB VARIO

LOOP DIRECTIONS L1 ← 1, IDIR

ANGULAR REGULARISING

APSI ← [...] / 360

T1 ← COS(APSI)

DIRECTION L1

ATHETA ← [...] / 180

CA ← COS(ATHETA)

SA ← SIN(ATHETA)

FIRST DIRECTION (L1=1) ?

COMPUTE MEAN AND VARIANCE OF Z

MOY ← AMEAN(Z, N, VMEA)

VRANCE ← COVGN(Z, Z, N, VMEA)

ECHEL ← YCHEL * VRANCE

LOOP PTS IN DIRECTION L1

LP1 ← 1, N

IS Z(L1) A MISSING VALUE

YES

NO

ADD ON AN EXTRA POINT FOR THE PAIRS

I2 ← LP1+1

LOOP PAIRS

LP2 ← I2, N

COMPUTE DISTANCE BETWEEN POINTS

D2 ← [(X2-X1)² + (Y2-Y1)²]

D1 ← √D2

PROJECT LINE BETWEEN POINTS

CC ← (X2-X1)*COS(ATHETA) + ... / D1

CC1 ← ABS(CC)

IS LINE DIRECTION ANGULAR REGULARISATION (L1) ?

NO

YES

DIVIDE DISTANCE BY STEP (LAG)

RR ← D1/STEP

MORE THAN 40 STEPS ?

YES

NO

NEXT LAG OR STEP

IC ← RR+1

CALCULATE DRIFT GRADIENT FOR THIS STEP

DELTZ ← CC/CC1 * (Z2-Z1)

ADD ONES TO THE No OF PAIRS

NFF(IC) ← NFF(IC)+1

CALCULATE DRIFT FOR THIS STEP

S1(IC) ← S1(IC) + DELTZ

CALCULATE SEMI-VARIANCE

S2(IC) ← S2(IC) + [CC/CC1 * (Z2-Z1)]²

ADD D1 TO TOTAL DISTANCE

DISTOT(IC) ← DISTOT(IC) + D1

WRITE (OUT) GENERAL INFO AND AVG PSI(L1), LAG, DIRECTION (THETA(L1)), GENERAL MEAN (MOY) AND VARIANCE (VRANCE) OF VARIABLE Z

LOOP STEPS (LAG) LP2 ← 1, 40

AT LEAST ONE PAIR OF POINTS ?

NO

YES

CALCULATE AVERAGE DRIFT LAG (LP2)

M1 ← S1(LP2) / FLOAT(NFF(LP2))

AVERAGE S-VARIANCE OVER PAIRS THIS LAG

M2 ← ½ S2(LP2) / FLOAT(NFF(LP2))

CALCULATE AVERAGE DISTANCE THIS STEP

DISMOY ← DISTOT(LP2) / FLOAT(NFF(LP2))

WRITE (OUT), DISTANCE LAG, No OF PAIRS, DRIFT, SEMI-VARIANCE, AND AVERAGE DISTANCE

WRITE (OUT) (SECONDARY OUTPUT) AVERAGE DISTANCE, DIR, SEMI-VARIANCE, No OF PAIRS

N

Triad or Subset : SUBSET
Subset's

Name : MDEP50R

Save result in : SVARIGM

Selection Y/N : N

Query : SEMIVAR

********** SEMI-VARIOGRAM **********

This routines compute the estimated semi-variogram for irregularly distributed samples in 2-dimensional space.

>> CROSS SEMI-VARIOGRAM or AUTO SEMI-VARIOGRAM? : C/A
A
> Soil Feature:
INTER_VALUE

> ALL DATA POINTS IN SUB-SET AS DATA FOR
THE SEMI-VARIOGRAM ? : Y/N
Y
>> NATURAL LOG TRANSFORMATION OF Z VARIABLE? :
if - yes - type - 1 -, else - 0 -
0
>> NUMBER OF DIRECTIONS FOR WHICH THE
SEMI-VARIOGRAM IS REQUIRED :
>
4

>> RANGE FOR THE CLASSIFICATION OF DISTANCE :
....in smallest unit defined by the ...
co-ordinate system.
(this routine calculates up to 40 of these steps)
>

```
10.0

>> THE              4 DIRECTIONS IN DEGREES :
   .... counter-clockwise from east....


>> DIRECTION              1 :
0.0
>> DIRECTION              2 :
45.0
>> DIRECTION              3 :
90.0
>> DIRECTION              4 :
135.0


>> ANGULAR REGULARIZATION  FOR EACH DIRECTION :
 >> ---Automatic -- or -- your Choice -- :  A/C
A
```

```
>> GRAPH PLOTTER OUTPUT?  :  1/0
   ....if --yes-- type  1
 >
1


>> VALUE FOR SIZE OF PLOTTER LAYOUT :
 ...a scale value of 0.1 = 5.6 cm.
 >
0.2


>> RATIO OF THE X-AXIS TO THE Y-AXIS LENGTH :
1.5


>> BLACK PEN ONLY  or  COLOURS? : 0/1
   ....0  for black, else  1 ...
1
****** NOTICE : OUTPUT SAVED IN FILE:MVARIGM
               SECUNDARY OUTPUT SAVED IN:SVARIGM
 Query : END
```

OUTPUT FROM "SEMI-VARIOGRAM" FACILITY.

S E M I - V A R I O G R A M

(WITH A FIELD OF 22.50 DEGREES IN EACH DIRECTION)

STEP IN UNITS = 0.1100E+02

GENERAL MEAN OF Z = 0.2556E+02

GENERAL VARIANCE OF Z = 0.3545E+02

DISTANCE IN UNITS	NO. OF PAIRS	DRIFT	SEMI-VARIOGRAM	AVERAGE DISTANCE
0 ---- 11	123	0.740E+00	0.1985E+02	9.9
11 ---- 22	124	0.202E+00	0.3356E+02	19.5
22 ---- 33	105	0.305E+00	0.4122E+02	30.0
33 ---- 44	94	-0.255E+00	0.4101E+02	40.0
44 ---- 55	90	-0.500E+00	0.3545E+02	50.1
55 ---- 66	198	-0.110E+01	0.3641E+02	60.5
66 ---- 77	167	-0.122E+01	0.3404E+02	70.5
77 ---- 88	136	0.118E+00	0.3429E+02	80.4
88 ---- 99	102	0.166E+01	0.3038E+02	90.3
99 ---- 110	73	0.286E+01	0.1646E+02	101.1
110 ---- 121	43	0.365E+01	0.1699E+02	110.9

0.00 22.50

0.71E+02 *
0.69E+02 *
0.68E+02 *
0.67E+02 *
0.65E+02 *
0.64E+02 *
0.62E+02 *
0.61E+02 *
0.59E+02 *
0.58E+02 *
0.56E+02 *
0.55E+02 *
0.54E+02 *
0.52E+02 *
0.51E+02 *
0.49E+02 *
0.48E+02 *
0.46E+02 *
0.45E+02 *
0.43E+02 *
0.42E+02 *
0.41E+02 * * *
0.39E+02 *
0.38E+02 *
0.36E+02 * *
0.35E+02 * *
0.33E+02 * * * *
0.32E+02 *
0.30E+02 *
0.29E+02 * *
0.27E+02 *
0.26E+02 *

S E M I - V A R I O G R A M

(WITH A FIELD OF 22.50 DEGREES IN EACH DIRECTION)

WWW	
45.00	

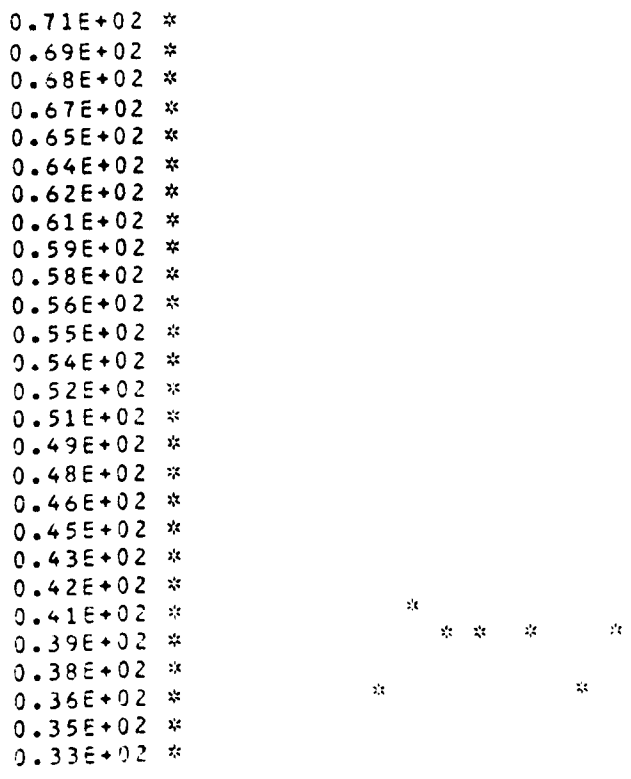
STEP IN UNITS = 0.1100E+02

GENERAL MEAN OF Z = 0.2556E+02

GENERAL VARIANCE OF Z = 0.3545E+02

DISTANCE IN UNITS	NO. OF PAIRS	DRIFT	SEMI-VARIOGRAM	AVERAGE DISTANCE
11 ---- 22	119	0.655E+00	0.2168E+02	14.1
22 ---- 33	96	0.323E+00	0.2872E+02	28.3
33 ---- 44	87	0.161E+00	0.3659E+02	41.8
44 ---- 55	140	-0.393E+00	0.4172E+02	50.0
55 ---- 66	173	-0.792E+00	0.3990E+02	61.3
66 ---- 77	55	-0.164E+01	0.3958E+02	71.1
77 ---- 88	136	-0.235E+01	0.4006E+02	82.3
88 ---- 99	87	-0.420E+01	0.3682E+02	94.2
99 ---- 110	93	-0.447E+01	0.4039E+02	103.1
110 ---- 121	74	-0.408E+01	0.3166E+02	116.0
121 ---- 132	49	-0.106E+01	0.1786E+02	125.2
132 ---- 143	31	0.126E+01	0.1034E+02	137.3
143 ---- 154	4	0.425E+01	0.1838E+02	148.7
154 ---- 165	1	0.600E+01	0.1800E+02	155.6

45.00 22.50

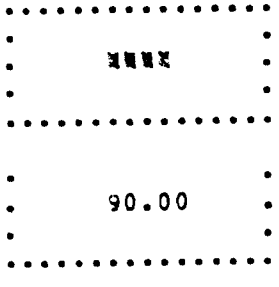


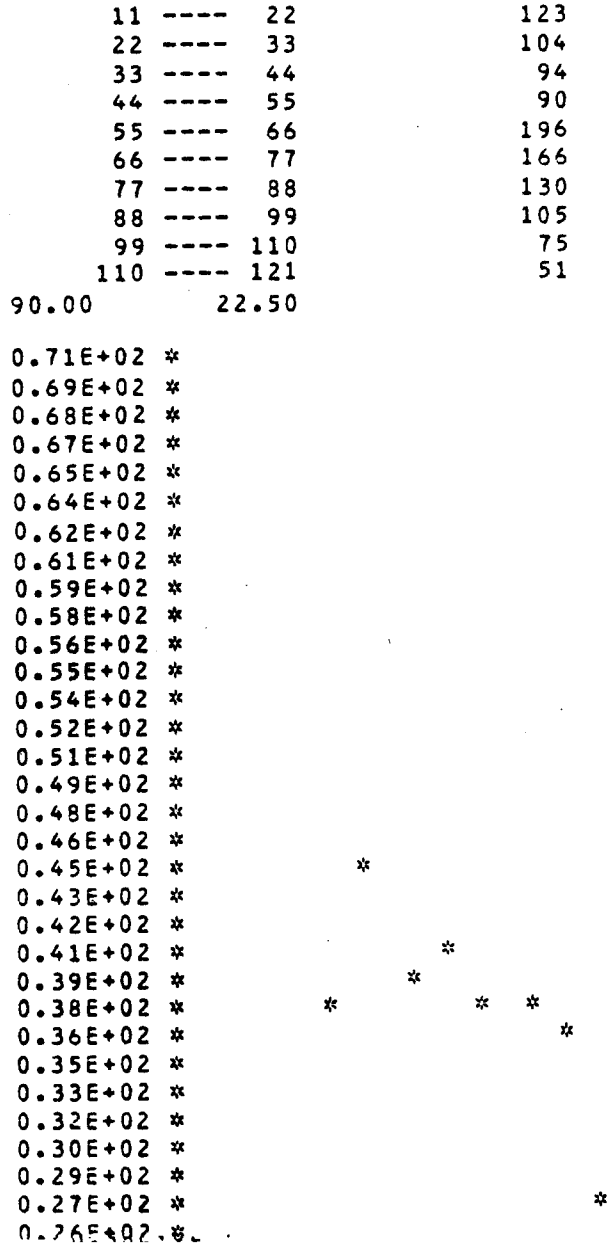
S E M I - V A R I O G R A M

(WITH A FIELD OF 22.50 DEGREES IN EACH DIRECTION)

STEP IN UNITS	= 0.1100E+02
GENERAL MEAN OF Z	= 0.2556E+02
GENERAL VARIANCE OF Z	= 0.3545E+02

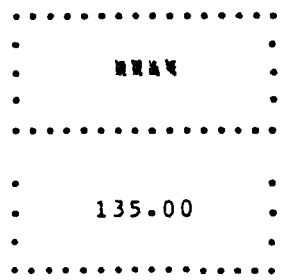
DISTANCE IN UNITS	NO. OF PAIRS	DRIFT	SEMI-VARIOGRAM	AVERAGE DISTANCE
0 ---- 11	120	0.300E+00	0.1525E+02	9.9
11 ---- 22	123	-0.309E+00	0.2533E+02	19.4
22 ---- 33	104	-0.846E+00	0.3779E+02	29.9
33 ---- 44	94	-0.153E+01	0.4502E+02	40.0
44 ---- 55	90	-0.127E+01	0.4032E+02	50.0
55 ---- 66	196	-0.214E+01	0.4131E+02	60.5
66 ---- 77	166	-0.216E+01	0.3872E+02	70.4
77 ---- 88	130	-0.268E+01	0.3879E+02	80.3
88 ---- 99	105	-0.184E+01	0.3725E+02	90.4
99 ---- 110	75	-0.125E+01	0.2819E+02	100.7
110 ---- 121	51	0.237E+01	0.2301E+02	110.8





S E M I - V A R I O G R A M

(WITH A FIELD OF 22.50 DEGREES IN EACH DIRECTION)



STEP IN UNITS = 0.1100E+02

GENERAL MEAN OF Z = 0.2556E+02

GENERAL VARIANCE OF Z = 0.3545E+02

DISTANCE IN UNITS	NO. OF PAIRS	DRIFT	SEMI-VARIOGRAM	AVERAGE DISTANCE
0 ---- 11	1	0.500E+01	0.1250E+02	1.4
11 ---- 22	117	-0.308E+00	0.2641E+02	14.1
22 ---- 33	97	-0.526E+00	0.4610E+02	28.3
33 ---- 44	88	-0.943E+00	0.3773E+02	41.6
44 ---- 55	136	-0.150E+01	0.3649E+02	50.0
55 ---- 66	167	-0.138E+01	0.2798E+02	61.3
66 ---- 77	56	-0.679E+00	0.2093E+02	71.3
77 ---- 88	175	-0.989E+00	0.2327E+02	82.4
88 ---- 99	83	-0.892E+00	0.2872E+02	94.2
99 ---- 110	83	-0.141E+01	0.2442E+02	103.1
110 ---- 121	71	-0.154E+01	0.1870E+02	116.0
121 ---- 132	40	-0.120E+01	0.9775E+01	125.4
132 ---- 143	30	0.833E+00	0.8683E+01	137.0
143 ---- 154	4	0.400E+01	0.1125E+02	148.3
154 ---- 165	1	0.300E+01	0.4500E+01	155.6

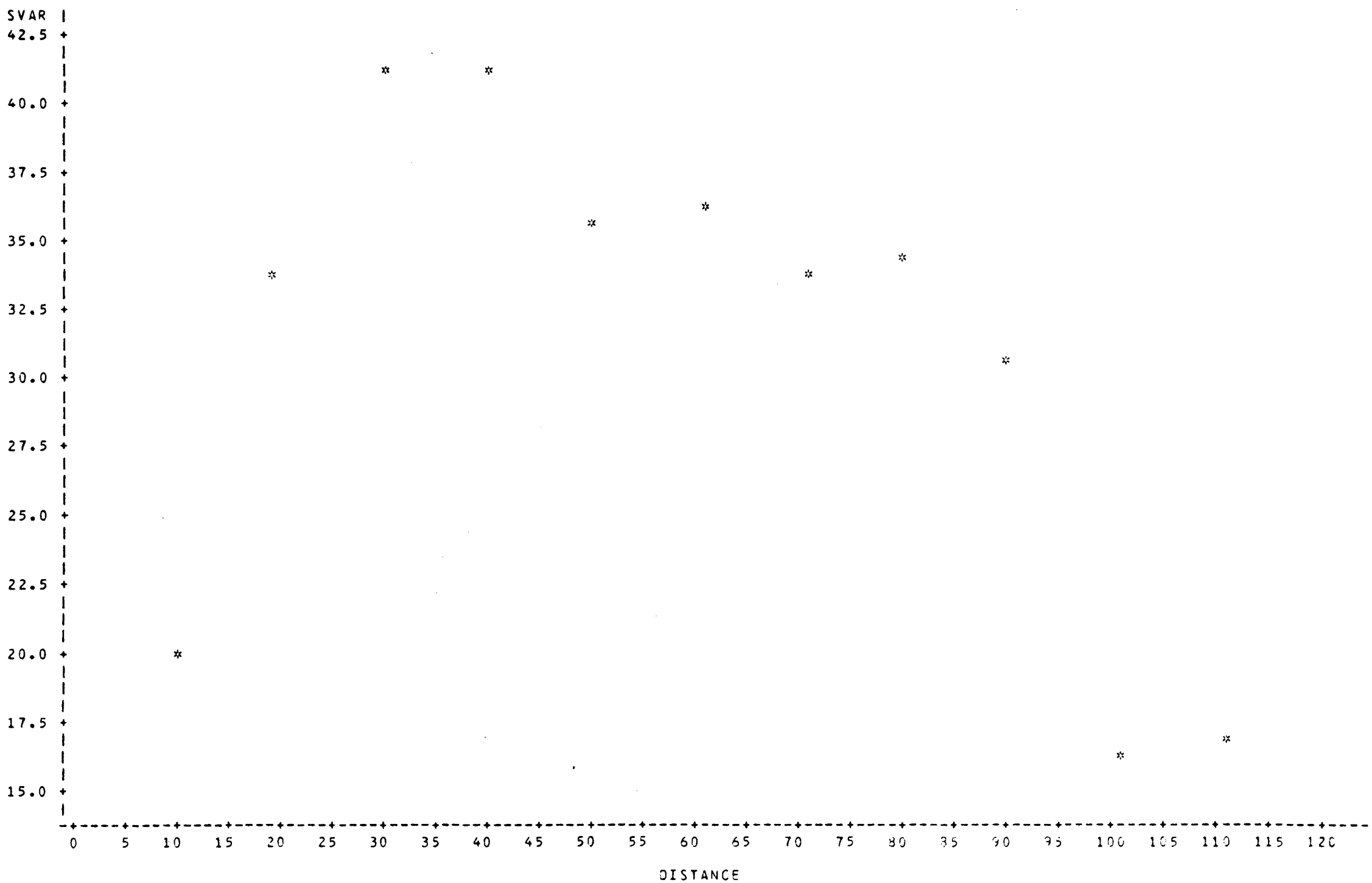
135.00 22.50

0.71E+02 *
0.69E+02 *
0.68E+02 *
0.67E+02 *
0.65E+02 *
0.64E+02 *
0.62E+02 *
0.61E+02 *
0.59E+02 *
0.58E+02 *
0.56E+02 *
0.55E+02 *
0.54E+02 *
0.52E+02 *
0.51E+02 *
0.49E+02 *
0.48E+02 *
0.46E+02 *
0.45E+02 *
0.43E+02 *
0.42E+02 *
0.41E+02 *
0.39E+02 *
0.38E+02 *

OBS	DISTANCE	DIR	SVAR	PAIRS
1	9.922	0	19.850	123
2	19.489	0	33.560	124
3	30.002	0	41.220	105
4	40.033	0	41.010	94
5	50.103	0	35.450	90
6	60.545	0	36.410	198
7	70.508	0	34.040	167
8	80.424	0	34.290	136
9	90.329	0	30.380	102
10	101.074	0	16.460	73
11	110.874	0	16.990	43
12	14.129	45	21.680	119
13	28.294	45	28.720	96
14	41.778	45	36.590	87
15	49.992	45	41.720	140
16	61.301	45	39.900	173
17	71.069	45	39.580	55
18	82.342	45	40.060	186
19	94.163	45	36.820	87
20	103.055	45	40.390	93
21	115.988	45	31.660	74
22	125.246	45	17.860	49
23	137.275	45	10.340	31
24	148.661	45	18.380	4
25	155.564	45	18.000	1
26	9.930	90	15.250	120
27	19.404	90	25.330	123
28	29.926	90	37.790	104
29	39.970	90	45.020	94
30	50.037	90	40.320	90
31	60.488	90	41.310	196
32	70.405	90	38.720	166
33	80.348	90	38.790	130
34	90.360	90	37.250	105
35	100.733	90	28.190	75
36	110.847	90	23.010	51
37	1.414	135	12.500	1
38	14.117	135	26.410	117
39	28.264	135	46.100	97
40	41.620	135	37.730	88
41	50.010	135	36.490	136
42	61.314	135	27.980	167
43	71.339	135	20.930	56
44	82.418	135	23.270	175
45	94.239	135	28.720	83
46	103.072	135	24.420	83
47	116.047	135	18.700	71
48	125.382	135	9.775	40
49	136.992	135	8.683	30
50	148.307	135	11.250	4
51	155.564	135	4.500	1
52	9.922	180	19.850	123
53	19.489	180	33.560	124

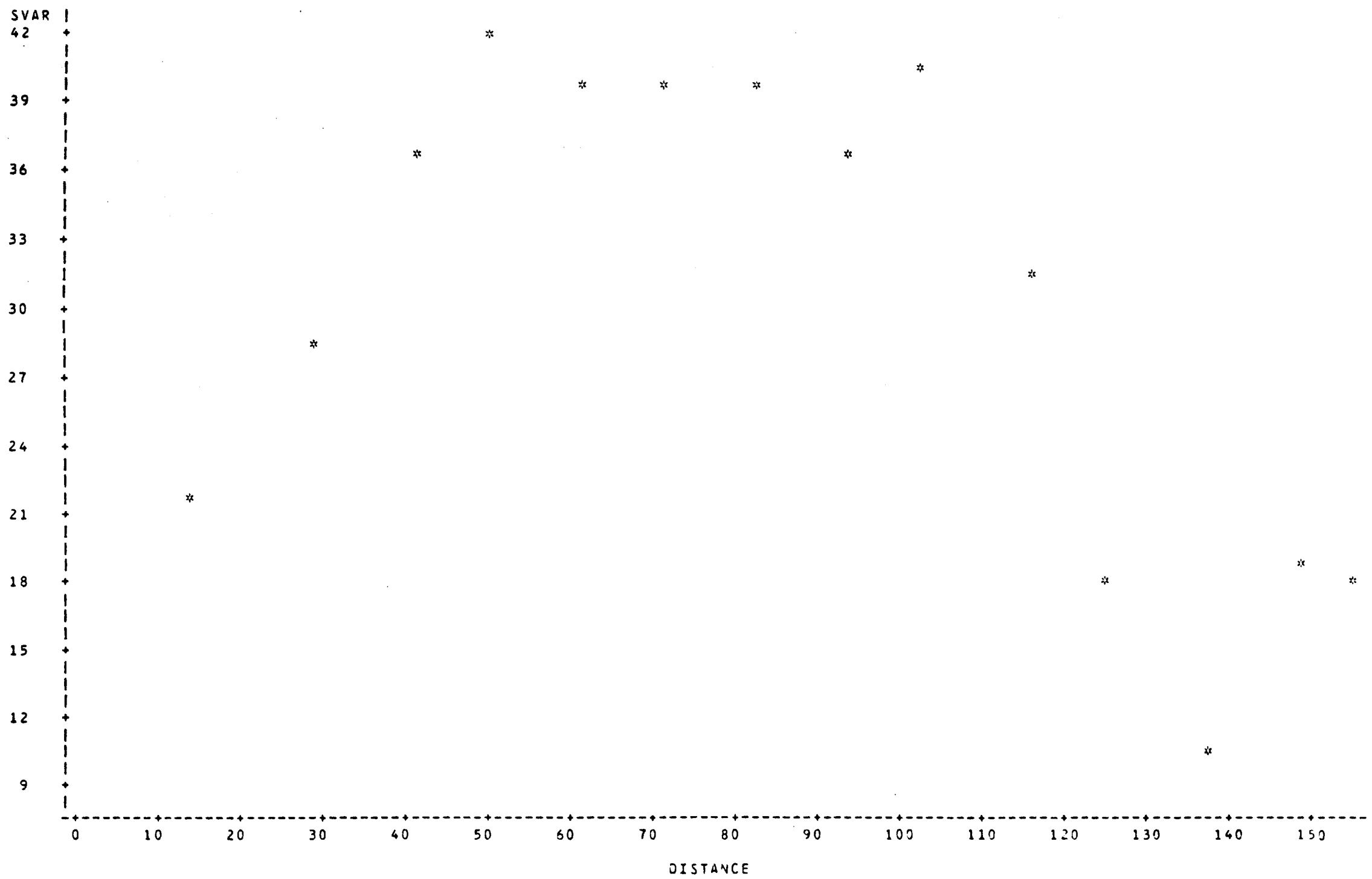
DIR=0

PLOT OF SVAR*DISTANCE SYMBOL USED IS *



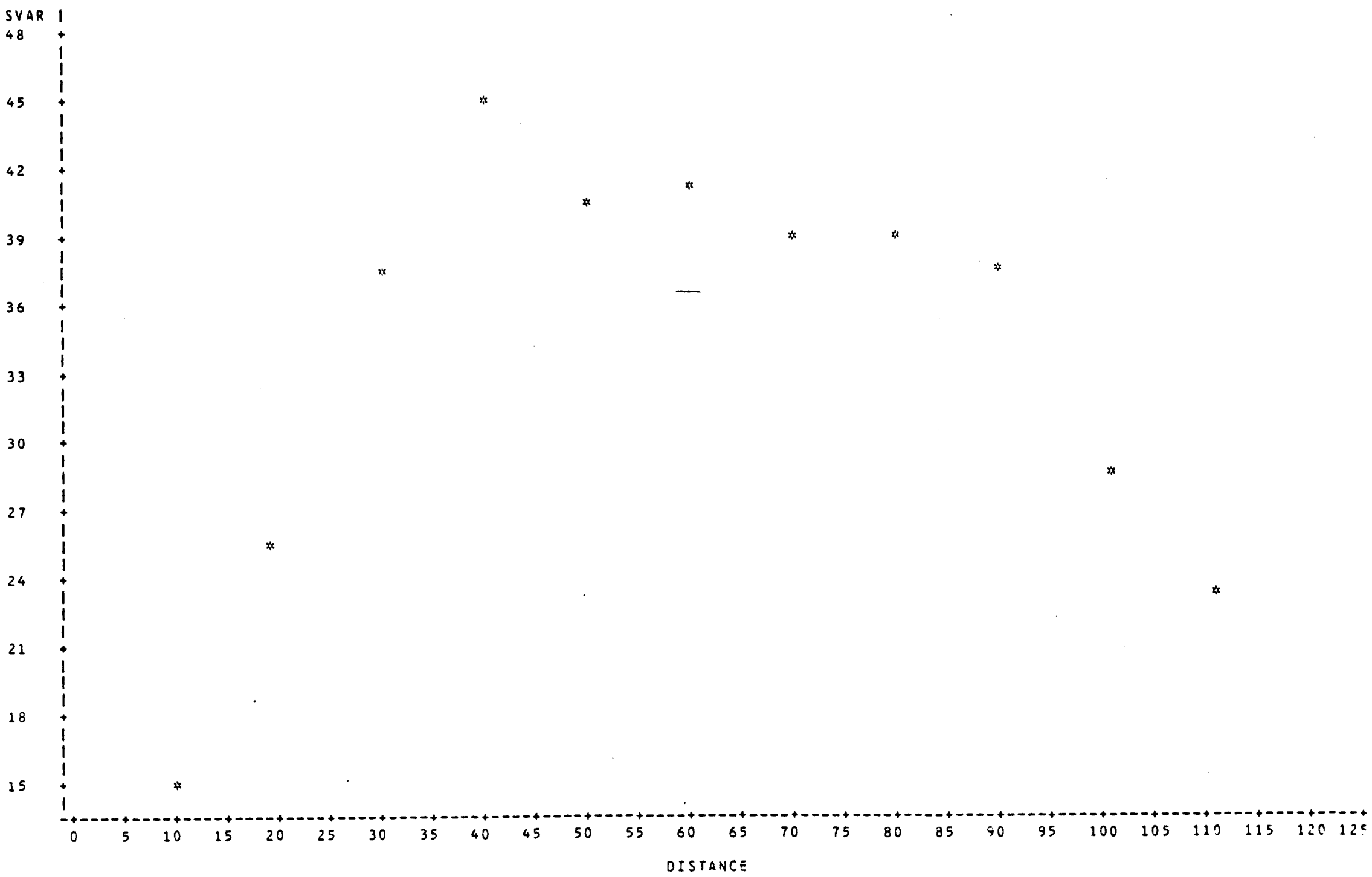
DIR=45

PLOT OF SVAR*DISTANCE SYMBOL USED IS *



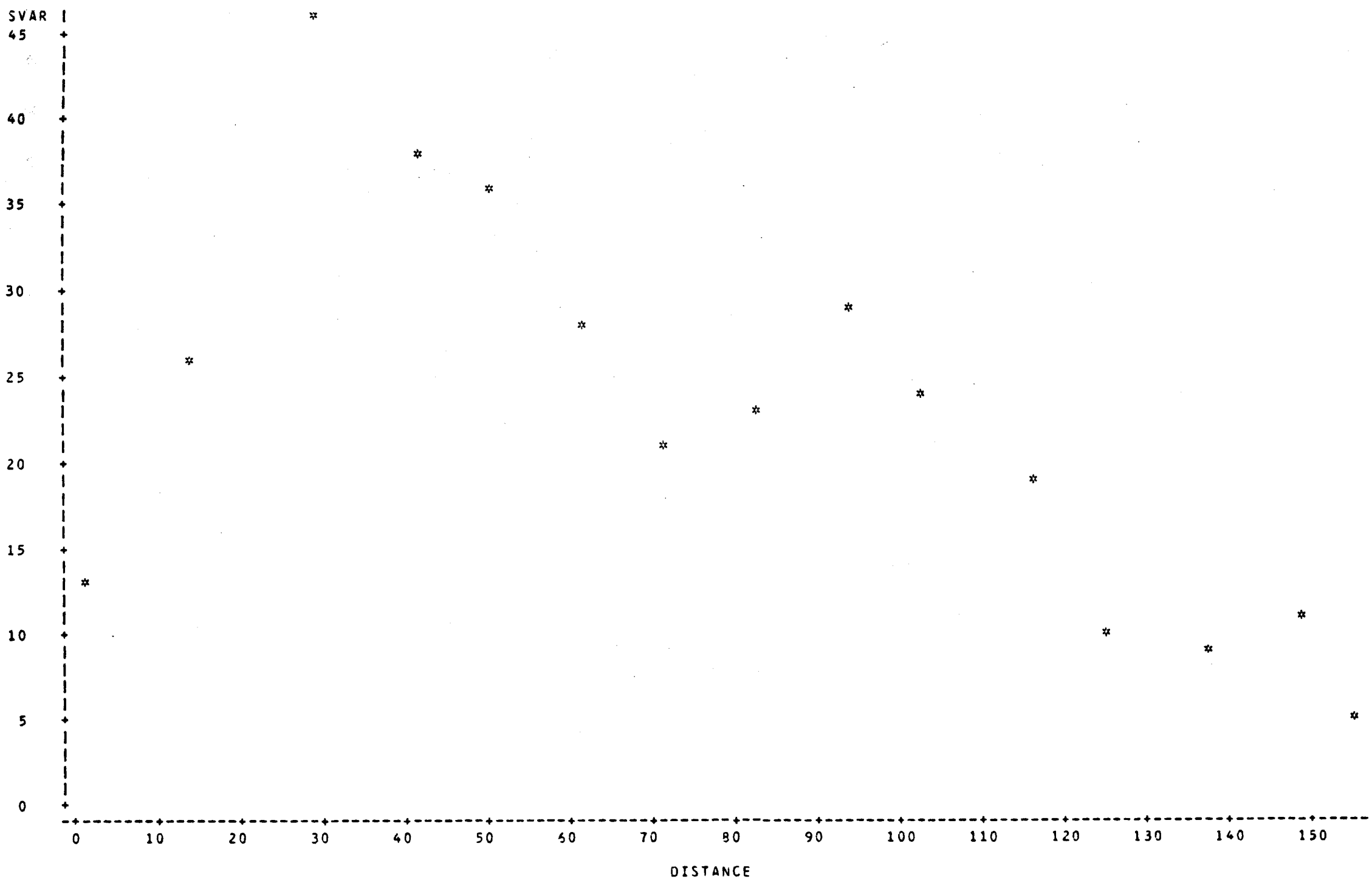
DIR=90

PLOT OF SVAR*DISTANCE SYMBOL USED IS *

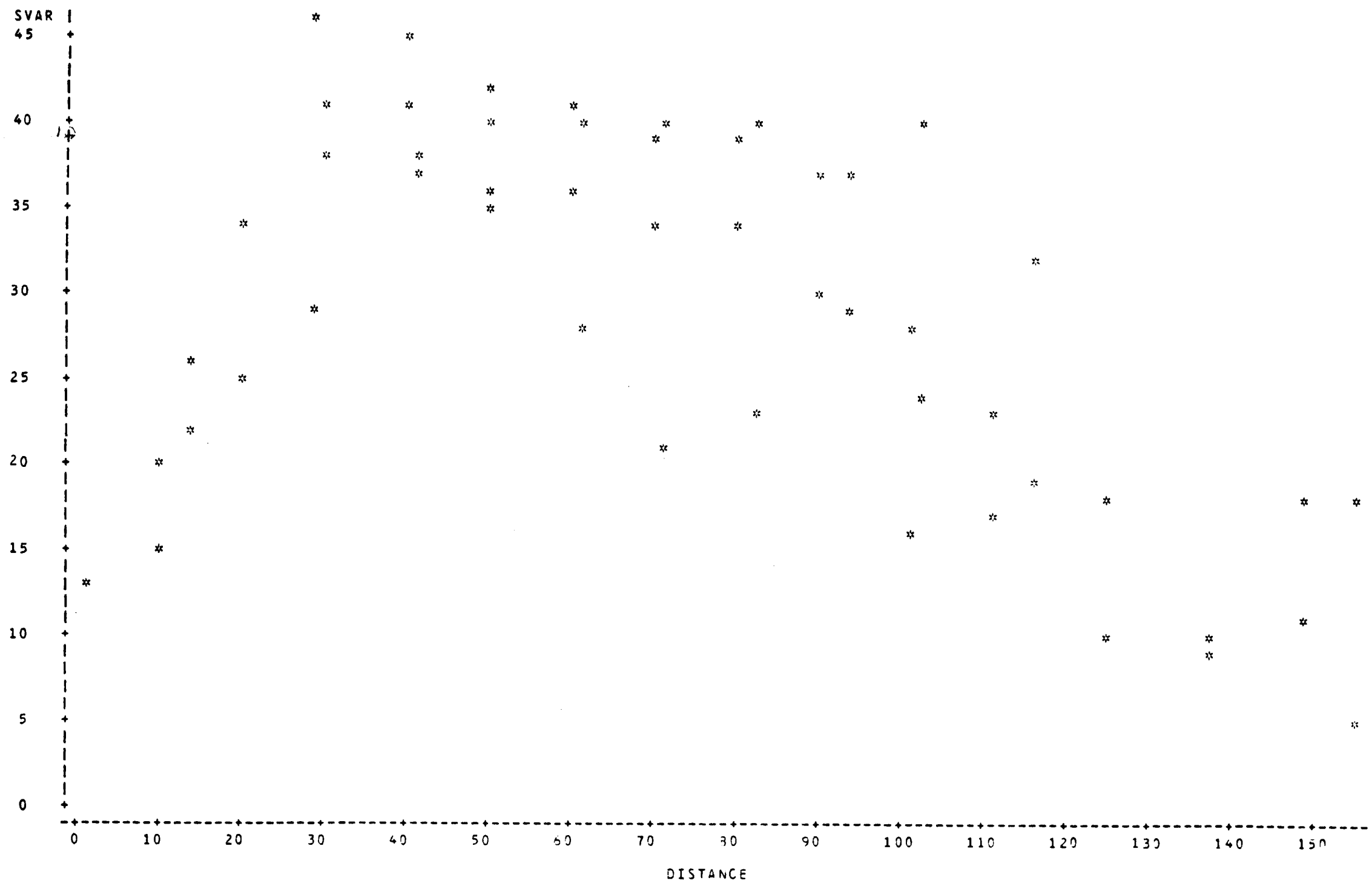


DIR=135

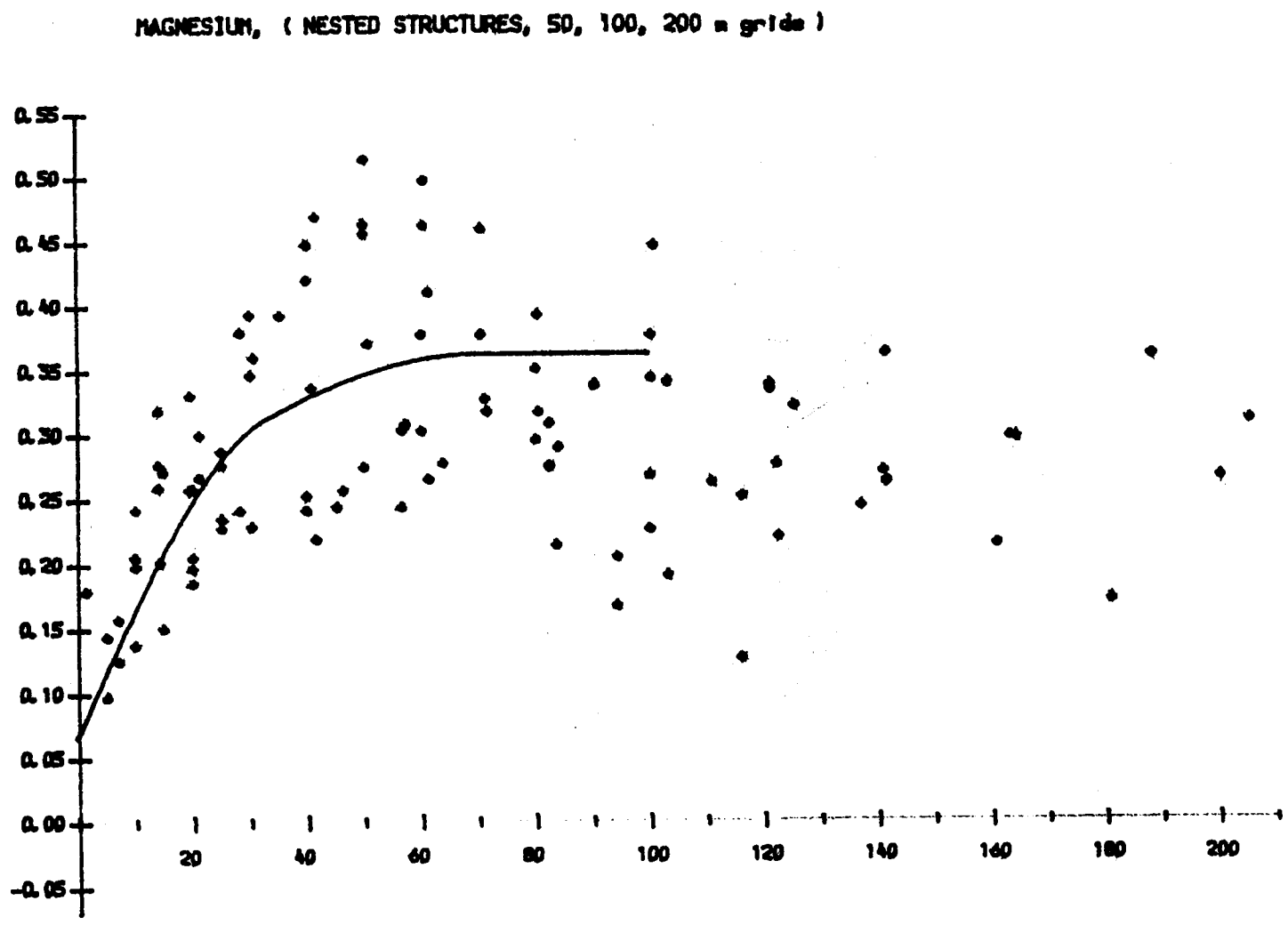
PLOT OF SVAR*DISTANCE SYMBOL USED IS *



PLOT OF SVAR*DISTANCE SYMBOL USED IS *



NOTE: 51 OBS HIDDEN


MAGNESIUM, (NESTED STRUCTURES, 50, 100, 200 m grids)
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
20
40
60
80
100
120
140
160
180
200

KRIGING Facility

```
Triad or Subset : SUBSET
 Subset's

Name : MDEP50R

Save result in : KRIG50R

  Selection Y/N : N

Query : KRIGING

********************  KRIGING  ********************

This routines compute SIMPLE KRIGING (Point & Block)
of irregularly spaced  2-Dimensional data on to a
   square interpolation grid.


  > POINT  or  BLOCK  KRIGING ? :  P/B
P
 > Soil   Feature:
INTER_VALUE

 > VALUE WHICH RELATES DISTANCE UNITS IN THE
   SEMI-VARIOGRAM MODEL TO THE KILOMETRE ? :
0.01

 > VALUE WHHICH RELATES DISTANCE UNITS OF THE
   X , Y  CO-ORDINATES TO THE KILOMETRE ? :
0.01

 > ALL DATA BLOCKS (POINTS) IN SUBSET
                AS DATA FOR KRIGING? :     Y/N
Y

 > SEARCH RADIUS ( AUTOMATIC / YOUR CHOICE ) :  A/C
A

****** KRIGING INTERPOLATION  may be performed onto a
      SQUARE GRID or at selected TARGET POINTS *****


>> KRIGING INTERPOLATION AT:
 > SQUARE GRID  or  TARGET POINTS ?:    G/T
```

T
********** INTERPOLATION AT TARGET POINTS ********

> ENTER NO. OF TARGET POINTS:
5

> ENTER TARGET POINTS CO-ORDINATES :
_____ eastings and northings _____

> EASTING 1 :
43584

> NORTHING 1 :
20563
> EASTING 2 :
43503

> NORTHING 2 :
20540
> EASTING 3 :
43571

> NORTHING 3 :
20533
> EASTING 4 :
43547

> NORTHING 4 :
20511
> EASTING 5 :
43590

> NORTHING 5 :
20532

> SEARCH RADIUS :

distance units as for x,y co-ordinates
50.0

___ ENTER EXTREME NO. OF DATA POINTS REQUIRED FOR
AN INTERPOLATION_____

> MINIMUM :
10
> MAXIMUM :
20

******* SPECIFY SEMI-VARIOGRAM MODEL **********

> ISOTROPIC or ANISOTROPIC ? : I/A

I

SEMI-VARIOGRAM MODELS

1. Linear Model (No Sill)
2. Linear with Sill Model
3. Spherical Model
4. Exponential Model
5. Gaussian Model
6. Double Spherical Model

> MODEL ? :
(Enter number)
3

> VALUE FOR NUGGET VARIANCE :
22.0
> GRADIENT OF LINEAR PART :

...For models other than linear enter 0.0....
0.0

> VALUE FOR SILL VARIANCE - NUGGET VARIANCE :
..... input 0.0 for Linear Models .....
.... For double spherical this applies to
the first structure .....
57.0

> VALUE FOR THE RANGE OF THE MODEL :
....distance units as relatd to the Kilometer....
... input 0.0 for linear model without sill ....
... for double spherical it refers to the range
of the first structure .....
>
33.0

********** OUTPUT OPTIONS **********

....enter 1 for YES or else 0 for NO .....

> LISTING OF CO-ORDINATES AND WEIGHTS OF
OBSERVATIONS? :
>
0

> REPORT ON ESTIMATES, THEIR VARIANCES AND
SEARCHING CONDITIONS ? :
>
1

> REPORT ON ESTIMATES AND VARIANCES IN X,Y,Z,V? :
(If - 0 - information is in grid format)

1
**** KRIGING INSTRUCTIONS ENTERED SUCCESSFULLY

.....END.....

****** NOTICE : OUTPUT SAVED IN FILE:MRIG50R
SECUNDARY OUTPUT SAVED IN:SRIG50R

Query : END

SIS SOIL SCIENCE LABORATORY
UNIVERSITY OF OXFORD.

Kriging of Irregularly Spaced 2-dimensional Data

SPHERICAL MODEL
GAMMA(H) = 0.650000 + 5.350000(1.5H/ 1050.000000 + 0.5 (H**3/ 1050.000000**3)) ; H < 1050.000000
GAMMA(H) = 6.000000 ; H >= 1050.000000
DISTANCES (H) ARE IN METRES

DATA RECTANGLE
MINIMUM X 203500.0000 MAXIMUM X 205700.0000
MINIMUM Y 434500.0000 MAXIMUM Y 436100.0000

INTERPOLATION RECTANGLE
MINIMUM X 203500.0000 MAXIMUM X 205700.0000
MINIMUM Y 434500.0000 MAXIMUM Y 436100.0000

ISOTROPIC SEARCH RADIUS 962.4529

MINIMUM NUMBER OF DATA POINTS REQUIRED PER INTERPOLATION 10
MAXIMUM NUMBER OF DATA POINTS REQUIRED PER INTERPOLATION 20

NUMBER OF DATA POINTS RETAINED 76

MATRIX OF SEARCH RECTANGLES

1	9	15
20	28	36
41	46	51
56	62	69

POINT KRIGING

SEARCH 1	XC=	205630.0000	YC=	435840.0000	KRGEST=	0.2427	ESTVAR=	0.161804E+01	NUMBER OF POINTS= 20
SEARCH 1	XC=	205400.0000	YC=	435030.0000	KRGEST=	0.4651	ESTVAR=	0.207077E+01	NUMBER OF POINTS= 20
SEARCH 1	XC=	205330.0000	YC=	435710.0000	KRGEST=	2.4902	ESTVAR=	0.205436E+01	NUMBER OF POINTS= 20
SEARCH 1	XC=	205110.0000	YC=	435470.0000	KRGEST=	2.8532	ESTVAR=	0.198564E+01	NUMBER OF POINTS= 20
SEARCH 1	XC=	205020.0000	YC=	435120.0000	KRGEST=	1.2780	ESTVAR=	0.218713E+01	NUMBER OF POINTS= 20
SEARCH 1	XC=	204660.0000	YC=	435720.0000	KRGEST=	3.4806	ESTVAR=	0.225762E+01	NUMBER OF POINTS= 20
SEARCH 1	XC=	204460.0000	YC=	435580.0000	KRGEST=	2.1736	ESTVAR=	0.161887E+01	NUMBER OF POINTS= 20
SEARCH 1	XC=	204150.0000	YC=	434810.0000	KRGEST=	-0.0144	ESTVAR=	0.164367E+01	NUMBER OF POINTS= 20
SEARCH 1	XC=	203970.0000	YC=	435010.0000	KRGEST=	0.0295	ESTVAR=	0.165719E+01	NUMBER OF POINTS= 20

```
SEARCH 1   XC=  203820.0000   YC=  435720.0000   KRGEST=      0.9104   ESTVAR=  0.162197E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  203720.0000   YC=  435630.0000   KRGEST=      0.6955   ESTVAR=  0.168187E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205440.0000   YC=  435720.0000   KRGEST=      1.6645   ESTVAR=  0.156010E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205310.0000   YC=  435040.0000   KRGEST=      0.7876   ESTVAR=  0.210525E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205210.0000   YC=  434950.0000   KRGEST=      0.7750   ESTVAR=  0.176731E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205320.0000   YC=  435440.0000   KRGEST=      0.3521   ESTVAR=  0.154119E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205320.0000   YC=  435900.0000   KRGEST=      1.4448   ESTVAR=  0.208103E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205240.0000   YC=  435390.0000   KRGEST=      1.3901   ESTVAR=  0.169602E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205080.0000   YC=  434910.0000   KRGEST=      1.1057   ESTVAR=  0.133582E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205000.0000   YC=  435790.0000   KRGEST=      5.2853   ESTVAR=  0.174802E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204910.0000   YC=  435820.0000   KRGEST=      4.4944   ESTVAR=  0.179323E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204610.0000   YC=  435090.0000   KRGEST=      0.3002   ESTVAR=  0.159051E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204750.0000   YC=  435720.0000   KRGEST=      3.6501   ESTVAR=  0.239768E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204550.0000   YC=  435760.0000   KRGEST=      3.7461   ESTVAR=  0.172937E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205130.0000   YC=  435420.0000   KRGEST=      2.5312   ESTVAR=  0.188405E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205010.0000   YC=  435590.0000   KRGEST=      4.3463   ESTVAR=  0.187683E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204810.0000   YC=  435380.0000   KRGEST=      0.5400   ESTVAR=  0.174469E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205190.0000   YC=  435600.0000   KRGEST=      3.8711   ESTVAR=  0.188236E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205020.0000   YC=  435380.0000   KRGEST=      2.1055   ESTVAR=  0.176211E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205000.0000   YC=  435420.0000   KRGEST=      1.8988   ESTVAR=  0.180855E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204940.0000   YC=  435480.0000   KRGEST=      1.3687   ESTVAR=  0.151625E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204910.0000   YC=  435380.0000   KRGEST=      0.8270   ESTVAR=  0.160330E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204870.0000   YC=  435580.0000   KRGEST=      2.5334   ESTVAR=  0.189425E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204680.0000   YC=  435570.0000   KRGEST=      2.3135   ESTVAR=  0.223061E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204680.0000   YC=  435610.0000   KRGEST=      2.7314   ESTVAR=  0.227352E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204620.0000   YC=  435440.0000   KRGEST=      1.0506   ESTVAR=  0.189848E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204610.0000   YC=  435470.0000   KRGEST=      1.2410   ESTVAR=  0.190127E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204580.0000   YC=  435600.0000   KRGEST=      2.7555   ESTVAR=  0.190294E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204180.0000   YC=  434680.0000   KRGEST=     -0.1144   ESTVAR=  0.158340E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205670.0000   YC=  436050.0000   KRGEST=     -0.0082   ESTVAR=  0.154153E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205670.0000   YC=  435780.0000   KRGEST=      0.0999   ESTVAR=  0.160725E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205130.0000   YC=  435750.0000   KRGEST=      6.1801   ESTVAR=  0.146140E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204530.0000   YC=  435720.0000   KRGEST=      3.9814   ESTVAR=  0.146619E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205600.0000   YC=  435520.0000   KRGEST=     -0.0017   ESTVAR=  0.159596E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204500.0000   YC=  435880.0000   KRGEST=      2.6063   ESTVAR=  0.131819E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205280.0000   YC=  435240.0000   KRGEST=      1.0759   ESTVAR=  0.168652E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205530.0000   YC=  435410.0000   KRGEST=      0.0578   ESTVAR=  0.160550E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  204540.0000   YC=  435440.0000   KRGEST=      0.9625   ESTVAR=  0.162764E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205150.0000   YC=  435670.0000   KRGEST=      5.8585   ESTVAR=  0.156254E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205000.0000   YC=  435630.0000   KRGEST=      5.0769   ESTVAR=  0.165033E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205150.0000   YC=  435610.0000   KRGEST=      4.7517   ESTVAR=  0.181119E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205110.0000   YC=  435600.0000   KRGEST=      4.9586   ESTVAR=  0.180571E+01 NUMBER OF POINTS=  20
SEARCH 1   XC=  205030.0000   YC=  435450.0000   KRGEST=      2.3587   ESTVAR=  0.189807E+01 NUMBER OF POINTS=  20
```

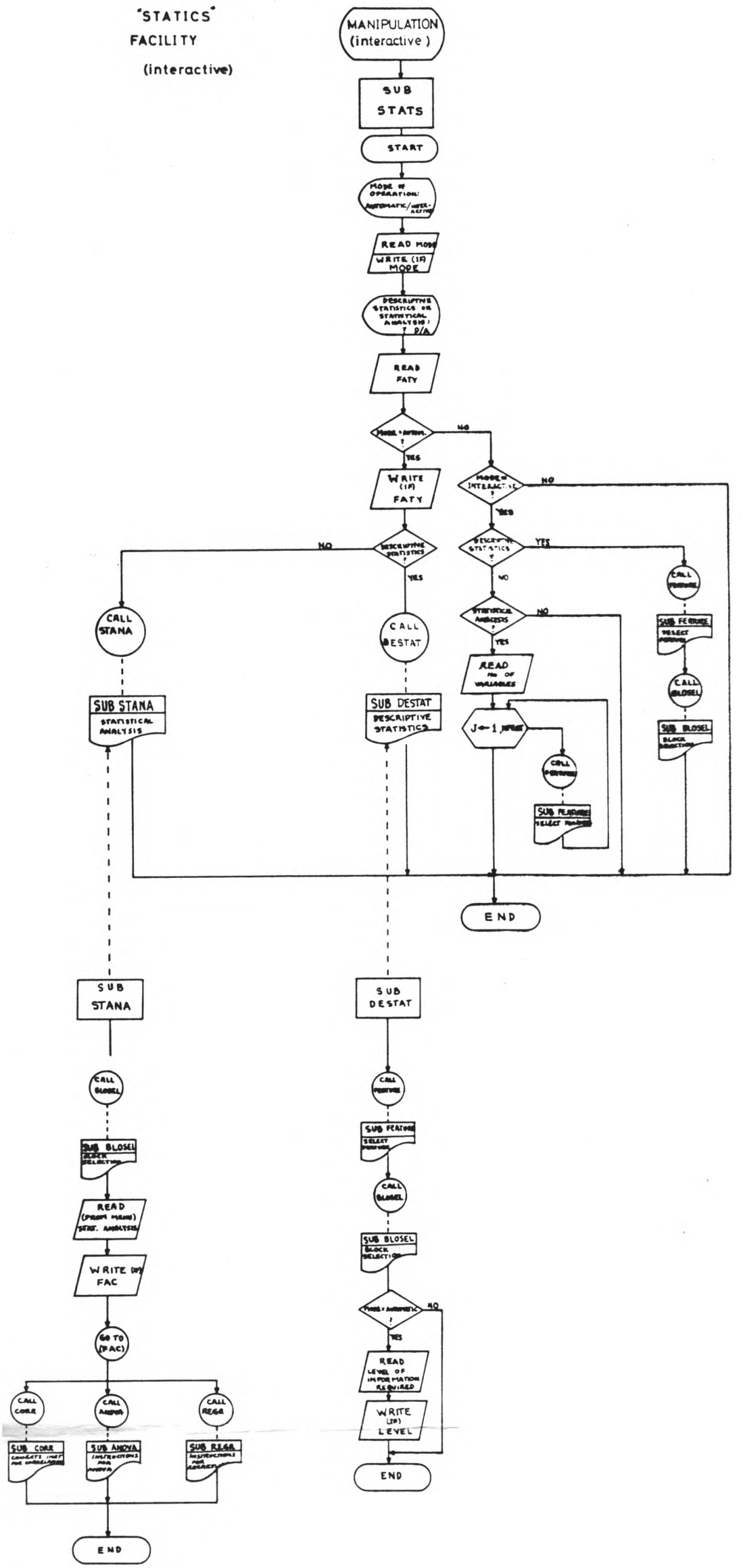
File complete

000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

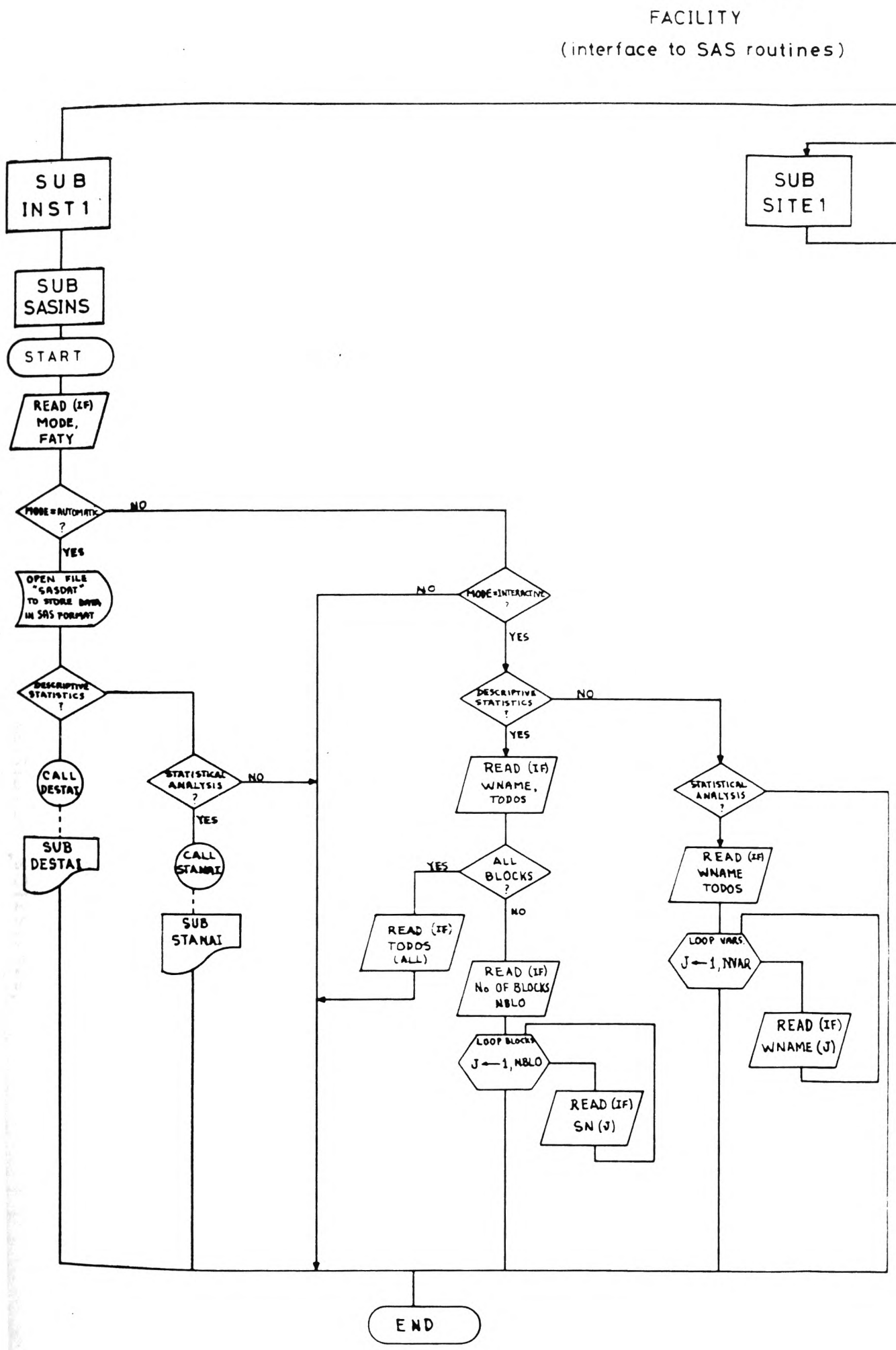
STATISTICS Facility

"STATICS"
FACILITY

(interactive)

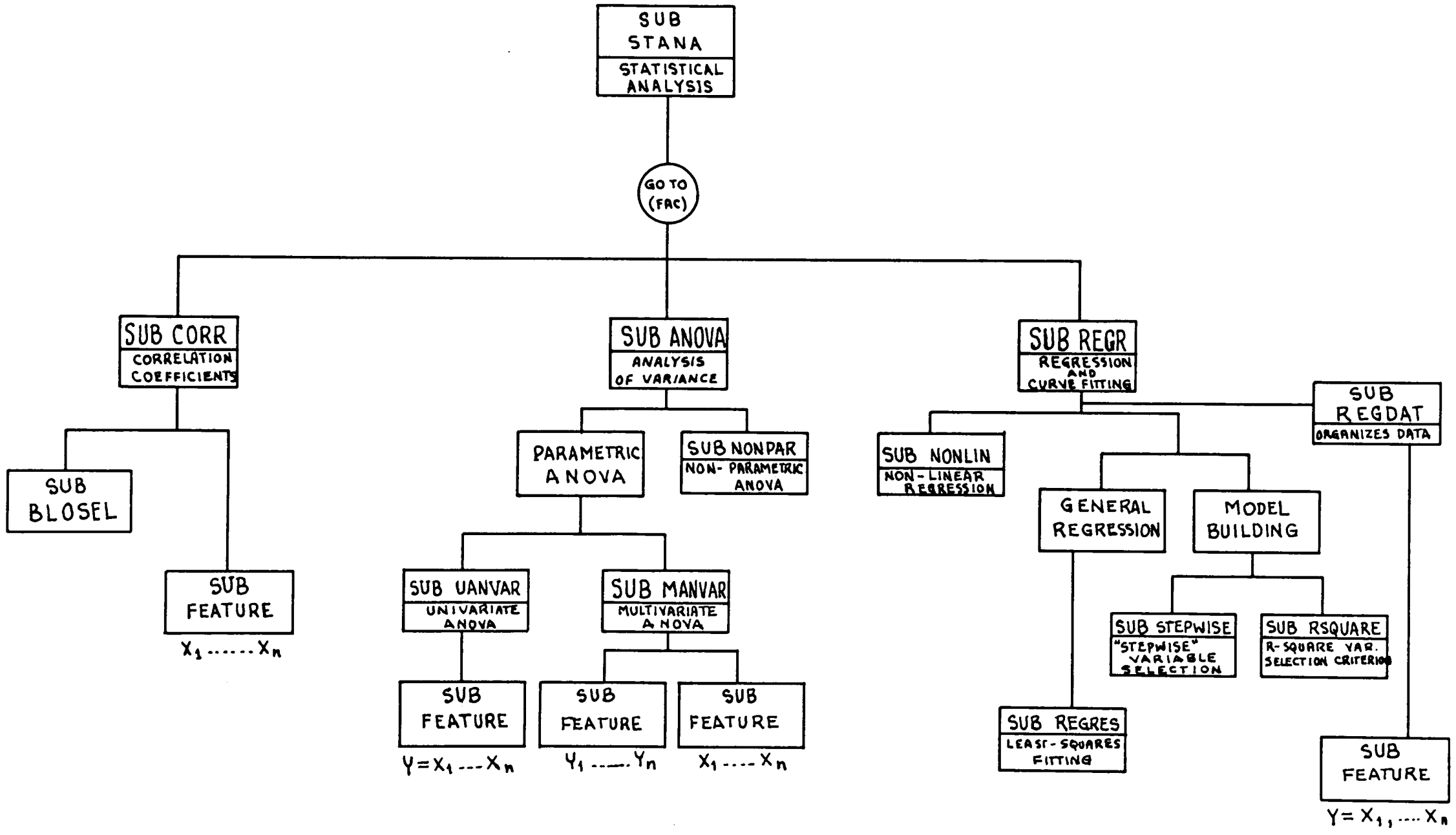


"STATISTICS"
FACILITY
(interface to SAS routines)



"STATISTICS" FACILITY

(hierarchy of subroutines)



```
$ N

 Triad or Subset : SUBSET
  Subset's

 Name : MDEP50R

 Save result in : STAT50

   Selection Y/N : N

 Query : STATISTICS

****************** STATISTICS ******************

      +++++++  OXSIS  STATISTICAL  PACKAGE  ++++++++

      Modes of Operation:

      > AUTOMATIC  (A)
     ( OXSIS-Controlled interface with SAS)

      > INTERACTIVE   (I)
   (Developing own program in SAS procedural language)

  >  MODE OF OPERATTION:    A/I
A

  > FACILITIES :

  > DESCRIPTIVE  STATISTICS   (D)

  > STATISTICAL ANALYSIS      (A)

  > Facility :   D/A
  >
D

********** DESCRIPTIVE STATISTICS ***************

   Soil
> Soil   Feature:
INTER_VALUE

  >  ALL BLOCKS IN SUBSET ? :   Y/N
   >
Y

  > LEVEL OF INFORMATION REQUIRED ? :

     High  ___ or___ Standard :        H/S
  >
H

  @@@@@@@@@@   INSTRUCTIONS  COMPLETED   @@@@@@@@@@
  Query : END
```

A TYPE OF OUTPUT FROM "STATISTICS" FACILITY.

OBS	EASTING	NORTHING	SN	FEATURE
1	20480	43530	15077	3
2	20470	43540	15087	1
3	20470	43560	15088	4
4	20450	43540	15105	2
5	20470	43550	55022	4
6	20450	43530	55025	1
7	20480	43535	65066	5
8	20480	43545	65067	4
9	20475	43535	65071	3
10	20475	43540	65072	3
11	20475	43545	65073	4
12	20475	43550	65074	4
13	20475	43555	65075	4
14	20475	43560	65076	4
15	20470	43535	65079	1
16	20470	43545	65080	5
17	20470	43555	65081	4
18	20465	43540	65085	2
19	20464	43544	65086	2
20	20466	43551	65087	2
21	20465	43555	65088	3
22	20465	43560	65089	5
23	20455	43530	65096	2
24	20455	43535	65097	2
25	20455	43540	65098	1
26	20450	43535	65105	2
27	20451	43546	65106	1

```
                                                                        SAS                            20:48 THURSDAY, OCTOBER 30, 1986  2

                                                                     UNIVARIATE

VARIABLE=FEATURE

                 MOMENTS                                              QUANTILES(DEF=4)                                 EXTREMES

N                    27  SUM WGTS            27           100% MAX          5        99%             5              LOWEST    HIGHEST
MEAN            2.88889  SUM                 78            75% Q3           4        95%             5                   1          4
STD DEV         1.33973  VARIANCE       1.79487            50% MED          3        90%             5                   1          4
SKEWNESS      0.0102366  KURTOSIS        -1.277            25% Q1           2        10%             1                   1          5
USS                 272  CSS            46.6667             0% MIN          1         5%             1                   1          5
CV              46.3752  STD MEAN      0.257831                                       1%             1                   1          5
T:MEAN=0        11.2046  PROB>|T|         .0001           RANGE             4
SGN RANK            189  PROB>|S|         .0001           Q3-Q1             2
NUM ^= 0             27                                   MODE              4

File complete

SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
```

```
YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY

User: AGRIC2                                                                    11:01:17
File: VAX1::DRC2:[AGRIC2]SIS.COM;12

YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY

$ TYPE WELCOME.DAT
$ SHOW TIME
$ SIS_DIR:==RUN DIRSIS
$ REC*ORD:==RUN AFMT
$ BLO*CK:==RUN AP2
$
$ VAL*IDATE:==RUN VALII
$ REG*ULATE:==@REGU.COM
$ !  TIME ** TIME **  TIME
$ FET*CH:==@APACA
$ MAP1:==RUN FULLS
$
$ MAP2:==RUN ABAYS
$ MAP3:==RUN ABAHIA
$ MAP4:==RUN ADRAWN
$ INS*_TO_ADAPT:==RUN AINSII
$
$ ADA*PT:==@ADAPT
$ TIDY_UP:==@TIDY.COM
$ TIDY_UP_MAP:==@ TIDUMAP
$ OVE*RLAP:== RUN AMAP
$ ! TIME  **  TIME  **  TIME
$
$ SEND_INPUT_PACK:==@SEND.COM
$ END:==@OUT
$ !    RETR  **  RETR  **  RETR
$ FEA*TURE:==RUN FCHIII
$ DAT*A:== RUN FCHAIII
$
$ DEF*INITION:==RUN DEFP
$ REF*ERENCE:==RUN REFP
$ SUR*ROGATE:==RUN SURP
$ SPE*CIFICATIONS:==RUN RSPC
$ INPUT_LOCATION:==RUN AI
$
$ EDI*TOR:==RUN ADTIV
$ UPD*ATE_FDS:==RUN ADTIII
$ INPUT_DEF*INITION:==RUN INPDEF
$ INPUT_REF*ERENCE:==RUN INPREF
$
$ INPUT_SUR*ROGATE:==RUN INPSUR
$ INPUT_CLA*SSIFICATION:==RUN INPCLS
$ INPUT_SPE*CIFICATIONS:==RUN MSPC
$ DIS*PLAY:==@TYPE
$ SEND:==@SENDING
$
$ PRIME_INP*UT_PACK:=='TRA' PRINJOB.DAT -
     /JOB=PI/USER=:AGRIC2/PASSWORD=237/CON=FAST
$ PRIME_SIS:=='TRA' PRSISJOB.DAT/JOB=PS -
     /USER=:AGRIC2/PASSWORD=237/CON=FAST
$ PRIME_SF_PACK:=='TRA' PRSFJOB.DAT/JOB=P -
     /USER=:AGRIC2/PASSWORD=237/CON=FAST
$ FETCH_INP*UT_PACK:=='TRA' FTINJOB.DAT -
     /JOB=FI/USER=:AGRIC2/PASSWORD=237/CON=FAST
$ FETCH_SIS:=='TRA' FTSISJOB.DAT/JOB=FS -
```

```
    /USER=:AGRIC2/PASSWORD=237/CON=FAST
$
$ FETCH_SF_PACK:=='TRA' FTSFJOB.DAT/JOB=T -
    /USER=:AGRIC2/PASSWORD=237/CON=FAST
$ COMPILE_COM*MUNICATION:==SUBMIT /QUEUE=LARGE -
    /NOLOG_FILE/NOPRINTER CPCCPACK.COM
$ DELETE_INP*UT_PACK:==SUBMIT DEINPACK
$ CLEAR_INP*UT_PACK:=='TRA' CLINPACK.DAT-
    /JOB=CI/USER=AGRIC2/PASSWORD=237/CON=FAST
$ COMPILE_INP*UT_PACK:==SUBMIT /QUEUE=LARGE -
    /NOLOG_FILE/NOPRINTER CPINPACK

$ NEW*_FEATURES:== RUN NEWF
$ TRI*AD:==@ ACTIC.COM
$ ERR*OR:==@ ERRC
$ COMPILE_SIS:==SUBMIT/QUEUE=LARGE/NOLOG_FILE -
    /NOPRINTER CPSISPACK
$ DELETE_SIS:==@ DESISPACK
$
$ CLEAR_SIS:=='TRA' CLSISJOB.DAT/JOB=CS -
    /PASSWORD=237/USER=:AGRIC2/CONS=FAST
$ CLEAR_COM*MUNICATION:=='TRA' CLCCJOB.DAT -
    /JOB=CBT/PASSWORD=237/USER=:AGRIC2/CONS=FAST
$ DELETE_COM*MUNICATION:==@ DECCPACK
$ COMPILE_SUP*PORTING_FILES:==SUBMIT /QUEUE=LARGE -
    /NOLOG_FILE/NOPRINTER CPSFPACK
$ DELETE_SUP*PORTING_FILES:==SUBMIT DESFPACK
$ CLEAR_SUP*PORTING_FILES:=='TRA' CLSFJOB.DAT -
    /JOB=S/PASSWORD=237/USER=:AGRIC2/CON=FAST
$
$ RET*RIEVE:== @ MANRET
$ MAN*IPULATION:== @ RAUL
$ COVER :== RUN COV


File complete

YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
```

ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ

User: AGRIC2 11:05:53
File: VAX1::DRC2:[AGRIC2]RAUL.COM;7

ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ

```
$ ASSIGN/USER_MODE SYS$COMMAND FOR005
$  RUN  RAUL1
$   OPEN/READ/ERROR=OPEN_ERROR INPUT_FILE BATCH.DAT
$    SUBMIT RAUL3
$    EXIT
$ OPEN_ERROR:
$  RUN  RAUL2
$  PUR MANI.DAT
$  PUR EMANI.DAT
$  PUR REMA.COM
```

File complete

ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ

```
        PROGRAM MANIPI
        CHARACTER*1      SEL
        CHARACTER*7      SUBSET,RESULT,WHAT,AREA
        CHARACTER*40     NAME(128),BUF,WNAME
        CHARACTER*10     QUERY,FACIL(12)
        INTEGER          NFACIL
        DATA NFACIL,FACIL/12,'AVE.','DEPTH','END','RETAIN','SORT',
     +'MERGE','MENU','KRIGING','SEMIVAR','ALLOCATION','STATISTICS',
     +'LISTING'/
*       ==========================================================
        PRINT*,'    '
        PRINT*,'     '
       PRINT*,'======= WELCOME TO OXSIS-MANIPULATION PACKAGE ======='
       PRINT*,'              '
       PRINT*,'              '
        PRINT*,'************** FACILITIES ******************'
        PRINT*,'     '
        PRINT*,'                   ALLOCATION'
        PRINT*,'                   AVERAGE'
        PRINT*,'                   KRIGING'
       PRINT*,'                    LISTING'
        PRINT*,'                   MERGE'
        PRINT*,'                   SELECTION'
        PRINT*,'                   SORT  '
        PRINT*,'                   DEPTH FUNCTIONS'
        PRINT*,'                   STATISTICS'
        PRINT*,'                   SEMI-VARIOGRAMS'
49      PRINT*,' '
        PRINT*,'     '
       PRINT*,'> Do you want more information from the MENU ? :  Y/N'
       PRINT*,'>  '
       READ(5,'(A)',ERR=300)MEN
       GOTO 301
300    PRINT*,' ***** ERROR..... RE-ENTER'
       GOTO 49
301    IF(MEN.EQ.'Y')THEN
       CALL MENU
       GOTO 49
       END IF
         PRINT*,'     '
         PRINT*,'    '
        TYPE 149
149     FORMAT('$ Triad or Subset : ')
        READ(5,10)WHAT
        IF(WHAT.EQ.'TRIAD')THEN
        PRINT*,'  Triad''s'
        ELSEIF(WHAT.EQ.'SUBSET')THEN
        PRINT*,'  Subset''s '
        ELSE
        GOTO 49
        ENDIF
        OPEN(40,FILE='MANI',STATUS='NEW')
        PRINT*,' '
        TYPE 150
150     FORMAT('$ Name : ')
```

```
        READ(5,10)SUBSET
        PRINT*,' '
        TYPE 151
151     FORMAT('$ Save result in : ')
        READ(5,10)RESULT
        WRITE(40,14)SUBSET,RESULT
        SUBSET(:1)='N'
        OPEN(41,FILE=SUBSET,STATUS='OLD',ERR=100)
        OPEN(43,FILE='REMA.COM',STATUS='NEW')
        WRITE(43,16)
16     FORMAT('$ TRA MANI.DAT/TO=MANI/PASSWORD=237/USER=:AGRIC2/DELETE')
        WRITE(43,17)
17     FORMAT('$ TRA EMANI.DAT/JOB=C/USER=:AGRIC2/PASSWORD=237/
     +CONS=FAST/DELETE')
        IF( WHAT .EQ. 'TRIAD' ) THEN
        WRITE(40,*)'LOC'
52        TYPE 155
155       FORMAT('$    Search area : ')
          READ(5,10)AREA
        PRINT*,' '
          IF(AREA.EQ.'        ')AREA(:1)='X'
        WRITE(40,*)AREA
                IF(AREA(:1).NE.'X')THEN
                  OPEN(98,FILE=AREA,STATUS='OLD',ERR=504)
                  WRITE(43,18)AREA(:5),AREA(:5)
18     FORMAT('$ TRA ',A5,'.DAT/TO=',A5,'/PASSWORD=237/USER=:AGRIC2')
                ENDIF
        ENDIF
        DO 90 N=1,128
        READ(41,13,END=101)NAME(N)
        IF(NAME(N)(:1).EQ.' ') THEN
        NAME(N)(1:39)=NAME(N)(2:40)
        ENDIF
90      CONTINUE
101     CONTINUE
        I=0
        DO 91 L=2,N-1
        IF(NAME(L).LT.NAME(L-1))THEN
          BUF=NAME(L)
          NAME(L)=NAME(L-1)
          NAME(L-1)=BUF
          I=1
        ENDIF
91      CONTINUE
        IF(I.EQ.1) GOTO 101
        DO 92 J=N,128
        NAME(J)='ZZZZ'
92      CONTINUE
        PRINT*,' '
        WRITE(40,*)'SEL'
        TYPE 154
154     FORMAT('$   Selection Y/N : ')
        READ(5,12)SEL
        WRITE(40,15)SEL
        IF(SEL.EQ.'Y')THEN
        CALL SELECT( NAME , WHAT , *505 )
        ENDIF
        PRINT*,' '
        DO 93 L=1,20
50      TYPE 152
152     FORMAT('$ Query : ')
        READ(5,12)QUERY
        IF(QUERY.EQ.'END')THEN
        OPEN(42,FILE='EMANI',STATUS='NEW')
```

```
      IF(SEL.EQ.'Y')WRITE(42,*)'BEGIN;OX_F77(EXSEL,OMFLIB=SISO);END'
      IF(WHAT.EQ.'SUBSET')THEN
        WRITE(42,*)'BEGIN;OXRUN(SISO.MANIP);END'
      WRITE(42,*)'BEGIN;TF(VAX1,FROM="MANIBOX",TO="POST.BOX",
     +   USER=AGRIC2,PASSWORD=237);END'
      IF(SEL.EQ.'Y')WRITE(42,*)'BEGIN;XFGEN(SISO.EXSEL)
     + ;XF(SISO.EXSEL);END'
      WRITE(42,*)'OXEJ(LIST=NONE);****'
        STOP' '
      ELSEIF(WHAT.EQ.'TRIAD')THEN
      WRITE(42,*)'BEGIN;OXRUN(SISO.RTVE);END'
      WRITE(42,*)'BEGIN;TF(VAX1,FROM="RTVEBOX",TO="POST.BOX",USER=AGRIC2,
     +     PASSWORD=237);END'
      IF(SEL.EQ.'Y')WRITE(42,*)'BEGIN;XFGEN(SISO.EXSEL);
     +XF(SISO.EXSEL);END'
      WRITE(42,*)'OXEJ(LIST=NONE);****'
      STOP' '
      ENDIF
      ELSEIF(QUERY(:6).EQ.'DELETE')THEN
        CLOSE(40,STATUS='DELETE')
      CLOSE(43,STATUS='DELETE')
        STOP' '
      ENDIF
              DO 94 N=1,NFACIL
              IF(QUERY.EQ.FACIL(N))THEN
            IF(N.NE.7)WRITE(40,*)N
      GOTO(500,501,503,500,506,507,508,509,510,511,512,513)N
500   CONTINUE
      PRINT*,' '
      PRINT*,' Name of the features: '
      IF(QUERY.EQ.'RETAIN')THEN
      PRINT*,'                  >> EASTING'
      PRINT*,'                  >> NORTHING'
      PRINT*,'                  >> SITE_NO'
      PRINT*,'                  >> HORIZON_DEPTH,_LOWER'
      WRITE(40,*)'EASTING'
      WRITE(40,*)'NORTHING'
      WRITE(40,*)'SITE_NO'
      WRITE(40,*)'HORIZON_DEPTH,_LOWER'
      ENDIF
      DO 95 J=1,100
51    TYPE 153
153   FORMAT('$                  >> ')
      READ(5,13)WNAME
      IF(WNAME(:6).EQ.'DELETE')THEN
      CLOSE(40,STATUS='DELETE')
      CLOSE(43,STATUS='DELETE')
      CLOSE(99,STATUS='DELETE')
      STOP' '
      ENDIF
      CALL EXITENCE( WNAME, NAME, *51 )
      WRITE(40,11)WNAME
      IF(WNAME(:3).EQ.'END')GOTO 50
      IF(WNAME(:3).EQ.'ALL') GOTO 50
95    CONTINUE
            GOTO 93
501   CONTINUE
      CALL INTBAT
      CALL DEPTH(NAME)
       RESULT(:1)='M'
       PRINT*,'          '
       PRINT*,' ****** NOTICE;   RESULTS SAVED IN FILE:  ',RESULT
            GOTO 93
      ENDIF
```

```
94      CONTINUE
        PRINT*,' No such facility'
               GOTO 50
100     PRINT*,' No such file'
        CLOSE(40,STATUS='DELETE')
        CLOSE(43,STATUS='DELETE')
10      FORMAT(A7)
11      FORMAT(1X,A40)
12      FORMAT(A10)
13      FORMAT(A40)
14      FORMAT(1X,2(A7))
15      FORMAT(1X,A1)
503     STOP' '
504     PRINT*,'     ',AREA,'  Search area does not exist.'
        GOTO 52
505     STOP' Procedure aborted.'
506          CONTINUE
          CALL INTBAT
             CALL SORTI (NAME )
            GOTO 93
507      CALL INTBAT
         CALL MERGE
           GOTO 93
508        CALL MENU
           GOTO50
509           CALL KRINST( NAME )
         RESULT(:1)='M'
         PRINT*,'****** NOTICE :  OUTPUT SAVED IN FILE:',RESULT
         RESULT(:1)='S'
         PRINT*,'                SECUNDARY OUTPUT SAVED IN:',RESULT
          GOTO 93
510        CALL SVINST( NAME )
          RESULT(:1)='M'
          PRINT*,'****** NOTICE : OUTPUT SAVED IN FILE:',RESULT
          RESULT(:1)='S'
          PRINT*,'                SECUNDARY OUTPUT SAVED IN:',RESULT
            GOTO 93
511      CALL ALLOCI( NAME )
        RESULT(:1)='M'
        PRINT*,' NOTICE: OUTPUT SAVED IN FILES:',RESULT,'1,2..N'
         GOTO 93
512      CALL STATS ( NAME )
        GOTO 93
513         CALL LISTINT( NAME )
93           CONTINUE
         END
         SUBROUTINE EXITENCE( WNAME, NAME, * )
         CHARACTER*40    WNAME,NAME(128)
         IF(WNAME(:).EQ.'ALL')RETURN
         IF(WNAME(:3).EQ.'END')RETURN
         J=128
         I=J
50       J=J/2
         IF(WNAME.EQ.NAME(I))THEN
         IF(I.EQ.128)RETURN 1
           DO 90 N=40 , 1, -1
           IF(WNAME(N:N).EQ.' ')GOTO 90
           IF(WNAME(:N).EQ.NAME(I+1)(:N))THEN
                 PRINT*,' '
           PRINT*,'           ',WNAME(:N)
           PRINT*,'  some qualifier are missing'
         RETURN 1
         ENDIF
         RETURN
```

```
90      CONTINUE
        ELSEIF(J.LT.1)THEN
        PRINT*,' Warning  ',wname,'  is not in the current data.'
        RETURN 1
        ELSEIF(WNAME.LT.NAME(I))THEN
        I=I-J
        GOTO 50
        ELSE
        ENDIF
        I=I+J
        GOTO 50
                        END
        SUBROUTINE SELECT( NAME , WHAT , * )
        CHARACTER*80    CONDIT
        CHARACTER*40    SELFCH(10),NAME(128)
        CHARACTER*7     WHAT
        CHARACTER*2     RELATI(10),DEF
        CHARACTER*1     ABC(10)
        REAL            VALUE(10)
        DATA ABC/'A','B','C','D','E','F','G','H','I','J'/
*       ========================================
C       IT READS FROM THE USER THE SELECTION CRITERIA ...
        PRINT*,' '
        PRINT*,'  Selection :'
        PRINT*,' '
        DO 90 J=1,10
51      PRINT*,' Condition ',ABC(J),':'
        TYPE 150
150     FORMAT('$       >>')
        READ(5,*,ERR=50)SELFCH(J),RELATI(J),VALUE(J)
        IF(SELFCH(J)(:6).EQ.'DELETE') GOTO 100
        CALL EXITENCE (SELFCH(J),NAME,*51 )
        WRITE(40,10)SELFCH(J),RELATI(J),VALUE(J)
        GOTO 90
50      IF(SELFCH(J).EQ.'END')THEN
        WRITE(40,*)'END'
        GOTO 250
        ELSE
        PRINT*,' In quotation marks'
        GOTO 51
        ENDIF
90      CONTINUE
250     CONTINUE
        PRINT*,' '
        TYPE151
151     FORMAT('$  Boolean condition:')
        READ(5,11)CONDIT
        IF(CONDIT(:6).EQ.'DELETE') GOTO 100
        DO 91 I=80,1,-1
        IF(CONDIT(I:I).NE.' ')THEN
        DO 95 II=1,I
C       PRINT*,CONDIT(II:II+2)
        IF(I.LT.3)THEN
        CONDIT(:80)='      '//CONDIT(:75)
        ELSEIF(CONDIT(II:II+2).EQ.'AND')THEN
C       PRINT*,II
        CONDIT=CONDIT(:II-1)//'*'//CONDIT(II+3:)
C       PRINT*,CONDIT
        ELSEIF(CONDIT(II:II+1).EQ.'OR')THEN
        CONDIT=CONDIT(:II-1)//'+'//CONDIT(II+2:)
C       PRINT*,CONDIT
        ENDIF
95      CONTINUE
        ENDIF
```

```
91      CONTINUE
        OPEN(99,FILE='EXSEL.FOR',STATUS='NEW')
        WRITE(99,*)'        SUBROUTINE EXSEL (   * )'
        WRITE(99,*)'        INTEGER      A,B,C,D,E,F,G,H,I,J,RESULT'
        WRITE(99,*)'     COMMON    A,B,C,D,E,F,G,H,I,J'
        WRITE(99,*)'        RESULT='//CONDIT
        WRITE(99,*)'        IF(RESULT.EQ.0) RETURN 1'
        WRITE(99,*)'        RETURN'
        WRITE(99,*)'        END'
        RETURN
10      FORMAT(1X,A40,A2,F7.2)
11      FORMAT(A80)
100     CLOSE(43,STATUS='DELETE')
        CLOSE(40,STATUS='DELETE')
        RETURN 1
        END
             SUBROUTINE SORTI ( NAME )
            CHARACTER*40        NAME(128), WNAME
50           CONTINUE
              PRINT*,' '
              PRINT*,' '
              TYPE 150
150           FORMAT('$ *** Sort data by feature : ')
              READ(5,'(A40)') WNAME
                  CALL EXITENCE ( WNAME, NAME, *50 )
              WRITE(40,'(1X,A40)')WNAME
                   RETURN
                END
      SUBROUTINE DEPTH(NAME)
      CHARACTER*40  NAME(128),WNAME
      CHARACTER*1   OPTION,COEF,GRAPH,INTERP
      INTEGER  DEQUE, SIN
       REAL  VAGT, VALT, VA, HIDTH, LODTH, DTH
        COMMON /SINIT/DEQUE, SIN/SINREAL/VAGT, VALT, VA, HIDTH,LODTH,
     + DTH
        COMMON /SINCHA/OPTION, COEF, GRAPH,INTERP
*-----------------------------------------------------------------
        PRINT*,'    '
        PRINT*,'        '
        PRINT*,' *****  DEPTH FUNCTIONS,_______ INTERPOLATION **'
        PRINT*,'       ------------------------------------------'
         PRINT*,'       '
        PRINT*,' Iformation about properties varying down the soil '
        PRINT*,' profile may be obtained by interpolation using either'
        PRINT*,' of two algorithms :'
        PRINT*,' 1.- Fitting EQUAL-AREA SPLINE CURVES through the soil'
        PRINT*,'     depth'
        PRINT*,' 2.- Using soil layers as basis to draw the information'
        PRINT*,'     wanted.'
        PRINT*,'       '
        PRINT*,'       '
205        PRINT*,'**** INTERPOLATION BY SPLINE  -or- LAYERS;'
        PRINT*,'                          ------      -------'
        PRINT*,'    '
        PRINT*,'     '
        PRINT*,'>> Type of Interpolation? :    S/L'
        PRINT*,' > '
          READ(5,'(A)',ERR=200)INTERP
          GOTO 202
200       PRINT*,'***** ERROR .... type of interp.... RETYPE '
          GOTO 205
202       WRITE(40,'(1X,A)')INTERP
160      TYPE 150
150      FORMAT('>> SINGLE BLOCK OR MULTIPLE BLOCK:   S/M ')
```

```
      PRINT*,' **** NOTE: In  MULTIPLE BLOCK mode a facility for '
      PRINT*,'       interpolating more than one soil feature is '
      PRINT*,'        available.'
      PRINT*,'     '
      PRINT*,'>>'
      READ(5,'(A)',ERR=170 )OPTION
     GOTO175
170    PRINT*,'****** ERROR,    RETYPE IT'
      GOTO160
175    CONTINUE
     IF(OPTION.EQ.'M')THEN
        WRITE(40,*)OPTION
       CALL MULTIPLE( NAME )
      ELSE IF(OPTION.EQ.'S')THEN
       WRITE(40,*)OPTION
      CALL SINGLE(NAME)
     ELSE IF(OPTION.EQ.'    ')THEN
     RETURN
     ELSE IF(OPTION.NE.'S'.AND.OPTION.NE.'M')THEN
     PRINT*,'__________ No such  facility'
     END IF
      RETURN
     END
*-------------------------------------------------------------------------
     SUBROUTINE SINGLE(NAME)
     CHARACTER*40  NAME(128), WNAME
     CHARACTER*1   OPTION, COEF, GRAPH,INTERP
     INTEGER  DEQUE, SIN
     REAL  VAGT, VALT, VA, HIDTH, LODTH, DTH
     COMMON /SININT/DEQUE,SIN/SINREAL/VAGT,VALT,VA,HIDTH,LODTH,DTH
        COMMON /SINCHA/OPTION, COEF, GRAPH,INTERP
*-------------------------------------------------------------------------
      CALL SINU(NAME,*59)
      CALL FEATURE(NAME, *59)
      CALL DEPQUE
      IF(INTERP.EQ.'S')THEN
      CALL OUTPUT
        END IF
59     RETURN
      END
*-------------------------------------------------------------
       SUBROUTINE SINU ( * )
        INTEGER  DEQUE, SIN
        COMMON  /SININT/DEQUE,SIN
*-------------------------------------------------------------------
       PRINT*,'     '
85     TYPE 130
130    FORMAT('>>  SITE NUMBER : ')
       READ(5,*,ERR=70) SIN
        GOTO80
70      PRINT*,'***** ERROR   _______ RETYPE IT'
        GOTO85
80      CONTINUE
       IF(SIN.EQ.0) RETURN1
        WRITE(40,*) SIN
       RETURN
       END
*-------------------------------------------------------------------------
       SUBROUTINE MULTIPLE( NAME )
       CHARACTER*40   NAME(128), WNAME
       CHARACTER*1      MANYVA
       INTEGER  DEQUE,SIN,NBLO
       REAL  VAGT,VALT,VA,HIDTH,LODTH,DTH
       COMMON /SININT/DEQUE,SIN,NBLO/SINREAL/VAGT,VALT,VA,HIDTH,LODTH
```

```
     +, DTH
*-----------------------------------------
        PRINT*,'      '
        PRINT*,'      '
       PRINT*,'-------------------------------------------------'
       PRINT*,'Depth interpolation can be computed for one or '
        PRINT*,'  more soil features on several blocks. '
        PRINT*,'-----------------------------------------'
320     PRINT*,'      '
        PRINT*,'       '
       PRINT*,'>SINGLE feature  or  MANY soil features? :(S/M)'
        PRINT*,'>    '
        READ(5,'(A)',ERR=300)MANYVA
        GOTO 310
300     PRINT*,'****** ERROR ..... FEATURE(S),  ..... RETYPE'
        GOTO 320
310     WRITE(40,'(1X,A)')MANYVA
        IF(MANYVA.EQ.'M')THEN
          CALL MULFEAT( NAME,DTH,HIDTH,LODTH )
           GOTO 59
         END IF
        CALL FEATURE( NAME, *59)
       PRINT*,'     '
185       TYPE 555
555       FORMAT('>>ALL BLOCKS IN SUBSET? :  Y/N')
          READ(5,'(A)',ERR=170)ALL
          GOTO180
170       PRINT*,'****** ERROR  ........ RETYPE'
          GO TO185
180       IF(ALL.EQ.'Y')THEN
          WRITE(40,'(1X,A)')ALL
          WRITE(40,200)
200       FORMAT(1X,'ALL')
          ELSE IF(ALL.EQ.'N')THEN
          WRITE(40,'(1X,A)')ALL
111     TYPE 222
222     FORMAT('>> HOW MANY BLOCKS: ')
        READ(5,*,ERR=333)NBLO
        GOTO444
333     PRINT*,'***** ERROR _________ RETYPE'
        GOTO111
444     WRITE(40,*)NBLO
        DO 999 J=1,NBLO
        CALL SINU( NAME, *59)
999     CONTINUE
           END IF
        CALL DEPQUE
59      RETURN
        END
*-------------------------------------------------------------------------
         SUBROUTINE FEATURE(NAME, *)
        CHARACTER*40  NAME(128), WNAME
5000          CONTINUE
        TYPE 133
133     FORMAT('>> Soil    Feature:')
       READ(5,100)WNAME
           IF(WNAME.EQ.'END')RETURN1
       CALL EXITENCE(WNAME,NAME, *5000)
       WRITE(40,'(1X,A40)')WNAME
100      FORMAT( A40 )
       RETURN
       END
*-------------------------------------------------------------------------
        SUBROUTINE DEPQUE
```

```
      INTEGER DEQUE, SIN
      REAL  VAGT, VALT, VA, HIDTH, LODTH, DTH
       COMMON /SININT/DEQUE,SIN/SINREAL/VAGT, VALT,VA,HIDTH
*_____________________________________________________________________
      PRINT*,'      '
          PRINT*,'~~~~~~~~~~~~ DEPTH INTERPOLATION FACILITIES ~~~~~~~~'
         PRINT*,'     '
         PRINT*,'           INTERPOLATION BY:   '
        PRINT*,'      '
       PRINT*,'    1._ FIND FEATURES VALUE FOR AGIVEN DEPTH '
        PRINT*,'      '
       PRINT*,'    2._ AVERAGE OF A FEATURE OVER A RANGE OF DEPTHS'
       PRINT*,'     '
       PRINT*,'    3._ FIND DEPTH(S) FOR A GIVEN FEATURES VALUE '
       PRINT*,'       '
       PRINT*,'    4._ DEPTH TO WHICH FEATURE GREATER THAN A VALUE'
       PRINT*,'         '
       PRINT*,'    5._ DEPTH TO WHICH FEATURE LOWER THAN A VALUE '
         PRINT*,'        '
         PRINT*,'         '
142    TYPE 135
135    FORMAT('>>  Depth  Query : (1-5)')
      READ(5,*,ERR=137)DEQUE
      GOTO140
137   PRINT*,'******* ERROR _________ RETYPE IT'
      GOTO142
140    CONTINUE
       IF(DEQUE.LT.1.OR.DEQUE.GT.5)THEN
       PRINT*,'________ No such facility'
       GOTO142
       END IF
       GO TO(701, 702, 703, 704, 705)DEQUE
701    PRINT*,'***** INTERPOLATING THE VALUE OF A FEATURE *****'
       WRITE(40,*)DEQUE
1422     TYPE 160
160      FORMAT('>> Enter Depth (cm) :')
       READ(5,*,ERR=139)DTH
       GOTO141
139    PRINT*,'***** ERROR _______ RETYPE IT'
      GOTO1422
141    WRITE(40,*)DTH
       GOTO 1000
702    CONTINUE
       WRITE(40,*)DEQUE
       PRINT*,'       '
       PRINT*,'     '
       PRINT*,'******* AVERAGE OVER A RANGE OF DEPTHS ********'
170    PRINT*,'    '
       TYPE 162
162     FORMAT('>> Higher Depth (cm):')
       READ(5,*,ERR=165) HIDTH
       TYPE 167
167    FORMAT('>> Lower Depth (cm): ')
       READ(5,*,ERR=165)LODTH
       GOTO 172
165    PRINT*,'**** ERROR ___ EITHER DEPTH VALUE, RETYPE'
       GOTO170
172    WRITE(40,*)HIDTH
       WRITE(40,*)LODTH
       GOTO 1000
703    CONTINUE
       WRITE(40,*)DEQUE
      PRINT*,'     '
      PRINT*,'***** DEPTH FOR A GIVEN FEATURES VALUE ******'
```

```
      PRINT*,'
      PRINT*,'
184   TYPE 180
180    FORMAT('>> Features Value:')
      READ(5,*,ERR=182)VA
     GOTO 183
182   PRINT*,'****** ERROR _____RETYPE IT'
      GOTO 184
183   WRITE(40,*)VA
      GOTO 1000
704    CONTINUE
      WRITE(40,*)DEQUE
      PRINT*,'******* DEPTH TO WHICH FEATURE GREATER THAN A VALUE '
      PRINT*,'          '
189    PRINT*,'        '
       TYPE 185
185    FORMAT('>> Features  Limit  Value :')
       print*,'     '
      READ(5,*,ERR=187)VAGT
      GOTO188
187   PRINT*,' ***** ERROR,    RETYPE IT'
      GOTO189
188    WRITE(40,*)VAGT
      GOTO 1000
705     CONTINUE
       WRITE(40,*)DEQUE
       PRINT*,'******* DEPTH TO WHICH FEATURE LOWER THAN A VALUE ***'
       PRINT*,'        '
197    PRINT*,'         '
       TYPE 190
190    FORMAT('>> Features Limit Value :')
       READ(5,*,ERR=193)VALT
       GO TO 195
193    PRINT*,'****** ERROR _________ RETYPE'
       GOTO 197
195     WRITE(40,*)VALT
1000   CONTINUE
       RETURN
       END
*_____________________________________________________________________
       SUBROUTINE OUTPUT
       CHARACTER*1 OPTION, COEF, GRAPH
        COMMON /SINCHA/OPTION,COEF,GRAPH
       PRINT*,'          '
       PRINT*,'          '
       PRINT*,'_____________________ OUTPUT  OPTIONS _________________'
      PRINT*,'          '
      PRINT*,'         '
      PRINT*,'  >> SET OF SPLINE COEFFICIENTS : Y/N'
      READ(5,'(A)')COEF
      PRINT*,'>> GRAPHICS INTERFACE :  Y/N'
      READ(5,'(A)')GRAPH
         IF(COEF.EQ.'Y')WRITE(40,777)
        IF(COEF.EQ.'N')WRITE(40,'(1X,A)')COEF
         IF(GRAPH.EQ.'Y')WRITE(40,888)
       IF(GRAPH.EQ.'N')WRITE(40,'(1X,A)')GRAPH
777   FORMAT(1X,'COEF')
888   FORMAT(1X,'GRAPH')
      RETURN
       END
*-------------------------------------------------------------
             SUBROUTINE MULFEAT( NAME,DTH,HIDTH,LODTH )
C.
C.
```

```
      CHARACTER*40        NAME(128)
      INTEGER             DEQUE,NCHAR
       REAL        DTH,HIDTH,LODTH
      COMMON /SININT/DEQUE
*-------------------------------------------------------
C.
C.
110   PRINT*,'
      PRINT*,'        '
      PRINT*,'>> HOW MANY SOIL FEATURES ? :'
      PRINT*,'>    '
      READ(5,*,ERR=100)NCHAR
      GOTO 105
100   PRINT*,' ***** ERROR .....No. OF FEATURES.... RETYPE'
      GOTO 110
105   WRITE(40,*) NCHAR
      PRINT*,'       '
      PRINT*,'       '
      PRINT*,'>  Enter OXSIS soil feature names only ************'
      DO 90 J=1,NCHAR
      PRINT*,' >> Enter Variable',J
       CALL FEATURE( NAME,*50 )
90    CONTINUE
      PRINT*,'      '
       CALL BLOSEL
      PRINT*,'       '
220   PRINT*,'------------ DEPTH INTERPOLATION FACILITIES ---------'
      PRINT*,'                  AVAILABLE IN THIS MODE : '
      PRINT*,'     '
      PRINT*,'      '
      PRINT*,'  1. FIND VALUE OF FEATURE(S) AT A GIVEN DEPTH'
      PRINT*,'           '
      PRINT*,'                  --- OR ---'
      PRINT*,'         '
      PRINT*,'  2. AVERAGE OF VALUES OVER A RANGE OF DEPTHS'
      PRINT*,'     '
      PRINT*,'       '
      PRINT*,'>> Depth Query ? :  ( 1 or 2 )'
      PRINT*,'>    '
      READ(5,*,ERR=200)DEQUE
      GOTO 210
200   PRINT*,'  **** ERROR ......QUERY......RETYPE'
      GOTO 220
210   IF(DEQUE.LT.1.OR.DEQUE.GT.2)THEN
        PRINT*,' ..............No such    facility'
        GOTO 220
      ELSE
       WRITE(40,*) DEQUE
      GO TO(1001, 1002) DEQUE
1001  PRINT*,'======= INTERPOLATING THE VALUE OF A FEATURE ======='
      TYPE 300
300   FORMAT('>> Enter Depth (cm):')
      READ(5,*,ERR=400)DTH
      GOTO 301
400   PRINT*,'***** ERROR, .......RETYPE IT'
      GOTO 1001
301   WRITE(40,*)DTH
      GOTO 50
1002  PRINT*,'====== AVERAGE OVER A RANGE OF DEPTHS ======'
      TYPE 310
310   FORMAT(' >> Higher Depth (cm):')
      READ(5,*,ERR=401)HIDTH
      TYPE 320
320   FORMAT(' >> Lower Depth (cm): ')
```

```
      READ(5,*,ERR=401)LODTH
      GOTO 330
401   PRINT*,' ***** ERROR, .... EITHER DEPTH VALUE ... RETYPE'
      GOTO 1002
330   WRITE(40,*)HIDTH
      WRITE(40,*)LODTH
      END IF
50    RETURN
       END
*_____________________________________________________
       SUBROUTINE INTBAT
       CHARACTER*1   MODE
       LOGICAL       Y
*_____________________________________________________
         PRINT*,'          '
         PRINT*,'        '
         PRINT*,'          '
50       CONTINUE
       TYPE 150
150    FORMAT('$ FACILITY TO BE EXECUTED IN INTERACTIVE
     + OR BATCH MODE:  I/B')
          PRINT*,'       '
           PRINT*,'         '
       READ(5,'(A)')MODE
       IF(MODE.EQ.'I')THEN
       INQUIRE(FILE='BATCH',EXIST=Y)
        IF(Y)THEN
         OPEN(1,FILE='BATCH',STATUS='OLD')
         CLOSE(1,STATUS='DELETE')
       ELSE
         RETURN
        END IF
       ELSE IF(MODE.EQ.'B')THEN
         INQUIRE(FILE='BATCH',EXIST=Y)
         IF(Y)THEN
           RETURN
         ELSE
           OPEN(1,FILE='BATCH',STATUS='NEW')
           CLOSE(1,STATUS='KEEP')
         END IF
       END IF
        PRINT*,'      '
          PRINT*,'       Re entry      B :  FOR BATCH MODE '
          PRINT*,'         '
          PRINT*,'                     I :  FOR INTERACTIVE MODE'
          PRINT*,'       '
         GOTO 50
          END
          SUBROUTINE MERGE
C  initiation
          CHARACTER*7        TRIAD1
          LOGICAL            RIGHT,WRONG
          INTEGER            J,OUT
*-------------------------------------------------------
C  OUT IS AVARIABLE INTEGER FOR THE FILE UNIT OF THE
C      INSTRUCTIONS FILE
C  Read both triads and write their names in the instructions file
            J=1
55        CONTINUE
          IF(J.EQ.1)TYPE 150
          IF(J.EQ.2)TYPE 151
            READ(5,'(A7)')TRIAD1
              IF(TRIAD1.EQ.'QUIT') CLOSE( 40, STATUS='DELETE' )
                 INQUIRE(FILE=TRIAD1,EXIST=RIGHT)
```

```
                    IF(.NOT.RIGHT)GOTO 50
                  INQUIRE(FILE='N'//TRIAD1(2:),EXIST=RIGHT )
                    IF(.NOT.RIGHT)GOTO 51
                WRITE(40,'(1X,A7)')TRIAD1
                      J=J+1
                 IF(J.EQ.2)GOTO 55
C Check the output file and write it on instructions file
54         TYPE 152
           READ(5,'(A7)')TRIAD1
            IF(TRIAD1.EQ.'QUIT') CLOSE(40,STATUS='DELETE')
                INQUIRE(FILE=TRIAD1,EXIST=WRONG)
                  IF(WRONG)GOTO 53
           WRITE(40,'(1X,A7)')TRIAD1
            PRINT*,'    '
           RETURN
C     Error checking
50        PRINT*,'    '
          PRINT*,'   Triad: ',TRIAD1,' does not exist '
          PRINT*,'     '
          GOTO 55
51        PRINT*,'     '
          PRINT*,'  N - file: ','N'//TRIAD1(2:),'  does not exist'
          print*,'     '
          GOTO 55
53        PRINT*,'      '
          PRINT*,'   file :  ',TRIAD1,'   alrady exist...'
          PRINT*,'     '
          GOTO 54
150       FORMAT('$  >> Triad 1 : ')
151       FORMAT('$  >> Triad 2 : ')
152       FORMAT('$     >>   Output name : ')
              END
*=============================================================
              SUBROUTINE MENU
       PRINT*,'       '
       PRINT*,' ****************  MENU  **********************'
       PRINT*,'       '
       PRINT*,'       '
       PRINT*,'   Facility                    Description'
       PRINT*,' ============          ==============================='
        PRINT*,'       '
        PRINT*,'       '
          PRINT*,'  ALLOCATION            Individual blocks of informa-'
          PRINT*,'                       tion are allocated to classes'
          PRINT*,'                       or mapping units. Records for'
          PRINT*,'                       the classes or mapping units'
          PRINT*,'                       may not be present in the'
          PRINT*,'                       blocks'
          PRINT*,'       '
          PRINT*,'       '
        PRINT*,'  AVERAGE                Computes averages for a given'
        PRINT*,'                         feature over a data subset.'
        PRINT*,'                         Access: "AVERAGE"'
         PAUSE ' TO CONTINUE TYPE  "C"  <Return>'
        PRINT*,'       '
        PRINT*,'       '
        PRINT*,'  KRIGING                Computes point and block '
         PRINT*,'                        Kriging of irregularly spaced'
         PRINT*,'                        2-Dimensional data on to a'
         PRINT*,'                        square grid.'
         PRINT*,'                        Requisites:The Semi-variogram'
        PRINT*,'                        model for the same data'
        PRINT*,'                        Option: Contouring'
        PRINT*,'                        Access: "KRIGING"'
```

```
PRINT*,'      '
 PRINT*,'              '
 PRINT*,'       '
  PRINT*,'  MERGE                  Produces the merging of two'
  PRINT*,'                        known data subsets held in'
  PRINT*,'                        separate files into an output'
  PRINT*,'                        file in three optional ways'
  PRINT*,'                        Sec.Facilities:"INTERDIGITATE'
 PRINT*,'                        " ANNEXE", "APPEND". '
  PRINT*,'                         Requisites: Names of the '
  PRINT*,'                         files to be merged'
 PRINT*,'                        Access: "MERGE" '
   PAUSE ' TO CONTINUE TYPE  "C"  <Return>'
 PRINT*,'           '
  PRINT*,'  SELECTION              Performs the selection of '
  PRINT*,'                        data sub-subsets from retrie-'
  PRINT*,'                        subsets based upon areal or'
  PRINT*,'                        boolean selections.'
  PRINT*,'                         Requisite: Output file name'
 PRINT*,'                        Access: "SELECTION"'
 PRINT*,'      '
  PRINT*,'  SORT &                 Executes the sorting of data'
 PRINT*,'  CLASSES                according to the increasing '
  PRINT*,'                         values of a user-selected '
     PRINT*,'                      soil or site feature.'
  PRINT*,'                       Classes and class limits may'
  PRINT*,'                        be user-defined to allocate'
  PRINT*,'                        blocks to classes.'
  PRINT*,'                        Sec. Facilities: "SORTIN"'
  PRINT*,'                                         "CLASS"'
  PRINT*,'                        Access: "SORT"'
  PAUSE ' TO CONTINUE TYPE  C  <Return>'
   PRINT*,'       '
   PRINT*,'       '
  PRINT*,'  DEPTH FUNCTIONS        Interpolates values of '
  PRINT*,'                        soil properties down '
  PRINT*,'                        the soil profile by '
  PRINT*,'                        depth functions.'
  PRINT*,'                        Interpolation is per-'
  PRINT*,'                        formed by either of '
  PRINT*,'                        two algorithms :'
  PRINT*,'                       1.Fitting EQUAL-AREA'
  PRINT*,'                         SPLINE CURVES through'
  PRINT*,'                         soil depth.'
  PRINT*,'                       2.Using soil layers to'
  PRINT*,'                         draw the values wanted'
 PRINT*,'                         Secundary facilities:  '
 PRINT*,'                       " VALUE AT","DEPTH FOR","AVERAGE '
 PRINT*,'                        OVER DEPTHS","DEPTHS AT WHICH '
 PRINT*,'                        VALUE GREATER THAN",___"LOWER'
 PRINT*,'                        THAN"'
 PRINT*,'                       Mode:  single/multiple block'
 PRINT*,'                       Option:  graphics'
 PRINT*,'                       Access:  "DEPTH" '
    PAUSE'   TO CONTINUE TYPE  C  <RETURN>  '
  PRINT*,'     '
  PRINT*,'      '
  PRINT*,'  STATISTICS          Interfaces the OXSIS STATIS'
  PRINT*,'                      -TICAL package.'
  PRINT*,'                     1. DESCRIPTIVE STATISTICS'
  PRINT*,'                                or '
  PRINT*,'                     2. STATISTICAL ANALYSIS'
  PRINT*,'                      are the two sub-packages'
  PRINT*,'                      available. '
```

```
      PRINT*,'                        Modes: Automatic (OXSIS)'
      PRINT*,'                               Interactive (SAS)'
      PRINT*,'                        STATISTICAL ANALYSIS :'
      PRINT*,'                         Facilities:'
      PRINT*,'                         a.-Correlation.'
      PRINT*,'                         b.-Analysis of Variance'
      PRINT*,'                         c.-Regression Analysis &'
      PRINT*,'                            Model Fitting'
      PRINT*,'                         d.-Multivariate Analysis'
      PRINT*,'                         e.-Discriminant Analysis'
      PRINT*,'                         f.-Cluster Analysis'
      PRINT*,'                        ACCESS: "STATISTICS"'
      PRINT*,'     '
      PAUSE  ' TO CONTINUE TYPE  "C" <Return>'
      PRINT*,'       '
      PRINT*,'      '
       PRINT*,'  SEMIVAR              Computes the experimental'
       PRINT*,'                         Semi-Variogram from irre-'
       PRINT*,'                         gularly distributed samples'
       PRINT*,'                         in 2-dimensional space.'
       PRINT*,'                         Requisites:Directions(theta)'
       PRINT*,'                        for the semi-variogram.'
       PRINT*,'                         Options: Graphical represen-'
       PRINT*,'                        tation of the semi-variogram'
      PRINT*,'                        Access:  "SEMIVAR"        '
       PAUSE ' TO CONTINUE TYPE  C  <Return > '
       PRINT*,'       '
       PRINT*,'        '
       PRINT*,'  WINDOWING &           Defines a "moving" window in'
       PRINT*,'  WEIGHTING            the geografical space around'
       PRINT*,'  FUNCTIONS            central points, with user-se'
       PRINT*,'                        -lected size and shape. Dis-'
       PRINT*,'                        tance weighting functions  '
       PRINT*,'                        may then be chosen to inter'
       PRINT*,'                        -polate the value at the cen'
       PRINT*,'                        -tral point.The "target" '
       PRINT*,'                        pont may or may not be an '
       PRINT*,'                        existing point.Users may '
       PRINT*,'                        type in their own weighting'
       PRINT*,'                        functions if based upon dis-'
       PRINT*,'                        tance.'
       PRINT*,'                        Requisites: Grid reference '
       PRINT*,'                        for "empty" target points'
       PRINT*,'                        Access: "WINDOW"'
       PRINT*,'       '
       PRINT*,'      '
         RETURN
         END
*-------------------------------------------------------------------
          SUBROUTINE KRINST( NAME )
       CHARACTER       PNTKRG,SETRAD,SETOUT,ISO,GEOISO,ISOSCH
        CHARACTER          ALL, DAT,INTMOD
        CHARACTER*40       NAME(128),WNAME
       REAL           UNITSM,UNITCO,XLDAT,XHDAT,YLDAT,YHDAT,XLINT,XHINT,
     +                YLINT,YHINT,RADIUS,CO,GRAD,C1,A1,C2,A2,PHI,PSIN,
     +                PCOS,XSIDE,YSIDE
        REAL          XTGT(200),YTGT(200)
       INTEGER         NSPACE,NSITES,MINPTS,MAXPTS,MODTYP,IWT,OUT1XY,
     +                OUT2XY
        INTEGER        DEQUE, SIN,NTAGTS
        COMMON /SININT/DEQUE,SIN
*-------------------------------------------------------------------
        PRINT*,'       '
        PRINT*,'       '
```

```
      PRINT*,' ********************  KRIGING  ********************'
      PRINT*,'       '
      PRINT*,'        '
      PRINT*,' This routines compute SIMPLE KRIGING (Point & Block)'
      PRINT*,' of irregularly spaced  2-Dimensional data on to a'
      PRINT*,'    square interpolation grid. '
      PRINT*,'         '
      PRINT*,'        '
       PRINT*,'          '
14    PRINT*,'  > POINT  or  BLOCK  KRIGING ? :  P/B  '
            READ(5,'(A)',ERR=10)PNTKRG
       IF(PNTKRG.EQ.'P') PNTKRG='T'
       IF(PNTKRG.EQ.'B') PNTKRG='F'
C             PRINT*,'PNTKRG= ',PNTKRG
       WRITE(40,'(1X,A)')PNTKRG
        GOTO12
10     PRINT*,'**** ERROR,  .... RETYPE IT '
          GOTO14
12          CONTINUE
         CALL FEATURE(NAME,*59)
20     PRINT*,'        '
       PRINT*,'        '
       PRINT*,' > VALUE WHICH RELATES DISTANCE UNITS IN THE'
      PRINT*,'   SEMI-VARIOGRAM MODEL TO THE KILOMETRE ? : '
       READ(5,*,ERR=16)UNITSM
          GOTO18
16     PRINT*,'**** ERROR,  ..... RETYPE IT'
       GOTO 20
18     CONTINUE
       PRINT*,'             '
       PRINT*,'              '
       PRINT*,' > VALUE WHHICH RELATES DISTANCE UNITS OF THE  '
       PRINT*,'   X , Y  CO-ORDINATES TO THE KILOMETRE ? :'
       READ(5,*,ERR=22) UNITCO
        WRITE(40,*)UNITSM,UNITCO
       GOTO774
22     PRINT*,'**** ERROR   .....RETYPE IT'
       GOTO 18
774     CONTINUE
       PRINT*,'             '
        PRINT*,'          '
       PRINT*,' > ALL DATA BLOCKS (POINTS) IN SUBSET '
       PRINT*,'                AS DATA FOR KRIGING? :     Y/N'
       READ(5,'(A)',ERR=200) ALL
       GOTO 201
200    PRINT*,'**** ERROR ...... all .....RETYPE'
       GOTO 28
201    CONTINUE
       IF(ALL.EQ.'Y')THEN
        WRITE(40,'(1X,A)') ALL
        WRITE(40,203)
203     FORMAT(1X,'ALL')
        ELSE IF(ALL.EQ.'N')THEN
        WRITE(40,'(1X,A)') ALL
302        PRINT*,'    '
        PRINT*,'      '
       PRINT*,' > DATA FOR KRIGING BY RECTANGULAR OUTLINE'
       PRINT*,'              - or - BY SITE NUMBERS ?     :  R/S  '
       READ(5,'(A)',ERR=300) DAT
        WRITE(40,'(1X,A)') DAT
       GOTO 301
300    PRINT*,' **** ERROR ...... sel dat .....RETYPE'
       GOTO 302
301    CONTINUE
```

```
      IF(DAT.EQ.'S')THEN
333    PRINT*,'    '
       PRINT*,'      '
       PRINT*,' > NO. OF DATA BLOCKS ( POINTS ) IN SUBSET : '
       READ(5,*,ERR=30) NSITES
        WRITE(40,*)NSITES
       GOTO 32
30     PRINT*,'***** ERROR,  .............RETYPE '
       GOTO 333
32     CONTINUE
      DO 304 I=1,NSITES
         CALL SINU( NAME, *59)
304   CONTINUE
       ELSE IF(DAT.EQ.'R')THEN
44     PRINT*,'          '
       PRINT*,'           '
       PRINT*,' > CONTROLED OR AUTOMATIC SETTING OF RECTANGULAR '
       PRINT*,'    OUTLINE FOR DATA? :  C/A'
       READ(5,'(A)',ERR=38) SETOUT
       GOTO 42
38    PRINT*,'**** ERROR,  ........... RETYPE'
      GOTO 44
42    IF(SETOUT.EQ.'A')THEN
      WRITE(40,'(1X,A)') SETOUT
      ELSE IF(SETOUT.EQ.'C')THEN
        WRITE(40,'(1X,A)')SETOUT
        PRINT*,'     '
        PRINT*,'      '
50    PRINT*,' > ENTER LOWEST VALID  X  CO-ORDINATE OF THE DATA :'
      READ(5,*,ERR=46) XLDAT
      GOTO 48
46    PRINT*,'**** ERROR   .........RETYPE '
      GOTO 50
48    PRINT*,' > HIGHEST VALID  X  CO-ORDINATE OF THE DATA :'
      READ(5,*,ERR=52) XHDAT
        GOTO54
52    PRINT*,'****** ERROR   ........ RETYPE'
        GOTO 48
54    PRINT*,' > LOWEST VALID  Y  CO-ORDINATE OF THE DATA :'
      READ(5,*,ERR=56) YLDAT
      GOTO58
56    PRINT*,'******** ERROR    ........ RETYPE'
      GOTO54
58    PRINT*,' > HIGHEST VALID  Y  CO-ORDINATE :'
      READ(5,*,ERR=60) YHDAT
      GOTO62
60    PRINT*,'****** ERROR       ....... RETYPE'
      GOTO58
62    CONTINUE
      WRITE(40,*)XLDAT,XHDAT,YLDAT,YHDAT
      END IF
      END IF
     END IF
332       PRINT*,'       '
       PRINT*,'       '
       PRINT*,' > SEARCH RADIUS ( AUTOMATIC / YOUR CHOICE ) :  A/C'
       READ(5,'(A)',ERR=34) SETRAD
       GOTO 36
34     PRINT*,'*** ERROR  ........ RETYPE '
        GOTO 332
36      CONTINUE
        IF(SETRAD.EQ.'A'.OR.SETRAD.EQ.'C')THEN
       WRITE(40,'(1X,A)')SETRAD
        ELSE
```

```
          GOTO 34
          END IF
          PRINT*,'       '
         PRINT*,'          '
799    PRINT*,'****** KRIGING INTERPOLATION  may be performed onto a'
       PRINT*,'       SQUARE GRID or at selected TARGET POINTS *****'
       PRINT*,'         '
       PRINT*,'       '
       PRINT*,'>> KRIGING INTERPOLATION AT:'
       PRINT*,' > SQUARE GRID  or  TARGET POINTS ?:    G/T'
       READ(5,'(A)',ERR=800)INTMOD
       GOTO 801
800    PRINT*,'******* ERROR , .....INTERP MODE  .... RETYPE'
       GOTO 799
801    IF(INTMOD.EQ.'T')THEN
804      PRINT*,'********** INTERPOLATION AT TARGET POINTS ********'
         PRINT*,'      '
         PRINT*,'      '
         PRINT*,' > ENTER NO. OF TARGET POINTS: '
         READ(5,*,ERR=802)NTAGTS
         GOTO 803
802       PRINT*,' ****** ERROR .... NO. TARGET PTS. ... RETYPE'
          GOTO 804
803      PRINT*,'      '
         PRINT*,' > ENTER TARGET POINTS CO-ORDINATES :'
         PRINT*,' _____ eastings and northings _____'
         PRINT*,'        '
         PRINT*,'        '
         DO 805 I=1,NTAGTS
         PRINT*,' > EASTING ',I,' : '
         READ(5,*,ERR=806)XTGT(I)
         PRINT*,'    '
         PRINT*,' > NORTHING ',I,' : '
         READ(5,*,ERR=806)YTGT(I)
805      CONTINUE
         GOTO 807
806      PRINT*,'***** ERROR .... CO-ORDINATES .... RETYPE '
         GOTO803
807      WRITE(40,'(1X,A)')INTMOD
         WRITE(40,*)NTAGTS
         DO 808 I=1,NTAGTS
         WRITE(40,*)XTGT(I),YTGT(I)
808      CONTINUE
811      PRINT*,'      '
         PRINT*,'      '
         PRINT*,' > SEARCH RADIUS :'
         PRINT*,'      '
         PRINT*,'distance units as for x,y co-ordinates'
         READ(5,*,ERR=809)RADIUS
         GOTO 810
809      PRINT*,'****** ERROR .... RADIUS ... RETYPE '
         GOTO 811
810      WRITE(40,*)RADIUS
         ELSE IF(INTMOD.EQ.'G')THEN
          WRITE(40,'(1X,A)')INTMOD
        PRINT*,'          '
        PRINT*,'             '
        PRINT*,'**** DEFINING THE AREA FOR INTERPOLATION *****'
        PRINT*,'         '
        PRINT*,'.......interpolations are on a square grid with user'
        PRINT*,'       -defined outline co-ordinates ..............'
        PRINT*,'        '
        PRINT*,'           '
68      PRINT*,'     '
```

```
      PRINT*,' > ENTER EXTREME CO-ORDINATES OF INTERPOLATED '
       PRINT*,'    RECTANGLE : '
      PRINT*,'          '
      PRINT*,' > LOWEST  X :'
      READ(5,*,ERR=64) XLINT
      PRINT*,' > HIGHEST X :'
      READ(5,*,ERR=64) XHINT
      PRINT*,'            '
      PRINT*,' > LOWEST  Y :'
      READ(5,*,ERR=64) YLINT
      PRINT*,' > HIGHEST  Y :'
      READ(5,*,ERR=64) YHINT
      GOTO 66
64    PRINT*,'****** ERROR,  ............. RETYPE'
      GOTO 68
66    PRINT*,'          '
      PRINT*,' > SEARCH RADIUS :'
      PRINT*,'         '
      PRINT*,' (distance units as for the x, y  co-ordinates)'
      READ(5,*,ERR=70) RADIUS
      GOTO 72
70    PRINT*,'****** ERROR,    .......... RETYPE'
      GOTO 66
72    WRITE(40,*) XLINT,XHINT,YLINT,YHINT,RADIUS
24       PRINT*,'       '
        PRINT*,'        '
        PRINT*,' > NO. OF INTERPOLATIONS REQUIRED IN THE  X'
        PRINT*,'    DIRECTION ? :'
       READ(5,*,ERR=26) NSPACE
       WRITE(40,*)NSPACE
        GOTO 28
26      PRINT*,'********* ERROR ........... RETYPE IT'
        GOTO 24
28      CONTINUE
        END IF
78    PRINT*,'        '
      PRINT*,'          '
      PRINT*,'___ ENTER EXTREME NO. OF DATA POINTS REQUIRED FOR'
      PRINT*,'    AN INTERPOLATION__________'
      PRINT*,'            '
      PRINT*,' > MINIMUM : '
      READ(5,*,ERR=74) MINPTS
      PRINT*,' > MAXIMUM :'
      READ(5,*,ERR=74) MAXPTS
      GOTO 76
74    PRINT*,'****** ERROR,    .............RETYPE'
      GOTO 78
76    WRITE(40,*) MINPTS,MAXPTS
      PRINT*,'            '
      PRINT*,'          '
84    PRINT*,'******* SPECIFY SEMI-VARIOGRAM MODEL ************'
      PRINT*,'            '
      PRINT*,' > ISOTROPIC  or  ANISOTROPIC ? :  I/A '
      READ(5,'(A)',ERR=80) ISO
          IF(ISO.EQ.'I'.OR.ISO.EQ.'A')THEN
       WRITE(40,'(1X,A)')ISO
        ELSE
          GOTO 80
        END IF
      PRINT*,'_____________ SEMI-VARIOGRAM MODELS _____________'
      PRINT*,'         '
      PRINT*,'            1. Linear Model  (No Sill) '
      PRINT*,'            2. Linear with Sill Model   '
      PRINT*,'            3. Spherical Model '
```

```
      PRINT*,'             4. Exponential Model '
      PRINT*,'             5. Gaussian Model'
      PRINT*,'             6. Double Spherical Model '
      PRINT*,'          '
      PRINT*,'          '
      PRINT*,'        '
      PRINT*,'  > MODEL ?  :'
       PRINT*,'   ( Enter number )  '
       READ(5,*,ERR=80) MODTYP
         WRITE(40,*) MODTYP
       GOTO 82
80     PRINT*,'***** ERROR, ..............RETYPE '
       GOTO 84
82     PRINT*,'        '
       PRINT*,'         '
       PRINT*,' > VALUE FOR NUGGET VARIANCE : '
       READ(5,*,ERR=86) CO
       PRINT*,' > GRADIENT OF LINEAR PART :'
       PRINT*,'     '
       PRINT*,'...For models other than linear enter 0.0....'
       READ(5,*,ERR=86) GRAD
       WRITE(40,*) CO,GRAD
       GOTO 88
86     PRINT*,'***** ERROR   ..........RETYPE '
       GOTO82
88     PRINT*,'        '
       PRINT*,'        '
       PRINT*,' > VALUE FOR SILL VARIANCE - NUGGET VARIANCE : '
       PRINT*,'  ..... input 0.0 for Linear Models ......'
       PRINT*,' .... For double spherical this applies to '
       PRINT*,'      the first structure ................'
       READ(5,*,ERR=90) C1
       PRINT*,'           '
       PRINT*,'      '
       PRINT*,' > VALUE FOR THE RANGE OF THE MODEL :'
       PRINT*,'....distance units as relatd to the Kilometer....'
       PRINT*,'... input 0.0 for linear model without sill ....'
       PRINT*,' ... for double spherical it refers to the range '
       PRINT*,'    of the first structure ....................'
       PRINT*,' > '
       READ(5,*,ERR=90) A1
         WRITE(40,*) C1,A1
       GOTO 92
90     PRINT*,'**** ERROR ......... RETYPE'
       GOTO88
92     IF(MODTYP.EQ.6)THEN
98     PRINT*,' IF DOUBLE SPHERICAL MODEL, THEN :'
       PRINT*,'          '
       PRINT*,' > VALUE FOR SILL VARIANCE - NUGGET VARIANCE :'
       PRINT*,'   .......for the second structure .........'
       READ(5,*,ERR=94) C2
       PRINT*,'            '
       PRINT*,' > VALUE FOR THE RANGE OF THE SECOND STRUCTURE :'
       READ(5,*,ERR=94) A2
       GOTO96
94    PRINT*,'***** ERROR  ............ RETYPE IT'
      PRINT*,'         '
      GO TO 98
96    CONTINUE
      ELSE
      C2=0.0
      A2=0.0
      END IF
      WRITE(40,*)C2,A2
```

```
      IF(ISO.EQ.'A')THEN
104    PRINT*,'      '
       PRINT*,'        '
       PRINT*,' > GEOMETRICAL or BURGESS  ANISOTROPY ? :  G/B'
       READ(5,'(A)',ERR=100) GEOISO
       PRINT*,'              '
       PRINT*,'        '
       PRINT*,' > SEARCH FOR DATA IN CIRCLES OR IN ANISOTROPIC'
       PRINT*,'         '
       PRINT*,'   REGIONS ? :  C/R'
      READ(5,'(A)',ERR=100) ISOSCH
       IF(GEOISO.EQ.'G'.OR.GEOISO.EQ.'B')THEN
         WRITE(40,'(1X,A)')GEOISO
       ELSE
         GOTO 100
       END IF
       IF(ISOSCH.EQ.'C'.OR.ISOSCH.EQ.'R')THEN
         WRITE(40,'(1X,A)')ISOSCH
       ELSE
         GOTO 100
       END IF
      PRINT*,'          '
      GOTO102
100   PRINT*,'****** ERROR,    .......... RETYPE '
      GOTO 104
102   PRINT*,'             '
      PRINT*,' > ANGLE OF MAXIMUM VARTIATION :'
      PRINT*,'  ....in radians and anticlockwise from ''east'''
      READ(5,*,ERR=106) PHI
      PRINT*,'                '
      PRINT*,'               '
      PRINT*,' > MINIMUM VALUE OF THE ANISOTROPIC PARAMETER :'
      READ(5,*,ERR=106) PSIN
      PRINT*,'        '
      PRINT*,' > MAXIMUM VALUE OF THE ANISOTROPIC PARAMETER :'
      READ(5,*,ERR=106) PCOS
      GOTO 108
106   PRINT*,'***** ERROR  ............. RETYPE'
      GOTO 102
108   CONTINUE
      WRITE(40,*)PHI,PSIN,PCOS
      END IF
      IF(PNTKRG.EQ.'F')THEN
114    PRINT*,' ******* DEFINING THE BLOCK TO BE INTERPOLATED ******'
      PRINT*,'           '
      PRINT*,'           '
      PRINT*,' > LENGTH OF INTERPOLATED BLOCK IN THE  X  DIRECTION :'
      PRINT*,' .....distance units as in semi-variogram model....'
      print*,' >  '
      READ(5,*,ERR=110) XSIDE
      PRINT*,'          '
      PRINT*,' > LENGTH OF INTERPOLATED BLOCK IN THE  Y  DIRECTION :'
      PRINT*,' ...distance units as in semi-variogram model .....'
      PRINT*,' >  '
      READ(5,*,ERR=110) YSIDE
      GO TO 112
110   PRINT*,'******* ERROR    .......... RETYPE'
      GO TO 114
112   CONTINUE
      WRITE(40,*)XSIDE,YSIDE
      END IF
      PRINT*,'              '
120   PRINT*,'         '
      PRINT*,'************ OUTPUT  OPTIONS **************'
```

```
      PRINT*,'           '
      PRINT*,'....enter  1  for YES  or else  0  for NO  .......'
      PRINT*,'         '
      PRINT*,'          '
      PRINT*,' > LISTING OF CO-ORDINATES AND WEIGHTS OF'
      PRINT*,'    OBSERVATIONS? : '
      PRINT*,' > '
      READ(5,*,ERR=116) IWT
      PRINT*,'            '
      PRINT*,'             '
      PRINT*,' > REPORT ON ESTIMATES, THEIR VARIANCES AND'
      PRINT*,'    SEARCHING CONDITIONS ? : '
      PRINT*,' >  '
      READ(5,*,ERR=116) OUT1XY
      PRINT*,'         '
      PRINT*,'           '
      PRINT*,' > REPORT ON ESTIMATES AND VARIANCES IN X,Y,Z,V? :'
       PRINT*,' ( If - 0 - information is in  grid format) '
       READ(5,*,ERR=116) OUT2XY
       GOTO118
116    PRINT*,'******* ERROR,   .......... RETYPE'
       GOTO 120
118    CONTINUE
       WRITE(40,*)IWT,OUT1XY,OUT2XY
          PRINT*,' **** KRIGING INSTRUCTIONS ENTERED SUCCESSFULLY '
          PRINT*,'       '
          PRINT*,'.......END.....'
          PRINT*,'        '
          PRINT*,'       '
59       RETURN
       END
*-------------------------------------------------------------
          SUBROUTINE SVINST( NAME )
      CHARACTER     CROSS,ANGREG,DASEL
      CHARACTER*3   ALL
      CHARACTER*40      NAME(128),WNAME
      INTEGER       ILOG,IDIR,IGHOST,ICOLOR,NSITES,SN(500)
      REAL          STEP,THETA(20),PSI(20),SCALE,WIDTH,SEMMAX
       REAL         LEAST,HEAST,LNORTH,HNORTH
*-------------------------------------------------------------
      PRINT*,'      '
      PRINT*,'      '
      PRINT*,'  ***************** SEMI-VARIOGRAM ******************'
      PRINT*,'       '
      PRINT*,'           '
      PRINT*,'     This routines compute the estimated semi-variogram'
      PRINT*,'   for irregularly distributed samples in 2-dimensional'
      PRINT*,'   space.'
4      PRINT*,'       '
      PRINT*,'       '
      PRINT*,'>> CROSS SEMI-VARIOGRAM or AUTO SEMI-VARIOGRAM? : C/A'
      READ(5,'(A)',ERR=2) CROSS
      IF(CROSS.EQ.'A'.OR.CROSS.EQ.'C')THEN
      IF(CROSS.EQ.'A')CROSS='F'
      IF(CROSS.EQ.'C')CROSS='T'
      ELSE
      GOTO 2
      END IF
        WRITE(40,'(1X,A)')CROSS
      GOTO 8
2     PRINT*,'****** ERROR   .............RETYPE IT'
      GOTO 4
8     CONTINUE
      CALL FEATURE( NAME, *59)
```

```
      PRINT*,'       '
      PRINT*,'       '
      PRINT*,' > ALL DATA POINTS IN SUB-SET AS DATA FOR'
      PRINT*,'                      THE SEMI-VARIOGRAM ?   :   Y/N
      READ(5,'(A)',ERR=100) ALL
      WRITE(40,'(1X,A)')ALL
      GOTO 101
100   PRINT*,'**** ERROR,..... DATA..... RETYPE'
      GOTO 8
101   IF(ALL.EQ.'Y')THEN
       ALL='ALL'
       WRITE(40,'(1X,A3)')ALL
       ELSE
103   PRINT*,'    '
      PRINT*,'      '
      PRINT*,' > SELECTION OF DATA POINTS BY :'
      PRINT*,'          AREA or SITE NUMBERS? :    A/S   '
      READ(5,'(A)',ERR=102)DASEL
      WRITE(40,'(1X,A)')DASEL
      GOTO 104
102   PRINT*,'***** ERROR, .... DATA SELECT..... RETYPE'
      GOTO 103
104   IF(DASEL.EQ.'A')THEN
106   PRINT*,'      '
      PRINT*,'       '
      PRINT*,' > ENTER EXTREME CO-ORDINATES  FOR DATA OUTLINE:'
      PRINT*,'     '
      PRINT*,' > LOWEST EASTING :'
      PRINT*,'   --------------- '
      READ(5,*,ERR=105)LEAST
      PRINT*,' > HIGHEST EASTING'
      PRINT*,'   ----------------'
       READ(5,*,ERR=105)HEAST
       PRINT*,' > LOWEST NORTHING:'
       PRINT*,'   ----------------'
       READ(5,*,ERR=105)LNORTH
       PRINT*,' > HIGHEST NORTHING:'
       PRINT*,'   -----------------'
        READ(5,*,ERR=105)HNORTH
         GOTO 107
105    PRINT*,' **** ERROR, ..... RETYPE'
       GOTO 106
107    CONTINUE
       WRITE(40,*)LEAST,HEAST,LNORTH,HNORTH
      ELSE IF(DASEL.EQ.'S')THEN
108    PRINT*,'       '
       PRINT*,' > NO. OF DATA-POINTS TO BE RETAINED ? :'
        READ(5,*,ERR=110)NSITES
       WRITE(40,*)NSITES
       GOTO 109
110    PRINT*,' **** ERROR ..... NO. OF DATA.... RETYPE'
       GOTO 108
109    PRINT*,'        '
       PRINT*,' > ENTER SITE NUMBERS '
       PRINT*,'      '
       DO 111 I=1,NSITES
       PRINT*,' > SITE NO.',I,':    '
       READ(5,*,ERR=112)SN(I)
       WRITE(40,*)SN(I)
       GOTO 111
112   PRINT*,' **** ERROR, ..... SN ..... RETYPE'
        GOTO 109
111   CONTINUE
      END IF
```

```
      END IF
       PRINT*,'>> NATURAL LOG TRANSFORMATION OF Z VARIABLE? :'
        PRINT*,' if - yes - type - 1 -, else - 0 -'
       READ(5,*,ERR=10)ILOG
       PRINT*,'>> NUMBER OF DIRECTIONS FOR WHICH THE '
       PRINT*,'   SEMI-VARIOGRAM IS REQUIRED  :'
       PRINT*,' > '
       READ(5,*,ERR=10) IDIR
       GOTO 12
10     PRINT*,'******** ERROR  .......... RETYPE'
        GOTO 8
12    CONTINUE
       PRINT*,'      '
       PRINT*,'       '
       PRINT*,'>> RANGE FOR THE CLASSIFICATION OF DISTANCE :'
       PRINT*,'  ....in smallest unit defined by the ...'
       PRINT*,'  co-ordinate system.'
       PRINT*,'  (this routine calculates up to 40 of these steps)'
       PRINT*,' > '
       READ(5,*,ERR=14) STEP
       GOTO 16
14     PRINT*,'******* ERROR   .........RETYPE'
       GOTO12
16     CONTINUE
       WRITE(40,*)  ILOG, IDIR, STEP
28          PRINT*,'    '
          PRINT*,'      '
        PRINT*,'>> THE',IDIR,' DIRECTIONS IN DEGREES :'
        PRINT*,'  .... counter-clockwise from east....'
        PRINT*,'      '
        PRINT*,'     '
      DO 24 I=1,IDIR
        PRINT*,'>> DIRECTION',I,' : '
        READ(5,*,ERR=26) THETA(I)
        GOTO 24
26     PRINT*,'***** ERROR ....DIR  ',I,'  ....RETYPE IT'
       GOTO 28
24    CONTINUE
34       PRINT*,'     '
        PRINT*,'      '
        PRINT*,'>> ANGULAR REGULARIZATION  FOR EACH DIRECTION :'
        PRINT*,' >> ---Automatic -- or -- your Choice -- :  A/C'
        READ(5,'(A)',ERR=25) ANGREG
        GOTO 27
25      PRINT*,'**** ERROR ..... RETYPE'
        GOTO34
27      IF(ANGREG.EQ.'C')THEN
          DO 30 J=1,IDIR
            PRINT*,'>> ANGULAR REG. DIRECTION  ',J,' :  '
             READ(5,*,ERR=32) PSI(J)
           GOTO 30
32     PRINT*,' ****** ERROR  ...ANG. REG.  ',J,'  ...RETYPE'
          GOTO 34
30        CONTINUE
          ELSE
          DO 75 K=1,IDIR
            PSI(K)=22.5
75        CONTINUE
         END IF
         DO 50 I=1,IDIR
         WRITE(40,*) THETA(I),PSI(I)
50       CONTINUE
997           PRINT*,'      '
           PRINT*,'       '
```

```
      PRINT*,'>> GRAPH PLOTTER OUTPUT?  :  1/0'
      PRINT*,'   ....if --yes-- type  1 '
      PRINT*,' > '
      READ(5,*,ERR=999) IGHOST
         GOTO 998
999    PRINT*,'**** ERROR ........RETYPE IT'
        GOTO997
998    CONTINUE
        IF(IGHOST.EQ.1)THEN
      PRINT*,'    '
42      PRINT*,'     '
      PRINT*,'>> VALUE FOR SIZE OF PLOTTER LAYOUT :'
      PRINT*,' ...a scale value of 0.1 = 5.6 cm.'
      PRINT*,' > '
      READ(5,*,ERR=36) SCALE
      PRINT*,'    '
      PRINT*,'    '
        GOTO 91
36     PRINT*,' ***** ERROR ...... scale ...RETYPE'
      GOTO 42
91      PRINT*,'>> RATIO OF THE X-AXIS TO THE Y-AXIS LENGTH :'
      READ(5,*,ERR=92) WIDTH
      PRINT*,'    '
      PRINT*,'     '
          GOTO 93
92     PRINT*,' ****** ERROR ........ratio....RETYPE'
       GOTO 91
93      PRINT*,'>> BLACK PEN ONLY  or  COLOURS? : 0/1'
      PRINT*,'   ....0  for black, else  1 ...'
      READ(5,*,ERR=94) ICOLOR
          GOTO 95
94       PRINT*,' ******* ERROR    ..... pen ....RETYPE'
          GOTO93
95         CONTINUE
          SEMMAX=0.0
           ELSE
          IGHOST=0
          SCALE=0.0
          WIDTH=0.0
          ICOLOR=0
          SEMMAX=0.0
          END IF
          WRITE(40,*)IGHOST,SCALE,WIDTH,ICOLOR,SEMMAX
59          RETURN
          END
*-------------------------------------------------------------
C
C
           SUBROUTINE ALLOCI( NAME )
      CHARACTER     EXIST,FIRST
      CHARACTER*3   ALL
      CHARACTER*40    NAME,WNAME
      INTEGER       NBLO, SN(500),NCLAS, MU(500)
*-------------------------------------------------------------
C  This routine allocates blocks of information to the class or
C  mapping unit they belong to. Information for the class or mapping
C  unit may not be present in the block.
C
      PRINT*,'*******  ALLOCATION  TO CLASSES OR MAPPING UNITS *****'
      PRINT*,'    '
      PRINT*,' Individual blocks of information are allocated to '
      PRINT*,' classes or mapping units.'
       PRINT*,'       '
       PRINT*,' Records for the class or mapping unit may not be'
```

```
      PRINT*,' present in the blocks.'
      PRINT*,'          '
      PRINT*,'          '
      PRINT*,' >CLASS OR MAPPING UNIT RECORDS ALREADY EXISTENT'
      PRINT*,'            WITHIN THE BLOCKS IN THIS SUBSET?    : Y/N'
      READ(5,'(A)',ERR=110)EXIST
      GOTO 111
110   PRINT*,'***** ERROR .....CLASS ... EXISTENCE..... RETYPE'
      GOTO 102
111   WRITE(40,'(1X,A)')EXIST
      IF(EXIST.EQ.'Y')THEN
      PRINT*,'       '
      PRINT*,'        '
      PRINT*,' > ALLOCATION BY '
      CALL FEATURE( NAME,*59)
113   PRINT*,'         '
      PRINT*,'      '
      PRINT*,' > ALL BLOCKS IN SUB-SET ? :  Y/N'
      READ(5,'(A)',ERR=112)ALL
      GOTO 114
112   PRINT*,'******* ERROR, .......ALL ......RETYPE'
      GOTO 113
114   WRITE(40,'(1X,A)')ALL
      IF(ALL.EQ.'Y')THEN
      ALL='ALL'
      WRITE(40,'(1X,A3)')ALL
      ELSE IF(ALL.EQ.'N')THEN
117   PRINT*,'       '
      PRINT*,'          '
      PRINT*,' > NO. OF BLOCKS TO ALLOCATE :'
      READ(5,*,ERR=115)NBLO
     WRITE(40,*)NBLO
      GOTO 116
115   PRINT*,'******* ERROR..... NO. OF BLOCKS.....RETYPE'
      GOTO 117
116   PRINT*,'          '
      PRINT*,'          '
      PRINT*,' > FIRST',NBLO,'BLOCKS IN SUB-SET -OR- '
      PRINT*,'                  BY SITE NUMBER ?       :   F/S'
      READ(5,'(A)',ERR=118)FIRST
      GOTO 119
118   PRINT*,' ***** ERROR ..........FIRST........RETYPE'
      GOTO 116
119   WRITE(40,'(1X,A)')FIRST
      IF(FIRST.EQ.'S')THEN
      PRINT*,'        '
123   PRINT*,'       '
      PRINT*,' > SITE NUMBER'
      PRINT*,'  --------------'
      DO 120 I=1,NBLO
      PRINT*,I,'.-'
      READ(5,*,ERR=122)SN(I)
      WRITE(40,*)SN(I)
      GOTO120
122   PRINT*,'******* ERROR ..... SN',I,'.....RETYPE'
      GOTO123
120   CONTINUE
      END IF
      END IF
      ELSE IF(EXIST.EQ.'N')THEN
102   PRINT*,'       '
      PRINT*,'           '
      PRINT*,' > NO. OF BLOCKS TO ALLOCATE :'
      READ(5,*,ERR=100)NBLO
```

```
        WRITE(40,*)NBLO
        GOTO 101
100     PRINT*,'****** ERROR ..... NO.  BLOCKS..... RETYPE'
        GOTO 102
101    PRINT*,'        '
       PRINT*,'> Enter no more than  20  classes or M.U.'
       PRINT*,'      '
       PRINT*,'      '
       PRINT*,'> No. of different Classes or Map Units?:'
       PRINT*,'>'
       READ(5,*,ERR=300) NCLAS
       WRITE(40,*)NCLAS
       GOTO 301
300    PRINT*,'***** ERROR...NO...OF CLASSES....RETYPE'
       GOTO 101
301    PRINT*,'       '
       PRINT*,'       '
        PRINT*,'    Type paired values'
        PRINT*,'         '
        PRINT*,' > SITE NUMBER        CLASS  OR  MAP UNIT'
        PRINT*,'  -------------      ----------------------'
        DO 90 I=1,NBLO
       PRINT*,'>    '
        READ(5,*,ERR=103)SN(I),MU(I)
        GOTO 90
103     PRINT*,' ******* ERROR ......SN, ... MAP UNIT..... RETYPE'
        GOTO 101
90      WRITE(40,*)SN(I),MU(I)
        END IF
59      RETURN
        END
*-------------------------------------------------------------------
C.
C.
              SUBROUTINE STATS ( NAME )
C.
C.
         CHARACTER*40              NAME(128)
         CHARACTER                 MODE, FATY
         INTEGER                   NFEAT
*-------------------------------------------------------------------
       PRINT*,'     '
       PRINT*,'      '
        PRINT*,'******************  STATISTICS  ******************'
       PRINT*,'    '
       PRINT*,'      '
12     PRINT*,'     +++++++  OXSIS  STATISTICAL  PACKAGE  ++++++++'
       PRINT*,'      '
       PRINT*,'       '
       PRINT*,'     Modes of Operation:'
       PRINT*,'      '
       PRINT*,'     > AUTOMATIC  (A)'
       PRINT*,'    ( OXSIS-Controlled interface with SAS)'
       PRINT*,'      '
       PRINT*,'      '
       PRINT*,'     > INTERACTIVE   (I)'
       PRINT*,'  (Developing own program in SAS procedural language)'
       PRINT*,'        '
       PRINT*,'      '
       PRINT*,' >  MODE OF OPERATTION:    A/I'
       READ(5,'(A)',ERR=10)MODE
       GOTO 11
10     PRINT*,'******* ERROR, ..... MODE ..... RETYPE'
       GOTO 12
```

```
11      WRITE(40,'(1X,A)')MODE
        PRINT*,'     '
        PRINT*,'       '
15      PRINT*,' > FACILITIES :'
        PRINT*,'     '
        PRINT*,'     '
        PRINT*,' > DESCRIPTIVE  STATISTICS    (D)'
        PRINT*,'     '
        PRINT*,' > STATISTICAL ANALYSIS       (A)'
        PRINT*,'       '
        PRINT*,'        '
        PRINT*,' > Facility :   D/A'
        PRINT*,' > '
        READ(5,'(A)',ERR=13)FATY
        GOTO 14
13      PRINT*,'*********** ERROR, ...... facility ......RETYPE'
        GOTO 15
14          IF(MODE.EQ.'A')THEN
         WRITE(40,'(1X,A)')FATY
        IF(FATY.EQ.'D') CALL DESTAT(NAME,MODE)
        IF(FATY.EQ.'A') CALL STANA(NAME,MODE)
          ELSE IF(MODE.EQ.'I')THEN
        PRINT*,'       '
        PRINT*,'      '
         IF(FATY.EQ.'D')THEN
          CALL FEATURE(NAME,*59)
          CALL BLOSEL
         PRINT*,'     '
         PRINT*,'        '
         PRINT*,'.................. Please Wait .................'
         PRINT*,'       Creation of working data subset in progress'
         PRINT*,'           '
         PRINT*,'           '
         PRINT*,' >>>> Interactive session starts after the prompt:'
         PRINT*,'                    "FORTRAN STOP"      '
         ELSE IF(FATY.EQ.'A')THEN
206      PRINT*,'     '
         PRINT*,'      '
         PRINT*,' > Total No. of Variables for the Analysis:'
          PRINT*,' > '
         READ(5,*,ERR=200)NFEAT
         GOTO205
200      PRINT*,'****** ERROR .......No. of Features .....Retype'
         GOTO206
205      DO 99 J=1,NFEAT
70        PRINT*,' > Variable',J
          CALL FEATURE(NAME,*69)
           GOTO 99
69        PRINT*,' ***** ERROR ... ............. RETYPE'
           GOTO 70
99        CONTINUE
        PRINT*,'**************  ALL PARAMETERS SUPPLIED  ***********'
         PRINT*,'     '
         PRINT*,'     '
        PRINT*,'.............. Please  Wait ..................'
         PRINT*,'        Creation of working data subset in progress'
        PRINT*,'      '
        PRINT*,'     '
        PRINT*,' >>>> Interactive session starts after the prompt:'
        PRINT*,'                    "FORTRAN STOP"   '
        PRINT*,'     '
        PRINT*,'      '
        PRINT*,'        SAS - Procedural commands are required'
        PRINT*,'       '
```

```
      PRINT*,' ........ Your data-file name is .......'
      END IF
      END IF
59      RETURN
      END
*-------------------------------------------------------------
C.
C.
                  SUBROUTINE DESTAT (NAME,MODE)
C.
C.
       CHARACTER        PROC,MODE
       CHARACTER*40     NAME(128)
C.
*-------------------------------------------------------------
       PRINT*,'    '
       PRINT*,'     '
       PRINT*,'********** DESCRIPTIVE STATISTICS ***************'
       PRINT*,'       '
       PRINT*,'  Soil'
       CALL FEATURE( NAME, *59 )
       CALL BLOSEL
       IF(MODE.EQ.'A')THEN
        PRINT*,'      '
108     PRINT*,'    '
        PRINT*,' > LEVEL OF INFORMATION REQUIRED ? :'
        PRINT*,'      '
        PRINT*,'     High   ___ or___ Standard :        H/S'
        PRINT*,' > '
        READ(5,'(A)',ERR=106)PROC
        GOTO 107
106     PRINT*,'   ******* ERROR ....... LEVEL ...... RETYPE'
        GOTO 108
107     WRITE(40,'(1X,A)')PROC
        END IF
        PRINT*,'      '
        PRINT*,'         '
        PRINT*,' @@@@@@@@@@   INSTRUCTIONS  COMPLETED   @@@@@@@@@@'
59      RETURN
        END
*-------------------------------------------------------------
C.
C.
                  SUBROUTINE STANA ( NAME, MODE )
C.
C.
      CHARACTER*40          NAME(128)
      CHARACTER             MODE
      INTEGER               FAC
*-------------------------------------------------------------
C.
C.
      IF(MODE.EQ.'A')THEN
       PRINT*,'    '
       PRINT*,'    '
       PRINT*,'>>>>>>>>>>>>>>>>>  OXSIS  <<<<<<<<<<<<<<<<<'
       PRINT*,'     '
       PRINT*,'      '
       PRINT*,' ****** STATISTICAL ANALYSIS PACKAGE ********'
       PRINT*,'        '
       PRINT*,'         '
        CALL BLOSEL
       PRINT*,'     '
       PRINT*,'        '
```

```
      PRINT*,'          '
      PRINT*,'            FACILITIES  AVAILABLE :'
      PRINT*,'_____________________________________________________'
      PRINT*,'     '
      PRINT*,'      '
      PRINT*,'      1._  CORRELATON  ANALYSIS'
      PRINT*,'    '
      PRINT*,'        2._  ANALYSIS OF VARIANCE '
      PRINT*,'             (Univariate & Multivariate)'
      PRINT*,'     '
      PRINT*,'        3._  REGRESSION  ANALYSIS '
      PRINT*,'                        &  '
      PRINT*,'                MODEL  FITTING'
      PRINT*,'        '
      PRINT*,'        4._  MULTIVARIATE ANALYSIS'
      PRINT*,'             Canonical Correlation'
      PRINT*,'             Factor Analysis   & '
      PRINT*,'             Principal Components A.'
      PRINT*,'     '
      PRINT*,'        5._  DISCRIMINANT  ANALYSIS'
      PRINT*,'        '
      PRINT*,'        6._  CLUSTER   ANALYSIS '
      PRINT*,'      '
      PAUSE  ' To continue type ... C ...<return>'
13      PRINT*,'       '
      PRINT*,'        '
      TYPE 10
10    FORMAT(' > Statistical Analysis ? :')
      PRINT*,'....type facility number....'
      PRINT*,' > '
      READ(5,*,ERR=11)FAC
      GOTO 12
11    PRINT*,'***** ERROR ....FACILITY NO. .....RETYPE'
      GOTO 13
12    WRITE(40,*)FAC
      GO TO ( 1, 2, 3, 4, 5, 6 )FAC
1     CALL CORR ( NAME )
      GOTO 20
2     CALL ANOVA ( NAME )
      GOTO 20
3     CALL REGR ( NAME )
      GOTO 20
4      PRINT*,' SUB MULTANA HERE!'
C      GOTO 20
5      PRINT*,'  SUB  DISCRIM  HERE! '
C      GOTO 20
6      PRINT*,'  SUB   CLUSTER  HERE ! '
20    CONTINUE
      PRINT*,'    '
      PRINT*,'     '
      PRINT*,'@@@@@@@@@@@@@@@  INSTRUCTIONS  COMPLETED  @@@@@@@@@@@'
        END IF
      RETURN
       END
*-------------------------------------------------------------
C.
C.
                    SUBROUTINE CORR ( NAME )
C.
C.
      CHARACTER*40          NAME(128)
      CHARACTER             RANK
      INTEGER               NVAR,COEF
*-------------------------------------------------------------
```

```
C.
C.
      PRINT*,'      '
      PRINT*,'           '
      PRINT*,'***************** CORRELATION ANALYSIS ***************'
      PRINT*,'         '
      CALL BLOSEL
12    PRINT*,'         '
      PRINT*,'          '
      PRINT*,'  > Total Number of Variables ? : '
      PRINT*,' >  '
      READ(5,*,ERR=10)NVAR
      GOTO 11
10    PRINT*,'***** ERROR..... NO.  VAR. .......RETYPE'
      GOTO 12
11    WRITE(40,*)NVAR
29    PRINT*,'      '
       PRINT*,'       '
      PRINT*,' > WARNING:    Type  OXSIS  feature names  only ******'
      PRINT*,'           '
      DO 20 J=1,NVAR
       CALL FEATURE ( NAME,*29 )
20    CONTINUE
33    PRINT*,'         '
      PRINT*,'       '
      PRINT*,' >  KIND OF CORRELATION ? :'
      PRINT*,'          '
      PRINT*,'  1._  PEARSON  PRODUCT-MOMENT CORRELATION'
      PRINT*,'      '
      PRINT*,'  2._  SPEARMAN CORRELATION COEFFICIENTS'
      PRINT*,'         '
      PRINT*,'  3.   KENDALS  Tau-b  COEFFICIENTS'
      PRINT*,'        '
      PRINT*,' > Enter kind of correlation :'
      PRINT*,' ...... type list number......'
      PRINT*,' > '
      READ(5,*,ERR=25)CCOEF
      GOTO 30
25    PRINT*,' ****** ERROR ..... KIND OF CORRELATION ...RETYPE'
      GOTO 33
30    WRITE(40,*)CCOEF
40    PRINT*,'         '
      PRINT*,'      '
      PRINT*,' > Correlation Coefficients  sorted by rank ?:  Y/N'
      PRINT*,' > '
      READ(5,'(A)',ERR=35)RANK
      GOTO 37
35    PRINT*,' ******* ERROR .... RANK ..... RETYPE'
      GOTO 40
37    WRITE(40,'(1X,A)')RANK
       RETURN
        END
*-------------------------------------------------------------------
C.
C.
                    SUBROUTINE ANOVA ( NAME )
C.
C.
      CHARACTER*40              NAME(128)
      CHARACTER                 PARA,UNIV
*-------------------------------------------------------------------
C.
C.
12    PRINT*,'         '
```

```
      PRINT*,'        '
      PRINT*,' ***************** ANALYSIS OF VARIANCE ***************'
      PRINT*,'        '
      PRINT*,'                          ( ANOVA )'
      PRINT*,'     '
      PRINT*,'      '
      PRINT*,' > Parametric   or   Non- Parametric  ANOVA ?:  P/N'
      PRINT*,'>  '
      READ(5,'(A)',ERR=10) PARA
      GOTO 11
10    PRINT*,'******** ERROR ........ Parametric..... RETYPE'
      GOTO 12
11    WRITE(40,'(1X,A)') PARA
      IF(PARA.EQ.'P')THEN
15     PRINT*,'        '
       PRINT*,'         '
       PRINT*,' > UNIVARIATE   or   MULTIVARIATE  ANOVA:   U/M'
       PRINT*,'>  '
      READ(5,'(A)',ERR=13)UNIV
       GOTO 14
13     PRINT*,' ********* ERROR ....... UNIVARIATE ...... RETYPE'
       GOTO 15
14     WRITE(40,'(1X,A)') UNIV
       IF(UNIV.EQ.'U') CALL UANVAR ( NAME )
       IF(UNIV.EQ.'M') CALL MANVAR ( NAME )
      ELSE IF(PARA.EQ.'N')THEN
C.     CALL NONPAR( NAME )
      END IF
         RETURN
          END
*
*
*-----------------------------------------------------------------
C.
C.
                    SUBROUTINE UANVAR ( NAME )
C.
C.
      CHARACTER         BALNCD,EFFECT,MODE
      CHARACTER*3       ALL
      CHARACTER*40      NAME(128), MODEL
      INTEGER           NVAR,NBLO,NIND
*-----------------------------------------------------------------
C.
C.
22     PRINT*,'      '
      PRINT*,'       '
      PRINT*,' > BALANCED or UNBALANCED DESIGN ? :    B/U'
      PRINT*,' >'
      READ(5,'(A)',ERR=20) BALNCD
      GOTO 21
20    PRINT*,' ***** ERROR ....DESIGN..... RETYPE'
      GOTO 22
21    WRITE(40,'(1X,A)')BALNCD
      PRINT*,'    '
25    PRINT*,'     '
      PRINT*,' > RANDOM EFFECTS  '
      PRINT*,' (Components of Variance)'
      PRINT*,'     '
      PRINT*,'           or    '
      PRINT*,'       '
      PRINT*,' > FIXED EFFECTS :          R/F'
      PRINT*,'    ( Design )  '
      READ(5,'(A)',ERR=23)EFFECT
```

```
      GOTO 24
23    PRINT*,' ***** ERROR  ..... EFFECTS..... RETYPE'
      GOTO 25
24    WRITE(40,'(1X,A)')EFFECT
      PRINT*,'      '
28    PRINT*,'      '
      PRINT*,' > TOTAL No. OF VARIABLES :'
      PRINT*,'>  '
      READ(5,*,ERR=26) NVAR
      GOTO27
26    PRINT*,' ***** ERROR ....NO. OF VAR..... RETYPE'
      GOTO 28
27    WRITE(40,*) NVAR
29    PRINT*,'      '
      PRINT*,' > ENTER  OXSIS  feature names only:'
      PRINT*,'      '
      DO 30 J=1,NVAR
       IF(J.EQ.1)THEN
        PRINT*,' > DEPENDENT VARIABLE:'
        PRINT*,'  Y:'
        CALL FEATURE ( NAME,*29 )
       ELSE
        PRINT*,' > INDEPENDENT VARIABLE :'
        PRINT*,'  X',J-1,': '
        CALL FEATURE ( NAME,*29 )
         NIND= NIND+1
        END IF
30     CONTINUE
377    PRINT*,'       '
      PRINT*,'      '
      PRINT*,' > MODEL ESPECIFICATION :'
      PRINT*,'.. In terms of Y and X1...Xn, etc.'
      PRINT*,'       '
      PRINT*,'       '
      PRINT*,' > MODEL : '
      PRINT*,'>  '
      READ(5,'(A40)',ERR=35) MODEL
      GOTO 36
35    PRINT*,'***** ERROR,  .... MODEL .....RETYPE'
      GOTO 377
36    WRITE(40,'(1X,A40)') MODEL
39    PRINT*,'       '
      PRINT*,'         '
      PRINT*,' > COMPARISON OF MEANS ? :  Y/N'
      PRINT*,' >  '
      READ(5,'(A)',ERR=37) MEANS
      GOTO 38
37    PRINT*,'*****  ERROR..... MEANS  .....RETYPE'
      GOTO 39
38    WRITE(40,'(1X,A)')MEANS
      IF(MEANS.EQ.'Y')THEN
        WRITE(40,222)
222     FORMAT(1X,'MEANS')
       PRINT*,'      '
       PRINT*,'      '
       PRINT*,'* * * * Means Procedure for all main effects in the '
       PRINT*,'                model submitted    * * * * * * * * * * '
42     PRINT*,'      '
       PRINT*,'      '
       PRINT*,' TESTS OF SIGNIFICANCE  AVAILABLE :'
       PRINT*,'       '
       PRINT*,'       '
       PRINT*,'      '
       PRINT*,' 1.  DUNCAN'
```

```
        PRINT*,'     '
        PRINT*,' 2.  GABRIEL'
        PRINT*,'          '
        PRINT*,' 3.  TUKEY     '
        PRINT*,'          '
        PRINT*,' 4.  STUDENT- NEWMAN- KEULS'
        PRINT*,'    '
        PRINT*,' 5.   T    TEST'
        PRINT*,'        '
        PRINT*,' 6.  LEAST SIGNIFICANT DIFFERENCE (FISHER)'
        PRINT*,'     '
        PRINT*,' 7.  SCHEFFE   '
        PRINT*,'     '
        PRINT*,'       '
        PRINT*,' >   TEST ?: '
        PRINT*,' type list number...'
        READ(5,*,ERR=40) TEST
        GOTO 41
40      PRINT*,' **** ERROR ...... TEST..... RETYPE'
        GOTO 42
41      WRITE(40,333)
333     FORMAT(1X,'TEST')
        WRITE(40,*) TEST
       END IF
       RETURN
        END
*-----------------------------------------------------------------
C.
C.
                        SUBROUTINE MANVAR ( NAME )
C.
C.
        CHARACTER*40            NAME(128), MODEL
        INTEGER                 DVAR,  INVAR
*-----------------------------------------------------------------
C.
C.
28        PRINT*,'      '
       PRINT*,'      '
       PRINT*,'******* MULTIVARIATE ANALYSIS OF VARIANCE *********'
       PRINT*,'      '
       PRINT*,'        '
       PRINT*,' > NUMBER OF DEPENDENT VARIABLES:'
       PRINT*,' > '
       READ(5,*,ERR=26) DVAR
       GOTO 27
26     PRINT*,' ***** ERROR..... NO.  DEP  VAR.....RETYPE'
       GOTO 28
27       WRITE(40,*) DVAR
29     PRINT*,'        '
       PRINT*,' > ENTER  OXSIS  feature names only:'
       PRINT*,'      '
       PRINT*,' > DEPENDENT VARIABLES: '
       DO 30 J=1,DVAR
        PRINT*,'  Y',J,':    '
        PRINT*,' > '
        CALL FEATURE ( NAME,*29 )
30     CONTINUE
        PRINT*,'    '
        PRINT*,'       '
        PRINT*,' > NUMBER OF INDEPENDENT VARIABLES :'
        PRINT*,' > '
        READ(5,*,ERR=31) INVAR
        GOTO 32
```

```
31        PRINT*,' ******* ERROR ... NO. IND. VAR.....RETYPE'
          GOTO 30
32        WRITE(40,*) INVAR
36        PRINT*,'     '
          PRINT*,' > ENTER  OXSIS feature names only:'
          PRINT*,'    '
          PRINT*,' > INDEPENDENT VARIABLES :'
         DO 35 J=1,INVAR
          PRINT*,'X ',J,':    '
          PRINT*,'>  '
          CALL FEATURE ( NAME,*36 )
35        CONTINUE
          PRINT*,'     '
          PRINT*,'    '
          PRINT*,' > MODEL ESPECIFICATION : '
          PRINT*,' In terms of Y1...Yn and X1...Xn,etc.'
          PRINT*,'    '
          PRINT*,' > MODEL :'
          PRINT*,' >    '
          READ(5,'(A40)',ERR=37) MODEL
          GOTO 38
37        PRINT*,' ERROR ...... MODEL..... RETYPE'
          GOTO 35
38         WRITE(40,'(1X,A40)') MODEL
           RETURN
            END
*-------------------------------------------------------
C.
C.
                  SUBROUTINE REGR (NAME)
C.
C.
          CHARACTER*40          NAME(128)
          CHARACTER             LIN, GENREG, STEPW
*-------------------------------------------------------
C.
C.
3          PRINT*,'       '
           PRINT*,'        '
           PRINT*,' **************   REGRESSION    ANALYSIS  *************'
           PRINT*,'                                  AND'
           PRINT*,' **************   CURVE FITTING ROUTINES  *************'
           PRINT*,'          '
           PRINT*,'                '
           CALL REGDAT ( NAME )
           PRINT*,'    '
           PRINT*,'       '
           PRINT*,' > LINEAR    or    NON - LINEAR  REGRESSION ?:     L/N'
           PRINT*,' >  '
           READ(5,'(A)',ERR=1) LIN
           GOTO 2
1          PRINT*,' ****** ERROR ....LINEAR MODEL...... RETYPE'
           GOTO 3
2          WRITE(40,'(1X,A)') LIN
          IF(LIN.EQ.'N')THEN
C          CALL NONLIN
          ELSE IF(LIN.EQ.'L')THEN
           PRINT*,'===============  GENERAL LINEAR MODELS  ==========='
6           PRINT*,'      '
           PRINT*,'         '
           PRINT*,' > MODEL BUILDING'
           PRINT*,'         or '
           PRINT*,' GENERAL STANDARD REGRESSION ? :   M/G'
           PRINT*,' >  '
```

```
        READ(5,'(A)',ERR=4) GENREG
        GOTO 5
4       PRINT*,'  ****** ERROR ........ MODEL ...... RETYPE'
        GOTO 6
5       WRITE(40,'(1X,A)') GENREG
       IF(GENREG.EQ.'G') CALL REGRES
       IF(GENREG.EQ.'M')THEN
9       PRINT*,'     '
        PRINT*,'     '
        PRINT*,' >          STEPWISE  REGRESSION     (S) '
        PRINT*,'                    or'
        PRINT*,'           R - SQUARE  PROCEDURE     (R) '
        PRINT*,'           (all possible regressions)'
        print*,'    '
        PRINT*,' > Regression  Procedure ?:     S/R '
        PRINT*,' >    '
        READ(5,'(A)',ERR=7) STEPW
        GOTO 8
7       PRINT*,' ****** ERROR ..... PROC. ......RETYPE'
        GOTO 9
8       WRITE(40,'(1X,A)') STEPW
       IF(STEPW.EQ.'S')  CALL STEPWISE
       IF(STEPW.EQ.'R')  CALL RSQUARE
       END IF
      END IF
      RETURN
       END
*-------------------------------------------------------------
C.
C.
                    SUBROUTINE REGRES
C.
C.
        CHARACTER*40          MODEL
*-------------------------------------------------------------
C.
C.
      PRINT*,'     '
      PRINT*,'       '
      PRINT*,' ::::::::::::  REGRESSION ANALYSIS  ::::::::::::'
      PRINT*,'                          General  Models'
12      PRINT*,'      '
      PRINT*,'          '
      PRINT*,'  >  MODEL ESPECIFICATION : '
      PRINT*,'           '
      PRINT*,' ... in terms of Y= X1...Xn ...etc.'
      PRINT*,'  >   '
      READ(5,'(A40)',ERR=10) MODEL
      GOTO 11
10    PRINT*,' ****** ERROR ...... MODEL ...... RETYPE'
      GOTO 12
11    WRITE(40,'(1X,A40)') MODEL
       RETURN
        END
*-------------------------------------------------------------
C.
C.
              SUBROUTINE STEPWISE
C.
C.
       CHARACTER*40          MODEL
       INTEGER               METHOD
*-------------------------------------------------------------
C.
```

```
C.
      PRINT*,'          '
12    PRINT*,'        '
      PRINT*,' @@@@@@@@@  STEPWISE  MODEL - BUILDING  @@@@@@@@@@'
      PRINT*,'      '
      PRINT*,'        '
      PRINT*,' _________ Model - Selection  Methods _________'
      PRINT*,'      '
      PRINT*,'           1._ Forward Selection'
      PRINT*,'           2._ Backward  Elimination '
      PRINT*,'           3._ Stepwise  Regression  ( 1 & 2 )'
      PRINT*,'           4._ Maximum  R-square improvement'
      PRINT*,'           5._ Minimum  R-square improvement'
      PRINT*,'       '
      PRINT*,'       '
      PRINT*,'  >   METHOD ? :'
      PRINT*,'....type number...'
      PRINT*,' >  '
      READ(5,*,ERR=10) METHOD
      GOTO 11
10    PRINT*,' ******* ERROR ..... Method..... RETYPE'
      GOTO 12
11    WRITE(40,*) METHOD
40      PRINT*,'      '
      PRINT*,'         '
      PRINT*,'  > MODEL ESPECIFICATION :'
      PRINT*,' In terms of Y= X1....Xn...etc.'
      PRINT*,'       '
      PRINT*,' Notice: Stepwise model-selection is executed for each'
      PRINT*,'           dependent variable especified'
      PRINT*,'     '
      PRINT*,'  >  MODEL ? :'
      PRINT*,'  >'
      READ(5,'(A40)',ERR=20) MODEL
      GOTO 30
20    PRINT*,'  ***** ERROR ...... MODEL ........ RETYPE'
      GOTO 40
30    WRITE(40,'(1X,A40)')MODEL
       RETURN
        END
*-------------------------------------------------------------
C.
C.
                    SUBROUTINE RSQUARE
C.
C.
       CHARACTER*40          MODEL
       INTEGER               SMALL, LARGE
*-------------------------------------------------------------
C.
C.
      PRINT*,'     '
      PRINT*,'         '
      PRINT*,' @@@@@@@@@@@@@@@@ R-SQUARE  MODEL-BUILDING  @@@@@@@@@@'
      PRINT*,'                   all possible regressions'
40    PRINT*,'           '
      PRINT*,'          '
      PRINT*,'  >  MODEL ESPECIFICATION :'
      PRINT*,'...In terms of Y=X1,....Xn...etc.'
      PRINT*,'      '
      PRINT*,' Notice: R-square model selection is executed for each'
      PRINT*,'          dependent variable especified.'
      PRINT*,'         '
      PRINT*,'          '
```

```
      PRINT*,' > MODEL :'
      PRINT*,' >       '
      READ(5,'(A40)',ERR=20) MODEL
      GOTO 30
20    PRINT*,'******* ERROR  ..... MODEL ..... RETYPE'
      GOTO 40
30    WRITE(40,'(1X,A40)') MODEL
55    PRINT*,'       '
      PRINT*,'          '
      PRINT*,' > SMALLEST No. OF INDEPENDENT VARIABLES WANTED IN'
      PRINT*,'                 THE  MODEL '
      PRINT*,' >  '
      READ(5,*,ERR=50) SMALL
      GOTO 60
50    PRINT*,' ***** ERROR ..... SMALLEST No. .... RETYPE'
      GOTO 55
60    WRITE(40,*)SMALL
75    PRINT*,'       '
      PRINT*,'      '
      PRINT*,' > LARGEST No. OF INDEPENDENT VARIABLES WANTED IN'
      PRINT*,'                THE  MODEL :'
      PRINT*,' >  '
      READ(5,*,ERR=70) LARGE
      GOTO 80
70    PRINT*,' ******* ERROR .... LARGEST No. .....RETYPE'
      GOTO 75
80    WRITE(40,*) LARGE
       RETURN
        END
*-----------------------------------------------------------------
C.
C.
                    SUBROUTINE BLOSEL
C.
C.
      CHARACTER*3           ALL
      INTEGER               NBLO
*-----------------------------------------------------------------
C.
C.
104   PRINT*,'       '
      PRINT*,'          '
      TYPE 100
100   FORMAT('  >  ALL BLOCKS IN SUBSET ? :   Y/N ' )
      PRINT*,'  >   '
      READ(5,'(A)',ERR=102) ALL
      GOTO 103
102   PRINT*,' *******  ERROR ...... ALL ...... RETYPE'
      GOTO 104
103   IF(ALL.EQ.'Y')THEN
       WRITE(40,'(1X,A)') ALL
       WRITE(40,105)
105    FORMAT(1X,'ALL')
      ELSE IF(ALL.EQ.'N')THEN
       WRITE(40,'(1X,A)')ALL
165    PRINT*,'          '
       TYPE 150
150    FORMAT('  >  HOW MANY BLOCKS ? :')
       PRINT*,' >   '
       READ(5,*,ERR=155)NBLO
       GOTO 160
155    PRINT*,' ****** ERROR ..... NO. OF BLOCKS .... RETYPE'
       GOTO 165
160    WRITE(40,*) NBLO
```

```
          DO 99 J=1,NBLO
         CALL SINU ( *59 )
99       CONTINUE
        END IF
59       RETURN
          END
*-------------------------------------------------------------
C.
C.
                      SUBROUTINE REGDAT( NAME )
C.
C.
       CHARACTER*40           NAME(128)
        INTEGER                NVAREG
*-------------------------------------------------------------
C.
C.
13     PRINT*,'       '
       PRINT*,'         '
         PRINT*,' > TOTAL No. OF VARIABLES :'
         PRINT*,' >  '
         READ(5,*,ERR=10) NVAREG
         GOTO 12
10       PRINT*,' ******* ERROR ...... No. OF VAR. ...... RETYPE'
         GOTO 13
12     WRITE(40,*)NVAREG
29     PRINT*,'      '
       PRINT*,'        '
       PRINT*,' >>>>>> Type OXSIS  feature names  only'
       PRINT*,'       '
       DO 20 J=1,NVAREG
       IF(J.EQ.1)THEN
        PRINT*,' > DEPENDENT  VARIABLE :'
        PRINT*,'  Y :'
        CALL FEATURE ( NAME,*29 )
       ELSE
30        PRINT*,'>>>>> Type OXSIS feature names  only ****'
       PRINT*,'  > INDEPENDENT  VARIABLE : '
       PRINT*,'   X',J-1,':      '
       CALL FEATURE (NAME,*30)
      END IF
20    CONTINUE
      RETURN
       END
*-------------------------------------------------------------
C.
C.
                    SUBROUTINE LISTINT( NAME )
C.
C.
        CHARACTER*40       NAME(128)
C.
C.
C.-------------------------------------------------------------
C. Subroutine LISTINT retains users instructions and stores them
C. in a instructions file for the 'LISTING' facility.
C.
C.
        PRINT*,'*********  LISTING   facility  ***********'
        PRINT*,'       '
        PRINT*,'         '
        PRINT*,'         { Enter features name: }'
        PRINT*,'           '
        PRINT*,'      '
```

```
        PRINT*,'>  ~~~~~~ Use  OXSIS  names  only ~~~~~~~~~'
        PRINT*,'          '
        PRINT*,'          '
          CALL FEATURE( NAME,*59 )
          CALL BLOSEL
59      RETURN
          END
*------------------------------------------------------------
```

File complete

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

User: AGRIC2 12:04:49
File: VAX1::DRC2:[AGRIC2]RAUL2.FOR;64

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

```
        PROGRAM MANIP
*       ---------------------------------------------------
        CHARACTER*2     RELATI(10)
       CHARACTER*7       FILENAM(200)
       INTEGER         KEY(12),NKEY,NFOR,NFRE(4),NFCH,N,NSEL
        INTEGER          NTIME(4),FORMA(100),FETCH(100)
        INTEGER          MNSEL(10),FNSEL(10),NWFCH,NI
        REAL             VALUE(10),STATUS(3)
        REAL             IBL(900),SUM(100),WANTED(6,50)
*       ---------------------------------------------------
        CALL INST1(KEY,NKEY,*10,NFOR,NFRE,NFCH,FORMA,FETCH,RELATI
     + , NSEL,MNSEL,FNSEL,VALUE, STATUS, NWFCH, NI )
1       CALL SITE1(*10,IBL,NFOR,NFRE,N,NTIME)
        IF(NSEL.NE.0)THEN
        CALL SELECT(*1,NSEL,NFOR,MNSEL,FNSEL,NTIME,NFRE,RELATI,
     +    VALUE,IBL )
          ENDIF
        DO 90 J=1,NKEY
        GOTO(500,501,502,503,506,507,508,509,510,511,512,513)KEY(J)
500    CONTINUE
      CALL AVERAG(IBL,N,NWFCH,NFOR,NFRE,NTIME,FORMA,FETCH,WANTED,SUM)
        GOTO 90
501    CALL DEPTH( IBL, NFOR, NFRE, NTIME )
        GOTO 90  •
502    CALL MINMAX(IBL,N)
        GOTO 90
503     CONTINUE
C       CALL SASFILE(IBL,N,NFCH,NFOR,NFRE,NTIME,FORMA,FETCH,WANTED,SUM)
      GOTO 90
506          CALL SORTBE(IBL,NFOR,NFRE,NTIME,N)
           GOTO 90
507         CALL EMERGE
508      CONTINUE
         GOTO 90
509     CALL KRIGE(IBL,NFOR,NFRE,NTIME)
         GOTO 90
510           CALL SVARIO( IBL,NFOR,NFRE,NTIME )
         GOTO 90
511     CALL ALLOEX(IBL,NFOR,NFRE,N,NTIME)
         GOTO 90
512      CALL SASDAT ( IBL,NFOR,NFRE,NTIME)
          GOTO 90
513      CALL LISTEX ( IBL,NFOR,NFRE,NTIME )
90      CONTINUE
        GOTO 1
10        IF ( NI .EQ. 5 ) THEN
            CALL DUMP(IBL,NFOR,NFRE)
           ELSE IF(NI.EQ.8)THEN
             CALL KRIGEX(IBL,NFOR,NFRE,NTIME)
            ELSE IF(NI.EQ.9)THEN
           CALL SVAREX( IBL,NFOR,NFRE,NTIME )
          ELSE IF(NI.EQ.11)THEN
           CALL SASCMD (IBL,NFOR,NFRE,NTIME )
          END IF
              STOP' '
```

```
          END
*         ================================================================
          SUBROUTINE INST1(KEY,NKEY,*,NFOR,NFRE,NFCH,FORMA,FETCH,RELATI
     + ,NSEL, MNSEL,FNSEL,VALUE,STATUS,NWFCH,NI)
*         ----------------------------------------------------------------
          CHARACTER*40     NAMES(80,4),WNAME,HEADIN(10)
          CHARACTER*40     SELFCH(10),WNAMES(50)
          CHARACTER*40      NEWVAR(20)
         CHARACTER*3         TODOS
          CHARACTER*2      RELATI(10)
          CHARACTER*1      SEL,MODEIN,FACILY,LEVINF
          CHARACTER*7      FACIL(4),SUBSET,RESULT,QUERY,FILENAM(200)
          INTEGER          NFOR,NFRE(4),NFACIL,NKEY,KEY(12),SN(500)
          INTEGER          FORMA(100),FETCH(100),SIN,SPLQUE,NBLO,NVAR
          INTEGER          NSEL,MNSEL(10),FNSEL(10),NWFCH,NI
          REAL             VALUE(10),STATUS(3)
          COMMON /CHSUBS/ WNAME,NAMES, FILENAM
             COMMON /PSVAR/NEWVAR
         COMMON /CHASAS/TODOS,WNAMES,FACILY,MODEIN
         COMMON /DESTA/LEVINF
              COMMON /INST/SIN,SPLQUE,SN,NBLO
          COMMON /CHALLOC/RESULT
          OPEN(23,FILE='MANI',STATUS='OLD',ERR=103)
          READ(23,12)SUBSET,RESULT
          OPEN(20,FILE=SUBSET,STATUS='OLD',ERR=100)
          SUBSET(:1)='N'
          OPEN(21,FILE=SUBSET,STATUS='OLD',ERR=101)
          READ(20,*)NFOR,NFRE
          DO 91 N=1,NFOR
          DO 91 J=1,NFRE(N)
          READ(21,11,END=102)NAMES(J,N)
         IF(NAMES(J,N)(1:1).EQ.' ')NAMES(J,N)(1:)=NAMES(J,N)(2:)
91        CONTINUE
CC        PRINT*,'   Save result in: '
C         READ*,RESULT
          IF(RESULT.EQ.'     ')RESULT='RESULT'
             NSEL=0
          READ(23,13)SEL
          READ(23,13)SEL
          IF(SEL.EQ.'Y')THEN
                 DO 290 J=1,8
                 READ(23,14,END=5000)SELFCH(J),RELATI(J),VALUE(J)
                 IF(SELFCH(J).EQ.'END')GOTO 5000
                 DO 291 I=40,1,-1
                    IF(SELFCH(J)(I:I).NE.' ')THEN
                      GOTO 251
                    ENDIF
291              CONTINUE
251              CONTINUE
                    DO 294 N=1,NFOR
                    DO 295 JJ=1,NFRE(N)
                    IF(SELFCH(J)(:I).EQ.NAMES(JJ,N)(:I))THEN
                            NSEL=NSEL+1
                            MNSEL(NSEL)= N
                            FNSEL ( NSEL ) = JJ
                            GOTO 290
                   ENDIF
295                 CONTINUE
294                 CONTINUE
290              CONTINUE
5000            CONTINUE
          ENDIF
               RESULT(:1)='M'
          OPEN(22,FILE=RESULT,STATUS='NEW')
```

```
C            WRITE(22,*)NFOR
C            WRITE(22,*)NFRE
           NFCH=0
          NKEY=0
CC        PRINT*,' Query: '
          DO 96 JJ=1,100
          READ(23,*,END=503)NI
           IF(NI.LT.7)THEN
             RESULT(:1)='N'
             OPEN(24,FILE=RESULT,STATUS='NEW')
             RESULT(:1)='L'
             OPEN(26,FILE=RESULT,STATUS='NEW')
           END IF
          NKEY=NKEY+1
          KEY(NKEY)=NI
          GOTO(500,501,502,500,506,507,508,509,510,511,512,513)NI
500       CONTINUE
          DO 93 IN=1,50
52        READ(23,15)WNAME
          IF(WNAME(:3).EQ.'END')THEN
C         PRINT*,'Back to commands.'
         NWFCH = IN - 1
          GOTO 96
          ENDIF
*         tail it off ...
          DO  190 I=40,1,-1
          IF(WNAME(I:I).NE.' ')THEN
          ILEN=I
          GOTO 51
          ENDIF
190       CONTINUE
51        CONTINUE
          DO 94 N=1,NFOR
          DO 95 J=1,NFRE(N)
          IF(WNAME(:ILEN).EQ.NAMES(J,N)(:ILEN))THEN
          NFCH=NFCH+1
          FORMA(NFCH)=N
          FETCH(NFCH)=J
          HEADIN(NFCH)(:ILEN)=WNAME(:ILEN)
          GOTO 93
          ENDIF
95        CONTINUE
94        CONTINUE
C         PRINT*,' No such feature'
          GOTO 52
93           CONTINUE
501           CALL SPLINS( *104 )
          GOTO 96
502       PRINT*,'  MAX & MIN QUESTIONAIRE  '
          GOTO 96
503       CONTINUE
          RETURN
506            CALL SORTB
               GOTO 96
507          CALL IMERGE
           GOTO 96
508        RETURN1
509         RESULT(:1)='S'
            OPEN(19,FILE=RESULT,STATUS='NEW')
          CALL KRIGIN
              GOTO 96
510        RESULT(:1)='S'
           OPEN(19,FILE=RESULT,STATUS='NEW')
           CALL SVARIN
```

```
          GOTO 96
511       RESULT(:1)='M'
          CALL ALLOIN( NFOR,NFRE,NAMES )
          GOTO 96
512           CALL SASINS
           GOTO 96
513        CALL LISTINS
96        CONTINUE
          RETURN
100       PRINT*,' No such data file.'
11        FORMAT(A40)
12        FORMAT(1X,2(A7))
13        FORMAT(1X,A1)
14        FORMAT(1X,A40,A2,F7.2)
15        FORMAT(1X,A40)
          RETURN 1
101       PRINT*,' No such dictionary.'
          RETURN 1
102       PRINT*,' ERROR while reading dictionary.'
          RETURN 1
103       PRINT*,'   ERROR OPEN INSTRUCTION FILE'
          RETURN 1
104       RETURN
          END
*         =================================================
          SUBROUTINE SITE1(*,IBL,NFOR,NFRE,N,NTIME)
          INTEGER          NFOR,NFRE(4),NTIME(4)
          REAL             IBL(900)
*         -------------------------------------------------
          N=0
          READ(20,*,END=100)NTIME
          DO 90 J=1,NFOR
          N=N+NFRE(J)*NTIME(J)
90        CONTINUE
          READ(20,*)(IBL(J2),J2=1,N)
          RETURN
100       RETURN 1
          END
*         ===========================================================
          SUBROUTINE AVERAG(IBL,N,NWFCH,NFOR,NFRE,NTIME,FORMA,FETCH,
      +       WANTED,SUM )
          INTEGER          NWFCH,NFOR,NFRE(4),NTIME(4)
          INTEGER          FORMA(NWFCH),FETCH(NWFCH)
          REAL             IBL(900),SUM(NWFCH),WANTED(6,NWFCH)
          REAL             MXDPTH
C.        -----------------------------------------------------------
          ITEM=0
          DO 91J=1,NWFCH
          DO 90 N=1,NFOR
            IF(N.LT.FORMA(J))THEN
            DO 92 IL = 1,NTIME(N)
            ITEM=ITEM+NFRE(IL)
92          CONTINUE
            ELSEIF(N.EQ.FORMA(J))THEN
            ITEM=ITEM+FETCH(J)
            DO 93 L=1,NTIME(N)
            WANTED(L,J)=IBL(ITEM)
            ITEM=ITEM+NFRE(N)
93          CONTINUE
          ITEM=0
          GOTO 91
                          ENDIF
90        CONTINUE
91        CONTINUE
```

```
      DO 95 K=2,NWFCH
      DO 94 L=1,NTIME(FORMA(2))
      IF(L.EQ.1)SUM(K)=WANTED(L,1)*WANTED(L,K)
      IF(L.GT.1)THEN
      SUM(K)=SUM(K)+(WANTED(L,1)-WANTED(L-1,1))*WANTED(L,K)
      ENDIF
      MXDPTH=WANTED(L,1)
94    CONTINUE
      SUM(K)=SUM(K)/MXDPTH
95    CONTINUE
      WRITE(22,*)MXDPTH,(SUM(J),J=2,NWFCH)
      RETURN
      END
*     ================================================================
      SUBROUTINE SELECT(*,NSEL,NFOR,MNSEL,FNSEL,NTIME,NFRE,RELATI,
     +     VALUE, IBL )
      CHARACTER*2     RELATI(NSEL)
      INTEGER         ITEM,NSEL,NFOR
      INTEGER         ZZZ(10),MNSEL(NSEL),FNSEL(NSEL)
      INTEGER         NTIME(NFOR),NFRE(NFOR)
      REAL            IBL(900),SELEC(6,10),VALUE(NSEL)
       COMMON  ZZZ
*     ----------------------------------------------------------------
      ITEM=0
      DO 91 J=1, NSEL
      DO 90 N=1, NFOR
      IF(N.LT.MNSEL(J))THEN
      DO 92 IL= 1, NTIME(N)
      ITEM=ITEM+ NFRE(IL)
92    CONTINUE
      ELSEIF(N.EQ.MNSEL(J))THEN
      ITEM=ITEM+ FNSEL(J)
      DO 93 L=1, NTIME(N)
      SELEC(L,J)=IBL(ITEM)
93    CONTINUE
      ITEM=0
      GOTO  91
      ENDIF
90    CONTINUE
91    CONTINUE
      L=1
      DO 191 J=1,NSEL
      ZZZ(J)=0
      IF(RELATI(J).EQ.'GT')THEN
              IF(SELEC(L,J).GT.VALUE(J))ZZZ(J)=1
      ELSEIF(RELATI(J).EQ.'LT')THEN
              IF(SELEC(L,J).LT.VALUE(J))ZZZ(J)=1
      ENDIF
191   CONTINUE
      CALL EXSEL(   *10 )
      RETURN
10    RETURN 1
      END
*     ================================================================
      SUBROUTINE MINMAX( IBL,N)
      RETURN
      END
*     ================================================================
      SUBROUTINE EXSEL (   * )
       INTEGER   RESULT,A,B,C,D,E,F,G,H,I,J
       COMMON A,B,C,D,E,F,G,H,I,J
C         PRINT*,A,B
C       RESULT=      ( A * B )
C        PRINT*,RESULT
```

```
C         IF(RESULT.EQ.0) RETURN 1
          RETURN
          END
*         ================================================================
          SUBROUTINE SASFILE(IBL,N,NWFCH,NFOR,NFRE,NTIME,FORMA,FETCH,
     +       WANTED,SUM )
          INTEGER           NWFCH,NFOR,NFRE(NFOR),NTIME(NFOR)
          INTEGER           FORMA(NWFCH),FETCH(NWFCH),FFOR,SFOR
          INTEGER           FINALE, BEGIN, END, M
          REAL              IBL(900),SUM(NWFCH),WANTED(6,NWFCH)
          REAL              MXDPTH, STATUS(3), RBL(100)
C.        ----------------------------------------------------------------
          STATUS(1) = 30.0
          FINALE = 0
          N = 1
          BEGIN = NFRE(1) + 1
          END = BEGIN -1 + ( NTIME(2)*NFRE(2))
50        CONTINUE
          DO 94 J =BEGIN,END,NFRE(2)
            IF ( ABS( IBL(J) -  STATUS (N)) .LT. 0.1 ) THEN
                  N = N + 1
                  GOTO 94
            ELSE
                  DO 96 L =J,END-NFRE(2)
                    M=L+NFRE(2)
                    IF ( M .LE. END ) THEN
                          IBL ( L ) = IBL ( M )
                    ELSE
                          FINALE = 1
                    ENDIF
96                CONTINUE
                    NTIME ( 2 ) = NTIME(2) - 1
                    N = 1
                    END = END - NFRE(2)
                          IF ( FINALE .EQ. 1) GOTO 51
                    GOTO 50
            ENDIF
94        CONTINUE
51        CONTINUE
          FFOR=0
          SFOR=0
          ITEM=0
          IJ=0
          BEGIN = NFRE(1)
          DO 290 J= 1,NWFCH
          IF( FORMA(J) .EQ. 1 ) FFOR=FFOR+1
          IF( FORMA(J) .EQ. 2 ) SFOR=SFOR+1
290       CONTINUE
          IJ = 0
          DO 91 J =1,NWFCH
            DO 90 N=1,NFOR
              IF( N .LT. FORMA(J) ) THEN
                  DO 92 IL= 1, NTIME(N)
                    ITEM = ITEM+NFRE(IL)
92                CONTINUE
              ELSEIF( N .EQ. FORMA(J)) THEN
                  IF(N.EQ.1)THEN
                    ITEM=ITEM+FETCH(J)
                      DO 93 L=1,NTIME(N)
                          IJ=IJ+1
                          RBL(IJ)=IBL(ITEM)
93                    CONTINUE
                          ITEM=0
                          GOTO 91
```

```
                ELSEIF(N.EQ.2)THEN
                  DO 195 IS=1,NTIME(2)
                    DO 194 K=FFOR+1,FFOR+SFOR
                        ITEM=BEGIN+FETCH(K)
                        IJ=IJ+1
                        RBL(IJ)=IBL(ITEM)
194                 CONTINUE
                        BEGIN=BEGIN+NFRE(2)
195                 CONTINUE
                        GOTO 300
                ENDIF
              ENDIF
90          CONTINUE
91        CONTINUE
300       CONTINUE
          WRITE(22,*)(RBL(IK),IK=1,IJ)
          RETURN
          END
*              ------------------------------------------------------
            SUBROUTINE SORTB
             CHARACTER*40          WNAME,NAMES(80,4)
         INTEGER     N,STRAT
        REAL      AUX(200)
         CHARACTER*7     FILENAM(200)
         CHARACTER*2         NUM
           COMMON/CHSUBS/WNAME,NAMES,FILENAM
         COMMON/SUBS/AUX,STRAT
         DATA AUX /200*1E6/
         DO  90 N = 1, 40
             WRITE(NUM,'(I2.2)')N
         FILENAM(N) = 'FILE'//NUM
90       CONTINUE
             READ(23,'(1X,A40)')WNAME
            RETURN
               END
             SUBROUTINE SORTBE(IBL,NFOR,NFRE,NTIME,TODOS)
* ------------------------------------------------------------------------
            CHARACTER*7       FILENAM(200)
        CHARACTER*40 NAMES(80,4),WNAME
        INTEGER  NFOR,NFRE(4),TODOS,NTIME(4)
        INTEGER  CONT,POSTN,STRAT
        REAL     IBL(900),AUX(200)
        COMMON /CHSUBS/ WNAME,NAMES, FILENAM
        COMMON /SUBS/ AUX,STRAT
C
C
C    COMPARE WNAME WITH EXISTENT VARIABLE NAMES AND ASCERTAIN  POSITION
C    OF WNAME IN ARRAY NAMES FROM N-FILE.
C
C
        CONT=0
        DO 90 K=1,NFOR
          DO 91 J=1,NFRE(K)
          CONT=CONT+1
           IF(WNAME.EQ.NAMES(J,K))THEN
           POSTN=CONT
           END IF
91      CONTINUE
90      CONTINUE
C   ASSIGNING 1000000 TO AN AUXILIAR ARRAY AUX(200)
         DO 92 J=1,200
         IF(ABS(AUX(J)-1000000.0).LT.0.01)GOTO92
         IF(AUX(J).LT.0.001)THEN
         AUX(J)=1000000.0
```

```
       END IF
92    CONTINUE
C   SORTING BY ASCERTION
555   CONTINUE
       DO 93 J=1,200
       IF(ABS(AUX(J)-IBL(POSTN)).LT.0.01)THEN
       WRITE(J,*)NTIME
       WRITE(J,*)(IBL(L),L=1,TODOS)
       RETURN
       END IF
93     CONTINUE
       STRAT=STRAT+1
       AUX(STRAT)=IBL(POSTN)
       OPEN(UNIT=STRAT,FILE=FILENAM(STRAT),STATUS='NEW',ERR=5001)
       GO TO 555
5001      PRINT*, 'ERROR OPENING FILE'
         RETURN
           END
*=================================================================
           SUBROUTINE  DUMP(IBL,NFOR,NFRE)
         CHARACTER*7     FILENAM(200)
            CHARACTER*40         WNAME, NAMES(80,4)
      INTEGER NFOR, NFRE(4), NTIME(4), N
      INTEGER STRAT,OUT
       REAL  IBL(900), AUX(200), HOLD(200), BUFR
       COMMON /SUBS/ AUX,STRAT
          COMMON/CHSUBS/ WNAME, NAMES, FILENAM
C-----------------------------------------------------------------
      DO 95 L=1,STRAT
95    HOLD(L)=AUX(L)
C   SORTING IN ASCENDING ORDER
       DO 98 I=2,STRAT
       BUFR=HOLD(I)
       DO 97 K=I-1,1,-1
       IF(BUFR.LT.HOLD(K))THEN
       HOLD(K+1)=HOLD(K)
       HOLD(K)=BUFR
       END IF
97     CONTINUE
98     CONTINUE
       OUT=22
       DO 991 J=1,STRAT
991    CLOSE(UNIT=J,STATUS='KEEP')  !  LATER DELETE ....
        DO 992 L=1,STRAT
        DO 993 M=1,STRAT
        IF(ABS(HOLD(L)-AUX(M)).LT.0.01)THEN
        OPEN(UNIT=M,FILE=FILENAM(M),STATUS='OLD')
        DO 994 NN=1,10000
        READ(M,*,END=50)NTIME
         N = 0
        DO 995 K=1,NFOR
995     N=N+NFRE(K)*NTIME(K)
        READ(M,*,END=50)(IBL(IJ),IJ=1,N)
        WRITE(OUT,*)NTIME
       WRITE(OUT,*)(IBL(IJ),IJ=1,N)
994     CONTINUE
50      CLOSE(UNIT=M,STATUS='DELETE')
       ENDIF
993     CONTINUE
992     CONTINUE
       RETURN
        END
*-----------------------------------------------------------
       SUBROUTINE SPLINS( * )
```

```
      CHARACTER*40   WNAME
      CHARACTER*5    GRAPH
      CHARACTER*4    COEF
      CHARACTER*3    ALL
        CHARACTER*1 OPTION,INTERP
      INTEGER  SIN, SPLQUE, SN(500),NBLO
      REAL DH, HIDTH, LODTH, VA, VAGT, VALT
       COMMON /INTER/INTERP
      COMMON /CHSUBS/WNAME/CHINST/GRAPH,COEF,ALL,OPTION
      COMMON /INST/SIN, SPLQUE, SN,NBLO /RINST/DH, HIDTH, LODTH,
     + VA, VAGT, VALT
*-------------------------------------------------------------
       READ(23,'(1X,A)')INTERP
      READ(23,'(1X,A)')OPTION
      IF(OPTION.EQ.'S')THEN
      CALL SININS
      RETURN1
      ELSE IF(OPTION.EQ.'M')THEN
      CALL MULINS
      RETURN1
      END IF
      RETURN
      END
*-------------------------------------------------------
      SUBROUTINE SININS
      CHARACTER*40 WNAME
      CHARACTER*5  GRAPH
      CHARACTER*4  COEF
      INTEGER SIN, SPLQUE
      REAL DH, HIDTH, LODTH, VA, VAGT, VALT
      COMMON /CHSUBS/WNAME/CHINST/GRAPH, COEF
      COMMON /INST/SIN,SPLQUE/RINST/DH, HIDTH,LODTH,VA,
     +VAGT,VALT
*-------------------------------------------------------
      READ (23,*) SIN
      READ(23,'(1X,A40)')WNAME
      CALL DEPTYP
      READ(23,'(1X,A4)')COEF
      READ(23,'(1X,A5)')GRAPH
      RETURN
      END
*-------------------------------------------------------------
      SUBROUTINE MULINS
      CHARACTER*40 WNAME,WFETRS(50)
        CHARACTER*5  GRAPH
        CHARACTER*4  COEF
      CHARACTER*3 ALL
      CHARACTER*1       MANYV
      INTEGER  SPFOR,SPFRE(4)
      INTEGER  SIN, SPLQUE, SN(500),NBLO
     INTEGER       NCHARS
      REAL DH, HIDTH, LODTH, VA, VAGT, VALT
      COMMON /CHSUBS/WNAME
      COMMON /MUVAR/MANYV,WFETRS
      COMMON /MUVAR2/NCHARS
       COMMON /CHINST/GRAPH,COEF,ALL
      COMMON /INST/SIN, SPLQUE, SN,NBLO/RINST/DH, HIDTH, LODTH,
     +VA, VAGT, VALT
*-------------------------------------------------------------
      READ(23,'(1X,A)')MANYV
      IF(MANYV.EQ.'M')THEN
         READ(23,*)NCHARS
         DO 99 I=1,NCHARS
           READ(23,'(1X,A40)')WFETRS(I)
```

```
99          CONTINUE
          ELSE
          READ(23,'(1X,A40)')WNAME
          END IF
          READ(23,'(1X,A)')ALL
          IF(ALL.EQ.'Y')THEN
           READ(23,'(1X,A3)')ALL
           ELSE
           READ(23,*)NBLO
           DO 90 J=1,NBLO
           READ(23,*)SN(J)
90         CONTINUE
           END IF
           CALL DEPTYP
           SPFOR=2
           SPFRE(1)=4
           SPFRE(2)=7
           WRITE(22,*)SPFOR
           WRITE(22,*)SPFRE
           RETURN
           END
*-------------------------------------------------------------
          SUBROUTINE DEPTYP
          INTEGER  SIN, SPLQUE
          REAL  DH, HIDTH, LODTH, VA, VAGT, VALT
          COMMON /INST/SIN, SPLQUE/RINST/DH, HIDTH,LODTH, VA, VAGT,
       +VALT
*-------------------------------------------------------------
          READ(23,*)SPLQUE
          GO TO (10, 20, 30, 40, 50)SPLQUE
10        CONTINUE
          READ(23,*)DH
          GO TO 1000
20        CONTINUE
          READ(23,*)HIDTH
          READ(23,*)LODTH
          GO TO 1000
30        CONTINUE
          READ(23,*)VA
          GO TO 1000
40        CONTINUE
          READ(23,*)VAGT
          GO TO 1000
50        CONTINUE
          READ(23,*)VALT
1000      CONTINUE
          RETURN
          END
*=============================================================
           SUBROUTINE DEPTH( IBL,NFOR,NFRE,NTIME )
          INTEGER  NFOR, NFRE(4), NTIME(4)
          REAL  IBL(900)
            CHARACTER*40      NEWVAR(20)
          CHARACTER*1  OPTION,INTERP
          CHARACTER*5  GRAPH
          CHARACTER*4  COEF
          CHARACTER*3  ALL
          COMMON /INTER/INTERP
              COMMON /PSVAR/NEWVAR
          COMMON /CHINST/GRAPH,COEF,ALL,OPTION
*-----------------------------------------
             NEWVAR(1)='EASTING'
             NEWVAR(2)='NORTHING'
             NEWVAR(3)='SITE_NO'
```

```
          NEWVAR(4)='INTER_TYPE'
          NEWVAR(5)='DEPTH1'
          NEWVAR(6)='DEPTH2'
          NEWVAR(7)='DEPTH3'
          NEWVAR(8)='DEPTH4'
          NEWVAR(9)='DEPTH5'
          NEWVAR(10)='DEPTH6'
          NEWVAR(11)='INTER_VALUE'
        IF(OPTION.EQ.'S')THEN
          NEWVAR(12)='COEF1'
          NEWVAR(13)='COEF2'
          NEWVAR(14)='COEF3'
          NEWVAR(15)='DEPTH_LAG_1CM'
          NEWVAR(16)='INT_VAL_LAG_1CM'
        CALL SPLSIN(IBL,NFOR,NFRE,NTIME)
        ELSE IF(OPTION.EQ.'M')THEN
        CALL SPLMUL(IBL,NFOR,NFRE,NTIME)
        END IF
        RETURN
        END
*_____________________________________________
         SUBROUTINE SPLSIN(IBL,NFOR,NFRE,NTIME)
          CHARACTER*40        NEWVAR(20)
       CHARACTER*5 GRAPH
       CHARACTER*4 COEF
        CHARACTER       INTERP
       INTEGER NFOR,NFRE(4),NTIME(4),N,NN,SIN,SPLQUE
       INTEGER  WPROP,WSITE,WDEPTH,WEAST,WNORTH
           INTEGER     SPFOR,SPFRE(4),SPTIME(4),IJ
           REAL        ISPL(426),ISP(11),A
       REAL  IBL(900),DH,HIDTH,LODTH,VA,VAGT,VALT
          DOUBLE PRECISION X(6),F(6),O(6,3),P(6,3),Q(6,3),E(2),
     +W(2),R(6,3),PP,QQ,RR,G(2),H,Y(6),SLP,B,RR1,RR2,PMP,PMF,FE
     +,RMAX,RMIN,MP(6),YMP(6),V,DTH1,DTH2,ROOT,YX(6),PROF(10),
     + DTH, XGPH(200), YGPH(200)
       INTEGER IDF,GG
          COMMON /INTER/INTERP
       COMMON /SPLIN/IDF,GG,X,F,O,P,Q,E,W,R,PP,QQ,RR,G,H,
     + Y,SLP,B,RR1,RR2,PMP,PMF,FE,RMAX,RMIN,MP,YMP,V,DTH1,DTH2,
     + ROOT,YX,A,PROF,DTH
         COMMON /HOR/ N
           COMMON /RISPL/ ISPL,ISP
       COMMON /CHINST/GRAPH,COEF
       COMMON /INST/SIN,SPLQUE
       COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
       COMMON /RINST/DH,HIDTH,LODTH,VA,VAGT,VALT
         COMMON /PSVAR/NEWVAR
*-------------------------------------------------------
          CALL FINDNA( NFOR, NFRE )
          CALL FINDSI( NFOR, NFRE )
          CALL FINDEP (NFOR, NFRE )
         IFLAG=0
        NN=0
         SIN= REAL(SIN)
C.
C.  PICKING UP THE RIGHT SITE NUMBER
C.  OF THE BLOCK ON WHICH INTERPOLATION IS TO BE PERFORMED
C.
         IF(ABS(SIN-IBL(WSITE)).LT.0.001) THEN
          IFLAG=1
          SPFOR=2
          SPFRE(1)=4
           SPFRE(2)=7
          SPTIME(1)=1
```

```
            SPTIME(2)=1
            ISPL(1)=IBL(WEAST)
                 ISPL(2)=IBL(WNORTH)
            ISPL(3)=IBL(WSITE)
            ISPL(4)=REAL(SPLQUE)
             WRITE(26,*)(ISPL(J),J=1,3)
               END IF
C. IF THE RIGHT BLOCK IS IN TURN THEN IT PICKS UP VALUES OF
C. WANTED PROPERTY AND HORIZON DEPTH WHOSE POSITION IS INDICATED
C. BY WPROP & WDEPTH IN DATA VECTOR IBL.
C.
          IF(IFLAG.EQ.1)THEN
          DO 66 J=1,NFOR
          IF(J.EQ.2)THEN
          N=NTIME(J)
           WPROP = WPROP+NFRE(J-1)
           WDEPTH = WDEPTH + NFRE(J-1)
           DO 168 L=1,NTIME(J)
           IF(L.EQ.1)THEN
C.
C. MAKES PROVISION FOR MISSING VALUES OF WANTED PROPERTY IN THE DATA.
C. CALLING ROUTINE MISSING WHICH OUTPUTS MISSING VALUES IN SIS FORMAT
C.
              IF(IBL(WPROP).LT.0.0)THEN
               CALL MISSING(SPFOR,SPFRE,SPTIME)
          IF(COEF.EQ.'COEF')THEN
            DO 762 K=1,16
            WRITE(24,'(1X,A40)')NEWVAR(K)
762         CONTINUE
          ELSE
           DO 722 K=1,11
           WRITE(24,'(1X,A40)')NEWVAR(K)
722         CONTINUE
           END IF
                RETURN
               END IF
             F(L)=DBLE(IBL(WPROP))
            Y(L)=F(L)
            X(L)=DBLE(IBL(WDEPTH))
           ELSE
            WPROP=WPROP+NFRE(J)
            WDEPTH=WDEPTH+NFRE(J)
               IF(IBL(WPROP).LT.0.0)THEN
                CALL MISSING (SPFOR,SPFRE,SPTIME)
          IF(COEF.EQ.'COEF')THEN
            DO 763 K=1,16
            WRITE(24,'(1X,A40)')NEWVAR(K)
763         CONTINUE
          ELSE
            DO 723 K=1,11
            WRITE(24,'(1X,A40)')NEWVAR(K)
723         CONTINUE
          END IF
                 RETURN
               END IF
            F(L)=DBLE(IBL(WPROP))
           Y(L)=F(L)
           X(L)=DBLE(IBL(WDEPTH))
            END IF
           F(L)=F(L)*X(L)
           IF(L.GT.1)THEN
           F(L)=F(L)*(X(L)-X(L-1))/X(L)
          END IF
168       CONTINUE
```

```
      END IF
66    CONTINUE
C. THE LAYER-STEP INTERPOLATION ROUTINE IS CALLED IF A SPLINE
C. FUNCTION IS NOT TO BE FITTED.
C.
       IF(INTERP.EQ.'L')THEN
       CALL LAYER(N,X,Y,DTH,DTH1,DTH2,FE)
       GOTO 8899
       END IF
C.
C. PROVISION FOR BLOCKS WITH ONLY ONE HORIZON
C.
      IF(N.EQ.1)THEN
        GO TO( 500,501,502,503,504 )SPLQUE
500     ISP(5)=DH
        DO 600 J=6,10
        ISP(J)=-1.0
600     CONTINUE
         IF(DH.LT.X(N))THEN
        ISP(11)=Y(N)
          ELSE
           ISP(11)=-1.0
          END IF
        GOTO 560
501     ISP(5)=HIDTH
        ISP(6)=LODTH
        IF(LODTH.LT.X(N))THEN
         DO 601 J=7,10
         ISP(J)=-1.0
601      CONTINUE
        ISP(11)=Y(N)
        ELSE
          DO 602 J=7,11
          ISP(J)=-1.0
602       CONTINUE
         END IF
         GOTO 560
502     IF((VA-Y(N)).LT.0.001)THEN
         ISP(5)=X(N)/2.0
        ELSE
         ISP(5)=-1.0
        END IF
        DO 603 J=6,10
         ISP(J)=-1.0
603     CONTINUE
        ISP(11)=VA
        GOTO 560
503     DO 604 J=5,10
        ISP(J)=-1.0
604     CONTINUE
        ISP(11)=VAGT
        GOTO 560
504     DO 605 J=5,10
        ISP(J)=-1.0
605     CONTINUE
        ISP(11)=VALT
        GOTO 560
      END IF
      ELSE
      RETURN
      END IF
C.
C. ROUTINE MATRIX SOLVES THE MATRICIAL ALGEBRA.
C.
```

```
      CALL MATRIX
C. CALCULATES THE APROPRIATE SET OF COEFFICIENTS
      DO 955 I=1,N
        DO 999 J=1,3
        R(I,J)=O(I,J)+PP*P(I,J)+QQ*Q(I,J)
999     CONTINUE
955     CONTINUE
C.
C. EXECUTION OF THE SPLINE FACILITY SELECTED
C.
      GOTO( 10, 20, 30, 40, 50 )SPLQUE
10    CONTINUE
        DTH=DBLE(DH)
          CALL DEPSIM
          GOTO8899
20    CONTINUE
           DTH1=DBLE(HIDTH)
       DTH2=DBLE(LODTH)
          CALL DEPAVE
         GOTO8899
30    CONTINUE
         FE=DBLE(VA)
          CALL DEPDEP
         GOTO8899
40     CONTINUE
          FE=DBLE(VAGT)
        CALL DEPGT
       GOTO8899
50     CONTINUE
            FE=DBLE(VALT)
         CALL DEPLT
8899    CONTINUE
C.   CHANGES OUTPUT FORMAT IF COEFFICIENTS WANTED BY
C.    PREPARING OUTPUT ARRAY.
C.
          IF(COEF.EQ.'COEF')THEN
             IJ=11
           SPFOR=4
          SPFRE(3)=3
          SPFRE(4)=2
          SPTIME(3)=N
          SPTIME(4)=INT(X(N))
         DO 95 I=1,N
          DO 99 J=1,3
           IJ=IJ+1
         ISPL(IJ)=R(I,J)
99       CONTINUE
95       CONTINUE
         DO 120 I=1,N
         XX=0.0
         IF(I.GT.1)THEN
         XX=X(I-1)+1.0
         END IF
           DO 130 A=XX,SNGL(X(I)),1.0
            H=R(I,1)+2*A*R(I,2)+3*(A**2)*R(I,3)
            IJ=IJ+1
            ISPL(IJ)=A
            IJ=IJ+1
            ISPL(IJ)=H
130       CONTINUE
120     CONTINUE
       ELSE
        DO 77 K=1,11
         ISP(K)=ISPL(K)
```

```
      CALL MATRIX
C. CALCULATES THE APROPRIATE SET OF COEFFICIENTS
       DO 955 I=1,N
         DO 999 J=1,3
         R(I,J)=O(I,J)+PP*P(I,J)+QQ*Q(I,J)
999      CONTINUE
955     CONTINUE
C.
C. EXECUTION OF THE SPLINE FACILITY SELECTED
C.
       GOTO( 10, 20, 30, 40, 50 )SPLQUE
10     CONTINUE
         DTH=DBLE(DH)
            CALL DEPSIM
            GOTO8899
20     CONTINUE
             DTH1=DBLE(HIDTH)
        DTH2=DBLE(LODTH)
            CALL DEPAVE
           GOTO8899
30     CONTINUE
          FE=DBLE(VA)
            CALL DEPDEP
           GOTO8899
40      CONTINUE
           FE=DBLE(VAGT)
          CALL DEPGT
         GOTO8899
50       CONTINUE
               FE=DBLE(VALT)
           CALL DEPLT
8899    CONTINUE
C.   CHANGES OUTPUT FORMAT IF COEFFICIENTS WANTED BY
C.    PREPARING OUTPUT ARRAY.
C.
            IF(COEF.EQ.'COEF')THEN
               IJ=11
             SPFOR=4
            SPFRE(3)=3
            SPFRE(4)=2
            SPTIME(3)=N
            SPTIME(4)=INT(X(N))
           DO 95 I=1,N
            DO 99 J=1,3
             IJ=IJ+1
           ISPL(IJ)=R(I,J)
99         CONTINUE
95         CONTINUE
           DO 120 I=1,N
           XX=0.0
           IF(I.GT.1)THEN
           XX=X(I-1)+1.0
           END IF
             DO 130 A=XX,SNGL(X(I)),1.0
              H=R(I,1)+2*A*R(I,2)+3*(A**2)*R(I,3)
              IJ=IJ+1
              ISPL(IJ)=A
              IJ=IJ+1
              ISPL(IJ)=H
130          CONTINUE
120        CONTINUE
         ELSE
          DO 77 K=1,11
           ISP(K)=ISPL(K)
```

```
77          CONTINUE
           END IF
560            WRITE(22,*)SPFOR
            WRITE(22,*)SPFRE
            WRITE(22,*)SPTIME
              IF(N.EQ.1)THEN
               DO 571 I=1,4
               ISP(I)=ISPL(I)
571           CONTINUE
                WRITE(22,*)ISP
           DO 733 K=1,11
            WRITE(24,'(1X,A40)')NEWVAR(K)
733        CONTINUE
                RETURN
              END IF
             IF(COEF.EQ.'COEF')THEN
                 WRITE(22,*)(ISPL(K), K=1,IJ)
            DO 793 K=1,16
             WRITE(24,'(1X,A40)')NEWVAR(K)
793         CONTINUE
             ELSE
               WRITE(22,*)ISP
                DO 747 K=1,11
                 WRITE(24,'(1X,A40)')NEWVAR(K)
747             CONTINUE
              END IF
           IF(GRAPH.EQ.'GRAPH')THEN
               L=0
                  DO 1122 I=1,N
                    XX=0.0
                 IF(I.GT.1)THEN
                    XX=X(I-1)+1.0
                  END IF
                      DO 2233 A=XX,SNGL(X(I)),1.0
                          L=L+1
                   H=R(I,1)+2*A*R(I,2)+3*(A**2)*R(I,3)
                      XGPH(L)=A
                      YGPH(L)=H
2233        CONTINUE
1122        CONTINUE
C           CALL GRAPHIC
           END IF
            PRINT*,'**** JOB  COMPLETED*****'
           RETURN
           END
*=============================================================
                SUBROUTINE SPLMUL(IBL,NFOR,NFRE,NTIME)
            CHARACTER*40        NEWVAR(20)
           CHARACTER*5 GRAPH
           CHARACTER*4 COEF
             CHARACTER*3  ALL
            CHARACTER       INTERP
           INTEGER NFOR,NFRE(4),NTIME(4),N,NN,SIN,SPLQUE
           INTEGER  WPROP,WSITE,WDEPTH,WEAST,WNORTH
            INTEGER  SN(500),NBLO
                INTEGER     SPFOR,SPFRE(4),SPTIME(4)
              REAL          ISPL(426),ISP(11)
           REAL  IBL(900),DH,HIDTH,LODTH,VA,VAGT,VALT
            DOUBLE PRECISION X(6),F(6),O(6,3),P(6,3),Q(6,3),E(2),
          +W(2),R(6,3),PP,QQ,RR,G(2),H,Y(6),SLP,B,RR1,RR2,PMP,PMF,FE
          +,RMAX,RMIN,MP(6),YMP(6),V,DTH1,DTH2,ROOT,YX(6),PROF(10),
          + DTH, XGPH(200), YGPH(200)
           INTEGER IDF,GG
             COMMON /INTER/INTERP
```

```
        COMMON /PSVAR/NEWVAR
       COMMON /SPLIN/IDF,GG,X,F,O,P,Q,E,W,R,PP,QQ,RR,G,H,
     + Y,SLP,B,RR1,RR2,PMP,PMF,FE,RMAX,RMIN,MP,YMP,V,DTH1,DTH2,
     + ROOT,YX,A,PROF,DTH
         COMMON /HOR/ N
            COMMON /RISPL/ ISPL,ISP
       COMMON /CHINST/GRAPH,COEF,ALL
       COMMON /INST/SIN,SPLQUE,SN,NBLO
       COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
       COMMON /RINST/DH,HIDTH,LODTH,VA,VAGT,VALT
*-------------------------------------------------------
          CALL FINDNA( NFOR, NFRE )
          CALL FINDSI( NFOR, NFRE )
          CALL FINDEP (NFOR, NFRE )
         IFLAG=0
C.  IF ALL BLOCKS IN SUBSET ARE TO BE OPERATED THEN ALL='ALL'
C.THIS ASCERTION AND THE REST OF THEM IN THIS SUBROUTINNE ARE
C.EXECUTED IN EACH TRIP TO THE MAIN PROGRAM AND BACK HAVING
C.READ A NEW DATA BLOCK FROM THE SUBSET.
C.
          IF(ALL.EQ.'ALL')THEN
           IFLAG=1
           NN=NN+1
          IF(NN.EQ.1)THEN
              DO 998 K=1,11
                WRITE(24,'(1X,A40)')NEWVAR(K)
998           CONTINUE
          END IF
            SPFOR=2
            SPFRE(1)=4
            SPFRE(2)=7
            SPTIME(1)=1
            SPTIME(2)=1
            ISPL(1)=IBL(WEAST)
            ISPL(2)=IBL(WNORTH)
            ISPL(3)=IBL(WSITE)
            ISPL(4)=REAL(SPLQUE)
C. WRITES GRID REFERENCES IN L-FILE
             WRITE(26,*)(ISPL(J),J=1,3)
           ELSE
C. FOR A USER-CHOSEN NO. OF BLOCKS ONLY (NBLO).
C.
         DO 777 J=1,NBLO
         SN(J)=REAL(SN(J))
C.  PICKING UP THE WANTED SITES IN THE USERS' LIST  THAT ARE
C.  PRESENT IN THE DATA SUBSET.
C.
         IF(ABS(SN(J)-IBL(WSITE)).LT.0.001)THEN
          SPFOR=2
          SPFRE(1)=4
          SPFRE(2)=7
          SPTIME(1)=1
          SPTIME(2)=1
          ISPL(1)=IBL(WEAST)
          ISPL(2)=IBL(WNORTH)
           ISPL(3)=IBL(WSITE)
          ISPL(4)=REAL(SPLQUE)
           WRITE(26,*)(ISPL(K),K=1,3)
          IFLAG=1
              NN=NN+1
         IF(NN.EQ.1)THEN
C.
C. WRITES NAMES OF NEW VARIABLES (PSEUDO-VARIABLES) IN  N-FILE
C.
```

```
            DO 977 JJ=1,11
              WRITE(24,'(1X,A20)')NEWVAR(JJ)
977         CONTINUE
             END IF
           GOTO666
           END IF
777     CONTINUE
          END IF
C.
C. WHEN THE BLOCK IN TURN IS WANTED (ASCERTION IS TRUE) THEN IFLAG=1
C.
666         IF(IFLAG.EQ.1)THEN
         DO 66 J=1,NFOR
C. FOR THE 2ND. FORMAT ONLY i.e. PROFILE FEATURES ONLY.
C. N IS THE NO. OF HORIZONS
C.
         IF(J.EQ.2)THEN
         N=NTIME(J)
          WPROP = WPROP+NFRE(J-1)
          WDEPTH = WDEPTH + NFRE(J-1)
C. LOOPING HORIZON BY HORIZON TO PICK UP DEPTH AND FEATURES VALUE
C. CORRESPONDINGLY.
C.
          DO 168 L=1,NTIME(J)
          IF(L.EQ.1)THEN
C. PROVISION FOR MISSING VALUES IN THE SOIL FEATURE WANTED.
C.
            IF(IBL(WPROP).LT.0.0)THEN
             CALL MISSING(SPFOR,SPFRE,SPTIME)
              RETURN
           END IF
           F(L)=DBLE(IBL(WPROP))
          Y(L)=F(L)
           X(L)=DBLE(IBL(WDEPTH))
          ELSE
           WPROP=WPROP+NFRE(J)
           WDEPTH=WDEPTH+NFRE(J)
                IF(IBL(WPROP).LT.0.0)THEN
                 CALL MISSING (SPFOR,SPFRE,SPTIME)
                 RETURN
                END IF
           F(L)=DBLE(IBL(WPROP))
          Y(L)=F(L)
          X(L)=DBLE(IBL(WDEPTH))
           END IF
          F(L)=F(L)*X(L)
          IF(L.GT.1)THEN
          F(L)=F(L)*(X(L)-X(L-1))/X(L)
         END IF
168      CONTINUE
         END IF
66       CONTINUE
         IF(INTERP.EQ.'L')THEN
          CALL LAYER(N,X,Y,DTH,DTH1,DTH2,FE)
           GOTO 8899
         END IF
C.     PROVISION FOR BLOCKS WITH ONLY ONE HORIZON
C.
         IF(N.EQ.1)THEN
           GO TO( 500,501,502,503,504 )SPLQUE
500        ISP(5)=DH
           DO 600 J=6,10
            ISP(J)=-1.0
600        CONTINUE
```

```
          IF(DH.LT.X(N))THEN
           ISP(11)=Y(N)
          ELSE
           ISP(11)=-1.0
          END IF
          GOTO 560
501       ISP(5)=HIDTH
          ISP(6)=LODTH
          IF(LODTH.LT.X(N))THEN
           DO 601 J=7,10
           ISP(J)=-1.0
601       CONTINUE
           ISP(11)=Y(N)
          ELSE
           DO 602 J=7,11
           ISP(J)=-1.0
602       CONTINUE
          END IF
          GOTO 560
502       IF((VA-Y(N)).LT.0.001)THEN
           ISP(5)=X(N)/2.0
          ELSE
         ISP(5)=-1.0
         END IF
          DO 603 J=6,10
          ISP(J)=-1.0
603      CONTINUE
         ISP(11)=VA
          GOTO 560
503       DO 604 J=5,10
            ISP(J)=-1.0
604       CONTINUE
            ISP(11)=VAGT
           GOTO 560
504         DO 605 J=5,10
            ISP(J)=-1.0
605        CONTINUE
            ISP(11)=VALT
            GOTO 560
            END IF
        ELSE
        RETURN
        END IF
        CALL MATRIX
         DO 955 I=1,N
           DO 999 J=1,3
           R(I,J)=O(I,J)+PP*P(I,J)+QQ*Q(I,J)
999       CONTINUE
955      CONTINUE
C. TRANSFER CONTROL TO THE DEPTH FACILITY WANTED
C.
        GOTO( 10, 20, 30, 40, 50 )SPLQUE
10      CONTINUE
          DTH=DBLE(DH)
             CALL DEPSIM
             GOTO8899
20      CONTINUE
              DTH1=DBLE(HIDTH)
         DTH2=DBLE(LODTH)
             CALL DEPAVE
            GOTO8899
30      CONTINUE
           FE=DBLE(VA)
             CALL DEPDEP
```

```
            GOTO8899
40         CONTINUE
              FE=DBLE(VAGT)
             CALL DEPGT
           GOTO8899
50         CONTINUE
                 FE=DBLE(VALT)
              CALL DEPLT
8899       CONTINUE
             DO 95 I=1,11
              ISP(I)=ISPL(I)
95          CONTINUE
           WRITE(22,*)SPTIME
           WRITE(22,*)ISP
          IF(INTERP.EQ.'L')RETURN
560              IF(N.EQ.1)THEN
               DO 571  I=1,4
               ISP(I)=ISPL(I)
571            CONTINUE
               WRITE(22,*)SPTIME
               WRITE(22,*)ISP
                RETURN
               END IF
            PRINT*,'**** JOB  COMPLETED*****'
          RETURN
          END
*=============================================================
           SUBROUTINE MATRIX
*THIS PROGRAM COMPUTES CUBIC SPLINE COEFFICIENTS USING THE EQUAL
* -AREA APPROACH.
          DOUBLE PRECISION X(6),F(6),O(6,3),P(6,3),Q(6,3),E(2),
     +W(2),R(6,3),PP,QQ,RR,G(2),H,Y(6),SLP,B,RR1,RR2,PMP,PMF,FE
     +,RMAX,RMIN,MP(6),YMP(6),V,DTH1,DTH2,ROOT,YX(6),PROF(10),
     + DTH,SS
            INTEGER IDF,GG,N
                 REAL  A
             COMMON /HOR/ N
            COMMON /SPLIN/IDF,GG,X,F,O,P,Q,E,W,R,PP,QQ,RR,G,H,
     + Y,SLP,B,RR1,RR2,PMP,PMF,FE,RMAX,RMIN,MP,YMP,V,DTH1,DTH2,
     + ROOT,YX,A,PROF,DTH
*CALCULATION OF THE COEFFICIENTS IN THE PROCEDURE FOR SOLVING
            O(1,1)=F(1)/X(1)
            O(1,2)=0
            O(1,3)=0
            P(1,1)=-1*X(1)
            P(1,2)=1
            P(1,3)=0
            Q(1,1)=-1*(X(1)**2)
            Q(1,2)=0
            Q(1,3)=1
            DO 90  K=2,N
            V1=F(K)/(X(K)-X(K-1))
            V2=O(K-1,1)+2*O(K-1,2)*X(K-1)+3*(X(K-1)**2)*O(K-1,3)
            V3=O(K-1,2)+3*X(K-1)*O(K-1,3)
            T11=3*(X(K-1)**2)
            T12=(X(K)**2)-2*(X(K-1)**2)-2*X(K-1)*X(K)
            T13=(X(K-1)**3)+(X(K-1)**2)*X(K)-2*X(K-1)*(X(K)**2)
            O(K,1)=(T11*V1+T12*V2+T13*V3)/(X(K)-X(K-1))**2
            W2=P(K-1,1)+2*X(K-1)*P(K-1,2)+3*(X(K-1)**2)*P(K-1,3)
            W3=P(K-1,2)+3*X(K-1)*P(K-1,3)
            P(K,1)=(T12*W2+T13*W3)/(X(K)-X(K-1))**2
            Z2=Q(K-1,1)+2*X(K-1)*Q(K-1,2)+3*(X(K-1)**2)*Q(K-1,3)
            Z3=Q(K-1,2)+3*X(K-1)*Q(K-1,3)
            Q(K,1)=(T12*Z2+T13*Z3)/(X(K)-X(K-1))**2
```

```
          T21=-1*(3*X(K-1))
          T22=-1*T21
          T23=T12+3*X(K-1)*X(K)
          T31=1
          T32=-1*T31
          T33=X(K-1)-X(K)
          O(K,2)=(T21*V1+T22*V2+T23*V3)/(X(K)-X(K-1))**2
          P(K,2)=(T22*W2+T23*W3)/(X(K)-X(K-1))**2
          Q(K,2)=(T22*Z2+T23*Z3)/(X(K)-X(K-1))**2
          O(K,3)=(T31*V1+T32*V2+T33*V3)/(X(K)-X(K-1))**2
          P(K,3)=(T32*W2+T33*W3)/(X(K)-X(K-1))**2
          Q(K,3)=(T32*Z2+T33*Z3)/(X(K)-X(K-1))**2
90        CONTINUE
          IDF=1
*GRADIENT AT TOP OF PROFILE
          PMF=X(1)/2.0
          PMP=(X(2)-X(1))/2.0 + X(1)
          SLP=(Y(2)-Y(1))/(PMP-PMF)
            B=Y(1)-(SLP*X(1))
          IF(B.GT.Y(1))THEN
           SS=(B-Y(1))/2.0+Y(1)
          ELSE
           SS=(Y(1)-B)/2.0+B
          END IF
            RR1=(Y(2)-SS)/PMP
*GRADIENT AT BASE OF PROFILE
            IF(N.EQ.2)THEN
            PMF=X(N-1)/2.0
            PMP=(X(N)-X(N-1))/2.0+X(N-1)
            ELSE IF(N.GT.2)THEN
            PMF=(X(N-1)-X(N-2))/2.0+X(N-2)
            PMP=(X(N)-X(N-1))/2.0+X(N-1)
            END IF
            IF(N.GE.2)THEN
            IF(Y(N).GT.Y(N-1))THEN
            SS=(Y(N)-Y(N-1))/2.0+Y(N-1)
            RR2=(SS-Y(N-1))/(PMP-PMF)
            ELSE
            SS=(Y(N-1)-Y(N))/2.0+Y(N)
            RR2=(Y(N)-SS)/(PMP-PMF)
            END IF
            END IF
          DO 550 J=1,2
          IF(J.EQ.1)THEN
          GG=IDF
          I=1
          RR=RR1
          ELSE IF(J.EQ.2)THEN
          GG=IDF
          I=N
          RR=RR2
          END IF
          XX=0.0
          IF(I.NE.0)THEN
          XX=X(I)
          END IF
          IF(I.EQ.0)THEN
          I=1
          END IF
          IF(GG.EQ.1)THEN
          E(J)=2*P(I,2)+6*XX*P(I,3)
          G(J)=2*Q(I,2)+6*XX*Q(I,3)
          W(J)=RR-O(I,2)*2-6*XX*O(I,3)
          END IF
```

```
550      CONTINUE
         ZZ=E(1)*G(2)-E(2)*G(1)
         PP=(W(1)*G(2)-W(2)*G(1))/ZZ
         QQ=-1*(W(1)*E(2)-W(2)*E(1))/ZZ
          RETURN
          END
*================================================
          SUBROUTINE DEPSIM
         DOUBLE PRECISION X(6),F(6),O(6,3),P(6,3),Q(6,3),E(2),
     +W(2),R(6,3),PP,QQ,RR,G(2),H,Y(6),SLP,B,RR1,RR2,PMP,PMF,FE
     +,RMAX,RMIN,MP(6),YMP(6),V,DTH1,DTH2,ROOT,YX(6),PROF(10),
     + DTH
       INTEGER IDF,GG,N
            REAL     ISPL(426),A
         COMMON /RISPL/ ISPL
            COMMON /HOR/ N
       COMMON /SPLIN/IDF,GG,X,F,O,P,Q,E,W,R,PP,QQ,RR,G,H,
     + Y,SLP,B,RR1,RR2,PMP,PMF,FE,RMAX,RMIN,MP,YMP,V,DTH1,DTH2,
     + ROOT,YX,A,PROF,DTH
         DO 120 I=1,N
          IF(I.GT.1)THEN
          IF(SNGL(DTH).LT.SNGL(X(I)).AND.SNGL(DTH).GT.SNGL(X(I-1)))THEN
          V=R(I,1)+2*R(I,2)*DTH+3*(DTH**2)*R(I,3)
           ISPL(11)=V
            GOTO 100
      ELSE IF((SNGL(DTH)-SNGL(X(I-1))).LT.0.001.OR.(SNGL(DTH)-SNGL(X(I)
     +)).LT.0.001)THEN
        V=R(I,1)+2*R(I,2)*DTH+3*(DTH**2)*R(I,3)
           ISPL(11)= V
            GOTO 100
      END IF
         ELSE IF(I.EQ.1)THEN
          IF(SNGL(DTH).LT.SNGL(X(I)))THEN
           V=R(I,1)+2*R(I,2)*DTH+3*(DTH**2)*R(I,3)
            ISPL(11)=V
              GOTO 100
        ELSE IF((SNGL(DTH)-SNGL(X(I))).LT.0.001)THEN
          V=R(I,1)+2*R(I,2)*DTH+3*(DTH**2)*R(I,3)
              ISPL(11)=V
                GOTO 100
          END IF
          END IF
120      CONTINUE
100              ISPL(5)=DTH
           DO 99 J=6,10
             ISPL(J)=-1.0
99         CONTINUE
        RETURN
        END
*================================================
               SUBROUTINE DEPAVE
         DOUBLE PRECISION X(6),F(6),O(6,3),P(6,3),Q(6,3),E(2),
     +W(2),R(6,3),PP,QQ,RR,G(2),H,Y(6),SLP,B,RR1,RR2,PMP,PMF,FE
     +,RMAX,RMIN,MP(6),YMP(6),V,DTH1,DTH2,ROOT,YX(6),PROF(10),
     + DTH,SUM,AVG,T
       INTEGER IDF,GG,N,IND
              REAL     ISPL(426)
              COMMON /RISPL/ ISPL
         COMMON /HOR/ N
       COMMON /SPLIN/IDF,GG,X,F,O,P,Q,E,W,R,PP,QQ,RR,G,H,
     + Y,SLP,B,RR1,RR2,PMP,PMF,FE,RMAX,RMIN,MP,YMP,V,DTH1,DTH2,
     + ROOT,YX,A,PROF,DTH,SUM, AVG,T
           IND=0
         SUM=0.0
```

```
        T=0.0
           IFLAG=0
C.
C. ASCERTION FOR THE FIRST HORIZON
C. FINDS OUT WHETHER RANGE WANTED LAYS WITHIN FIRST HORIZON
C. AVERAGES VALUES INTERPOLATED EACH 1 CM WITHIN RANGE
C.
        DO 1000 I=1,N
        IF(I.EQ.1)THEN
       IF(DTH1.LT.X(I))THEN
        IF(DTH2.LT.X(I))THEN
           DO 620 A=SNGL(DTH1),SNGL(DTH2),1.0
           V=R(I,1)+2*R(I,2)*A+3*(A**2)*R(I,3)
          SUM=SUM+V
          T=T+1.0
620     CONTINUE
        GOTO700
        ELSE
C.
C. INTERPOLATES FROM THE RANGES HIGHER LIMIT TO HORIZON LOWER LIMIT
C.
        DO 630 A=SNGL(DTH1),SNGL(X(I)),1.0
         V=R(I,1)+2*R(I,2)*A+3*(A**2)*R(I,3)
         SUM=SUM+V
         T=T+1.0
630    CONTINUE
        IFLAG=1
        END IF
        END IF
C.
C. ASCERTION FOR THE REST OF THE HORIZONS
C.
C. IFLAG INDICATES WHETHER INTERPOLATION DOWN TO THE HORIZON LIMIT
C. PREVIOUS TO THE CURRENT HORIZON HAS BEEN PERFORMED (1)
C.
        ELSE
        IF(IFLAG.EQ.1)THEN
          IF(DTH2.LT.X(I))THEN
           DO 640 A=SNGL(X(I-1)),SNGL(DTH2),1.0
            V=R(I,1)+2*R(I,2)*A+3*(A**2)*R(I,3)
            SUM=SUM+V
            T=T+1.0
640         CONTINUE
            GOTO 700
          ELSE
            DO 650 A=SNGL(X(I-1)),SNGL(X(I)),1.0
             V=R(I,1)+2*R(I,2)*A+3*(A**2)*R(I,3)
             SUM=SUM+V
             T=T+1.0
650          CONTINUE
         IFLAG=1
          END IF
        ELSE
         IF(DTH1.LT.X(I))THEN
             IF(DTH2.LT.X(I))THEN
              DO 660 A=SNGL(DTH1),SNGL(DTH2),1.0
               V=R(I,1)+2*R(I,2)*A+3*(A**2)*R(I,3)
               SUM=SUM+V
               T=T+1.0
660           CONTINUE
             GOTO 700
            ELSE
              DO 670 A=SNGL(DTH1),SNGL(X(I)),1.0
               V=R(I,1)+2*R(I,2)*A+3*(A**2)*R(I,3)
```

```
                SUM=SUM+V
                T=T+1.0
670            CONTINUE
              IFLAG=1
             END IF
           END IF
         END IF
        END IF
1000    CONTINUE
700     IF(DTH2.GT.X(N))THEN
         ISPL(5)=DTH1
         ISPL(6)=DTH2
          DO 103 K=7,11
           ISPL(K)=-1.0
103       CONTINUE
        ELSE
          ISPL(5)=DTH1
          ISPL(6)=DTH2
           DO 104 K=7,10
            ISPL(K)=-1.0
104        CONTINUE
          AVG=SUM/T
          ISPL(11)=AVG
         END IF
       RETURN
       END
*=======================================================
           SUBROUTINE DEPDEP
         DOUBLE PRECISION X(6),F(6),O(6,3),P(6,3),Q(6,3),E(2),
      +W(2),R(6,3),PP,QQ,RR,G(2),H,Y(6),SLP,B,RR1,RR2,PMP,PMF,FE
      +,RMAX,RMIN,MP(6),YMP(6),V,DTH1,DTH2,ROOT,YX(6),PROF(10),
      + DTH,YINT(20000)
            INTEGER   IDF,GG,N,ICON,IND,IL
             REAL   ISPL(426)
            COMMON /RISPL/ ISPL
           COMMON /HOR/ N
         COMMON /SPLIN/IDF,GG,X,F,O,P,Q,E,W,R,PP,QQ,RR,G,H,
      + Y,SLP,B,RR1,RR2,PMP,PMF,FE,RMAX,RMIN,MP,YMP,V,DTH1,DTH2,
      + ROOT,YX,A,PROF,DTH
           IND=0
          ICON=0
              IL=4
           DO 120 I=1,N
           XX=0.0
          IF(I.GT.1)THEN
          XX=X(I-1)+0.01
          END IF
C. FORMING AN ARRAY OF INTERPOLATED VALUES ( YINT ) WITH AS MANY
C. VALUES AS ICON
C.
         DO 130 A=XX,SNGL(X(I)),0.01
         ICON = ICON+1
         YINT(ICON) = R(I,1)+2*A*R(I,2)+3*(A**2)*R(I,3)
C. EACH VALUE IN  YINT IS COMPARED WITH THE FEATURES VALUE GIVEN BY
C. THE USER
C.
          IF(ABS(FE-YINT(ICON)).LT.0.005)THEN
             IL=IL+1
           IND=1
C. STORING THE DEPTH WANTED
C. SELECTING ONLY SIGNIFICANTLY DIFFERENT VALUES OF DEPTH AND STORING
C. THEM IN ARRAY ISPL FOR OUTPUT.
C.
         IF(IL.EQ.1)THEN
```

```
          ISPL(IL)=A
        ELSE
          IF((A-ISPL(IL-1)).LT.1.0)THEN
              IL=IL-1
              GOTO 130
          ELSE
              ISPL(IL)=A
          END IF
        END IF
          END IF
130      CONTINUE
120    CONTINUE
C. FILLING IN THE REST OF THE ARRAY ISPL
C.
            DO 90 K=IL+1,10
            ISPL(K)=-1.0
90          CONTINUE
             ISPL(11)=FE
C. IF THE VALUE FE WAS NEVER FOUND AMONG THE INTERPOLATED VALUES THEN
C.
       IF(IND.EQ.0)THEN
* COMPUTATION OF MIN & MAX VALUES
        RMAX=0.0
        RMIN=1000000000000000000000000000000.0
        DO 800 J=1,20000
        IF(YINT(J).GT.RMAX)THEN
        RMAX=YINT(J)
       ELSE IF(YINT(J).LT.RMIN)THEN
        RMIN=YINT(J)
       END IF
800    CONTINUE
* SORTING OUT VALUES OUTSIDE THE RANGE
        IF(FE.GT.RMAX.OR.FE.LT.RMIN)THEN
           DO 92 K=5,10
            ISPL(K)=-1.0
92         CONTINUE
           ISPL(11)=FE
        END IF
        END IF
            RETURN
        END
*=============================================================
        SUBROUTINE DEPGT
        DOUBLE PRECISION X(6),F(6),O(6,3),P(6,3),Q(6,3),E(2),
     +W(2),R(6,3),PP,QQ,RR,G(2),H,Y(6),SLP,B,RR1,RR2,PMP,PMF,FE
     +,RMAX,RMIN,MP(6),YMP(6),V,DTH1,DTH2,ROOT,YX(6),PROF(400),
     + DTH,YINT(400)
       INTEGER IDF,GG,N,JJ
        INTEGER IMARK,IFLAG,ICON
             REAL ISPL(426)
            COMMON /RISPL/ ISPL
         COMMON /HOR/ N
       COMMON /SPLIN/IDF,GG,X,F,O,P,Q,E,W,R,PP,QQ,RR,G,H,
     + Y,SLP,B,RR1,RR2,PMP,PMF,FE,RMAX,RMIN,MP,YMP,V,DTH1,DTH2,
     + ROOT,YX,A,PROF,DTH
          IMARK=0
          IFLAG=0
          ICON=0
        DO 120 I=1,N
        XX=0.0
        IF(I.GT.1)THEN
         XX=X(I-1)+0.5
        END IF
          DO 130 A=XX,SNGL(X(I)),0.5
```

```
            ICON=ICON+1
             YINT(ICON)=R(I,1)+2*A*R(I,2)+3*(A**2)*R(I,3)
            IF(YINT(ICON).GT.FE)THEN
             IMARK=IMARK+1
             PROF(IMARK)=A
             IFLAG=1
            END IF
130       CONTINUE
120      CONTINUE
            RMAX=0.0
            RMIN=1000000000000000000000000.0
           DO 800 J=1,400
            IF(YINT(J).GT.RMAX)THEN
              RMAX=YINT(J)
            ELSE IF(YINT(J).LT.RMIN)THEN
             RMIN=YINT(J)
            END IF
800      CONTINUE
          IF(IFLAG.EQ.0)THEN
* FINDING OUT IF VALUE GREATER THAN RMAX
          IF(FE.GT.RMAX)THEN
             DO 90 K=5,10
              ISPL(K)=-1.0
90           CONTINUE
              ISPL(11)=FE
          END IF
* FINDING OUT IF VALUE LOWER THAN RMIN
          ELSE IF(IFLAG.EQ.1)THEN
           IF(FE.LT.RMIN)THEN
             ISPL(5)=0.0
             ISPL(6)=X(N)
              DO 92 K=7,10
               ISPL(K)=-1.0
92            CONTINUE
             ISPL(11)=FE
           ELSE
              JJ=5
            DO 900 K=1,IMARK
            IF(K.EQ.1)THEN
                ISPL(JJ)=PROF(K)
             JJ=JJ+1
            ELSE IF(ABS(PROF(K)-PROF(K-1)).GT.1.0)THEN
              ISPL(JJ)=PROF(K-1)
              ISPL(JJ+1)=PROF(K)
              JJ=JJ+2
          ELSE IF(K.EQ.IMARK)THEN
               ISPL(JJ)=PROF(K)
                 DO 97 I=JJ+1,10
                   ISPL(I)=-1.0
97              CONTINUE
               ISPL(11)=FE
          END IF
900      CONTINUE
          END IF
         END IF
          RETURN
           END
*=============================================================
           SUBROUTINE DEPLT
           DOUBLE PRECISION X(6),F(6),O(6,3),P(6,3),Q(6,3),E(2),
     +W(2),R(6,3),PP,QQ,RR,G(2),H,Y(6),SLP,B,RR1,RR2,PMP,PMF,FE
     +,RMAX,RMIN,MP(6),YMP(6),V,DTH1,DTH2,ROOT,YX(6),PROF(400),
     + DTH,YINT(400)
           INTEGER IDF,GG,N,JJ
```

```
      INTEGER IMARK,IFLAG,ICON
          REAL  ISPL(426)
          COMMON /RISPL/ ISPL
       COMMON /HOR/ N
      COMMON /SPLIN/IDF,GG,X,F,O,P,Q,E,W,R,PP,QQ,RR,G,H,
     + Y,SLP,B,RR1,RR2,PMP,PMF,FE,RMAX,RMIN,MP,YMP,V,DTH1,DTH2,
     + ROOT,YX,A,PROF,DTH
         IMARK=0
         IFLAG=0
         ICON=0
        DO 120 I=1,N
        XX=0.0
        IF(I.GT.1)THEN
         XX=X(I-1)+0.5
        END IF
         DO 130 A=XX,SNGL(X(I)),0.5
         ICON=ICON+1
          YINT(ICON)=R(I,1)+2*A*R(I,2)+3*(A**2)*R(I,3)
         IF(YINT(ICON).LT.FE)THEN
          IMARK=IMARK+1
          PROF(IMARK)=A
          IFLAG=1
         END IF
130      CONTINUE
120     CONTINUE
         RMAX=0.0
         RMIN=1000000000000000000000000.0
        DO 800 J=1,400
         IF(YINT(J).GT.RMAX)THEN
           RMAX=YINT(J)
         ELSE IF(YINT(J).LT.RMIN)THEN
          RMIN=YINT(J)
          END IF
800     CONTINUE
         IF(IFLAG.EQ.0)THEN
* FINDING OUT IF VALUE LOWER THAN RMIN
        IF(FE.LT.RMIN)THEN
             DO 99 K=5,10
            ISPL(K)=-10.0
99          CONTINUE
            ISPL(11)=FE
        END IF
* FINDING OUT IF VALUE GREATER THAN RMAX
        ELSE IF(IFLAG.EQ.1)THEN
         IF(FE.GT.RMAX)THEN
             ISPL(5)=0.0
             ISPL(6)=X(N)
             DO 98 K=7,10
              ISPL(K)=-1.0
98           CONTINUE
            ISPL(11)=FE
         ELSE
* PRINTING RESULTS FROM ARRAY PROF(L)
            JJ=5
          DO 900 K=1,IMARK
          IF(K.EQ.1)THEN
                ISPL(5)=PROF(K)
                JJ=JJ+1
          ELSE IF(ABS(PROF(K)-PROF(K-1)).GT.1.0)THEN
              ISPL(JJ)=PROF(K-1)
              ISPL(JJ+1)=PROF(K)
               JJ=JJ+2
        ELSE IF(K.EQ.IMARK)THEN
              ISPL(JJ)=PROF(K)
```

```
            DO 96 I=JJ+1,10
             ISPL(I)=-1.0
96          CONTINUE
            ISPL(11)=FE
          END IF
900     CONTINUE
        END IF
       END IF
        RETURN
         END
*=============================================================
         SUBROUTINE FINDNA( NFOR, NFRE )
         CHARACTER*40   WNAME, NAMES(80,4)
         INTEGER  NFOR, NFRE(4), WPROP,ILEN
         COMMON /CHSUBS/WNAME,NAMES
         COMMON /CHECK/WPROP
*-------------------------------------------
          DO 90 I=40,1,-1
          IF(WNAME(I:I).NE.' ')THEN
          ILEN=I
          GOTO200
          END IF
90        CONTINUE
200       CONTINUE
         DO 99 N=1,NFOR
           DO 95 J=1,NFRE(N)
           IF(WNAME(:ILEN).EQ.NAMES(J,N)(:ILEN))THEN
           WPROP=J
          GOTO100
            END IF
95        CONTINUE
99        CONTINUE
100       RETURN
          END
*-------------------------------------
*=============================================================
           SUBROUTINE FINDSI( NFOR, NFRE )
          CHARACTER*40   WNAME,NAMES(80,4)
          INTEGER  NFOR, NFRE(4), WPROP, WSITE
              INTEGER    WDEPTH,WEAST,WNORTH
          COMMON /CHSUBS/WNAME,NAMES
          COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
*-------------------------------------------
           DO 99 N=1,NFOR
           DO 95 J=1,NFRE(N)
             IF('EASTING'.EQ.NAMES(J,N))THEN
               WEAST=J
            ELSE IF('NORTHING'.EQ.NAMES(J,N))THEN
              WNORTH=J
            ELSE IF('SITE_NO'.EQ.NAMES(J,N))THEN
             WSITE=J
           END IF
95      CONTINUE
99      CONTINUE
100       RETURN
          END
*=============================================================
         SUBROUTINE FINDEP( NFOR, NFRE )
         CHARACTER*40   WNAME,NAMES(80,4)
         INTEGER  NFOR, NFRE(4), WPROP, WSITE, WDEPTH
         COMMON /CHSUBS/WNAME,NAMES
         COMMON /CHECK/WPROP, WSITE, WDEPTH
*-------------------------------------------------
        DO 999  N=1,NFOR
```

```
          DO 888 J=1,NFRE(N)
          IF('HORIZON_DEPTH,_LOWER *01'.EQ.NAMES(J,N).
     +      OR.'LAYER,_DEPTH,_LOWER *01'.EQ.NAMES(J,N))THEN
          WDEPTH=J
          GOTO 100
          END IF
888       CONTINUE
999      CONTINUE
100     RETURN
        END
*-------------------------------------------------
*=================================================================
              SUBROUTINE MISSING ( SPFOR,SPFRE, SPTIME )
        INTEGER      SPFOR,SPFRE(4), SPTIME(4),WPROP,SIN,SPLQUE
        REAL         ISPL(426), DH,HIDTH,LODTH,VA,VAGT,VALT
       CHARACTER*4    COEF
       CHARACTER*5    GRAPH
         COMMON /RISPL/ISPL
         COMMON /CHINST/GRAPH,COEF
         COMMON /INST/SIN,SPLQUE
         COMMON /CHECK/WPROP
         COMMON /RINST/DH,HIDTH,LODTH,VA,VAGT,VALT
*-----------------------------------------------------------------
          SPFOR=2
          SPFRE(1)=4
          SPFRE(2)=7
          SPTIME(1)=1
          SPTIME(2)=1
        IF(COEF.EQ.'COEF')THEN
          SPFOR=4
          SPFRE(3)=3
          SPFRE(4)=2
          SPTIME(3)=1
          SPTIME(4)=1
            DO 444 K=12,16
             ISPL(K)=-2.0
444         CONTINUE
        END IF
          DO 443 K=6,10
           ISPL(K)=-1.0
443       CONTINUE
          GO TO( 100,200,300,400,500 ) SPLQUE
100      ISPL(5)=DH
         ISPL(11)=-2.0
         GOTO 600
200      ISPL(5)=HIDTH
         ISPL(6)=LODTH
         ISPL(11)=-2.0
         GOTO 600
300      ISPL(5)=-2.0
         ISPL(11)=VA
         GOTO 600
400      ISPL(5)=-2.0
         ISPL(11)=VAGT
         GOTO 600
500      ISPL(5)=-2.0
         ISPL(11)=VALT
600       CONTINUE
         WRITE(22,*)SPFOR
         WRITE(22,*)SPFRE
         WRITE(22,*)SPTIME
       IF(COEF.EQ.'COEF')THEN
         WRITE(22,*)(ISPL(K),K=1,16)
       ELSE
```

```
        WRITE(22,*)(ISPL(K),K=1,11)
      END IF
      RETURN
       END
*-------------------------------------------------------
                SUBROUTINE  IMERGE
        CHARACTER*7        TRIAD1,TRIAD2,OUTPUT
        CHARACTER*40       NAMES
        INTEGER            NFEAT1(4),NFEAT2(4),SIZE1,SIZE2
        INTEGER            NTIME1(4),NTIME2(4),OUT,NF1,NF2
           INTEGER           IFLAG,SITE1,SITE2,SUM1,SUM2
         COMMON /MERINT/NFEAT1,NFEAT2,SIZE1,SIZE2,NTIME1,NTIME2,
     +OUT,NF1,NF2,IFLAG,SITE1,SITE2,SUM1,SUM2
         COMMON /MECHAR/TRIAD1,TRIAD2,OUTPUT,NAMES
*-------------------------------------------------------
C. READING INSTRUCTIONS FROM INSTRUCTIONS FILE
C. AND OPEN ALLRELEVANT FILES
        READ(23,'(1X,A7)')TRIAD1
        READ(23,'(1X,A7)')TRIAD2
        OPEN(1,FILE=TRIAD1,ERR=50,STATUS='OLD')
        OPEN(11,FILE='N'//TRIAD1(2:),ERR=51,STATUS='OLD')
        OPEN(2,FILE=TRIAD2,ERR=52,STATUS='OLD')
        OPEN(12,FILE='N'//TRIAD2(2:),ERR=53,STATUS='OLD')
        OPEN(33,FILE='L'//TRIAD2(2:),ERR=54,STATUS='OLD')
        READ(23,'(1X,A7)')OUTPUT
        OPEN(46,FILE=OUTPUT,STATUS='NEW')
        OUT=46
C.  MERGE THE TWO N-FILES INTO ONLY ONE N-FILE
        OPEN(44,FILE='N'//OUTPUT(2:),STATUS='NEW')
        DO 90 J=1,500
          READ(11,'(1X,A40)',END=55)NAMES
           IF('SITE_NO'.EQ.NAMES)SITE1=J
           WRITE(44,'(1X,A40)')NAMES
90       CONTINUE
55       CONTINUE
        DO 91 J=1,500
           READ(12,'(1X,A40)',END=56)NAMES
           IF('SITE_NO'.EQ.NAMES) SITE2=J
           WRITE(44,'(1X,A40)')NAMES
91       CONTINUE
56      CONTINUE
        CLOSE(44,STATUS='KEEP')
C.   READ PREAMBLE FROM THE TWO D-FILES TO BE MERGED.
        READ(1,*)NF1
            READ(2,*)NF2
          WRITE(OUT,*) NF1+NF2
        READ(1,*) NFEAT1
                          READ(2,*) NFEAT2
           WRITE(OUT,*)(NFEAT1(N),N=1,NF1),(NFEAT2(N),N=1,NF2)
                RETURN
50        PRINT*,' !!!! ERROR MISSNG : ',TRIAD1
         RETURN
51       PRINT*,'  !!!!! ERROR MISSING :','N'//TRIAD1(2:)
        RETURN
52      PRINT*,' !!!!! ERROR MISSING : ',TRIAD2
        RETURN
53      PRINT*,'  !!!!! ERROR MISSING :','N'//TRIAD2(2:)
        RETURN
54      PRINT*,'   !!!! ERROR MISSING :','L'//TRIAD2(2:)
         RETURN
           END
*-------------------------------------------------
*=================================================
        SUBROUTINE EMERGE
```

```
      CHARACTER*7        TRIAD1,TRIAD2,OUTPUT
      CHARACTER*40       NAMES
      INTEGER            NFEAT1(4),NFEAT2(4),SIZE1,SIZE2
      INTEGER            NTIME1(4),NTIME2(4),OUT,NF1,NF2
           INTEGER            IFLAG,SITE1,SITE2,SUM1,SUM2
      REAL               IBL1(800), IBL2(800), IBL3(800)
       COMMON /MERINT/NFEAT1,NFEAT2,SIZE1,SIZE2,NTIME1,NTIME2,
     +OUT,NF1,NF2,IFLAG,SITE1,SITE2,SUM1,SUM2
       COMMON /MEREAL/IBL1,IBL2,IBL3
       COMMON /MECHAR/TRIAD1,TRIAD2,OUTPUT,NAMES
*-------------------------------------------------------------
C.   Read the two D-file and merge into only one D-file
        OUT=46
       IFLAG=0
59     READ(1,*,END=57)NTIME1
      IF(IFLAG.EQ.2)GOTO 62
60          READ(2,*,END=58) NTIME2
62      SIZE1=0
      DO 92 J=1,NF1
          SIZE1=SIZE1+NFEAT1(J)*NTIME1(J)
92    CONTINUE
       SIZE2=0
       DO 93 J=1,NF2
           SIZE2=SIZE2+NFEAT2(J)*NTIME2(J)
93     CONTINUE
         IF(IFLAG.EQ.1)GOTO 67
       READ(1,*) (IBL1(N),N=1,SIZE1)
            IF(IFLAG.EQ.2)GOTO 65
67     READ(2,*)(IBL2(N),N=1,SIZE2)
65     IF(ABS(IBL1(SITE1)-IBL2(SITE2)).LT.0.001)THEN
         WRITE(OUT,*)(NTIME1(N),N=1,NF1),(NTIME2(N),N=1,NF2)
         WRITE(OUT,*)(IBL1(N),N=1,SIZE1),(IBL2(N),N=1,SIZE2)
         IFLAG=0
       ELSE IF(IBL1(SITE1).LT.IBL2(SITE2))THEN
        WRITE(OUT,*)(NTIME1(N),N=1,NF1),'1','1'
       SUM2=0
          DO 98 J=1,NF2
             SUM2=SUM2+NFEAT2(J)
98       CONTINUE
         DO 99 J=1,SUM2
            IBL3(J)=-1
99       CONTINUE
      WRITE(OUT,*)(IBL1(N),N=1,SIZE1),(IBL3(N),N=1,SUM2)
         IFLAG=2
      ELSE IF(IBL1(SITE1).GT.IBL2(SITE2))THEN
         WRITE(OUT,*) '1','1',(NTIME2(N),N=1,NF2)
         SUM1=0
         DO 101 J=1,NF1
           SUM1=SUM1+NFEAT1(J)
101      CONTINUE
         DO 102 J=1,SUM1
         IBL3(J)=-1
102      CONTINUE
                WRITE(OUT,*)(IBL3(N),N=1,SUM1),(IBL2(N),N=1,SIZE2)
         IFLAG=1
       END IF
       IF(IFLAG.EQ.0) GOTO 59
       IF(IFLAG.EQ.1) GOTO 60
57     CONTINUE
58     RETURN
          END
*-------------------------------------------------------------
           SUBROUTINE KRIGIN
      CHARACTER      PNTKR2, SETRA2, SETOU2,ISO2,GEOIS2,ISOSC2,DAT
```

```
      CHARACTER         INTMOD
     CHARACTER*3     ALL
     CHARACTER*40    WNAME
      REAL            X,Y,T,IBL(900),XP,YP,TP,VALMIS,XTGT,YTGT
     REAL            LX,LY,FMTDAT(16),TITLE(32),KRGEST(7500),
     +               ESTVAR(7500),C2FEW(1000,2),FMTEST(16),DSTINC
     REAL           UNITSM,UNITCO,XLDAT,XHDAT,YLDAT,YHDAT,XLINT,
     +              XHINT,YLINT,YHINT,RADIUS,CO,GRAD,C1,A1,C2,A2,
     +              PHI,PSIN,PCOS,XSIDE,YSIDE
     INTEGER        INDEX(40),MARKER(40,40),IN2FEW(1000,2),
     +              IM2FEW(1000)
     INTEGER        OUT,OUT2,SEARCH,OUT1XY,OUT2XY,SQS,NTIMES
     INTEGER        NSPACE,NSITES,MINPTS,MAXPTS,MODTYP,IWT,SIN,
     +              SPLQUE
     INTEGER        NFOR,NFRE(4),NTIME(4),SN(500),WEAST,WNORTH,
     +              WPROP,WSITE,WDEPTH,IFLAG,NN,NTAGTS
     LOGICAL        NEWMAT,ISO,OUTSID,PNTKRG,KMETRE,DATAPT,
     +              SETRAD,SETOUT,GEOISO,ISOSCH
     COMMON        X(3500),Y(3500),T(3500),XLDAT,XHDAT,YLDAT,
     +             YHDAT,NSITES
     COMMON /SEMMOD/ MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,
     +                PHI,PSIN,PCOS
       COMMON /LOGIC/ NEWMAT,ISO,OUTSID,PNTKRG,KMETRE,DATAPT,
     +                 SETRAD,SETOUT,ISOSCH
     COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
     COMMON /KRIGCH/PNTKR2,SETRA2,SETOU2,ISO2,GEOIS2,ISOSC2,
     +               ALL,DAT,INTMOD
     COMMON /KRINT/NSPACE,MINPTS,MAXPTS,IWT,OUT1XY,OUT2XY,
     +    NTAGTS
     COMMON /CHSUBS/WNAME
     COMMON /INST/SIN,SPLQUE,SN
     COMMON /KRISPC/NN,XP(3500),YP(3500),TP(3500),VALMIS,
     +      XTGT(200),YTGT(200)
           COMMON /KRIRES/UNITSM,UNITCO,XLINT,XHINT,YLINT,YHINT,
     +                    RADIUS,XSIDE,YSIDE
*-------------------------------------------------------------
          READ(23,'(1X,A)')PNTKR2
            IF(PNTKR2.EQ.'F')PNTKRG=.FALSE.
            IF(PNTKR2.EQ.'T')PNTKRG=.TRUE.
          READ(23,'(1X,A40)')WNAME
              READ(23,*) UNITSM,UNITCO
          READ(23,'(1X,A)') ALL
           IF(ALL.EQ.'Y')THEN
             READ(23,'(1X,A3)')ALL
             SETOUT=.FALSE.
            ELSE IF(ALL.EQ.'N')THEN
             READ(23,'(1X,A)')DAT
              IF(DAT.EQ.'S')THEN
                READ(23,*) NSITES
                 DO 99 I=1,NSITES
                  READ(23,*) SN(I)
99               CONTINUE
               SETOUT=.FALSE.
              ELSE IF(DAT.EQ.'R')THEN
               READ(23,'(1X,A)')SETOU2
               IF(SETOU2.EQ.'A')THEN
                SETOUT=.FALSE.
               ELSE IF(SETOU2.EQ.'C')THEN
                SETOUT=.TRUE.
                READ(23,*)XLDAT,XHDAT,YLDAT,YHDAT
               END IF
              END IF
            END IF
         READ(23,'(1X,A)')SETRA2
```

```
      IF(SETRA2.EQ.'A')SETRAD=.FALSE.
      IF(SETRA2.EQ.'C')SETRAD=.TRUE.
       READ(23,'(1X,A)')INTMOD
       IF(INTMOD.EQ.'T')THEN
         READ(23,*)NTAGTS
       DO 808 I=1,NTAGTS
        READ(23,*)XTGT(I),YTGT(I)
808    CONTINUE
       READ(23,*)RADIUS
      ELSE IF(INTMOD.EQ.'G')THEN
      READ(23,*)XLINT,XHINT,YLINT,YHINT,RADIUS
        READ(23,*)NSPACE
      END IF
       READ(23,*)MINPTS,MAXPTS
      READ(23,'(1X,A)')ISO2
      IF(ISO2.EQ.'I')ISO=.TRUE.
      IF(ISO2.EQ.'A')ISO=.FALSE.
      READ(23,*)MODTYP
       READ(23,*)CO,GRAD
      READ(23,*)C1,A1
       READ(23,*)C2,A2
     IF(ISO2.EQ.'A')THEN
       READ(23,'(1X,A)')GEOIS2
       READ(23,'(1X,A)')ISOSC2
      IF(GEOIS2.EQ.'G')GEOISO=.TRUE.
      IF(GEOIS2.EQ.'B')GEOISO=.FALSE.
      IF(ISOSC2.EQ.'C')ISOSCH=.TRUE.
      IF(ISOSC2.EQ.'R')ISOSCH=.FALSE.
       READ(23,*)PHI,PSIN,PCOS
     END IF
     IF(PNTKR2.EQ.'F')THEN
       READ(23,*) XSIDE,YSIDE
     END IF
      READ(23,*) IWT,OUT1XY,OUT2XY
     RETURN
      END
*-------------------------------------------------------------
            SUBROUTINE KRIGE( IBL,NFOR,NFRE,NTIME )
      CHARACTER      PNTKR2, SETRA2, SETOU2,ISO2,GEOIS2,ISOSC2,DAT
      CHARACTER*3    ALL
      CHARACTER*40   WNAME
       REAL          X,Y,T,IBL(900),XP,YP,TP,VALMIS
      REAL          LX,LY,FMTDAT(16),TITLE(32),KRGEST(7500),
     +              ESTVAR(7500),C2FEW(1000,2),FMTEST(16),DSTINC
      REAL         UNITSM,UNITCO,XLDAT,XHDAT,YLDAT,YHDAT,XLINT,
     +             XHINT,YLINT,YHINT,RADIUS,CO,GRAD,C1,A1,C2,A2,
     +             PHI,PSIN,PCOS,XSIDE,YSIDE
      INTEGER      INDEX(40),MARKER(40,40),IN2FEW(1000,2),
     +             IM2FEW(1000)
      INTEGER      OUT,OUT2,SEARCH,OUT1XY,OUT2XY,SQS,NTIMES
      INTEGER      NSPACE,NSITES,MINPTS,MAXPTS,MODTYP,IWT,SIN,
     +             SPLQUE
      INTEGER      NFOR,NFRE(4),NTIME(4),SN(500),WEAST,WNORTH,
     +             WPROP,WSITE,WDEPTH,IFLAG,NN
      LOGICAL      NEWMAT,ISO,OUTSID,PNTKRG,KMETRE,DATAPT,
     +             SETRAD,SETOUT,GEOISO,ISOSCH
      COMMON      X(3500),Y(3500),T(3500),XLDAT,XHDAT,YLDAT,
     +            YHDAT,NSITES
      COMMON /SEMMOD/ MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,
     +                PHI,PSIN,PCOS
       COMMON /LOGIC/NEWMAT,ISO,OUTSID,PNTKRG,KMETRE,DATAPT,
     +               SETRAD,SETOUT,ISOSCH
      COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
      COMMON /KRIGCH/PNTKR2,SETRA2,SETOU2,ISO2,GEOIS2,ISOSC2,
```

```
     +                    ALL,DAT
          COMMON /KRINT/NSPACE,MINPTS,MAXPTS,IWT,OUT1XY,OUT2XY
          COMMON /CHSUBS/WNAME
          COMMON /INST/SIN,SPLQUE,SN
          COMMON /KRISPC/NN,XP(3500),YP(3500),TP(3500),VALMIS
             COMMON /KRIRES/UNITSM,UNITCO,XLINT,XHINT,YLINT,YHINT,
     +                       RADIUS, XSIDE, YSIDE
*-----------------------------------------------------------------
C. This routine serves as a link between the routine that reads
c. the instructions file (krigin) and routine krigex which
C. executes the kriging calculations. It picks up the positions
C. of easting,northing and the wanted property (mainly inter_value)
C. and extracts the information from the block that is read in turn
C. from the manipulated file,the values in those positions. It
C. assigns them to X,Y,T, accordig to the data option preferred by
C.the user.
C.
           CALL FINDNA( NFOR,NFRE )
           CALL FINDSI( NFOR,NFRE )
C. PREPARING DATA FOR KRIGING
         IF(ALL.EQ.'N')THEN
           IF(DAT.EQ.'S')THEN
            DO 90 I=1,NSITES
             SN(I)=REAL(SN(I))
             IF(ABS(SN(I)-IBL(WSITE)).LT.0.001)THEN
              IFLAG=1
              NN=NN+1
              GOTO 200
             END IF
90           CONTINUE
           ELSE IF(DAT.EQ.'R')THEN
             IFLAG=1
             NN=NN+1
           END IF
         ELSE IF(ALL.EQ.'ALL')THEN
           IFLAG=1
           NN=NN+1
         END IF
200      IF(IFLAG.EQ.1)THEN
          XP(NN)=IBL(WEAST)
          YP(NN)=IBL(WNORTH)
           DO 66 J=1,NFOR
             IF(J.EQ.2)THEN
              WPROP=WPROP+NFRE(J-1)
             END IF
66           CONTINUE
          TP(NN)=IBL(WPROP)
         END IF
            VALMIS=-1.0
         RETURN
          END
              SUBROUTINE KRIGEX( IBL, NFOR, NFRE, NTIME )
         CHARACTER       PNTKR2, SETRA2, SETOU2,ISO2,GEOIS2,ISOSC2,DAT
            CHARACTER          INTMOD
         CHARACTER*3     ALL
         CHARACTER*40    WNAME
          REAL           X,Y,T,IBL(900),XP,YP,TP,VALMIS,XTGT,YTGT
         REAL           LX,LY,FMTDAT(16),TITLE(32),KRGEST(7500),
     +                  ESTVAR(7500),C2FEW(1000,2),FMTEST(16),DSTINC
         REAL          UNITSM,UNITCO,XLDAT,XHDAT,YLDAT,YHDAT,XLINT,
     +                 XHINT,YLINT,YHINT,RADIUS,CO,GRAD,C1,A1,C2,A2,
     +                 PHI,PSIN,PCOS,XSIDE,YSIDE
         INTEGER       INDEX(40),MARKER(40,40),IN2FEW(1000,2),
     +                 IM2FEW(1000)
```

```
      INTEGER       OUT,OUT2,SEARCH,OUT1XY,OUT2XY,SQS,NTIMES
      INTEGER       NSPACE,NSITES,MINPTS,MAXPTS,MODTYP,IWT,SIN,
     +              SPLQUE
      INTEGER       NFOR,NFRE(4),NTIME(4),SN(500),WEAST,WNORTH,
     +              WPROP,WSITE,WDEPTH,IFLAG,NN,NTAGTS
      LOGICAL       NEWMAT,ISO,OUTSID,PNTKRG,KMETRE,DATAPT,
     +              SETRAD,SETOUT,GEOISO,ISOSCH
      COMMON       X(3500),Y(3500),T(3500),XLDAT,XHDAT,YLDAT,
     +             YHDAT,NSITES
      COMMON /SEMMOD/ MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,
     +                PHI,PSIN,PCOS
      COMMON /LOGIC/ NEWMAT,ISO,OUTSID,PNTKRG,KMETRE,DATAPT,
     +               SETRAD,SETOUT,ISOSCH
      COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
      COMMON /KRIGCH/PNTKR2,SETRA2,SETOU2,ISO2,GEOIS2,ISOSC2,
     +               ALL,DAT,INTMOD
      COMMON /KRINT/NSPACE,MINPTS,MAXPTS,IWT,OUT1XY,OUT2XY
     +, NTAGTS
      COMMON /CHSUBS/WNAME
      COMMON /INST/SIN,SPLQUE,SN
      COMMON /KRISPC/NN,XP(3500),YP(3500),TP(3500),VALMIS
     +,  XTGT(200),YTGT(200)
       COMMON /KRIRES/UNITSM,UNITCO,XLINT,XHINT,YLINT,YHINT,
     +                RADIUS,XSIDE,YSIDE
*-----------------------------------------------------------------
C   Kriging  of  Irregularly  Spaced  2-dimensional  Data
C
      DATA OUT,OUT2/22,19/
      DATA MRKROW,MRKCOL,INTDIM,MX2FEW,MAXPNT/40,40,7500,1000,40/
      DATA SQS/4/
C
C-----------------------------------------------------------------
C
C     read data
      ISOSCH=.TRUE.
      KOUNT=0
      IF(SETOUT)GO TO 139
      XLDAT=1.0E30
      XHDAT=-1.0E30
      YLDAT=1.0E30
      YHDAT=-1.0E30
         IF(ALL.EQ.'ALL')THEN
        NSITES=NN
      ELSE IF(ALL.EQ.'N')THEN
        IF(DAT.EQ.'R')THEN
          NSITES=NN
        END IF
      END IF
139      DO 3 I=1,NSITES
           XI=XP(I)
           YI=YP(I)
           TI=TP(I)
      IF (INT(TI).LT.INT(VALMIS+1.0)) GOTO 3
      IF(.NOT.SETOUT) GOTO 25
      IF(YI.LT.YLDAT.OR.YI.GT.YHDAT)GOTO 3
      IF(XI.LT.XLDAT.OR.XI.GT.XHDAT)GOTO 3
   25 KOUNT=KOUNT+1
      X(KOUNT)=XI
      Y(KOUNT)=YI
      T(KOUNT)=TI
      IF(SETOUT)GO TO 3
      XLDAT=AMIN1(XLDAT,XI)
      XHDAT=AMAX1(XHDAT,XI)
      YLDAT=AMIN1(YLDAT,YI)
```

```
        YHDAT=AMAX1(YHDAT,YI)
      3 CONTINUE
        NSITES=KOUNT
        AREA=(XHDAT-XLDAT)*(YHDAT-YLDAT)
        IF(.NOT.SETRAD)RADIUS=SQRT(MAXPTS*AREA/NSITES)
           IF(INTMOD.EQ.'T')THEN
            XLINT=XLDAT
            XHINT=XHDAT
            YLINT=YLDAT
            YHINT=YHDAT
           END IF
C
C     data read
C
        IF(UNITSM.GE.0.1) KMETRE=.TRUE.
        IF(UNITSM.LT.0.1) KMETRE=.FALSE.
        IF(KMETRE) GOTO 7
        DO 4 I=1,NSITES
        X(I)=X(I)*1000.0*UNITCO
        Y(I)=Y(I)*1000.0*UNITCO
      4 CONTINUE
        XLDAT=XLDAT*1000.0*UNITCO
        YLDAT=YLDAT*1000.0*UNITCO
        XHDAT=XHDAT*1000.0*UNITCO
        YHDAT=YHDAT*1000.0*UNITCO
        XLINT=XLINT*1000.0*UNITCO
        YLINT=YLINT*1000.0*UNITCO
        XHINT=XHINT*1000.0*UNITCO
        YHINT=YHINT*1000.0*UNITCO
         IF(INTMOD.EQ.'T')THEN
          DO 333 I=1,NTAGTS
           XTGT(I)=XTGT(I)*1000.0*UNITCO
           YTGT(I)=YTGT(I)*1000.0*UNITCO
  333     CONTINUE
         END IF
        RADIUS=RADIUS*1000.0*UNITCO
        XSIDE=XSIDE*1000.0*UNITSM
        YSIDE=YSIDE*1000.0*UNITSM
        IF(ISO)GOTO 6
        IF(MODTYP.EQ.7) GOTO 66
        PSIN=PSIN*1000.0*UNITSM
        PCOS=PCOS*1000.0*UNITSM
        GOTO 7
     66 PSIN=PSIN/(1000.0*UNITSM)
        PCOS=PCOS/(1000.0*UNITSM)
      6 A1=A1*1000.0*UNITSM
        A2=A2*1000.0*UNITSM
        GRAD=GRAD/(1000.0*UNITSM)
        GOTO 12
      7 DO 8 I=1,NSITES
        X(I)=X(I)*UNITCO
        Y(I)=Y(I)*UNITCO
      8 CONTINUE
        XLDAT=XLDAT*UNITCO
        YLDAT=YLDAT*UNITCO
        XHDAT=XHDAT*UNITCO
        YHDAT=YHDAT*UNITCO
        XLINT=XLINT*UNITCO
        YLINT=YLINT*UNITCO
        XHINT=XHINT*UNITCO
        YHINT=YHINT*UNITCO
         IF(INTMOD.EQ.'T')THEN
          DO 555 I=1,NTAGTS
           XTGT(I)=XTGT(I)*UNITCO
```

```
          YTGT(I)=YTGT(I)*UNITCO
555      CONTINUE
        END IF
       RADIUS=RADIUS*UNITCO
       XSIDE=XSIDE*UNITSM
       YSIDE=YSIDE*UNITSM
       IF(ISO)GOTO 11
       IF(MODTYP.EQ.7) GOTO 9
       PSIN=PSIN*UNITSM
       PCOS=PCOS*UNITSM
       GOTO 11
     9 PSIN=PSIN/UNITSM
       PCOS=PCOS/UNITSM
    11 A1=A1*UNITSM
       A2=A2*UNITSM
       GRAD=GRAD/UNITSM
C
C     write out information from steering data
C
    12 WRITE(OUT,105)
       IF(.NOT.ISO) MODTYP=MODTYP+6
        GOTO (14,16,18,20,22,24,250,250,250,250,250,250),MODTYP
    14 WRITE(OUT,106) CO,GRAD
        GOTO 26
    16 C1=GRAD*A1
       SILL=CO+C1
       WRITE(OUT,107) CO,GRAD,A1,SILL,A1
       GOTO 26
    18 SILL=CO+C1
       WRITE(OUT,108) CO,C1,A1,A1,A1,SILL,A1
       GOTO 26
    20 WRITE(OUT,109) CO,C1,A1
       GOTO 26
    22 WRITE(OUT,110) CO,C1,A1
       GOTO 26
    24 SILL=CO+C1+C2
       GOTO 26
   250 IF(GEOISO) GOTO 251
       WRITE(OUT,256)
       WRITE(OUT,258) PHI,PSIN,PCOS
       GOTO 26
   251 WRITE(OUT,257)
       WRITE(OUT,258) PHI,PSIN,PCOS
    26 IF(KMETRE) WRITE(OUT,111)
       IF(.NOT.KMETRE) WRITE(OUT,112)
       IF(MAXPTS.LE.MAXPNT) GOTO 27
       WRITE(OUT,102) MAXPNT
       STOP
    27 WRITE(OUT,103) XLDAT,XHDAT,YLDAT,YHDAT,XLINT,XHINT,YLINT,YHINT
       IF(ISOSCH)WRITE(OUT,1030)RADIUS
       IF(.NOT.ISOSCH)WRITE(OUT,1031)RADIUS
C
C     finish writing information from steering data
C
   102 FORMAT(10X,'**** MAXPTS SET TOO LARGE - IT SHOULD NOT',1X,
     & 'EXCEED ',I3)
   103 FORMAT(//10X,'DATA RECTANGLE'/20X,'MINIMUM X',F12.4,5X,
     & 'MAXIMUM X',F12.4/20X,'MINIMUM Y',F12.4,5X,'MAXIMUM Y',
     & F12.4//10X,'INTERPOLATION RECTANGLE'/20X,'MINIMUM X',
     & F12.4,5X,'MAXIMUM X',F12.4/20X,'MINIMUM Y',F12.4,5X,
     & 'MAXIMUM Y',F12.4/)
  1030 FORMAT(10X,'ISOTROPIC SEARCH RADIUS',F11.4)
  1031 FORMAT(10X,'ANISOTROPIC SEARCH, MEAN RADIUS',F11.4)
       WRITE(OUT,1032)MINPTS,MAXPTS
```

```
 1032 FORMAT(/10X,'MINIMUM NUMBER OF DATA POINTS REQUIRED PER',1X,
     & 'INTERPOLATION',I5/10X,'MAXIMUM NUMBER OF DATA POINTS'
     & ,1X,'REQUIRED PER INTERPOLATION',I5//)
105      FORMAT(//10X,'SIS',4X,'SOIL SCIENCE LABORATORY'/14X,
     + 'UNIVERSITY OF OXFORD.'//
     + 10X,' Kriging of Irregularly Spaced 2-dimensional Data'/
     + )
  106 FORMAT(//10X,'LINEAR MODEL',/15X,
     & 'GAMMA(H) = ',F12.6,' + ',F12.6,' H ')
  107 FORMAT(//10X,'LINEAR WITH SILL MODEL'/15X,
     & 'GAMMA(H) = ',F12.6,' + ',F12.6,' H  ;  H < ',F12.6/,15X,
     & 'GAMMA(H) = ',F12.6,19X,';  H >= ',F11.6)
  108 FORMAT(//10X,'SPHERICAL MODEL'/15X,
     & 'GAMMA(H) = ',F12.6,' + ',F12.6,'(1.5H/',F12.6,' + ',
     & '0.5 (H**3/',F12.6,'**3))  ;  H < ',F12.6/,15X,
     & 'GAMMA(H) = ',F12.6,63X,'  ;  H >= ',F11.6)
  109 FORMAT(//10X,'EXPONENTIAL MODEL'/15X,
     & 'GAMMA(H) = ',F12.6,' + ',F12.6,' (1 - EXP(-H/'
     & ,F12.6,' ))')
  110 FORMAT(//10X,'GAUSSIAN MODEL'/15X,
     & 'GAMMA(H) = ',F12.6,' + ',F12.6,' (1 - EXP(-H**2/'
     & ,F12.6,'**2 ))')
  256 FORMAT(//10X,'ANISOTROPIC VARIATION   BURGESS MODEL'/)
  257 FORMAT(//10X,'GEOMETRICAL ANISOTROPY'/)
  258 FORMAT(20X,'ANISOTROPHY PARAMETERS'//
     1 10X,'ANGLE OF MAXIMUM VARIATION',F12.4/
     2 10X,'MINIMUM VALUE OF PARAMETER',F12.5/
     3 10X,'MAXIMUM VALUE OF PARAMETER',F12.5//)
  111 FORMAT(25X,'DISTANCES (H) ARE IN KILOMETRES'/)
  112 FORMAT(25X,'DISTANCES (H) ARE IN METRES'/)
C
C   Quantities concerned with the sorting of the data points
C   are now calculated.   For sorting purposes the map area
C   is divided into a grid of NLX by NLY rectangles, the
C   sides of which are LX by LY in length.   The number of
C   grid rectangles which will just contain a circle of
C   radius RADIUS is given by SQS.
C
      NTIMES=0
   30 NTIMES=NTIMES+1
      NLX=INT((XHDAT-XLDAT)*1.00001*SQS/(2.0*RADIUS))
      NLY=INT((YHDAT-YLDAT)*1.00001*SQS/(2.0*RADIUS))
      IF(NLX.EQ.0) NLX=1
      IF(NLY.EQ.0) NLY=1
      IF(NLX.GT.MRKROW) NLX=MRKROW
      IF(NLY.GT.MRKCOL) NLY=MRKCOL
      CALL SRTDAT(MARKER,NLX,NLY,LX,LY,MRKROW,MRKCOL)
C
      WRITE(OUT,140) NSITES
      DO 40 I=1,NLX
   40   WRITE(OUT,141) (MARKER(I,J),J=1,NLY)
C
  140 FORMAT(//10X,'NUMBER OF DATA POINTS RETAINED',I6//
     & 10X,'MATRIX OF SEARCH RECTANGLES'/)
  141   FORMAT(2X,10I10)
  142 FORMAT(//10X,'DISTANCE BETWEEN INTERPOLATIONS',7X,F10.4/
     & 10X,'NUMBER OF ROWS ON INTERPOLATED GRID',4X,I5/
     & 10X,'NUMBER OF COLUMNS ON INTERPOLATED GRID',I5//)
      IF(NTIMES.GT.1) GOTO 92
C
C     calculate the within-block variance
C
      IF(PNTKRG)GOTO 50
      VARWBL=WBLVAR(XSIDE,YSIDE)
```

```
      WRITE(OUT,113) XSIDE,YSIDE,VARWBL
      GOTO 60
   50 VARWBL=0.0
      WRITE(OUT,114)
  113 FORMAT(///10X,'BLOCK KRIGING   XSIDE=',F10.3,3X,
     & 'YSIDE=',F10.3,3X,'WITHIN-BLOCK VARIANCE=',F10.3)
  114 FORMAT(///10X,'POINT KRIGING')
C.
C.
C.  Interpolates at target points of co-ordinates given by the user
c.  Calls subroutine TARGEK
C.
C.
60       IF(INTMOD.EQ.'T')THEN
      CALL TARGEK(MARKER,NLX,NLY,LX,LY,MRKROW,MRKCOL,OUT,OUT2,
     +             INTDIM,MX2FEW,MAXPNT,SQS)
           GOTO 91
         ELSE IF(INTMOD.EQ.'G')THEN
          DSTINC=(XHINT-XLINT)/(NSPACE-1)
      NCOL=NSPACE
      NROW=INT((YHINT-YLINT)/DSTINC)+1
      N2FEW=0
      WRITE(OUT,142) DSTINC,NROW,NCOL
      IJ=NROW*NCOL
         END IF
      IF(IJ.LE.INTDIM) GO TO 64
      WRITE(OUT,443)
      STOP
   64 DO 90 I=1,NROW
      YC=YHINT-DSTINC*(I-1)
        DO 90 J=1,NCOL
      IJ=(J-1)*NROW+I
          XC=XLINT+DSTINC*(J-1)
      IF(IJ.LT.INTDIM) GOTO 65
      WRITE(OUT,443)
  443 FORMAT(10X,'TOO MANY INTERPOLATIONS')
      STOP
   65     OUTSID=.FALSE.
          IF(XC.LT.XLDAT.OR.XC.GT.XHDAT) OUTSID=.TRUE.
          IF(YC.LT.YLDAT.OR.YC.GT.YHDAT) OUTSID=.TRUE.
          IF(OUTSID) GOTO 80
C
C     find points for interpolation
C
      CALL FNDPT1(XC,YC,LX,LY,NLX,NLY,RADIUS,ISOSCH,MARKER,MRKROW,
     & MRKCOL,INDEX,MAXPTS,PNTKRG,NEWMAT,DATAPT,SQS,NFOUND)
      IF (NFOUND.GT.MAXPTS) NFOUND=MAXPTS
      IF(.NOT.DATAPT) GOTO 70
      INDEX1=INDEX(1)
      KRGEST(IJ)=T(INDEX1)
      ESTVAR(IJ)=0.0
      SEARCH=0
      IF(OUT1XY.EQ.1)WRITE(OUT,118) SEARCH,XC,YC,KRGEST(IJ),ESTVAR(IJ)
      IF(OUT2XY.EQ.1)WRITE(OUT2,'(1X,4E14.6)')XC,YC,KRGEST(IJ),
     +    ESTVAR(IJ)
      GOTO 90
C
C     interpolate
C
   70 IF(NFOUND.GT.MINPTS) GOTO 71
      N2FEW=N2FEW+1
      IF(N2FEW.LE.MX2FEW) GOTO 72
      WRITE(OUT,121)
  121 FORMAT(10X,'**** TOO MANY INTERPOLATIONS REQUIRE'
```

```
     & ,1X,'MORE DATA POINTS'/10X,'INCREASE SEARCH RADIUS'//)
       STOP
    72 C2FEW(N2FEW,1)=XC
       C2FEW(N2FEW,2)=YC
       IN2FEW(N2FEW,1)=I
       IN2FEW(N2FEW,2)=J
       GOTO 90
    71 IFAIL=0
       CALL KRG32S(XC,YC,KRGEST(IJ),ESTVAR(IJ),NEWMAT,
     & NFOUND,INDEX,PNTKRG,XSIDE,YSIDE,VARWBL,IFAIL,OUT,IWT)
       IF(IFAIL.NE.0) WRITE(OUT,116) IFAIL,IJ,XC,YC
C
   116 FORMAT(2X,'***** IFAIL =',I3,'  INTERPOLATION NO',I5,
     & 'X CENTRE =',F6.3,'  YCENTRE =',F6.3)
   117 FORMAT(2X,'SEARCH',I2,2X,'XC= ',F10.4,2X,'YC= ',F10.4,2X,
     & 'KRGEST= ',F13.4,2X,'ESTVAR= ',E13.6,' NUMBER OF POINTS= ',I3)
   118 FORMAT(2X,'SEARCH',I2,2X,'XC= ',F10.4,2X,'YC= ',F10.4,2X,
     & 'KRGEST= ',F13.4,2X,'ESTVAR= ',E13.6)
C
       SEARCH=1
       IF(OUT1XY.EQ.1)WRITE(OUT,117) SEARCH,XC,YC,KRGEST(IJ),
      +    ESTVAR(IJ),NFOUND
       IF(OUT2XY.EQ.1)WRITE(OUT2,'(1X,4E14.6)')XC,YC,KRGEST(IJ),
      +     ESTVAR(IJ)
       GOTO 90
    80 KRGEST(IJ)=VALMIS
       SEARCH=0
       ESTVAR(IJ)=VALMIS
       WRITE(OUT,118) SEARCH,XC,YC,KRGEST(IJ),ESTVAR(IJ)
    90 CONTINUE
    91 IF(N2FEW.EQ.0) GOTO 96
       RADIUS=RADIUS*2.0
       GOTO 30
    92 M2FEW=0
       DO 94 K=1,N2FEW
       XC=C2FEW(K,1)
       YC=C2FEW(K,2)
       I=IN2FEW(K,1)
       J=IN2FEW(K,2)
       IJ=(J-1)*NROW+I
       CALL FNDPT1(XC,YC,LX,LY,NLX,NLY,RADIUS,ISOSCH,MARKER,MRKROW,
     &  MRKCOL,INDEX,MAXPTS,PNTKRG,NEWMAT,DATAPT,SQS,NFOUND)
       IF(NFOUND.GT.MAXPTS)NFOUND=MAXPTS
       IF(NFOUND.GT.MINPTS) GOTO 93
       M2FEW=M2FEW+1
       IM2FEW(M2FEW)=K
       GOTO 94
    93 IFAIL=0
       CALL KRG32S(XC,YC,KRGEST(IJ),ESTVAR(IJ),
     &             NEWMAT,NFOUND,INDEX,PNTKRG,XSIDE,YSIDE,
     &             VARWBL,IFAIL,OUT,IWT)
       IF(IFAIL.NE.0) WRITE(OUT,116) IFAIL,K,XC,YC
       SEARCH=2
       IF(OUT1XY.EQ.1)WRITE(OUT,117)SEARCH,XC,YC,KRGEST(IJ),
     +    ESTVAR(IJ),NFOUND
       IF(OUT2XY.EQ.1)WRITE(OUT2,'(1X,4E14.6)')XC,YC,KRGEST(IJ),
     +    ESTVAR(IJ)
    94 CONTINUE
       WRITE(OUT,119)
   119 FORMAT(1H )
       IF(M2FEW.EQ.0) GOTO 96
       DO  95 K=1,M2FEW
       KK=IM2FEW(K)
       XC=C2FEW(KK,1)
```

```
      YC=C2FEW(KK,2)
      I=IN2FEW(KK,1)
      J=IN2FEW(KK,2)
      IJ=(J-1)*NROW+I
      CALL FNDPT2(XC,YC,NSITES,INDEX,MINPTS,MAXPTS,NEWMAT,NFOUND,ISOSCH)
      CALL KRG32S(XC,YC,KRGEST(IJ),ESTVAR(IJ),
     &            NEWMAT,NFOUND,INDEX,PNTKRG,XSIDE,YSIDE,
     &            VARWBL,IFAIL,OUT,IWT)
      IF(IFAIL.NE.0) WRITE(OUT,116) IFAIL,K,XC,YC
      SEARCH=3
      IF(OUT1XY.EQ.1)WRITE(OUT,117)SEARCH,XC,YC,KRGEST(IJ),
     +    ESTVAR(IJ),NFOUND
      IF(OUT2XY.EQ.1)WRITE(OUT2,'(1X,4E14.6)')XC,YC,KRGEST(IJ),
     +    ESTVAR(IJ)
   95 CONTINUE
   96 IF(OUT2XY.EQ.1)GOTO 98
      DO 97 I=1,NROW
      J=(NCOL-1)*NROW+I
      WRITE(OUT2,'(1X,4E14.6)')(KRGEST(IJ),ESTVAR(IJ),IJ=I,J,NROW)
   97 CONTINUE
   98 STOP
      END
C
C **** SUBROUTINES ****
C
      SUBROUTINE SRTDAT(MARK,NLX,NLY,LX,LY,MRKROW,MRKCOL)
C
C         Sorts the data points into rectangles so that all
C         points for interpolation at any point can be found
C         quickly.   The locations of those data in arrays X( ),
C         Y( ) and T( ) are indexed in MARK( , ) such that
C         the first point in the Ith rectangle in the
C         X-direction and the Jth rectangle in the
C         Y-direction has subscript MARK(I,J).
C
C
      REAL LX,LY
      INTEGER MARK(MRKROW,MRKCOL),R
      COMMON X(3500),Y(3500),T(3500),XLDAT,XHDAT,YLDAT,YHDAT,NSITES
      LX=(XHDAT-XLDAT)/NLX
      LY=(YHDAT-YLDAT)/NLY
      IF(LX.LT.0.0000001) LX=0.0000001
      IF(LY.LT.0.0000001) LY=0.0000001
C **** THIS ENABLES VERTICAL AND HORIZONTAL TRANSECTS
C      TO BE HANDLED.
      M=1
      R=1
      DO 600 I=1,NLX
C
C         the data points are first sorted by columns
C
        DO 200 K=1,NSITES
          Q=X(K)
          IF(INT((Q-XLDAT)/LX).EQ.I-1) GOTO 100
          IF(I.EQ.1.AND.Q.LE.XLDAT) GOTO 100
          IF(I.EQ.NLX.AND.Q.GE.XHDAT) GOTO 100
          GOTO 200
  100     X(K)=X(M)
          X(M)=Q
          Q=Y(K)
          Y(K)=Y(M)
          Y(M)=Q
          Q=T(K)
          T(K)=T(M)
```

```
          T(M)=Q
          M=M+1
  200   CONTINUE
        MLESS1=M-1
        DO 500 J=1,NLY
          MARK(I,J)=R
C
C          the data points are now sorted by rows
C
          IF(R.GT.MLESS1) GOTO 500
          DO 400 L=R,MLESS1
             Q=Y(L)
             IF(INT((Q-YLDAT)/LY).EQ.J-1) GOTO 300
              IF(J.EQ.1.AND.Q.LE.YLDAT) GOTO 300
              IF(J.EQ.NLY.AND.Q.GE.YHDAT) GOTO 300
              GOTO 400
  300         Y(L)=Y(R)
              Y(R)=Q
              Q=X(L)
              X(L)=X(R)
              X(R)=Q
              Q=T(L)
              T(L)=T(R)
              T(R)=Q
              R=R+1
  400       CONTINUE
  500     CONTINUE
  600 CONTINUE
      RETURN
      END
C
C
      SUBROUTINE FNDPT1(XC,YC,LX,LY,NLX,NLY,RADIUS,ISOSCH,MARK,MRKROW
     & ,MRKCOL,IND,MAXPT,PNTKRG,NEWPTS,DATAPT,SQS,NCOUNT)
C
C     Finds at most the MAXPT nearest data points
C     to the point or centre of block to be interpolated.
C     The data points must be located in search rectangles
C     which are within distance RADIUS of the interpolation
C     point (XC,YC).
C
      REAL LX,LY,DISTNS(40)
      INTEGER MARK(MRKROW,MRKCOL),IND2(40),IND(MAXPT),SQS
      LOGICAL PNTKRG,NEWPTS,DATAPT,GEOISO,ISOSCH
      COMMON X(3500),Y(3500),T(3500),XLDAT,XHDAT,YLDAT,YHDAT,NSITES
      COMMON/SEMMOD/MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,PHI,PSIN,PCOS
      DATA BIGDIS/1.0E20/
      TOLDIS=(XHDAT-XLDAT)*0.0000001
      RADSQ=RADIUS*RADIUS
      DATAPT=.FALSE.
      DO 10 I=1,MAXPT
      IND2(I)=0
   10 DISTNS(I)=BIGDIS
C
C    the rectangles that must be examined for data points
C    within distance RADIUS of (XC,YC) are now found
C
      IR=INT((XC-RADIUS-XLDAT)/LX)+1
      JR=INT((YC-RADIUS-YLDAT)/LY)+1
      IS=IR+SQS
      JS=JR+SQS
      IF(IR.LE.0) IR=1
      IF(IR.GT.NLX) IR=NLX
      IF(JR.LE.0) JR=1
```

```
      IF(JR.GT.NLY) JR=NLY
      IF(IS.LE.0) IS=1
      IF(IS.GT.NLX) IS=NLX
      IF(JS.LE.0) JS=1
      IF(JS.GT.NLY) JS=NLY
      NCOUNT=0
      DO 100 II=IR,IS
        MKIJR=MARK(II,JR)
        LAST=MARK(II,JS+1)-1
        IF(JS.EQ.NLY) LAST=MARK(II+1,1)-1
        IF(II.EQ.NLX.AND.JS.EQ.NLY) LAST=NSITES
        IF (MKIJR.GT.LAST) GO TO 100
        DO 90 K=MKIJR,LAST
C
C     the data points in the search rectangles surrounding
C     (XC,YC) are tested to see if they lie within
C     distance RADIUS of (XC,YC)
C
         U=X(K)-XC
         V=Y(K)-YC
         DD=U*U+V*V
       IF(ISOSCH) GOTO 25
       IF(MODTYP.LE.6) GOTO 25
C****ADJUST GEOMETRY OF SEARCH TO TAKE ACCOUNT OF ANISOTROPY
       IF(ABS(U).LT.ABS(TOLDIS))U=TOLDIS
       THETA=ATAN(V/U)
       COSANG=COS(THETA-PHI)
       SINANG=SIN(THETA-PHI)
       COSSQ=COSANG*COSANG
       SINSQ=SINANG*SINANG
       PRATIO=PCOS/PSIN
       RATCOS=SQRT(PRATIO)
       RATSIN=1.0/RATCOS
       IF(GEOISO) GOTO 22
       DD=(SQRT(DD)*(RATCOS*COSSQ+RATSIN*SINSQ))**2
       GOTO 25
    22 DD=DD*(RATCOS*RATCOS*COSSQ+RATSIN*RATSIN*SINSQ)
    25 IF(DD.GE.RADSQ) GOTO 90
          IF(.NOT.PNTKRG)GOTO 30
         IF(DD.GT.TOLDIS) GOTO 30
         DATAPT=.TRUE.
         IND(1)=K
         RETURN
    30 IF(DD.GT.DISTNS(MAXPT)) GOTO 90
       DO 80 J=1,MAXPT
           IF(DD.GT.DISTNS(J)) GOTO 80
              DO 70 M=J,MAXPT
                IF(M.EQ.MAXPT) GOTO 35
                MJ=MAXPT-M+J
       DISTNS(MJ)=DISTNS(MJ-1)
       IND2(MJ)=IND2(MJ-1)
    70 CONTINUE
    35          DISTNS(J)=DD
                IND2(J)=K
                NCOUNT=NCOUNT+1
                 GO TO 90
    80        CONTINUE
    90     CONTINUE
   100 CONTINUE
       DO 120 I=1,MAXPT
       IF(IND2(I).EQ.IND(I))GOTO 120
       DO 110 J=1,MAXPT
       IF(IND2(I).EQ.IND(J))GOTO 120
   110 CONTINUE
```

```
      NEWPTS=.TRUE.
      GOTO 130
  120 CONTINUE
      DO 122 I=1,MAXPT
      IF(IND(I).EQ.IND2(I))GOTO 122
      DO 121 J=1,MAXPT
      IF(IND(I).EQ.IND2(J))GOTO 122
  121 CONTINUE
      NEWPTS=.TRUE.
      GO TO 130
  122 CONTINUE
      NEWPTS=.FALSE.
      IF(.NOT.NEWPTS)RETURN
  130 DO 140 I=1,MAXPT
      IND(I)=IND2(I)
  140 CONTINUE
      RETURN
      END
      SUBROUTINE FNDPT2(XCOORD,YCOORD,NDATPT,IND2,MINPT,
     1 MAXPT,NEWPTS,NFOUND,ISOSCH)
C
C         Makes a radial search and finds at least MINPT
C         and most MAXPT nearest data points to the
C         interpolation point (XCOORD,YCOORD)
C
      INTEGER IND1(40),IND2(MAXPT)
      LOGICAL NEWPTS,GEOISO,ISOSCH
      COMMON X(3500),Y(3500),T(3500),XLDAT,XHDAT,YLDAT,YHDAT,NSITES
      COMMON/SEMMOD/MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,PHI,PSIN,PCOS
      DATA SEPDIS/0.0001/
      TOTDIS=0.0
      DO 100 K=1,NDATPT
      XKMXC=X(K)-XCOORD
      YKMYC=Y(K)-YCOORD
      D=SQRT(XKMXC*XKMXC+YKMYC*YKMYC)
  100 TOTDIS=TOTDIS+D
      RADIUS=TOTDIS/NDATPT
  110 NFOUND=0
      DO 120 K=1,NDATPT
      XKMXC=X(K)-XCOORD
      YKMYC=Y(K)-YCOORD
      D=SQRT(XKMXC*XKMXC+YKMYC*YKMYC)
      IF(ISOSCH) GOTO 118
      IF(MODTYP.LE.6) GOTO 118
C****ADJUST GEOMETRY OF SEARCH IF ANISOTROPIC
      IF(ABS(XKMXC).LT.0.0000001)XKMXC=0.0000001
      THETA=ATAN(YKMYC/XKMXC)
      COSANG=COS(THETA-PHI)
      SINANG=SIN(THETA-PHI)
      COSSQ=COSANG*COSANG
      SINSQ=SINANG*SINANG
      PRATIO=PCOS/PSIN
      RATCOS=SQRT(PRATIO)
      RATSIN=1.0/RATCOS
      IF(GEOISO) GOTO 112
      D=D*(RATCOS*COSSQ+RATSIN*SINSQ)
      GOTO 118
  112 D=D*SQRT(RATCOS*RATCOS*COSSQ+RATSIN*RATSIN*SINSQ)
  118 IF(D.GT.RADIUS.OR.D.LT.SEPDIS) GOTO 120
      NFOUND=NFOUND+1
      IF(NFOUND.GT.MAXPT) GOTO 130
      IND2(NFOUND)=K
  120 CONTINUE
      IF(NFOUND-MINPT)  140,150,150
```

```
  130 RADIUS=RADIUS*0.75
      GOTO 110
  140 RADIUS=RADIUS*1.25
      GOTO 110
C
C      check if points found are the same as before
C
  150 DO 170 I=1,NFOUND
      IF(IND2(I).EQ.IND1(I)) GOTO 170
      DO 160 J=1,NFOUND
      IF(IND2(I).EQ.IND1(J)) GOTO 170
  160 CONTINUE
C
C      different points found
C
      NEWPTS=.TRUE.
      GOTO 180
  170 CONTINUE
C
C     same points found
C
      NEWPTS=.FALSE.
      IF(.NOT.NEWPTS) RETURN
  180 DO 190 I=1,NFOUND
      IND1(I)=IND2(I)
  190 CONTINUE
      RETURN
      END
C
C
      SUBROUTINE KRG32S(XCEN,YCEN,TKRIGE,KRGVAR,
     & NEWPTS,NUMPTS,IDENT,PNTKRG,XDIS,YDIS,SGSQRT,IFAIL,LP,IWT)
C
C    Subroutine to krige a point or block in 2 dimensional
C    space.   Returns the interpolated value TKRIGE
C    at point or block centred on XCEN,YCEN
C    and its estimation variance KRGVAR.
C
C
C
C    Requires   FUNCTIONs GAMMAH, SEMAV and INVERS
C
C
C
      REAL KRGVAR
      DOUBLE PRECISION A(41,41),B(41),C(41),DSUM
      INTEGER IDENT(NUMPTS)
      LOGICAL NEWPTS,PNTKRG,GEOISO
      COMMON X(3500),Y(3500),T(3500),XLDAT,XHDAT,YLDAT,YHDAT,NSITES
      COMMON /SEMMOD/ MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,PHI
     & ,PSIN,PCOS
      DATA IADIM/41/
      NORDER=NUMPTS+1
      IF(.NOT.NEWPTS) GOTO 135
C
C    initialize symmetric matrix A
C    (semi-variance between chosen grid points)
C
      DO 100 J=1,IADIM
      DO 100 L=1,IADIM
      A(J,L)=0.0D0
  100 A(L,J)=0.0D0
C
C    calculation of matrix A
```

```
C
      DO 120 J=1,NUMPTS
         DO 120 L=1,J
      IF(J.EQ.L) GOTO 105
      I1=IDENT(J)
      I2=IDENT(L)
      XI1=X(I1)
      YI1=Y(I1)
      XI2=X(I2)
      YI2=Y(I2)
      AJI=GAMMAH(XI1,YI1,XI2,YI2)
      A(J,L)=AJI
      A(L,J)=AJI
      GOTO 120
  105     A(J,L)=0.0D0
  120 CONTINUE
      DO 130 L=1,NUMPTS
       A(NORDER,L)=1.0D0
  130  A(L,NORDER)=1.0D0
      A(NORDER,NORDER)=0.0D0
C
C    initialize vector B
C    (semi-variance between grid points and the
C    point or block to be interpolated)
C
  135 DO 140 K=1,IADIM
  140 B(K)=0.0D0
C    calculation of vector B
      DO 170 M=1,NUMPTS
      I1 =IDENT(M)
      XI1=X(I1)
      YI1=Y(I1)
      IF (.NOT.PNTKRG)GOTO 160
      B(M)=GAMMAH(XCEN,YCEN,XI1,YI1)
      GOTO 170
  160  B(M)=SEMAV(XI1,YI1,XCEN,YCEN,XDIS,YDIS)
  170 CONTINUE
      B(NORDER)=1.0D0
C
C    invert matrix A its inverse is returned in A
C
      IF(.NOT.NEWPTS) GOTO 180
      CALL INVERS(A,IADIM,NORDER,IFAIL)
      IF(IFAIL.NE.0) RETURN
C
C    multiply inverse A by vector B to find weights vector C
C
  180 DO 200 J=1,NORDER
      DSUM=0.0D0
      DO 190 K=1,NORDER
  190 DSUM=DSUM+A(J,K)*B(K)
      C(J)=DSUM
  200 CONTINUE
C
C   calculation of the kriged estimate and the
C   estimation variance of the point or block
C
      TKRIGE=0.0
      KRGVAR=0.0
      DO 210 K=1,NORDER
  210 KRGVAR=KRGVAR+B(K)*C(K)
      KRGVAR=KRGVAR-SGSQRT
      DO 220 K=1,NUMPTS
             I1=IDENT(K)
```

```
  220 TKRIGE=TKRIGE+T(I1)*C(K)
      IF(IWT.LT.1) GOTO 230
C **** PRINT KRIGING WEIGHTS IF REQUESTED
      WRITE(LP,221)
  221 FORMAT(//10X,'DATA AND WEIGHTS FOR INDIVIDUAL ESTIMATES'/)
      WRITE(LP,222) XCEN,YCEN,TKRIGE,KRGVAR
  222 FORMAT(/5X,'COORDINATES . . . X =',F12.4,'    Y =',F12.4/
     1 5X,'KRIGED ESTIMATE . . .',F14.5/
     2 5X,'KRIGING VARIANCE  . .',F14.5/)
      WRITE(LP,223)
  223 FORMAT(/5X,'OBSERVATIONS'//
     1 10X,'X',10X,'Y',10X,'VALUE',8X,'WEIGHT'/)
      DO 225 K=1,NUMPTS
      I1=IDENT(K)
      WRITE(LP,224) X(I1),Y(I1),T(I1),C(K)
  224 FORMAT(5X,F10.2,F10.2,F15.4,F14.5)
  225 CONTINUE
      WRITE(LP,227) C(NORDER)
  227 FORMAT(/5X,'LAGRANGE MULTIPLIER . .',F14.5/)
  230 RETURN
      END
      FUNCTION WBLVAR(DX,DY)
C
C    Function for calculating the variance within a rectangular
C    block with sides parallel and perpendicular to the co-ordinate
C    system using an equally weighted discrete approximation.
C
C    Arguments
C           DX DY  length of block in x and y directions
C
C    Requires  FUNCTION GAMMAH
C
C
      LOGICAL GEOISO
      COMMON /SEMMOD/ MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,PHI
     & ,PSIN,PCOS
      DATA NEST,R2NEST,RNSTSQ/8,0.0625,0.015625/
C
C    NEST should be an even number
C
      DINCX=R2NEST*DX
      DINCY=R2NEST*DY
      WBLVAR=0.0
      DO 10 I=1,NEST
         DO 10 J=1,NEST
            XBLCO=(FLOAT(2*I)-1.0)*DINCX
            YBLCO=(FLOAT(2*J)-1.0)*DINCY
            DO 10 K=1,NEST
                DO 10 L=1,NEST
                   XXBLCO=(FLOAT(2*K)-1.0)*DINCX
                   YYBLCO=(FLOAT(2*L)-1.0)*DINCY
                   WBLVAR=WBLVAR+GAMMAH(XBLCO,YBLCO,XXBLCO,YYBLCO)
   10 CONTINUE
      WBLVAR=WBLVAR*RNSTSQ*RNSTSQ
      RETURN
      END
      FUNCTION SEMAV(X,Y,XCEN,YCEN,DX,DY)
C
C    Function for calculating the semi-variance of a grid point
C    and a rectangular block with sides parallel and perpendicular
C    to the co-ordinate system using an equally weighted discrete
C    approximation.
C
C    Arguments
```

```
C           X    Y     co-ordinates of the grid point
C           XCEN YCEN  co-ordinates of the centre of the block
C           DX   DY    length of block in x and y directions
C
C     Requires  FUNCTION GAMMAH
C
C
      LOGICAL GEOISO
      COMMON /SEMMOD/ MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,PHI
     & ,PSIN,PCOS
      DATA NEST,R2NEST,RNSTSQ/8,0.0625,0.015625/
C
C     NEST should be an even number
C
      SUMGAM=0.0
      XEDGE=XCEN-DX*0.5
      YEDGE=YCEN-DY*0.5
      DINCX=R2NEST*DX
      DINCY=R2NEST*DY
      DO 10 I=1,NEST
         DO 10 J=1,NEST
         XBLKCO=XEDGE+(FLOAT(2*I)-1.0)*DINCX
         YBLKCO=YEDGE+(FLOAT(2*J)-1.0)*DINCY
         SUMGAM=SUMGAM+GAMMAH(X,Y,XBLKCO,YBLKCO)
   10 CONTINUE
      SEMAV = SUMGAM*RNSTSQ
      RETURN
      END
      FUNCTION GAMMAH(X1,Y1,X2,Y2)
C
C     Function for calculating the semi-variance between
C     two points.
C
C     Arguments
C           X1 Y1  co-ordinates of the first point
C           X2 Y2  co-ordinates of the second point
C           for all other arguments see FUNCTION SEMAV
C
C-----------------------------------------------------------
      LOGICAL GEOISO
      COMMON /SEMMOD/ MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,PHI
     & ,PSIN,PCOS
      GANISF(AA,CC,BB,SS)=SQRT(AA*AA*CC*CC+BB*BB*SS*SS)
      X1MX2=X1-X2
      Y1MY2=Y1-Y2
      H=SQRT(X1MX2*X1MX2+Y1MY2*Y1MY2)
      GOTO(10,20,30,40,50,60,70,80,90,100,110,120),MODTYP
C
C     isotropic linear model (no sill)
C
   10 GAMMAH=CO+GRAD*H
      RETURN
C
C     isotropic linear with sill model
C
   20 IF(H.LT.A1) GOTO 25
      GAMMAH=SILL
      RETURN
   25 GAMMAH=CO+GRAD*H
      RETURN
C
C     isotropic spherical model
C
   30 IF(H.LT.A1) GOTO 35
```

```
      GAMMAH = SILL
      RETURN
   35 HOVERA=H/A1
      GAMMAH=CO+C1*(1.5*HOVERA-0.5*HOVERA*HOVERA*HOVERA)
      RETURN
C
C     isotropic exponential model
C
   40 HOVERA=-H/A1
      GAMMAH = CO+C1*(1.0-EXP(HOVERA))
      RETURN
C
C     isotropic gaussian model
C
   50 HOVERA=H/A1
      HOVERA=-HOVERA*HOVERA
      GAMMAH = CO+C1*(1.0-EXP(HOVERA))
      RETURN
C
C      NESTED (2 STRUCTURE) SPHERICAL MODEL
C
   60 IF(H.LT.A2) GOTO 63
      GAMMAH=SILL
      RETURN
   63 IF(H.LT.A1) GOTO 67
      HOVER2=H/A2
      GAMMAH=CO+C1+C2*(1.5*HOVER2-0.5*HOVER2*HOVER2*HOVER2)
      RETURN
   67 HOVER1=H/A1
      HOVER2=H/A2
      GAMMAH=CO+C1*(1.5*HOVER1-0.5*HOVER1*HOVER1*HOVER1)
     &         +C2*(1.5*HOVER2-0.5*HOVER2*HOVER2*HOVER2)
      RETURN
C
C     anisotropic (gradient) linear model (no sill)
C
   70 THETA=ATAN(Y1MY2/(X1MX2+0.000001))
      COSANG=COS(THETA-PHI)
      SINANG=SIN(THETA-PHI)
      IF(GEOISO) GOTO 75
      GAMMAH=CO+(PCOS*COSANG*COSANG+PSIN*SINANG*SINANG)*H
      RETURN
   75 GAMMAH=CO+H*GANISF(PCOS,COSANG,PSIN,SINANG)
      RETURN
C
C     anisotropic (range) linear with sill model
C
   80 THETA=ATAN(Y1MY2/(X2MX2+0.000001))
      COSANG=COS(THETA-PHI)
      SINANG=SIN(THETA-PHI)
      IF(GEOISO) GOTO 82
      A1=PCOS*COSANG*COSANG+PSIN*SINANG*SINANG
      GOTO 83
   82 A1=GANISF(PCOS,COSANG,PSIN,SINANG)
   83 IF(H.LT.A1) GOTO 85
      GAMMAH=CO+C1
      RETURN
   85 GAMMAH=CO+H*C1/A1
      RETURN
C
C     anisotropic (range) spherical model
C
   90 THETA=ATAN(Y1MY2/(X1MX2+0.000001))
      COSANG=COS(THETA-PHI)
```

```
      SINANG=SIN(THETA-PHI)
      IF(GEOISO) GOTO 92
      A1=PCOS*COSANG*COSANG+PSIN*SINANG*SINANG
      GOTO 93
   92 A1=GANISF(PCOS,COSANG,PSIN,SINANG)
   93 IF(H.LT.A1) GOTO 95
      GAMMAH=C0+C1
      RETURN
   95 HOVERA=H/A1
      GAMMAH=C0+C1*(1.5*HOVERA-0.5*HOVERA*HOVERA*HOVERA)
      RETURN
C
C    anisotropic (range) exponential model
C
  100 THETA=ATAN(Y1MY2/(X1MX2+0.000001))
      COSANG=COS(THETA-PHI)
      SINANG=SIN(THETA-PHI)
      IF(GEOISO) GOTO 102
      A1=PCOS*COSANG*COSANG+PSIN*SINANG*SINANG
      GOTO 105
  102 A1=GANISF(PCOS,COSANG,PSIN,SINANG)
  105 HOVERA=-H/A1
      GAMMAH=C0+C1*(1.0-EXP(HOVERA))
      RETURN
C
C    anisotropic (range) gaussian model
C
  110 THETA=ATAN(Y1MY2/(X1MY2+0.000001))
      COSANG=COS(THETA-PHI)
      SINANG=SIN(THETA-PHI)
      IF(GEOISO) GOTO 112
      A1=PCOS*COSANG*COSANG+PSIN*SINANG*SINANG
      GOTO 115
  112 A1=GANISF(PCOS,COSANG,PSIN,SINANG)
  115 HOVERA=H/A1
      HOVERA=-HOVERA*HOVERA
      GAMMAH=C0+C1*(1.0-EXP(HOVERA))
      RETURN
  120 RETURN
      END
      SUBROUTINE INVERS(SYMMAT,ISDIM,ISIZE,IFAULT)
C
C    Subroutine for inverting a symmetric matrix, SYMMAT.
C    It requires a small (machine dependent) value for TOL
C    as a criterion of singularity.
C
C    Arguments
C           SYMMAT  the symmetric matrix, its inverse is returned
C                    in SYMMAT
C           ISDIM   the dimensions of SYMMAT (max set to 41)
C           ISIZE   the order of SYMMAT (max ISDIM)
C           IFAULT  error indicator.  A value of 0 is returned
C                   if inversion is successful, 1 if
C                   unsuccessful (matrix non positive definite).
C
C
      DOUBLE PRECISION SYMMAT(ISDIM,ISDIM),D(41),E(41),Y,W,TOL
      INTEGER Z(41),P
C
      DATA TOL/1.0D-12/
      DO 100 J=1,ISIZE
  100  Z(J)=J
      DO 160 I=1,ISIZE
        K=I
```

```
      Y=SYMMAT(I,I)
      L=I-1
      P=I+1
      IF(P.GT.ISIZE) GOTO 120
      DO 105 J=P,ISIZE
        W=SYMMAT(I,J)
        IF(DABS(W).LE.DABS(Y)) GOTO 105
        K=J
        Y=W
  105 CONTINUE
  120 IF(DABS(Y).LT.TOL) GOTO 200
      Y=1.0D0/Y
      DO 130 J=1,ISIZE
        E(J)=SYMMAT(J,K)
        SYMMAT(J,K)=SYMMAT(J,I)
        SYMMAT(J,I)=-E(J)*Y
        SYMMAT(I,J)=SYMMAT(I,J)*Y
  130   D(J)=SYMMAT(I,J)
C
      SYMMAT(I,I)=Y
      J=Z(I)
      Z(I)=Z(K)
      Z(K)=J
      DO 150 K=1,ISIZE
        IF(K.EQ.I) GOTO 150
        DO 140 J=1,ISIZE
          IF(J.EQ.I) GOTO 140
          SYMMAT(K,J)=SYMMAT(K,J)-D(J)*E(K)
  140   CONTINUE
  150 CONTINUE
  160 CONTINUE
C
      DO 190 I=1,ISIZE
  170   K=Z(I)
        IF(K.EQ.I) GOTO 190
        DO 180 J=1,ISIZE
          W=SYMMAT(I,J)
          SYMMAT(I,J)=SYMMAT(K,J)
  180     SYMMAT(K,J)=W
        P=Z(I)
        Z(I)=Z(K)
        Z(K)=P
        GOTO 170
  190 CONTINUE
      IFAULT=0
      GOTO 210
  200 IFAULT=1
  210 RETURN
      END
C
C
*-------------------------------------------------------------
C
C
      SUBROUTINE TARGEK(MARKER,NLX,NLY,LX,LY,MRKROW,MRKCOL,OUT,OUT2,
     +                  INTDIM,MX2FEW,MAXPNT,SQS)
        CHARACTER       PNTKR2, SETRA2, SETOU2,ISO2,GEOIS2,ISOSC2,DAT
           CHARACTER          INTMOD
        CHARACTER*3     ALL
        CHARACTER*40    WNAME
         REAL           X,Y,T,IBL(900),XP,YP,TP,VALMIS,XTGT,YTGT
        REAL           LX,LY,FMTDAT(16),TITLE(32),KRGEST(7500),
     +                 ESTVAR(7500),C2FEW(1000,2),FMTEST(16),DSTINC
        REAL          UNITSM,UNITCO,XLDAT,XHDAT,YLDAT,YHDAT,XLINT,
```

```
     +                XHINT,YLINT,YHINT,RADIUS,CO,GRAD,C1,A1,C2,A2,
     +                PHI,PSIN,PCOS,XSIDE,YSIDE
        INTEGER       INDEX(40),MARKER(40,40),IN2FEW(1000,2),
     +                IM2FEW(1000)
        INTEGER       OUT,OUT2,SEARCH,OUT1XY,OUT2XY,SQS,NTIMES
        INTEGER       NSPACE,NSITES,MINPTS,MAXPTS,MODTYP,IWT,SIN,
     +                SPLQUE
        INTEGER       NFOR,NFRE(4),NTIME(4),SN(500),WEAST,WNORTH,
     +                WPROP,WSITE,WDEPTH,IFLAG,NN,NTAGTS
        LOGICAL       NEWMAT,ISO,OUTSID,PNTKRG,KMETRE,DATAPT,
     +                SETRAD,SETOUT,GEOISO,ISOSCH
        COMMON       X(3500),Y(3500),T(3500),XLDAT,XHDAT,YLDAT,
     +               YHDAT,NSITES
        COMMON /SEMMOD/ MODTYP,CO,GRAD,C1,A1,C2,A2,SILL,GEOISO,
     +                  PHI,PSIN,PCOS
        COMMON /LOGIC/ NEWMAT,ISO,OUTSID,PNTKRG,KMETRE,DATAPT,
     +                 SETRAD,SETOUT,ISOSCH
        COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
        COMMON /KRIGCH/PNTKR2,SETRA2,SETOU2,ISO2,GEOIS2,ISOSC2,
     +                 ALL,DAT,INTMOD
        COMMON /KRINT/NSPACE,MINPTS,MAXPTS,IWT,OUT1XY,OUT2XY
     +, NTAGTS
        COMMON /CHSUBS/WNAME
        COMMON /INST/SIN,SPLQUE,SN
        COMMON /KRISPC/NN,XP(3500),YP(3500),TP(3500),VALMIS
     +,  XTGT(200),YTGT(200)
         COMMON /KRIRES/UNITSM,UNITCO,XLINT,XHINT,YLINT,YHINT,
     +                  RADIUS,XSIDE,YSIDE
*-----------------------------------------------------------------
*
        IJ=NTAGTS
      N2FEW=0
        IF(IJ.LE.INTDIM) GO TO 64
        WRITE(OUT,443)
        STOP
     64 DO 90 K=1,NTAGTS
          NROW=1
          NCOL=1
          DO 90 I=1,NROW
           YC=YTGT(K)
            DO 90 J=1,NCOL
             XC=XTGT(K)
            IJ=(J-1)*NROW+I
        IF(IJ.LT.INTDIM) GOTO 65
        WRITE(OUT,443)
    443 FORMAT(10X,'TOO MANY INTERPOLATIONS')
        STOP
     65     OUTSID=.FALSE.
            IF(XC.LT.XLDAT.OR.XC.GT.XHDAT) OUTSID=.TRUE.
            IF(YC.LT.YLDAT.OR.YC.GT.YHDAT) OUTSID=.TRUE.
            IF(OUTSID) GOTO 80
C
C       find points for interpolation
C
        CALL FNDPT1(XC,YC,LX,LY,NLX,NLY,RADIUS,ISOSCH,MARKER,MRKROW,
       & MRKCOL,INDEX,MAXPTS,PNTKRG,NEWMAT,DATAPT,SQS,NFOUND)
        IF (NFOUND.GT.MAXPTS) NFOUND=MAXPTS
        IF(.NOT.DATAPT) GOTO 70
        INDEX1=INDEX(1)
        KRGEST(IJ)=T(INDEX1)
        ESTVAR(IJ)=0.0
        SEARCH=0
        IF(OUT1XY.EQ.1)WRITE(OUT,118) SEARCH,XC,YC,KRGEST(IJ),ESTVAR(IJ)
        IF(OUT2XY.EQ.1)WRITE(OUT2,'(1X,4E20.6)')XC,YC,KRGEST(IJ),
```

```
     +    ESTVAR(IJ)
      GOTO 90
C
C     interpolate
C
   70 IF(NFOUND.GT.MINPTS) GOTO 71
      N2FEW=N2FEW+1
      IF(N2FEW.LE.MX2FEW) GOTO 72
      WRITE(OUT,121)
  121 FORMAT(10X,'**** TOO MANY INTERPOLATIONS REQUIRE'
     & ,1X,'MORE DATA POINTS'/10X,'INCREASE SEARCH RADIUS'//)
      STOP
   72 C2FEW(N2FEW,1)=XC
      C2FEW(N2FEW,2)=YC
      IN2FEW(N2FEW,1)=I
      IN2FEW(N2FEW,2)=J
      GOTO 90
   71 IFAIL=0
      CALL KRG32S(XC,YC,KRGEST(IJ),ESTVAR(IJ),NEWMAT,
     & NFOUND,INDEX,PNTKRG,XSIDE,YSIDE,VARWBL,IFAIL,OUT,IWT)
      IF(IFAIL.NE.0) WRITE(OUT,116) IFAIL,IJ,XC,YC
C
  116 FORMAT(2X,'***** IFAIL =',I3,'  INTERPOLATION NO',I5,
     & 'X CENTRE =',F6.3,'  YCENTRE =',F6.3)
  117 FORMAT(2X,'SEARCH',I2,2X,'XC= ',F12.4,2X,'YC= ',F12.4,2X,
     & 'KRGEST= ',F13.4,2X,'ESTVAR= ',E13.6,' NUMBER OF POINTS= ',I3)
  118 FORMAT(2X,'SEARCH',I2,2X,'XC= ',F12.4,2X,'YC= ',F12.4,2X,
     & 'KRGEST= ',F13.4,2X,'ESTVAR= ',E13.6)
C
      SEARCH=1
      IF(OUT1XY.EQ.1)WRITE(OUT,117) SEARCH,XC,YC,KRGEST(IJ),
     +   ESTVAR(IJ),NFOUND
      IF(OUT2XY.EQ.1)WRITE(OUT2,'(1X,4E14.6)')XC,YC,KRGEST(IJ),
     +     ESTVAR(IJ)
      GOTO 90
   80 KRGEST(IJ)=VALMIS
      SEARCH=0
      ESTVAR(IJ)=VALMIS
      WRITE(OUT,118) SEARCH,XC,YC,KRGEST(IJ),ESTVAR(IJ)
   90 CONTINUE
          RETURN
          END
*-------------------------------------------------------------
              SUBROUTINE SVARIN
C.
C.
C. Routine SVARIN reads instructions from the instructions file
C. MANI.DAT and sets parameters required by routine SVAREX for
C. the computation of semi-variances and construction of the
C. the SEMI-VARIOGRAM. This routine precedes routine SVARIO which
C. reads data and serves as steering program for data selection.
C.
C.
        CHARACTER      CROS2,ANGRE2,DASEL
        CHARACTER*3    ALL
        CHARACTER*40    WNAME
        LOGICAL        CROSS
        INTEGER       ILOG,IDIR,IGHOST,ICOLOR,NPTS,SN(500),SIN,SPLQUE
        REAL           STEP,THETA(10),PSI(10),SCALE,WIDTH,SEMMAX,LEAST,
     &                 HEAST,LNORTH,HNORTH,XCHEL,YCHEL
        COMMON /EAST/ PSI,THETA
        COMMON         STEP,ILOG,IDIR,IGHOST,SCALE,WIDTH,ICOLOR,SEMMAX,
     &                 XCHEL,YCHEL,CROSS
        COMMON /CHSVAR/ CROS2,ANGRE2,DASEL,ALL
```

```
      COMMON /IRSVAR/ LEAST,HEAST,LNORTH,HNORTH,NPTS
      COMMON /CHSUBS/ WNAME
      COMMON /INST/ SIN SPLQUE,SN
*-----------------------------------------------------------------
      READ(23,'(1X,A)') CROS2
      IF(CROS2.EQ.'F')CROSS=.FALSE.
      IF(CROS2.EQ.'T')CROSS=.TRUE.
      READ(23,'(1X,A40)')WNAME
      READ(23,'(1X,A)') ALL
      IF(ALL.EQ.'Y')THEN
       READ(23,'(1X,A3)')ALL
      ELSE IF(ALL.EQ.'N')THEN
       READ(23,'(1X,A)')DASEL
       IF(DASEL.EQ.'A')THEN
       READ(23,*) LEAST,HEAST,LNORTH,HNORTH
       ELSE IF(DASEL.EQ.'S')THEN
       READ(23,*) NPTS
        DO 90 I=1,NPTS
         READ(23,*) SN(I)
90      CONTINUE
       END IF
      END IF
      READ(23,*) ILOG,IDIR,STEP
       DO 91 I=1,IDIR
        READ(23,*) THETA(I),PSI(I)
91     CONTINUE
       READ(23,*)IGHOST,SCALE,WIDTH,ICOLOR,SEMMAX
       RETURN
        END
*-----------------------------------------------------------------
           SUBROUTINE SVARIO( IBL,NFOR,NFRE,NTIME )
C.
C. Subroutine SVARIO serves as a link between sub-routine SVARIN
C. which reads instructions and sub-routine SVAREX which executes
C. the calculations for the SEMI-VARIOGRAM. SVARIO reads and steers
C. the relevant data according to the selection criterion chosen,
C. and sets all relevant parameters for the execution of SVAREX.
C.
      CHARACTER     CROS2,ANGRE2,DASEL
      CHARACTER*3   ALL
      CHARACTER*40   WNAME
      LOGICAL       CROSS
      INTEGER      ILOG,IDIR,IGHOST,ICOLOR,NPTS,SN(500),SIN,SPLQUE
      INTEGER      NFOR,NFRE(4),NTIME(4),WSITE,WDEPTH,WPROP,
     &             WEAST,WNORTH,NN
      REAL          STEP,THETA(10),PSI(10),SCALE,WIDTH,SEMMAX,LEAST,
     &             HEAST,LNORTH,HNORTH,XCHEL,YCHEL,IBL(900)
      REAL          XI(3500),YI(3500),ZI(3500),TI(3500)
      COMMON /EAST/ PSI,THETA
      COMMON        STEP,ILOG,IDIR,IGHOST,SCALE,WIDTH,ICOLOR,SEMMAX,
     &             XCHEL,YCHEL,CROSS
      COMMON /CHSVAR/ CROS2,ANGRE2,DASEL,ALL
      COMMON /IRSVAR/ LEAST,HEAST,LNORTH,HNORTH,NPTS
      COMMON /CHSUBS/ WNAME
      COMMON /INST/ SIN SPLQUE,SN
      COMMON /CHECK/ WPROP,WSITE,WDEPTH,WEAST,WNORTH
       COMMON /SEMIR/ XI,YI,ZI,TI,NN
*-----------------------------------------------------------------
      CALL FINDNA( NFOR,NFRE )
      CALL FINDSI( NFOR,NFRE )
C. Steering data by the selection criterion
          IFLAG=0
      IF(CROSS)GOTO 59
      IF(ALL.EQ.'ALL')THEN
```

```
          IFLAG=1
          NN=NN+1
          GOTO 200
         ELSE IF(ALL.EQ.'N')THEN
          IF(DASEL.EQ.'A')THEN
           LESTE=NINT(LEAST)
           IESTE=NINT(HEAST)
           LNORTE=NINT(LNORTH)
           INORTE=NINT(HNORTH)
           IBLEAS=NINT(IBL(WEAST))
           IBLNOR=NINT(IBL(WNORTH))
           IF(IBLEAS.GE.LESTE.AND.IBLEAS.LE.IESTE)THEN
             IF(IBLNOR.GE.LNORTE.AND.IBLNOR.LE.INORTE)THEN
               IFLAG=1
               NN=NN+1
               GOTO 200
             END IF
           END IF
          ELSE IF(DASEL.EQ.'S')THEN
           DO 90 I=NPTS
           IF((REAL(SN(I))-IBL(WSITE)).LT.0.001)THEN
              IFLAG=1
              NN=NN+1
              GOTO 200
           END IF
90         CONTINUE
          END IF
           END IF
200       CONTINUE
          IF(IFLAG.EQ.1)THEN
           XI(NN)=IBL(WEAST)
           YI(NN)=IBL(WNORTH)
           DO 66 J=1,NFOR
           IF(J.EQ.2)THEN
            WPROP=WPROP+NFRE(J-1)
           END IF
66         CONTINUE
           ZI(NN)=IBL(WPROP)
           VALMIS=-1.0
           SEMMAX=0.0
          END IF
          GOTO 150
59        PRINT*,'CROSS SEMI-VARIOGRAM NOT CURRENTLY AVAILABLE'
150       RETURN
          END
*-------------------------------------------------------------
                SUBROUTINE SVAREX( IBL,NFOR,NFRE,NTIME )
         INTEGER      OUTPUT,IOUT2,NN,NSITES
         INTEGER      ILOG,IDIR,IGHOST,ICOLOR
         INTEGER      NFOR,NFRE(4),NTIME(4)
         REAL         STEP,SCALE,WIDTH,SEMMAX,XCHEL,YCHEL
         REAL         XI(3500),YI(3500),ZI(3500),TI(3500)
         REAL         IBL(900)
        REAL X(3500),Y(3500),Z(3500),T(3500)
        REAL PSI(10),FMT(20),THETA(10)
        LOGICAL CROSS
         COMMON /EAST/PSI,THETA
        COMMON        STEP,ILOG,IDIR,IGHOST,SCALE,WIDTH
       &       ,ICOLOR,SEMMAX,XCHEL,YCHEL,CROSS,IOUT2
          COMMON /SEMIR/XI,YI,ZI,TI,NN
         DATA IOUT2,OUTPUT/19,22/
C-------------------------------------------------------------
C                         read data
C
```

```
         VALMIS=-1.0
         SEMMAX=0.0
        NSITES=0
        DO 90 N=1,NN
        IF((Z(N)-VALMIS).GT.0.001)THEN
          NSITES=NSITES+1
          X(N)=XI(N)
          Y(N)=YI(N)
          Z(N)=ZI(N)
        END IF
90      CONTINUE
       WRITE (OUTPUT,5)
         N=NSITES
       WRITE (OUTPUT,7) N
       IF(ILOG.EQ.1) WRITE(OUTPUT,8)
     2 FORMAT  (20A4)
     4 FORMAT(A4)
     5 FORMAT (1H1,////15X,'SPATIAL DEPENDENCE ANALYSIS OF IRREGULARLY'
      &,' SCATTERED 2D DATA'/)
     7 FORMAT (15X,19HNUMBER OF SAMPLES =,I8)
     8 FORMAT(15X,'DATA TRANSFORMED TO NATURAL LOGARITHMS')
       XCHEL=STEP*40.0
       YCHEL=2.0
          VALMIS=-0.000000001
       CALL VARIO(X,Y,Z,T,N,VALMIS)
       STOP
       END
       SUBROUTINE VARIO(X,Y,Z,T,N,VALMIS)
C
C----------ROUTINE VARIO----------
C
C   FUNCTION      COMPUTING OF SEMI-VARIOGRAMS IN SEVERAL DIRECTIONS
C
C
C   CAPACITY                  3500 SAMPLES
C                             10  DIRECTIONS
C
C   REQD. ROUTINES            GRAPH
C
C ---------------------------------
C
       DIMENSION DISTOT(40),BFF(40),S1(40),S2(40)
       DIMENSION X(3500),Y(3500),Z(3500),T(3500)
       DIMENSION XG(42),YG(42)
       REAL MOY,MOYT,M1,M2,PSI(10),THETA(10)
       INTEGER BFF,BINF,BSUP,OUTPUT
       LOGICAL CROSS
       COMMON/EAST/PSI,THETA
       COMMON     STEP,ILOG,IDIR,IGHOST,SCALE,WIDTH
      &       ,ICOLOR,SEMMAX,XCHEL,YCHEL,CROSS,IOUT2
        DATA IOUT2,OUTPUT/19,22/
     2 FORMAT(1H ,68X,'CROSS')
     3 FORMAT(1H ,12X, 'DISTANCE IN UNITS    NO. OF PAIRS',
      1    7X,'DRIFT       SEMI-VARIOGRAM          AVERAGE DISTANCE'//)
     4 FORMAT (1H ,12X,I4,5H ----,I4, 8X,I8,7X,E10.3,4X,
      1    E13.4,14X,F6.1)
     5 FORMAT(2X,F11.4,F7.2,E12.4,I8)
3500  FORMAT (1H1,52X,27HS E M I - V A R I O G R A M///
     1         1H ,38X,19H( WITH A FIELD OF  ,F6.2,
     1         31H DEGREES IN EACH DIRECTION    )/
     1         1H ,100X,16(1H.))
4500  FORMAT(1H1,47X,38HC R O S S  S E M I - V A R I O G R A M///
     1       1H ,38X,19H( WITH A FIELD OF  ,F6.2,
     1       31H DEGREES IN EACH DIRECTION    )/
```

```
     1       1H ,100X,16(1H.))
  501 FORMAT (1H ,100X,1H.,14X,1H.)
  502 FORMAT(1H ,100X,1H.,5X,A4,5X,1H.)
  503 FORMAT (1H ,27HSTEP IN UNITS              = ,E11.4,
     1             62X,16(1H.)/)
  504 FORMAT (1H ,27HGENEPAL MEAN OF T          = ,E11.4)
  505 FORMAT (1H ,100X,1H.,14X,1H.)
  506 FORMAT (1H ,27HGENERAL MEAN OF Z          = ,E11.4,62X,
     1             1H.,4X,F6.2,4X,1H.)
  507 FORMAT (1H ,27HGENERAL VARIANCE OF Z      = ,E11.4,62X,
     1             16(1H.) /)
  508 FORMAT (1H ,27HGENERAL COVARIANCE OF ZT = ,E11.4)
  509 FORMAT (1H ,27HGENERAL VARIANCE OF T      = ,E11.4)
  510 FORMAT(1H )
C
C                EACH DIRECTION IS CONSIDERED IN ITS TURN
C
      IF(IGHOST.NE.1) GOTO 50
      CALL PAPER(1)
      SEPDIS=0.1
      YL=SEPDIS
      YH=0.0
      CYH=0.0
   50 DO 155 L1=1,IDIR
      APSI=3.141592*PSI(L1)/360.0
      T1=COS(APSI)
      ATHETA=3.141592*THETA(L1)/180.0
      CA=COS(ATHETA)
      SA=SIN(ATHETA)
      DO 100 LP2=1,40
      BFF(LP2)=0
      DISTOT(LP2)=0.0
      S1(LP2)=0.0
  100 S2(LP2)=0.0
C
C          FOR L1=1 (1ST DIRECTION),MOY AND VRNCE
C           ARE COMPUTED
C
      IF(L1.GT.1) GO TO 112
      IF(CROSS) GOTO 105
      MOY=RMEAN(Z,N,VALMIS)
      VRNCE=COVAR(Z,Z,N,VALMIS)
      GOTO 110
  105 MOY=RMEAN(Z,N,VALMIS)
      MOYT=RMEAN(T,N,VALMIS)
      VRNT=COVAR(T,T,N,VALMIS)
      VRNZ=COVAR(Z,Z,N,VALMIS)
      VRNZT=COVAR(Z,T,N,VALMIS)
      VRNCE=COVAR(Z,T,N,VALMIS)
  110 ECHEL=YCHEL*VRNCE
C
C          GIVEN A DIRECTION ( L1) ALL POSSIBLE PAIRS
C           OF SAMPLES ARE INVESTIGATED.   IF THE
C           DIRECTION OF THE LINE JOINING THE POINTS OF
C           A PAIR FALLS BETWEEN THE ANGULAR LIMITS
C           AROUND THETA , THE PAIR IS RETAINED AND ITS
C           CONTRIBUTION TO SEMI-VARIOGRAM AND DRIFT IS
C           CALCULATED
C
  112 DO 145 LP1=1,N
      IF(Z(LP1)+VALMIS.LE.0.0) GOTO 145
      IF(.NOT.CROSS) GOTO 114
      IF(T(LP1)+VALMIS.LE.0.0) GOTO 145
  114 I2=LP1+1
```

```
      IF(I2.GT.N) GO TO 145
      DO 146 LP2=I2,N
      IF(Z(LP2)+VALMIS.LE.0.0) GOTO 146
      IF(.NOT.CROSS) GOTO 115
      IF(T(LP2)+VALMIS.LE.0.0) GOTO 146
  115 D2=(X(LP1)-X(LP2))*(X(LP1)-X(LP2))+(Y(LP1)-Y(LP2))*
     &     (Y(LP1)-Y(LP2))
      IF(D2.LT.0.000001) GO TO 146
      D1=SQRT(D2)
      CC=(X(LP1)-X(LP2))*CA/D1+(Y(LP1)-Y(LP2))*SA/D1
      CC1=ABS(CC)
      IF(CC1.GE.T1) GO TO 400
      GO TO 146
  400 RR=D1/STEP
      IF(RR-40.) 140,146,146
  140 IC=RR+1.
      DELTZ=CC*(Z(LP1)-Z(LP2))/CC1
      IF(.NOT.CROSS) GOTO 142
      DELTT=CC*(T(LP1)-T(LP2))/CC1
  142 BFF(IC)=BFF(IC)+1
      S1(IC)=S1(IC)+DELTZ
      IF(CROSS) GOTO 143
      S2(IC)=S2(IC)+DELTZ*DELTZ
      GOTO 144
  143 S2(IC)=S2(IC)+DELTZ*DELTT
  144 DISTOT(IC)=DISTOT(IC)+D1
  146 CONTINUE
  145 CONTINUE
C
C          WRITING OF RESULTS
C
  216 ITEN=INAME
  217 IF(CROSS) GOTO 148
      WRITE (OUTPUT,3500) PSI(L1)
      WRITE (OUTPUT,501)
      WRITE (OUTPUT,502) ITEN
      WRITE (OUTPUT,501)
      WRITE (OUTPUT,503) STEP
      WRITE (OUTPUT,505)
      WRITE (OUTPUT,506) MOY,THETA(L1)
      WRITE (OUTPUT,505)
      WRITE (OUTPUT,507) VRNCE
      GOTO 149
  148 WRITE(OUTPUT,4500) PSI(L1)
      WRITE(OUTPUT,501)
      WRITE(OUTPUT,502) ITEN
      WRITE(OUTPUT,501)
      WRITE(OUTPUT,503) STEP
      WRITE(OUTPUT,505)
      WRITE(OUTPUT,506) MOY,THETA(L1)
      WRITE(OUTPUT,505)
      WRITE(OUTPUT,507) VRNZ
      WRITE(OUTPUT,510)
      WRITE(OUTPUT,504) MOYT
      WRITE(OUTPUT,510)
      WRITE(OUTPUT,509) VRNT
      WRITE(OUTPUT,510)
      WRITE(OUTPUT,508) VRNZT
  149 IF(CROSS) WRITE(OUTPUT,2)
      WRITE(OUTPUT,3)
      IPT=0
      IF(CROSS) ECHEL=-1.0E-10
      DO 153 LP2=1,40
      IF(BFF(LP2)) 153,153,150
```

```
  150 M1=S1(LP2)/FLOAT(BFF(LP2))
      M2=0.5*S2(LP2)/FLOAT(BFF(LP2))
      DISMOY=DISTOT(LP2)/FLOAT(BFF(LP2))
      BINF=STEP*LP2-STEP
      BSUP=STEP*LP2
      IPT=IPT+1
      XG(IPT)=DISMOY
      YG(IPT)=M2
      IF(.NOT.CROSS) GOTO 152
      IF(M2.GT.ECHEL) ECHEL=M2
  152 WRITE (OUTPUT,4)BINF,BSUP,BFF(LP2),M1,M2,DISMOY
      IF(IOUT2.NE.0) WRITE(IOUT2,5) DISMOY,THETA(L1),M2,BFF(LP2)
  153 CONTINUE
C
C.... GHOST OUTPUT
C
      IF(IGHOST.NE.1) GOTO 154
      XL=0.1
      XH=0.1+SCALE*0.8*WIDTH
      YL=CYH+SEPDIS
      YH=CYH+SEPDIS+SCALE*0.8
      CYL=YL-SEPDIS*0.5
      CYH=YH+SEPDIS*0.5
      IF(CYH.LT.0.95) GOTO 745
      CALL FRAME
      YL=SEPDIS
      YH=SEPDIS+SCALE*0.8
      CYL=YL-0.5*SEPDIS
      CYH=YH+0.5*SEPDIS
  745 XMIN=0.0
      XMAX=XMIN
      YMIN=0.0
      YMAX=SEMMAX
      DO 750 L=2,40
      XMAX=AMAX1(XMAX,XG(L))
  750 YMAX=AMAX1(YMAX,YG(L))
      RY=(YMAX-YMIN)/6.0
      RYHALF=0.5*RY
      XTRA=(XMAX-XMIN)*0.01
      CALL MAP(XMIN,XMAX+XTRA,YMIN,YMAX+RYHALF)
      CALL PSPACE(XL,XH,YL,YH)
      CALL CSPACE(0.0,XH+0.1,CYL,CYH)
      SIZE=SCALE*7.0+1.0
      IMAG=INT(SIZE)
      CALL CTRMAG(IMAG)
      CALL BLKPEN
      CALL AXES
      IF(ICOLOR.NE.0) CALL GRNPEN
      CALL PTPLOT(XG,YG,1,40,45)
      IF(ICOLOR.NE.0) CALL REDPEN
      IMAG=IMAG+1
      CALL CTRMAG(IMAG)
C      CALL CTRSET(8)
      RX=5.0*(XMAX-XMIN)/80.0
      CALL PLOTCS(XMIN+RX,YMAX+RY,ITITLE,80)
      CALL POSITN(XMIN+RX,YMAX+RYHALF)
      CALL TYPECS(' Direction =  ',14)
      CALL TYPENF(THETA(L1),1)
      CALL TYPECS(' degrees with a regularisation of  ',35)
      CALL TYPENF(PSI(L1),2)
      CALL TYPECS(' degrees.',9)
      YHALF=0.5*(YMAX-YMIN)
      XHALF=0.5*(XMAX-XMIN)
      CALL POSITN(XHALF-RX,YMIN-RYHALF)
```

```
      CALL TYPECS('h  Average distance',19)
C      CALL CTRSET(4)
      TWORX=2.0*RX
      CALL POSITN(XMIN-TWORX,YHALF)
      CALL TYPENC(13)
C      CALL CTRSET(8)
      CALL TYPECS('(h)',3)
C
C          ROUTINE GRAPH IS CALLED FOR A GRAPHICAL
C           REPRESENTATION OF THE SEMI-VARIOGRAM
C
  154 IPT=IPT+1
      IF(CROSS) ECHEL=ECHEL*1.2
      XG(IPT)=0.0
      YG(IPT)=0.0
      IPT=IPT+1
      XG(IPT)=XCHEL
      YG(IPT)=ECHEL
      CALL GRAPH(XG,YG,IPT,L1)
  155 CONTINUE
C      CALL GREND
      RETURN
      END
      SUBROUTINE GRAPH(X,Y,N,L1)
C
C----------ROUTINE GRAPH----------
C
C   FUNCTION     GRAPHICAL REPRESENTATION OF A SEMI-VARIOGRAM
C
C   PARAMETERS   X       DISTANCE
C                Y       SEMI-VARIOGRAM
C                N       NUMBER OF PAIRS X-Y   2
C                L1      INDEX OF THE DIRECTION UNDER STUDY
C                XCHEL   UPPER LIMIT OF THE DISTANCE IN THE
C                           GRAPHICAL REPRESENTATION
C                           ( STORED IN X(N) )
C                YCHEL   *VRNCE , UPPER LIMIT OF THE
C                           SEMI-VARIOGRAM VALUES IN THE GRAPHICAL
C                           REPRESENTATION
C                           ( STORED IN Y(N) )
C
C   CAPACITY                N=42
C
C--------------------------------
C
      DIMENSION X(42),Y(42),ABS(11)
      DIMENSION IX(100),IY(100),IVEC(100)
      REAL PSI(10),THETA(10)
      LOGICAL CROSS
      COMMON/EAST/PSI,THETA
      COMMON   STEP,ILOG,IDIR,IGHOST,SCALE,WIDTH
     &        ,ICOLOR,SEMMAX,XCHEL,YCHEL,CROSS,IOUT2
      INTEGER BLAN,STAR,OUTPUT
       DATA IOUT2,OUTPUT/19,22/
      DATA BLAN,STAR/1H ,1H*/
   20 FORMAT (1H ,19X,1H ,9(10H********* ),9H******** )
   21 FORMAT (/1H ,18X,10(E9.2,1X),E9.2/)
   22 FORMAT(1H ,65X,16HAVERAGE DISTANCE)
   10 FORMAT (1H ,7X,E9.2,1X,1H*,1X,100A1)
150     FORMAT(1H,7X,F6.2,6X,F6.2/)
      WRITE (OUTPUT,150) THETA(L1),PSI(L1)
      IPM=N-1
      XMAX=X(N)
      XMIN=X(IPM)
```

```
      YMAX=Y(N)
      YMIN=Y(IPM)
      N=N-2
      XSTEP=(XMAX-XMIN)/99
      YSTEP=(YMAX-YMIN)/49.
      YHAUT=YMAX
      XBAS=XMIN
      DO 106 I=1,N
      DO 100 K=1,100
      IF(K.EQ.100) XMIN=XMAX
      IF(X(I).LE.XMIN) GO TO 105
      XMIN=XMIN+XSTEP
      IF(XMIN.GE.XMAX) GO TO 107
      GO TO 100
  105 IX(I)=K
      GO TO 106
  100 CONTINUE
  106 XMIN=XBAS
  107 N=I-1
      DO 116 I=1,N
      DO 110 K=1,50
      IF(K.EQ.50) YMAX=YMIN
      IF(Y(I).GE. YMAX) GO TO 115
      YMAX=YMAX-YSTEP
      GO TO 110
  115 IY(I)=K
      GO TO 116
  110 CONTINUE
  116 YMAX=YHAUT
      DO 140 K=1,100
  140 IVEC(K)=BLAN
      DO 125 I=1,50
      DO 120 J=1,N
      IF(IY(J).NE.I) GO TO 120
  119 IPOS=IX(J)
      IVEC(IPOS)=STAR
  120 CONTINUE
      GRAD=YHAUT-(I-1)*YSTEP
      WRITE (OUTPUT,10)     GRAD,IVEC
      DO 125 LP1=1,100
  125 IVEC(LP1)=BLAN
      WRITE (OUTPUT,20)
      DO 130 I=1,10
  130 ABS(I)=XBAS+(I-1)*10.*XSTEP
      ABS(11)=ABS(10)+9*XSTEP
      WRITE (OUTPUT,21) ABS
      WRITE (OUTPUT,22)
      RETURN
      END
      REAL FUNCTION RMEAN (ARRAY1,NDIM,VALMIS)
      REAL ARRAY1(1)
      RMEAN=0.0
      N=0
      DO 10 I=1,NDIM
      IF(ARRAY1(I)+VALMIS.LE.0.0) GOTO 10
      RMEAN=RMEAN+ARRAY1(I)
   10 CONTINUE
      RMEAN=RMEAN/NDIM
      RETURN
      END
      REAL FUNCTION COVAR (ARRAY1,ARRAY2,NDIM,VALMIS)
      REAL ARRAY1(1),ARRAY2(1),RMEAN1,RMEAN2
      RMEAN1=0.0
      RMEAN2=0.0
```

```
      COVAR=0.0
      N=0
      DO 10 I=1,NDIM
      IF(ARRAY1(I)+VALMIS.LE.0.0) GOTO 10
      N=N+1
      RMEAN1=RMEAN1+ARRAY1(I)
   10 CONTINUE
      RMEAN1=RMEAN1/N
      N=0
      DO 15 I=1,NDIM
      IF(ARRAY2(I)+VALMIS.LE.0.0) GOTO 15
      N=N+1
      RMEAN2=RMEAN1+ARRAY2(I)
   15 CONTINUE
      RMEAN2=RMEAN2/N
      N=0
      DO 20 I=1,NDIM
      IF (ARRAY1(I)+VALMIS.LE.0.0) GOTO 20
      IF(ARRAY2(I)+VALMIS.LE.0.0) GOTO 20
      N=N+1
      COVAR=COVAR+(ARRAY1(I)-RMEAN1)*(ARRAY2(I)-RMEAN2)
   20 CONTINUE
      COVAR=COVAR/(N-1)
      RETURN
      END
*-------------------------------------------------------------
        SUBROUTINE LAYER(N,X,Y,DTH,DTH1,DTH2,FE)
        INTEGER       N,SIN,SPLQUE
        REAL          ISPL(426),DH,HIDTH,LODTH,VA,VAGT,VALT
        DOUBLE PRECISION   X(6),Y(6),DTH,FE,DTH1,DTH2
        COMMON /RISPL/ISPL
        COMMON /INST/SIN,SPLQUE
        COMMON /RINST/DH,HIDTH,LODTH,VA,VAGT,VALT
*-------------------------------------------------------------
C.
C.
C
C Subroutine LAYER interpolates values of soil properties down the
c soil depth drowing the data wanted from "stepped" profiles'layers
C Subfacilities available are the same as for spline depth functions.
C
C
C Execution of the Spline facility selected.
C
C
         GO TO(1,2,3,4,5)DEQUE
1       DTH=DBLE(DH)
        CALL INTSIM(N,X,Y,DTH)
         GOTO 100
2       DTH1=DBLE(HIDTH)
        DTH2=DBLE(LODTH)
        CALL INTAVE(N,X,Y,DTH1,DTH2)
        GOTO 100
3       FE=DBLE(VA)
        CALL INTDEP(N,X,Y,FE)
        GOTO 100
4       FE=DBLE(VAGT)
        CALL INTGT(N,X,Y,FE)
        GOTO 100
5       FE=DBLE(VALT)
        CALL INTLT(N,X,Y,FE)
100      CONTINUE
        RETURN
        END
```

```
*-------------------------------------------------------------
C.
C.
              SUBROUTINE INTSIM( N,X,Y,DTH )
C.
C.
       INTEGER     N
       DOUBLE PRECISION     X(6),Y(6),DTH
       REAL                 ISPL(426)
       COMMON /RISPL/ISPL
*-------------------------------------------------------------
C.
C.Search for the position of depth wanted, layer by layer and assign
C. to ISPL the value of the corresponding layers limit.
c.
        DO 120 I=1,N
       IF(I.EQ.1)THEN
        IF((DTH).LT.SNGL(X(I)))THEN
         ISPL(11)=SNGL(Y(I))
         GOTO 100
        ELSE IF(ABS(SNGL(DTH)-SNGL(X(I))).LT.0.001)THEN
         ISPL(11)=SNGL(Y(I))
         GOTO 100
        END IF
       ELSE IF(I.GT.1)THEN
        IF(SNGL(DTH).LT.SNGL(X(I)).AND.SNGL(DTH).GT.SNGL(X(I-1)))THEN
         ISPL(11)=SNGL(Y(I))
          GOTO 100
        ELSE IF(ABS(SNGL(DTH)-SNGL(X(I))).LT.0.001)THEN
         ISPL(11)=SNGL(Y(I))
          GOTO 100
        END IF
        END IF
120    CONTINUE
100     ISPL(5)=SNGL(DTH)
         DO 99 J=6,10
          ISPL(J)=-1.0
99       CONTINUE
        RETURN
         END
*-------------------------------------------------------------
C.
C.
             SUBROUTINE INTAVE(N,X,Y,DTH1,DTH2)
C.
C.
        INTEGER     N
        REAL        ISPL(426),AVG,SUM,COUNT
        DOUBLE PRECISION    X(6),Y(6),DTH1,DTH2
        COMMON /RISPL/ISPL
*-------------------------------------------------------------
C.
C.
       DO 99 I=1,N
       IF(I.EQ.1)THEN
        IF(SNGL(DTH2).LT.SNGL(X(I)).OR.ABS(SNGL(DTH2)-SNGL(X(I))).LT.
     &  0.001)THEN
        AVG=SNGL(Y(I))
        GOTO 100
        ELSE IF(SNGL(DTH1).LT.SNGL(X(I)))THEN
        IFLAG=1
        SUM=SUM+SNGL(Y(I))
        COUNT=COUNT+1.0
        END IF
```

```
        ELSE IF(I.GT.1)THEN
         IF(IFLAG.EQ.1)THEN
          IF(SNGL(DTH2).LT.SNGL(X(I)).OR.ABS(SNGL(DTH2)-SNGL(X(I)))
     &    .LT.0.001)THEN
          SUM=SUM+SNGL(Y(I))
          COUNT=COUNT+1.0
          GOTO 50
          ELSE
          SUM=SUM+SNGL(Y(I))
          COUNT=COUNT+1.0
          END IF
         ELSE
          IF(SNGL(DTH2).LT.SNGL(X(I)).OR.ABS(SNGL(DTH2)-SNGL(X(I)))
     &    .LT.0.001)THEN
          AVG=SNGL(Y(I))
          GOTO 100
          ELSE IF(SNGL(DTH1).LT.SNGL(X(I)))THEN
          IFLAG=1
          SUM=SUM+SNGL(Y(I))
          COUNT=COUNT+1.0
          END IF
         END IF
        END IF
99     CONTINUE
50     AVG=SUM/COUNT
100    ISPL(5)=SNGL(DTH1)
       ISPL(6)=SNGL(DTH2)
       IF(SNGL(DTH2).GT.SNGL(X(N)))THEN
        DO 90 K=7,11
        ISPL(K)=-1.0
90      CONTINUE
       ELSE
        DO 95 K=7,10
         ISPL(K)=-1.0
95      CONTINUE
         ISPL(11)=AVG
       END IF
       RETURN
       END
*-----------------------------------------------------------------
C.
C.
                    SUBROUTINE INTDEP(N,X,Y,FE)
C.
C.
        INTEGER         N,KOUNT,HOR(6)
        REAL            ISPL(426),RMAX,RMIN
        DOUBLE PRECISION X(6),Y(6),FE
        COMMON /RISPL/ISPL
*-----------------------------------------------------------------
C.
C. Finds max and min values of Y
C.
        RMAX=0.0
        RMIN=10000000000.0
       DO 90 I=1,N
        IF(SNGL(Y(I)).GT.RMAX)THEN
         RMAX=SNGL(Y(I))
        ELSE IF(SNGL(Y(I)).LT.RMIN)THEN
         RMIN=SNGL(Y(I))
        END IF
90     CONTINUE
C.
C. Ascertion to test if FE is greater or lower than extrema.
```

```
C.
      IF(SNGL(FE).GT.RMAX.OR.SNGL(FE).LT.RMIN)GOTO100
C.
C. Finds correspondence of FE with any of profile's values.
C.
       KOUNT=0
       DO 99 I=1,N
       IF(ABS(SNGL(FE)-SNGL(Y(I))).LT.0.01)THEN
       KOUNT=KOUNT+1
       HOR(KOUNT)=I
       END IF
99     CONTINUE
       IF(KOUNT.EQ.0)GOTO 100
       DO 80 K=1,KOUNT
        ISPL(K+4)=SNGL(X(HOR(K)))
80     CONTINUE
100    DO 88 J=KOUNT+5,10
        ISPL(J)=-1.0
88     CONTINUE
        ISPL(11)=SNGL(FE)
       RETURN
       END
*-------------------------------------------------------------
C.
C.
                SUBROUTINE INTGT(N,X,Y,FE)
C.
C.
       INTEGER        N,KOUNT,HOR(6)
       REAL           ISPL(426),RMAX,RMIN
       DOUBLE PRECISION  X(6),Y(6),FE
       COMMON /RISPL/ISPL
*-------------------------------------------------------------
C.
C. Finds extrema of Y
C.
       RMAX=0.0
       RMIN=1000000000.0
       DO 90 I=1,N
        IF(SNGL(Y(I)).GT.RMAX)THEN
         RMAX=SNGL(Y(I))
        ELSE IF(SNGL(Y(I)).LT.RMIN)THEN
         RMIN=SNGL(Y(I))
        END IF
90     CONTINUE
C.
C. Discarding if FE value greater than maxima.
C.
       IF(SNGL(FE).GT.RMAX)GOTO 100
       IF(SNGL(FE).LT.RMIN)THEN
        ISPL(5)=0.0
        ISPL(6)=SNGL(X(N))
        KOUNT=2
        GOTO 200
       END IF
C.
C. Values of Y greater than FE are stored in HOR(KOUNT).
C.
       KOUNT=0
       DO 95 I=1,N
        IF(SNGL(Y(I)).GT.SNGL(FE))THEN
         KOUNT=KOUNT+1
        IF(I.EQ.1)THEN
         HOR(KOUNT)=0.0
```

```
          HOR(KOUNT+1)=SNGL(X(I))
          KOUNT=KOUNT+1
         ELSE
          HOR(KOUNT)=SNGL(X(I-1))
          HOR(KOUNT+1)=SNGL(X(I))
          KOUNT=KOUNT+1
         END IF
         END IF
95      CONTINUE
        IK=5
        ISPL(IK)=HOR(1)
        IF(KOUNT.GT.2)THEN
        DO 80 J=2,KOUNT,2
         IF(J.EQ.KOUNT)ISPL(IK+1)=HOR(J)
         IF(ABS(HOR(J)-HOR(J+1)).GT.0.01)THEN
          IK=IK+1
          ISPL(IK)=HOR(J)
          IK=IK+1
          ISPL(IK)=HOR(J)
          IK=IK+1
          ISPL(IK)=HOR(J+1)
         END IF
80      CONTINUE
        ELSE
         ISPL(IK+1)=HOR(2)
        END IF
        IF(KOUNT.EQ.0)GOTO 100
200     DO 85 I=KOUNT+5,10
85      ISPL(I)=-1.0
        GOTO 300
100     DO 89 J=1,10
89      ISPL(I)=-1.0
300     ISPL(11)=SNGL(FE)
         RETURN
         END
*-------------------------------------------------------------
C.
C.
C.
                SUBROUTINE INTLT(N,X,Y,FE)
C.
C.
        INTEGER         N,KOUNT,HOR(6)
        REAL            ISPL(426),RMAX,RMIN
        DOUBLE PRECISION  X(6),Y(6),FE
        COMMON /RISPL/ISPL
*-------------------------------------------------------------
C.
C. Finds extrema of Y
C.
        RMAX=0.0
        RMIN=1000000000.0
        DO 90 I=1,N
         IF(SNGL(Y(I)).GT.RMAX)THEN
          RMAX=SNGL(Y(I))
         ELSE IF(SNGL(Y(I)).LT.RMIN)THEN
          RMIN=SNGL(Y(I))
         END IF
90      CONTINUE
C.
C. Discarding if FE value lower than minima.
C.
        IF(SNGL(FE).LT.RMIN)GOTO 100
        IF(SNGL(FE).GT.RMAX)THEN
```

```
          ISPL(5)=0.0
          ISPL(6)=SNGL(X(N))
          KOUNT=2
          GOTO 200
         END IF
C.
C. Values of Y lower than FE are stored in HOR(KOUNT).
C.
         KOUNT=0
         DO 95 I=1,N
          IF(SNGL(Y(I)).LT.SNGL(FE))THEN
           KOUNT=KOUNT+1
          IF(I.EQ.1)THEN
           HOR(KOUNT)=0.0
           HOR(KOUNT+1)=SNGL(X(I))
           KOUNT=KOUNT+1
          ELSE
           HOR(KOUNT)=SNGL(X(I-1))
           HOR(KOUNT+1)=SNGL(X(I))
           KOUNT=KOUNT+1
          END IF
          END IF
95       CONTINUE
         IK=5
         ISPL(IK)=HOR(1)
         IF(KOUNT.GT.2)THEN
         DO 80 J=2,KOUNT,2
          IF(J.EQ.KOUNT)ISPL(IK+1)=HOR(J)
          IF(ABS(HOR(J)-HOR(J+1)).GT.0.01)THEN
           IK=IK+1
           ISPL(IK)=HOR(J)
           IK=IK+1
           ISPL(IK)=HOR(J+1)
          END IF
80       CONTINUE
         ELSE
          ISPL(IK+1)=HOR(2)
         END IF
         IF(KOUNT.EQ.0)GOTO 100
200      DO 85 I=KOUNT+5,10
85       ISPL(I)=-1.0
         GOTO 300
100      DO 89 J=1,10
89       ISPL(I)=-1.0
300      ISPL(11)=SNGL(FE)
          RETURN
          END
*-------------------------------------------------------
C.
                        SUBROUTINE SASINS
C.
C.
         CHARACTER              MODEIN, FACILY,LEVINF
         CHARACTER*3            TODOS
         CHARACTER*40           WNAME, WNAMES(50)
         INTEGER                NBLO, SN(500),NVAR,SIN, SPLQUE
         COMMON /INST/SIN,SPLQUE,SN,NBLO
         COMMON /CHSUBS/WNAME
        COMMON /DESTA/LEVINF
         COMMON /CHASAS/TODOS,WNAMES,FACILY,MODEIN
         COMMON /INTSAS/NVAR
*-------------------------------------------------------
```

```
C.
C.
        READ(23,'(1X,A)')MODEIN
        READ(23,'(1X,A)') FACILY.
      IF(MODEIN.EQ.'A')THEN
        OPEN(55,FILE='SASDAT',STATUS='NEW',ERR=103)
       IF(FACILY.EQ.'D')CALL DESTAI( MODEIN )
       IF(FACILY.EQ.'A')PRINT*,' SUB STANAI  HERE !'
      ELSE IF(MODEIN.EQ.'I')THEN
       IF(FACILY.EQ.'D')THEN
        READ(23,'(1X,A40)')WNAME
        READ(23,'(1X,A3)')TODOS
        IF(TODOS.EQ.'Y') READ(23,'(1X,A3)')TODOS
         IF(TODOS.EQ.'N')THEN
          READ(23,*)NBLO
          DO 90 J=1,NBLO
          READ(23,*) SN(J)
90        CONTINUE
          END IF
        ELSE IF(FACILY.EQ.'A')THEN
         READ(23,*)NVAR
         DO 99 J=1,NVAR
           READ(23,'(1X,A40)')WNAMES(J)
99       CONTINUE
          END IF
         END IF
       GO TO 1004
103       PRINT*,'**** FAILURE   CREATING   SAS DATA FILE'
1004          RETURN
           END
*-----------------------------------------------------------------
C.
                        SUBROUTINE DESTAI( MODEIN )
C.
       CHARACTER              LEVINF,MODEIN
       CHARACTER*3            TODOS
       CHARACTER*40           WNAME
       INTEGER                NBLO,SN(500),SIN,SPLQUE
       COMMON /CHSUBS/WNAME
       COMMON /INST/SIN SPLQUE,SN,NBLO
       COMMON /DESTA/LEVINF
        COMMON /CHASAS/TODOS
*-----------------------------------------------------------------
C.
         READ(23,'(1X,A40)')WNAME
       READ(23,'(1X,A3)')TODOS
      IF(TODOS.EQ.'Y') READ(23,'(1X,A3)')TODOS
      IF(TODOS.EQ.'N')THEN
       READ(23,*)NBLO
       DO 95 J=1,NBLO
        READ(23,*)SN(J)
95     CONTINUE
         END IF
      IF(MODEIN.EQ.'A') READ(23,'(1X,A)')LEVINF
       RETURN
        END
*-----------------------------------------------------------------
C.
                    SUBROUTINE SASDAT (IBL,NFOR,NFRE,NTIME)
C.
       CHARACTER          FACILY,MODEIN
       CHARACTER*40       WNAME,WNAMES(50),NAMES(80,4)
       CHARACTER*3        TODOS
       INTEGER            SIN,SPLQUE,NBLO,SN(500)
```

```
      INTEGER             NVAR,NFOR,NFRE(4),NTIME(4)
      INTEGER             WPROP,WSITE,WDEPTH,WEAST,WNORTH
       REAL           IBL(900)
      LOGICAL             OUR
       COMMON /CHASAS/TODOS,WNAMES,FACILY,MODEIN
      COMMON /INST/SIN,SPLQUE,SN,NBLO
      COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
      COMMON /CHSUBS/WNAME
*-------------------------------------------------------------
C.
C.This subroutine creates a SAS data file for descriptive statistics
C.It picks up data from OXSIS depth interp. data files according to
C.users instructions.
c.
      OUR=.FALSE.
     IF(FACILY.EQ.'D')THEN
       CALL FINDNA (NFOR,NFRE)
       CALL FINDSI (NFOR,NFRE)
C.Selecting wanted sites only.
c.
       IF(TODOS.EQ.'ALL')THEN
        OUR=.TRUE.
        NN=NN+1
       ELSE IF(TODOS.EQ.'N')THEN
        DO 99 J=1,NBLO
         SN(J)=REAL(SN(J))
         IF(ABS(SN(J)-IBL(WSITE)).LT.0.001)THEN
          OUR=.TRUE.
          NN=NN+1
          GOTO 200
         END IF
99       CONTINUE
        END IF
200    IF(OUR)THEN
        DO 66 J=1,NFOR
         IF(J.EQ.2) WPROP=WPROP+NFRE(J-1)
66      CONTINUE
C.
C. Writting up the wanted sites co-ordinates and the value of the
C. feature wanted in columns format for SAS.
C.
        WRITE(55,*)IBL(WEAST),IBL(WNORTH),IBL(WSITE),IBL(WPROP)
       END IF
      ELSE IF(FACILY.EQ.'A')THEN
       PRINT*,' CREATING SAS DATA FILE FOR STAT. ANALYSIS'
      END IF
       RETURN
        END
*-------------------------------------------------------------
C.
                          SUBROUTINE SASCMD (IBL,NFOR ,NFRE,NTIME )
C.
      CHARACTER             FACILY,LEVINF
      CHARACTER*40          WNAMES(50)
      CHARACTER*3           TODOS
      INTEGER              NFOR,NFRE(4),NTIME(4)
      REAL                 IBL(900)
      COMMON /CHASAS/TODOS,WNAMES,FACILY
      COMMON /DESTA/LEVINF
*-------------------------------------------------------------
C.
C.
C.This subroutine opens a SAS commands file and writes SAS statements
C.in it following the instructions for data processing submitted by
```

```
C.the user in the instructions file interactively.
C.
C.
        OPEN(66,FILE='SASCOM',STATUS='NEW',ERR=103)
        WRITE(66,200)
200     FORMAT(1X,'DATA;')
           WRITE(66,201)
201       FORMAT(1X,'INFILE SASDAT;')
          WRITE(66,202)
202       FORMAT(1X,'INPUT EASTING NORTHING SN FEATURE;')
          WRITE(66,203)
203       FORMAT(1X,'PROC PRINT;')
        IF(FACILY.EQ.'D')THEN
          IF(LEVINF.EQ.'S')THEN
          WRITE(66,204)
204       FORMAT(1X,'PROC MEANS;')
          WRITE(66,205)
205       FORMAT(1X,'VAR FEATURE;')
       ELSE IF(LEVINF.EQ.'H')THEN
         WRITE(66,206)
206      FORMAT(1X,'PROC UNIVARIATE;')
            WRITE(66,207)
207        FORMAT(1X,'VAR FEATURE;')
         WRITE(66,208)
208      FORMAT(1X,'RUN;')
         WRITE(66,209)
209      FORMAT(1X,'ENDSAS;')
      END IF
      ELSE IF(FACILY.EQ.'A')THEN
       PRINT*,'  SAS STATEMENTS FOR STATTISTICAL ANALYSIS HERE!'
      END IF
         GOTO 500
103       PRINT*,' ***** ERROR  OPENING   SAS STATEMENTS FILE '
500       RETURN
        END
*-------------------------------------------------------------
C.
                    SUBROUTINE LISTINS
C.
      CHARACTER*40        WNAME
      CHARACTER*3         TODOS
      INTEGER             NBLO,SN(500),NVAR,SIN,SPLQUE
      COMMON /INST/SIN,SPLQUE,SN,NBLO
      COMMON /CHASAS/TODOS
          COMMON /CHSUBS/WNAME
*-------------------------------------------------------------
C.
         READ(23,'(1X,A40)')WNAME
         READ(23,'(1X,A3)')TODOS
           IF(TODOS.EQ.'Y')THEN
             READ(23,'(1X,A3)')TODOS
         GOTO 100
         ELSE IF(TODOS.EQ.'N')THEN
         READ(23,*)NBLO
         DO 99 J=1,NBLO
          READ(23,*) SN(J)
99       CONTINUE
        END IF
100     RETURN
        END
*-----------------------------------------------
C.
              SUBROUTINE LISTEX ( IBL,NFOR,NFRE,NTIME )
C.
```

```
      CHARACTER*40            NAMES(80,4),WNAME
      CHARACTER*3             TODOS
      INTEGER                 NBLO,SN(500), SIN,SPLQUE
      INTEGER                 NFOR,NFRE(4),NTIME(4)
      INTEGER                 WPROP,WSITE
          INTEGER                WDEPTH,WEAST,WNORTH
      REAL                    IBL(900)
       COMMON /CHSUBS/WNAME,NAMES
       COMMON /CHASAS/TODOS
       COMMON /INST/SIN,SPLQUE,SN,NBLO
       COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
*-------------------------------------------------
C.
         CALL FINDNA (NFOR , NFRE )
      CALL FINDSI ( NFOR, NFRE )
         IFLAG=0
      IF(TODOS.EQ.'N')THEN
       DO 90 J=1,NBLO
        SN(J)=REAL(SN(J))
         IF(ABS(SN(J)-IBL(WSITE)).LT.0.001) IFLAG=1
90    CONTINUE
      ELSE IF(TODOS.EQ.'ALL')THEN
      IFLAG=1
      END IF
      IF(IFLAG.EQ.1)THEN
        DO 98 N=1,NFOR
          IF(N.EQ.2) WPROP=WPROP+NFRE(N-1)
98         CONTINUE
        WRITE(22,*)IBL(WEAST),IBL(WNORTH),IBL(WSITE),IBL(WPROP)
      END IF
      RETURN
      END
*-------------------------------------------------
C.
C.                SUBROUTINE ALLOIN( NFOR,NFRE,NAMES )
C.
       CHARACTER          EXIST, FIRST,CHARB1
      CHARACTER*40       WNAME,NAMES(80,4)
      CHARACTER*2         CHARB2
      CHARACTER*3        TODOS
       CHARACTER*7         RESULT
      INTEGER            NBLO,NCLAS,MU(500),SN(500)
      INTEGER            SIN,SPLQUE,NFILE(20),NEXT
       INTEGER           NFOR,NFRE(4)
      COMMON /ALLOC/NCLAS,MU
      COMMON /CHALLOC/RESULT,EXIST,FIRST
      COMMON /INST/SIN,SPLQUE,SN,NBLO
      COMMON /CHSUBS/WNAME/CHASAS/TODOS
*-------------------------------------------------
C.
C. Subroutine ALLOIN( NFOR,NFRE,NAMES )reads from instructions file MANI
c. all necessary parameters to link executive routine
c. ALLOEX for allocation facility.
c.
       READ(23,'(1X,A)')EXIST
      IF(EXIST.EQ.'N')THEN
       READ(23,*)NBLO
       READ(23,*)NCLAS
       IF(NCLAS.GT.20)GOTO 100
        DO 90 I=1,NBLO
         READ(23,*,END=200)SN(I),MU(I)
       NEXT=MU(I)
      DO 777 J=1,NCLAS
       IF(NEXT.EQ.NFILE(J))GOTO 90
```

```
          IF(I.EQ.1)THEN
           NFILE(J)=NEXT
           KK=KK+1
           GOTO 90
          ELSE IF(J.EQ.KK)THEN
           NFILE(J+1)=NEXT
           KK=KK+1
           GOTO 90
          END IF
777      CONTINUE
90        CONTINUE
         OPEN(50,FILE='CLASES',STATUS='NEW')
        DO 666 J=1,NCLAS
         IF(NFILE(J).LT.10)THEN
             WRITE(50,11)NFILE(J)
11           FORMAT(1X,I)
         ELSE IF(NFILE(J).GE.10)THEN
           WRITE(50,12)NFILE(J)
12         FORMAT(1X,I2)
         END IF
666     CONTINUE
         CLOSE(50,STATUS='KEEP')
        OPEN(50,FILE='CLASES',STATUS='OLD',ERR=500)
        DO 555 I=1,NCLAS
         IF(NFILE(I).LT.10)THEN
          READ(50,'(A20)')CHARB1
          IF(RESULT(7:7).EQ.' ')RESULT=RESULT//CHARB1
          IF(RESULT(7:7).NE.' ')RESULT(7:7)=CHARB1
         ELSE IF(NFILE(I).GE.10)THEN
          READ(50,'(A20)')CHARB2
          IF(RESULT(6:7).EQ.'  ')RESULT=RESULT//CHARB2
          IF(RESULT(6:7).NE.'  ')RESULT(6:7)=CHARB2
         END IF
          RESULT(:1)='M'
        OPEN(UNIT=NFILE(I),FILE=RESULT,STATUS='NEW',ERR=500)
         WRITE(NFILE(I),*)NFOR
         WRITE(NFILE(I),*)NFRE
         RESULT(:1)='N'
        OPEN(UNIT=NFILE(I)+50,FILE=RESULT,STATUS='NEW')
         RESULT(:1)='L'
        OPEN(UNIT=NFILE(I)+70,FILE=RESULT,STATUS='NEW')
555      CONTINUE
C.writting into N-files.
        DO 333 I=1,NCLAS
         DO 303 N=1,NFOR
          DO 303 J=1,NFRE(N)
           WRITE(NFILE(I)+50,13)NAMES(J,N)
13         FORMAT(1X,A40)
303       CONTINUE
333     CONTINUE
         GOTO 200
500     PRINT*,' **** ERROR  OPENING OUTPUT CLASS FILES'
         GOTO 200
        ELSE IF(EXIST.EQ.'Y')THEN
         READ(23,'(1X,A40)')WNAME
         READ(23,'(1X,A3)')TODOS
         IF(TODOS.EQ.'Y')THEN
          READ(23,'(1X,A3)')TODOS
         ELSE IF(TODOS.EQ.'N')THEN
          READ(23,*)NBLO
          READ(23,'(1X,A)')FIRST
          IF(FIRST.EQ.'S')THEN
           DO 99 I=1,NBLO
            READ(23,*)SN(I)
```

```
99         CONTINUE
          END IF
         END IF
        END IF
          GOTO 200
100       PRINT*,'More than 20 classes or M.U.'
          PRINT*,' ****** JOB TERMINATED *****'
200       RETURN
           END
*-----------------------------------
C.
C.
                     SUBROUTINE ALLOEX( IBL,NFOR,NFRE,N,NTIME )
C.
C.
         CHARACTER           EXIST, FIRST
         CHARACTER*3         TODOS
         CHARACTER*7         RESULT
         CHARACTER*40        WNAME
         INTEGER             NFOR,NFRE(4),N,NTIME(4)
         INTEGER             WPROP,WSITE,NBLO,NCLAS,SIN,SPLQUE
         INTEGER             MU(500),SN(500)
        INTEGER          WDEPTH,WEAST,WNORTH
         REAL                IBL(900)
          COMMON /ALLOC/NCLAS,MU
          COMMON /CHALLOC/RESULT,EXIST,FIRST
          COMMON /CHASAS/TODOS
          COMMON /CHSUBS/WNAME
          COMMON /INST/SIN,SPLQUE,SN,NBLO
          COMMON /CHECK/WPROP,WSITE,WDEPTH,WEAST,WNORTH
*-----------------------------------------------------
C.
C.
C.
C. Ascertion to check if block in turn is in wanted SN list.
C.
        CALL FINDSI( NFOR,NFRE )
        DO 99 I=1,NBLO
         IF(ABS(IBL(WSITE)-SN(I)).LT.0.001)THEN
          WRITE(MU(I),*)NTIME
C.
C.  If bock in turn is wanted, it writes in the appropriate
C.  given by the MU(I) unit.
C.
          WRITE(MU(I),*)(IBL(K),K=1,N)
            WRITE(MU(I)+70,*)IBL(WEAST),IBL(WNORTH),IBL(WSITE)
         END IF
99      CONTINUE
          RETURN
         END
*
*
*  END OF MANIPULATION PACKAGE *****************************
*
*
*
```

File complete

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

APPENDIX 9.1

Listings of the data triads used for the trials in spatial prediction including the random check points.

```
TTTTTTTTTT  0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000  TTTTTTTTTT
TTTTTTTTTT  0000000000000000  VAX1 - Oxford University Computing Service - VAX/VMS Version V4.5  0000000000000000  TTTTTTTTTT
TTTTTTTTTT  0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000  TTTTTTTTTT
```

```
 AAA    GGGG  RRRR    III    CCCC   222
A   A  G      R   R    I    C      2   2
A   A  G      R   R    I    C          2
A   A  G      RRRR     I    C         2
AAAAA  G GGG  R R      I    C        2
A   A  G   G  R  R     I    C       2
A   A   GGG   R   R   III    CCCC  22222
```

D-FILE :

```
RRRRRRRR    DDDDDDDD      000000    5555555555    222222
RRRRRRRR    DDDDDDDD      000000    5555555555    222222
RR      RR  DD      DD  00      00  55           22      22
RR      RR  DD      DD  00      00  55           22      22
RR      RR  DD      DD  00    0000  555555               22
RR      RR  DD      DD  00    0000  555555               22
RRRRRRRR    DD      DD  00  00  00        55         22
RRRRRRRR    DD      DD  00  00  00        55         22
RR  RR      DD      DD  0000    00          55      22
RR  RR      DD      DD  0000    00          55      22
RR    RR    DD      DD  00      00  55      55    22
RR    RR    DD      DD  00      00  55      55    22
RR      RR  DDDDDDDD      000000      555555    2222222222
RR      RR  DDDDDDDD      000000      555555    2222222222
```

RANDOM CHECK SITES

```
        DDDDDDDD      AAAAAA    TTTTTTTTTT      ::::        11
        DDDDDDDD      AAAAAA    TTTTTTTTTT      ::::        11
        DD      DD  AA      AA      TT          ::::      1111
        DD      DD  AA      AA      TT          ::::      1111
        DD      DD  AA      AA      TT                      11
        DD      DD  AA      AA      TT                      11
        DD      DD  AA      AA      TT          ::::        11
        DD      DD  AA      AA      TT          ::::        11
        DD      DD  AAAAAAAAAA      TT          ::::        11
        DD      DD  AAAAAAAAAA      TT          ::::        11
....    DD      DD  AA      AA      TT            ::        11
....    DD      DD  AA      AA      TT            ::        11
....    DDDDDDDD    AA      AA      TT          ::      111111
....    DDDDDDDD    AA      AA      TT          ::      111111
```

```
File _DRC2:[AGRIC2]RD052.DAT;1 (13123,37,0), last revised on 11-MAY-1987 10:17, is a 54 block sequential file owned by UIC
[BMFF,AGRIC2].  The records are variable length with implied (CR) carriage control.  The longest record is 211 bytes.

Job RD052 (1387) queued to LPA0 on 14-MAY-1987 12:35 by user AGRIC2, UIC [BMFF,AGRIC2], under account BMFF at priority 6, started
on printer _LPA0: on 14-MAY-1987 12:36 from queue LPA0.

TTTTTTTTTT  0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000  TTTTTTTTTT
TTTTTTTTTT  0000000000000000000000  Digital Equipment Corporation - VAX/VMS Version V4.5  0000000000000000000000  TTTTTTTTTT
TTTTTTTTTT  0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000  TTTTTTTTTT
```

```
        2
        3          14           0           0
        1           2           0           0
43584.00       20563.00       95001.00
2.000000       0.0000000E+00  15.00000       0.4000000      7.040000       36.60001       -3.000000      1.200000       0.6000000
   5.000000       46.00000       27.00000       5.000000       21.00000
2.000000       35.00000       50.00000       0.5000000      7.500000       30.80000       -3.000000      1.700000       0.3000000
   1.000000       68.00000       22.00000       3.000000       7.000000
        1           2           0           0
43503.00       20540.00       95002.00
2.000000       0.0000000E+00  15.00000       0.4000000      6.670000       37.00000       27.89999       2.300000       0.9000000
   7.900000       36.00000       32.00000       6.000000       27.00000
2.000000       35.00000       50.00000       0.7000000      7.410000       30.10001       -3.000000      3.000000       0.3000000
   1.100000       66.00000       22.00000       2.000000       9.000000
        1           2           0           0
43571.00       20533.00       95003.00
2.000000       0.0000000E+00  15.00000       5.500000       7.310000       26.60001       -3.000000      0.7000000      0.5000000
   3.400000       29.00000       10.00000       43.00000       18.00000
2.000000       35.00000       50.00000       7.800000       7.310000       21.89999       -3.000000      0.7000000      0.3000000
   1.600000       29.00000       9.000000       45.00000       17.00000
        1           2           0           0
43547.00       20511.00       95004.00
2.000000       0.0000000E+00  15.00000       2.400000       7.380000       44.20000       -3.000000      1.400000       1.000000
   8.400000       47.00000       32.00000       8.000000       13.00000
2.000000       35.00000       50.00000       14.70000       7.610000       26.60001       -3.000000      1.700000       0.5000000
   1.600000       58.00000       22.00000       11.00000       9.000000
        1           2           0           0
43512.00       20502.00       95005.00
2.000000       0.0000000E+00  15.00000       0.0000000E+00  5.750000       55.39999       36.39999       1.600000       0.4000000
   12.60000       34.00000       34.00000       6.000000       25.00000
2.000000       35.00000       50.00000       0.0000000E+00  7.210000       29.70000       -3.000000      0.7000000      0.3000000
   1.500000       47.00000       22.00000       9.000000       22.00000
        1           2           0           0
43572.00       20466.00       95006.00
2.000000       0.0000000E+00  15.00000       0.2000000      6.620000       59.00000       44.89999       1.600000       0.3000000
   13.70000       25.00000       32.00000       6.000000       36.00000
2.000000       35.00000       50.00000       4.600000       7.330000       31.30000       -3.000000      1.500000       0.3000000
   2.300000       42.00000       21.00000       10.00000       27.00000
        1           2           0           0
43558.00       20446.00       95007.00
2.000000       0.0000000E+00  15.00000       0.6000000      6.330000       48.50000       34.10001       1.900000       0.6000000
   5.200000       65.00000       20.00000       2.000000       13.00000
2.000000       35.00000       50.00000       0.0000000E+00  6.930000       25.10001       16.80000       1.000000       0.2000000
   1.400000       39.00000       24.00000       2.000000       34.00000
        1           2           0           0
43481.00       20415.00       95008.00
2.000000       0.0000000E+00  15.00000       0.0000000E+00  5.980000       37.70000       22.89999       1.800000       0.4000000
   5.000000       45.00000       25.00000       2.000000       28.00000
2.000000       35.00000       50.00000       0.6000000      6.280000       33.60001       22.60001       1.800000       0.3000000
   2.000000       52.00000       25.00000       2.000000       22.00000
        1           2           0           0
43501.00       20397.00       95009.00
2.000000       0.0000000E+00  15.00000       0.3000000      6.580000       52.70000       46.70000       2.200000       0.3000000
   6.400000       55.00000       24.00000       2.000000       19.00000
2.000000       35.00000       50.00000       0.0000000E+00  6.860000       34.39999       27.50000       1.400000       0.3000000
   1.100000       57.00000       16.00000       0.0000000E+00  27.00000
        1           2           0           0
43572.00       20382.00       95010.00
2.000000       0.0000000E+00  15.00000       3.700000       7.290000       29.80000       -3.000000      1.000000       0.4000000
   3.600000       33.00000       17.00000       15.00000       35.00000
2.000000       35.00000       50.00000       2.500000       7.400000       20.30000       -3.000000      0.7000000      0.2000000
   0.8000000      31.00000       20.00000       6.000000       42.00000
        1           2           0           0
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2.000000        0.0000000E+00   15.00000        5.100000        7.210000        31.20000        -3.000000       1.000000        0.5000000
   4.200000        31.00000        19.00000        19.00000        32.00000
2.000000        35.00000        50.00000        11.00000        7.440000        24.70000        -3.000000       0.8000000       0.2000000
   2.400000        31.00000        18.00000        21.00000        31.00000
        1               2               0               0
43572.00        20544.00        95012.00
2.000000        0.0000000E+00   15.00000        0.4000000       5.740000        36.50000        22.80000        1.900000        0.4000000
   8.000000        34.00000        26.00000        9.000000        32.00000
2.000000        35.00000        50.00000        0.4000000       7.470000        22.30000        -3.000000       1.100000        0.2000000
   1.500000        35.00000        19.00000        15.00000        32.00000
        1               2               0               0
43504.00        20531.00        95013.00
2.000000        0.0000000E+00   15.00000        1.500000        6.970000        33.00000        32.89999        1.500000        1.200000
   5.900000        30.00000        24.00000        8.000000        38.00000
2.000000        35.00000        50.00000        0.6000000       7.190000        24.20000        -3.000000       1.000000        0.3000000
   1.400000        33.00000        23.00000        6.000000        38.00000
        1               2               0               0
43495.00        20521.00        95014.00
2.000000        0.0000000E+00   15.00000        0.1000000       5.500000        43.39999        26.30000        2.000000        0.6000000
   2.200000        28.00000        29.00000        3.000000        40.00000
2.000000        35.00000        50.00000        0.0000000E+00   6.830000        26.80000        18.20000        0.9000000       0.2000000
   2.000000        36.00000        23.00000        4.000000        37.00000
        1               2               0               0
43544.00        20532.00        95015.00
2.000000        0.0000000E+00   15.00000        0.1000000       7.100000        39.50000        -3.000000       1.600000        0.5000000
   6.600000        51.00000        29.00000        7.000000        13.00000
2.000000        35.00000        50.00000        0.4000000       6.860000        31.70000        21.60001        1.500000        0.4000000
   2.300000        54.00000        23.00000        12.00000        11.00000
        1               2               0               0
43590.00        20532.00        95016.00
2.000000        0.0000000E+00   15.00000        3.300000        7.140000        33.39999        -3.000000       1.200000        1.000000
   5.600000        46.00000        22.00000        15.00000        17.00000
2.000000        35.00000        50.00000        18.39999        7.600000        22.39999        -3.000000       1.900000        0.3000000
   1.200000        54.00000        27.00000        13.00000        6.000000
        1               2               0               0
43539.00        20524.00        95017.00
2.000000        0.0000000E+00   15.00000        2.200000        7.090000        43.89999        -3.000000       0.8000000       0.8000000
   4.900000        48.00000        24.00000        11.00000        18.00000
2.000000        35.00000        50.00000        6.300000        7.390000        25.10001        -3.000000       0.7000000       0.4000000
   1.700000        49.00000        21.00000        13.00000        17.00000
        1               2               0               0
43491.00        20508.00        95018.00
2.000000        0.0000000E+00   15.00000        2.100000        6.670000        40.60001        44.60001        2.100000        0.2000000
   10.00000        24.00000        30.00000        4.000000        42.00000
2.000000        35.00000        50.00000        0.5000000       6.970000        24.60001        16.39999        0.8000000       0.2000000
   1.800000        34.00000        21.00000        4.000000        41.00000
        1               2               0               0
43579.00        20500.00        95019.00
2.000000        0.0000000E+00   15.00000        0.1000000       5.090000        44.10001        20.30000        3.800000        1.500000
   9.200000        50.00000        30.00000        5.000000        14.00000
2.000000        35.00000        50.00000        0.1000000       6.240000        34.89999        19.89999        5.400000        0.4000000
   1.600000        75.00000        21.00000        2.000000        3.000000
        1               2               0               0
43582.00        20491.00        95020.00
2.000000        0.0000000E+00   15.00000        0.3000000       4.530000        46.00000        17.70000        4.200000        0.8000000
   9.100000        53.00000        27.00000        5.000000        15.00000
2.000000        35.00000        50.00000        0.2000000       6.630000        33.10001        20.50000        3.100000        0.4000000
   2.200000        70.00000        22.00000        3.000000        5.000000
        1               2               0               0
43509.00        20461.00        95021.00
2.000000        0.0000000E+00   15.00000        0.4000000       5.590000        32.60001        20.39999        1.100000        0.2000000
   4.800000        33.00000        26.00000        3.000000        38.00000
2.000000        35.00000        50.00000        0.3000000       6.880000        26.20000        18.00000        1.200000        0.2000000
   1.600000        40.00000        22.00000        3.000000        35.00000
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        1           2           0           0
43572.00       20475.00       95022.00
2.000000  0.0000000E+00       15.00000   0.1000000       5.940000       43.80000       28.89999       1.300000       0.2000000
   9.800000       30.00000       33.00000       6.000000       32.00000
2.000000       35.00000       50.00000  0.0000000E+00       7.160000       23.39999      -3.000000       0.7000000       0.2000000
   1.300000       39.00000       25.00000       29.00000       6.000000
        1           2           0           0
43576.00       20455.00       95023.00
2.000000  0.0000000E+00       15.00000   0.6000000       7.080000       42.10001      -3.000000       1.200000       0.5000000
   5.700000       45.00000       23.00000       6.000000       26.00000
2.000000       35.00000       50.00000   1.600000       7.430000       21.20000      -3.000000       0.7000000       0.2000000
   1.000000       34.00000       21.00000       7.000000       38.00000
        1           2           0           0
43542.00       20513.00       95024.00
2.000000  0.0000000E+00       15.00000   0.4000000       7.330000       42.20000      -3.000000       1.300000       0.7000000
   7.300000       49.00000       31.00000       6.000000       14.00000
2.000000       35.00000       50.00000   1.000000       7.480000       30.00000      -3.000000       1.800000       0.4000000
   1.600000       58.00000       20.00000       10.00000       12.00000
        1           2           0           0
43559.00       20501.00       95025.00
2.000000  0.0000000E+00       15.00000   3.700000       7.240000       39.80000      -3.000000       1.300000       0.9000000
   7.200000       52.00000       32.00000       8.000000       9.000000
2.000000       35.00000       50.00000   8.700000       7.950000       25.50000      -3.000000       1.400000       0.5000000
   1.800000       55.00000       23.00000       13.00000       8.000000
        1           2           0           0
43538.00       20481.00       95026.00
2.000000  0.0000000E+00       15.00000   0.3000000       6.730000       30.30000       20.89999       1.100000       0.2000000
   3.800000       37.00000       25.00000       6.000000       32.00000
2.000000       35.00000       50.00000   0.3000000       6.540000       24.89999       16.50000       1.000000       0.2000000
   1.400000       40.00000       24.00000       5.000000       31.00000
        1           2           0           0
43560.00       20519.00       95027.00
2.000000  0.0000000E+00       15.00000       18.00000       7.080000       28.39999      -3.000000       0.6000000       0.7000000
   3.800000       28.00000       10.00000       44.00000       18.00000
2.000000       35.00000       50.00000       37.30000       7.370000       8.200000      -3.000000       0.4000000       0.1000000
  0.5000000       14.00000       3.000000       73.00000       10.00000
        1           2           0           0
43538.00       20502.00       95028.00
2.000000  0.0000000E+00       15.00000   0.2000000       6.800000       45.60001       32.50000       2.000000       0.6000000
   8.300000       48.00000       33.00000       3.000000       15.00000
2.000000       35.00000       50.00000   1.000000       7.470000       35.20000      -3.000000       3.200000       0.4000000
   1.600000       69.00000       24.00000       2.000000       5.000000
        1           2           0           0
43542.00       20500.00       95029.00
2.000000  0.0000000E+00       15.00000   1.000000       7.240000       39.00000      -3.000000       1.600000       0.5000000
   6.100000       41.00000       30.00000       8.000000       21.00000
2.000000       35.00000       50.00000  0.0000000E+00       7.150000       28.10001      -3.000000       2.100000       0.3000000
   1.500000       49.00000       23.00000       11.00000       17.00000
        1           2           0           0
43548.00       20494.00       95030.00
2.000000  0.0000000E+00       15.00000   0.6000000       6.750000       49.70000       38.00000       2.800000       1.100000
   12.30000       41.00000       35.00000       5.000000       19.00000
2.000000       35.00000       50.00000   0.7000000       7.480000       31.70000      -3.000000       3.900000       0.6000000
   1.100000       73.00000       21.00000       3.000000       3.000000
        1           2           0           0
43538.00       20491.00       95031.00
2.000000  0.0000000E+00       15.00000   0.2000000       6.080000       30.10001       18.10001       0.9000000       0.3000000
   4.900000       33.00000       28.00000       8.000000       32.00000
2.000000       35.00000       50.00000  0.0000000E+00       7.080000       24.89999      -3.000000       0.7000000       0.3000000
   1.500000       39.00000       23.00000       6.000000       32.00000
        1           2           0           0
43553.00       20487.00       95032.00
2.000000  0.0000000E+00       15.00000  0.0000000E+00       6.040000       51.70000       35.00000       1.700000       0.3000000
   13.00000       33.00000       37.00000       6.000000       24.00000
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2.000000        35.00000        50.00000        0.3000000       7.280000        29.20000        -3.000000       0.9500000       0.4000000
   1.700000        50.00000        23.00000        9.000000        18.00000
          1               2               0               0
43557.00        20468.00        95033.00
2.000000        0.0000000E+00   15.00000        0.8000000       6.780000        53.20000        43.89999        1.000000        0.3000000
   11.60000        27.00000        29.00000        13.00000        31.00000
2.000000        35.00000        50.00000        6.100000        7.340000        32.50000        -3.000000       1.100000        0.3000000
   2.900000        40.00000        20.00000        14.00000        27.00000
          1               2               0               0
43561.00        20463.00        95034.00
2.000000        0.0000000E+00   15.00000        0.2000000       6.020000        60.89999        40.00000        3.400000        0.5000000
   14.90000        31.00000        33.00000        3.000000        33.00000
2.000000        35.00000        50.00000        1.400000        7.120000        33.39999        -3.000000       2.800000        0.4000000
   2.400000        43.00000        21.00000        7.000000        29.00000
          1               2               0               0
43544.00        20462.00        95035.00
2.000000        0.0000000E+00   15.00000        0.3000000       6.260000        50.10001        28.80000        1.700000        0.4000000
   5.300000        54.00000        25.00000        2.000000        19.00000
2.000000        35.00000        50.00000        0.1000000       6.810000        28.39999        16.89999        1.200000        0.2000000
   1.400000        46.00000        26.00000        2.000000        26.00000
          1               2               0               0
43547.00        20461.00        95036.00
2.000000        0.0000000E+00   15.00000        0.1000000       5.980000        42.80000        28.39999        1.900000        0.4000000
   5.400000        54.00000        23.00000        2.000000        21.00000
2.000000        35.00000        50.00000        0.3000000       6.420000        28.00000        19.80000        1.100000        0.3000000
   1.600000        46.00000        26.00000        3.000000        26.00000
          1               2               0               0
43560.00        20458.00        95037.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.530000        48.89999        34.70000        1.700000        0.5000000
   6.300000        59.00000        25.00000        2.000000        14.00000
2.000000        35.00000        50.00000        0.3000000       6.850000        40.10001        32.30000        1.500000        0.3000000
   2.300000        66.00000        17.00000        2.000000        15.00000
          1               2               0               0
43468.00        20418.00        95038.00
2.000000        0.0000000E+00   15.00000        0.0000000E+00   6.230000        41.10001        27.39999        1.900000        0.4000000
   5.000000        45.00000        26.00000        2.000000        26.00000
2.000000        35.00000        50.00000        0.0000000E+00   6.610000        38.20000        27.89999        1.700000        0.2000000
   1.800000        54.00000        21.00000        2.000000        23.00000
          1               2               0               0
43605.00        20567.00        95039.00
2.000000        0.0000000E+00   15.00000        25.00000        7.330000        29.30000        -3.000000       1.500000        0.7000000
   4.000000        43.00000        23.00000        23.00000        11.00000
2.000000        35.00000        50.00000        28.50000        7.460000        26.39999        -3.000000       0.5000000       0.2000000
   1.200000        61.00000        30.00000        9.000000        0.0000000E+00
          1               2               0               0
43578.00        20567.00        95040.00
2.000000        0.0000000E+00   15.00000        0.5000000       7.170000        31.80000        -3.000000       1.300000        0.5000000
   4.500000        49.00000        30.00000        5.000000        16.00000
2.000000        35.00000        50.00000        0.2000000       7.380000        34.39999        -3.000000       2.400000        0.4000000
   0.9000000       77.00000        22.00000        1.000000        0.0000000E+00
          1               2               0               0
43575.00        20513.00        95041.00
2.000000        0.0000000E+00   15.00000        6.100000        7.390000        40.50000        -3.000000       1.500000        1.100000
   6.400000        49.00000        22.00000        16.00000        13.00000
2.000000        35.00000        50.00000        16.39999        7.510000        25.30000        -3.000000       1.900000        0.3000000
   1.800000        58.00000        29.00000        8.000000        5.000000
          1               2               0               0
43572.00        20453.00        95042.00
2.000000        0.0000000E+00   15.00000        1.300000        6.900000        42.70000        34.30000        1.000000        0.4000000
   5.900000        44.00000        26.00000        5.000000        26.00000
2.000000        35.00000        50.00000        10.30000        7.420000        20.89999        -3.000000       0.6000000       0.2000000
   0.9000000       42.00000        21.00000        10.00000        27.00000
          1               2               0               0
43552.00        20560.00        95043.00
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2.000000	0.0000000E+00	15.00000	0.2000000	6.840000	36.60001	25.70000	1.300000	0.6000000
5.000000	49.00000	32.00000	4.000000	15.00000				
2.000000	35.00000	50.00000	0.2000000	7.060000	28.60001	-3.000000	1.300000	0.3000000
1.400000	54.00000	26.00000	7.000000	14.00000				
1	2	0	0					
43538.00	20450.00	95044.00						
2.000000	0.0000000E+00	15.00000	0.4000000	6.780000	44.00000	34.39999	1.000000	0.3000000
9.000000	26.00000	30.00000	8.000000	37.00000				
2.000000	35.00000	50.00000	1.100000	7.500000	25.80000	-3.000000	1.200000	0.3000000
2.100000	35.00000	23.00000	9.000000	33.00000				
1	2	0	0					
43524.00	20528.00	95045.00						
2.000000	0.0000000E+00	15.00000	0.6000000	6.680000	46.70000	33.30000	2.100000	1.000000
9.600000	42.00000	31.00000	8.000000	19.00000				
2.000000	35.00000	50.00000	0.0000000E+00	7.220000	32.50000	-3.000000	1.700000	0.4000000
2.200000	47.00000	22.00000	9.000000	22.00000				
1	2	0	0					
43541.00	20553.00	95046.00						
2.000000	0.0000000E+00	15.00000	0.0000000E+00	6.780000	40.50000	28.80000	2.000000	0.4000000
5.400000	54.00000	28.00000	5.000000	13.00000				
2.000000	35.00000	50.00000	0.4000000	7.360000	34.10001	-3.000000	3.000000	0.3000000
1.400000	66.00000	20.00000	4.000000	10.00000				
1	2	0	0					
43544.00	20454.00	95047.00						
2.000000	0.0000000E+00	15.00000	0.4000000	6.870000	44.10001	31.10001	2.100000	0.6000000
5.400000	55.00000	27.00000	1.000000	17.00000				
2.000000	35.00000	50.00000	0.4000000	6.810000	37.00000	26.89999	2.100000	0.4000000
2.200000	63.00000	24.00000	0.0000000E+00	13.00000				
1	2	0	0					
43567.00	20515.00	95048.00						
2.000000	0.0000000E+00	15.00000	7.500000	7.330000	30.80000	-3.000000	0.8000000	0.7000000
4.300000	34.00000	13.00000	33.00000	20.00000				
2.000000	35.00000	50.00000	10.40000	7.500000	26.00000	-3.000000	0.9000000	0.4000000
2.000000	38.00000	14.00000	28.00000	20.00000				
1	2	0	0					
43563.00	20500.00	95049.00						
2.000000	0.0000000E+00	15.00000	1.600000	7.220000	47.39999	-3.000000	1.800000	0.8000000
8.100000	52.00000	34.00000	5.000000	10.00000				
2.000000	35.00000	50.00000	10.20000	7.550000	8.300000	-3.000000	2.400000	0.5000000
1.700000	63.00000	27.00000	6.000000	4.000000				
1	2	0	0					
43561.00	20515.00	95050.00						
2.000000	0.0000000E+00	15.00000	8.900000	7.250000	29.00000	-3.000000	0.7000000	0.4000000
4.000000	33.00000	11.00000	34.00000	21.00000				
2.000000	35.00000	50.00000	10.60000	7.350000	44.80000	-3.000000	0.8000000	0.3000000
1.900000	37.00000	14.00000	21.00000	28.00000				
1	2	0	0					
43560.00	20511.00	95051.00						
2.000000	0.0000000E+00	15.00000	8.900000	7.040000	38.50000	-3.000000	0.8000000	1.300000
7.700000	32.00000	19.00000	26.00000	22.00000				
2.000000	35.00000	50.00000	49.50000	7.350000	16.70000	-3.000000	0.7000000	0.5000000
1.700000	28.00000	9.000000	51.00000	12.00000				
1	2	0	0					
43545.00	20503.00	95052.00						
2.000000	0.0000000E+00	15.00000	1.400000	7.030000	46.50000	-3.000000	1.500000	1.100000
7.900000	49.00000	32.00000	6.000000	12.00000				
2.000000	35.00000	50.00000	2.100000	7.430000	38.50000	-3.000000	1.100000	0.1000000
1.800000	58.00000	22.00000	11.00000	10.00000				

OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO(

User: AGRIC2 12:
File: VAX1::DRC2:[AGRIC2]ND052.DAT;2

OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO(

NORTHING
EASTING
SITE_NO
STATUS
LAYER,_DEPTH,_UPPER *01
LAYER,_DEPTH,_LOWER *01
CARBONATE A02
PH C01
C.E.C. A01
CALCIUM,_EXCHANGE. A01
MAGNESIUM,_EXCHANGE. A01
POTASSIUM,_EXCHANGE. A01
ORGANIC_MATTER,_ABUNDANCE A02
CLAY *02
SILT A02
SAND,_COARSE A02
SAND,_FINE A02

File complete

OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO(

MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

User: AGRIC2 12:38:08
File: VAX1::DRC2:[AGRIC2]LD052.DAT;2

MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

20563.00	43584.00	95001.00
20540.00	43503.00	95002.00
20533.00	43571.00	95003.00
20511.00	43547.00	95004.00
20502.00	43512.00	95005.00
20466.00	43572.00	95006.00
20446.00	43558.00	95007.00
20415.00	43481.00	95008.00
20397.00	43501.00	95009.00
20382.00	43572.00	95010.00
20372.00	43563.00	95011.00
20544.00	43572.00	95012.00
20531.00	43504.00	95013.00
20521.00	43495.00	95014.00
20532.00	43544.00	95015.00
20532.00	43590.00	95016.00
20524.00	43539.00	95017.00
20508.00	43491.00	95018.00
20500.00	43579.00	95019.00
20491.00	43582.00	95020.00
20461.00	43509.00	95021.00
20475.00	43572.00	95022.00
20455.00	43576.00	95023.00
20513.00	43542.00	95024.00
20501.00	43559.00	95025.00
20481.00	43538.00	95026.00
20519.00	43560.00	95027.00
20502.00	43538.00	95028.00
20500.00	43542.00	95029.00
20494.00	43548.00	95030.00
20491.00	43538.00	95031.00
20487.00	43558.00	95032.00
20468.00	43557.00	95033.00
20468.00	43561.00	95034.00
20462.00	43544.00	95035.00
20461.00	43547.00	95036.00
20458.00	43560.00	95037.00
20418.00	43468.00	95038.00
20567.00	43605.00	95039.00
20567.00	43578.00	95040.00
20513.00	43575.00	95041.00
20453.00	43572.00	95042.00
20560.00	43552.00	95043.00
20450.00	43588.00	95044.00
20528.00	43524.00	95045.00
20553.00	43541.00	95046.00
20454.00	43544.00	95047.00
20515.00	43567.00	95048.00
20500.00	43563.00	95049.00
20515.00	43561.00	95050.00
20511.00	43560.00	95051.00
20503.00	43545.00	95052.00

File complete

GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG

User: AGRIC2 12:22:49
File: VAX1::DRC2:[AGRIC2]ND051.DAT;4

GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG

NORTHING
EASTING
SITE_NO
STATUS
LAYER,_DEPTH,_UPPER *01
LAYER,_DEPTH,_LOWER *01
CARBONATE A02
PH C01
C.E.C. A01
CALCIUM,_EXCHANGE. A01
MAGNESIUM,_EXCHANGE. A01
POTASSIUM,_EXCHANGE. A01
ORGANIC_MATTER,_ABUNDANCE A02
CLAY *02
SILT A02
SAND,_COARSE A02
SAND,_FINE A02

File complete

GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG

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        2
        3          14          0          0
        1           2          0          0
43530.00        20520.00    15042.00
2.000000    0.0000000E+00   15.00000    2.200000    7.230000    39.10001    -3.000000    1.000000    0.6000000
   6.300000       44.00000    29.00000    7.000000   20.00000
2.000000       35.00000    50.00000    0.8000000   7.350000    30.70000    -3.000000    0.9000000   0.4000000
   2.200000       49.00000    23.00000   10.00000    18.00000
        1           2          0          0
43540.00        20520.00    15043.00
2.000000    0.0000000E+00   15.00000    1.300000    7.120000    34.80000    -3.000000    1.100000    0.7000000
   5.200000       42.00000    23.00000   11.00000    24.00000
2.000000       35.00000    50.00000    4.600000    7.350000    24.60001    -3.000000    1.700000    0.5000000
   1.300000       55.00000    23.00000   10.00000    12.00000
        1           2          0          0
43550.00        20520.00    15044.00
2.000000    0.0000000E+00   15.00000   13.80000    7.450000    33.20000    -3.000000    0.9000000   0.9000000
   4.700000       40.00000    15.00000   30.00000   15.00000
2.000000       35.00000    50.00000   20.50000    7.610000    19.80000    -3.000000    0.8000000   0.5000000
   1.300000       40.00000    16.00000   35.00000    9.000000
        1           2          0          0
43560.00        20520.00    15045.00
2.000000    0.0000000E+00   15.00000   10.50000    7.110000    28.60001    -3.000000    0.9000000   0.7000000
   4.700000       28.00000    10.00000   41.00000   21.00000
2.000000       35.00000    50.00000   17.50000    7.260000    25.39999    -3.000000    0.8000000   0.3000000
   2.300000       29.00000    9.000000   47.00000   15.00000
        1           2          0          0
43540.00        20510.00    15052.00
2.000000    0.0000000E+00   15.00000    1.000000    7.200000    42.00000    -3.000000    1.800000    0.7000000
   6.800000       46.00000    32.00000    4.000000   18.00000
2.000000       35.00000    50.00000    1.300000    7.050000    27.20000    -3.000000    1.600000    0.5000000
   1.600000       49.00000    26.00000    8.000000   17.00000
        1           2          0          0
43560.00        20510.00    15053.00
2.000000    0.0000000E+00   15.00000   11.90000    7.110000    38.70000    -3.000000    1.000000    0.8000000
   7.300000       35.00000    20.00000   28.00000   18.00000
2.000000       35.00000    50.00000   39.70000    7.430000    4.200000    -3.000000    0.6000000   0.2000000
   1.400000       24.00000    9.000000   57.00000   10.00000
        1           2          0          0
43530.00        20500.00    15059.00
2.000000    0.0000000E+00   15.00000    1.700000    6.960000    39.10001    25.60001    1.000000    0.3000000
   7.300000       38.00000    22.00000    4.000000   35.00000
2.000000       35.00000    50.00000    1.400000    7.420000    27.00000    -3.000000    1.400000    0.3000000
   1.200000       54.00000    18.00000    6.000000   23.00000
        1           2          0          0
43540.00        20500.00    15060.00
2.000000    0.0000000E+00   15.00000    0.3000000   6.760000    35.50000    22.89999    1.500000    0.4000000
   5.800000       42.00000    29.00000    7.000000   22.00000
2.000000       35.00000    50.00000    0.6000000   7.400000    28.39999    -3.000000    2.000000    0.3000000
   1.300000       52.00000    20.00000    8.000000   19.00000
        1           2          0          0
43550.00        20500.00    15061.00
2.000000    0.0000000E+00   15.00000    1.800000    7.220000    53.80000    -3.000000    1.900000    1.100000
   10.20000       47.00000    29.00000    4.000000   21.00000
2.000000       35.00000    50.00000   12.10000    7.320000    27.50000    -3.000000    2.800000    0.5000000
   1.800000       63.00000    25.00000    5.000000    7.000000
        1           2          0          0
43560.00        20500.00    15062.00
2.000000    0.0000000E+00   15.00000    1.700000    7.220000    50.10001    -3.000000    1.600000    1.100000
   9.500000       50.00000    30.00000    4.000000   15.00000
2.000000       35.00000    50.00000   14.30000    7.330000    26.50000    -3.000000    1.900000    0.6000000
   2.200000       59.00000    30.00000    5.000000    6.000000
        1           2          0          0
43540.00        20490.00    15069.00
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RD051

D-FILE: RD051 (50 m GRID)
YELFORD.

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2.000000        0.0000000E+00   15.00000        0.3000000       6.780000        36.20000        20.80000        1.000000        0.2000000
   6.300000        30.00000        29.00000        8.000000        33.00000
2.000000        35.00000        50.00000        0.3000000       6.790000        25.89999        18.10001        1.100000        0.3000000
   2.400000        37.00000        23.00000        9.000000        32.00000
         1               2               0               0
43560.00        20490.00        15070.00
2.000000        0.0000000E+00   15.00000        2.300000        7.060000        49.70000        -3.000000       1.900000        0.4000000
   9.800000        41.00000        29.00000        5.000000        25.00000
2.000000        35.00000        50.00000        0.9000000       7.240000        29.10001        -3.000000       2.100000        0.5000000
   1.400000        59.00000        25.00000        3.000000        12.00000
         1               2               0               0
43530.00        20480.00        15077.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.080000        42.00000        24.20000        1.600000        0.6000000
   11.90000        44.00000        28.00000        3.000000        25.00000
2.000000        35.00000        50.00000        2.200000        7.590000        27.50000        -3.000000       1.100000        0.2000000
   1.900000        54.00000        22.00000        9.000000        15.00000
         1               2               0               0
43540.00        20480.00        15078.00
2.000000        0.0000000E+00   15.00000        0.5000000       6.600000        33.30000        22.30000        1.000000        0.3000000
   6.400000        35.00000        29.00000        5.000000        31.00000
2.000000        35.00000        50.00000        0.6000000       7.220000        25.10001        -3.000000       1.000000        0.3000000
   1.300000        42.00000        18.00000        6.000000        34.00000
         1               2               0               0
43350.00        20480.00        15079.00
2.000000        0.0000000E+00   15.00000        0.1000000       6.070000        39.80000        25.39999        1.000000        0.1000000
   7.600000        25.00000        30.00000        5.000000        39.00000
2.000000        35.00000        50.00000        0.4000000       6.740000        21.89999        15.50000        0.9000000       0.2000000
   1.300000        35.00000        23.00000        6.000000        35.00000
         1               2               0               0
43560.00        20480.00        15080.00
2.000000        0.0000000E+00   15.00000        2.600000        6.610000        40.80000        27.10001        1.000000        0.5000000
   8.000000        27.00000        30.00000        5.000000        39.00000
2.000000        35.00000        50.00000        0.3000000       6.770000        24.39999        16.50000        1.500000        0.2000000
   1.400000        39.00000        24.00000        7.000000        31.00000
         1               2               0               0
43570.00        20480.00        15081.00
2.000000        0.0000000E+00   15.00000        0.6000000       7.130000        45.00000        -3.000000       1.200000        0.3000000
   10.80000        25.00000        32.00000        6.000000        37.00000
2.000000        35.00000        50.00000        0.3000000       7.080000        24.20000        -3.000000       1.000000        0.3000000
   1.600000        39.00000        24.00000        7.000000        30.00000
         1               2               0               0
43540.00        20470.00        15087.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.780000        50.70000        29.70000        1.500000        0.4000000
   8.100000        56.00000        30.00000        1.000000        13.00000
2.000000        35.00000        50.00000        0.5000000       6.940000        39.10001        31.60001        1.800000        0.4000000
   1.700000        70.00000        20.00000        1.000000        9.000000
         1               2               0               0
43560.00        20470.00        15088.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.900000        50.89999        33.60001        1.900000        0.2000000
   11.00000        28.00000        27.00000        4.000000        41.00000
2.000000        35.00000        50.00000        1.600000        7.290000        33.30000        -3.000000       1.300000        0.2000000
   2.200000        44.00000        19.00000        4.000000        33.00000
         1               2               0               0
43530.00        20460.00        15095.00
2.000000        0.0000000E+00   15.00000        0.7000000       6.160000        30.89999        19.60001        1.000000        0.1000000
   4.300000        34.00000        26.00000        3.000000        37.00000
2.000000        35.00000        50.00000        0.4000000       7.290000        23.89999        -3.000000       1.000000        0.3000000
   1.100000        36.00000        29.00000        2.000000        33.00000
         1               2               0               0
43540.00        20460.00        15096.00
2.000000        0.0000000E+00   15.00000        0.5000000       6.870000        46.50000        30.80000        2.100000        0.4000000
   7.100000        52.00000        29.00000        1.000000        18.00000
2.000000        35.00000        50.00000        0.6000000       6.650000        32.00000        24.60001        1.500000        0.4000000
   2.400000        49.00000        23.00000        1.000000        27.00000
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        1           2           0           0
43550.00       20460.00    15097.00
2.000000    0.0000000E+00  15.00000     1.700000     6.650000     47.00000     33.39999     2.100000     0.7000000
   6.300000       61.00000    21.00000     2.000000    17.00000
2.000000       35.00000    50.00000     0.5000000    6.760000     32.30000     21.39999     1.600000     0.2000000
   1.600000       53.00000    23.00000     3.000000    21.00000
        1           2           0           0
43560.00       20460.00    15098.00
2.000000    0.0000000E+00  15.00000     0.8000000    7.290000     45.50000     -3.000000    1.500000     0.6000000
   5.400000       57.00000    21.00000     2.000000    19.00000
2.000000       35.00000    50.00000     0.5000000    7.320000     36.30000     -3.000000    1.300000     0.4000000
   1.700000       61.00000    17.00000     2.000000    19.00000
        1           2           0           0
43540.00       20450.00    15105.00
2.000000    0.0000000E+00  15.00000     0.5000000    6.860000     36.20000     28.10001     1.500000     0.2000000
   4.700000       38.00000    28.00000     2.000000    32.00000
2.000000       35.00000    50.00000     0.1000000    6.960000     25.60001     19.39999     1.300000     0.3000000
   1.200000       37.00000    30.00000     2.000000    31.00000
        1           2           0           0
43560.00       20450.00    15106.00
2.000000    0.0000000E+00  15.00000     0.6000000    7.260000     51.60001     -3.000000    2.100000     0.6000000
   6.600000       66.00000    21.00000     1.000000    12.00000
2.000000       35.00000    50.00000     0.4000000    7.020000     26.70000     -3.000000    1.000000     0.2000000
   1.000000       43.00000    25.00000     2.000000    30.00000
        1           2           0           0
43550.00       20450.00    21164.00
2.000000    0.0000000E+00  15.00000     0.3000000    6.770000     28.20000     30.30000     2.100000     0.4000000
   5.900000       54.00000    27.00000     2.000000    17.00000
2.000000       35.00000    50.00000     0.3000000    6.150000     35.10001     24.20000     1.400000     0.4000000
   2.500000       54.00000    21.00000     1.000000    24.00000
        1           2           0           0
43530.00       20510.00    45014.00
2.000000    0.0000000E+00  15.00000     0.9000000    7.250000     42.10001     -3.000000    1.600000     0.3000000
   8.100000       39.00000    33.00000     4.000000    23.00000
2.000000       35.00000    50.00000     0.9000000    7.510000     30.89999     -3.000000    2.400000     0.7000000
   0.9000000      59.00000    21.00000     6.000000    14.00000
        1           2           0           0
43550.00       20490.00    45019.00
2.000000    0.0000000E+00  15.00000     0.9000000    6.580000     48.20000     29.00000     1.900000     0.6000000
   10.10000       38.00000    34.00000     4.000000    24.00000
2.000000       35.00000    50.00000     1.000000     7.290000     26.20000     -3.000000    1.600000     0.4000000
   1.100000       52.00000    25.00000     5.000000    18.00000
        1           2           0           0
43530.00       20470.00    45022.00
2.000000    0.0000000E+00  15.00000     0.8000000    6.560000     46.80000     28.50000     2.200000     0.6000000
   5.600000       51.00000    25.00000     3.000000    17.00000
2.000000       35.00000    50.00000     0.8000000    6.640000     38.00000     28.10001     1.700000     0.4000000
   2.300000       62.00000    21.00000     2.000000    15.00000
        1           2           0           0
43550.00       20510.00    55015.00
2.000000    0.0000000E+00  15.00000     3.600000     7.320000     39.89999     -3.000000    1.000000     1.300000
   6.600000       46.00000    28.00000    12.00000     14.00000
2.000000       35.00000    50.00000     15.00000     7.430000     20.70000     -3.000000    1.000000     0.5000000
   1.500000       51.00000    21.00000    14.00000     14.00000
        1           2           0           0
43530.00       20490.00    55018.00
2.000000    0.0000000E+00  15.00000     0.4000000    5.820000     27.60001     15.70000     0.9000000    0.2000000
   4.100000       33.00000    24.00000     7.000000    36.00000
2.000000       35.00000    50.00000     0.3000000    6.600000     23.10001     15.30000     0.9000000    0.4000000
   1.000000       39.00000    18.00000     5.000000    38.00000
        1           2           0           0
43550.00       20470.00    55022.00
2.000000    0.0000000E+00  15.00000     0.5000000    6.240000     52.60001     32.30000     3.000000     0.3000000
   12.50000       32.00000    29.00000     4.000000    35.00000
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2.000000        35.00000        50.00000        0.3000000       7.340000        30.00000        -3.000000       2.900000        0.3000000
   1.300000        49.00000        23.00000        2.000000        26.00000
         1               2               0               0
43530.00        20450.00        55025.00
2.000000        0.0000000E+00   15.00000        0.8000000       6.950000        31.30000        21.39999        1.200000        0.1000000
   4.000000        33.00000        30.00000        1.000000        37.00000
2.000000        35.00000        50.00000        0.6000000       6.590000        23.20000        17.80000        1.400000        0.3000000
   1.200000        34.00000        28.00000        1.000000        37.00000
         1               2               0               0
43535.00        20520.00        65014.00
2.000000        0.0000000E+00   15.00000        0.2000000       6.570000        32.30000        -3.000000       1.000000        0.8000000
   5.100000        42.00000        25.00000        12.00000        21.00000
2.000000        35.00000        50.00000        0.3000000       7.320000        25.70000        -3.000000       0.7000000       0.4000000
   1.600000        49.00000        19.00000        13.00000        19.00000
         1               2               0               0
43545.00        20520.00        65015.00
2.000000        0.0000000E+00   15.00000         7.300000       7.250000        32.00000        -3.000000       0.8000000       0.6000000
   4.700000        45.00000        19.00000        23.00000        13.00000
2.000000        35.00000        50.00000        24.89999        7.340000        19.50000        -3.000000       0.9000000       0.4000000
   1.400000        48.00000        19.00000        23.00000        10.00000
         1               2               0               0
43555.00        20520.00        65016.00
2.000000        0.0000000E+00   15.00000         6.500000       7.280000        31.39999        -3.000000       0.8000000       0.6000000
   5.100000        33.00000        14.00000        34.00000        19.00000
2.000000        35.00000        50.00000         8.800000       7.270000        29.89999        -3.000000       0.8000000       0.3000000
   2.900000        34.00000        13.00000        33.00000        20.00000
         1               2               0               0
43530.00        20515.00        65018.00
2.000000        0.0000000E+00   15.00000        0.6000000       6.990000        42.10001        -3.000000       1.000000        0.4000000
   7.900000        44.00000        32.00000        4.000000        19.00000
2.000000        35.00000        50.00000        0.7000000       7.330000        28.39999        -3.000000       1.600000        0.4000000
   1.100000        50.00000        17.00000        10.00000        23.00000
         1               2               0               0
43535.00        20515.00        65019.00
2.000000        0.0000000E+00   15.00000        0.5000000       6.580000        34.60001        22.50000        1.100000        0.3000000
   5.600000        42.00000        28.00000        6.000000        23.00000
2.000000        35.00000        50.00000        0.6000000       7.260000        24.10001        -3.000000       1.000000        0.3000000
   1.400000        48.00000        19.00000        12.00000        20.00000
         1               2               0               0
43540.00        20515.00        65020.00
2.000000        0.0000000E+00   15.00000        0.6000000       7.280000        39.10001        -3.000000       1.100000        0.7000000
   6.600000        41.00000        25.00000        7.000000        27.00000
2.000000        35.00000        50.00000         4.000000       7.290000        28.30000        -3.000000       1.200000        0.4000000
   1.500000        49.00000        21.00000        10.00000        19.00000
         1               2               0               0
43555.00        20515.00        65021.00
2.000000        0.0000000E+00   15.00000         7.200000       7.530000        32.30000        -3.000000       1.000000        1.200000
   5.300000        50.00000        19.00000        16.00000        15.00000
2.000000        35.00000        50.00000        17.89999        7.360000        23.70000        -3.000000       1.000000        0.4000000
   2.100000        58.00000        27.00000        12.00000         3.000000
         1               2               0               0
43550.00        20515.00        65022.00
2.000000        0.0000000E+00   15.00000         9.200000       7.340000        32.00000        -3.000000       0.9000000       1.100000
   4.300000        43.00000        12.00000        29.00000        16.00000
2.000000        35.00000        50.00000        40.89999        7.610000        13.80000        -3.000000       0.7000000       0.3000000
  0.5000000        31.00000        11.00000        51.00000         6.000000
         1               2               0               0
43555.00        20515.00        65023.00
2.000000        0.0000000E+00   15.00000         9.100000       7.120000        36.00000        -3.000000       1.600000        2.000000
   6.000000        31.00000        12.00000        33.00000        23.00000
2.000000        35.00000        50.00000         9.900000       7.320000        23.20000        -3.000000       1.000000        1.100000
   2.100000        31.00000        12.00000        41.00000        17.00000
         1               2               0               0
43540.00        20515.00        65024.00
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   4.300000       32.00000       10.00000       34.00000       24.00000
2.000000       35.00000       50.00000       15.00000       7.380000       22.00000      -3.000000      0.9000000      0.4000000
   1.400000       32.00000       14.00000       24.00000       30.00000
          1              2              0              0
43535.00       20510.00       65027.00
2.000000       0.0000000E+00  15.00000       0.2000000      6.210000       37.50000       25.10001      2.000000       0.5000000
   7.300000       46.00000       30.00000       4.000000       21.00000
2.000000       35.00000       50.00000       0.3000000      7.280000       30.89999      -3.000000      2.800000       0.5000000
   1.200000       67.00000       22.00000       2.000000       9.000000
          1              2              0              0
43545.00       20510.00       65028.00
2.000000       0.0000000E+00  15.00000       2.100000       7.490000       41.89999      -3.000000      1.600000       0.8000000
   7.400000       46.00000       31.00000       6.000000       17.00000
2.000000       35.00000       50.00000       16.70000       7.560000       26.30000      -3.000000      2.200000       0.4000000
   2.100000       58.00000       27.00000       7.000000       9.000000
          1              2              0              0
43555.00       20510.00       65029.00
2.000000       0.0000000E+00  15.00000       6.500000       7.270000       47.10001      -3.000000      1.100000       0.9000000
   10.00000       34.00000       28.00000       18.00000       20.00000
2.000000       35.00000       50.00000       29.89999       7.490000       24.30000      -3.000000      1.300000       0.4000000
   2.200000       48.00000       28.00000       15.00000       9.000000
          1              2              0              0
43530.00       20505.00       65031.00
2.000000       0.0000000E+00  15.00000       0.1000000      6.670000       43.70000       30.00000      1.400000       0.6000000
   8.400000       44.00000       34.00000       3.000000       19.00000
2.000000       35.00000       50.00000       0.4000000      7.250000       51.30000      -3.000000      1.500000       0.3000000
   1.500000       54.00000       23.00000       5.000000       18.00000
          1              2              0              0
43555.00       20505.00       65032.00
2.000000       0.0000000E+00  15.00000       0.7000000      6.860000       41.39999       29.70000      2.200000       0.4000000
   8.400000       38.00000       37.00000       4.000000       21.00000
2.000000       35.00000       50.00000       0.9000000      6.960000       25.80000       17.80000      3.200000       0.4000000
   1.600000       49.00000       27.00000       6.000000       18.00000
          1              2              0              0
43545.00       20505.00       65033.00
2.000000       0.0000000E+00  15.00000       0.4000000      6.770000       46.60001       29.10001      2.000000       0.5000000
   8.900000       47.00000       30.00000       3.000000       20.00000
2.000000       35.00000       50.00000       1.500000       7.540000       29.70000      -3.000000      2.500000       0.6000000
   1.400000       66.00000       25.00000       4.000000       5.000000
          1              2              0              0
43545.00       20505.00       65034.00
2.000000       0.0000000E+00  15.00000       1.200000       7.230000       39.30000      -3.000000      1.700000       0.7000000
   5.900000       47.00000       29.00000       6.000000       18.00000
2.000000       35.00000       50.00000       4.900000       7.380000       25.60001      -3.000000      2.500000       0.3000000
   1.100000       63.00000       22.00000       7.000000       8.000000
          1              2              0              0
43550.00       20505.00       65035.00
2.000000       0.0000000E+00  15.00000       6.400000       7.320000       43.80000      -3.000000      1.600000       0.7000000
   7.600000       48.00000       28.00000       6.000000       18.00000
2.000000       35.00000       50.00000       19.10001       7.440000       24.80000      -3.000000      1.700000       0.5000000
   1.400000       56.00000       32.00000       7.000000       5.000000
          1              2              0              0
43555.00       20505.00       65036.00
2.000000       0.0000000E+00  15.00000       7.700000       7.330000       45.70000      -3.000000      1.600000       1.200000
   9.700000       46.00000       15.00000       8.000000       30.00000
2.000000       35.00000       50.00000       20.70000       7.440000       22.39999      -3.000000      2.300000       0.5000000
   1.400000       55.00000       28.00000       10.00000       7.000000
          1              2              0              0
43560.00       20505.00       65037.00
2.000000       0.0000000E+00  15.00000       6.400000       7.260000       50.00000      -3.000000      2.000000       1.400000
   9.300000       42.00000       27.00000       8.000000       22.00000
2.000000       35.00000       50.00000       17.00000       7.330000       25.10001      -3.000000      1.900000       0.6000000
   2.000000       51.00000       26.00000       13.00000       10.00000
```

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       1          2          0          0
43535.00       20500.00   65040.00
2.000000   0.0000000E+00  15.00000   0.2000000   6.580000   30.89999   26.30000   2.100000   0.6000000
   6.300000       46.00000   29.00000   3.000000   22.00000
2.000000       35.00000   50.00000   0.4000000   7.330000   28.80000   -3.000000  2.900000   0.3000000
   1.100000       57.00000   19.00000   4.000000   19.00000
       1          2          0          0
43545.00       20500.00   65041.00
2.000000   0.0000000E+00  15.00000   0.5000000   7.150000   43.20000   -3.000000  1.500000   0.9000000
   7.500000       41.00000   32.00000   5.000000   22.00000
2.000000       35.00000   50.00000   1.200000   7.490000   14.30000   -3.000000  2.100000   0.4000000
   1.500000       53.00000   22.00000   8.000000   17.00000
       1          2          0          0
43555.00       20500.00   65042.00
2.000000   0.0000000E+00  15.00000   3.400000   7.290000   49.00000   -3.000000  1.600000   0.8000000
   8.100000       52.00000   27.00000   6.000000   15.00000
2.000000       35.00000   50.00000   9.900000   7.510000   28.70000   -3.000000  2.400000   0.6000000
   1.600000       63.00000   20.00000   8.000000   9.000000
       1          2          0          0
43530.00       20495.00   65044.00
2.000000   0.0000000E+00  15.00000   0.1000000   5.790000   26.20000   15.50000   0.8000000  0.3000000
   4.100000       32.00000   26.00000   7.000000   35.00000
2.000000       35.00000   50.00000   0.6000000   5.960000   29.89999   16.30000   1.100000   0.3000000
   1.600000       46.00000   20.00000   7.000000   72.00000
       1          2          0          0
43535.00       20495.00   65045.00
2.000000   0.0000000E+00  15.00000   12.90000   6.320000   36.50000   19.60001   1.100000   0.3000000
   5.900000       37.00000   31.00000   5.000000   27.00000
2.000000       35.00000   50.00000   2.700000   6.630000   28.30000   21.60001   1.400000   0.3000000
   1.700000       50.00000   20.00000   7.000000   23.00000
       1          2          0          0
43540.00       20495.00   65046.00
2.000000   0.0000000E+00  15.00000   0.5000000   6.780000   33.10001   22.20000   1.300000   0.4000000
   5.800000       42.00000   29.00000   6.000000   23.00000
2.000000       35.00000   50.00000   0.9000000   6.870000   26.70000   19.60001   1.500000   0.4000000
   1.400000       47.00000   22.00000   8.000000   22.00000
       1          2          0          0
43545.00       20495.00   65047.00
2.000000   0.0000000E+00  15.00000   3.500000   7.310000   39.10001   33.20000   1.700000   0.6000000
   6.200000       41.00000   27.00000   5.000000   26.00000
2.000000       35.00000   50.00000   0.2000000   7.180000   27.30000   -3.000000  2.500000   0.4000000
   1.600000       48.00000   24.00000   7.000000   20.00000
       1          2          0          0
43550.00       20495.00   65048.00
2.000000   0.0000000E+00  15.00000   0.3000000   7.180000   45.20000   -3.000000  2.500000   0.9000000
   8.600000       49.00000   27.00000   6.000000   18.00000
2.000000       35.00000   50.00000   1.300000   7.420000   32.39999   -3.000000  3.200000   0.4000000
   1.100000       67.00000   21.00000   3.000000   8.000000
       1          2          0          0
43555.00       20495.00   65049.00
2.000000   0.0000000E+00  15.00000   0.3000000   6.410000   44.80000   31.20000   2.200000   0.8000000
   8.100000       51.00000   28.00000   4.000000   17.00000
2.000000       35.00000   50.00000   0.2000000   7.240000   30.60001   -3.000000  2.300000   0.6000000
   1.400000       62.00000   24.00000   5.000000   9.000000
       1          2          0          0
43560.00       20495.00   65050.00
2.000000   0.0000000E+00  15.00000   0.7000000   6.430000   43.89999   28.30000   2.000000   0.5000000
   8.400000       53.00000   31.00000   3.000000   13.00000
2.000000       35.00000   50.00000   0.8000000   7.420000   31.39999   -3.000000  2.100000   0.4000000
   1.400000       69.00000   23.00000   2.000000   6.000000
       1          2          0          0
43535.00       20490.00   65053.00
2.000000   0.0000000E+00  15.00000   0.7000000   5.960000   23.30000   31.39999   1.800000   0.4000000
   3.600000       30.00000   27.00000   8.000000   35.00000
2.000000       35.00000   50.00000   0.3000000   5.660000   28.39999   15.00000   1.100000   0.3000000
```

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I       I                                              I
              1              2              0              0
     43555.00        20470.00       65081.00
     2.000000    0.0000000E+00      15.00000      0.4000000      5.720000      51.70000      33.50000      1.900000      0.5000000
        12.60000        32.00000       30.00000       4.000000       35.00000
     2.000000        35.00000       50.00000      0.2000000      7.070000      24.70000     -3.000000      1.400000      0.2000000
        1.100000        42.00000       23.00000       3.000000       33.00000
              1              2              0              0
     43530.00        20465.00       65083.00
     2.000000    0.0000000E+00      15.00000      0.8000000      6.710000      36.20000      25.89999      1.500000      0.2000000
        4.200000        41.00000       26.00000       2.000000       30.00000
     2.000000        35.00000       50.00000      0.7000000      7.250000      21.60001     -3.000000     0.9000000      0.0000000E
00      1.400000        35.00000       24.00000       5.000000       36.00000
              1              2              0              0
     43535.00        20445.00       65084.00
     2.000000    0.0000000E+00      15.00000       2.400000      7.330000      48.00000     -3.000000      2.000000      0.8000000
        8.300000        45.00000       23.00000       2.000000       29.00000
     2.000000        35.00000       50.00000       1.700000      7.210000      34.39999     -3.000000      1.600000      0.3000000
        2.700000        50.00000       25.00000       3.000000       22.00000
              1              2              0              0
     43540.00        20465.00       65085.00
     2.000000    0.0000000E+00      15.00000      0.9000000      6.310000      48.50000      31.30000      2.600000      0.7000000
        8.400000        47.00000       29.00000       2.000000       22.00000
     2.000000        35.00000       50.00000      0.6000000      6.630000      36.70000      28.00000      2.000000      0.4000000
        2.300000        58.00000       21.00000       1.000000       21.00000
              1              2              0              0
     43544.00        20464.00       65086.00
     2.000000    0.0000000E+00      15.00000      0.6000000      6.980000      44.50000      34.39999      1.800000      0.5000000
        7.100000        46.00000       26.00000       2.000000       26.00000
     2.000000        35.00000       50.00000      0.4000000      7.060000      30.30000     -3.000000      1.400000      0.3000000
        1.400000        43.00000       27.00000       2.000000       28.00000
              1              2              0              0
     43551.00        20466.00       65087.00
     2.000000    0.0000000E+00      15.00000      0.6000000      6.180000      55.20000      35.00000      2.300000      0.3000000
        10.80000        49.00000       31.00000       2.000000       19.00000
     2.000000        35.00000       50.00000      0.4000000      6.820000      31.80000      23.30000      1.700000      0.3000000
        1.800000        51.00000       24.00000       3.000000       22.00000
              1              2              0              0
     43555.00        20465.00       65088.00
     2.000000    0.0000000E+00      15.00000      0.2000000      6.300000      51.60001      36.30000      2.400000      0.3000000
        9.400000        43.00000       33.00000       3.000000       21.00000
     2.000000        35.00000       50.00000      0.6000000      6.860000      37.39999      26.70000      2.200000      0.4000000
        2.300000        58.00000       18.00000       1.000000       22.00000
              1              2              0              0
     43560.00        20465.00       65089.00
     2.000000    0.0000000E+00      15.00000      0.9000000      6.710000      50.80000      37.60001      2.400000       1.000000
        11.30000        28.00000       28.00000       5.000000       40.00000
     2.000000        35.00000       50.00000       3.600000      7.220000      31.10001     -3.000000      1.700000      0.6000000
        2.500000        44.00000       20.00000       7.000000       29.00000
              1              2              0              0
     43535.00        20460.00       65092.00
     2.000000    0.0000000E+00      15.00000      0.6000000      6.740000      35.70000      23.70000      1.100000      0.2000000
        5.000000        38.00000       30.00000       2.000000       30.00000
     2.000000        35.00000       50.00000      0.3000000      6.880000      22.50000      16.89999      1.100000      0.4000000
       0.9000000        37.00000       34.00000       1.000000       28.00000
              1              2              0              0
     43545.00        20460.00       65093.00
     2.000000    0.0000000E+00      15.00000      0.9000000      6.470000      42.39999      29.00000      1.700000      0.5000000
        5.600000        55.00000       24.00000       2.000000       20.00000
     2.000000        35.00000       50.00000      0.6000000      6.580000      26.20000      17.50000     0.9000000      0.2000000
        1.300000        41.00000       23.00000       2.000000       33.00000
              1              2              0              0
     43555.00        20460.00       65094.00
     2.000000    0.0000000E+00      15.00000       1.100000      6.620000      49.30000      37.30000      2.100000      0.6000000
        5.500000        56.00000       23.00000       2.000000       19.00000
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2.000000        35.00000        50.00000        0.4000000       5.980000        32.39999        23.30000        1.400000        0.2000000
   1.500000        48.00000        21.00000        3.000000        28.00000
         1               2               0               0
43530.00        20455.00        65096.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.890000        35.60001        28.30000        1.000000        0.3000000
   5.000000        34.00000        26.00000        2.000000        39.00000
2.000000        35.00000        50.00000        0.4000000       7.520000        21.39999        -3.000000       0.6000000       0.2000000
   0.8000000       32.00000        21.00000        1.000000        45.00000
         1               2               0               0
43535.00        20455.00        65097.00
2.000000        0.0000000E+00   15.00000        0.9000000       6.870000        32.50000        25.60001        1.500000        0.2000000
   4.300000        39.00000        24.00000        2.000000        36.00000
2.000000        35.00000        50.00000        0.5000000       6.920000        21.10001        17.20000        1.000000        0.3000000
   0.8000000       38.00000        22.00000        3.000000        37.00000
         1               2               0               0
43540.00        20455.00        65098.00
2.000000        0.0000000E+00   15.00000        1.100000        7.120000        36.50000        -3.000000       1.100000        0.4000000
   4.600000        42.00000        23.00000        1.000000        34.00000
2.000000        35.00000        50.00000        0.4000000       7.040000        27.80000        -3.000000       0.8000000       0.2000000
   1.400000        42.00000        23.00000        2.000000        34.00000
         1               2               0               0
43545.00        20455.00        65099.00
2.000000        0.0000000E+00   15.00000        0.4000000       7.210000        46.50000        -3.000000       1.900000        0.4000000
   5.900000        52.00000        25.00000        1.000000        22.00000
2.000000        35.00000        50.00000        0.5000000       6.790000        32.20000        23.30000        1.200000        0.3000000
   2.000000        51.00000        25.00000        1.000000        23.00000
         1               2               0               0
43550.00        20455.00        65100.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.580000        43.30000        35.20000        1.700000        0.5000000
   5.600000        61.00000        24.00000        1.000000        14.00000
2.000000        35.00000        50.00000        0.5000000       6.850000        32.20000        21.39999        1.100000        0.2000000
   1.800000        52.00000        21.00000        3.000000        24.00000
         1               2               0               0
43555.00        20455.00        65101.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.880000        48.80000        36.30000        1.700000        0.5000000
   5.800000        60.00000        24.00000        2.000000        14.00000
2.000000        35.00000        50.00000        0.5000000       7.040000        34.10001        -3.000000       1.000000        0.3000000
   1.500000        53.00000        21.00000        2.000000        23.00000
         1               2               0               0
43560.00        20455.00        65102.00
2.000000        0.0000000E+00   15.00000        0.6000000       6.860000        51.50000        39.60001        2.000000        0.7000000
   5.800000        61.00000        24.00000        2.000000        13.00000
2.000000        35.00000        50.00000        0.9000000       7.260000        38.80000        -3.000000       1.900000        0.3000000
   1.800000        66.00000        19.00000        1.000000        14.00000
         1               2               0               0
43535.00        20450.00        65105.00
2.000000        0.0000000E+00   15.00000        0.2000000       6.570000        32.50000        21.20000        1.300000        0.2000000
   4.400000        38.00000        27.00000        2.000000        33.00000
2.000000        35.00000        50.00000        0.7000000       7.320000        22.10001        -3.000000       1.300000        0.2000000
   0.8000000       35.00000        29.00000        1.000000        35.00000
         1               2               0               0
43546.00        20451.00        65106.00
2.000000        0.0000000E+00   15.00000        0.5000000       6.930000        44.70000        30.70000        2.000000        0.6000000
   5.800000        55.00000        24.00000        1.000000        20.00000
2.000000        35.00000        50.00000        0.4000000       6.700000        40.00000        25.70000        2.000000        0.3000000
   2.300000        66.00000        23.00000        0.0000000E+00   11.00000
         1               2               0               0
43555.00        20450.00        65107.00
2.000000        0.0000000E+00   15.00000        1.000000        6.420000        49.00000        34.70000        2.000000        0.7000000
   5.600000        63.00000        18.00000        1.000000        12.00000
2.000000        35.00000        50.00000        0.6000000       6.520000        27.00000        18.20000        1.100000        0.3000000
   1.700000        44.00000        24.00000        3.000000        29.00000
```

D-FILE :

100m GRID

(YELFORD)

```
WWWWWWWWWW     3333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333     WWWWWWWWWW
WWWWWWWWWW     3333333333333333  VAX1 - Oxford University Computing Service - VAX/VMS Version V4.5  3333333333333333333     WWWWWWWWWW
WWWWWWWWWW     3333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333     WWWWWWWWWW

                 AAA     GGGG  RRRR     III     CCCC    222
                A   A   G      R   R     I     C       2   2
                A   A   G      R   R     I     C           2
                A   A   G      RRRR      I     C         2
                AAAAA   G GGG  R R       I     C       2
                A   A   G   G  R  R      I     C       2
                A   A    GGG   R   R    III     CCCC   22222

RRRRRRRR     DDDDDDDD       000000     5555555555     000000
RRRRRRRR     DDDDDDDD       000000     5555555555     000000
RR       RR  DD       DD   00    00   55             00    00
RR       RR  DD       DD   00    00   55             00    00
RR       RR  DD       DD   00  0000   555555         00  0000
RR       RR  DD       DD   00  0000   555555         00  0000
RRRRRRRR     DD       DD   00 00 00         55       00 00 00
RRRRRRRR     DD       DD   00 00 00         55       00 00 00
RR   RR      DD       DD   0000  00           55     0000  00
RR   RR      DD       DD   0000  00           55     0000  00
RR     RR    DD       DD   00    00   55      55     00    00
RR     RR    DD       DD   00    00   55      55     00    00
RR       RR  DDDDDDDD       000000       555555       000000
RR       RR  DDDDDDDD       000000       555555       000000

      DDDDDDDD       AAAAAA     TTTTTTTTTT       ;;;;         11
      DDDDDDDD       AAAAAA     TTTTTTTTTT       ;;;;         11
      DD       DD   AA    AA       TT           ;;;;       1111
      DD       DD   AA    AA       TT                        11
      DD       DD   AA    AA       TT                        11
      DD       DD   AA    AA       TT           ;;;;         11
      DD       DD   AA    AA       TT           ;;;;         11
      DD       DD   AAAAAAAAAA     TT           ;;;;         11
      DD       DD   AAAAAAAAAA     TT           ;;;;         11
....  DD       DD   AA    AA       TT             ;;         11
....  DD       DD   AA    AA       TT             ;;         11
....  DDDDDDDD      AA    AA       TT           ;;         111111
....  DDDDDDDD      AA    AA       TT           ;;         111111
```

File _DRC2:[AGRIC2]RD050.DAT;1 (13120,49,0), last revised on 11-MAY-1987 09:54, is a 147 block sequential file owned by UIC [3HFF,AGRIC2]. The records are variable length with implied (CR) carriage control. The longest record is 211 bytes.

Job RD050 (1385) queued to LPA0 on 14-MAY-1987 12:35 by user AGRIC2, UIC [3HFF,AGRIC2], under account 3HFF at priority 6, started on printer _LPA0: on 14-MAY-1987 12:38 from queue LPA0.

```
WWWWWWWWWW     3333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333     WWWWWWWWWW
WWWWWWWWWW     3333333333333333333333  Digital Equipment Corporation - VAX/VMS Version V4.5  3333333333333333333     WWWWWWWWWW
WWWWWWWWWW     3333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333     WWWWWWWWWW
```

```
        2
        3          14           0           0
        1           2           0           0
43480.00       20560.00    15001.00
2.000000    0.0000000E+00  15.00000     3.800000     7.480000     29.50000    -3.000000     1.200000     0.4000000
   3.800000       42.00000    24.00000     7.000000    27.00000
2.000000       35.00000    50.00000    20.80000     7.480000     27.10001    -3.000000     2.600000     0.2000000
  0.7000000       49.00000    27.00000     8.000000    16.00000
        1           2           0           0
43491.00       20559.00    15002.00
2.000000    0.0000000E+00  15.00000     0.8000000    6.680000     38.50000     27.89999     2.100000     2.200000
   7.800000       32.00000    25.00000     7.000000    35.00000
2.000000       35.00000    50.00000     0.4000000    7.170000     22.80000    -3.000000     0.8000000    0.4000000
   1.000000       37.00000    20.00000     6.000000    36.00000
        1           2           0           0
43500.00       20560.00    15003.00
2.000000    0.0000000E+00  15.00000     0.5000000    6.730000     28.20000     19.00000     1.200000     0.7000000
   4.600000       28.00000    23.00000     7.000000    43.00000
2.000000       35.00000    50.00000     1.300000    6.830000     27.00000     17.10001     0.8000000    0.2000000
   1.300000       36.00000    17.00000     5.000000    42.00000
        1           2           0           0
43510.00       20560.00    15004.00
2.000000    0.0000000E+00  15.00000     0.5000000    6.420000     35.00000     19.89999     2.300000     0.3000000
   6.200000       35.00000    32.00000     6.000000    26.00000
2.000000       35.00000    50.00000     0.6000000    7.040000     27.70000    -3.000000     2.700000     0.4000000
   1.400000       48.00000    26.00000     5.000000    22.00000
        1           2           0           0
43520.00       20560.00    15005.00
2.000000    0.0000000E+00  15.00000     1.000000     6.490000     34.89999     22.60001     1.900000     0.7000000
   6.800000       38.00000    32.00000     7.000000    23.00000
2.000000       35.00000    50.00000     1.000000    7.180000     33.00000    -3.000000     2.000000     0.3000000
  0.8000000       73.00000    22.00000     1.000000    4.000000
        1           2           0           0
43530.00       20560.00    15006.00
2.000000    0.0000000E+00  15.00000     1.400000     6.280000     58.00000     38.00000     2.500000     0.4000000
   12.90000       31.00000    40.00000     3.000000    27.00000
2.000000       35.00000    50.00000     0.8000000    7.290000     31.60001    -3.000000     1.200000     0.3000000
   2.000000       53.00000    23.00000     4.000000    19.00000
        1           2           0           0
43520.00       20540.00    15007.00
2.000000    0.0000000E+00  15.00000     0.5000000    6.370000     35.89999     21.70000     3.000000     0.9000000
   4.000000       56.00000    24.00000     3.000000    17.00000
2.000000       35.00000    50.00000     0.8000000    7.110000     34.30000    -3.000000     3.500000     0.5000000
   1.700000       62.00000    23.00000     3.000000    12.00000
        1           2           0           0
43550.00       20560.00    15008.00
2.000000    0.0000000E+00  15.00000     1.100000     7.070000     43.10001    -3.000000     1.500000     0.6000000
   5.800000       53.00000    28.00000     3.000000    15.00000
2.000000       35.00000    50.00000     3.600000    7.420000     27.50000    -3.000000     1.700000     0.4000000
  0.9000000       64.00000    25.00000     3.000000    8.000000
        1           2           0           0
43560.00       20560.00    15009.00
2.000000    0.0000000E+00  15.00000     1.300000     6.640000     35.39999     27.60001     1.600000     0.7000000
   5.500000       48.00000    28.00000     5.000000    18.00000
2.000000       35.00000    50.00000     0.8000000    7.290000     32.89999    -3.000000     2.000000     0.4000000
   1.400000       66.00000    20.00000     4.000000    10.00000
        1           2           0           0
43570.00       20560.00    15010.00
2.000000    0.0000000E+00  15.00000     0.3000000    6.940000     38.00000     31.00000     1.500000     0.8000000
   5.300000       54.00000    27.00000     5.000000    15.00000
2.000000       35.00000    50.00000     0.3000000    7.290000     32.80000    -3.000000     1.900000     0.4000000
   1.100000       74.00000    20.00000     1.000000    5.000000
        1           2           0           0
43580.00       20560.00    15011.00

2.000000    0.0000000E+00  15.00000     2.300000     7.240000     37.10001    -3.000000     1.300000     0.4000000
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2.000000        0.00000000E+00  15.00000        2.300000        7.240000        37.10001        -3.000000       1.300000        0.6000000
   5.300000        44.00000        29.00000        7.000000        20.00000
2.000000        35.00000        50.00000        4.900000        7.610000        29.50000        -3.000000       2.100000        0.3000000
   1.500000        72.00000        21.00000        2.000000        5.000000
        1               2               0               0
43590.00        20560.00        15012.00
2.000000        0.00000000E+00  15.00000        0.3000000       7.040000        30.60001        -3.000000       0.9000000       0.9000000
   4.200000        35.00000        24.00000        9.000000        32.00000
2.000000        35.00000        50.00000        3.000000        7.480000        24.20000        -3.000000       0.7000000       0.4000000
   1.700000        41.00000        19.00000        11.00000        29.00000
        1               2               0               0
43480.00        20550.00        15013.00
2.000000        0.00000000E+00  15.00000        5.300000        7.430000        33.10001        -3.000000       1.500000        0.5000000
   4.100000        43.00000        21.00000        14.00000        22.00000
2.000000        35.00000        50.00000        18.50000        7.540000        28.60001        -3.000000       2.300000        0.3000000
   1.300000        63.00000        32.00000        4.000000        1.000000
        1               2               0               0
43500.00        20550.00        15014.00
2.000000        0.00000000E+00  15.00000        2.200000        6.820000        30.50000        21.70000        1.400000        0.6000000
   6.400000        28.00000        24.00000        7.000000        41.00000
2.000000        35.00000        50.00000        0.8000000       7.230000        25.89999        -3.000000       1.300000        0.5000000
   1.100000        43.00000        17.00000        6.000000        29.00000
        1               2               0               0
43520.00        20550.00        15015.00
2.000000        0.00000000E+00  15.00000        0.9000000       6.530000        34.50000        22.89999        1.800000        0.4000000
   7.100000        36.00000        29.00000        7.000000        28.00000
2.000000        35.00000        50.00000        0.6000000       7.260000        30.50000        -3.000000       2.600000        0.2000000
   1.000000        62.00000        22.00000        6.000000        10.00000
        1               2               0               0
43540.00        20550.00        15016.00
2.000000        0.00000000E+00  15.00000        0.5000000       6.910000        39.50000        27.80000        1.400000        0.4000000
   5.300000        54.00000        30.00000        5.000000        11.00000
2.000000        35.00000        50.00000        0.2000000       7.260000        34.60001        -3.000000       0.1000000       0.3000000
   1.500000        64.00000        23.00000        4.000000        10.00000
        1               2               0               0
43560.00        20550.00        15017.00
2.000000        0.00000000E+00  15.00000        0.6000000       7.090000        35.39999        -3.000000       1.200000        0.8000000
   5.400000        48.00000        22.00000        11.00000        18.00000
2.000000        35.00000        50.00000        0.1000000       7.330000        28.80000        -3.000000       1.500000        0.3000000
   1.400000        59.00000        19.00000        7.000000        15.00000
        1               2               0               0
43580.00        20550.00        15018.00
2.000000        0.00000000E+00  15.00000        2.000000        7.410000        35.39999        -3.000000       1.500000        1.000000
   4.700000        44.00000        20.00000        13.00000        23.00000
2.000000        35.00000        50.00000        8.700000        7.420000        30.10001        -3.000000       2.700000        0.4000000
   1.100000        64.00000        21.00000        9.000000        6.000000
        1               2               0               0
43481.00        20539.00        15019.00
2.000000        0.00000000E+00  15.00000        3.200000        7.190000        44.30000        -3.000000       1.700000        1.100000
   6.300000        43.00000        26.00000        8.000000        23.00000
2.000000        35.00000        50.00000        16.00000        7.440000        25.00000        -3.000000       2.000000        0.5000000
   1.500000        57.00000        26.00000        8.000000        10.00000
        1               2               0               0
43490.00        20540.00        15020.00
2.000000        0.00000000E+00  15.00000        1.400000        7.070000        44.30000        -3.000000       2.400000        1.100000
   9.300000        37.00000        34.00000        6.000000        24.00000
2.000000        35.00000        50.00000        3.800000        7.530000        28.70000        -3.000000       3.700000        0.4000000
   1.300000        70.00000        26.00000        2.000000        3.000000
        1               2               0               0
43500.00        20540.00        15021.00
2.000000        0.00000000E+00  15.00000        0.5000000       6.890000        35.60001        24.10001        2.000000        0.6000000
   7.600000        35.00000        28.00000        5.000000        32.00000
2.000000        35.00000        50.00000        1.600000        7.470000        29.39999        -3.000000       4.100000        0.5000000
   1.300000        66.00000        23.00000        3.000000        9.000000
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       1            2           0           0
  43510.00     20540.00    15022.00
  2.000000   0.0000000E+00  15.00000   0.5000000   7.020000   38.39999   -3.000000   1.700000   0.7000000
     7.600000     28.00000    26.00000    7.000000   39.00000
  2.000000     35.00000    50.00000    2.500000    7.460000   28.50000   -3.000000   1.600000   0.5000000
     1.400000     55.00000    21.00000    5.000000   19.00000
       1            2           0           0
  43520.00     20540.00    15023.00
  2.000000   0.0000000E+00  15.00000   0.2000000   6.280000   34.80000    21.70000   1.700000   0.3000000
     6.300000     35.00000    48.00000    6.000000   11.00000
  2.000000     35.00000    50.00000    0.4000000   7.280000   30.39999   -3.000000   1.100000   0.3000000
     1.500000     50.00000    24.00000    6.000000   21.00000
       1            2           0           0
  43530.00     20540.00    15024.00
  2.000000   0.0000000E+00  15.00000   0.7000000   6.470000   54.70000    33.89999   2.900000   0.7000000
     11.30000     37.00000    37.00000    4.000000   23.00000
  2.000000     35.00000    50.00000    0.8000000   6.720000   30.50000    19.60001   1.600000   0.5000000
     1.900000     44.00000    24.00000    5.000000   27.00000
       1            2           0           0
  43540.00     20540.00    15025.00
  2.000000   0.0000000E+00  15.00000   0.3000000   7.110000   40.70000   -3.000000   1.200000   0.5000000
     5.900000     49.00000    31.00000    5.000000   15.00000
  2.000000     35.00000    50.00000    0.6000000   7.240000   33.50000   -3.000000   1.500000   0.3000000
     1.600000     65.00000    26.00000    3.000000   6.000000
       1            2           0           0
  43550.00     20540.00    15026.00
  2.000000   0.0000000E+00  15.00000   1.000000    7.490000   36.89999   -3.000000   1.000000   0.5000000
     5.000000     48.00000    24.00000    14.00000   14.00000
  2.000000     35.00000    50.00000    2.000000    7.380000   30.20000   -3.000000   0.9000000  0.3000000
     2.000000     49.00000    18.00000    17.00000   16.00000
       1            2           0           0
  43560.00     20540.00    15027.00
  2.000000   0.0000000E+00  15.00000   5.300000    7.360000   26.60001   -3.000000   0.7000000  0.6000000
     3.800000     35.00000    13.00000    35.00000   17.00000
  2.000000     35.00000    50.00000    17.50000    7.580000   19.80000   -3.000000   0.0000000E+00  0.0000000E
+00  1.200000     50.00000    21.00000    22.00000   7.000000
       1            2           0           0
  43570.00     20540.00    15028.00
  2.000000   0.0000000E+00  15.00000   10.20000    7.220000   23.10001   -3.000000   0.8000000  0.4000000
     3.500000     24.00000    7.000000    49.00000   20.00000
  2.000000     35.00000    50.00000    16.00000    7.360000   14.60000   -3.000000   0.7000000  0.1000000
     1.300000     19.00000    4.000000    63.00000   14.00000
       1            2           0           0
  43580.00     20540.00    15029.00
  2.000000   0.0000000E+00  15.00000   5.300000    7.360000   26.80000   -3.000000   0.6000000  0.5000000
     3.500000     34.00000    10.00000    36.00000   20.00000
  2.000000     35.00000    50.00000    8.100000    7.340000   20.89999   -3.000000   0.8000000  0.2000000
     1.000000     45.00000    14.00000    30.00000   12.00000
       1            2           0           0
  43590.00     20540.00    15030.00
  2.000000   0.0000000E+00  15.00000   3.300000    7.180000   29.60001   -3.000000   0.9000000  0.9000000
     4.000000     35.00000    20.00000    19.00000   26.00000
  2.000000     35.00000    50.00000    9.400000    7.410000   20.80000   -3.000000   0.9000000  0.3000000
     1.400000     39.00000    20.00000    21.00000   20.00000
       1            2           0           0
  43480.00     20530.00    15031.00
  2.000000   0.0000000E+00  15.00000   0.7000000   6.620000   35.20000    20.60001   2.200000   0.9000000
     7.200000     34.00000    32.00000    6.000000   28.00000
  2.000000     35.00000    50.00000    1.500000    7.290000   29.30000   -3.000000   4.300000   0.5000000
     1.100000     66.00000    22.00000    3.000000   10.00000
       1            2           0           0
  43500.00     20530.00    15032.00
  2.000000   0.0000000E+00  15.00000   0.8000000   6.670000   38.30000    25.39999   1.400000   0.6000000
     7.500000     28.00000    26.00000    4.000000   42.00000
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2.000000	35.00000	50.00000	0.4000000	7.020000	24.70000	-3.000000	0.8000000	0.2000000
1.400000	34.00000	23.00000	5.000000	38.00000				
1	2	0	0					
43520.00	20530.00	15033.00						
2.000000	0.0000000E+00	15.00000	0.300000	7.230000	30.10001	-3.000000	1.600000	0.6000000
4.300000	31.00000	21.00000	17.00000	30.00000				
2.000000	35.00000	50.00000	2.600000	7.370000	24.20000	-3.000000	1.400000	0.4000000
1.600000	35.00000	24.00000	4.000000	36.00000				
1	2	0	0					
43540.00	20530.00	15034.00						
2.000000	0.0000000E+00	15.00000	0.7000000	6.090000	42.20000	29.50000	1.700000	0.4000000
7.100000	48.00000	28.00000	6.000000	18.00000				
2.000000	35.00000	50.00000	1.800000	7.330000	33.30000	-3.000000	1.600000	0.4000000
1.600000	59.00000	24.00000	6.000000	10.00000				
1	2	0	0					
43560.00	20530.00	15035.00						
2.000000	0.0000000E+00	15.00000	12.70000	7.340000	26.50000	-3.000000	0.7000000	0.6000000
3.400000	31.00000	9.000000	41.00000	19.00000				
2.000000	35.00000	50.00000	12.00000	7.050000	21.10001	-3.000000	2.200000	0.3000000
1.200000	34.00000	10.00000	40.00000	17.00000				
1	2	0	0					
43580.00	20530.00	15036.00						
2.000000	0.0000000E+00	15.00000	9.900000	7.330000	26.00000	-3.000000	0.9000000	0.6000000
4.400000	27.00000	11.00000	40.00000	21.00000				
2.000000	35.00000	50.00000	10.50000	7.420000	22.60001	-3.000000	1.000000	0.3000000
1.200000	34.00000	15.00000	14.00000	37.00000				
1	2	0	0					
43480.00	20520.00	15037.00						
2.000000	0.0000000E+00	15.00000	0.6000000	6.880000	33.50000	21.39999	1.600000	0.5000000
6.100000	33.00000	25.00000	6.000000	37.00000				
2.000000	35.00000	50.00000	5.100000	7.380000	21.30000	-3.000000	2.700000	0.2000000
1.200000	43.00000	16.00000	12.00000	29.00000				
1	2	0	0					
43490.00	20520.00	15038.00						
2.000000	0.0000000E+00	15.00000	2.300000	7.020000	34.20000	-3.000000	2.800000	1.600000
6.800000	35.00000	21.00000	5.000000	39.00000				
2.000000	35.00000	50.00000	0.5000000	6.170000	25.70000	15.20000	1.600000	0.6000000
2.400000	35.00000	24.00000	6.000000	34.00000				
1	2	0	0					
43500.00	20520.00	15039.00						
2.000000	0.0000000E+00	15.00000	1.200000	6.330000	46.20000	30.60001	2.200000	1.500000
9.800000	27.00000	25.00000	3.000000	45.00000				
2.000000	35.00000	50.00000	1.300000	7.220000	29.60001	-3.000000	1.200000	0.5000000
2.100000	41.00000	20.00000	6.000000	32.00000				
1	1	0	0					
43520.00	20520.00	15041.00						
2.000000	0.0000000E+00	15.00000	0.3000000	6.920000	50.39999	33.30000	1.600000	1.600000
11.40000	44.00000	34.00000	2.000000	20.00000				
1	2	0	0					
43530.00	20520.00	15042.00						
2.000000	0.0000000E+00	15.00000	2.200000	7.230000	39.10001	-3.000000	1.000000	0.6000000
6.300000	44.00000	29.00000	7.000000	20.00000				
2.000000	35.00000	50.00000	0.8000000	7.350000	30.70000	-3.000000	0.9000000	0.4000000
2.200000	49.00000	23.00000	10.00000	18.00000				
1	2	0	0					
43540.00	20520.00	15043.00						
2.000000	0.0000000E+00	15.00000	1.300000	7.120000	34.80000	-3.000000	1.100000	0.7000000
5.200000	42.00000	23.00000	11.00000	24.00000				
2.000000	35.00000	50.00000	4.600000	7.350000	24.60001	-3.000000	1.700000	0.5000000
1.300000	55.00000	23.00000	10.00000	12.00000				
1	2	0	0					
43550.00	20520.00	15044.00						
2.000000	0.0000000E+00	15.00000	13.80000	7.450000	33.20000	-3.000000	0.9000000	0.9000000
4.700000	40.00000	15.00000	30.00000	15.00000				

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2.000000        35.00000        50.00000        20.50000        7.610000        19.80000        -3.000000       0.8000000       0.5000000
   1.300000        40.00000        16.00000        35.00000        9.000000
          1               2               0               0
43560.00        20520.00        15045.00
2.000000        0.0000000E+00   15.00000        10.50000        7.110000        28.60001        -3.000000       0.9000000       0.7000000
   4.700000        23.00000        10.00000        41.00000        21.00000
2.000000        35.00000        50.00000        17.50000        7.260000        25.39999        -3.000000       0.8000000       0.3000000
   2.300000        29.00000        9.000000        47.00000        15.00000
          1               2               0               0
43570.00        20520.00        15046.00
2.000000        0.0000000E+00   15.00000        8.100000        7.230000        28.89999        -3.000000       1.000000        0.6000000
   4.000000        29.00000        13.00000        34.00000        25.00000
2.000000        35.00000        50.00000        8.900000        7.360000        29.20000        -3.000000       0.8000000       0.5000000
   2.400000        36.00000        12.00000        29.00000        24.00000
          1               2               0               0
43580.00        20520.00        15047.00
2.000000        0.0000000E+00   15.00000        9.000000        7.240000        32.39999        -3.000000       1.500000        0.6000000
   5.400000        42.00000        17.00000        21.00000        21.00000
2.000000        35.00000        50.00000        35.10001        7.330000        24.60001        -3.000000       1.900000        0.4000000
   1.000000        55.00000        31.00000        7.000000        7.000000
          1               2               0               0
43590.00        20520.00        15048.00
2.000000        0.0000000E+00   15.00000        3.800000        7.230000        39.70000        -3.000000       1.500000        0.6000000
   5.700000        47.00000        23.00000        10.00000        20.00000
2.000000        35.00000        50.00000        20.39999        7.480000        23.60001        -3.000000       2.000000        0.4000000
   0.8000000       60.00000        29.00000        5.000000        6.000000
          1               2               0               0
43480.00        20510.00        15049.00
2.000000        0.0000000E+00   15.00000        0.5000000       6.180000        25.60001        16.00000        1.100000        0.2000000
   4.700000        25.00000        23.00000        5.000000        47.00000
2.000000        35.00000        50.00000        0.2000000       6.690000        21.39999        17.50000        1.400000        0.2000000
   1.100000        37.00000        21.00000        3.000000        39.00000
          1               2               0               0
43500.00        20510.00        15050.00
2.000000        0.0000000E+00   15.00000        0.5000000       6.090000        43.50000        25.60001        2.000000        0.3000000
   9.200000        23.00000        25.00000        6.000000        46.00000
2.000000        35.00000        50.00000        0.4000000       7.230000        26.70000        -3.000000       0.8000000       0.3000000
   1.400000        37.00000        20.00000        5.000000        38.00000
          1               2               0               0
43520.00        20510.00        15051.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.790000        39.70000        26.89999        1.300000        0.4000000
   6.100000        42.00000        29.00000        6.000000        23.00000
2.000000        35.00000        50.00000        0.2000000       7.100000        34.00000        -3.000000       1.300000        0.3000000
   1.500000        50.00000        21.00000        7.000000        22.00000
          1               2               0               0
43540.00        20510.00        15052.00
2.000000        0.0000000E+00   15.00000        1.000000        7.200000        42.00000        -3.000000       1.900000        0.7000000
   6.800000        46.00000        32.00000        4.000000        18.00000
2.000000        35.00000        50.00000        1.300000        7.050000        27.20000        -3.000000       1.600000        0.5000000
   1.600000        49.00000        26.00000        8.000000        17.00000
          1               2               0               0
43560.00        20510.00        15053.00
2.000000        0.0000000E+00   15.00000        11.90000        7.110000        38.70000        -3.000000       1.000000        0.8000000
   7.300000        35.00000        20.00000        28.00000        18.00000
2.000000        35.00000        50.00000        39.70000        7.430000        4.200000        -3.000000       0.6000000       0.2000000
   1.400000        24.00000        9.000000        57.00000        10.00000
          1               2               0               0
43580.00        20510.00        15054.00
2.000000        0.0000000E+00   15.00000        2.900000        7.290000        40.60001        -3.000000       1.600000        0.6000000
   5.400000        56.00000        27.00000        7.000000        10.00000
2.000000        35.00000        50.00000        14.70000        7.430000        26.60000        -3.000000       2.000000        0.5000000
   1.600000        65.00000        28.00000        4.000000        2.000000
          1               2               0               0
43480.00        20500.00        15055.00
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2.000000	0.0000000E+00	15.00000	1.000000	6.070000	36.30000	25.39999	2.100000	0.3000000
3.500000	36.00000	24.00000	2.000000	36.00000				
2.000000	35.00000	50.00000	0.7000000	6.590000	29.30000	19.80000	2.400000	0.2000000
1.400000	45.00000	23.00000	2.000000	30.00000				
1	2	0	0					
43490.00	20500.00	15059.00						
2.000000	0.0000000E+00	15.00000	0.6000000	6.440000	54.10001	30.30000	4.000000	1.000000
10.00000	39.00000	36.00000	1.000000	24.00000				
2.000000	35.00000	50.00000	0.3000000	7.260000	37.00000	-3.000000	3.300000	0.6000000
1.700000	63.00000	20.00000	2.000000	16.00000				
1	2	0	0					
43510.00	20500.00	15057.00						
2.000000	0.0000000E+00	15.00000	0.5000000	6.370000	45.80000	27.80000	1.900000	0.6000000
8.700000	33.00000	31.00000	6.000000	30.00000				
2.000000	35.00000	50.00000	0.8000000	7.090000	26.70000	23.89999	0.8000000	0.4000000
1.500000	43.00000	20.00000	7.000000	30.00000				
1	2	0	0					
43520.00	20500.00	15058.00						
2.000000	0.0000000E+00	15.00000	0.5000000	6.420000	33.00000	19.89999	1.000000	0.2000000
4.800000	37.00000	24.00000	8.000000	31.00000				
2.000000	35.00000	50.00000	0.2000000	6.580000	26.20000	18.39999	0.8000000	0.2000000
1.400000	40.00000	18.00000	10.00000	32.00000				
1	2	0	0					
43530.00	20500.00	15059.00						
2.000000	0.0000000E+00	15.00000	1.700000	6.960000	39.10001	25.60001	1.000000	0.3000000
7.300000	38.00000	22.00000	4.000000	35.00000				
2.000000	35.00000	50.00000	1.400000	7.420000	27.00000	-3.000000	1.400000	0.3000000
1.200000	54.00000	18.00000	6.000000	23.00000				
1	2	0	0					
43540.00	20500.00	15060.00						
2.000000	0.0000000E+00	15.00000	0.3000000	6.760000	35.50000	22.89999	1.500000	0.4000000
5.300000	42.00000	29.00000	7.000000	22.00000				
2.000000	35.00000	50.00000	0.6000000	7.400000	28.39999	-3.000000	2.000000	0.3000000
1.300000	52.00000	20.00000	8.000000	19.00000				
1	2	0	0					
43550.00	20500.00	15061.00						
2.000000	0.0000000E+00	15.00000	1.800000	7.220000	53.80000	-3.000000	1.900000	1.100000
10.20000	47.00000	29.00000	4.000000	21.00000				
2.000000	35.00000	50.00000	12.10000	7.320000	27.50000	-3.000000	2.800000	0.5000000
1.800000	63.00000	25.00000	5.000000	7.000000				
1	2	0	0					
43560.00	20500.00	15062.00						
2.000000	0.0000000E+00	15.00000	1.700000	7.220000	50.10001	-3.000000	1.600000	1.100000
9.500000	50.00000	30.00000	4.000000	15.00000				
2.000000	35.00000	50.00000	14.30000	7.330000	26.50000	-3.000000	1.900000	0.6000000
2.200000	59.00000	30.00000	5.000000	6.000000				
1	2	0	0					
43570.00	20500.00	15063.00						
2.000000	0.0000000E+00	15.00000	0.6000000	7.320000	48.80000	-3.000000	1.900000	0.6000000
8.900000	45.00000	30.00000	5.000000	20.00000				
2.000000	35.00000	50.00000	13.50000	7.420000	8.100000	-3.000000	2.500000	0.5000000
1.400000	63.00000	28.00000	4.000000	5.000000				
1	2	0	0					
43580.00	20500.00	15064.00						
2.000000	0.0000000E+00	15.00000	0.6000000	5.330000	49.39999	18.60001	4.100000	1.200000
8.800000	51.00000	28.00000	4.000000	17.00000				
2.000000	35.00000	50.00000	1.100000	6.170000	34.39999	21.00000	4.900000	0.4000000
1.500000	74.00000	22.00000	2.000000	3.000000				
1	2	0	0					
43590.00	20500.00	15065.00						
2.000000	0.0000000E+00	15.00000	1.000000	6.810000	42.60001	29.10001	2.100000	1.400000
7.200000	45.00000	32.00000	4.000000	18.00000				
2.000000	35.00000	50.00000	0.6000000	7.360000	27.10001	-3.000000	2.200000	0.5000000
1.400000	56.00000	24.00000	5.000000	15.00000				

1	2	0	0					
43480.00	20490.00	15066.00						
2.000000	0.0000000E+00	15.00000	2.500000	6.480000	41.10001	25.70000	2.100000	0.7000000
6.300000	49.00000	16.00000	2.000000	33.00000				
2.000000	35.00000	50.00000	0.8000000	6.880000	28.80000	20.80000	1.300000	0.3000000
1.200000	48.00000	28.00000	1.000000	23.00000				
1	2	0	0					
43500.00	20490.00	15067.00						
2.000000	0.0000000E+00	15.00000	0.6000000	6.980000	37.30000	25.50000	1.700000	0.5000000
4.900000	41.00000	31.00000	3.000000	25.00000				
2.000000	35.00000	50.00000	0.3000000	7.380000	30.00000	-3.000000	0.8000000	0.2000000
1.500000	47.00000	25.00000	2.000000	26.00000				
1	2	0	0					
43520.00	20490.00	15068.00						
2.000000	0.0000000E+00	15.00000	0.3000000	6.490000	45.89999	30.50000	1.200000	0.5000000
7.600000	45.00000	28.00000	3.000000	23.00000				
2.000000	35.00000	50.00000	0.4000000	7.130000	25.80000	-3.000000	0.7000000	0.3000000
1.200000	40.00000	18.00000	10.00000	33.00000				
1	2	0	0					
43540.00	20490.00	15069.00						
2.000000	0.0000000E+00	15.00000	0.3000000	6.780000	36.20000	20.80000	1.000000	0.2000000
6.300000	30.00000	29.00000	8.000000	33.00000				
2.000000	35.00000	50.00000	0.3000000	6.790000	25.89999	18.10001	1.100000	0.3000000
2.400000	37.00000	23.00000	9.000000	32.00000				
1	2	0	0					
43560.00	20490.00	15070.00						
2.000000	0.0000000E+00	15.00000	2.300000	7.060000	49.70000	-3.000000	1.900000	0.4000000
9.800000	41.00000	29.00000	5.000000	25.00000				
2.000000	35.00000	50.00000	0.9000000	7.240000	29.10001	-3.000000	2.100000	0.5000000
1.400000	59.00000	25.00000	3.000000	12.00000				
1	2	0	0					
43580.00	20490.00	15071.00						
2.000000	0.0000000E+00	15.00000	0.9000000	6.960000	41.89999	28.10001	2.300000	0.5000000
7.100000	46.00000	28.00000	7.000000	20.00000				
2.000000	35.00000	50.00000	4.700000	7.490000	31.30000	-3.000000	2.300000	0.5000000
1.400000	71.00000	24.00000	4.000000	1.000000				
1	2	0	0					
43480.00	20480.00	15072.00						
2.000000	0.0000000E+00	15.00000	0.2000000	6.930000	34.39999	22.00000	1.100000	0.6000000
5.100000	39.00000	25.00000	3.000000	33.00000				
2.000000	35.00000	50.00000	1.100000	7.220000	30.00000	-3.000000	1.200000	0.3000000
1.400000	46.00000	21.00000	3.000000	30.00000				
1	2	0	0					
43489.00	20479.00	15073.00						
2.000000	0.0000000E+00	15.00000	7.900000	7.430000	29.80000	-3.000000	1.100000	0.5000000
3.900000	39.00000	24.00000	9.000000	29.00000				
2.000000	35.00000	50.00000	2.100000	7.420000	31.20000	-3.000000	1.100000	0.4000000
1.800000	50.00000	24.00000	4.000000	22.00000				
1	2	0	0					
43500.00	20480.00	15074.00						
2.000000	0.0000000E+00	15.00000	0.7000000	6.660000	38.89999	29.89999	2.000000	0.4000000
5.400000	43.00000	27.00000	3.000000	27.00000				
2.000000	35.00000	50.00000	0.3000000	7.210000	30.10001	-3.000000	0.9000000	0.4000000
3.300000	50.00000	25.00000	2.000000	23.00000				
1	2	0	0					
43511.00	20481.00	15075.00						
2.000000	0.0000000E+00	15.00000	0.6000000	7.170000	36.39999	-3.000000	1.200000	1.000000
4.000000	49.00000	23.00000	6.000000	22.00000				
2.000000	35.00000	50.00000	0.5000000	7.320000	31.70000	-3.000000	1.100000	0.6000000
1.500000	56.00000	17.00000	6.000000	21.00000				
1	2	0	0					
43520.00	20480.00	15076.00						
2.000000	0.0000000E+00	15.00000	1.700000	6.130000	37.80000	25.20000	1.700000	0.7000000
4.400000	52.00000	21.00000	4.000000	24.00000				

2.000000	35.00000	50.00000	0.5000000	6.570000	33.60001	25.00000	1.600000	0.6000000	
3.000000	56.00000	20.00000	4.000000	20.00000					
1	2	0	0						
43580.00	20480.00	15077.00							
2.000000	0.0000000E+00	15.00000	0.4000000	6.080000	42.00000	24.20000	1.400000	0.6000000	
11.00000	44.00000	28.00000	3.000000	25.00000					
2.000000	35.00000	50.00000	2.200000	7.590000	27.50000	-3.000000	1.100000	0.2000000	
1.900000	54.00000	22.00000	9.000000	15.00000					
1	2	0	0						
43540.00	20480.00	15078.00							
2.000000	0.0000000E+00	15.00000	0.5000000	6.600000	33.30000	22.30000	1.000000	0.3000000	
6.400000	35.00000	29.00000	5.000000	31.00000					
2.000000	35.00000	50.00000	0.6000000	7.220000	25.10001	-3.000000	1.000000	0.3000000	
1.300000	42.00000	18.00000	6.000000	34.00000					
1	2	0	0						
43550.00	20480.00	15079.00							
2.000000	0.0000000E+00	15.00000	0.1000000	6.070000	39.80000	25.39999	1.000000	0.1000000	
7.600000	25.00000	30.00000	5.000000	39.00000					
2.000000	35.00000	50.00000	0.4000000	6.740000	21.89999	15.50000	0.9000000	0.2000000	
1.300000	35.00000	23.00000	6.000000	35.00000					
1	2	0	0						
43560.00	20480.00	15080.00							
2.000000	0.0000000E+00	15.00000	2.600000	6.610000	40.80000	27.10001	1.000000	0.5000000	
3.000000	27.00000	30.00000	5.000000	39.00000					
2.000000	35.00000	50.00000	0.3000000	6.770000	24.39999	16.50000	1.500000	0.2000000	
1.400000	39.00000	24.00000	7.000000	31.00000					
1	2	0	0						
43570.00	20480.00	15081.00							
2.000000	0.0000000E+00	15.00000	0.6000000	7.130000	45.00000	-3.000000	1.200000	0.3000000	
10.80000	25.00000	32.00000	6.000000	37.00000					
2.000000	35.00000	50.00000	0.3000000	7.080000	24.20000	-3.000000	1.000000	0.3000000	
1.600000	39.00000	24.00000	7.000000	30.00000					
1	2	0	0						
43581.00	20479.00	15082.00							
2.000000	0.0000000E+00	15.00000	0.7000000	6.950000	42.60001	29.89999	1.900000	1.900000	
3.600000	33.00000	26.00000	8.000000	28.00000					
2.000000	35.00000	50.00000	0.4000000	7.080000	29.20000	-3.000000	1.500000	1.300000	
2.300000	47.00000	24.00000	8.000000	21.00000					
1	2	0	0						
43590.00	20480.00	15083.00							
2.000000	0.0000000E+00	15.00000	6.400000	7.190000	41.39999	-3.000000	1.800000	3.000000	
7.700000	38.00000	18.00000	17.00000	26.00000					
2.000000	35.00000	50.00000	4.100000	7.130000	29.30000	-3.000000	1.500000	1.900000	
2.700000	43.00000	16.00000	17.00000	21.00000					
1	2	0	0						
43480.00	20470.00	15084.00							
2.000000	0.0000000E+00	15.00000	0.4000000	6.780000	36.30000	23.70000	1.200000	0.4000000	
4.500000	41.00000	25.00000	3.000000	31.00000					
2.000000	35.00000	50.00000	0.3000000	7.080000	34.89999	-3.000000	1.100000	0.4000000	
1.700000	56.00000	20.00000	2.000000	23.00000					
1	2	0	0						
43500.00	20470.00	15085.00							
2.000000	0.0000000E+00	15.00000	0.5000000	6.610000	37.50000	27.39999	1.200000	0.4000000	
4.900000	45.00000	24.00000	3.000000	28.00000					
2.000000	35.00000	50.00000	0.3000000	7.020000	33.00000	-3.000000	0.7000000	0.2000000	
1.600000	50.00000	22.00000	2.000000	26.00000					
1	2	0	0						
43521.00	20469.00	15086.00							
2.000000	0.0000000E+00	15.00000	2.300000	7.360000	33.60001	-3.000000	1.100000	0.4000000	
3.600000	42.00000	22.00000	3.000000	32.00000					
2.000000	35.00000	50.00000	0.4000000	7.190000	31.10001	-3.000000	1.200000	0.1000000	
2.100000	41.00000	22.00000	3.000000	34.00000					
1	2	0	0						
43540.00	20470.00	15087.00							

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2.000000    0.0000000E+00  15.00000    0.4000000   6.780000   50.70000   29.70000   1.500000   0.4000000
   8.100000     56.00000      30.00000     1.000000    13.00000
2.000000     35.00000       50.00000    0.5000000   6.940000   39.10001   31.60001   1.800000   0.4000000
   1.700000     70.00000      20.00000     1.000000    9.000000
         1            2             0            0
43560.00     20470.00       15093.00
2.000000    0.0000000E+00  15.00000    0.4000000   6.900000   50.89999   33.60001   1.900000   0.2000000
   11.00000     28.00000      27.00000     4.000000    41.00000
2.000000     35.00000       50.00000     1.600000   7.290000   33.30000   -3.000000  1.300000   0.2000000
   2.200000     44.00000      19.00000     4.000000    33.00000
         1            2             0            0
43580.00     20470.00       15089.00
2.000000    0.0000000E+00  15.00000     1.300000   6.890000   43.70000   40.60001   1.800000   0.6000000
   8.100000     37.00000      25.00000     10.00000    28.00000
2.000000     35.00000       50.00000     1.700000   7.290000   35.20000   -3.000000  1.300000   0.3000000
   2.700000     47.00000      17.00000     10.00000    26.00000
         1            2             0            0
43480.00     20460.00       15090.00
2.000000    0.0000000E+00  15.00000    0.7000000   6.160000   34.00000   25.50000   1.400000   0.4000000
   4.500000     41.00000      21.00000     4.000000    35.00000
2.000000     35.00000       50.00000    0.1000000   7.140000   23.20000   -3.000000  0.7000000  0.2000000
   0.8000000    36.00000      12.00000     7.000000    45.00000
         1            2             0            0
43490.00     20460.00       15091.00
2.000000    0.0000000E+00  15.00000    0.5000000   6.280000   37.39999   25.39999   1.500000   0.3000000
   4.800000     41.00000      23.00000     3.000000    33.00000
2.000000     35.00000       50.00000     3.400000   7.390000   24.00000   -3.000000  0.9000000  0.2000000
   1.000000     40.00000      21.00000     4.000000    35.00000
         1            2             0            0
43500.00     20460.00       15092.00
2.000000    0.0000000E+00  15.00000     1.300000   7.070000   37.60001   -3.000000  1.100000   0.5000000
   5.300000     38.00000      25.00000     3.000000    33.00000
2.000000     35.00000       50.00000    0.8000000   7.390000   28.50000   -3.000000  0.8000000  0.3000000
   1.500000     41.00000      24.00000     3.000000    32.00000
         1            2             0            0
43510.00     20460.00       15093.00
2.000000    0.0000000E+00  15.00000    0.2000000   6.420000   30.70000   20.89999   1.100000   0.1000000
   4.000000     35.00000      23.00000     4.000000    37.00000
2.000000     35.00000       50.00000    0.6000000   6.920000   21.00000   15.30000   0.9000000  0.1000000
   0.6000000    34.00000      24.00000     3.000000    40.00000
         1            2             0            0
43520.00     20460.00       15094.00
2.000000    0.0000000E+00  15.00000    0.5000000   6.220000   36.89999   24.20000   1.400000   0.2000000
   4.900000     41.00000      21.00000     12.00000    25.00000
2.000000     35.00000       50.00000     1.100000   6.820000   28.50000   22.89999   0.8000000  0.2000000
   1.500000     47.00000      22.00000     2.000000    29.00000
         1            2             0            0
43530.00     20460.00       15095.00
2.000000    0.0000000E+00  15.00000    0.7000000   6.160000   30.89999   19.60001   1.000000   0.1000000
   4.300000     34.00000      26.00000     3.000000    37.00000
2.000000     35.00000       50.00000    0.4000000   7.290000   23.89999   -3.000000  1.000000   0.3000000
   1.100000     36.00000      29.00000     2.000000    33.00000
         1            2             0            0
43540.00     20460.00       15096.00
2.000000    0.0000000E+00  15.00000    0.5000000   6.870000   46.50000   30.80000   2.100000   0.4000000
   7.100000     52.00000      29.00000     1.000000    18.00000
2.000000     35.00000       50.00000    0.6000000   6.650000   32.00000   24.60001   1.500000   0.4000000
   2.400000     49.00000      23.00000     1.000000    27.00000
         1            2             0            0
43550.00     20460.00       15097.00
2.000000    0.0000000E+00  15.00000     1.700000   6.650000   47.00000   33.39999   2.100000   0.7000000
   6.300000     61.00000      21.00000     2.000000    17.00000
2.000000     35.00000       50.00000    0.5000000   6.760000   32.30000   21.39999   1.600000   0.2000000
   1.600000     53.00000      23.00000     3.000000    21.00000
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 1          2          0          0
43560.00    20460.00   15098.00
2.000000    0.0000000E+00 15.00000  0.8000000  7.290000   45.50000   -3.000000  1.500000   0.6000000
   5.400000    57.00000   21.00000   2.000000  19.00000
2.000000    35.00000   50.00000   0.5000000  7.320000   36.30000   -3.000000  1.300000   0.4000000
   1.700000    61.00000   17.00000   2.000000  19.00000
 1          2          0          0
43570.00    20460.00   15099.00
2.000000    0.0000000E+00 15.00000  0.5000000  7.020000   41.89999   -3.000000  1.200000   0.4000000
   5.900000    35.00000   24.00000   5.000000  36.00000
2.000000    35.00000   50.00000   1.400000  7.430000   21.50000   -3.000000  0.9000000  0.2000000
   1.000000    36.00000   15.00000  10.00000  39.00000
 1          2          0          0
43580.00    20460.00   15100.00
2.000000    0.0000000E+00 15.00000  1.400000  7.280000   50.10001   -3.000000  1.000000   0.4000000
   8.200000    30.00000   23.00000   9.000000  38.00000
2.000000    35.00000   50.00000   3.200000  7.390000   22.70000   -3.000000  0.5000000  0.3000000
   1.200000    33.00000   18.00000  11.00000  38.00000
 1          2          0          0
43590.00    20460.00   15101.00
2.000000    0.0000000E+00 15.00000  2.400000  7.170000   50.70000   -3.000000  1.000000   0.4000000
   9.700000    32.00000   31.00000   9.000000  28.00000
2.000000    35.00000   50.00000   3.800000  7.340000   35.80000   -3.000000  1.000000   0.6000000
   2.400000    51.00000   18.00000   9.000000  22.00000
 1          2          0          0
43480.00    20450.00   15102.00
2.000000    0.0000000E+00 15.00000  0.6000000  6.940000   33.30000    23.70000  1.300000   0.4000000
   3.800000    41.00000   18.00000   3.000000  38.00000
2.000000    35.00000   50.00000   0.5000000  7.360000   34.50000   -3.000000  1.100000   0.3000000
   1.800000    49.00000   19.00000   2.000000  29.00000
 1          2          0          0
43500.00    20450.00   15103.00
2.000000    0.0000000E+00 15.00000  1.200000  6.990000   41.30000   28.20000   1.500000   0.3000000
   7.000000    39.00000   25.00000   2.000000  34.00000
2.000000    35.00000   50.00000   0.2000000  6.860000   22.70000   16.50000   1.200000   0.2000000
   1.100000    36.00000   24.00000   3.000000  37.00000
 1          2          0          0
43520.00    20451.00   15104.00
2.000000    0.0000000E+00 15.00000  0.6000000  6.810000   35.00000   26.30000   1.300000   0.2000000
   4.900000    35.00000   28.00000   2.000000  36.00000
2.000000    35.00000   50.00000   0.5000000  7.120000   26.39999   -3.000000  0.9000000  0.2000000
   1.300000    40.00000   24.00000   2.000000  34.00000
 1          2          0          0
43540.00    20450.00   15105.00
2.000000    0.0000000E+00 15.00000  0.5000000  6.860000   36.20000   28.10001   1.500000   0.2000000
   4.700000    38.00000   28.00000   2.000000  32.00000
2.000000    35.00000   50.00000   0.1000000  6.960000   25.60001   19.39999   1.300000   0.3000000
   1.200000    37.00000   30.00000   2.000000  31.00000
 1          2          0          0
43560.00    20450.00   15106.00
2.000000    0.0000000E+00 15.00000  0.6000000  7.260000   51.60001   -3.000000  2.100000   0.6000000
   6.600000    66.00000   21.00000   1.000000  12.00000
2.000000    35.00000   50.00000   0.4000000  7.020000   26.70000   -3.000000  1.000000   0.2000000
   1.000000    43.00000   25.00000   2.000000  30.00000
 1          2          0          0
43580.00    20450.00   15107.00
2.000000    0.0000000E+00 15.00000  0.6000000  7.060000   49.60001   -3.000000  1.200000   0.3000000
   9.100000    32.00000   25.00000   5.000000  37.00000
2.000000    35.00000   50.00000   8.200000  7.330000   22.60001   -3.000000  0.9000000  0.2000000
   1.600000    34.00000   17.00000  16.00000  32.00000
 1          2          0          0
43550.00    20450.00   21164.00
2.000000    0.0000000E+00 15.00000  0.3000000  6.770000   28.20000   30.30000   2.100000   0.4000000
   5.900000    54.00000   27.00000   2.000000  17.00000
```

2.000000	35.00000	50.00000	0.3000000	6.150000	35.10001	24.20000	1.400000	0.4000000
2.500000	54.00000	21.00000	1.000000	24.00000				
1	2	0	0					
43491.00	20551.00	45005.00						
2.000000	0.0000000E+00	15.00000	1.300000	7.110000	34.80000	-3.000000	1.700000	1.100000
4.300000	40.00000	25.00000	6.000000	29.00000				
2.000000	35.00000	50.00000	0.6000000	7.380000	31.50000	-3.000000	2.100000	0.4000000
1.100000	69.00000	22.00000	3.000000	5.000000				
1	2	0	0					
43530.00	20550.00	45006.00						
2.000000	0.0000000E+00	15.00000	1.500000	5.780000	60.39999	38.10001	2.300000	0.3000000
11.90000	41.00000	37.00000	3.000000	20.00000				
2.000000	35.00000	50.00000	0.6000000	7.020000	38.80000	-3.000000	1.400000	0.4000000
1.800000	66.00000	20.00000	4.000000	9.000000				
1	2	0	0					
43570.00	20550.00	45007.00						
2.000000	0.0000000E+00	15.00000	1.200000	7.280000	40.39999	-3.000000	1.500000	0.9000000
5.200000	56.00000	21.00000	8.000000	15.00000				
2.000000	35.00000	50.00000	15.60000	7.480000	27.50000	-3.000000	2.700000	0.6000000
1.500000	64.00000	24.00000	6.000000	6.000000				
1	2	0	0					
43511.00	20531.00	45010.00						
2.000000	0.0000000E+00	15.00000	1.600000	6.930000	40.39999	32.50000	2.300000	1.600000
9.000000	29.00000	24.00000	9.000000	39.00000				
2.000000	35.00000	50.00000	0.4000000	7.330000	24.89999	-3.000000	1.700000	0.7000000
1.000000	38.00000	18.00000	5.000000	39.00000				
1	2	0	0					
43550.00	20530.00	45011.00						
2.000000	0.0000000E+00	15.00000	4.200000	7.430000	34.30000	-3.000000	1.300000	0.6000000
4.100000	55.00000	21.00000	16.00000	8.000000				
2.000000	35.00000	50.00000	17.80000	7.430000	25.30000	-3.000000	2.400000	0.5000000
1.400000	59.00000	28.00000	7.000000	5.000000				
1	2	0	0					
43590.00	20530.00	45012.00						
2.000000	0.0000000E+00	15.00000	5.400000	7.360000	37.00000	-3.000000	1.500000	0.8000000
5.900000	40.00000	26.00000	3.000000	31.00000				
2.000000	35.00000	50.00000	15.80000	7.590000	24.70000	-3.000000	2.100000	0.5000000
1.700000	53.00000	25.00000	11.00000	10.00000				
1	2	0	0					
43490.00	20510.00	45013.00						
2.000000	0.0000000E+00	15.00000	0.5000000	6.120000	22.89999	25.30000	2.100000	0.4000000
9.000000	22.00000	28.00000	3.000000	47.00000				
2.000000	35.00000	50.00000	0.6000000	6.870000	29.00000	20.20000	0.9000000	0.3000000
2.700000	35.00000	21.00000	3.000000	40.00000				
1	2	0	0					
43530.00	20510.00	45014.00						
2.000000	0.0000000E+00	15.00000	0.9000000	7.250000	42.10001	-3.000000	1.600000	0.3000000
8.100000	39.00000	33.00000	4.000000	23.00000				
2.000000	35.00000	50.00000	0.9000000	7.510000	30.89999	-3.000000	2.400000	0.3000000
0.9000000	59.00000	21.00000	6.000000	14.00000				
1	2	0	0					
43570.00	20510.00	45015.00						
2.000000	0.0000000E+00	15.00000	2.100000	7.440000	46.50000	-3.000000	1.700000	0.8000000
7.600000	48.00000	27.00000	8.000000	17.00000				
2.000000	35.00000	50.00000	12.30000	7.380000	27.80000	-3.000000	3.000000	0.5000000
1.400000	60.00000	24.00000	9.000000	7.000000				
1	2	0	0					
43510.00	20490.00	45018.00						
2.000000	0.0000000E+00	15.00000	1.300000	6.770000	38.00000	25.10001	1.700000	0.5000000
6.100000	37.00000	24.00000	8.000000	31.00000				
2.000000	35.00000	50.00000	1.900000	6.960000	23.60001	19.39999	0.7000000	0.2000000
1.400000	38.00000	19.00000	7.000000	36.00000				
1	2	0	0					
43550.00	20490.00	45019.00						

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2.000000      0.0000000E+00  15.00000      0.9000000     6.580000      48.20000      29.00000      1.900000      0.6000000
   10.10000       38.00000      34.00000      4.000000     24.00000
2.000000       35.00000      50.00000      1.000000     7.290000      26.20000      -3.000000     1.600000      0.4000000
   1.100000       52.00000      25.00000      5.000000     18.00000
          1              2             0             0
43590.00       20490.00      45020.00
2.000000      0.0000000E+00  15.00000      1.400000     7.210000      54.39999      -3.000000     2.000000      0.6000000
   12.10000       34.00000      28.00000      6.000000     31.00000
2.000000       35.00000      50.00000      0.6000000    7.340000      29.20000      -3.000000     2.900000      0.5000000
   1.300000       56.00000      24.00000      4.000000     15.00000
          1              2             0             0
43490.00       20470.00      45021.00
2.000000      0.0000000E+00  15.00000      0.6000000    6.720000      35.10001      24.60001      1.200000      0.4000000
   4.500000       44.00000      26.00000      3.000000     27.00000
2.000000       35.00000      50.00000      0.7000000    6.790000      25.00000      19.70000      1.100000      0.4000000
   1.000000       42.00000      25.00000      1.000000     31.00000
          1              2             0             0
43530.00       20470.00      45022.00
2.000000      0.0000000E+00  15.00000      0.8000000    6.560000      46.80000      28.50000      2.200000      0.6000000
   5.600000       55.00000      25.00000      3.000000     17.00000
2.000000       35.00000      50.00000      0.8000000    6.640000      38.00000      28.10001      1.700000      0.4000000
   2.300000       62.00000      21.00000      2.000000     15.00000
          1              2             0             0
43570.00       20470.00      45023.00
2.000000      0.0000000E+00  15.00000      1.600000     6.780000      45.30000      31.10001      2.100000      0.2000000
   9.500000       34.00000      23.00000      4.000000     40.00000
2.000000       35.00000      50.00000      0.3000000    7.120000      41.10001      -3.000000     2.000000      0.4000000
   2.000000       46.00000      19.00000      4.000000     30.00000
          1              2             0             0
43510.00       20450.00      45025.00
2.000000      0.0000000E+00  15.00000      0.4000000    7.260000      39.70000      -3.000000     1.200000      0.2000000
   5.500000       42.00000      25.00000      2.000000     31.00000
2.000000       35.00000      50.00000      0.3000000    7.070000      28.00000      -3.000000     0.9000000     0.2000000
   1.400000       40.00000      26.00000      2.000000     33.00000
          1              2             0             0
43590.00       20450.00      45026.00
2.000000      0.0000000E+00  15.00000      1.400000     7.120000      46.10001      -3.000000     1.200000      0.5000000
   8.100000       21.00000      27.00000      6.000000     46.00000
2.000000       35.00000      50.00000      0.2000000    7.230000      28.70000      -3.000000     0.7000000     0.2000000
   2.100000       39.00000      19.00000      6.000000     36.00000
          1              2             0             0
43570.00       20550.00      55006.00
2.000000      0.0000000E+00  15.00000      0.4000000    6.430000      30.60001      -3.000000     1.500000      0.3000000
   5.800000       31.00000      24.00000      10.00000     35.00000
2.000000       35.00000      50.00000      0.4000000    7.290000      28.20000      -3.000000     1.100000      0.3000000
   1.400000       43.00000      17.00000      10.00000     30.00000
          1              2             0             0
43550.00       20550.00      55007.00
2.000000      0.0000000E+00  15.00000      0.1000000    6.780000      37.60001      25.00000      1.200000      0.4000000
   5.400000       50.00000      30.00000      7.000000     13.00000
2.000000       35.00000      50.00000      0.6000000    7.230000      31.70000      -3.000000     1.200000      0.2000000
   1.400000       62.00000      22.00000      4.000000     13.00000
          1              2             0             0
43590.00       20550.00      55008.00
2.000000      0.0000000E+00  15.00000      0.8000000    6.990000      30.70000      22.80000      0.9000000     0.5000000
   3.900000       44.00000      22.00000      8.000000     26.00000
2.000000       35.00000      50.00000      1.200000     7.090000      29.60001      -3.000000     1.300000      0.3000000
   1.100000       50.00000      21.00000      4.000000     25.00000
          1              2             0             0
43490.00       20530.00      55009.00
2.000000      0.0000000E+00  15.00000      0.7000000    6.870000      37.80000      28.20000      2.200000      0.8000000
   7.100000       38.00000      28.00000      7.000000     27.00000
2.000000       35.00000      50.00000      1.500000     7.130000      27.89999      -3.000000     2.100000      0.5000000
   1.500000       52.00000      26.00000      7.000000     15.00000
```

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      1          2          0          0
43530.00   20530.00   55010.00
2.000000   0.0000000E+00 15.00000   1.700000   7.330000   39.89999   -3.000000   1.100000   0.6000000
   5.400000      52.00000   28.00000   6.000000   14.00000
2.000000   35.00000   50.00000   5.900000   7.540000   29.39999   -3.000000   1.300000   0.4000000
   1.400000      68.00000   24.00000   2.000000   6.000000
      1          2          0          0
43570.00   20530.00   55011.00
2.000000   0.0000000E+00 15.00000   8.500000   7.250000   24.60001   -3.000000   0.8000000   0.5000000
   3.800000      26.00000   10.00000   46.00000   18.00000
2.000000   35.00000   50.00000   19.89999   7.340000   14.80000   -3.000000   0.9000000   0.3000000
   1.800000      20.00000   6.000000   63.00000   11.00000
      1          2          0          0
43571.00   20509.00   55014.00
2.000000   0.0000000E+00 15.00000   0.5000000   6.560000   50.39999   31.80000   2.300000   1.600000
   8.400000      40.00000   32.00000   2.000000   26.00000
2.000000   35.00000   50.00000   0.9000000   7.330000   35.30000   -3.000000   1.500000   1.100000
   2.400000      59.00000   23.00000   2.000000   16.00000
      1          2          0          0
43550.00   20510.00   55015.00
2.000000   0.0000000E+00 15.00000   3.600000   7.320000   39.89999   -3.000000   1.000000   1.300000
   6.600000      46.00000   28.00000   12.00000   14.00000
2.000000   35.00000   50.00000   15.00000   7.430000   20.70000   -3.000000   1.000000   0.5000000
   1.500000      51.00000   21.00000   14.00000   14.00000
      1          2          0          0
43590.00   20510.00   55016.00
2.000000   0.0000000E+00 15.00000   0.9000000   6.150000   58.30000   36.60001   2.900000   1.000000
   11.40000      48.00000   31.00000   5.000000   16.00000
2.000000   35.00000   50.00000   0.6000000   7.360000   37.89999   -3.000000   2.200000   0.5000000
   1.700000      59.00000   23.00000   7.000000   11.00000
      1          2          0          0
43490.00   20490.00   55017.00
2.000000   0.0000000E+00 15.00000   0.8000000   6.340000   44.50000   31.00000   2.600000   0.5000000
   7.000000      46.00000   25.00000   2.000000   26.00000
2.000000   35.00000   50.00000   0.4000000   7.260000   29.30000   -3.000000   1.300000   0.4000000
   1.200000      48.00000   30.00000   2.000000   20.00000
      1          2          0          0
43530.00   20490.00   55018.00
2.000000   0.0000000E+00 15.00000   0.4000000   5.820000   27.60001   15.70000   0.9000000   0.2000000
   4.100000      33.00000   24.00000   7.000000   36.00000
2.000000   35.00000   50.00000   0.3000000   6.600000   23.10001   15.30000   0.9000000   0.4000000
   1.000000      39.00000   18.00000   5.000000   38.00000
      1          2          0          0
43570.00   20490.00   55019.00
2.000000   0.0000000E+00 15.00000   1.100000   7.130000   58.00000   -3.000000   2.700000   0.8000000
   12.30000      35.00000   33.00000   5.000000   28.00000
2.000000   35.00000   50.00000   1.500000   7.420000   30.80000   -3.000000   3.000000   0.4000000
   1.400000      69.00000   26.00000   2.000000   3.000000
      1          2          0          0
43510.00   20470.00   55021.00
2.000000   0.0000000E+00 15.00000   0.9000000   6.170000   34.70000   24.30000   0.9000000   0.2000000
   4.900000      37.00000   23.00000   3.000000   37.00000
2.000000   35.00000   50.00000   0.4000000   6.760000   21.39999   16.60001   0.8000000   0.3000000
   1.000000      33.00000   22.00000   4.000000   40.00000
      1          2          0          0
43550.00   20470.00   55022.00
2.000000   0.0000000E+00 15.00000   0.5000000   6.240000   52.60001   32.30000   3.000000   0.3000000
   12.50000      32.00000   29.00000   4.000000   35.00000
2.000000   35.00000   50.00000   0.3000000   7.340000   30.00000   -3.000000   2.900000   0.3000000
   1.300000      49.00000   23.00000   2.000000   26.00000
      1          2          0          0
43590.00   20470.00   55023.00
2.000000   0.0000000E+00 15.00000   10.80000   7.180000   48.60001   -3.000000   2.500000   2.900000
   10.70000      33.00000   26.00000   18.00000   23.00000
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II

2.000000 3.500000 1	35.00000 48.00000 2	50.00000 16.00000 0	6.600000 18.00000 0	7.160000 18.00000	37.20000	-3.000000	1.900000	2.000000
43490.00 2.000000 5.500000 2.000000 1.000000 1	20450.00 0.0000000E+00 40.00000 35.00000 36.00000 2	55024.00 15.00000 25.00000 50.00000 25.00000 0	0.8000000 2.000000 0.5000000 2.000000 0	6.420000 33.00000 6.760000 37.00000	36.89999 24.39999	26.60001 19.39999	1.500000 1.200000	0.4000000 0.3000000
43530.00 2.000000 4.000000 2.000000 1.200000 1	20450.00 0.0000000E+00 33.00000 35.00000 34.00000 2	55025.00 15.00000 30.00000 50.00000 28.00000 0	0.8000000 1.000000 0.6000000 1.000000 0	6.950000 37.00000 6.590000 37.00000	31.30000 23.20000	21.39999 17.80000	1.200000 1.400000	0.1000000 0.3000000
43570.00 2.000000 5.700000 2.000000 0.9000000	20450.00 0.0000000E+00 55.00000 35.00000 36.00000	55026.00 15.00000 21.00000 50.00000 24.00000	1.000000 2.000000 1.000000 4.000000	6.720000 22.00000 7.040000 35.00000	44.00000 21.89999	34.20000 -3.000000	1.900000 1.000000	0.4000000 0.2000000

IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

User: AGRIC2 12:
File: VAX1::DRC2:[AGRIC2]ND050.DAT;2

IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

NORTHING
EASTING
SITE_NO
STATUS
LAYER,_DEPTH,_UPPER *01
LAYER,_DEPTH,_LOWER *01
CARBONATE A02
PH C01
C.E.C. A01
CALCIUM,_EXCHANGE. A01
MAGNESIUM,_EXCHANGE. A01
POTASSIUM,_EXCHANGE. A01
ORGANIC_MATTER,_ABUNDANCE A02
CLAY *02
SILT A02
SAND,_COARSE A02
SAND,_FINE A02

File complete

IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

2056043480 15001
2055943491 15002
2056043500 15003
2056043510 15004
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2056043530 15006
2054043520 15007
2056043550 15008
2056043560 15009
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2056043580 15011
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2047043570 45023
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2047043590 55023
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2045043530 55025
2045043570 55026

File complete

JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ

VVVVVVVVVV 22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222 VVVVVVVVVV
VVVVVVVVVV 22222222222222 VAX1 - Oxford University Computing Service - VAX/VMS Version V4.5 22222222222222222 VVVVVVVVVV
VVVVVVVVVV 22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222 VVVVVVVVVV

```
 AAA    GGGG  RRRR    III    CCCC   222
A   A  G      R   R    I    C      2   2
A   A  G      R   R    I    C          2
A   A  G      RRRR     I    C         2
AAAAA  G GGG  R R      I    C        2
A   A  G   G  R  R     I    C       2
A   A   GGG   R   R   III    CCCC  22222
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D-FILE :

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RRRRRRRR    DDDDDDDD      000000    44    44      999999
RR      RR  DD      DD  00      00  44    44    99      99
RR      RR  DD      DD  00      00  44    44    99      99
RR      RR  DD      DD  00    0000  44    44    99      99
RR      RR  DD      DD  00    0000  44    44    99      99
RRRRRRRR    DD      DD  00  00  00  4444444444    99999999
RRRRRRRR    DD      DD  00  00  00  4444444444    99999999
RR  RR      DD      DD  0000    00        44          99
RR  RR      DD      DD  0000    00        44          99
RR    RR    DD      DD  00      00        44          99
RR    RR    DD      DD  00      00        44          99
RR      RR  DDDDDDDD      000000          44      999999
RR      RR  DDDDDDDD      000000          44      999999
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200 m

GRID

(YELFORD)

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DD      DD  AA      AA      TT          ;;;;     1111
DD      DD  AA      AA      TT          ;;;;     1111
DD      DD  AA      AA      TT                     11
DD      DD  AA      AA      TT                     11
DD      DD  AA      AA      TT          ;;;;       11
DD      DD  AA      AA      TT          ;;;;       11
DD      DD  AAAAAAAAAA      TT          ;;;;       11
DD      DD  AAAAAAAAAA      TT          ;;;;       11
DD      DD  AA      AA      TT            ;;       11
DD      DD  AA      AA      TT            ;;       11
DDDDDDDD    AA      AA      TT          ;;       111111
DDDDDDDD    AA      AA      TT          ;;       111111
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File _DRC2:[AGRIC2]RD049.DAT;1 (13118,18,0), last revised on 11-MAY-1987 09:39, is a 96 block sequential file owned by UIC [BHFF,AGRIC2]. The records are variable length with implied (CR) carriage control. The longest record is 211 bytes.

Job RD049 (1386) queued to LPA0 on 14-MAY-1987 12:35 by user AGRIC2, UIC [BHFF,AGRIC2], under account BHFF at priority 6, started on printer _LPA0: on 14-MAY-1987 12:37 from queue LPA0.

VVVVVVVVVV 22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222 VVVVVVVVVV
VVVVVVVVVV 22222222222222222222 Digital Equipment Corporation - VAX/VMS Version V4.5 22222222222222222222 VVVVVVVVVV
VVVVVVVVVV 22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222 VVVVVVVVVV

```
        2
        3          14           0           0
        1           2           0           0
43550.00        20450.00    21164.00
2.000000    0.0000000E+00   15.00000    0.3000000   6.770000    28.20000    30.30000    2.100000    0.4000000
   5.900000        54.00000    27.00000    2.000000    17.00000
2.000000        35.00000    50.00000    0.3000000   6.150000    35.10001    24.20000    1.400000    0.4000000
   2.500000        54.00000    21.00000    1.000000    24.00000
        1           2           0           0
43450.00        20350.00    21189.00
2.000000    0.0000000E+00   15.00000    1.300000    7.500000    42.39999    -3.000000   1.300000    0.6000000
   8.700000        25.00000    26.00000    8.000000    40.00000
2.000000        35.00000    50.00000    6.500000    7.290000    30.30000    -3.000000   1.300000    0.4000000
   3.000000        33.00000    17.00000    11.00000    39.00000
        1           2           0           0
43470.00        20570.00    45001.00
2.000000    0.0000000E+00   15.00000    7.000000    7.350000    34.70000    -3.000000   1.500000    0.6000000
   4.900000        46.00000    19.00000    17.00000    18.00000
2.000000        35.00000    50.00000    26.50000    7.460000    26.50000    -3.000000   2.600000    0.3000000
   1.200000        61.00000    30.00000    6.000000    3.000000
        1           2           0           0
43510.00        20570.00    45002.00
2.000000    0.0000000E+00   15.00000    0.8000000   6.650000    35.70000    24.50000    1.700000    0.7000000
   7.400000        36.00000    26.00000    8.000000    30.00000
2.000000        35.00000    50.00000    0.6000000   7.120000    32.70000    -3.000000   1.400000    0.4000000
   1.100000        71.00000    21.00000    3.000000    5.000000
        1           2           0           0
43550.00        20570.00    45003.00
2.000000    0.0000000E+00   15.00000    0.5000000   7.060000    35.80000    -3.000000   1.600000    0.5000000
   4.100000        53.00000    24.00000    5.000000    18.00000
2.000000        35.00000    50.00000    3.900000    7.470000    31.39999    -3.000000   3.500000    0.3000000
   1.300000        70.00000    19.00000    3.000000    8.000000
        1           2           0           0
43590.00        20570.00    45004.00
2.000000    0.0000000E+00   15.00000    0.6000000   7.100000    32.30000    -3.000000   1.100000    0.3000000
   5.000000        38.00000    25.00000    6.000000    31.00000
2.000000        35.00000    50.00000    0.4000000   7.190000    25.89999    -3.000000   0.9000000   0.2000000
   1.300000        43.00000    23.00000    6.000000    27.00000
        1           2           0           0
43491.00        20551.00    45005.00
2.000000    0.0000000E+00   15.00000    1.300000    7.110000    34.80000    -3.000000   1.700000    1.100000
   4.800000        40.00000    25.00000    6.000000    29.00000
2.000000        35.00000    50.00000    0.6000000   7.390000    31.50000    -3.000000   2.100000    0.4000000
   1.100000        69.00000    22.00000    3.000000    5.000000
        1           2           0           0
43530.00        20550.00    45006.00
2.000000    0.0000000E+00   15.00000    1.500000    5.780000    60.39999    38.10001    2.300000    0.3000000
   11.90000        41.00000    37.00000    3.000000    20.00000
2.000000        35.00000    50.00000    0.6000000   7.020000    38.80000    -3.000000   1.400000    0.4000000
   1.800000        66.00000    20.00000    4.000000    9.000000
        1           2           0           0
43570.00        20550.00    45007.00
2.000000    0.0000000E+00   15.00000    1.200000    7.280000    40.39999    -3.000000   1.500000    0.9000000
   5.200000        56.00000    21.00000    8.000000    15.00000
2.000000        35.00000    50.00000    15.60000    7.480000    27.50000    -3.000000   2.700000    0.6000000
   1.500000        64.00000    24.00000    6.000000    6.000000
        1           2           0           0
43610.00        20550.00    45008.00
2.000000    0.0000000E+00   15.00000    16.20000    7.380000    28.30000    -3.000000   0.7000000   0.7000000
   4.300000        30.00000    18.00000    25.00000    27.00000
2.000000        35.00000    50.00000    8.200000    7.430000    22.70000    -3.000000   0.7000000   0.4000000
   1.900000        35.00000    17.00000    21.00000    27.00000
        1           2           0           0
43470.00        20530.00    45009.00
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2.000000	0.0000000E+00	15.00000	2.800000	7.250000	39.50000	-3.000000	2.000000	1.000000
6.000000	50.00000	25.00000	6.000000	19.00000				
2.000000	35.00000	50.00000	2.800000	7.500000	30.80000	-3.000000	3.000000	0.4000000
1.500000	69.00000	27.00000	2.000000	2.000000				
1	2	0	0					
43511.00	20531.00	45010.00						
2.000000	0.0000000E+00	15.00000	1.600000	6.930000	40.39999	32.50000	2.300000	1.600000
9.000000	28.00000	24.00000	9.000000	39.00000				
2.000000	35.00000	50.00000	0.4000000	7.330000	24.89999	-3.000000	1.700000	0.7000000
1.000000	38.00000	18.00000	5.000000	39.00000				
1	2	0	0					
43550.00	20530.00	45011.00						
2.000000	0.0000000E+00	15.00000	4.200000	7.430000	34.30000	-3.000000	1.300000	0.6000000
4.100000	55.00000	21.00000	16.00000	8.000000				
2.000000	35.00000	50.00000	17.80000	7.430000	25.30000	-3.000000	2.400000	0.5000000
1.400000	59.00000	28.00000	7.000000	5.000000				
1	2	0	0					
43590.00	20530.00	45012.00						
2.000000	0.0000000E+00	15.00000	5.400000	7.360000	37.00000	-3.000000	1.500000	0.8000000
5.900000	40.00000	26.00000	3.000000	31.00000				
2.000000	35.00000	50.00000	15.80000	7.590000	24.70000	-3.000000	2.100000	0.5000000
1.700000	53.00000	25.00000	11.00000	10.00000				
1	2	0	0					
43490.00	20510.00	45013.00						
2.000000	0.0000000E+00	15.00000	0.5000000	6.120000	22.89999	25.30000	2.100000	0.4000000
9.000000	22.00000	28.00000	3.000000	47.00000				
2.000000	35.00000	50.00000	0.6000000	6.870000	29.00000	20.20000	0.9000000	0.3000000
2.700000	35.00000	21.00000	3.000000	40.00000				
1	2	0	0					
43530.00	20510.00	45014.00						
2.000000	0.0000000E+00	15.00000	0.9000000	7.250000	42.10001	-3.000000	1.600000	0.3000000
8.100000	39.00000	33.00000	4.000000	23.00000				
2.000000	35.00000	50.00000	0.9000000	7.510000	30.89999	-3.000000	2.400000	0.3000000
0.9000000	59.00000	21.00000	6.000000	14.00000				
1	2	0	0					
43570.00	20510.00	45015.00						
2.000000	0.0000000E+00	15.00000	2.100000	7.440000	46.50000	-3.000000	1.700000	0.8000000
7.600000	48.00000	27.00000	8.000000	17.00000				
2.000000	35.00000	50.00000	12.30000	7.380000	27.80000	-3.000000	3.000000	0.5000000
1.400000	60.00000	24.00000	9.000000	7.000000				
1	2	0	0					
43610.00	20510.00	45016.00						
2.000000	0.0000000E+00	15.00000	1.900000	7.140000	47.70000	-3.000000	1.800000	0.7000000
9.500000	40.00000	29.00000	7.000000	24.00000				
2.000000	35.00000	50.00000	3.300000	7.440000	28.70000	-3.000000	1.800000	0.5000000
1.800000	52.00000	21.00000	10.00000	17.00000				
1	2	0	0					
43470.00	20490.00	45017.00						
2.000000	0.0000000E+00	15.00000	5.500000	7.420000	30.60001	-3.000000	1.100000	0.7000000
4.900000	29.00000	23.00000	8.000000	41.00000				
2.000000	35.00000	50.00000	0.8000000	7.200000	22.70000	-3.000000	0.6000000	0.3000000
1.300000	33.00000	23.00000	4.000000	39.00000				
1	2	0	0					
43510.00	20490.00	45018.00						
2.000000	0.0000000E+00	15.00000	1.300000	6.770000	38.00000	25.10001	1.700000	0.5000000
6.100000	37.00000	24.00000	8.000000	31.00000				
2.000000	35.00000	50.00000	1.800000	6.960000	23.60001	19.39999	0.7000000	0.2000000
1.400000	38.00000	19.00000	7.000000	36.00000				
1	2	0	0					
43550.00	20490.00	45019.00						
2.000000	0.0000000E+00	15.00000	0.9000000	6.580000	48.20000	29.00000	1.900000	0.6000000
10.10000	38.00000	34.00000	4.000000	24.00000				
2.000000	35.00000	50.00000	1.000000	7.290000	26.20000	-3.000000	1.600000	0.4000000
1.100000	52.00000	25.00000	5.000000	18.00000				

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 1          2          0          0
43590.00    20490.00   45020.00
2.000000    0.0000000E+00 15.00000   1.400000   7.210000   54.39999   -3.000000  2.000000   0.6000000
  12.10000     34.00000     28.00000   6.000000  31.00000
2.000000    35.00000   50.00000   0.6000000  7.340000   29.20000   -3.000000  2.900000   0.5000000
  1.300000     56.00000     24.00000   4.000000  15.00000
 1          2          0          0
43490.00    20470.00   45021.00
2.000000    0.0000000E+00 15.00000   0.6000000  6.720000   35.10001   24.60001   1.200000   0.4000000
  4.500000     44.00000     26.00000   3.000000  27.00000
2.000000    35.00000   50.00000   0.7000000  6.790000   25.00000   19.70000   1.100000   0.4000000
  1.000000     42.00000     25.00000   1.000000  31.00000
 1          2          0          0
43530.00    20470.00   45022.00
2.000000    0.0000000E+00 15.00000   0.8000000  6.560000   46.80000   28.50000   2.200000   0.6000000
  5.600000     55.00000     25.00000   3.000000  17.00000
2.000000    35.00000   50.00000   0.8000000  6.640000   38.00000   28.10001   1.700000   0.4000000
  2.300000     62.00000     21.00000   2.000000  15.00000
 1          2          0          0
43570.00    20470.00   45023.00
2.000000    0.0000000E+00 15.00000   1.600000   6.780000   45.30000   31.10001   2.100000   0.2000000
  9.500000     34.00000     23.00000   4.000000  40.00000
2.000000    35.00000   50.00000   0.3000000  7.120000   41.10001   -3.000000  2.000000   0.4000000
  2.000000     46.00000     19.00000   4.000000  30.00000
 1          2          0          0
43470.00    20450.00   45024.00
2.000000    0.0000000E+00 15.00000   0.4000000  6.810000   29.70000   21.89999   1.000000   1.000000
  4.000000     34.00000     21.00000   4.000000  42.00000
2.000000    35.00000   50.00000   1.200000   7.260000   31.39999   -3.000000  1.000000   0.4000000
  1.900000     43.00000     20.00000   3.000000  34.00000
 1          2          0          0
43510.00    20450.00   45025.00
2.000000    0.0000000E+00 15.00000   0.4000000  7.260000   39.70000   -3.000000  1.200000   0.2000000
  5.500000     42.00000     25.00000   2.000000  31.00000
2.000000    35.00000   50.00000   0.3000000  7.070000   28.00000   -3.000000  0.9000000  0.2000000
  1.400000     40.00000     26.00000   2.000000  33.00000
 1          2          0          0
43590.00    20450.00   45026.00
2.000000    0.0000000E+00 15.00000   1.400000   7.120000   46.10001   -3.000000  1.200000   0.5000000
  8.100000     21.00000     27.00000   6.000000  46.00000
2.000000    35.00000   50.00000   0.2000000  7.230000   28.70000   -3.000000  0.7000000  0.2000000
  2.100000     39.00000     19.00000   6.000000  36.00000
 1          2          0          0
43450.00    20430.00   45027.00
2.000000    0.0000000E+00 15.00000   0.4000000  7.220000   33.70000   -3.000000  1.600000   0.9000000
  3.800000     42.00000     23.00000   3.000000  31.00000
2.000000    35.00000   50.00000   0.7000000  6.870000   23.39999   19.39999   1.200000   0.3000000
  0.7000000    37.00000     26.00000   2.000000  35.00000
 1          2          0          0
43490.00    20430.00   45028.00
2.000000    0.0000000E+00 15.00000   0.9000000  5.980000   35.70000   22.80000   1.700000   0.4000000
  5.200000     42.00000     24.00000   2.000000  32.00000
2.000000    35.00000   50.00000   0.6000000  6.560000   22.39999   15.70000   1.200000   0.2000000
  0.8000000    38.00000     25.00000   1.000000  36.00000
 1          2          0          0
43530.00    20430.00   45029.00
2.000000    0.0000000E+00 15.00000   1.200000   6.440000   37.00000   26.50000   1.200000   0.4000000
  5.900000     45.00000     24.00000   2.000000  29.00000
2.000000    35.00000   50.00000   0.3000000  7.120000   22.39999   -3.000000  0.7000000  0.2000000
  0.8000000    34.00000     24.00000   3.000000  38.00000
 1          2          0          0
43570.00    20430.00   45030.00
2.000000    0.0000000E+00 15.00000   0.7000000  6.740000   52.39999   37.70000   1.900000   0.6000000
  5.400000     71.00000     20.00000   1.000000   8.000000
```

2.000000	35.00000	50.00000	1.000000	6.780000	52.50000	34.70000	1.700000	0.6000000
2.300000	81.00000	11.00000	1.000000	7.000000				
1	2	0	0					
43470.00	20410.00	45031.00						
2.000000	0.0000000E+00	15.00000	0.7000000	6.780000	38.80000	26.50000	1.800000	0.3000000
4.900000	47.00000	26.00000	3.000000	24.00000				
2.000000	35.00000	50.00000	0.4000000	7.170000	27.50000	-3.000000	1.300000	0.2000000
0.8000000	41.00000	29.00000	2.000000	29.00000				
1	2	0	0					
43510.00	20410.00	45032.00						
2.000000	0.0000000E+00	15.00000	0.9000000	6.900000	55.80000	46.30000	1.800000	0.6000000
7.700000	58.00000	21.00000	2.000000	19.00000				
2.000000	35.00000	50.00000	0.5000000	7.430000	36.20000	-3.000000	1.300000	0.2000000
1.300000	56.00000	16.00000	6.000000	22.00000				
1	2	0	0					
43550.00	20410.00	45033.00						
2.000000	0.0000000E+00	15.00000	0.2000000	6.570000	41.60001	29.39999	1.500000	0.3000000
5.800000	45.00000	25.00000	2.000000	28.00000				
2.000000	35.00000	50.00000	0.4000000	6.880000	27.50000	22.39999	1.200000	0.2000000
1.100000	36.00000	25.00000	2.000000	37.00000				
1	2	0	0					
43590.00	20410.00	45034.00						
2.000000	0.0000000E+00	15.00000	0.6000000	6.230000	33.50000	21.20000	0.8000000	0.2000000
5.300000	34.00000	19.00000	6.000000	41.00000				
2.000000	35.00000	50.00000	0.6000000	6.720000	23.30000	16.89999	0.4000000	0.3000000
1.000000	33.00000	22.00000	6.000000	39.00000				
1	2	0	0					
43450.00	20390.00	45035.00						
2.000000	0.0000000E+00	15.00000	0.4000000	6.380000	29.80000	19.50000	1.200000	0.2000000
4.400000	32.00000	26.00000	3.000000	39.00000				
2.000000	35.00000	50.00000	0.3000000	6.790000	20.10001	15.30000	1.100000	0.3000000
0.8000000	33.00000	28.00000	4.000000	36.00000				
1	2	0	0					
43490.00	20390.00	45036.00						
2.000000	0.0000000E+00	15.00000	0.9000000	6.410000	55.50000	38.80000	2.300000	0.5000000
6.000000	60.00000	17.00000	2.000000	21.00000				
2.000000	35.00000	50.00000	0.6000000	6.620000	32.39999	24.30000	1.400000	0.2000000
1.000000	54.00000	18.00000	1.000000	27.00000				
1	2	0	0					
43530.00	20390.00	45037.00						
2.000000	0.0000000E+00	15.00000	0.4000000	6.390000	46.10001	32.10001	2.100000	0.4000000
5.800000	57.00000	20.00000	2.000000	20.00000				
2.000000	35.00000	50.00000	0.4000000	6.930000	21.50000	14.60000	0.8000000	0.2000000
0.5000000	36.00000	23.00000	2.000000	38.00000				
1	2	0	0					
43570.00	20390.00	45038.00						
2.000000	0.0000000E+00	15.00000	0.5000000	6.860000	40.10001	32.10001	1.300000	0.2000000
6.200000	38.00000	24.00000	4.000000	33.00000				
2.000000	35.00000	50.00000	0.9000000	6.610000	25.39999	18.10001	0.9000000	0.1000000
1.400000	33.00000	23.00000	5.000000	39.00000				
1	2	0	0					
43470.00	20370.00	45039.00						
2.000000	0.0000000E+00	15.00000	0.8000000	5.710000	42.80000	26.70000	1.300000	0.3000000
8.100000	34.00000	26.00000	3.000000	37.00000				
2.000000	35.00000	50.00000	0.7000000	6.800000	21.00000	16.10001	0.8000000	0.3000000
1.100000	32.00000	25.00000	3.000000	39.00000				
1	2	0	0					
43510.00	20370.00	45040.00						
2.000000	0.0000000E+00	15.00000	1.100000	7.280000	46.00000	-3.000000	1.700000	0.6000000
6.500000	42.00000	22.00000	5.000000	31.00000				
2.000000	35.00000	50.00000	0.8000000	7.230000	22.30000	-3.000000	0.9000000	0.3000000
0.7000000	36.00000	27.00000	3.000000	34.00000				
1	2	0	0					
43550.00	20370.00	45041.00						

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2.000000      0.0000000E+00   15.00000      1.900000      7.310000      35.89999     -3.000000     0.9000000     0.2000000
   4.300000      35.00000        15.00000      13.00000      37.00000
2.000000      35.00000        50.00000      13.90000      7.590000      20.00000     -3.000000     0.7000000     0.1000000
   0.7000000     30.00000        16.00000      17.00000      37.00000
      1           2              0             0
43590.00      20370.00        45042.00
2.000000      0.0000000E+00   15.00000      7.400000      7.260000      28.80000     -3.000000     0.8000000     0.5000000
   3.400000      23.00000        16.00000      25.00000      31.00000
2.000000      35.00000        50.00000      36.60001      7.530000      14.80000     -3.000000     0.5000000     0.1000000
   0.9000000     19.00000        11.00000      44.00000      25.00000
      1           2              0             0
43490.00      20350.00        45043.00
2.000000      0.0000000E+00   15.00000      1.000000      6.590000      42.80000      31.50000     1.800000      1.700000
   10.00000      24.00000        27.00000      3.000000      46.00000
2.000000      35.00000        50.00000      0.6000000     7.020000      29.89999     -3.000000     1.100000      0.3000000
   2.200000      33.00000        27.00000      3.000000      37.00000
      1           2              0             0
43530.00      20350.00        45044.00
2.000000      0.0000000E+00   15.00000      8.300000      7.190000      38.10001     -3.000000     1.100000      0.4000000
   6.400000      29.00000        17.00000      26.00000      28.00000
2.000000      35.00000        50.00000      12.10000      7.440000      33.70000     -3.000000     0.9000000     0.2000000
   2.400000      30.00000        14.00000      29.00000      27.00000
      1           2              0             0
43570.00      20350.00        45045.00
2.000000      0.0000000E+00   15.00000      8.100000      7.320000      29.60001     -3.000000     0.9000000     0.8000000
   4.800000      27.00000        15.00000      27.00000      31.00000
2.000000      35.00000        50.00000      11.30000      7.500000      20.50000     -3.000000     0.7000000     0.3000000
   1.600000      27.00000        12.00000      33.00000      28.00000
      1           2              0             0
43490.00      20570.00        55001.00
2.000000      0.0000000E+00   15.00000      1.200000      7.250000      36.20000     -3.000000     1.100000      0.7000000
   5.400000      45.00000        27.00000      8.000000      20.00000
2.000000      35.00000        50.00000      6.300000      7.450000      27.70000     -3.000000     1.800000      0.4000000
   2.400000      66.00000        26.00000      3.000000      5.000000
      1           2              0             0
43530.00      20570.00        55002.00
2.000000      0.0000000E+00   15.00000      0.7000000     6.270000      31.89999      20.60001     1.500000      0.6000000
   4.400000      43.00000        24.00000      7.000000      26.00000
2.000000      35.00000        50.00000      0.4000000     7.220000      32.80000     -3.000000     2.000000      0.3000000
   1.300000      58.00000        16.00000      9.000000      17.00000
      1           2              0             0
43570.00      20570.00        55003.00
2.000000      0.0000000E+00   15.00000      1.000000      7.030000      35.60001     -3.000000     1.400000      0.5000000
   5.000000      51.00000        32.00000      4.000000      13.00000
2.000000      35.00000        50.00000      0.5000000     7.510000      30.60001     -3.000000     1.700000      0.4000000
   1.100000      70.00000        25.00000      1.000000      4.000000
      1           2              0             0
43610.00      20570.00        55004.00
2.000000      0.0000000E+00   15.00000      16.60001      7.440000      31.20000     -3.000000     1.100000      0.6000000
   4.600000      30.00000        15.00000      33.00000      22.00000
2.000000      35.00000        50.00000      17.70000      7.370000      20.60001     -3.000000     0.8000000     0.2000000
   2.100000      27.00000        11.00000      44.00000      18.00000
      1           2              0             0
43470.00      20550.00        55005.00
2.000000      0.0000000E+00   15.00000      3.600000      7.190000      39.89999     -3.000000     1.200000      0.6000000
   6.200000      29.00000        19.00000      23.00000      29.00000
2.000000      35.00000        50.00000      8.600000      7.450000      16.00000      17.10001     0.7000000     0.1000000
   0.5000000     28.00000        10.00000      23.00000      39.00000
      1           2              0             0
43570.00      20550.00        55006.00
2.000000      0.0000000E+00   15.00000      0.4000000     6.430000      30.60001     -3.000000     1.500000      0.3000000
   5.300000      31.00000        24.00000      10.00000      35.00000
2.000000      35.00000        50.00000      0.4000000     7.290000      28.20000     -3.000000     1.100000      0.3000000
   1.400000      43.00000        17.00000      10.00000      30.00000
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N									
1	2	0	0						
43550.00	20550.00	55007.00							
2.000000	0.0000000E+00	15.00000	0.1000000	6.780000	37.60001	25.00000	1.200000	0.4000000	
5.400000	50.00000	30.00000	7.000000	13.00000					
2.000000	35.00000	50.00000	0.6000000	7.230000	31.70000	-3.000000	1.200000	0.2000000	
1.400000	62.00000	22.00000	4.000000	13.00000					
1	2	0	0						
43590.00	20550.00	55008.00							
2.000000	0.0000000E+00	15.00000	0.8000000	6.990000	30.70000	22.80000	0.9000000	0.5000000	
3.900000	44.00000	22.00000	8.000000	26.00000					
2.000000	35.00000	50.00000	1.200000	7.090000	29.60001	-3.000000	1.300000	0.3000000	
1.100000	50.00000	21.00000	4.000000	25.00000					
1	2	0	0						
43490.00	20530.00	55009.00							
2.000000	0.0000000E+00	15.00000	0.7000000	6.870000	37.80000	28.20000	2.200000	0.8000000	
7.100000	38.00000	28.00000	7.000000	27.00000					
2.000000	35.00000	50.00000	1.500000	7.130000	27.89999	-3.000000	2.100000	0.5000000	
1.500000	52.00000	26.00000	7.000000	15.00000					
1	2	0	0						
43530.00	20530.00	55010.00							
2.000000	0.0000000E+00	15.00000	1.700000	7.330000	39.89999	-3.000000	1.100000	0.6000000	
5.400000	52.00000	28.00000	6.000000	14.00000					
2.000000	35.00000	50.00000	5.900000	7.540000	28.39999	-3.000000	1.300000	0.4000000	
1.400000	68.00000	24.00000	2.000000	6.000000					
1	2	0	0						
43570.00	20530.00	55011.00							
2.000000	0.0000000E+00	15.00000	8.500000	7.250000	24.60001	-3.000000	0.8000000	0.5000000	
3.800000	26.00000	10.00000	46.00000	18.00000					
2.000000	35.00000	50.00000	19.89999	7.340000	14.80000	-3.000000	0.9000000	0.3000000	
1.800000	20.00000	6.000000	63.00000	11.00000					
1	2	0	0						
43610.00	20530.00	55012.00							
2.000000	0.0000000E+00	15.00000	5.100000	7.300000	35.20000	-3.000000	0.8000000	0.7000000	
4.900000	38.00000	20.00000	15.00000	27.00000					
2.000000	35.00000	50.00000	5.000000	7.360000	31.20000	-3.000000	0.9000000	0.3000000	
2.400000	40.00000	21.00000	15.00000	25.00000					
1	2	0	0						
43470.00	20510.00	55013.00							
2.000000	0.0000000E+00	15.00000	0.4000000	6.720000	24.30000	15.70000	1.000000	0.4000000	
4.300000	25.00000	26.00000	7.000000	42.00000					
2.000000	35.00000	50.00000	1.100000	7.320000	19.10001	-3.000000	1.000000	0.2000000	
1.100000	29.00000	20.00000	9.000000	42.00000					
1	2	0	0						
43571.00	20509.00	55014.00							
2.000000	0.0000000E+00	15.00000	0.5000000	6.560000	50.39999	31.80000	2.300000	1.600000	
8.400000	40.00000	32.00000	2.000000	26.00000					
2.000000	35.00000	50.00000	0.9000000	7.330000	35.30000	-3.000000	1.500000	1.100000	
2.400000	59.00000	23.00000	2.000000	16.00000					
1	2	0	0						
43550.00	20510.00	55015.00							
2.000000	0.0000000E+00	15.00000	3.600000	7.320000	39.89999	-3.000000	1.000000	1.300000	
6.600000	46.00000	28.00000	12.00000	14.00000					
2.000000	35.00000	50.00000	15.00000	7.430000	20.70000	-3.000000	1.000000	0.5000000	
1.500000	51.00000	21.00000	14.00000	14.00000					
1	2	0	0						
43590.00	20510.00	55016.00							
2.000000	0.0000000E+00	15.00000	0.9000000	6.150000	58.30000	36.60001	2.900000	1.000000	
11.40000	48.00000	31.00000	5.000000	16.00000					
2.000000	35.00000	50.00000	0.6000000	7.360000	37.89999	-3.000000	2.200000	0.5000000	
1.700000	59.00000	23.00000	7.000000	11.00000					
1	2	0	0						
43490.00	20490.00	55017.00							
2.000000	0.0000000E+00	15.00000	0.8000000	6.340000	44.50000	31.00000	2.600000	0.5000000	
7.000000	46.00000	25.00000	2.000000	26.00000					

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2.000000        35.00000        50.00000        0.4000000       7.260000        29.30000        -3.000000       1.300000        0.4000000
   1.200000        48.00000        30.00000        2.000000        20.00000
          1               2               0               0
43530.00        20490.00        55018.00
2.000000        0.0000000E+00   15.00000        0.4000000       5.820000        27.60001        15.70000        0.9000000       0.2000000
   4.100000        33.00000        24.00000        7.000000        36.00000
2.000000        35.00000        50.00000        0.3000000       6.600000        23.10001        15.30000        0.9000000       0.4000000
   1.000000        39.00000        18.00000        5.000000        38.00000
          1               2               0               0
43570.00        20490.00        55019.00
2.000000        0.0000000E+00   15.00000        1.100000        7.130000        58.00000        -3.000000       2.700000        0.8000000
   12.30000        35.00000        33.00000        5.000000        28.00000
2.000000        35.00000        50.00000        1.500000        7.420000        30.80000        -3.000000       3.000000        0.4000000
   1.400000        69.00000        26.00000        2.000000        3.000000
          1               2               0               0
43470.00        20470.00        55020.00
2.000000        0.0000000E+00   15.00000        0.8000000       6.890000        28.10001        20.89999        0.7000000       0.3000000
   4.300000        30.00000        27.00000        4.000000        39.00000
2.000000        35.00000        50.00000        0.7000000       7.160000        22.50000        -3.000000       0.6000000       0.2000000
  0.9000000        34.00000        25.00000        3.000000        39.00000
          1               2               0               0
43510.00        20470.00        55021.00
2.000000        0.0000000E+00   15.00000        0.9000000       6.170000        34.70000        24.30000        0.9000000       0.2000000
   4.900000        37.00000        23.00000        3.000000        37.00000
2.000000        35.00000        50.00000        0.4000000       6.760000        21.39999        16.60001        0.8000000       0.3000000
   1.000000        33.00000        22.00000        4.000000        40.00000
          1               2               0               0
43550.00        20470.00        55022.00
2.000000        0.0000000E+00   15.00000        0.5000000       6.240000        52.60001        32.30000        3.000000        0.3000000
   12.50000        32.00000        29.00000        4.000000        35.00000
2.000000        35.00000        50.00000        0.3000000       7.340000        30.00000        -3.000000       2.900000        0.3000000
   1.300000        49.00000        23.00000        2.000000        26.00000
          1               2               0               0
43590.00        20470.00        55023.00
2.000000        0.0000000E+00   15.00000        10.80000        7.180000        48.60001        -3.000000       2.500000        2.900000
   10.70000        33.00000        26.00000        18.00000        23.00000
2.000000        35.00000        50.00000        6.600000        7.160000        37.20000        -3.000000       1.800000        2.000000
   3.500000        48.00000        16.00000        18.00000        18.00000
          1               2               0               0
43490.00        20450.00        55024.00
2.000000        0.0000000E+00   15.00000        0.8000000       6.420000        36.89999        26.60001        1.500000        0.4000000
   5.500000        40.00000        25.00000        2.000000        33.00000
2.000000        35.00000        50.00000        0.5000000       6.760000        24.39999        19.39999        1.200000        0.3000000
   1.000000        36.00000        25.00000        2.000000        37.00000
          1               2               0               0
43530.00        20450.00        55025.00
2.000000        0.0000000E+00   15.00000        0.8000000       6.950000        31.30000        21.39999        1.200000        0.1000000
   4.000000        33.00000        30.00000        1.000000        37.00000
2.000000        35.00000        50.00000        0.6000000       6.590000        23.20000        17.80000        1.400000        0.3000000
   1.200000        34.00000        28.00000        1.000000        37.00000
          1               2               0               0
43570.00        20450.00        55026.00
2.000000        0.0000000E+00   15.00000        1.000000        6.720000        44.00000        34.20000        1.900000        0.4000000
   5.700000        55.00000        21.00000        2.000000        22.00000
2.000000        35.00000        50.00000        1.000000        7.040000        21.89999        -3.000000       1.000000        0.2000000
  0.9000000        36.00000        24.00000        4.000000        35.00000
          1               2               0               0
43470.00        20430.00        55027.00
2.000000        0.0000000E+00   15.00000        1.100000        6.460000        33.89999        23.50000        1.400000        0.6000000
   2.600000        45.00000        22.00000        3.000000        30.00000
2.000000        35.00000        50.00000        0.6000000       7.280000        21.39999        -3.000000       0.8000000       0.1000000
  0.7000000        38.00000        29.00000        1.000000        31.00000
          1               2               0               0
43510.00        20430.00        55023.00
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5.200000	38.00000	27.00000	1.000000	6.170000	33.70000	22.50000	1.400000	0.3000000
2.000000	35.00000	50.00000	1.000000	34.00000				
0.8000000	33.00000	27.00000	0.7000000	6.420000	20.30000	16.10001	1.100000	0.2000000
1	2	0	3.000000	38.00000				
43550.00	20430.00	55029.00	0					
2.000000	0.0000000E+00	15.00000	0.6000000	6.420000	38.39999	28.70000	1.800000	0.4000000
5.700000	46.00000	22.00000	2.000000	30.00000				
2.000000	35.00000	50.00000	1.200000	7.280000	21.89999	-3.000000	1.100000	0.2000000
0.7000000	34.00000	21.00000	1.000000	43.00000				
1	2	0	0					
43590.00	20430.00	55030.00						
2.000000	0.0000000E+00	15.00000	1.300000	6.920000	55.00000	43.20000	1.800000	0.5000000
6.100000	72.00000	17.00000	2.000000	10.00000				
2.000000	35.00000	50.00000	1.100000	7.180000	43.50000	-3.000000	1.600000	0.3000000
2.100000	70.00000	13.00000	1.000000	20.00000				
1	2	0	0					
43450.00	20410.00	55031.00						
2.000000	0.0000000E+00	15.00000	1.400000	6.930000	33.39999	26.60001	1.400000	0.8000000
3.700000	45.00000	22.00000	2.000000	30.00000				
2.000000	35.00000	50.00000	2.100000	7.440000	34.60001	-3.000000	1.200000	0.5000000
2.000000	51.00000	22.00000	3.000000	24.00000				
1	2	0	0					
43491.00	20411.00	55032.00						
2.000000	0.0000000E+00	15.00000	0.8000000	6.770000	44.00000	33.39999	1.700000	0.4000000
5.900000	44.00000	24.00000	2.000000	30.00000				
2.000000	35.00000	50.00000	0.5000000	7.020000	24.80000	-3.000000	1.100000	0.3000000
0.9000000	41.00000	27.00000	2.000000	31.00000				
1	2	0	0					
43530.00	20410.00	55033.00						
2.000000	0.0000000E+00	15.00000	0.8000000	6.950000	44.10001	33.10001	1.600000	0.4000000
5.000000	51.00000	21.00000	2.000000	25.00000				
2.000000	35.00000	50.00000	9.800000	7.550000	19.00000	-3.000000	1.000000	0.3000000
0.6000000	34.00000	22.00000	9.000000	35.00000				
1	2	0	0					
43570.00	20410.00	55034.00						
2.000000	0.0000000E+00	15.00000	0.5000000	6.740000	44.80000	39.00000	2.100000	0.5000000
5.700000	66.00000	21.00000	2.000000	11.00000				
2.000000	35.00000	50.00000	0.9000000	6.980000	31.00000	23.89999	1.200000	0.2000000
1.000000	47.00000	17.00000	4.000000	32.00000				
1	2	0	0					
43470.00	20390.00	55035.00						
2.000000	0.0000000E+00	15.00000	0.9000000	6.940000	39.20000	30.80000	1.600000	0.5000000
5.900000	38.00000	26.00000	3.000000	34.00000				
2.000000	35.00000	50.00000	0.7000000	6.830000	25.60001	20.70000	1.100000	0.2000000
0.9000000	39.00000	29.00000	3.000000	29.00000				
1	2	0	0					
43510.00	20390.00	55036.00						
2.000000	0.0000000E+00	15.00000	0.5000000	6.850000	53.30000	37.50000	2.500000	2.500000
6.500000	56.00000	19.00000	2.000000	22.00000				
2.000000	35.00000	50.00000	0.7000000	7.090000	22.30000	-3.000000	0.8000000	0.2000000
0.7000000	30.00000	16.00000	2.000000	51.00000				
1	2	0	0					
43550.00	20390.00	55037.00						
2.000000	0.0000000E+00	15.00000	1.000000	6.820000	42.10001	31.60001	1.400000	0.4000000
5.200000	46.00000	22.00000	3.000000	30.00000				
2.000000	35.00000	50.00000	1.300000	6.980000	24.30000	20.39999	0.8000000	0.1000000
0.8000000	35.00000	24.00000	4.000000	37.00000				
1	2	0	0					
43590.00	20390.00	55038.00						
2.000000	0.0000000E+00	15.00000	4.800000	7.170000	28.39999	-3.000000	0.8000000	0.4000000
3.700000	31.00000	17.00000	18.00000	34.00000				
2.000000	35.00000	50.00000	2.900000	7.160000	27.60001	-3.000000	0.8000000	0.2000000
2.000000	34.00000	17.00000	13.00000	36.00000				

1	2	0	0					
43450.00	20370.00	55039.00						
2.000000	0.0000000E+00	15.00000	0.5000000	5.620000	31.30000	19.90000	1.200000	0.4000000
6.900000	26.00000	26.00000	3.000000	45.00000				
2.000000	35.00000	50.00000	1.100000	6.360000	21.89999	16.30000	1.100000	0.3000000
1.200000	33.00000	24.00000	5.000000	38.00000				
1	2	0	0					
43490.00	20370.00	55040.00						
2.000000	0.0000000E+00	15.00000	0.6000000	5.870000	48.10001	32.39999	1.400000	0.2000000
9.900000	28.00000	34.00000	3.000000	36.00000				
2.000000	35.00000	50.00000	0.6000000	7.190000	22.70000	-3.000000	0.6000000	0.2000000
0.7000000	30.00000	27.00000	4.000000	39.00000				
1	2	0	0					
43530.00	20370.00	55041.00						
2.000000	0.0000000E+00	15.00000	0.8000000	7.780000	40.50000	-3.000000	1.500000	0.5000000
6.900000	44.00000	23.00000	4.000000	28.00000				
2.000000	35.00000	50.00000	0.6000000	7.280000	27.50000	-3.000000	0.8000000	0.2000000
1.300000	39.00000	21.00000	31.00000	9.000000				
1	1	0	0					
43570.00	20370.00	55042.00						
2.000000	0.0000000E+00	15.00000	22.00000	7.340000	27.50000	-3.000000	1.000000	0.7000000
4.200000	27.00000	16.00000	28.00000	28.00000				
1	2	0	0					
43470.00	20350.00	55043.00						
2.000000	0.0000000E+00	15.00000	1.800000	7.190000	36.89999	-3.000000	0.9000000	0.3000000
5.700000	33.00000	21.00000	6.000000	39.00000				
2.000000	35.00000	50.00000	0.9000000	7.480000	30.20000	-3.000000	0.6000000	0.3000000
1.100000	37.00000	21.00000	10.00000	32.00000				
1	2	0	0					
43509.00	20351.00	55044.00						
2.000000	0.0000000E+00	15.00000	2.000000	7.020000	37.50000	-3.000000	1.400000	0.8000000
6.600000	28.00000	21.00000	9.000000	41.00000				
2.000000	35.00000	50.00000	0.9000000	7.490000	27.70000	-3.000000	0.8000000	0.4000000
1.400000	32.00000	18.00000	8.000000	43.00000				
1	2	0	0					
43550.00	20350.00	55045.00						
2.000000	0.0000000E+00	15.00000	11.40000	7.330000	29.39999	-3.000000	1.000000	0.8000000
4.600000	28.00000	15.00000	28.00000	29.00000				
2.000000	35.00000	50.00000	6.600000	7.330000	25.60001	-3.000000	1.000000	0.3000000
1.700000	32.00000	15.00000	24.00000	29.00000				
1	2	0	0					
43590.00	20350.00	55046.00						
2.000000	0.0000000E+00	15.00000	8.700000	7.400000	26.50000	-3.000000	0.8000000	0.5000000
3.600000	26.00000	14.00000	29.00000	31.00000				
2.000000	35.00000	50.00000	28.50000	7.370000	18.60001	-3.000000	0.6000000	0.1000000
1.300000	23.00000	11.00000	44.00000	22.00000				

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User: AGRIC2 12:
File: VAX1::DRC2:[AGRIC2]ND049.DAT;2

NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN

NORTHING
EASTING
SITE_NO
STATUS
LAYER,_DEPTH,_UPPER *01
LAYER,_DEPTH,_LOWER *01
CARBONATE A02
PH C01
C.E.C. A01
CALCIUM,_EXCHANGE. A01
MAGNESIUM,_EXCHANGE. A01
POTASSIUM,_EXCHANGE. A01
ORGANIC_MATTER,_ABUNDANCE A02
CLAY *02
SILT A02
SAND,_COARSE A02
SAND,_FINE A02

File complete

NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN

LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL

User: AGRIC2 12:
File: VAX1::DRC2:[AGRIC2]LD049.DAT;1

LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL

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2039043590 55038
2037043450 55039
2037043490 55040
2037043530 55041
2037043570 55042
2035043470 55043
2035143509 55044
2035043550 55045
2035043590 55046

File complete

LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL

D-FILE :

283 m

GRID.

YELFORD

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SSSSSSSSSS    9999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999    SSSSSSSSSS
SSSSSSSSSS    9999999999999999  VAX1 - Oxford University Computing Service - VAX/VMS Version V4.5  9999999999999999    SSSSSSSSSS
SSSSSSSSSS    9999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999    SSSSSSSSSS

                  AAA     GGGG  RRRR     III     CCCC   222
                 A   A   G      R   R     I     C      2   2
                 A   A   G      R   R     I     C          2
                 A   A   G      RRRR      I     C         2
                 AAAAA   G GGG  R R       I     C        2
                 A   A   G   G  R  R      I     C       2
                 A   A    GGG   R   R   III     CCCC   22222

RRRRRRRR     DDDDDDDD       000000     44     44       888888
RRRRRRRR     DDDDDDDD       000000     44     44       888888
RR       RR  DD       DD   00    00   44     44     88      88
RR       RR  DD       DD   00    00   44     44     88      88
RR       RR  DD       DD   00  0000   44     44     88      88
RR       RR  DD       DD   00  0000   44     44     88      88
RRRRRRRR     DD       DD   00 00 00   4444444444     888888
RRRRRRRR     DD       DD   00 00 00   4444444444     888888
RR   RR      DD       DD   0000  00         44     88      88
RR   RR      DD       DD   0000  00         44     88      88
RR    RR     DD       DD   00    00         44     88      88
RR    RR     DD       DD   00    00         44     88      88
RR       RR  DDDDDDDD       000000           44       888888
RR       RR  DDDDDDDD       000000           44       888888

DDDDDDDD       AAAAAA     TTTTTTTTTT      ;;;;        11
DDDDDDDD       AAAAAA     TTTTTTTTTT      ;;;;        11
DD       DD   AA    AA       TT          ;;;;      1111
DD       DD   AA    AA       TT          ;;;;      1111
DD       DD   AA    AA       TT                      11
DD       DD   AA    AA       TT                      11
DD       DD   AA    AA       TT          ;;;;        11
DD       DD   AA    AA       TT          ;;;;        11
DD       DD   AAAAAAAAAA     TT          ;;;;        11
DD       DD   AAAAAAAAAA     TT          ;;;;        11
....     DD   DD   AA    AA   TT            ;;        11
....     DD   DD   AA    AA   TT            ;;        11
....     DDDDDDDD   AA    AA   TT          ;;      111111
....     DDDDDDDD   AA    AA   TT          ;;      111111

File _DRC2:[AGRIC2]RD048.DAT;1 (13117,63,0), last revised on  8-MAY-1987 18:23, is a 49 block sequential file owned by UIC
[BHFF,AGRIC2].  The records are variable length with implied (CR) carriage control.  The longest record is 211 bytes.

Job RD043 (1388) queued to LPA0 on 14-MAY-1987 12:36 by user AGRIC2, UIC [BHFF,AGRIC2], under account BHFF at priority 6, started
on printer _LPA0: on 14-MAY-1987 12:36 from queue LPA0.

SSSSSSSSSS    9999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999    SSSSSSSSSS
SSSSSSSSSS    9999999999999999999999  Digital Equipment Corporation - VAX/VMS Version V4.5  9999999999999999999999    SSSSSSSSSS
SSSSSSSSSS    9999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999    SSSSSSSSSS
```

```
        2
        3          14          0          0
        1           2          0          0
43550.00        20450.00    21164.00
2.000000    0.0000000E+00   15.00000   0.3000000   6.770000   28.20000   30.30000   2.100000   0.4000000
   5.900000        54.00000    27.00000    2.000000   17.00000
2.000000        35.00000    50.00000   0.3000000   6.150000   35.10001   24.20000   1.400000   0.4000000
   2.500000        54.00000    21.00000    1.000000   24.00000
        1           2          0          0
43450.00        20350.00    21189.00
2.000000    0.0000000E+00   15.00000    1.300000   7.500000   42.39999   -3.000000   1.300000   0.6000000
   8.700000        25.00000    26.00000    8.000000   40.00000
2.000000        35.00000    50.00000    6.500000   7.290000   30.30000   -3.000000   1.300000   0.4000000
   3.000000        33.00000    17.00000   11.00000    39.00000
        1           2          0          0
43470.00        20570.00    45001.00
2.000000    0.0000000E+00   15.00000    7.000000   7.350000   34.70000   -3.000000   1.500000   0.6000000
   4.900000        46.00000    19.00000   17.00000    18.00000
2.000000        35.00000    50.00000   26.50000   7.460000   26.50000   -3.000000   2.600000   0.3000000
   1.200000        61.00000    30.00000    6.000000    3.000000
        1           2          0          0
43510.00        20570.00    45002.00
2.000000    0.0000000E+00   15.00000   0.8000000   6.650000   35.70000   24.50000   1.700000   0.7000000
   7.400000        36.00000    26.00000    8.000000   30.00000
2.000000        35.00000    50.00000   0.6000000   7.120000   32.70000   -3.000000   1.400000   0.4000000
   1.100000        71.00000    21.00000    3.000000    5.000000
        1           2          0          0
43550.00        20570.00    45003.00
2.000000    0.0000000E+00   15.00000   0.5000000   7.060000   35.80000   -3.000000   1.600000   0.5000000
   4.100000        53.00000    24.00000    5.000000   18.00000
2.000000        35.00000    50.00000    3.900000   7.470000   31.39999   -3.000000   3.500000   0.3000000
   1.300000        70.00000    19.00000    3.000000    8.000000
        1           2          0          0
43590.00        20570.00    45004.00
2.000000    0.0000000E+00   15.00000   0.6000000   7.100000   32.30000   -3.000000   1.100000   0.3000000
   5.000000        38.00000    25.00000    6.000000   31.00000
2.000000        35.00000    50.00000   0.4000000   7.190000   25.89999   -3.000000   0.9000000   0.2000000
   1.300000        43.00000    23.00000    6.000000   27.00000
        1           2          0          0
43491.00        20551.00    45005.00
2.000000    0.0000000E+00   15.00000    1.300000   7.110000   34.80000   -3.000000   1.700000    1.100000
   4.800000        40.00000    25.00000    6.000000   29.00000
2.000000        35.00000    50.00000   0.6000000   7.380000   31.50000   -3.000000   2.100000   0.4000000
   1.100000        69.00000    22.00000    3.000000    5.000000
        1           2          0          0
43530.00        20550.00    45006.00
2.000000    0.0000000E+00   15.00000    1.500000   5.780000   60.39999   38,.10001   2.300000   0.3000000
   11.90000        41.00000    37.00000    3.000000   20.00000
2.000000        35.00000    50.00000   0.6000000   7.020000   38.80000   -3.000000   1.400000   0.4000000
   1.800000        66.00000    20.00000    4.000000    9.000000
        1           2          0          0
43570.00        20550.00    45007.00
2.000000    0.0000000E+00   15.00000    1.200000   7.280000   40.39999   -3.000000   1.500000   0.9000000
   5.200000        56.00000    21.00000    8.000000   15.00000
2.000000        35.00000    50.00000   15.60000   7.480000   27.50000   -3.000000   2.700000   0.6000000
   1.500000        64.00000    24.00000    6.000000    6.000000
        1           2          0          0
43610.00        20550.00    45008.00
2.000000    0.0000000E+00   15.00000   16.20000   7.380000   28.30000   -3.000000   0.7000000   0.7000000
   4.300000        30.00000    18.00000   25.00000   27.00000
2.000000        35.00000    50.00000   8.200000   7.430000   22.70000   -3.000000   0.7000000   0.4000000
   1.900000        35.00000    17.00000   21.00000   27.00000
        1           2          0          0
43470.00        20530.00    45009.00


2.000000    0.0000000E+00   15.00000   2.800000   7.250000   39.50000   -3.000000   2.000000   1.000000
   6.000000        50.00000    25.00000    6.000000   19.00000
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2.000000	0.0000000E+00	15.00000	2.800000	7.250000	39.50000	-3.000000	2.000000	1.000000
6.000000	50.00000	25.00000	6.000000	19.00000				
2.000000	35.00000	50.00000	2.800000	7.500000	30.80000	-3.000000	3.000000	0.4000000
1.500000	69.00000	27.00000	2.000000	2.000000				
1	2	0	0					
43511.00	20531.00	45010.00						
2.000000	0.0000000E+00	15.00000	1.600000	6.930000	40.39999	32.50000	2.300000	1.600000
9.000000	28.00000	24.00000	9.000000	39.00000				
2.000000	35.00000	50.00000	0.4000000	7.330000	24.89999	-3.000000	1.700000	0.7000000
1.000000	38.00000	18.00000	5.000000	39.00000				
1	2	0	0					
43550.00	20530.00	45011.00						
2.000000	0.0000000E+00	15.00000	4.200000	7.430000	34.30000	-3.000000	1.300000	0.6000000
4.100000	55.00000	21.00000	16.00000	8.000000				
2.000000	35.00000	50.00000	17.80000	7.430000	25.30000	-3.000000	2.400000	0.5000000
1.400000	59.00000	28.00000	7.000000	5.000000				
1	2	0	0					
43590.00	20530.00	45012.00						
2.000000	0.0000000E+00	15.00000	5.400000	7.360000	37.00000	-3.000000	1.500000	0.8000000
5.900000	40.00000	26.00000	3.000000	31.00000				
2.000000	35.00000	50.00000	15.80000	7.590000	24.70000	-3.000000	2.100000	0.5000000
1.700000	53.00000	25.00000	11.00000	10.00000				
1	2	0	0					
43490.00	20510.00	45013.00						
2.000000	0.0000000E+00	15.00000	0.5000000	6.120000	22.89999	25.30000	2.100000	0.4000000
9.000000	22.00000	28.00000	3.000000	47.00000				
2.000000	35.00000	50.00000	0.6000000	6.870000	29.00000	20.20000	0.9000000	0.3000000
2.700000	35.00000	21.00000	3.000000	40.00000				
1	2	0	0					
43530.00	20510.00	45014.00						
2.000000	0.0000000E+00	15.00000	0.9000000	7.250000	42.10001	-3.000000	1.600000	0.3000000
8.100000	39.00000	33.00000	4.000000	23.00000				
2.000000	35.00000	50.00000	0.9000000	7.510000	30.89999	-3.000000	2.400000	0.3000000
0.9000000	59.00000	21.00000	6.000000	14.00000				
1	2	0	0					
43570.00	20510.00	45015.00						
2.000000	0.0000000E+00	15.00000	2.100000	7.440000	46.50000	-3.000000	1.700000	0.8000000
7.600000	48.00000	27.00000	8.000000	17.00000				
2.000000	35.00000	50.00000	12.30000	7.380000	27.80000	-3.000000	3.000000	0.5000000
1.400000	60.00000	24.00000	9.000000	7.000000				
1	2	0	0					
43610.00	20510.00	45016.00						
2.000000	0.0000000E+00	15.00000	1.900000	7.140000	47.70000	-3.000000	1.800000	0.7000000
9.500000	40.00000	29.00000	7.000000	24.00000				
2.000000	35.00000	50.00000	3.300000	7.440000	28.70000	-3.000000	1.800000	0.5000000
1.800000	52.00000	21.00000	10.00000	17.00000				
1	2	0	0					
43470.00	20490.00	45017.00						
2.000000	0.0000000E+00	15.00000	5.500000	7.420000	30.60001	-3.000000	1.100000	0.7000000
4.900000	29.00000	23.00000	8.000000	41.00000				
2.000000	35.00000	50.00000	0.8000000	7.200000	22.70000	-3.000000	0.6000000	0.3000000
1.300000	33.00000	23.00000	4.000000	39.00000				
1	2	0	0					
43510.00	20490.00	45018.00						
2.000000	0.0000000E+00	15.00000	1.300000	6.770000	38.00000	25.10001	1.700000	0.5000000
5.100000	37.00000	24.00000	8.000000	31.00000				
2.000000	35.00000	50.00000	1.800000	6.960000	23.60001	19.39999	0.7000000	0.2000000
1.400000	38.00000	19.00000	7.000000	36.00000				
1	2	0	0					
43550.00	20490.00	45019.00						
2.000000	0.0000000E+00	15.00000	0.9000000	6.580000	48.20000	29.00000	1.900000	0.6000000
10.10000	38.00000	34.00000	4.000000	24.00000				
2.000000	35.00000	50.00000	1.000000	7.290000	26.20000	-3.000000	1.500000	0.4000000
1.100000	52.00000	25.00000	5.000000	18.00000				

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        1          2          0          0
43590.00    20490.00    45020.00
2.000000  0.0000000E+00  15.00000    1.400000    7.210000    54.39999   -3.000000   2.000000   0.6000000
   12.10000      34.00000      28.00000    6.000000      31.00000
2.000000      35.00000      50.00000    0.6000000    7.340000    29.20000   -3.000000   2.900000   0.5000000
   1.300000      56.00000      24.00000    4.000000      15.00000
        1          2          0          0
43490.00    20470.00    45021.00
2.000000  0.0000000E+00  15.00000    0.6000000    6.720000    35.10001    24.60001   1.200000   0.4000000
   4.500000      44.00000      26.00000    3.000000      27.00000
2.000000      35.00000      50.00000    0.7000000    6.790000    25.00000    19.70000   1.100000   0.4000000
   1.000000      42.00000      25.00000    1.000000      31.00000
        1          2          0          0
43530.00    20470.00    45022.00
2.000000  0.0000000E+00  15.00000    0.8000000    6.560000    46.80000    28.50000   2.200000   0.6000000
   5.600000      55.00000      25.00000    3.000000      17.00000
2.000000      35.00000      50.00000    0.8000000    6.640000    38.00000    28.10001   1.700000   0.4000000
   2.300000      62.00000      21.00000    2.000000      15.00000
        1          2          0          0
43570.00    20470.00    45023.00
2.000000  0.0000000E+00  15.00000    1.600000    6.780000    45.30000    31.10001   2.100000   0.2000000
   9.500000      34.00000      23.00000    4.000000      40.00000
2.000000      35.00000      50.00000    0.3000000    7.120000    41.10001   -3.000000   2.000000   0.4000000
   2.000000      46.00000      19.00000    4.000000      30.00000
        1          2          0          0
43470.00    20450.00    45024.00
2.000000  0.0000000E+00  15.00000    0.4000000    6.810000    29.70000    21.89999   1.000000   1.000000
   4.000000      34.00000      21.00000    4.000000      42.00000
2.000000      35.00000      50.00000    1.200000    7.260000    31.39999   -3.000000   1.000000   0.4000000
   1.900000      43.00000      20.00000    3.000000      34.00000
        1          2          0          0
43510.00    20450.00    45025.00
2.000000  0.0000000E+00  15.00000    0.4000000    7.260000    39.70000   -3.000000   1.200000   0.2000000
   5.500000      42.00000      25.00000    2.000000      31.00000
2.000000      35.00000      50.00000    0.3000000    7.070000    28.00000   -3.000000   0.9000000   0.2000000
   1.400000      40.00000      26.00000    2.000000      33.00000
        1          2          0          0
43590.00    20450.00    45026.00
2.000000  0.0000000E+00  15.00000    1.400000    7.120000    46.10001   -3.000000   1.200000   0.5000000
   8.100000      21.00000      27.00000    6.000000      46.00000
2.000000      35.00000      50.00000    0.2000000    7.230000    28.70000   -3.000000   0.7000000   0.2000000
   2.100000      39.00000      19.00000    6.000000      36.00000
        1          2          0          0
43450.00    20430.00    45027.00
2.000000  0.0000000E+00  15.00000    0.4000000    7.220000    33.70000   -3.000000   1.600000   0.9000000
   3.800000      42.00000      23.00000    3.000000      31.00000
2.000000      35.00000      50.00000    0.7000000    6.870000    23.39999    19.39999   1.200000   0.3000000
   0.7000000     37.00000      26.00000    2.000000      35.00000
        1          2          0          0
43490.00    20430.00    45028.00
2.000000  0.0000000E+00  15.00000    0.9000000    5.980000    35.70000    22.80000   1.700000   0.4000000
   5.200000      42.00000      24.00000    2.000000      32.00000
2.000000      35.00000      50.00000    0.6000000    6.560000    22.39999    15.70000   1.200000   0.2000000
   0.8000000     38.00000      25.00000    1.000000      36.00000
        1          2          0          0
43530.00    20430.00    45029.00
2.000000  0.0000000E+00  15.00000    1.200000    6.440000    37.00000    26.50000   1.200000   0.4000000
   5.900000      45.00000      24.00000    2.000000      29.00000
2.000000      35.00000      50.00000    0.3000000    7.120000    22.39999   -3.000000   0.7000000   0.2000000
   0.8000000     34.00000      24.00000    3.000000      38.00000
        1          2          0          0
43570.00    20430.00    45030.00
2.000000  0.0000000E+00  15.00000    0.7000000    6.740000    52.39999    37.70000   1.900000   0.6000000
   5.400000      71.00000      20.00000    1.000000      9.000000
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2.000000        35.00000        50.00000        1.000000        6.780000        52.50000        34.70000        1.700000        0.6000000
   2.300000        81.00000        11.00000        1.000000        7.000000
          1               2               0               0
43470.00        20410.00        45031.00
2.000000        0.0000000E+00   15.00000        0.7000000       6.780000        38.80000        26.50000        1.900000        0.3000000
   4.900000        47.00000        26.00000        3.000000        24.00000
2.000000        35.00000        50.00000        0.4000000       7.170000        27.50000        -3.000000       1.300000        0.2000000
   0.8000000       41.00000        29.00000        2.000000        29.00000
          1               2               0               0
43510.00        20410.00        45032.00
2.000000        0.0000000E+00   15.00000        0.9000000       6.900000        55.30000        46.30000        1.800000        0.6000000
   7.700000        58.00000        21.00000        2.000000        19.00000
2.000000        35.00000        50.00000        0.5000000       7.430000        36.20000        -3.000000       1.300000        0.2000000
   1.300000        56.00000        16.00000        6.000000        22.00000
          1               2               0               0
43550.00        20410.00        45033.00
2.000000        0.0000000E+00   15.00000        0.2000000       6.570000        41.60001        29.39999        1.500000        0.3000000
   5.300000        45.00000        25.00000        2.000000        28.00000
2.000000        35.00000        50.00000        0.4000000       6.830000        27.50000        22.39999        1.200000        0.2000000
   1.100000        36.00000        25.00000        2.000000        37.00000
          1               2               0               0
43590.00        20410.00        45034.00
2.000000        0.0000000E+00   15.00000        0.6000000       6.230000        33.50000        21.20000        0.8000000       0.2000000
   5.300000        34.00000        19.00000        6.000000        41.00000
2.000000        35.00000        50.00000        0.6000000       6.720000        23.30000        16.89999        0.4000000       0.3000000
   1.000000        33.00000        22.00000        6.000000        39.00000
          1               2               0               0
43450.00        20390.00        45035.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.380000        29.80000        19.50000        1.200000        0.2000000
   4.400000        32.00000        26.00000        3.000000        39.00000
2.000000        35.00000        50.00000        0.3000000       6.790000        20.10001        15.30000        1.100000        0.3000000
   0.8000000       33.00000        28.00000        4.000000        36.00000
          1               2               0               0
43490.00        20390.00        45036.00
2.000000        0.0000000E+00   15.00000        0.9000000       6.410000        55.50000        38.80000        2.300000        0.5000000
   6.000000        60.00000        17.00000        2.000000        21.00000
2.000000        35.00000        50.00000        0.6000000       6.620000        32.39999        24.30000        1.400000        0.2000000
   1.000000        54.00000        18.00000        1.000000        27.00000
          1               2               0               0
43530.00        20390.00        45037.00
2.000000        0.0000000E+00   15.00000        0.4000000       6.390000        46.10001        32.10001        2.100000        0.4000000
   5.800000        57.00000        20.00000        2.000000        20.00000
2.000000        35.00000        50.00000        0.4000000       6.930000        21.50000        14.60000        0.3000000       0.2000000
   0.5000000       36.00000        23.00000        2.000000        38.00000
          1               2               0               0
43570.00        20390.00        45038.00
2.000000        0.0000000E+00   15.00000        0.5000000       6.860000        40.10001        32.10001        1.300000        0.2000000
   6.200000        38.00000        24.00000        4.000000        33.00000
2.000000        35.00000        50.00000        0.9000000       6.610000        25.39999        18.10001        0.9000000       0.1000000
   1.400000        33.00000        23.00000        5.000000        39.00000
          1               2               0               0
43470.00        20370.00        45039.00
2.000000        0.0000000E+00   15.00000        0.8000000       5.710000        42.80000        26.70000        1.500000        0.3000000
   8.100000        34.00000        26.00000        3.000000        37.00000
2.000000        35.00000        50.00000        0.7000000       6.800000        21.00000        16.10001        0.8000000       0.3000000
   1.100000        32.00000        25.00000        3.000000        39.00000
          1               2               0               0
43510.00        20370.00        45040.00
2.000000        0.0000000E+00   15.00000        1.100000        7.280000        46.00000        -3.000000       1.700000        0.6000000
   6.500000        42.00000        22.00000        5.000000        31.00000
2.000000        35.00000        50.00000        0.8000000       7.230000        22.30000        -3.000000       0.9000000       0.3000000
   0.7000000       36.00000        27.00000        3.000000        34.00000
          1               2               0               0
43550.00        20370.00        45041.00
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2.000000        0.0000000E+00   15.00000        1.900000        7.310000        35.89999        -3.000000       0.9000000       0.2000000
   4.300000        35.00000        15.00000        13.00000        37.00000
2.000000        35.00000        50.00000        13.90000        7.590000        20.00000        -3.000000       0.7000000       0.1000000
   0.7000000       30.00000        16.00000        17.00000        37.00000
         1               2               0               0
43590.00        20370.00        45042.00
2.000000        0.0000000E+00   15.00000        7.400000        7.260000        28.80000        -3.000000       0.8000000       0.5000000
   3.400000        28.00000        16.00000        25.00000        31.00000
2.000000        35.00000        50.00000        36.60001        7.530000        14.80000        -3.000000       0.5000000       0.1000000
   0.9000000       19.00000        11.00000        44.00000        25.00000
         1               2               0               0
43490.00        20350.00        45043.00
2.000000        0.0000000E+00   15.00000        1.000000        6.590000        42.80000        31.50000        1.800000        1.700000
   10.00000        24.00000        27.00000        3.000000        46.00000
2.000000        35.00000        50.00000        0.6000000       7.020000        29.89999        -3.000000       1.100000        0.3000000
   2.200000        33.00000        27.00000        3.000000        37.00000
         1               2               0               0
43530.00        20350.00        45044.00
2.000000        0.0000000E+00   15.00000        8.300000        7.190000        38.10001        -3.000000       1.100000        0.4000000
   6.400000        29.00000        17.00000        26.00000        28.00000
2.000000        35.00000        50.00000        12.10000        7.440000        33.70000        -3.000000       0.9000000       0.2000000
   2.400000        30.00000        14.00000        29.00000        27.00000
         1               2               0               0
43570.00        20350.00        45045.00
2.000000        0.0000000E+00   15.00000        8.100000        7.320000        29.60001        -3.000000       0.9000000       0.8000000
   4.300000        27.00000        15.00000        27.00000        31.00000
2.000000        35.00000        50.00000        11.30000        7.500000        20.50000        -3.000000       0.7000000       0.3000000
   1.600000        27.00000        12.00000        33.00000        28.00000
```

$ DATA
 Data name :D048

Features	Out of ten recorded	not applicable
EASTING	10	0
NORTHING	10	0
SITE_NO	10	0
STATUS	10	0
LL014	10	0
LAYER,_DEPTH,_UPPER *01	10	0
LAYER,_DEPTH,_LOWER *01	10	0
CARBONATE A02	10	0
pH C01	10	0
C.E.C. A01	10	0
CALCIUM,_EXCHANGE. A01	4	0
MAGNESIUM,_EXCHANGE. A01	10	0
POTASSIUM,_EXCHANGE. A01	10	0
ORGANIC_MATTER,_ABUNDANCE A02	10	0
CLAY *02	10	0
SILT A02	10	0
SAND,_COARSE A02	10	0
SAND,_FINE A02	10	0

$ \

PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP

User: AGRIC2 12:41:28
File: VAX1::DRC2:[AGRIC2]LD048.DAT;1

PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP

```
20570203504361043450
2057043590 45004
2057043550 45003
2057043510 45002
2057043470 45001
2055143491 45005
2055043610 45008
2055043570 45007
2055043530 45006
2053143511 45010
2053043590 45012
2053043550 45011
2053043470 45009
2051043610 45016
2051043570 45015
2051043530 45014
2051043490 45013
2049043590 45020
2049043550 45019
2049043510 45018
2049043470 45017
2047043570 45023
2047043530 45022
2047043490 45021
2045043590 45026
2045043550 21164
2045043510 45025
2045043470 45024
2043043570 45030
2043043530 45029
2043043490 45028
2043043450 45027
2041043590 45034
2041043550 45033
2041043510 45032
2041043470 45031
2039043570 45038
2039043530 45037
2039043490 45036
2039043450 45035
2037043590 45042
2037043550 45041
2037043510 45040
2037043470 45039
2035043570 45045
2035043530 45044
2035043490 45043
2035043450 21189
```

File complete

PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP

```
XXXXXXXXXX   44444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444   XXXXXXXXXX
XXXXXXXXXX   4444444444444444  VAX1 - Oxford University Computing Service - VAX/VMS Version V4.5  4444444444444444   XXXXXXXXXX
XXXXXXXXXX   44444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444   XXXXXXXXXX
```


```
         AAA    GGGG  RRRR    III   CCCC   222
        A   A  G      R   R    I   C      2   2
        A   A  G      R   R    I   C          2
        A   A  G      RRRR     I   C         2
        AAAAA  G GGG  R R      I   C        2
        A   A  G   G  R  R     I   C       2
        A   A   GGG   R   R   III   CCCC  22222

RRRRRRRR   DDDDDDDD     000000   44    44     666666
RRRRRRRR   DDDDDDDD     000000   44    44     666666
RR      RR DD      DD 00      00 44    44   66
RR      RR DD      DD 00      00 44    44   66
RR      RR DD      DD 00    0000 44    44   66
RR      RR DD      DD 00    0000 44    44   66
RRRRRRRR   DD      DD 00  00  00 4444444444 66666666
RRRRRRRR   DD      DD 00  00  00 4444444444 66666666
RR  RR     DD      DD 0000    00       44   66      66
RR  RR     DD      DD 0000    00       44   66      66
RR    RR   DD      DD 00      00       44   66      66
RR    RR   DD      DD 00      00       44   66      66
RR      RR DDDDDDDD     000000         44     666666
RR      RR DDDDDDDD     000000         44     666666
```

D-FILE:

1 Km GRID

(SP30 - SHEET)

```
      DDDDDDDD     AAAAAA    TTTTTTTTTT     ::::        11
      DDDDDDDD     AAAAAA    TTTTTTTTTT     ::::        11
      DD      DD AA      AA      TT         ::::      1111
      DD      DD AA      AA      TT         ::::      1111
      DD      DD AA      AA      TT                     11
      DD      DD AA      AA      TT                     11
      DD      DD AA      AA      TT         ::::        11
      DD      DD AA      AA      TT         ::::        11
      DD      DD AAAAAAAAAA      TT         ::::        11
      DD      DD AAAAAAAAAA      TT         ::::        11
....  DD      DD AA      AA      TT           ::        11
....  DD      DD AA      AA      TT           ::        11
....  DDDDDDDD   AA      AA      TT         ::      111111
....  DDDDDDDD   AA      AA      TT         ::      111111
```

File _DRC2:[AGRIC2]RD046.DAT:1 (13115,44,0), last revised on 8-MAY-1987 17:03, is a 265 block sequential file owned by UIC [BHFF,AGRIC2]. The records are variable length with implied (CR) carriage control. The longest record is 211 bytes.

Job RD046 (1339) queued to LPA0 on 14-MAY-1987 12:36 by user AGRIC2, UIC [BHFF,AGRIC2], under account BHFF at priority 6, started on printer _LPA0: on 14-MAY-1987 12:39 from queue LPA0.


```
XXXXXXXXXX   44444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444   XXXXXXXXXX
XXXXXXXXXX   4444444444444444444444  Digital Equipment Corporation - VAX/VMS Version V4.5  4444444444444444444444   XXXXXXXXXX
XXXXXXXXXX   44444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444   XXXXXXXXXX
```

```
         2
         3          14           0           0
         1           3           0           0
43000.00       21000.00       1.000000
1.000000      0.0000000E+00    15.00000       1.400000       3.010000       42.60000      -3.000000       1.000000       1.200000
   4.800000       54.00000       23.00000       1.000000       21.00000
2.000000      0.0000000E+00    15.00000       1.800000       7.400000       44.60001      -3.000000       1.100000       1.700000
   5.600000       48.00000       24.00000       2.000000       26.00000
2.000000       35.00000       50.00000       1.100000       7.610000       41.60001      -3.000000       0.9000000      0.6000000
   2.000000       69.00000       18.00000      0.0000000E+00   13.00000
         1           3           0           0
43000.00       21000.00       2.000000
1.000000      0.0000000E+00    15.00000       1.100000       7.000000       50.60001      -3.000000       1.400000       0.3000000
   9.500000       29.00000       26.00000       4.000000       41.00000
2.000000      0.0000000E+00    15.00000       4.500000       7.590000       42.10001      -3.000000       0.9000000      1.100000
   5.200000       52.00000       26.00000       3.000000       18.00000
2.000000       35.00000       50.00000       3.000000       7.690000       43.20000      -3.000000       1.000000       0.7000000
   2.900000       59.00000       18.00000       3.000000       20.00000
         1           3           0           0
43100.00       21000.00       3.000000
1.000000      0.0000000E+00    15.00000       1.300000       7.410000       37.00000      -3.000000       0.7000000      0.6000000
   5.400000       37.00000       21.00000       1.000000       40.00000
2.000000      0.0000000E+00    15.00000       1.200000       7.150000       38.30000      -3.000000       1.000000       0.8000000
   5.300000       36.00000       22.00000       1.000000       41.00000
2.000000       35.00000       50.00000       8.900000       7.490000       26.70000      -3.000000       0.8000000      0.4000000
   2.200000       40.00000       20.00000       5.000000       35.00000
         1           3           0           0
43100.00       21000.00       4.000000
1.000000      0.0000000E+00    15.00000       2.000000       7.140000       38.10001      -3.000000       0.7000000      0.7000000
   5.100000       29.00000       41.00000       2.000000       28.00000
2.000000      0.0000000E+00    15.00000       1.000000       7.280000       38.50000      -3.000000       0.7000000      0.9000000
   5.400000       33.00000       24.00000       1.000000       41.00000
2.000000       35.00000       50.00000       30.89999       7.790000       22.10001      -3.000000       0.9000000      0.3000000
   1.600000       35.00000       21.00000       11.00000       33.00000
         1           2           0           0
43200.00       21000.00       5.000000
1.000000      0.0000000E+00    15.00000       4.300000       7.540000       38.89999      -3.000000       0.9000000      0.8000000
   5.300000       40.00000       23.00000       4.000000       33.00000
2.000000      0.0000000E+00    15.00000       2.500000       7.300000       40.00000      -3.000000       1.000000       0.7000000
   5.600000       38.00000       25.00000       3.000000       33.00000
         1           3           0           0
43200.00       21000.00       6.000000
1.000000      0.0000000E+00    15.00000       3.500000       7.500000       42.39999      -3.000000       0.9000000      0.9000000
   5.300000       39.00000       21.00000       4.000000       35.00000
2.000000      0.0000000E+00    15.00000       4.800000       7.380000       38.89999      -3.000000       1.000000       0.8000000
   5.600000       39.00000       25.00000       4.000000       31.00000
2.000000       35.00000       50.00000       40.89999       7.390000       21.20000      -3.000000       0.7000000      0.3000000
   0.9000000      31.00000       21.00000       20.00000       28.00000
         1           3           0           0
43300.00       21000.00       7.000000
1.000000      0.0000000E+00    15.00000       13.80000       7.650000       38.00000      -3.000000       0.9000000      0.6000000
   6.100000       34.00000       30.00000       7.000000       29.00000
2.000000      0.0000000E+00    15.00000       11.50000       7.720000       38.00000      -3.000000       0.9000000      0.7000000
   6.600000       34.00000       28.00000       7.000000       31.00000
2.000000       35.00000       50.00000       18.50000       7.450000       23.00000      -3.000000       0.8000000      0.2000000
   1.600000       40.00000       24.00000       7.000000       29.00000
         1           3           0           0
43300.00       21000.00       8.000000
1.000000      0.0000000E+00    15.00000       16.20000       7.520000       16.70000      -3.000000       1.100000       0.9000000
   5.900000       34.00000       25.00000       8.000000       33.00000
2.000000      0.0000000E+00    15.00000       15.00000       7.510000       29.20000      -3.000000       1.000000       0.6000000
   5.800000       31.00000       28.00000       8.000000       33.00000
2.000000       35.00000       50.00000       41.80000       7.500000       15.40000      -3.000000       0.8000000      0.3000000
   1.000000       31.00000       17.00000       17.00000       35.00000
```

```
        1           3           0           0
43400.00       21000.00    9.000000
1.000000    0.0000000E+00   15.00000    6.200000    6.450000    47.20000    26.39999    1.800000    1.700000
   11.40000       20.00000    25.00000    4.000000       51.00000
2.000000    0.0000000E+00   15.00000    1.000000    6.490000    50.89999    30.89999    2.300000    3.900000
   13.40000       28.00000    33.00000    2.000000       37.00000
2.000000       35.00000    50.00000    4.800000    6.600000    31.20000    16.50000    0.5000000   0.8000000
   3.500000       35.00000    22.00000    1.000000       42.00000
        1           3           0           0
43400.00       21000.00    10.00000
1.000000    0.0000000E+00   15.00000    2.200000    7.080000    48.70000    -3.000000   1.400000    1.100000
   12.20000       26.00000    30.00000    2.000000       43.00000
2.000000    0.0000000E+00   15.00000    1.700000    6.700000    54.30000    14.50000    1.400000    3.400000
   13.70000       18.00000    19.00000    2.000000       61.00000
2.000000       35.00000    50.00000    0.5000000   7.090000    28.50000    -3.000000   0.5000000   0.4000000
   1.900000       38.00000    16.00000    2.000000       44.00000
        1           3           0           0
43600.00       21000.00    13.00000
1.000000    0.0000000E+00   15.00000    25.50000    7.390000    61.00000    -3.000000   0.7000000   0.2000000
   14.10000       29.00000    34.00000    6.000000       31.00000
2.000000    0.0000000E+00   15.00000    16.10001    7.800000    62.80000    -3.000000   1.500000    0.4000000
   15.40000       12.00000    21.00000    12.00000       55.00000
2.000000       35.00000    50.00000    0.7000000   7.650000    75.80000    -3.000000   0.2000000   0.2000000
   14.40000       43.00000    33.00000    1.000000       24.00000
        1           3           0           0
43600.00       21000.00    14.00000
1.000000    0.0000000E+00   15.00000    27.50000    7.600000    58.89999    -3.000000   1.000000    0.3000000
   13.20000       22.00000    33.00000    7.000000       38.00000
2.000000    0.0000000E+00   15.00000    18.80000    7.290000    74.70000    -3.000000   1.500000    0.3000000
   16.60000       17.00000    30.00000    6.000000       46.00000
2.000000       35.00000    50.00000    0.9000000   7.680000    70.70000    -3.000000   0.2000000   0.2000000
   10.90000       57.00000    30.00000    1.000000       12.00000
        1           3           0           0
43700.00       21000.00    15.00000
1.000000    0.0000000E+00   15.00000    0.4000000       7.290000    35.80000    -3.000000   1.000000    0.3000000
   7.800000       25.00000    37.00000    7.000000       30.00000
2.000000    0.0000000E+00   15.00000    0.5000000       6.940000    36.60001    23.50000    0.7000000   0.2000000
   7.500000       26.00000    36.00000    7.000000       31.00000
2.000000       35.00000    50.00000    0.4000000       7.150000    28.50000    -3.000000   1.200000    0.3000000
   0.6000000      64.00000    25.00000    0.0000000E+00  12.00000
        1           3           0           0
43710.00       21000.00    16.00000
1.000000    0.0000000E+00   15.00000    0.4000000       5.700000    33.50000    17.20000    0.5000000   0.2000000
   5.800000       23.00000    28.00000    10.00000       39.00000
2.000000    0.0000000E+00   15.00000    0.5000000       5.610000    33.00000    14.50000    0.6000000   0.3000000
   5.300000       24.00000    27.00000    11.00000       38.00000
2.000000       35.00000    50.00000    0.6000000       7.080000    32.10001    -3.000000   0.8000000   0.3000000
   1.000000       40.00000    19.00000    9.000000       32.00000
        1           3           0           0
43800.00       20990.00    17.00000
1.000000    0.0000000E+00   15.00000    1.900000        7.310000    37.10001    -3.000000   1.800000    1.100000
   5.800000       44.00000    26.00000    8.000000       23.00000
2.000000    0.0000000E+00   15.00000    3.300000        7.410000    35.89999    -3.000000   1.800000    1.200000
   6.700000       41.00000    23.00000    10.00000       27.00000
2.000000       35.00000    50.00000    0.9000000       7.250000    36.80000    -3.000000   2.000000    1.200000
   4.100000       52.00000    25.00000    4.000000       20.00000
        1           3           0           0
43800.00       20990.00    18.00000
1.000000    0.0000000E+00   15.00000    1.500000        7.300000    36.00000    -3.000000   1.400000    1.000000
   5.200000       42.00000    25.00000    8.000000       24.00000
2.000000    0.0000000E+00   15.00000    2.600000        7.510000    36.60001    -3.000000   1.600000    1.200000
   6.300000       46.00000    23.00000    7.000000       24.00000
2.000000       35.00000    50.00000    0.9000000       7.320000    29.00000    -3.000000   1.900000    0.5000000
   1.000000       61.00000    16.00000    5.000000       18.00000
```

```
        1          3          0          0
43900.00       21000.00   19.00000
1.000000   0.0000000E+00  15.00000   0.5000000      6.700000       29.50000       19.60001       1.300000       0.4000000
   3.100000       41.00000       31.00000       2.000000       26.00000
2.000000   0.0000000E+00  15.00000   0.4000000      7.200000       32.70000       -3.000000      1.100000       0.4000000
   5.300000       40.00000       27.00000       2.000000       31.00000
2.000000       35.00000   50.00000   0.3000000      4.500000       27.60001       10.20000       1.600000       0.6000000
  0.9000000       70.00000       22.00000     0.0000000E+00    8.000000
        1          3          0          0
44000.00       21000.00   21.00000
1.000000   0.0000000E+00  15.00000   0.8000000      6.190000       26.70000       14.60000       0.7000000      0.3000000
   5.900000       26.00000       32.00000       7.000000       35.00000
2.000000   0.0000000E+00  15.00000    4.700000      6.000000       23.60001       10.60000       0.6000000      0.2000000
   4.500000       32.00000       11.00000       6.000000       51.00000
2.000000       35.00000   50.00000    8.700000      4.780000       22.50000       9.000000       0.3000000      0.3000000
   1.100000       42.00000       20.00000       3.000000       35.00000
        1          3          0          0
44000.00       21000.00   22.00000
1.000000   0.0000000E+00  15.00000   0.5000000      5.900000       26.60001       25.00000       0.7000000      0.2000000
   5.700000       26.00000       26.00000       7.000000       41.00000
2.000000   0.0000000E+00  15.00000   0.3000000      6.800000       26.89999       19.00000       0.7000000      0.4000000
   5.100000       19.00000       33.00000       7.000000       41.00000
2.000000       35.00000   50.00000    3.700000      6.730000       23.00000       13.30000       0.6000000      0.2000000
   13.00000       41.00000       23.00000       4.000000       32.00000
        1          3          0          0
43000.00       20900.00   23.00000
1.000000   0.0000000E+00  15.00000    15.30000      7.600000       33.50000       -3.000000      1.100000       0.9000000
   7.300000       43.00000       27.00000       7.000000       23.00000
2.000000   0.0000000E+00  15.00000    14.00000      7.500000       50.50000       -3.000000      1.300000       0.7000000
   7.200000       47.00000       23.00000       9.000000       21.00000
2.000000       35.00000   50.00000    46.10001      7.510000       27.60001       -3.000000      1.000000       0.3000000
  0.8000000       58.00000       32.00000       6.000000       4.000000
        1          3          0          0
43000.00       20900.00   24.00000
1.000000   0.0000000E+00  15.00000    5.900000      7.530000       39.10001       -3.000000      1.200000       0.9000000
   6.900000       48.00000       22.00000       5.000000       25.00000
2.000000   0.0000000E+00  15.00000    7.000000      7.630000       38.50000       -3.000000      1.300000       0.8000000
   5.000000       46.00000       21.00000       4.000000       28.00000
2.000000       35.00000   50.00000    45.20000      7.450000       17.00000       -3.000000      0.8000000      0.3000000
  0.8000000       46.00000       28.00000       17.00000       9.000000
        1          3          0          0
43100.00       20900.00   25.00000
1.000000   0.0000000E+00  15.00000    12.30000      7.690000       40.30000       -3.000000      0.9000000      0.9000000
   6.700000       46.00000       25.00000       6.000000       24.00000
2.000000   0.0000000E+00  15.00000    13.60000      7.500000       45.30000       -3.000000      1.100000       0.9000000
   5.500000       39.00000       26.00000       5.000000       30.00000
2.000000       35.00000   50.00000    64.70000      7.690000       17.00000       -3.000000      0.7000000      0.3000000
   1.300000       27.00000       24.00000       22.00000       26.00000
        1          3          0          0
43100.00       20900.00   26.00000
1.000000   0.0000000E+00  15.00000    6.200000      7.600000       42.39999       -3.000000      1.000000       0.7000000
   5.800000       48.00000       19.00000       5.000000       28.00000
2.000000   0.0000000E+00  15.00000    5.500000      7.300000       47.39999       -3.000000      1.200000       0.9000000
   3.000000       45.00000       26.00000       3.000000       26.00000
2.000000       35.00000   50.00000    23.00000      7.620000       29.20000       -3.000000      0.9000000      0.4000000
   1.300000       56.00000       17.00000       10.00000       17.00000
        1          3          0          0
43200.00       20900.00   27.00000
1.000000   0.0000000E+00  15.00000    14.30000      7.780000       31.70000       -3.000000      0.9000000      1.000000
   4.700000       44.00000       21.00000       6.000000       28.00000
2.000000   0.0000000E+00  15.00000    13.40000      7.410000       34.80000       -3.000000      0.9000000      1.000000
   4.700000       43.00000       21.00000       9.000000       26.00000
2.000000       35.00000   50.00000    41.80000      7.350000       20.89999       -3.000000      0.7000000      0.3000000
   2.300000       43.00000       25.00000       13.00000       19.00000
```

```
     1          3          0          0
43300.00    20900.00    29.00000
1.000000    0.0000000E+00  15.00000    17.80000    7.800000    31.80000    -3.000000    1.200000    1.100000
   6.100000    34.00000    26.00000    9.000000    31.00000
2.000000    0.0000000E+00  15.00000    15.10000    7.690000    34.20000    -3.000000    1.100000    1.300000
   7.400000    23.00000    22.00000    9.000000    41.00000
2.000000    35.00000    50.00000    28.80000    7.860000    27.20000    -3.000000    1.000000    0.3000000
   1.100000    23.00000    58.00000    12.00000    7.000000
     1          3          0          0
43400.00    20900.00    31.00000
1.000000    0.0000000E+00  15.00000    8.500000    7.980000    43.50000    -3.000000    1.100000    1.300000
   9.400000    31.00000    31.00000    6.000000    32.00000
2.000000    0.0000000E+00  15.00000    9.600000    7.650000    46.80000    -3.000000    1.300000    1.200000
   9.300000    28.00000    32.00000    5.000000    35.00000
2.000000    35.00000    50.00000    26.70000    7.590000    27.50000    -3.000000    1.100000    0.5000000
   3.400000    40.00000    25.00000    12.00000    24.00000
     1          3          0          0
43600.00    20900.00    35.00000
1.000000    0.0000000E+00  15.00000    25.39999    7.410000    49.30000    -3.000000    0.9000000    0.5000000
   10.70000    25.00000    34.00000    15.00000    26.00000
2.000000    0.0000000E+00  15.00000    20.50000    7.500000    53.30000    -3.000000    1.000000    0.4000000
   11.80000    25.00000    35.00000    8.000000    32.00000
2.000000    35.00000    50.00000    14.40000    7.610000    37.00000    -3.000000    0.7000000    0.4000000
   2.400000    52.00000    23.00000    8.000000    17.00000
     1          3          0          0
43600.00    20900.00    36.00000
1.000000    0.0000000E+00  15.00000    7.800000    7.570000    61.80000    -3.000000    1.300000    0.3000000
   12.30000    29.00000    36.00000    6.000000    29.00000
2.000000    0.0000000E+00  15.00000    8.600000    7.860000    54.20000    -3.000000    1.000000    0.3000000
   10.40000    25.00000    24.00000    6.000000    45.00000
2.000000    35.00000    50.00000    13.60000    7.520000    37.60001    -3.000000    0.5000000    0.3000000
   3.000000    47.00000    29.00000    2.000000    22.00000
     1          3          0          0
43700.00    20900.00    37.00000
1.000000    0.0000000E+00  15.00000    0.7000000    5.970000    29.30000    14.50000    1.600000    0.5000000
   6.900000    27.00000    28.00000    16.00000    29.00000
2.000000    0.0000000E+00  15.00000    1.200000    6.110000    34.10001    16.00000    1.700000    0.4000000
   6.000000    24.00000    29.00000    15.00000    31.00000
2.000000    35.00000    50.00000    0.3000000    5.190000    31.89999    15.30000    3.000000    0.4000000
   1.200000    70.00000    24.00000    3.000000    4.000000
     1          3          0          0
43800.00    20900.00    39.00000
1.000000    0.0000000E+00  15.00000    4.600000    5.190000    31.50000    16.10001    0.6000000    0.3000000
   8.200000    19.00000    7.000000    35.00000    39.00000
2.000000    0.0000000E+00  15.00000    3.900000    5.700000    28.60001    10.10000    0.9000000    0.3000000
   9.000000    13.00000    9.000000    40.00000    38.00000
2.000000    35.00000    50.00000    0.7000000    6.390000    24.80000    16.39999    0.7000000    0.2000000
   1.500000    39.00000    10.00000    28.00000    23.00000
     1          3          0          0
43800.00    20900.00    40.00000
1.000000    0.0000000E+00  15.00000    0.9000000    5.190000    36.80000    13.20000    0.8000000    0.3000000
   6.900000    26.00000    23.00000    26.00000    25.00000
2.000000    0.0000000E+00  15.00000    2.700000    5.250000    34.20000    14.10000    0.6000000    0.4000000
   10.50000    15.00000    11.00000    35.00000    39.00000
2.000000    35.00000    50.00000    3.100000    6.700000    19.00000    14.70000    0.6000000    0.2000000
   2.400000    25.00000    10.00000    33.00000    32.00000
     1          3          0          0
43900.00    20900.00    41.00000
1.000000    0.0000000E+00  15.00000    0.9000000    6.410000    30.50000    22.89999    2.400000    0.8000000
   7.900000    41.00000    31.00000    7.000000    21.00000
2.000000    0.0000000E+00  15.00000    1.600000    6.410000    49.60001    22.20000    4.000000    0.3000000
   9.000000    40.00000    31.00000    8.000000    21.00000
2.000000    35.00000    50.00000    0.4000000    7.310000    34.60001    -3.000000    3.400000    0.5000000
   1.100000    75.00000    20.00000    2.000000    2.000000
```

1	3	0	0					
44000.00	20900.00	43.00000						
1.000000	0.0000000E+00	15.00000	0.4000000	6.710000	25.89999	14.40000	1.200000	0.6000000
3.700000	28.00000	19.00000	5.000000	48.00000				
2.000000	0.0000000E+00	15.00000	0.5000000	7.020000	25.10001	-3.000000	1.200000	0.4000000
3.400000	30.00000	26.00000	4.000000	41.00000				
2.000000	35.00000	50.00000	0.6000000	6.900000	22.50000	14.60000	1.000000	0.3000000
0.7000000	33.00000	19.00000	6.000000	42.00000				
1	3	0	0					
43010.00	20800.00	45.00000						
1.000000	0.0000000E+00	15.00000	28.89999	7.580000	50.39999	-3.000000	1.100000	0.5000000
9.000000	26.00000	33.00000	10.00000	31.00000				
2.000000	0.0000000E+00	15.00000	19.70000	7.200000	45.00000	-3.000000	0.9000000	0.1000000
9.500000	24.00000	25.00000	11.00000	40.00000				
2.000000	35.00000	50.00000	36.30000	7.510000	29.50000	-3.000000	0.7000000	0.4000000
3.800000	33.00000	20.00000	19.00000	29.00000				
1	3	0	0					
43100.00	20800.00	47.00000						
1.000000	0.0000000E+00	15.00000	3.000000	7.100000	49.20000	-3.000000	1.300000	2.200000
9.900000	25.00000	34.00000	4.000000	37.00000				
2.000000	0.0000000E+00	15.00000	2.600000	7.150000	48.20000	-3.000000	0.8000000	1.300000
9.500000	23.00000	21.00000	4.000000	42.00000				
2.000000	35.00000	50.00000	11.30000	7.350000	39.20000	-3.000000	0.8000000	0.8000000
4.800000	30.00000	33.00000	7.000000	30.00000				
1	3	0	0					
43110.00	20790.00	48.00000						
1.000000	0.0000000E+00	15.00000	7.600000	7.300000	41.30000	-3.000000	1.000000	0.9000000
10.90000	26.00000	32.00000	6.000000	36.00000				
2.000000	0.0000000E+00	15.00000	6.600000	7.500000	53.80000	-3.000000	0.9000000	1.300000
9.500000	25.00000	32.00000	7.000000	36.00000				
2.000000	35.00000	50.00000	25.60001	7.690000	32.00000	-3.000000	0.7000000	0.5000000
4.500000	33.00000	26.00000	12.00000	28.00000				
1	3	0	0					
43200.00	20800.00	49.00000						
1.000000	0.0000000E+00	15.00000	24.00000	7.300000	37.20000	-3.000000	0.9000000	0.5000000
6.300000	35.00000	21.00000	16.00000	28.00000				
2.000000	0.0000000E+00	15.00000	15.10000	7.670000	40.10001	-3.000000	0.7000000	0.3000000
5.600000	36.00000	15.00000	10.00000	39.00000				
2.000000	35.00000	50.00000	34.39999	7.750000	27.90000	-3.000000	0.5000000	0.2000000
3.400000	31.00000	16.00000	31.00000	22.00000				
1	3	0	0					
43200.00	20800.00	50.00000						
1.000000	0.0000000E+00	15.00000	9.400000	7.290000	31.00000	-3.000000	1.100000	0.7000000
10.10000	39.00000	23.00000	9.000000	29.00000				
2.000000	0.0000000E+00	15.00000	14.00000	7.520000	44.20000	-3.000000	1.300000	0.3000000
10.90000	31.00000	29.00000	11.00000	29.00000				
2.000000	35.00000	50.00000	41.89999	7.200000	20.89999	-3.000000	1.700000	0.3000000
1.900000	30.00000	10.00000	36.00000	24.00000				
1	3	0	0					
43300.00	20800.00	51.00000						
1.000000	0.0000000E+00	15.00000	1.700000	6.980000	44.70000	23.50000	2.600000	1.600000
10.30000	28.00000	34.00000	2.000000	36.00000				
2.000000	0.0000000E+00	15.00000	1.400000	6.890000	42.60001	32.39999	2.400000	1.800000
9.200000	39.00000	35.00000	1.000000	24.00000				
2.000000	35.00000	50.00000	1.200000	6.180000	26.00000	18.39999	2.300000	0.5000000
1.700000	70.00000	20.00000	0.0000000E+00	9.000000				
1	3	0	0					
43300.00	20800.00	52.00000						
1.000000	0.0000000E+00	15.00000	1.500000	7.000000	49.60001	-3.000000	3.300000	3.100000
11.40000	24.00000	41.00000	1.000000	34.00000				
2.000000	0.0000000E+00	15.00000	1.100000	7.240000	50.20000	-3.000000	3.300000	3.200000
11.40000	29.00000	34.00000	1.000000	36.00000				
2.000000	35.00000	50.00000	0.9000000	6.890000	31.50000	18.10001	2.400000	1.400000
1.900000	60.00000	21.00000	1.000000	18.00000				

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       1          3          0          0
43400.00    20800.00    53.00000
1.000000    0.0000000E+00  15.00000    6.000000    7.450000    30.39999    -3.000000    1.000000    1.000000
   5.700000    48.00000    27.00000    4.000000    21.00000
2.000000    0.0000000E+00  15.00000    0.8000000   6.830000    49.30000    34.20000    1.100000    0.2000000
   10.10000    30.00000    26.00000    11.00000    33.00000
2.000000    35.00000    50.00000    0.4000000   7.690000    26.30000    -3.000000   0.7000000   0.2000000
   1.900000    34.00000    22.00000    4.000000    40.00000
       1          3          0          0
43400.00    20800.00    54.00000
1.000000    0.0000000E+00  15.00000    2.400000    7.250000    49.80000    -3.000000   1.200000    0.3000000
   9.900000    37.00000    18.00000    2.000000    44.00000
2.000000    0.0000000E+00  15.00000    1.900000    7.120000    53.89999    -3.000000   0.6000000   0.5000000
   10.70000    25.00000    25.00000    3.000000    47.00000
2.000000    35.00000    50.00000    0.6000000   7.300000    27.39999    -3.000000   0.8000000   0.2000000
   2.300000    35.00000    23.00000    5.000000    37.00000
       1          3          0          0
43500.00    20800.00    55.00000
1.000000    0.0000000E+00  15.00000    0.5000000   7.450000    40.30000    -3.000000   1.300000    1.100000
   6.200000    40.00000    25.00000    3.000000    32.00000
2.000000    0.0000000E+00  15.00000    1.400000    7.310000    37.80000    -3.000000   1.500000    0.3000000
   5.000000    33.00000    27.00000    4.000000    31.00000
2.000000    35.00000    50.00000    0.9000000   7.520000    27.10001    -3.000000   1.000000    0.4000000
   1.200000    43.00000    3.000000    10.00000    44.00000
       1          3          0          0
43600.00    20800.00    57.00000
1.000000    0.0000000E+00  15.00000    3.700000    7.200000    63.39999    -3.000000   1.000000    0.4000000
   10.40000    50.00000    24.00000    2.000000    24.00000
2.000000    0.0000000E+00  15.00000    5.800000    7.590000    67.70000    -3.000000   1.200000    0.3000000
   13.70000    23.00000    37.00000    4.000000    36.00000
2.000000    35.00000    50.00000    0.3000000   7.400000    44.50000    -3.000000   0.5000000   0.2000000
   1.500000    64.00000    21.00000    1.000000    14.00000
       1          3          0          0
43600.00    20800.00    58.00000
1.000000    0.0000000E+00  15.00000    3.700000    7.130000    70.50000    -3.000000   1.200000    0.4000000
   14.00000    38.00000    33.00000    2.000000    27.00000
2.000000    0.0000000E+00  15.00000    2.700000    7.500000    69.89999    -3.000000   1.000000    0.3000000
   15.40000    30.00000    35.00000    3.000000    32.00000
2.000000    35.00000    50.00000    0.7000000   7.550000    46.20000    -3.000000   0.4000000   0.2000000
   1.800000    58.00000    20.00000    1.000000    22.00000
       1          3          0          0
43700.00    20800.00    59.00000
1.000000    0.0000000E+00  15.00000    5.200000    7.490000    42.00000    -3.000000   1.100000    0.5000000
   4.700000    47.00000    23.00000    5.000000    25.00000
2.000000    0.0000000E+00  15.00000    5.900000    7.400000    41.10001    -3.000000   1.000000    0.5000000
   5.700000    41.00000    22.00000    5.000000    32.00000
2.000000    35.00000    50.00000    73.60001    7.720000    15.60000    -3.000000   0.7000000   0.1000000
   0.9000000   23.00000    10.00000    45.00000    22.00000
       1          3          0          0
43800.00    20800.00    61.00000
1.000000    0.0000000E+00  15.00000    0.5000000   6.500000    29.30000    13.30000    0.7000000   1.000000
   4.300000    31.00000    28.00000    4.000000    37.00000
2.000000    0.0000000E+00  15.00000    2.200000    6.300000    27.30000    10.40000    0.5000000   0.7000000
   4.300000    24.00000    33.00000    3.000000    37.00000
2.000000    35.00000    50.00000    1.100000    7.220000    27.20000    -3.000000   0.6000000   0.4000000
   1.700000    43.00000    31.00000    2.000000    24.00000
       1          3          0          0
43800.00    20800.00    62.00000
1.000000    0.0000000E+00  15.00000    0.7000000   6.920000    28.00000    18.50001    0.7000000   0.6000000
   4.500000    35.00000    30.00000    3.000000    32.00000
2.000000    0.0000000E+00  15.00000    4.400000    7.040000    29.50000    -3.000000   0.9000000   0.5000000
   4.500000    31.00000    39.00000    3.000000    36.00000
2.000000    35.00000    50.00000    0.1000000   6.540000    27.20000    15.90000    0.9000000   0.4000000
   2.100000    37.00000    31.00000    3.000000    29.00000
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       1          3          0          0
43900.00    20800.00    63.00000
1.000000    0.0000000E+00    15.00000    0.4000000    5.890000    29.70000    14.10000    1.000000    0.3000000
   5.100000    23.00000    34.00000    4.000000    34.00000
2.000000    0.0000000E+00    15.00000    0.7000000    6.000000    28.10001    14.40000    1.200000    0.3000000
   5.700000    22.00000    34.00000    7.000000    37.00000
2.000000    35.00000    50.00000    0.4000000    7.110000    30.30000    -3.000000    2.800000    0.4000000
   0.8000000    77.00000    20.00000    0.0000000E+00    3.000000
       1          3          0          0
44000.00    20800.00    65.00000
1.000000    0.0000000E+00    15.00000    0.8000000    7.190000    46.39999    -3.000000    1.900000    0.6000000
   9.000000    41.00000    31.00000    4.000000    24.00000
2.000000    0.0000000E+00    15.00000    0.5000000    6.970000    53.89999    37.20000    2.400000    0.9000000
   10.40000    33.00000    27.00000    4.000000    36.00000
2.000000    35.00000    50.00000    0.9000000    7.420000    34.89999    -3.000000    1.100000    0.3000000
   1.400000    52.00000    18.00000    3.000000    27.00000
       1          3          0          0
43100.00    20700.00    69.00000
1.000000    0.0000000E+00    15.00000    0.8000000    6.420000    35.89999    25.50000    1.100000    0.3000000
   8.100000    16.00000    13.00000    2.000000    63.00000
2.000000    0.0000000E+00    15.00000    1.000000    6.900000    36.50000    -3.000000    2.700000    0.3000000
   6.200000    33.00000    34.00000    5.000000    28.00000
2.000000    35.00000    50.00000    0.5000000    7.150000    25.00000    -3.000000    0.5000000    0.2000000
   0.7000000    39.00000    8.000000    6.000000    47.00000
       1          3          0          0
43200.00    20700.00    71.00000
1.000000    0.0000000E+00    15.00000    2.200000    5.980000    38.70000    21.00000    0.7000000    0.8000000
   8.100000    50.00000    31.00000    1.000000    18.00000
2.000000    0.0000000E+00    15.00000    0.4000000    5.600000    35.70000    15.60000    0.7000000    0.7000000
   6.000000    41.00000    31.00000    1.000000    27.00000
2.000000    35.00000    50.00000    0.3000000    4.490000    35.60001    9.100000    0.6000000    0.4000000
   4.900000    51.00000    31.00000    0.0000000E+00    18.00000
       1          3          0          0
43300.00    20700.00    73.00000
1.000000    0.0000000E+00    15.00000    1.400000    5.020000    37.50000    17.10001    1.000000    0.6000000
   8.700000    24.00000    35.00000    3.000000    38.00000
2.000000    0.0000000E+00    15.00000    0.5000000    5.190000    32.80000    11.00000    0.9000000    0.7000000
   8.100000    22.00000    33.00000    2.000000    43.00000
2.000000    35.00000    50.00000    1.000000    4.680000    25.60001    8.200000    0.6000000    0.5000000
   2.100000    56.00000    23.00000    1.000000    20.00000
       1          3          0          0
43300.00    20700.00    74.00000
1.000000    0.0000000E+00    15.00000    0.8000000    4.710000    29.00000    8.300000    0.7000000    0.6000000
   7.700000    40.00000    31.00000    2.000000    27.00000
2.000000    0.0000000E+00    15.00000    0.7000000    4.600000    28.30000    7.400000    0.8000000    0.4000000
   5.400000    38.00000    31.00000    2.000000    29.00000
2.000000    35.00000    50.00000    1.200000    4.390000    24.20000    8.100000    0.6000000    0.3000000
   1.400000    54.00000    28.00000    1.000000    17.00000
       1          3          0          0
43400.00    20700.00    75.00000
1.000000    0.0000000E+00    15.00000    2.100000    4.180000    22.89999    5.800000    0.6000000    0.9000000
   5.600000    32.00000    31.00000    2.000000    35.00000
2.000000    0.0000000E+00    15.00000    1.400000    4.250000    24.39999    3.800000    0.7000000    0.8000000
   6.900000    30.00000    33.00000    1.000000    36.00000
2.000000    35.00000    50.00000    1.100000    4.120000    22.70000    2.400000    0.4000000    0.4000000
   1.800000    38.00000    30.00000    1.000000    31.00000
       1          3          0          0
43390.00    20690.00    76.00000
1.000000    0.0000000E+00    15.00000    1.300000    4.220000    24.60001    2.800000    0.8000000    0.4000000
   3.500000    27.00000    31.00000    2.000000    40.00000
2.000000    0.0000000E+00    15.00000    1.200000    4.200000    19.00000    5.500000    1.100000    0.5000000
   3.800000    29.00000    33.00000    2.000000    36.00000
2.000000    35.00000    50.00000    0.4000000    4.610000    31.70000    10.50000    2.000000    0.3000000
   0.9000000    43.00000    25.00000    2.000000    30.00000
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       1          3          0          0
43500.00    20700.00    77.00000
1.000000   0.0000000E+00  15.00000   0.7000000   6.700000   29.39999   24.80000   1.400000   1.700000
   5.600000    28.00000    20.00000    12.00000    40.00000
2.000000   0.0000000E+00  15.00000   1.400000   7.000000   34.00000   -3.000000   1.600000   1.100000
   5.900000    29.00000    20.00000    10.00000    41.00000
2.000000    35.00000    50.00000   0.9000000   7.100000   37.60000   -3.000000   1.200000   0.5000000
   1.000000    62.00000    20.00000    4.000000    14.00000
       1          3          0          0
43500.00    20700.00    78.00000
1.000000   0.0000000E+00  15.00000   16.60001   6.800000   25.80000   22.70000   1.400000   1.000000
   4.900000    22.00000    18.00000    13.00000    47.00000
2.000000   0.0000000E+00  15.00000   1.300000   7.040000   28.50000   -3.000000   1.400000   2.300000
   5.600000    32.00000    18.00000    14.00000    36.00000
2.000000    35.00000    50.00000   0.7000000   7.390000   13.00000   -3.000000   1.100000   1.100000
  0.9000000    60.00000    20.00000    5.000000    15.00000
       1          3          0          0
43600.00    20700.00    79.00000
1.000000   0.0000000E+00  15.00000   3.900000   7.520000   37.20000   -3.000000   1.500000   0.9000000
   5.600000    42.00000    25.00000    8.000000    25.00000
2.000000   0.0000000E+00  15.00000   4.400000   7.800000   38.00000   -3.000000   1.600000   1.100000
   7.400000    44.00000    19.00000    8.000000    29.00000
2.000000    35.00000    50.00000   2.000000   7.580000   29.20000   -3.000000   1.200000   0.4000000
   1.300000    58.00000    21.00000    3.000000    18.00000
       1          3          0          0
43700.00    20700.00    81.00000
1.000000   0.0000000E+00  15.00000   26.70000   7.100000   69.50000   -3.000000   1.200000   0.2000000
   8.700000    24.00000    25.00000    25.00000    26.00000
2.000000   0.0000000E+00  15.00000   22.20000   7.320000   69.20000   -3.000000   0.9000000   0.2000000
   13.00000    16.00000    16.00000    44.00000    24.00000
2.000000    35.00000    50.00000   13.80000   8.000000   40.89999   -3.000000   0.5000000   0.1000000
   2.000000    58.00000    31.00000    4.000000    7.000000
       1          3          0          0
43700.00    20700.00    82.00000
1.000000   0.0000000E+00  15.00000   14.20000   7.520000   68.39999   -3.000000   0.9000000   0.2000000
   15.30000    36.00000    35.00000    3.000000    26.00000
2.000000   0.0000000E+00  15.00000   18.70000   7.160000   62.20000   -3.000000   1.200000   0.3000000
   20.10001    16.00000    19.00000    40.00000    25.00000
2.000000    35.00000    50.00000   10.80000   7.640000   39.30000   -3.000000   0.6000000   0.2000000
   2.600000    62.00000    27.00000    2.000000    9.000000
       1          3          0          0
43800.00    20700.00    83.00000
1.000000   0.0000000E+00  15.00000   21.89999   7.450000   54.10001   -3.000000   0.9000000   0.3000000
   13.10000    19.00000    31.00000    6.000000    44.00000
2.000000   0.0000000E+00  15.00000   22.70000   7.420000   52.39999   -3.000000   0.9000000   0.2000000
   12.80000    21.00000    27.00000    9.000000    43.00000
2.000000    35.00000    50.00000   41.00000   7.210000   26.60001   -3.000000   0.7000000   0.2000000
   3.600000    27.00000    15.00000    22.00000    36.00000
       1          3          0          0
43900.00    20700.00    85.00000
1.000000   0.0000000E+00  15.00000   12.00000   7.150000   32.10001   -3.000000   1.500000   1.100000
   7.100000    27.00000    26.00000    14.00000    31.00000
2.000000   0.0000000E+00  15.00000   11.10000   7.050000   32.89999   -3.000000   1.500000   1.200000
   6.900000    32.00000    23.00000    16.00000    29.00000
2.000000    35.00000    50.00000   28.00000   7.500000   23.50000   -3.000000   2.600000   0.4000000
   1.100000    52.00000    32.00000    5.000000    11.00000
       1          3          0          0
44000.00    20700.00    87.00000
1.000000   0.0000000E+00  15.00000   4.200000   6.980000   24.39999   18.89999   0.8000000   0.6000000
   2.800000    29.00000    16.00000    6.000000    51.00000
2.000000   0.0000000E+00  15.00000   7.500000   6.960000   24.50000   18.10001   0.5000000   0.5000000
   11.20000    29.00000    17.00000    6.000000    48.00000
2.000000    35.00000    50.00000   0.4000000   7.300000   27.70000   -3.000000   0.6000000   0.3000000
   1.200000    45.00000    21.00000    1.000000    34.00000
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1	3	0	0					
44000.00	20700.00	88.00000						
1.000000	0.0000000E+00	15.00000	0.6000000	6.710000	22.50000	13.20000	0.4000000	0.6000000
2.300000	26.00000	21.00000	7.000000	46.00000				
2.000000	0.0000000E+00	15.00000	0.3000000	6.600000	25.20000	15.00000	0.4000000	0.7000000
2.700000	23.00000	21.00000	7.000000	49.00000				
2.000000	35.00000	50.00000	0.1000000	6.550000	27.30000	17.60001	0.7000000	0.3000000
5.100000	42.00000	25.00000	1.000000	32.00000				
1	3	0	0					
43100.00	20600.00	91.00000						
1.000000	0.0000000E+00	15.00000	1.000000	5.190000	21.60001	12.70000	0.5000000	0.2000000
3.700000	25.00000	17.00000	4.000000	51.00000				
2.000000	0.0000000E+00	15.00000	0.4000000	5.290000	21.30000	10.10000	0.5000000	0.2000000
3.700000	28.00000	16.00000	4.000000	51.00000				
2.000000	35.00000	50.00000	0.6000000	5.850000	23.60001	12.10000	0.8000000	0.4000000
0.7000000	35.00000	15.00000	3.000000	47.00000				
1	3	0	0					
43110.00	20600.00	92.00000						
1.000000	0.0000000E+00	15.00000	0.5000000	5.790000	25.89999	13.20000	0.7000000	0.2000000
3.700000	23.00000	20.00000	3.000000	48.00000				
2.000000	0.0000000E+00	15.00000	0.5000000	5.410000	26.10001	13.30000	0.7000000	0.2000000
4.300000	26.00000	24.00000	3.000000	47.00000				
2.000000	35.00000	50.00000	0.9000000	6.400000	14.60000	13.60000	0.5000000	0.2000000
1.400000	29.00000	21.00000	7.000000	43.00000				
1	3	0	0					
43200.00	20600.00	93.00000						
1.000000	0.0000000E+00	15.00000	0.9000000	7.320000	43.39999	-3.000000	1.400000	0.5000000
9.500000	27.00000	36.00000	6.000000	31.00000				
2.000000	0.0000000E+00	15.00000	0.3000000	7.350000	45.30000	-3.000000	1.300000	0.6000000
7.100000	33.00000	35.00000	3.000000	29.00000				
2.000000	35.00000	50.00000	0.9000000	7.500000	29.70000	-3.000000	1.600000	0.3000000
1.000000	65.00000	26.00000	1.000000	7.000000				
1	3	0	0					
43200.00	20600.00	94.00000						
1.000000	0.0000000E+00	15.00000	0.5000000	7.280000	42.10001	-3.000000	1.300000	0.6000000
6.700000	37.00000	35.00000	4.000000	23.00000				
2.000000	0.0000000E+00	15.00000	0.4000000	7.590000	42.70000	-3.000000	1.100000	0.7000000
8.300000	35.00000	38.00000	3.000000	24.00000				
2.000000	35.00000	50.00000	0.9000000	7.400000	26.70000	-3.000000	1.300000	0.3000000
1.200000	54.00000	29.00000	2.000000	15.00000				
1	3	0	0					
43300.00	20600.00	95.00000						
1.000000	0.0000000E+00	15.00000	0.5000000	4.680000	39.89999	18.20000	1.600000	0.5000000
9.600000	27.00000	27.00000	2.000000	44.00000				
2.000000	0.0000000E+00	15.00000	0.4000000	4.600000	37.80000	12.20000	1.200000	0.5000000
9.000000	25.00000	30.00000	10.00000	35.00000				
2.000000	35.00000	50.00000	0.3000000	5.080000	22.60001	8.600000	1.100000	0.2000000
1.400000	43.00000	9.000000	4.000000	44.00000				
1	3	0	0					
43300.00	20600.00	96.00000						
1.000000	0.0000000E+00	15.00000	0.7000000	4.780000	44.39999	19.60001	1.700000	0.5000000
9.600000	33.00000	38.00000	2.000000	27.00000				
2.000000	0.0000000E+00	15.00000	0.4000000	4.540000	40.70000	16.89999	1.700000	0.6000000
10.50000	38.00000	39.00000	2.000000	22.00000				
2.000000	35.00000	50.00000	0.8000000	5.520000	32.00000	23.10001	1.600000	0.3000000
2.700000	42.00000	25.00000	3.000000	29.00000				
1	3	0	0					
43400.00	20600.00	97.00000						
1.000000	0.0000000E+00	15.00000	1.200000	6.600000	31.80000	20.10001	0.9000000	0.1000000
6.700000	13.00000	43.00000	4.000000	35.00000				
2.000000	0.0000000E+00	15.00000	0.6000000	6.500000	31.10001	19.39999	1.000000	0.3000000
7.200000	14.00000	34.00000	4.000000	48.00000				
2.000000	35.00000	50.00000	0.5000000	4.450000	31.30000	11.30000	0.9000000	0.4000000
1.100000	65.00000	21.00000	1.000000	13.00000				

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       1          3          0          0
43400.00    20600.00    98.00000
1.000000   0.0000000E+00   15.00000   0.2000000   7.000000   30.10001   -3.000000   1.000000   0.3000000
   5.100000    32.00000    36.00000    3.000000    29.00000
2.000000   0.0000000E+00   15.00000   0.9000000   7.400000   30.10001   -3.000000   0.9000000   0.2000000
   5.700000    27.00000    36.00000    3.000000    33.00000
2.000000    35.00000    50.00000    1.300000    5.200000   28.00000    15.90000   0.8000000   0.4000000
   1.100000    67.00000    15.00000    1.000000    17.00000
       1          3          0          0
43500.00    20600.00    99.00000
1.000000   0.0000000E+00   15.00000    4.200000   7.750000   31.70000   -3.000000   1.300000   0.8000000
   5.400000    36.00000    14.00000    24.00000    26.00000
2.000000   0.0000000E+00   15.00000    4.900000   7.610000   35.50000   -3.000000   1.300000   0.7000000
   5.800000    36.00000    17.00000    21.00000    26.00000
2.000000    35.00000    50.00000    18.60001   7.830000   13.80000   -3.000000   1.300000   0.3000000
   1.200000    55.00000    18.00000    8.000000    19.00000
       1          3          0          0
43600.00    20600.00    101.0000
1.000000   0.0000000E+00   15.00000    2.100000   4.690000   30.00000   2.700000   2.000000   0.5000000
   8.300000    42.00000    39.00000    4.000000    15.00000
2.000000   0.0000000E+00   15.00000    1.200000   6.580000   34.89999   13.00000   2.200000   0.5000000
   10.50000    27.00000    43.00000    6.000000    24.00000
2.000000    35.00000    50.00000    1.100000   4.870000   34.10001   12.90000   4.400000   0.6000000
   1.500000    74.00000    18.00000    1.000000    7.000000
       1          3          0          0
43600.00    20600.00    102.0000
1.000000   0.0000000E+00   15.00000    5.200000   4.100000   25.00000   7.700000   1.200000   0.4000000
   7.000000    32.00000    34.00000    6.000000    28.00000
2.000000   0.0000000E+00   15.00000    1.000000   4.150000   34.10001   9.500000   1.700000   0.6000000
   13.30000    40.00000    35.00000    4.000000    21.00000
2.000000    35.00000    50.00000   0.9000000   4.200000   34.80000   14.40000   5.500000   0.5000000
   1.000000    79.00000    19.00000    1.000000    2.000000
       1          3          0          0
43700.00    20600.00    103.0000
1.000000   0.0000000E+00   15.00000    1.000000   6.810000   47.89999   31.10001   1.800000   0.3000000
   11.00000    18.00000    25.00000    6.000000    51.00000
2.000000   0.0000000E+00   15.00000    2.500000   7.060000   56.00000   -3.000000   1.900000   0.5000000
   13.30000    19.00000    24.00000    5.000000    52.00000
2.000000    35.00000    50.00000   0.5000000   7.590000   27.70000   -3.000000   1.800000   0.2000000
   1.200000    43.00000    25.00000    8.000000    25.00000
       1          3          0          0
43700.00    20600.00    104.0000
1.000000   0.0000000E+00   15.00000    1.300000   6.980000   56.50000   39.20000   1.400000   0.5000000
   11.80000    29.00000    34.00000    4.000000    33.00000
2.000000   0.0000000E+00   15.00000    1.900000   6.490000   55.80000   34.50000   2.100000   0.5000000
   12.90000    20.00000    29.00000    6.000000    45.00000
2.000000    35.00000    50.00000    4.900000   7.180000   35.80000   -3.000000   0.8000000   0.3000000
   2.300000    50.00000    21.00000    7.000000    22.00000
       1          3          0
43800.00    20600.00    105.0000
1.000000   0.0000000E+00   15.00000    33.50000   7.830000   31.89999   -3.000000   1.400000   1.800000
   6.600000    25.00000    18.00000    23.00000    34.00000
2.000000   0.0000000E+00   15.00000    37.70000   7.590000   33.60001   -3.000000   1.400000   1.600000
   6.200000    24.00000    16.00000    25.00000    35.00000
2.000000    35.00000    50.00000    33.89999   7.520000   7.200000   -3.000000   0.8000000   0.3000000
  0.3000000    3.000000    1.000000    85.00000    11.00000
       1          3          0          0
43800.00    20600.00    106.0000
1.000000   0.0000000E+00   15.00000    26.10001   7.300000   38.70000   -3.000000   1.200000   1.900000
   7.500000    28.00000    17.00000    21.00000    34.00000
2.000000   0.0000000E+00   15.00000    24.20000   7.600000   36.80000   -3.000000   1.400000   2.100000
   7.600000    27.00000    19.00000    17.00000    37.00000
2.000000    35.00000    50.00000    33.60001   7.400000   26.00000   -3.000000   1.400000   0.8000000
   3.900000    31.00000    18.00000    27.00000    30.00000
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      1           3           0           0
+3390.00      20600.00      107.0000
1.000000      0.0000000E+00 15.00000      28.39999      7.910000      51.89999      -3.000000     1.500000      0.3000000
   7.300000      34.00000      34.00000      5.000000      27.00000
2.000000      0.0000000E+00 15.00000      28.30000      7.730000      52.50000      -3.000000     1.400000      0.3000000
   7.400000      29.00000      36.00000      5.000000      30.00000
2.000000      35.00000      50.00000      46.50000      7.700000      27.39999      -3.000000     0.7000000     0.2000000
   2.100000      34.00000      23.00000      18.00000      25.00000
      1           3           0           0
44000.00      20600.00      109.0000
1.000000      0.0000000E+00 15.00000      9.500000      7.300000      34.10001      -3.000000     0.9000000     0.6000000
   5.000000      32.00000      17.00000      12.00000      39.00000
2.000000      0.0000000E+00 15.00000      8.800000      7.600000      23.70000      -3.000000     0.9000000     0.6000000
   4.500000      33.00000      14.00000      11.00000      43.00000
2.000000      35.00000      50.00000      6.800000      7.490000      27.30000      -3.000000     0.4000000     0.3000000
   2.100000      37.00000      16.00000      11.00000      34.00000
      1           3           0           0
44000.00      20600.00      110.0000
1.000000      0.0000000E+00 15.00000      0.5000000     6.890000      15.50000      9.900000      0.5000000     0.4000000
   5.900000      14.00000      7.000000      10.00000      68.00000
2.000000      0.0000000E+00 15.00000      11.70000      7.510000      30.10001      -3.000000     1.100000      0.7000000
   4.700000      30.00000      19.00000      13.00000      38.00000
2.000000      35.00000      50.00000      3.100000      7.560000      26.50000      -3.000000     0.8000000     0.2000000
   1.600000      39.00000      13.00000      23.00000      25.00000
      1           3           0           0
43100.00      20500.00      113.0000
1.000000      0.0000000E+00 15.00000      3.000000      6.500000      33.39999      30.20000      1.000000      0.3000000
   5.200000      23.00000      22.00000      5.000000      50.00000
2.000000      0.0000000E+00 15.00000      0.9000000     7.600000      37.50000      -3.000000     0.9000000     0.3000000
   6.900000      18.00000      27.00000      5.000000      50.00000
2.000000      35.00000      50.00000      0.2000000     7.490000      23.89999      -3.000000     0.8000000     0.2000000
   3.500000      26.00000      25.00000      5.000000      44.00000
      1           3           0           0
43200.00      20500.00      115.0000
1.000000      0.0000000E+00 15.00000      2.300000      7.760000      35.50000      -3.000000     1.100000      0.7000000
   5.200000      41.00000      22.00000      3.000000      29.00000
2.000000      0.0000000E+00 15.00000      0.7000000     7.460000      34.00000      -3.000000     0.9000000     0.6000000
   5.400000      39.00000      25.00000      9.000000      26.00000
2.000000      35.00000      50.00000      17.00000      7.890000      23.80000      -3.000000     0.8000000     0.3000000
   2.600000      59.00000      27.00000      6.000000      9.000000
      1           3           0           0
43310.00      20500.00      117.0000
1.000000      0.0000000E+00 15.00000      0.3000000     6.750000      39.89999      28.50000      1.700000      0.5000000
   5.400000      40.00000      31.00000      6.000000      23.00000
2.000000      0.0000000E+00 15.00000      0.2000000     6.710000      42.00000      27.50000      1.200000      0.5000000
   6.600000      41.00000      34.00000      6.000000      19.00000
2.000000      35.00000      50.00000      0.6000000     7.700000      21.60001      -3.000000     1.400000      0.3000000
   1.600000      66.00000      29.00000      4.000000      1.000000
      1           3           0           0
43400.00      20500.00      119.0000
1.000000      0.0000000E+00 15.00000      0.7000000     7.570000      33.89999      -3.000000     0.9000000     0.5000000
   4.100000      44.00000      25.00000      4.000000      26.00000
2.000000      0.0000000E+00 15.00000      0.1000000     7.020000      31.80000      -3.000000     0.8000000     0.6000000
   4.200000      44.00000      27.00000      4.000000      25.00000
2.000000      35.00000      50.00000      22.10001      7.250000      26.89999      -3.000000     1.400000      0.5000000
   2.300000      65.00000      27.00000      1.000000      8.000000
      1           3           0           0
43500.00      20500.00      121.0000
1.000000      0.0000000E+00 15.00000      1.900000      7.050000      56.89999      -3.000000     1.800000      0.6000000
   12.10000      39.00000      33.00000      2.000000      26.00000
2.000000      0.0000000E+00 15.00000      1.200000      7.110000      63.70000      -3.000000     2.300000      0.8000000
   12.20000      32.00000      34.00000      3.000000      31.00000
2.000000      35.00000      50.00000      0.5000000     6.960000      33.60001      21.00000      1.000000      0.7000000
   2.000000      57.00000      17.00000      3.000000      23.00000
```

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        1          3          0          0
43400.00       20600.00       98.00000
1.000000       0.0000000E+00  15.00000       0.2000000      7.000000       30.10001       -3.000000      1.000000       0.3000000
   5.100000       32.00000       36.00000       3.000000       29.00000
2.000000       0.0000000E+00  15.00000       0.9000000      7.400000       30.10001       -3.000000      0.9000000      0.2000000
   5.700000       27.00000       36.00000       3.000000       33.00000
2.000000       35.00000       50.00000       1.300000       5.200000       28.00000       15.90000       0.8000000      0.4000000
   1.100000       67.00000       15.00000       1.000000       17.00000
        1          3          0          0
43500.00       20600.00       99.00000
1.000000       0.0000000E+00  15.00000       4.200000       7.750000       31.70000       -3.000000      1.300000       0.8000000
   5.400000       36.00000       14.00000       24.00000       26.00000
2.000000       0.0000000E+00  15.00000       4.900000       7.610000       35.50000       -3.000000      1.300000       0.7000000
   5.800000       36.00000       17.00000       21.00000       26.00000
2.000000       35.00000       50.00000       18.60001       7.830000       13.80000       -3.000000      1.300000       0.3000000
   1.200000       55.00000       18.00000       8.000000       19.00000
        1          3          0          0
43600.00       20600.00       101.0000
1.000000       0.0000000E+00  15.00000       2.100000       4.690000       30.00000       8.700000       2.000000       0.5000000
   8.300000       42.00000       39.00000       4.000000       15.00000
2.000000       0.0000000E+00  15.00000       1.200000       6.580000       34.89999       13.00000       2.200000       0.5000000
   10.50000       27.00000       43.00000       6.000000       24.00000
2.000000       35.00000       50.00000       1.100000       4.870000       34.10001       12.90000       4.400000       0.6000000
   1.500000       74.00000       18.00000       1.000000       7.000000
        1          3          0          0
43600.00       20600.00       102.0000
1.000000       0.0000000E+00  15.00000       5.200000       4.100000       25.00000       7.700000       1.200000       0.4000000
   7.000000       32.00000       34.00000       6.000000       28.00000
2.000000       0.0000000E+00  15.00000       1.000000       4.150000       34.10001       9.500000       1.700000       0.6000000
   13.30000       40.00000       35.00000       4.000000       21.00000
2.000000       35.00000       50.00000       0.9000000      4.200000       34.80000       14.40000       5.500000       0.5000000
   1.000000       79.00000       19.00000       1.000000       2.000000
        1          3          0          0
43700.00       20600.00       103.0000
1.000000       0.0000000E+00  15.00000       1.000000       6.810000       47.89999       31.10001       1.800000       0.3000000
   11.00000       18.00000       25.00000       6.000000       51.00000
2.000000       0.0000000E+00  15.00000       2.500000       7.060000       56.00000       -3.000000      1.900000       0.5000000
   13.30000       19.00000       24.00000       5.000000       52.00000
2.000000       35.00000       50.00000       0.5000000      7.590000       27.70000       -3.000000      1.800000       0.2000000
   1.200000       43.00000       25.00000       8.000000       25.00000
        1          3          0          0
43700.00       20600.00       104.0000
1.000000       0.0000000E+00  15.00000       1.300000       6.980000       56.50000       39.20000       1.900000       0.5000000
   11.80000       29.00000       34.00000       4.000000       33.00000
2.000000       0.0000000E+00  15.00000       1.800000       6.490000       55.80000       34.50000       2.100000       0.5000000
   12.90000       20.00000       29.00000       6.000000       45.00000
2.000000       35.00000       50.00000       4.900000       7.190000       35.80000       -3.000000      0.5000000      0.3000000
   2.300000       50.00000       21.00000       7.000000       22.00000
        1          3          0
43800.00       20600.00       105.0000
1.000000       0.0000000E+00  15.00000       33.50000       7.830000       31.89999       -3.000000      1.400000       1.800000
   6.600000       25.00000       18.00000       23.00000       34.00000
2.000000       0.0000000E+00  15.00000       37.70000       7.590000       33.60001       -3.000000      1.400000       1.800000
   6.200000       24.00000       16.00000       25.00000       35.00000
2.000000       35.00000       50.00000       33.89999       7.520000       7.200000       -3.000000      0.8000000      0.3000000
   0.3000000      3.000000       1.000000       85.00000       11.00000
        1          3          0          0
43800.00       20600.00       106.0000
1.000000       0.0000000E+00  15.00000       26.10001       7.300000       38.70000       -3.000000      1.200000       1.900000
   7.500000       24.00000       17.00000       21.00000       34.00000
2.000000       0.0000000E+00  15.00000       24.20000       7.600000       35.80000       -3.000000      1.400000       2.100000
   7.600000       27.00000       19.00000       17.00000       37.00000
2.000000       35.00000       50.00000       33.60001       7.400000       26.00000       -3.000000      1.400000       0.8000000
   3.900000       31.00000       18.00000       27.00000       30.00000
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        1           3           0           0
43500.00    20500.00    122.0000
1.000000  0.0000000E+00  15.00000    6.600000    6.200000    50.80000    34.70000    1.700000    0.5000000
   11.60000    23.00000    27.00000    9.000000   41.00000
2.000000  0.0000000E+00  15.00000    1.500000    5.920000    51.89999    34.00000    2.300000    0.7000000
   12.10000    30.00000    30.00000    3.000000   38.00000
2.000000    35.00000    50.00000    0.7000000    7.200000    33.70000    0.9000000    0.3000000   -1.000000
   1.800000    48.00000    19.00000    6.000000   27.00000
        1           3           0           0
43600.00    20500.00    123.0000
1.000000  0.0000000E+00  15.00000    0.1000000    6.520000    46.39999    16.50000    1.300000    0.6000000
   7.700000    28.00000    29.00000    8.000000   35.00000
2.000000  0.0000000E+00  15.00000    0.3000000    7.210000    35.39999    -3.000000    1.100000    0.5000000
   7.000000    34.00000    26.00000    7.000000   33.00000
2.000000    35.00000    50.00000    0.8000000    7.000000    23.10001    -3.000000    1.100000    0.3000000
   1.300000    36.00000    21.00000    7.000000   36.00000
        1           3           0           0
43700.00    20500.00    125.0000
1.000000  0.0000000E+00  15.00000    28.70000    7.650000    29.20000    -3.000000    1.000000    1.200000
   5.600000    26.00000    14.00000    35.00000   26.00000
2.000000  0.0000000E+00  15.00000    22.60001    7.430000    29.50000    -3.000000    1.200000    1.300000
   5.700000    24.00000    15.00000    34.00000   27.00000
2.000000    35.00000    50.00000    48.60001    7.400000    17.39999    -3.000000    0.6000000    0.1000000
   1.500000    19.00000    7.000000    58.00000   16.00000
        1           3           0           0
43800.00    20500.00    127.0000
1.000000  0.0000000E+00  15.00000    13.80000    7.430000    18.60001    -3.000000    1.200000    0.8000000
   5.200000    39.00000    24.00000    11.00000   26.00000
2.000000  0.0000000E+00  15.00000    10.90000    7.200000    32.89999    -3.000000    1.100000    0.7000000
   6.900000    30.00000    28.00000    11.00000   3.000000
2.000000    35.00000    50.00000    26.20000    7.490000    27.20000    -3.000000    1.600000    0.3000000
  0.9000000    49.00000    33.00000    5.000000   13.00000
        1           3           0           0
44000.00    20500.00    131.0000
1.000000  0.0000000E+00  15.00000    6.900000    7.030000    62.80000    -3.000000    0.8000000    0.3000000
   11.00000    51.00000    27.00000    1.000000   21.00000
2.000000  0.0000000E+00  15.00000    8.900000    7.300000    71.20000    -3.000000    0.9000000    0.3000000
   12.80000    31.00000    34.00000    2.000000   33.00000
2.000000    35.00000    50.00000    17.30000    7.740000    35.39999    -3.000000    0.7000000    0.2000000
   2.500000    55.00000    29.00000    2.000000   14.00000
        1           3           0           0
43000.00    20400.00    133.0000
1.000000  0.0000000E+00  15.00000    15.40000    7.900000    38.70000    -3.000000    1.000000    0.3000000
   6.200000    31.00000    14.00000    18.00000   38.00000
2.000000  0.0000000E+00  15.00000    16.00000    7.500000    33.89999    -3.000000    0.6000000    0.2000000
   6.500000    23.00000    23.00000    16.00000   38.00000
2.000000    35.00000    50.00000    80.39999    7.810000    18.00000    -3.000000    0.3000000    0.1000000
  0.5000000    11.00000    11.00000    65.00000   13.00000
        1           3           0           0
43100.00    20400.00    135.0000
1.000000  0.0000000E+00  15.00000    1.400000    7.700000    52.00000    -3.000000    1.000000    0.3000000
   8.600000    37.00000    23.00000    7.000000   33.00000
2.000000  0.0000000E+00  15.00000    2.400000    7.600000    53.80000    -3.000000    1.200000    0.4000000
   10.70000    36.00000    19.00000    8.000000   37.00000
2.000000    35.00000    50.00000    0.8000000    7.550000    22.00000    -3.000000    0.4000000    0.2000000
   2.800000    25.00000    8.000000    11.00000   56.00000
        1           3           0           0
43200.00    20400.00    137.0000
1.000000  0.0000000E+00  15.00000    4.100000    7.710000    33.20000    -3.000000    0.9000000    0.6000000
   3.800000    41.00000    20.00000    12.00000   27.00000
2.000000  0.0000000E+00  15.00000    3.500000    7.690000    34.30000    -3.000000    1.200000    0.7000000
   4.400000    43.00000    15.00000    11.00000   31.00000
2.000000    35.00000    50.00000    1.500000    7.800000    31.70000    -3.000000    0.9000000    0.4000000
   1.200000    47.00000    18.00000    8.000000   27.00000
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       1            3            0            0
43300.00      20400.00     139.0000
1.000000     0.0000000E+00     15.00000     0.4000000     6.220000     33.50000     23.80000     1.300000     0.5000000
   4.900000      39.00000      24.00000      7.000000      30.00000
2.000000     0.0000000E+00     15.00000     0.7000000     5.750000     32.30000     20.50000     1.300000     0.6000000
   5.500000      35.00000      23.00000      7.000000      35.00000
2.000000      35.00000      50.00000     0.7000000     7.500000     27.89999     -3.000000     0.8000000     0.3000000
   1.300000      42.00000      20.00000      7.000000      31.00000
       1            3            0            0
43400.00      20400.00     141.0000
1.000000     0.0000000E+00     15.00000     0.3000000     7.400000     32.00000     -3.000000     1.100000     0.8000000
   5.000000      35.00000      18.00000      7.000000      40.00000
2.000000     0.0000000E+00     15.00000     0.5000000     7.110000     31.60001     -3.000000     1.100000     1.000000
   5.500000      33.00000      23.00000      8.000000      37.00000
2.000000      35.00000      50.00000     1.800000     7.690000     25.39999     -3.000000     1.400000     0.5000000
   1.300000      42.00000      19.00000      6.000000      33.00000
       1            3            0            0
43400.00      20400.00     142.0000
1.000000     0.0000000E+00     15.00000     0.5000000     7.000000     28.39999     -3.000000     1.000000     0.6000000
   3.800000      33.00000      22.00000      7.000000      38.00000
2.000000     0.0000000E+00     15.00000     1.100000     6.850000     31.30000     18.50000     1.200000     0.7000000
   3.900000      32.00000      20.00000      7.000000      41.00000
2.000000      35.00000      50.00000     1.000000     7.180000     26.39999     -3.000000     0.6000000     0.2000000
   1.300000      35.00000      22.00000      6.000000      36.00000
       1            3            0            0
43500.00      20400.00     143.0000
1.000000     0.0000000E+00     15.00000     0.4000000     6.700000     53.30000     36.50000     2.400000     0.6000000
   7.100000      57.00000      22.00000      2.000000      19.00000
2.000000     0.0000000E+00     15.00000     0.6000000     6.300000     55.10001     34.00000     2.600000     0.5000000
   10.30000      49.00000      28.00000      2.000000      21.00000
2.000000      35.00000      50.00000     0.2000000     7.060000     44.00000     -3.000000     2.200000     0.5000000
   1.200000      75.00000      10.00000     0.0000000E+00     14.00000
       1            3            0            0
43500.00      20400.00     144.0000
1.000000     0.0000000E+00     15.00000     1.000000     6.350000     52.70000     40.00000     2.200000     0.5000000
   8.300000      57.00000      21.00000      2.000000      20.00000
2.000000     0.0000000E+00     15.00000     0.6000000     6.900000     55.00000     37.20000     2.300000     0.5000000
   9.300000      56.00000      22.00000      2.000000      20.00000
2.000000      35.00000      50.00000     0.5000000     7.290000     26.60001     -3.000000     1.700000     0.4000000
   1.600000      64.00000      11.00000      1.000000      23.00000
       1            3            0            0
43600.00      20400.00     145.0000
1.000000     0.0000000E+00     15.00000     0.7000000     6.290000     27.60001     16.80000     0.7000000     0.2000000
   3.900000      23.00000      18.00000      7.000000      52.00000
2.000000     0.0000000E+00     15.00000     0.9000000     6.580000     30.00000     21.00000     0.9000000     0.2000000
   4.200000      23.00000      16.00000      7.000000      54.00000
2.000000      35.00000      50.00000     0.6000000     6.900000     26.10001     19.39999     0.7000000     0.2000000
  0.8000000      38.00000      8.000000      16.00000      38.00000
       1            3            0            0
43600.00      20400.00     146.0000
1.000000     0.0000000E+00     15.00000     0.2000000     6.000000     27.20000     17.50000     13.50000     0.2000000
   4.400000      23.00000      7.000000      7.000000      63.00000
2.000000     0.0000000E+00     15.00000     0.6000000     5.910000     27.80000     16.89999     0.7000000     0.2000000
   4.100000      23.00000      18.00000      7.000000      52.00000
2.000000      35.00000      50.00000     1.200000     6.800000     22.00000     16.70000     0.4000000     0.2000000
  0.7000000      26.00000      18.00000      8.000000      48.00000
       1            3            0            0
43700.00      20400.00     147.0000
1.000000     0.0000000E+00     15.00000     1.700000     6.700000     57.39999     40.50001     1.900000     0.6000000
   7.200000      58.00000      12.00000      1.000000      29.00000
2.000000     0.0000000E+00     15.00000     0.3000000     6.480000     52.89999     39.80000     1.900000     0.5000000
   5.700000      64.00000      16.00000      2.000000      18.00000
2.000000      35.00000      50.00000     0.9000000     7.400000     21.00000     -3.000000     0.7000000     0.2000000
  0.3000000      31.00000      19.00000      2.000000      48.00000
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       1          3          0          0
43710.00     20400.00     148.0000
1.000000  0.0000000E+00  15.00000     1.300000     6.980000     50.30000     35.89999     1.600000     0.5000000
   5.700000     56.00000     17.00000     2.000000     25.00000
2.000000  0.0000000E+00  15.00000     1.200000     6.680000     46.80000     33.60001     1.500000     0.5000000
   5.300000     62.00000     16.00000     2.000000     20.00000
2.000000     35.00000     50.00000     1.000000     7.190000     24.20000     -3.000000     0.6000000     0.2000000
  0.8000000     31.00000     24.00000     4.000000     41.00000
       1          3          0          0
43800.00     20400.00     149.0000
1.000000  0.0000000E+00  15.00000     11.80000     7.410000     29.00000     -3.000000     0.8000000     0.7000000
   6.000000     23.00000     13.00000     27.00000     36.00000
2.000000  0.0000000E+00  15.00000     13.80000     7.100000     26.80000     -3.000000     0.9000000     0.5000000
   5.100000     20.00000     13.00000     33.00000     34.00000
2.000000     35.00000     50.00000     49.10001     7.600000     8.700000     -3.000000     0.3000000     0.1000000
  0.6000000     13.00000     5.000000     62.00000     20.00000
       1          3          0          0
43800.00     20400.00     150.0000
1.000000  0.0000000E+00  15.00000     6.500000     7.590000     25.10001     -3.000000     1.000000     0.7000000
   4.900000     24.00000     11.00000     27.00000     37.00000
2.000000  0.0000000E+00  15.00000     7.800000     7.660000     27.39999     -3.000000     0.9000000     0.6000000
   6.100000     24.00000     14.00000     23.00000     38.00000
2.000000     35.00000     50.00000     41.39999     7.600000     12.90000     -3.000000     0.6000000     0.2000000
  0.9000000     18.00000     7.000000     51.00000     24.00000
       1          3          0          0
43900.00     20400.00     151.0000
1.000000  0.0000000E+00  15.00000     9.700000     7.590000     25.30000     -3.000000     0.7000000     0.6000000
   3.200000     28.00000     17.00000     14.00000     42.00000
2.000000  0.0000000E+00  15.00000     10.30000     7.510000     25.80000     -3.000000     0.8000000     0.5000000
   3.300000     28.00000     20.00000     13.00000     39.00000
2.000000     35.00000     50.00000     25.10001     7.400000     17.20000     -3.000000     1.000000     0.3000000
   1.100000     27.00000     2.000000     21.00000     50.00000
       1          3          0          0
43910.00     20410.00     152.0000
1.000000  0.0000000E+00  15.00000     4.100000     7.480000     27.20000     -3.000000     0.8000000     0.5000000
   3.300000     25.00000     14.00000     13.00000     48.00000
2.000000  0.0000000E+00  15.00000     3.500000     7.540000     26.70000     -3.000000     0.6000000     0.5000000
   3.300000     27.00000     16.00000     13.00000     44.00000
2.000000     35.00000     50.00000     7.500000     7.500000     22.10001     -3.000000     0.8000000     0.2000000
   1.200000     31.00000     10.00000     12.00000     47.00000
       1          3          0          0
44000.00     20400.00     153.0000
1.000000  0.0000000E+00  15.00000     48.20000     7.700000     28.30000     -3.000000     1.100000     0.2000000
   7.600000     27.00000     22.00000     21.00000     30.00000
2.000000  0.0000000E+00  15.00000     48.50000     7.760000     33.70000     -3.000000     1.000000     0.3000000
   7.100000     24.00000     23.00000     28.00000     25.00000
2.000000     35.00000     50.00000     45.20000     7.650000     29.20000     -3.000000     0.8000000     0.1000000
   3.500000     31.00000     35.00000     12.00000     22.00000
       1          3          0          0
44000.00     20400.00     154.0000
1.000000  0.0000000E+00  15.00000     23.39999     7.650000     42.50000     -3.000000     1.000000     0.2000000
   7.100000     29.00000     26.00000     15.00000     30.00000
2.000000  0.0000000E+00  15.00000     24.60001     7.550000     44.30000     -3.000000     0.9000000     0.2000000
   9.000000     28.00000     28.00000     15.00000     29.00000
2.000000     35.00000     50.00000     44.39999     7.590000     20.00000     -3.000000     1.000000     0.2000000
   1.700000     26.00000     4.000000     34.00000     36.00000
       1          3          0          0
43000.00     20310.00     155.0000
1.000000  0.0000000E+00  15.00000     11.40000     7.680000     25.39999     -3.000000     0.7000000     0.3000000
   3.400000     26.00000     14.00000     27.00000     33.00000
2.000000  0.0000000E+00  15.00000     12.60000     7.600000     25.20000     -3.000000     0.7000000     0.3000000
   3.500000     27.00000     13.00000     27.00000     33.00000
2.000000     35.00000     50.00000     10.50000     7.600000     25.59999     -3.000000     0.8000000     0.4000000
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     1          3          0          0
42990.00    20320.00   156.0000
1.000000   0.0000000E+00  15.00000    17.20000   7.520000   32.30000   -3.000000   0.6000000   0.3000000
   3.500000    26.00000   16.00000    25.00000   34.00000
2.000000   0.0000000E+00  15.00000    13.60000   7.300000   26.30000   -3.000000   1.100000   0.2000000
   3.700000    26.00000   16.00000    26.00000   32.00000
2.000000    35.00000   50.00000    21.89999   7.360000   25.20000   -3.000000   0.8000000   0.2000000
   1.700000    25.00000   15.00000    29.00000   31.00000
     1          3          0          0
43100.00    20300.00   157.0000
1.000000   0.0000000E+00  15.00000    19.20000   7.200000   60.39999   -3.000000   1.600000   0.9000000
   17.80000    20.00000   22.00000    15.00000   42.00000
2.000000   0.0000000E+00  15.00000    36.00000   7.100000   60.89999   -3.000000   1.500000   0.7000000
   20.50000    8.000000   13.00000    47.00000   32.00000
2.000000    35.00000   50.00000    17.70000   7.480000   55.20000   -3.000000   1.400000   0.7000000
   12.90000    23.00000   26.00000    12.00000   39.00000
     1          3          0          0
43100.00    20300.00   158.0000
1.000000   0.0000000E+00  15.00000    13.70000   7.030000   47.89999   -3.000000   0.3000000   0.5000000
   12.60000    20.00000   26.00000    16.00000   38.00000
2.000000   0.0000000E+00  15.00000    10.20000   7.390000   50.30000   -3.000000   1.300000   0.7000000
   12.70000    22.00000   32.00000    11.00000   35.00000
2.000000    35.00000   50.00000    19.00000   7.600000   24.00000   -3.000000   0.8000000   0.3000000
   6.700000    39.00000   21.00000    13.00000   27.00000
     1          3          0          0
43200.00    20300.00   159.0000
1.000000   0.0000000E+00  15.00000    19.00000   7.200000   53.30000   -3.000000   0.8000000   0.5000000
   14.20000    19.00000   21.00000    22.00000   38.00000
2.000000   0.0000000E+00  15.00000    17.10001   7.350000   50.39999   -3.000000   1.100000   0.4000000
   12.10000    14.00000   18.00000    19.00000   49.00000
2.000000    35.00000   50.00000    61.80000   7.300000   9.100000   -3.000000   0.3000000   0.2000000
  0.8000000    15.00000   1.000000    74.00000   10.00000
     1          3          0          0
43300.00    20300.00   161.0000
1.000000   0.0000000E+00  15.00000    7.000000   7.380000   23.70000   -3.000000   0.7000000   0.7000000
   2.800000    22.00000   14.00000    14.00000   51.00000
2.000000   0.0000000E+00  15.00000    6.400000   7.600000   22.00000   -3.000000   0.8000000   0.6000000
   2.600000    20.00000   16.00000    13.00000   51.00000
2.000000    35.00000   50.00000    6.300000   7.510000   22.89999   -3.000000   0.9000000   0.3000000
   1.000000    22.00000   16.00000    12.00000   50.00000
     1          3          0          0
43300.00    20300.00   162.0000
1.000000   0.0000000E+00  15.00000    5.300000   7.490000   24.60001   -3.000000   0.8000000   0.9000000
   3.500000    21.00000   13.00000    13.00000   52.00000
2.000000   0.0000000E+00  15.00000    6.200000   7.550000   22.80000   -3.000000   0.8000000   1.000000
   3.500000    24.00000   13.00000    13.00000   50.00000
2.000000    35.00000   50.00000    5.200000   7.420000   17.60001   -3.000000   0.8000000   0.3000000
  0.8000000    25.00000   14.00000    13.00000   48.00000
     1          3          0          0
43500.00    20300.00   165.0000
1.000000   0.0000000E+00  15.00000    4.500000   7.210000   37.39999   -3.000000   1.200000   1.100000
   7.900000    23.00000   21.00000    12.00000   44.00000
2.000000   0.0000000E+00  15.00000    3.700000   7.320000   38.20000   -3.000000   1.200000   1.000000
   8.200000    21.00000   23.00000    11.00000   46.00000
2.000000    35.00000   50.00000    17.50000   7.450000   19.89999   -3.000000   0.7000000   0.2000000
  0.9000000    25.00000   16.00000    17.00000   42.00000
     1          3          0          0
43600.00    20300.00   167.0000
1.000000   0.0000000E+00  15.00000    14.80000   7.650000   25.39999   -3.000000   0.7000000   0.3000000
   4.100000    24.00000   10.00000    36.00000   30.00000
2.000000   0.0000000E+00  15.00000    16.89999   7.320000   20.60001   -3.000000   0.8000000   0.2000000
   3.100000    23.00000   11.00000    36.00000   30.00000
2.000000    35.00000   50.00000    12.40000   7.400000   22.50000   -3.000000   0.8000000   0.1000000
   2.200000    25.00000   4.000000    38.00000   33.00000
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1	3	0	0					
43600.00	20300.00	168.0000						
1.000000	0.0000000E+00	15.00000	17.70000	7.500000	20.30000	-3.000000	0.8000000	0.7000000
3.400000	23.00000	10.00000	38.00000	29.00000				
2.000000	0.0000000E+00	15.00000	22.89999	7.000000	20.20000	-3.000000	0.9000000	0.5000000
3.800000	21.00000	9.000000	39.00000	31.00000				
2.000000	35.00000	50.00000	7.700000	7.350000	18.89999	-3.000000	0.8000000	0.2000000
1.700000	26.00000	13.00000	33.00000	28.00000				
1	3	0	0					
43700.00	20300.00	169.0000						
1.000000	0.0000000E+00	15.00000	6.000000	7.600000	36.80000	-3.000000	1.000000	0.4000000
9.200000	19.00000	15.00000	30.00000	36.00000				
2.000000	0.0000000E+00	15.00000	7.500000	7.370000	35.30000	-3.000000	0.9000000	0.4000000
9.200000	15.00000	15.00000	28.00000	42.00000				
2.000000	35.00000	50.00000	31.80000	7.700000	19.70000	-3.000000	0.4000000	0.2000000
0.7000000	14.00000	0.0000000E+00	62.00000	24.00000				
1	3	0	0					
43700.00	20300.00	170.0000						
1.000000	0.0000000E+00	15.00000	10.60000	7.250000	43.80000	-3.000000	0.8000000	0.3000000
8.200000	18.00000	16.00000	32.00000	34.00000				
2.000000	0.0000000E+00	15.00000	8.900000	7.350000	34.20000	-3.000000	0.8000000	0.3000000
8.300000	18.00000	17.00000	29.00000	36.00000				
2.000000	35.00000	50.00000	24.10001	7.600000	20.50000	-3.000000	0.5000000	0.2000000
1.600000	21.00000	9.000000	46.00000	24.00000				
1	3	0	0					
43800.00	20300.00	171.0000						
1.000000	0.0000000E+00	15.00000	6.000000	6.980000	37.39999	38.20000	0.5000000	0.3000000
8.500000	17.00000	25.00000	10.00000	48.00000				
2.000000	0.0000000E+00	15.00000	2.200000	6.900000	41.39999	36.30000	0.4000000	0.5000000
7.500000	19.00000	23.00000	9.000000	49.00000				
2.000000	35.00000	50.00000	2.300000	7.350000	30.60001	-3.000000	0.3000000	0.2000000
0.9000000	24.00000	22.00000	6.000000	48.00000				
1	3	0	0					
43780.00	20280.00	172.0000						
1.000000	0.0000000E+00	15.00000	7.900000	7.790000	52.80000	-3.000000	1.300000	0.4000000
13.40000	40.00000	12.00000	19.00000	29.00000				
2.000000	0.0000000E+00	15.00000	9.200000	7.050000	36.80000	-3.000000	1.000000	0.7000000
12.20000	41.00000	15.00000	11.00000	33.00000				
2.000000	35.00000	50.00000	0.8000000	7.440000	33.89999	-3.000000	0.9000000	0.4000000
1.700000	54.00000	11.00000	5.000000	30.00000				
1	3	0	0					
43900.00	20290.00	173.0000						
1.000000	0.0000000E+00	15.00000	36.70000	7.410000	27.70000	-3.000000	0.8000000	0.2000000
5.200000	20.00000	16.00000	31.00000	31.00000				
2.000000	0.0000000E+00	15.00000	35.39999	7.400000	19.50000	-3.000000	0.8000000	0.2000000
3.900000	20.00000	15.00000	35.00000	30.00000				
2.000000	35.00000	50.00000	82.30000	7.100000	11.10000	-3.000000	0.5000000	0.0000000E
00 0.4000000	8.000000	0.0000000E+00	76.00000	16.00000				
1	3	0	0					
43900.00	20290.00	174.0000						
1.000000	0.0000000E+00	15.00000	41.70000	7.490000	28.39999	-3.000000	0.9000000	0.4000000
6.400000	18.00000	13.00000	34.00000	35.00000				
2.000000	0.0000000E+00	15.00000	34.60001	7.600000	28.20000	-3.000000	0.8000000	0.3000000
6.100000	21.00000	18.00000	32.00000	30.00000				
2.000000	35.00000	50.00000	76.89999	7.720000	9.300000	-3.000000	0.2000000	0.1000000
0.9000000	13.00000	7.000000	63.00000	16.00000				
1	3	0	0					
44000.00	20300.00	175.0000						
1.000000	0.0000000E+00	15.00000	11.90000	7.600000	43.50000	-3.000000	1.000000	0.4000000
8.900000	24.00000	25.00000	15.00000	36.00000				
2.000000	0.0000000E+00	15.00000	9.600000	7.490000	43.20000	-3.000000	1.300000	0.3000000
6.400000	20.00000	27.00000	1.000000	52.00000				
2.000000	35.00000	50.00000	6.900000	7.500000	52.80000	-3.000000	0.8000000	0.1000000
7.300000	25.00000	22.00000	15.00000	38.00000				

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        1          3          0          0
44000.00    20300.00    176.0000
1.000000  0.0000000E+00  15.00000    40.50000    7.500000    45.30000   -3.000000   0.5000000   0.2000000
   8.600000    19.00000    30.00000    15.00000    36.00000
2.000000  0.0000000E+00  15.00000    36.89999    7.890000    44.70000   -3.000000   0.6000000   0.3000000
   9.000000    18.00000    28.00000    15.00000    39.00000
2.000000    35.00000     50.00000    55.60001    7.590000    30.30000   -3.000000   0.5000000   0.1000000
   3.800000    29.00000    23.00000    17.00000    32.00000
        1          3          0          0
43000.00    20200.00    179.0000
1.000000  0.0000000E+00  15.00000     6.700000    7.450000    29.50000   -3.000000    1.100000   0.5000000
   3.400000    30.00000    17.00000    14.00000    39.00000
2.000000  0.0000000E+00  15.00000     5.900000    7.490000    25.39999   -3.000000   0.7000000   0.4000000
   3.100000    28.00000    15.00000    13.00000    43.00000
2.000000    35.00000     50.00000    11.90000    7.400000    20.39999   -3.000000   0.7000000   0.2000000
   1.100000    26.00000    13.00000    14.00000    47.00000
        1          3          0          0
43100.00    20200.00    181.0000
1.000000  0.0000000E+00  15.00000     4.500000    7.490000    24.70000   -3.000000   0.6000000   0.3000000
   1.800000    30.00000    11.00000    34.00000    25.00000
2.000000  0.0000000E+00  15.00000     6.400000    7.400000    26.60001   -3.000000   0.6000000   0.5000000
   5.900000    28.00000    11.00000    34.00000    27.00000
2.000000    35.00000     50.00000     6.300000    7.390000    27.20000   -3.000000    1.100000   0.6000000
   4.200000    27.00000    12.00000    32.00000    29.00000
        1          3          0          0
43100.00    20200.00    182.0000
1.000000  0.0000000E+00  15.00000     4.800000    7.290000    26.80000   -3.000000   0.5000000   0.6000000
   4.400000    25.00000    11.00000    34.00000    30.00000
2.000000  0.0000000E+00  15.00000     4.500000    7.700000    25.30000   -3.000000   0.6000000   0.5000000
   3.800000    27.00000    11.00000    33.00000    29.00000
2.000000    35.00000     50.00000    10.00000    7.380000    25.30000   -3.000000   0.6000000   0.4000000
   1.800000    30.00000     9.000000   37.00000    25.00000
        1          3          0          0
43200.00    20200.00    183.0000
1.000000  0.0000000E+00  15.00000     2.500000    7.600000    49.80000   -3.000000   4.400000   0.4000000
   10.80000    20.00000    27.00000    10.00000    43.00000
2.000000  0.0000000E+00  15.00000     1.900000    7.630000    49.00000   -3.000000   1.700000   0.5000000
   9.600000    16.00000    24.00000    10.00000    50.00000
2.000000    35.00000     50.00000    20.39999    7.010000    22.89999   -3.000000   0.8000000   0.2000000
   2.600000    21.00000    15.00000    30.00000    34.00000
        1          3          0          0
43200.00    20190.00    184.0000
1.000000  0.0000000E+00  15.00000     1.700000    7.500000    32.60001   -3.000000   1.200000   0.2000000
   4.300000    25.00000    17.00000     8.000000   50.00000
2.000000  0.0000000E+00  15.00000     1.400000    7.500000    44.39999   -3.000000   1.100000   0.2000000
   5.200000    21.00000    23.00000     7.000000   49.00000
2.000000    35.00000     50.00000     1.200000    7.500000    26.00000   -3.000000   0.8000000   0.2000000
   1.400000    27.00000    19.00000     7.000000   46.00000
        1          3          0          0
43300.00    20200.00    185.0000
1.000000  0.0000000E+00  15.00000    15.30000    7.800000    53.80000   -3.000000   1.200000   0.4000000
   13.50000    26.00000    18.00000    17.00000    39.00000
2.000000  0.0000000E+00  15.00000     8.100000    7.780000    59.70000   -3.000000   1.400000   0.4000000
   13.50000    13.00000    29.00000    12.00000    41.00000
2.000000    35.00000     50.00000    49.89999    7.560000    13.20000   -3.000000   1.100000   0.1000000
  0.4000000     4.000000    1.000000   87.00000     8.000000
        1          3          0          0
43300.00    20200.00    186.0000
1.000000  0.0000000E+00  15.00000    13.70000    7.650000    55.10001   -3.000000   0.8000000   0.3000000
   12.10000    21.00000    22.00000    15.00000    42.00000
2.000000  0.0000000E+00  15.00000    11.00000    7.280000    57.80000   -3.000000   0.9000000   0.3000000
   12.90000    17.00000    23.00000    15.00000    45.00000
2.000000    35.00000     50.00000    73.70000    7.490000     8.500000   -3.000000   0.4000000   0.1000000
  0.3000000     7.000000    2.000000   79.00000    12.00000
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         1          3          0          0
43400.00        20200.00        187.0000
1.000000    0.0000000E+00   15.00000    13.50000    7.390000    28.00000   -3.000000    1.000000    0.5000000
  5.200000       15.00000    21.00000    20.00000    44.00000
2.000000    0.0000000E+00   15.00000    14.40000    7.180000    29.30000   -3.000000    1.000000    0.6000000
  5.100000       33.00000    12.00000    20.00000    35.00000
2.000000       35.00000    50.00000    29.20000    7.790000    18.00000   -3.000000    1.000000    0.3000000
  1.300000       39.00000    31.00000    10.00000    20.00000
         1          3          0          0
43500.00        20200.00        189.0000
1.000000    0.0000000E+00   15.00000    0.6000000   6.210000    31.20000    19.10001    0.6000000   0.2000000
  5.100000       22.00000    19.00000    7.000000    51.00000
2.000000    0.0000000E+00   15.00000    0.4000000   6.780000    29.89999    18.89999    0.8000000   0.3000000
  5.400000       18.00000    21.00000    8.000000    53.00000
2.000000       35.00000    50.00000    0.7000000   6.910000    24.60001    17.10001    0.5000000   0.2000000
  0.8000000      29.00000    15.00000    6.000000    50.00000
         1          3          0          0
43500.00        20200.00        190.0000
1.000000    0.0000000E+00   15.00000    0.1000000   5.990000    31.60001    20.70000    0.6000000   0.2000000
  4.500000       19.00000    14.00000    7.000000    60.00000
2.000000    0.0000000E+00   15.00000    1.000000    6.090000    32.39999    19.39999    0.7000000   0.3000000
  5.000000       22.00000    17.00000    8.000000    53.00000
2.000000       35.00000    50.00000    1.200000    7.490000    30.00000   -3.000000    0.6000000   0.2000000
  3.100000       37.00000    13.00000    5.000000    45.00000
         1          3          0          0
43600.00        20200.00        191.0000
1.000000    0.0000000E+00   15.00000    11.10000    7.410000    27.89999   -3.000000    0.6000000   0.4000000
  4.500000       26.00000    14.00000    28.00000    33.00000
2.000000    0.0000000E+00   15.00000    10.60000    7.690000    26.89999   -3.000000    1.000000    0.4000000
  4.800000       25.00000    13.00000    30.00000    31.00000
2.000000       35.00000    50.00000    9.000000    7.400000    20.50000   -3.000000    0.5000000   0.2000000
  1.700000       27.00000    11.00000    33.00000    30.00000
         1          3          0          0
43600.00        20180.00        192.0000
1.000000    0.0000000E+00   15.00000    6.500000    7.610000    28.00000   -3.000000    0.8000000   0.5000000
  4.000000       26.00000    15.00000    20.00000    38.00000
2.000000    0.0000000E+00   15.00000    8.000000    7.450000    29.60001   -3.000000    0.7000000   0.3000000
  4.200000       27.00000    17.00000    17.00000    39.00000
2.000000       35.00000    50.00000    5.500000    7.750000    23.30000   -3.000000    0.6000000   0.2000000
  1.400000       28.00000    17.00000    11.00000    44.00000
         1          3          0          0
43700.00        20200.00        193.0000
1.000000    0.0000000E+00   15.00000    12.20000    7.430000    26.70000   -3.000000    1.100000    0.7000000
  4.000000       35.00000    14.00000    21.00000    30.00000
2.000000    0.0000000E+00   15.00000    11.40000    7.700000    30.60001   -3.000000    1.400000    0.8000000
  5.100000       34.00000    14.00000    20.00000    32.00000
2.000000       35.00000    50.00000    20.70000    7.500000    18.80000   -3.000000    1.000000    0.4000000
  1.200000       39.00000    16.00000    25.00000    21.00000
         1          3          0          0
43700.00        20200.00        194.0000
1.000000    0.0000000E+00   15.00000    8.700000    7.600000    29.30000   -3.000000    1.500000    1.100000
  4.300000       36.00000    19.00000    19.00000    26.00000
2.000000    0.0000000E+00   15.00000    9.300000    7.380000    29.30000   -3.000000    1.200000    1.100000
  4.300000       35.00000    15.00000    21.00000    28.00000
2.000000       35.00000    50.00000    27.10001    7.690000    23.70000   -3.000000    2.900000    0.4000000
  0.9000000      56.00000    27.00000    9.000000    7.000000
         1          3          0          0
43800.00        20200.00        195.0000
1.000000    0.0000000E+00   15.00000    10.70000    7.350000    30.89999   -3.000000    1.000000    0.5000000
  5.300000       30.00000    13.00000    20.00000    37.00000
2.000000    0.0000000E+00   15.00000    9.600000    7.540000    33.80000   -3.000000    1.000000    0.5000000
  5.100000       30.00000    14.00000    20.00000    36.00000
2.000000       35.00000    50.00000    10.00000    7.600000    28.20000   -3.000000    1.000000    0.2000000
  2.100000       31.00000    14.00000    23.00000    32.00000
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        1           3           0           0
43900.00        20200.00        196.0000
1.000000        0.0000000E+00   15.00000        14.40000        7.290000        31.70000        -3.000000       1.000000        0.6000000
   5.000000        29.00000        14.00000        22.00000        36.00000
2.000000        0.0000000E+00   15.00000        16.39999        7.700000        32.20000        -3.000000       1.300000        0.7000000
   6.100000        23.00000        7.000000        20.00000        45.00000
2.000000        35.00000        50.00000        30.20000        7.480000        25.39999        -3.000000       0.7000000       0.2000000
   2.400000        28.00000        13.00000        30.00000        29.00000
        1           3           0           0
43900.00        20200.00        197.0000
1.000000        0.0000000E+00   15.00000        10.90000        7.500000        33.50000        -3.000000       0.6000000       0.3000000
   5.500000        30.00000        10.00000        30.00000        30.00000
2.000000        0.0000000E+00   15.00000        14.20000        7.590000        36.89999        -3.000000       0.7000000       0.2000000
   5.500000        31.00000        11.00000        30.00000        28.00000
2.000000        35.00000        50.00000        55.39999        7.700000        15.50000        -3.000000       0.3000000       0.1000000
   1.500000        12.00000        4.000000        53.00000        31.00000
        1           3           0           0
43900.00        20200.00        198.0000
1.000000        0.0000000E+00   15.00000        8.400000        7.500000        33.60001        -3.000000       0.6000000       0.2000000
   5.400000        29.00000        9.000000        32.00000        29.00000
2.000000        0.0000000E+00   15.00000        10.30000        7.390000        30.20000        -3.000000       0.7000000       0.2000000
   6.400000        26.00000        15.00000        29.00000        30.00000
2.000000        35.00000        50.00000        66.39999        7.510000        22.89999        -3.000000       0.2000000       0.1000000
  0.8000000        12.00000        2.000000        67.00000        19.00000
        1           3           0           0
44000.00        20190.00        199.0000
1.000000        0.0000000E+00   15.00000        16.70000        7.200000        35.39999        -3.000000       0.5000000       0.3000000
   7.600000        18.00000        16.00000        23.00000        43.00000
2.000000        0.0000000E+00   15.00000        15.30000        7.610000        40.20000        -3.000000       0.7000000       0.4000000
   9.500000        18.00000        19.00000        19.00000        44.00000
2.000000        35.00000        50.00000        76.39999        7.590000        12.50000        -3.000000       0.4000000       0.1000000
  0.6000000        12.00000        10.00000        59.00000        19.00000
        1           3           0           0
44000.00        20190.00        200.0000
1.000000        0.0000000E+00   15.00000        23.39999        7.490000        28.30000        -3.000000       0.5000000       0.1000000
   5.500000        22.00000        9.000000        42.00000        27.00000
2.000000        0.0000000E+00   15.00000        25.20000        7.490000        27.20000        -3.000000       0.6000000       0.1000000
   5.900000        22.00000        9.000000        40.00000        29.00000
2.000000        35.00000        50.00000        38.60001        8.000000        16.39999        -3.000000       0.3000000       0.1000000
   1.600000        16.00000        6.000000        53.00000        25.00000
        1           3           0           0
43000.00        20100.00        201.0000
1.000000        0.0000000E+00   15.00000        0.8000000       7.400000        26.10001        -3.000000       0.5000000       0.3000000
   3.400000        23.00000        17.00000        9.000000        51.00000
2.000000        0.0000000E+00   15.00000        0.5000000       7.200000        24.39999        -3.000000       0.6000000       0.3000000
   3.400000        19.00000        6.000000        8.000000        69.00000
2.000000        35.00000        50.00000        5.000000        7.480000        18.39999        -3.000000       0.5000000       0.2000000
   1.000000        24.00000        13.00000        11.00000        52.00000
        1           3           0           0
43000.00        20100.00        202.0000
1.000000        0.0000000E+00   15.00000        0.7000000       7.580000        25.00000        -3.000000       0.4000000       0.2000000
   3.400000        21.00000        18.00000        8.000000        53.00000
2.000000        0.0000000E+00   15.00000        0.9000000       7.180000        27.10001        -3.000000       0.4000000       0.2000000
   3.800000        21.00000        14.00000        10.00000        55.00000
2.000000        35.00000        50.00000        0.3000000       7.690000        22.30000        -3.000000       0.4000000       0.2000000
   1.000000        23.00000        18.00000        7.000000        52.00000
        1           3           0           0
43100.00        20100.00        203.0000
1.000000        0.0000000E+00   15.00000        1.300000        7.390000        46.89999        -3.000000       0.3000000       0.2000000
   8.900000        24.00000        29.00000        6.000000        41.00000
2.000000        0.0000000E+00   15.00000        1.200000        7.300000        49.39999        -3.000000       0.9000000       0.3000000
   9.700000        22.00000        24.00000        6.000000        48.00000
2.000000        35.00000        50.00000        5.600000        7.500000        22.39999        -3.000000       0.9000000       0.3000000
   1.400000        23.00000        17.00000        18.00000        42.00000
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       1          3          0          0
43200.00      20100.00     205.0000
1.000000   0.0000000E+00   15.00000    8.600000    7.690000    62.20000   -3.000000    1.000000    0.3000000
   10.60000      37.00000    31.00000    6.000000    26.00000
2.000000   0.0000000E+00   15.00000    6.600000    7.730000    58.39999   -3.000000    1.200000    0.4000000
   10.70000      32.00000    31.00000    6.000000    31.00000
2.000000      35.00000    50.00000    13.30000    7.600000    35.10001   -3.000000   0.6000000    0.2000000
   2.700000      38.00000    17.00000    9.000000    36.00000
       1          3          0          0
43200.00      20100.00     206.0000
1.000000   0.0000000E+00   15.00000    4.300000    7.800000    57.70000   -3.000000   0.9000000    0.3000000
   8.000000      30.00000    19.00000    4.000000    47.00000
2.000000   0.0000000E+00   15.00000    3.100000    7.800000    54.39999   -3.000000   0.8000000    0.3000000
   6.800000      37.00000    28.00000    5.000000    30.00000
2.000000      35.00000    50.00000    3.000000    7.690000    32.89999   -3.000000   0.4000000    0.1000000
   1.300000      36.00000    18.00000    12.00000    34.00000
       1          3          0          0
43300.00      20100.00     207.0000
1.000000   0.0000000E+00   15.00000    5.300000    7.820000    63.39999   -3.000000    1.000000    0.5000000
   9.700000      60.00000    16.00000    3.000000    21.00000
2.000000   0.0000000E+00   15.00000    15.20000    7.400000    71.50000   -3.000000    1.300000    0.6000000
   8.000000      52.00000    10.00000    5.000000    33.00000
2.000000      35.00000    50.00000    2.200000    7.430000    31.60001   -3.000000   0.3000000    0.2000000
   1.200000      45.00000    15.00000    11.00000    29.00000
       1          3          0          0
43300.00      20100.00     208.0000
1.000000   0.0000000E+00   15.00000    7.500000    7.400000    59.20000   -3.000000    1.700000    0.6000000
   9.500000      68.00000    16.00000    8.000000    8.000000
2.000000   0.0000000E+00   15.00000    2.200000    7.680000    41.50000    1.400000   -1.000000    0.3000000
   9.400000      47.00000    19.00000    9.000000    25.00000
2.000000      35.00000    50.00000    7.100000    7.400000    30.39999   -3.000000    3.800000    0.1000000
   1.700000      39.00000    6.000000    19.00000    36.00000
       1          3          0          0
43400.00      20100.00     209.0000
1.000000   0.0000000E+00   15.00000   0.8000000    6.990000    66.50000    48.80000    1.000000    0.2000000
   9.300000      41.00000    26.00000    5.000000    28.00000
2.000000   0.0000000E+00   15.00000   0.3000000    6.410000    56.10001    53.50000    1.100000    0.3000000
   9.300000      40.00000    30.00000    4.000000    27.00000
2.000000      35.00000    50.00000    1.500000    7.310000    28.30000   -3.000000   0.3000000    0.2000000
  0.8000000      33.00000    21.00000    8.000000    37.00000
       1          3          0          0
43400.00      20100.00     210.0000
1.000000   0.0000000E+00   15.00000   0.7000000    7.020000    61.20000   -3.000000    1.200000    0.3000000
   8.700000      49.00000    23.00000    4.000000    25.00000
2.000000   0.0000000E+00   15.00000    1.100000    6.950000    58.39999    50.80000    1.100000    0.3000000
   10.20000      32.00000    21.00000    4.000000    43.00000
2.000000      35.00000    50.00000    11.30000    7.590000    24.50000   -3.000000   0.4000000    0.2000000
  0.3000000      29.00000    13.00000    12.00000    46.00000
       1          3          0          0
43500.00      20100.00     211.0000
1.000000   0.0000000E+00   15.00000   0.7000000    6.800000    81.70000    68.89999    1.600000    0.5000000
   13.70000      43.00000    28.00000    5.000000    24.00000
2.000000   0.0000000E+00   15.00000   0.9000000    6.890000    80.39999    67.39999    1.500000    0.3000000
   14.20000      46.00000    28.00000    1.000000    25.00000
2.000000      35.00000    50.00000    1.300000    7.200000    62.89999   -3.000000   0.3000000    0.2000000
   1.100000      42.00000    19.00000    9.000000    30.00000
       1          3          0          0
43600.00      20100.00     213.0000
1.000000   0.0000000E+00   15.00000    19.50000    7.490000    29.30000   -3.000000   0.9000000    0.4000000
   5.300000      24.00000    12.00000    21.00000    43.00000
2.000000   0.0000000E+00   15.00000    19.89999    7.430000    31.60001   -3.000000   0.9000000    0.6000000
   5.000000      22.00000    14.00000    21.00000    43.00000
2.000000      35.00000    50.00000    16.50000    7.520000    20.80000   -3.000000   0.7000000    0.3000000
   1.500000      29.00000    19.00000    19.00000    33.00000
```

1	3	0	0					
43600.00	20100.00	214.0000						
1.000000	0.0000000E+00	15.00000	18.89999	7.540000	28.30000	-3.000000	0.9000000	0.4000000
4.500000	23.00000	14.00000	21.00000	42.00000				
2.000000	0.0000000E+00	15.00000	19.60001	7.580000	29.00000	-3.000000	1.200000	0.4000000
5.000000	18.00000	14.00000	21.00000	47.00000				
2.000000	35.00000	50.00000	31.20000	7.490000	15.10000	-3.000000	0.6000000	0.5000000
1.300000	23.00000	9.000000	32.00000	36.00000				
1	3	0	0					
43700.00	20110.00	215.0000						
1.000000	0.0000000E+00	15.00000	20.89999	7.800000	60.70000	-3.000000	1.200000	0.4000000
12.60000	45.00000	20.00000	2.000000	32.00000				
2.000000	0.0000000E+00	15.00000	23.39999	8.180000	61.30000	-3.000000	1.200000	0.4000000
14.50000	31.00000	38.00000	2.000000	29.00000				
2.000000	35.00000	50.00000	2.400000	7.510000	54.00000	-3.000000	1.300000	0.4000000
1.900000	73.00000	15.00000	2.000000	9.000000				
1	3	0	0					
43700.00	20110.00	216.0000						
1.000000	0.0000000E+00	15.00000	2.900000	7.500000	60.00000	-3.000000	0.9000000	0.4000000
10.80000	37.00000	16.00000	7.000000	40.00000				
2.000000	0.0000000E+00	15.00000	0.9000000	7.370000	62.39999	-3.000000	0.9000000	0.4000000
10.20000	29.00000	24.00000	8.000000	39.00000				
2.000000	35.00000	50.00000	53.60001	7.690000	18.39999	-3.000000	0.6000000	0.2000000
0.9000000	19.00000	9.000000	56.00000	16.00000				
1	3	0	0					
43800.00	20100.00	217.0000						
1.000000	0.0000000E+00	15.00000	0.6000000	7.350000	37.39999	-3.000000	1.600000	0.4000000
8.500000	41.00000	20.00000	6.000000	33.00000				
2.000000	0.0000000E+00	15.00000	1.300000	7.370000	35.80000	-3.000000	1.700000	0.6000000
4.700000	43.00000	19.00000	5.000000	33.00000				
2.000000	35.00000	50.00000	5.600000	7.450000	28.80000	-3.000000	3.500000	0.4000000
1.200000	59.00000	17.00000	5.000000	19.00000				
1	3	0	0					
43900.00	20100.00	219.0000						
1.000000	0.0000000E+00	15.00000	0.6000000	6.200000	39.50000	38.89999	2.900000	0.6000000
6.900000	47.00000	19.00000	3.000000	31.00000				
2.000000	0.0000000E+00	15.00000	0.8000000	6.390000	46.80000	27.10001	2.600000	0.5000000
5.100000	50.00000	20.00000	2.000000	28.00000				
2.000000	35.00000	50.00000	1.000000	6.900000	44.20000	34.10001	4.000000	0.5000000
1.300000	64.00000	17.00000	1.000000	18.00000				
1	3	0	0					
43910.00	20110.00	220.0000						
1.000000	0.0000000E+00	15.00000	0.4000000	7.100000	39.60001	-3.000000	2.600000	0.4000000
4.400000	43.00000	20.00000	4.000000	33.00000				
2.000000	0.0000000E+00	15.00000	0.2000000	7.000000	37.20000	25.30000	2.500000	0.6000000
4.500000	42.00000	18.00000	4.000000	36.00000				
2.000000	35.00000	50.00000	9.700000	7.600000	31.70000	-3.000000	3.200000	0.4000000
1.300000	57.00000	18.00000	2.000000	23.00000				
1	3	0	0					
44000.00	20100.00	221.0000						
1.000000	0.0000000E+00	15.00000	1.300000	7.000000	42.89999	-3.000000	2.200000	0.5000000
6.100000	42.00000	20.00000	4.000000	34.00000				
2.000000	0.0000000E+00	15.00000	0.4000000	6.840000	45.00000	33.39999	2.700000	0.8000000
11.50000	35.00000	14.00000	9.000000	42.00000				
2.000000	35.00000	50.00000	0.5000000	7.020000	33.10001	-3.000000	2.200000	0.6000000
1.900000	54.00000	17.00000	4.000000	25.00000				
1	3	0	0					
44000.00	20100.00	222.0000						
1.000000	0.0000000E+00	15.00000	1.900000	7.120000	44.10001	-3.000000	2.000000	0.5000000
5.100000	46.00000	20.00000	8.000000	26.00000				
2.000000	0.0000000E+00	15.00000	8.800000	6.800000	46.50000	29.30000	1.400000	0.4000000
8.100000	22.00000	23.00000	7.000000	48.00000				
2.000000	35.00000	50.00000	1.700000	7.300000	38.80000	-3.000000	2.200000	0.5000000
9.500000	54.00000	16.00000	3.000000	29.00000				

```
          1                3                0                0
43000.00          20000.00          223.0000
1.000000          0.0000000E+00     15.00000          20.89999          7.500000          61.50000          -3.000000         1.100000          0.4000000
   13.60000          37.00000          27.00000          4.000000          32.00000
2.000000          0.0000000E+00     15.00000          20.60001          7.280000          67.20000          -3.000000         1.200000          0.4000000
   14.50000          33.00000          34.00000          4.000000          29.00000
2.000000          35.00000          50.00000          2.500000          7.520000          56.20000          -3.000000         0.6000000         0.3000000
   1.900000          81.00000          10.00000          1.000000          8.000000
          1                3                0          0
43000.00          20000.00          224.0000
1.000000          0.0000000E+00     15.00000          6.700000          7.510000          73.89999          -3.000000         1.400000          0.5000000
   12.10000          55.00000          23.00000          2.000000          21.00000
2.000000          0.0000000E+00     15.00000          7.900000          7.820000          78.10001          -3.000000         1.500000          0.5000000
   13.70000          38.00000          31.00000          4.000000          28.00000
2.000000          35.00000          50.00000          2.100000          7.690000          62.30000          -3.000000         1.100000          0.3000000
   2.300000          85.00000          13.00000          0.0000000E+00     2.000000
          1                3                0          0
43100.00          20000.00          225.0000
1.000000          0.0000000E+00     15.00000          3.900000          7.580000          75.00000          -3.000000         1.900000          0.6000000
   13.30000          43.00000          18.00000          2.000000          37.00000
2.000000          0.0000000E+00     15.00000          4.800000          7.720000          87.80000          -3.000000         1.900000          0.5000000
   13.00000          28.00000          33.00000          3.000000          36.00000
2.000000          35.00000          50.00000          0.8000000         7.690000          57.50000          -3.000000         0.8000000         0.3000000
   1.300000          73.00000          16.00000          1.000000          10.00000
          1                3                0          0
43100.00          20000.00          226.0000
1.000000          0.0000000E+00     15.00000          4.700000          7.680000          72.80000          -3.000000         1.400000          0.5000000
   12.90000          47.00000          32.00000          2.000000          19.00000
2.000000          0.0000000E+00     15.00000          4.400000          7.710000          88.70000          -3.000000         1.900000          0.5000000
   13.40000          28.00000          31.00000          3.000000          38.00000
2.000000          35.00000          50.00000          2.300000          7.600000          55.10001          -3.000000         0.7000000         0.3000000
   1.800000          73.00000          18.00000          1.000000          7.000000
          1                3                0          0
43200.00          20000.00          227.0000
1.000000          0.0000000E+00     15.00000          1.600000          7.510000          50.10001          -3.000000         0.8000000         0.3000000
   7.700000          38.00000          18.00000          9.000000          35.00000
2.000000          0.0000000E+00     15.00000          0.9000000         7.180000          50.39999          -3.000000         0.7000000         0.3000000
   5.400000          35.00000          20.00000          11.00000          34.00000
2.000000          35.00000          50.00000          1.700000          7.120000          30.10001          -3.000000         0.3000000         0.2000000
   1.300000          36.00000          10.00000          12.00000          42.00000
          1                3                0          0
43300.00          20000.00          229.0000
1.000000          0.0000000E+00     15.00000          19.50000          7.510000          64.60001          -3.000000         0.8000000         0.4000000
   13.10000          39.00000          31.00000          4.000000          26.00000
2.000000          0.0000000E+00     15.00000          17.80000          7.700000          57.30000          -3.000000         0.8000000         0.4000000
   12.60000          26.00000          35.00000          4.000000          35.00000
2.000000          35.00000          50.00000          4.400000          7.680000          34.10001          -3.000000         0.5000000         0.2000000
   1.100000          45.00000          15.00000          16.00000          24.00000
          1                3                0          0
43400.00          20000.00          231.0000
1.000000          0.0000000E+00     15.00000          0.4000000         5.930000          74.30000          56.70000          2.200000          0.5000000
   13.40000          47.00000          15.00000          1.000000          37.00000
2.000000          0.0000000E+00     15.00000          0.5000000         6.200000          74.50000          64.70000          2.100000          0.4000000
   13.20000          46.00000          28.00000          2.000000          24.00000
2.000000          35.00000          50.00000          0.3000000         7.260000          60.20000          -3.000000         0.8000000         0.4000000
   2.100000          80.00000          13.00000          0.0000000E+00     7.000000
          1                3                0          0
43500.00          20000.00          233.0000
1.000000          0.0000000E+00     15.00000          30.60001          7.750000          67.10001          -3.000000         0.7000000         0.2000000
   16.39999          36.00000          25.00000          2.000000          37.00000
2.000000          0.0000000E+00     15.00000          27.80000          7.680000          68.10001          -3.000000         0.7000000         0.2000000
   16.20000          30.00000          36.00000          3.000000          31.00000
2.000000          35.00000          50.00000          0.5000000         7.510000          57.20000          -3.000000         0.8000000         0.4000000
   1.900000          81.00000          12.00000          1.000000          7.000000
```

```
       1          3          0          0
43600.00     20000.00    235.0000
1.000000    0.0000000E+00   15.00000    11.50000    7.780000    60.59999   -3.000000    1.000000    0.4000000
   12.90000     41.00000     24.00000     4.000000    31.00000
2.000000    0.0000000E+00   15.00000    13.00000    7.650000    61.70000   -3.000000    1.000000    0.4000000
   11.20000     35.00000     31.00000     3.000000    32.00000
2.000000     35.00000     50.00000     2.800000    7.050000    34.70000   -3.000000    0.6000000    0.2000000
  0.7000000     43.00000     15.00000     7.000000    35.00000
       1          3          0          0
43700.00     20000.00    237.0000
1.000000    0.0000000E+00   15.00000    0.3000000    7.340000    41.00000   -3.000000    1.700000    0.3000000
   8.900000     19.00000     12.00000     13.00000    55.00000
2.000000    0.0000000E+00   15.00000    6.600000    7.330000    43.10001   -3.000000    1.400000    0.8000000
   10.00000     13.00000     20.00000     14.00000    48.00000
2.000000     35.00000     50.00000     7.100000    7.650000    31.60001   -3.000000    1.000000    0.4000000
   1.300000     31.00000     5.000000     18.00000    46.00000
       1          3          0          0
43700.00     20000.00    238.0000
1.000000    0.0000000E+00   15.00000    6.300000    7.100000    41.39999   -3.000000    1.000000    0.2000000
   8.200000     23.00000     12.00000     14.00000    51.00000
2.000000    0.0000000E+00   15.00000    3.800000    7.610000    40.30000   -3.000000    1.200000    0.6000000
   8.600000     20.00000     20.00000     12.00000    48.00000
2.000000     35.00000     50.00000     7.400000    7.320000    23.10001   -3.000000    0.9000000    0.3000000
   1.500000     28.00000     13.00000     15.00000    44.00000
       1          3          0          0
43800.00     20000.00    239.0000
1.000000    0.0000000E+00   15.00000    0.2000000    6.000000    51.60001    33.30000    3.000000    0.5000000
   9.000000     45.00000     22.00000     3.000000    30.00000
2.000000    0.0000000E+00   15.00000    0.2000000    5.790000    48.10001    30.20000    2.600000    0.5000000
   7.900000     36.00000     23.00000     3.000000    38.00000
2.000000     35.00000     50.00000     1.200000    6.640000    44.39999    30.20000    2.800000    0.4000000
   3.600000     57.00000     21.00000     1.000000    21.00000
       1          3          0          0
43800.00     20000.00    240.0000
1.000000    0.0000000E+00   15.00000     2.000000    6.330000    46.20000    36.89999    3.200000    0.4000000
   6.700000     42.00000     16.00000     3.000000    39.00000
2.000000    0.0000000E+00   15.00000    0.9000000    6.510000    47.89999    32.89999    2.900000    0.5000000
   7.700000     42.00000     21.00000     4.000000    33.00000
2.000000     35.00000     50.00000    0.6000000    7.090000    35.80000   -3.000000    3.500000    0.4000000
  0.8000000     49.00000     14.00000     5.000000    32.00000
       1          3          0          0
43900.00     19990.00    241.0000
1.000000    0.0000000E+00   15.00000    1.600000    7.420000    52.10001   -3.000000    2.600000    0.3000000
   10.90000     27.00000     18.00000     11.00000    45.00000
2.000000    0.0000000E+00   15.00000    0.4000000    7.200000    54.50000   -3.000000    2.400000    0.6000000
   9.500000     22.00000     20.00000     10.00000    48.00000
2.000000     35.00000     50.00000     9.900000    7.500000    34.50000   -3.000000    3.700000    0.4000000
   1.300000     49.00000     17.00000     5.000000    29.00000
       1          3          0          0
44000.00     20000.00    243.0000
1.000000    0.0000000E+00   15.00000    0.9000000    7.100000    50.50000   -3.000000    1.800000    0.6000000
   10.00000     35.00000     21.00000     7.000000    37.00000
2.000000    0.0000000E+00   15.00000    0.8000000    7.060000    48.10001   -3.000000    1.800000    0.5000000
   8.400000     29.00000     23.00000     8.000000    40.00000
2.000000     35.00000     50.00000     3.300000    7.050000    32.39999   -3.000000    1.300000    0.4000000
   1.200000     37.00000     12.00000     11.00000    40.00000
```

DATA
Data name :D046

Features	Out of ten recorded	not applicable
EASTING	10	0
NORTHING	10	0
SITE_NO	10	0
STATUS	10	0
LL001	10	0
LAYER,_DEPTH,_UPPER *01	10	0
LAYER,_DEPTH,_LOWER *01	10	0
CARBONATE A02	10	0
pH C01	10	0
C.E.C. A01	10	0
CALCIUM,_EXCHANGE. A01	2	0
MAGNESIUM,_EXCHANGE. A01	10	0
POTASSIUM,_EXCHANGE. A01	10	0
ORGANIC_MATTER,_ABUNDANCE A02	10	0
CLAY *02	10	0
SILT A02	10	0
SAND,_COARSE A02	10	0
SAND,_FINE A02	10	0

QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ

User: AGRIC2 12:41:34
File: VAX1::DRC2:[AGRIC2]LD046.DAT;1

QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ

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4400021000     21
4400021000     22
4400020900     43
4400020800     65
4400020700     87
4400020700     88
4400020600    109
4400020600    110
4400020500    131
4400020400    153
4400020400    154
4400020300    175
4400020300    176
4400020190    199
4400020190    200
4400020100    221
4400020100    222
4400020000    243
4391020410    152
4391020110    220
4390021000     19
4390020900     41
4390020800     63
4390020700     85
4390020600    107
4390020400    151
4390020290    173
4390020290    174
4390020200    197
4390020200    198
4390020100    219
4390019990    241
4380020990     17
4380020990     18
4380020900     39
4380020900     40
4380020800     61
4380020800     62
4380020700     83
4380020600    105
4380020600    106
4380020500    127
4380020400    149
4380020400    150
4380020300    171
4380020200    195
4380020200    196
4380020100    217
4380020000    239
4380020000    240
4378020280    172
4371021000     16
4371020400    148
4370021000     15
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4370020900	37
4370020800	59
4370020700	81
4370020700	82
4370020600	103
4370020600	104
4370020500	125
4370020400	147
4370020300	169
4370020300	170
4370020200	193
4370020200	194
4370020110	215
4370020110	216
4370020000	237
4370020000	238
4360021000	13
4360021000	14
4360020900	35
4360020900	36
4360020800	57
4360020800	58
4360020700	79
4360020600	101
4360020600	102
4360020500	123
4360020400	145
4360020400	146
4360020300	167
4360020300	168
4360020200	191
4360020180	192
4360020100	213
4360020100	214
4360020000	235
4350020800	55
4350020700	78
4350020700	77
4350020600	99
4350020500	121
4350020500	122
4350020400	143
4350020400	144
4350020300	165
4350020200	189
4350020200	190
4350020100	211
4350020000	233
4340021000	10
4340021000	9
4340020900	31
4340020800	54
4340020800	53
4340020700	75
4340020600	97
4340020600	98
4340020500	119
4340020400	141
4340020400	142
4340020200	187
4340020100	209
4340020100	210
4340020000	231
4339020690	76

4331020500	117
4330021000	7
4330021000	8
4330020900	29
4330020800	51
4330020800	52
4330020700	73
4330020700	74
4330020600	95
4330020600	96
4330020400	139
4330020300	161
4330020300	162
4330020200	185
4330020200	186
4330020100	207
4330020100	208
4330020000	229
4320021000	5
4320021000	6
4320020900	27
4320020800	49
4320020800	50
4320020700	71
4320020600	93
4320020600	94
4320020500	115
4320020400	137
4320020300	159
4320020200	183
4320020190	184
4320020100	205
4320020100	206
4320020000	227
4311020790	48
4311020600	92
4310021000	3
4310021000	4
4310020900	25
4310020900	26
4310020800	47
4310020700	69
4310020600	91
4310020500	113
4310020400	135
4310020300	157
4310020300	158
4310020200	181
4310020200	182
4310020100	203
4310020000	225
4310020000	226
4301020800	45
4300021000	2
4300021000	1
4300020900	23
4300020900	24
4300020400	133
4300020310	155
4300020200	179
4300020100	201
4300020100	202
4300020000	224
4300020000	223

XXXXXXXXXX 4444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444 XXXXXXXXXX
XXXXXXXXXX 4444444444444444 VAX1 - Oxford University Computing Service - VAX/VMS Version V4.5 4444444444444444 XXXXXXXXXX
XXXXXXXXXX 4444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444 XXXXXXXXXX

```
 AAA    GGGG  RRRR    III    CCCC   222
A   A  G      R   R    I    C      2   2
A   A  G      R   R    I    C          2
A   A  G      RRRR     I    C         2
AAAAA  G GGG  R R      I    C        2
A   A  G   G  R  R     I    C       2
A   A   GGG   R   R   III    CCCC  22222
```

D-FILE:

```
RRRRRRRR    DDDDDDDD      000000    44    44      666666
RRRRRRRR    DDDDDDDD      000000    44    44      666666
RR      RR  DD      DD  00      00  44    44    66
RR      RR  DD      DD  00      00  44    44    66
RR      RR  DD      DD  00    0000  44    44    66
RR      RR  DD      DD  00    0000  44    44    66
RRRRRRRR    DD      DD  00  00  00  4444444444  66666666
RRRRRRRR    DD      DD  00  00  00  4444444444  66666666
RR  RR      DD      DD  0000    00        44    66      66
RR  RR      DD      DD  0000    00        44    66      66
RR    RR    DD      DD  00      00        44    66      66
RR    RR    DD      DD  00      00        44    66      66
RR      RR  DDDDDDDD      000000          44      666666
RR      RR  DDDDDDDD      000000          44      666666
```

1 Km GRID

(SP30 - SHEET)

```
DDDDDDDD      AAAAAA    TTTTTTTTTT    ;;;;      11
DDDDDDDD      AAAAAA    TTTTTTTTTT    ;;;;      11
DD      DD  AA      AA      TT        ;;;;    1111
DD      DD  AA      AA      TT        ;;;;    1111
DD      DD  AA      AA      TT                  11
DD      DD  AA      AA      TT                  11
DD      DD  AA      AA      TT        ;;;;      11
DD      DD  AA      AA      TT        ;;;;      11
DD      DD  AAAAAAAAAA      TT        ;;;;      11
DD      DD  AAAAAAAAAA      TT        ;;;;      11
....  DD      DD  AA      AA      TT          ;;    11
....  DD      DD  AA      AA      TT          ;;    11
....  DDDDDDDD    AA      AA      TT        ;;    111111
....  DDDDDDDD    AA      AA      TT        ;;    111111
```

File _DRC2:[AGRIC2]RD046.DAT;1 (13115,44,0), last revised on 8-MAY-1987 17:03, is a 265 block sequential file owned by UIC [BHFF,AGRIC2]. The records are variable length with implied (CR) carriage control. The longest record is 211 bytes.

Job RD046 (1339) queued to LPA0 on 14-MAY-1987 12:36 by user AGRIC2, UIC [BHFF,AGRIC2], under account BHFF at priority 6, started on printer _LPA0: on 14-MAY-1987 12:39 from queue LPA0.

XXXXXXXXXX 4444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444 XXXXXXXXXX
XXXXXXXXXX 4444444444444444444444 Digital Equipment Corporation - VAX/VMS Version V4.5 4444444444444444444444 XXXXXXXXXX
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        2
        3          14           0           0
        1           3           0           0
43000.00       21000.00    1.000000
1.000000   0.0000000E+00   15.00000    1.400000    3.010000    42.60000   -3.000000    1.000000    1.200000
   4.800000       54.00000    23.00000    1.000000   21.00000
2.000000   0.0000000E+00   15.00000    1.800000    7.400000    44.60001   -3.000000    1.100000    1.700000
   5.600000       48.00000    24.00000    2.000000   26.00000
2.000000       35.00000    50.00000    1.100000    7.610000    41.60001   -3.000000    0.9000000   0.6000000
   2.000000       69.00000    18.00000   0.0000000E+00   13.00000
        1           3           0           0
43000.00       21000.00    2.000000
1.000000   0.0000000E+00   15.00000    1.100000    7.000000    50.60001   -3.000000    1.400000    0.3000000
   9.500000       29.00000    26.00000    4.000000   41.00000
2.000000   0.0000000E+00   15.00000    4.500000    7.590000    42.10001   -3.000000    0.9000000   1.100000
   6.200000       52.00000    26.00000    3.000000   18.00000
2.000000       35.00000    50.00000    3.000000    7.690000    43.20000   -3.000000    1.000000    0.7000000
   2.900000       59.00000    18.00000    3.000000   20.00000
        1           3           0           0
43100.00       21000.00    3.000000
1.000000   0.0000000E+00   15.00000    1.300000    7.410000    37.00000   -3.000000    0.7000000   0.6000000
   5.400000       37.00000    21.00000    1.000000   40.00000
2.000000   0.0000000E+00   15.00000    1.200000    7.150000    38.30000   -3.000000    1.000000    0.8000000
   5.300000       36.00000    22.00000    1.000000   41.00000
2.000000       35.00000    50.00000    8.900000    7.490000    26.70000   -3.000000    0.8000000   0.4000000
   2.200000       40.00000    20.00000    5.000000   35.00000
        1           3           0           0
43100.00       21000.00    4.000000
1.000000   0.0000000E+00   15.00000    2.000000    7.140000    38.10001   -3.000000    0.7000000   0.7000000
   5.100000       29.00000    41.00000    2.000000   28.00000
2.000000   0.0000000E+00   15.00000    1.000000    7.280000    38.50000   -3.000000    0.7000000   0.9000000
   5.400000       33.00000    24.00000    1.000000   41.00000
2.000000       35.00000    50.00000   30.89999    7.790000    22.10001   -3.000000    0.9000000   0.3000000
   1.600000       35.00000    21.00000   11.00000   33.00000
        1           2           0           0
43200.00       21000.00    5.000000
1.000000   0.0000000E+00   15.00000    4.300000    7.540000    38.89999   -3.000000    0.9000000   0.8000000
   5.300000       40.00000    23.00000    4.000000   33.00000
2.000000   0.0000000E+00   15.00000    2.500000    7.300000    40.00000   -3.000000    1.000000    0.7000000
   5.600000       38.00000    25.00000    3.000000   33.00000
        1           3           0           0
43200.00       21000.00    6.000000
1.000000   0.0000000E+00   15.00000    3.500000    7.500000    42.39999   -3.000000    0.9000000   0.9000000
   5.300000       39.00000    21.00000    4.000000   35.00000
2.000000   0.0000000E+00   15.00000    4.800000    7.380000    38.89999   -3.000000    1.000000    0.8000000
   5.600000       39.00000    25.00000    4.000000   31.00000
2.000000       35.00000    50.00000   40.89999    7.390000    21.20000   -3.000000    0.7000000   0.3000000
  0.9000000       31.00000    21.00000   20.00000   28.00000
        1           3           0           0
43300.00       21000.00    7.000000
1.000000   0.0000000E+00   15.00000   13.80000    7.650000    38.00000   -3.000000    0.9000000   0.6000000
   6.100000       34.00000    30.00000    7.000000   29.00000
2.000000   0.0000000E+00   15.00000   11.50000    7.720000    38.00000   -3.000000    0.9000000   0.7000000
   6.600000       34.00000    28.00000    7.000000   31.00000
2.000000       35.00000    50.00000   18.50000    7.450000    23.00000   -3.000000    0.8000000   0.2000000
   1.600000       40.00000    24.00000    7.000000   29.00000
        1           3           0           0
43300.00       21000.00    8.000000
1.000000   0.0000000E+00   15.00000   16.20000    7.520000    16.70000   -3.000000    1.100000    0.9000000
   5.900000       34.00000    25.00000    8.000000   33.00000
2.000000   0.0000000E+00   15.00000   15.00000    7.510000    29.20000   -3.000000    1.000000    0.6000000
   5.800000       31.00000    28.00000    8.000000   33.00000
2.000000       35.00000    50.00000   41.80000    7.500000    15.40000   -3.000000    0.8000000   0.3000000
   1.000000       31.00000    17.00000   17.00000   35.00000
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        1             3             0             0
43400.00       21000.00      9.000000
1.000000      0.0000000E+00  15.00000      6.200000      6.450000      47.20000      26.39999      1.800000      1.700000
   11.40000       20.00000      25.00000      4.000000      51.00000
2.000000      0.0000000E+00  15.00000      1.000000      6.490000      50.89999      30.89999      2.300000      3.900000
   13.40000       28.00000      33.00000      2.000000      37.00000
2.000000       35.00000      50.00000      4.800000      6.600000      31.20000      16.50000      0.5000000     0.8000000
   3.500000       35.00000      22.00000      1.000000      42.00000
        1             3             0             0
43400.00       21000.00      10.00000
1.000000      0.0000000E+00  15.00000      2.200000      7.080000      48.70000      -3.000000     1.400000      1.100000
   12.20000       26.00000      30.00000      2.000000      43.00000
2.000000      0.0000000E+00  15.00000      1.700000      6.700000      54.30000      14.50000      1.400000      3.400000
   13.70000       18.00000      19.00000      2.000000      61.00000
2.000000       35.00000      50.00000      0.5000000     7.090000      28.50000      -3.000000     0.5000000     0.4000000
   1.900000       38.00000      16.00000      2.000000      44.00000
        1             3             0             0
43600.00       21000.00      13.00000
1.000000      0.0000000E+00  15.00000      25.50000      7.390000      61.00000      -3.000000     0.7000000     0.2000000
   14.10000       29.00000      34.00000      6.000000      31.00000
2.000000      0.0000000E+00  15.00000      16.10001      7.800000      62.80000      -3.000000     1.500000      0.4000000
   15.40000       12.00000      21.00000      12.00000      55.00000
2.000000       35.00000      50.00000      0.7000000     7.650000      75.80000      -3.000000     0.2000000     0.2000000
   14.40000       43.00000      33.00000      1.000000      24.00000
        1             3             0             0
43600.00       21000.00      14.00000
1.000000      0.0000000E+00  15.00000      27.50000      7.600000      58.89999      -3.000000     1.000000      0.3000000
   13.20000       22.00000      33.00000      7.000000      38.00000
2.000000      0.0000000E+00  15.00000      18.80000      7.290000      74.70000      -3.000000     1.500000      0.3000000
   16.80000       17.00000      30.00000      6.000000      46.00000
2.000000       35.00000      50.00000      0.9000000     7.680000      70.70000      -3.000000     0.2000000     0.2000000
   10.90000       57.00000      30.00000      1.000000      12.00000
        1             3             0             0
43700.00       21000.00      15.00000
1.000000      0.0000000E+00  15.00000      0.4000000     7.290000      35.80000      -3.000000     1.000000      0.3000000
   7.800000       25.00000      37.00000      7.000000      30.00000
2.000000      0.0000000E+00  15.00000      0.5000000     6.940000      36.60001      23.50000      0.7000000     0.2000000
   7.500000       26.00000      36.00000      7.000000      31.00000
2.000000       35.00000      50.00000      0.4000000     7.150000      28.50000      -3.000000     1.200000      0.3000000
   0.6000000      64.00000      25.00000      0.0000000E+00 12.00000
        1             3             0             0
43710.00       21000.00      16.00000
1.000000      0.0000000E+00  15.00000      0.4000000     5.700000      33.50000      17.20000      0.5000000     0.2000000
   5.800000       23.00000      28.00000      10.00000      39.00000
2.000000      0.0000000E+00  15.00000      0.5000000     5.610000      33.00000      14.50000      0.6000000     0.3000000
   5.300000       24.00000      27.00000      11.00000      38.00000
2.000000       35.00000      50.00000      0.6000000     7.080000      32.10001      -3.000000     0.8000000     0.3000000
   1.000000       40.00000      19.00000      9.000000      32.00000
        1             3             0             0
43800.00       20990.00      17.00000
1.000000      0.0000000E+00  15.00000      1.900000      7.310000      37.10001      -3.000000     1.800000      1.100000
   5.800000       44.00000      26.00000      8.000000      23.00000
2.000000      0.0000000E+00  15.00000      3.300000      7.410000      35.89999      -3.000000     1.800000      1.200000
   6.700000       41.00000      23.00000      10.00000      27.00000
2.000000       35.00000      50.00000      0.9000000     7.250000      36.80000      -3.000000     2.000000      1.200000
   4.100000       52.00000      25.00000      4.000000      20.00000
        1             3             0             0
43800.00       20990.00      18.00000
1.000000      0.0000000E+00  15.00000      1.500000      7.300000      36.00000      -3.000000     1.400000      1.000000
   5.200000       42.00000      25.00000      8.000000      24.00000
2.000000      0.0000000E+00  15.00000      2.600000      7.510000      36.60001      -3.000000     1.600000      1.200000
   6.300000       46.00000      23.00000      7.000000      24.00000
2.000000       35.00000      50.00000      0.9000000     7.320000      29.00000      -3.000000     1.900000      0.5000000
   1.000000       61.00000      16.00000      5.000000      18.00000
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        1           3           0           0
43900.00    21000.00    19.00000
1.000000    0.0000000E+00   15.00000    0.5000000   6.700000    29.50000    19.60001    1.300000    0.4000000
   5.100000    41.00000    31.00000    2.000000    26.00000
2.000000    0.0000000E+00   15.00000    0.4000000   7.200000    32.70000    -3.000000   1.100000    0.4000000
   5.300000    40.00000    27.00000    2.000000    31.00000
2.000000    35.00000    50.00000    0.8000000   4.500000    27.60001    10.20000    1.600000    0.6000000
  0.9000000    70.00000    22.00000    0.0000000E+00   8.000000
        1           3           0           0
44000.00    21000.00    21.00000
1.000000    0.0000000E+00   15.00000    0.8000000   6.190000    26.70000    14.60000    0.7000000   0.3000000
   5.900000    26.00000    32.00000    7.000000    35.00000
2.000000    0.0000000E+00   15.00000    4.700000    6.000000    23.60001    10.60000    0.6000000   0.2000000
   4.500000    32.00000    11.00000    6.000000    51.00000
2.000000    35.00000    50.00000    8.700000    4.780000    22.50000    9.000000    0.3000000   0.3000000
   1.100000    42.00000    20.00000    3.000000    35.00000
        1           3           0           0
44000.00    21000.00    22.00000
1.000000    0.0000000E+00   15.00000    0.5000000   5.900000    26.60001    25.00000    0.7000000   0.2000000
   5.700000    26.00000    26.00000    7.000000    41.00000
2.000000    0.0000000E+00   15.00000    0.3000000   6.800000    26.89999    19.00000    0.7000000   0.4000000
   5.100000    19.00000    33.00000    7.000000    41.00000
2.000000    35.00000    50.00000    3.700000    6.730000    23.00000    13.30000    0.6000000   0.2000000
   13.00000    41.00000    23.00000    4.000000    32.00000
        1           3           0           0
43000.00    20900.00    23.00000
1.000000    0.0000000E+00   15.00000    15.30000    7.600000    33.50000    -3.000000   1.100000    0.9000000
   7.300000    43.00000    27.00000    7.000000    23.00000
2.000000    0.0000000E+00   15.00000    14.00000    7.500000    50.50000    -3.000000   1.300000    0.7000000
   7.200000    47.00000    23.00000    9.000000    21.00000
2.000000    35.00000    50.00000    46.10001    7.510000    27.60001    -3.000000   1.000000    0.3000000
  0.8000000    58.00000    32.00000    6.000000    4.000000
        1           3           0           0
43000.00    20900.00    24.00000
1.000000    0.0000000E+00   15.00000    5.900000    7.530000    39.10001    -3.000000   1.200000    0.9000000
   6.900000    48.00000    22.00000    5.000000    25.00000
2.000000    0.0000000E+00   15.00000    7.000000    7.630000    38.50000    -3.000000   1.300000    0.8000000
   5.000000    46.00000    21.00000    4.000000    28.00000
2.000000    35.00000    50.00000    45.20000    7.450000    17.00000    -3.000000   0.8000000   0.3000000
  0.8000000    46.00000    28.00000    17.00000    9.000000
        1           3           0           0
43100.00    20900.00    25.00000
1.000000    0.0000000E+00   15.00000    12.30000    7.690000    40.30000    -3.000000   0.9000000   0.9000000
   6.700000    46.00000    25.00000    6.000000    24.00000
2.000000    0.0000000E+00   15.00000    13.60000    7.500000    45.30000    -3.000000   1.100000    0.9000000
   6.500000    39.00000    26.00000    5.000000    30.00000
2.000000    35.00000    50.00000    64.70000    7.690000    17.00000    -3.000000   0.7000000   0.3000000
   1.300000    27.00000    24.00000    22.00000    26.00000
        1           3           0           0
43100.00    20900.00    26.00000
1.000000    0.0000000E+00   15.00000    6.200000    7.600000    42.39999    -3.000000   1.000000    0.7000000
   5.800000    48.00000    19.00000    5.000000    28.00000
2.000000    0.0000000E+00   15.00000    5.500000    7.300000    47.39999    -3.000000   1.200000    0.9000000
   8.000000    45.00000    26.00000    3.000000    26.00000
2.000000    35.00000    50.00000    23.00000    7.620000    29.20000    -3.000000   0.9000000   0.4000000
   1.300000    56.00000    17.00000    10.00000    17.00000
        1           3           0           0
43200.00    20900.00    27.00000
1.000000    0.0000000E+00   15.00000    14.30000    7.780000    31.70000    -3.000000   0.9000000   1.000000
   4.700000    44.00000    21.00000    6.000000    28.00000
2.000000    0.0000000E+00   15.00000    13.40000    7.410000    34.80000    -3.000000   0.9000000   1.000000
   4.700000    43.00000    21.00000    9.000000    26.00000
2.000000    35.00000    50.00000    41.80000    7.350000    20.89999    -3.000000   0.7000000   0.3000000
   2.300000    43.00000    25.00000    13.00000    19.00000
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       1          3          0          0
43300.00   20900.00   29.00000
1.000000  0.0000000E+00  15.00000   17.80000   7.800000   31.80000  -3.000000   1.200000   1.100000
   6.100000   34.00000   26.00000   9.000000   31.00000
2.000000  0.0000000E+00  15.00000   15.10000   7.690000   34.20000  -3.000000   1.100000   1.300000
   7.400000   28.00000   22.00000   9.000000   41.00000
2.000000   35.00000   50.00000   28.80000   7.860000   27.20000  -3.000000   1.000000   0.3000000
   1.100000   23.00000   58.00000   12.00000   7.000000
       1          3          0          0
43400.00   20900.00   31.00000
1.000000  0.0000000E+00  15.00000   8.500000   7.980000   43.50000  -3.000000   1.100000   1.300000
   9.400000   31.00000   31.00000   6.000000   32.00000
2.000000  0.0000000E+00  15.00000   9.600000   7.650000   46.80000  -3.000000   1.300000   1.200000
   9.300000   28.00000   32.00000   5.000000   35.00000
2.000000   35.00000   50.00000   26.70000   7.590000   27.50000  -3.000000   1.100000   0.5000000
   3.400000   40.00000   25.00000   12.00000   24.00000
       1          3          0          0
43600.00   20900.00   35.00000
1.000000  0.0000000E+00  15.00000   25.39999   7.410000   49.30000  -3.000000   0.9000000   0.5000000
   10.70000   25.00000   34.00000   15.00000   26.00000
2.000000  0.0000000E+00  15.00000   20.50000   7.500000   53.30000  -3.000000   1.000000   0.4000000
   11.80000   25.00000   35.00000   8.000000   32.00000
2.000000   35.00000   50.00000   14.40000   7.610000   37.00000  -3.000000   0.7000000   0.4000000
   2.400000   52.00000   23.00000   8.000000   17.00000
       1          3          0          0
43600.00   20900.00   36.00000
1.000000  0.0000000E+00  15.00000   7.800000   7.570000   61.80000  -3.000000   1.300000   0.3000000
   12.30000   29.00000   36.00000   6.000000   29.00000
2.000000  0.0000000E+00  15.00000   8.600000   7.860000   54.20000  -3.000000   1.000000   0.3000000
   10.40000   25.00000   24.00000   6.000000   45.00000
2.000000   35.00000   50.00000   13.60000   7.520000   37.60001  -3.000000   0.5000000   0.3000000
   3.000000   47.00000   29.00000   2.000000   22.00000
       1          3          0          0
43700.00   20900.00   37.00000
1.000000  0.0000000E+00  15.00000   0.7000000   5.970000   29.30000   14.50000   1.600000   0.5000000
   6.900000   27.00000   28.00000   16.00000   29.00000
2.000000  0.0000000E+00  15.00000   1.200000   6.110000   34.10001   16.00000   1.700000   0.4000000
   6.000000   24.00000   29.00000   15.00000   31.00000
2.000000   35.00000   50.00000   0.3000000   5.190000   31.89999   15.30000   3.000000   0.4000000
   1.200000   70.00000   24.00000   3.000000   4.000000
       1          3          0          0
43800.00   20900.00   39.00000
1.000000  0.0000000E+00  15.00000   4.600000   5.190000   31.50000   16.10001   0.6000000   0.3000000
   8.200000   19.00000   7.000000   35.00000   39.00000
2.000000  0.0000000E+00  15.00000   3.900000   5.700000   28.60001   10.10000   0.9000000   0.3000000
   9.000000   13.00000   9.000000   40.00000   38.00000
2.000000   35.00000   50.00000   0.7000000   6.390000   24.80000   16.39999   0.7000000   0.2000000
   1.500000   39.00000   10.00000   28.00000   23.00000
       1          3          0          0
43800.00   20900.00   40.00000
1.000000  0.0000000E+00  15.00000   0.9000000   5.190000   36.80000   13.20000   0.8000000   0.3000000
   6.900000   26.00000   23.00000   26.00000   25.00000
2.000000  0.0000000E+00  15.00000   2.700000   5.250000   34.20000   14.10000   0.6000000   0.4000000
   10.50000   15.00000   11.00000   35.00000   39.00000
2.000000   35.00000   50.00000   3.100000   6.700000   19.00000   14.70000   0.6000000   0.2000000
   2.400000   25.00000   10.00000   33.00000   32.00000
       1          3          0          0
43900.00   20900.00   41.00000
1.000000  0.0000000E+00  15.00000   0.9000000   6.410000   30.50000   22.89999   2.400000   0.8000000
   7.900000   41.00000   31.00000   7.000000   21.00000
2.000000  0.0000000E+00  15.00000   1.600000   6.410000   49.60001   22.20000   4.000000   0.3000000
   9.000000   40.00000   31.00000   8.000000   21.00000
2.000000   35.00000   50.00000   0.4000000   7.310000   34.60001   -3.000000   3.400000   0.5000000
   1.100000   75.00000   20.00000   2.000000   2.000000
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         1          3          0          0
44000.00       20900.00       43.00000
1.000000       0.0000000E+00  15.00000       0.4000000      6.710000       25.89999       14.40000       1.200000       0.6000000
   3.700000       28.00000       19.00000       5.000000       48.00000
2.000000       0.0000000E+00  15.00000       0.5000000      7.020000       25.10001       -3.000000      1.200000       0.4000000
   3.400000       30.00000       26.00000       4.000000       41.00000
2.000000       35.00000       50.00000       0.6000000      6.900000       22.50000       14.60000       1.000000       0.3000000
   0.7000000      33.00000       19.00000       6.000000       42.00000
         1          3          0          0
43010.00       20900.00       45.00000
1.000000       0.0000000E+00  15.00000       28.89999       7.580000       50.39999       -3.000000      1.100000       0.5000000
   9.000000       26.00000       33.00000       10.00000       31.00000
2.000000       0.0000000E+00  15.00000       19.70000       7.200000       45.00000       -3.000000      0.9000000      0.1000000
   9.500000       24.00000       25.00000       11.00000       40.00000
2.000000       35.00000       50.00000       36.30000       7.510000       29.50000       -3.000000      0.7000000      0.4000000
   3.800000       33.00000       20.00000       19.00000       29.00000
         1          3          0          0
43100.00       20800.00       47.00000
1.000000       0.0000000E+00  15.00000       3.000000       7.100000       49.20000       -3.000000      1.300000       2.200000
   9.900000       25.00000       34.00000       4.000000       37.00000
2.000000       0.0000000E+00  15.00000       2.600000       7.150000       48.20000       -3.000000      0.8000000      1.300000
   9.500000       23.00000       21.00000       4.000000       42.00000
2.000000       35.00000       50.00000       11.30000       7.350000       39.20000       -3.000000      0.8000000      0.8000000
   4.800000       30.00000       33.00000       7.000000       30.00000
         1          3          0          0
43110.00       20790.00       48.00000
1.000000       0.0000000E+00  15.00000       7.600000       7.300000       41.30000       -3.000000      1.000000       0.9000000
   10.90000       26.00000       32.00000       6.000000       36.00000
2.000000       0.0000000E+00  15.00000       6.600000       7.500000       53.80000       -3.000000      0.9000000      1.300000
   9.500000       25.00000       32.00000       7.000000       36.00000
2.000000       35.00000       50.00000       25.60001       7.690000       32.00000       -3.000000      0.7000000      0.5000000
   4.500000       33.00000       26.00000       12.00000       28.00000
         1          3          0          0
43200.00       20800.00       49.00000
1.000000       0.0000000E+00  15.00000       24.00000       7.300000       37.20000       -3.000000      0.9000000      0.5000000
   6.300000       35.00000       21.00000       16.00000       28.00000
2.000000       0.0000000E+00  15.00000       15.10000       7.670000       40.10001       -3.000000      0.7000000      0.3000000
   5.600000       36.00000       15.00000       10.00000       39.00000
2.000000       35.00000       50.00000       34.39999       7.750000       27.80000       -3.000000      0.5000000      0.2000000
   3.400000       31.00000       16.00000       31.00000       22.00000
         1          3          0          0
43200.00       20800.00       50.00000
1.000000       0.0000000E+00  15.00000       9.400000       7.290000       31.00000       -3.000000      1.100000       0.7000000
   10.10000       39.00000       23.00000       9.000000       29.00000
2.000000       0.0000000E+00  15.00000       14.00000       7.520000       44.20000       -3.000000      1.300000       0.3000000
   10.90000       31.00000       29.00000       11.00000       29.00000
2.000000       35.00000       50.00000       41.89999       7.200000       20.89999       -3.000000      1.700000       0.3000000
   1.900000       30.00000       10.00000       36.00000       24.00000
         1          3          0          0
43300.00       20800.00       51.00000
1.000000       0.0000000E+00  15.00000       1.700000       6.980000       44.70000       23.50000       2.600000       1.600000
   10.30000       28.00000       34.00000       2.000000       36.00000
2.000000       0.0000000E+00  15.00000       1.400000       6.890000       42.60001       32.39999       2.400000       1.800000
   9.200000       39.00000       35.00000       1.000000       24.00000
2.000000       35.00000       50.00000       1.200000       6.180000       26.00000       18.39999       2.300000       0.5000000
   1.700000       70.00000       20.00000       0.0000000E+00  9.000000
         1          3          0          0
43300.00       20800.00       52.00000
1.000000       0.0000000E+00  15.00000       1.500000       7.000000       49.60001       -3.000000      3.300000       3.100000
   11.40000       24.00000       41.00000       1.000000       34.00000
2.000000       0.0000000E+00  15.00000       1.100000       7.240000       50.20000       -3.000000      3.300000       3.200000
   11.40000       29.00000       34.00000       1.000000       36.00000
2.000000       35.00000       50.00000       0.9000000      6.890000       31.50000       18.10001       2.400000       1.400000
   1.900000       60.00000       21.00000       1.000000       18.00000
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         1          3          0          0
  43400.00   20300.00   53.00000
  1.000000  0.0000000E+00  15.00000   6.000000   7.450000   30.39999  -3.000000   1.000000   1.000000
     5.700000   48.00000   27.00000   4.000000   21.00000
  2.000000  0.0000000E+00  15.00000  0.8000000   6.830000   49.30000   34.20000   1.100000   0.2000000
     10.10000   30.00000   26.00000   11.00000   33.00000
  2.000000   35.00000   50.00000  0.4000000   7.690000   26.30000  -3.000000   0.7000000   0.2000000
     1.900000   34.00000   22.00000   4.000000   40.00000
         1          3          0          0
  43400.00   20800.00   54.00000
  1.000000  0.0000000E+00  15.00000   2.400000   7.250000   49.80000  -3.000000   1.200000   0.3000000
     9.900000   37.00000   18.00000   2.000000   44.00000
  2.000000  0.0000000E+00  15.00000   1.900000   7.120000   53.89999  -3.000000   0.6000000   0.5000000
     10.70000   25.00000   25.00000   3.000000   47.00000
  2.000000   35.00000   50.00000  0.6000000   7.300000   27.39999  -3.000000   0.8000000   0.2000000
     2.300000   35.00000   23.00000   5.000000   37.00000
         1          3          0          0
  43500.00   20800.00   55.00000
  1.000000  0.0000000E+00  15.00000  0.5000000   7.450000   40.30000  -3.000000   1.300000   1.100000
     6.200000   40.00000   25.00000   3.000000   32.00000
  2.000000  0.0000000E+00  15.00000   1.400000   7.310000   37.80000  -3.000000   1.500000   0.3000000
     5.000000   33.00000   27.00000   4.000000   31.00000
  2.000000   35.00000   50.00000  0.9000000   7.520000   27.10001  -3.000000   1.000000   0.4000000
     1.200000   43.00000   3.000000   10.00000   44.00000
         1          3          0          0
  43600.00   20800.00   57.00000
  1.000000  0.0000000E+00  15.00000   3.700000   7.200000   63.39999  -3.000000   1.000000   0.4000000
     10.40000   50.00000   24.00000   2.000000   24.00000
  2.000000  0.0000000E+00  15.00000   5.800000   7.590000   67.70000  -3.000000   1.200000   0.3000000
     13.70000   23.00000   37.00000   4.000000   36.00000
  2.000000   35.00000   50.00000  0.3000000   7.400000   44.50000  -3.000000   0.5000000   0.2000000
     1.500000   64.00000   21.00000   1.000000   14.00000
         1          3          0          0
  43600.00   20800.00   58.00000
  1.000000  0.0000000E+00  15.00000   3.700000   7.180000   70.50000  -3.000000   1.200000   0.4000000
     14.00000   38.00000   33.00000   2.000000   27.00000
  2.000000  0.0000000E+00  15.00000   2.700000   7.500000   69.89999  -3.000000   1.000000   0.3000000
     15.40000   30.00000   35.00000   3.000000   32.00000
  2.000000   35.00000   50.00000  0.7000000   7.550000   46.20000  -3.000000   0.4000000   0.2000000
     1.800000   58.00000   20.00000   1.000000   22.00000
         1          3          0          0
  43700.00   20800.00   59.00000
  1.000000  0.0000000E+00  15.00000   5.200000   7.490000   42.00000  -3.000000   1.100000   0.5000000
     4.700000   47.00000   23.00000   5.000000   25.00000
  2.000000  0.0000000E+00  15.00000   5.900000   7.400000   41.10001  -3.000000   1.000000   0.5000000
     5.700000   41.00000   22.00000   5.000000   32.00000
  2.000000   35.00000   50.00000   73.60001   7.720000   15.60000  -3.000000   0.7000000   0.1000000
    0.9000000   23.00000   10.00000   45.00000   22.00000
         1          3          0          0
  43800.00   20800.00   61.00000
  1.000000  0.0000000E+00  15.00000  0.5000000   6.500000   29.30000   13.30000   0.7000000   1.000000
     4.300000   31.00000   28.00000   4.000000   37.00000
  2.000000  0.0000000E+00  15.00000   2.200000   6.300000   27.30000   10.40000   0.5000000   0.7000000
     4.300000   24.00000   33.00000   3.000000   37.00000
  2.000000   35.00000   50.00000   1.100000   7.220000   27.20000  -3.000000   0.6000000   0.4000000
     1.700000   43.00000   31.00000   2.000000   24.00000
         1          3          0          0
  43800.00   20800.00   62.00000
  1.000000  0.0000000E+00  15.00000  0.7000000   6.920000   28.00000   18.60001   0.7000000   0.6000000
     4.500000   35.00000   30.00000   3.000000   32.00000
  2.000000  0.0000000E+00  15.00000   4.400000   7.040000   29.50000  -3.000000   0.9000000   0.5000000
     4.500000   31.00000   30.00000   3.000000   36.00000
  2.000000   35.00000   50.00000  0.1000000   6.540000   27.20000   15.90000   0.3000000   0.4000000
     2.100000   37.00000   31.00000   3.000000   29.00000
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        1           3           0
43900.00    20800.00    83.00000
1.000000    0.0000000E+00   15.00000    0.4000000   5.880000    29.70000    14.10000    1.000000    0.3000000
   5.100000    28.00000    34.00000    4.000000    34.00000
2.000000    0.0000000E+00   15.00000    0.7000000   6.000000    28.10001    14.40000    1.200000    0.3000000
   5.700000    22.00000    34.00000    7.000000    37.00000
2.000000    35.00000    50.00000    0.4000000   7.110000    30.30000    -3.000000   2.800000    0.4000000
  0.8000000    77.00000    20.00000    0.0000000E+00   3.000000
        1           3           0           0
44000.00    20800.00    65.00000
1.000000    0.0000000E+00   15.00000    0.8000000   7.190000    46.39999    -3.000000   1.900000    0.6000000
   9.000000    41.00000    31.00000    4.000000    24.00000
2.000000    0.0000000E+00   15.00000    0.5000000   6.970000    53.89999    37.20000    2.400000    0.9000000
   10.40000    33.00000    27.00000    4.000000    36.00000
2.000000    35.00000    50.00000    0.9000000   7.420000    34.89999    -3.000000   1.100000    0.3000000
   1.400000    52.00000    16.00000    3.000000    27.00000
        1           3           0           0
43100.00    20700.00    69.00000
1.000000    0.0000000E+00   15.00000    0.8000000   6.420000    35.89999    25.50000    1.100000    0.3000000
   8.100000    16.00000    19.00000    2.000000    63.00000
2.000000    0.0000000E+00   15.00000    1.000000    6.900000    36.50000    -3.000000   2.700000    0.3000000
   6.200000    33.00000    34.00000    5.000000    28.00000
2.000000    35.00000    50.00000    0.5000000   7.150000    25.00000    -3.000000   0.5000000   0.2000000
  0.7000000    39.00000    8.000000    6.000000    47.00000
        1           3           0           0
43200.00    20700.00    71.00000
1.000000    0.0000000E+00   15.00000    2.200000    5.980000    38.70000    21.00000    0.7000000   0.8000000
   8.100000    50.00000    31.00000    1.000000    18.00000
2.000000    0.0000000E+00   15.00000    0.4000000   5.600000    35.70000    15.60000    0.7000000   0.7000000
   6.000000    41.00000    31.00000    1.000000    27.00000
2.000000    35.00000    50.00000    0.3000000   4.490000    35.60001    9.100000    0.6000000   0.4000000
   4.900000    51.00000    31.00000    0.0000000E+00   18.00000
        1           3           0           0
43300.00    20700.00    73.00000
1.000000    0.0000000E+00   15.00000    1.400000    5.020000    37.50000    17.10001    1.000000    0.6000000
   8.700000    24.00000    35.00000    3.000000    38.00000
2.000000    0.0000000E+00   15.00000    0.5000000   5.190000    32.80000    11.00000    0.9000000   0.7000000
   8.100000    22.00000    33.00000    2.000000    43.00000
2.000000    35.00000    50.00000    1.000000    4.680000    25.60001    8.200000    0.6000000   0.5000000
   2.100000    56.00000    23.00000    1.000000    20.00000
        1           3           0           0
43300.00    20700.00    74.00000
1.000000    0.0000000E+00   15.00000    0.8000000   4.710000    29.00000    8.300000    0.7000000   0.6000000
   7.700000    40.00000    31.00000    2.000000    27.00000
2.000000    0.0000000E+00   15.00000    0.7000000   4.600000    28.30000    7.400000    0.8000000   0.4000000
   5.400000    38.00000    31.00000    2.000000    29.00000
2.000000    35.00000    50.00000    1.200000    4.390000    24.20000    8.100000    0.6000000   0.3000000
   1.400000    54.00000    28.00000    1.000000    17.00000
        1           3           0           0
43400.00    20700.00    75.00000
1.000000    0.0000000E+00   15.00000    2.100000    4.180000    22.89999    5.800000    0.6000000   0.9000000
   5.600000    32.00000    31.00000    2.000000    35.00000
2.000000    0.0000000E+00   15.00000    1.400000    4.250000    24.39999    3.800000    0.7000000   0.8000000
   6.900000    30.00000    33.00000    1.000000    36.00000
2.000000    35.00000    50.00000    1.100000    4.120000    22.70000    2.400000    0.4000000   0.4000000
   1.800000    38.00000    30.00000    1.000000    31.00000
        1           3           0           0
43390.00    20690.00    76.00000
1.000000    0.0000000E+00   15.00000    1.300000    4.220000    24.60001    2.800000    0.8000000   0.4000000
   3.500000    27.00000    31.00000    2.000000    40.00000
2.000000    0.0000000E+00   15.00000    1.200000    4.200000    19.00000    5.500000    1.100000    0.5000000
   3.800000    29.00000    33.00000    2.000000    36.00000
2.000000    35.00000    50.00000    0.4000000   4.610000    31.70000    10.50000    2.000000    0.3000000
  0.9000000    43.00000    25.00000    2.000000    30.00000
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         1            3            0            0
43500.00      20700.00      77.00000
1.000000  0.0000000E+00      15.00000  0.7000000      6.700000      29.39999      24.30000      1.400000      1.700000
    5.600000      28.00000      20.00000     12.00000      40.00000
2.000000  0.0000000E+00      15.00000    1.400000      7.000000      34.00000     -3.000000      1.600000      1.100000
    5.900000      29.00000      20.00000     10.00000      41.00000
2.000000      35.00000      50.00000  0.9000000      7.100000      37.30000     -3.000000      1.200000     0.5000000
    1.000000      62.00000      20.00000      4.000000      14.00000
         1            3            0            0
43500.00      20700.00      78.00000
1.000000  0.0000000E+00      15.00000    16.60001      6.800000      25.80000      22.70000      1.400000      1.000000
    4.300000      22.00000      18.00000     13.00000      47.00000
2.000000  0.0000000E+00      15.00000    1.300000      7.040000      28.50000     -3.000000      1.400000      2.300000
    5.600000      32.00000      18.00000     14.00000      36.00000
2.000000      35.00000      50.00000  0.7000000      7.390000      13.00000     -3.000000      1.100000      1.100000
   0.9000000      60.00000      20.00000      5.000000      15.00000
         1            3            0            0
43600.00      20700.00      79.00000
1.000000  0.0000000E+00      15.00000    3.900000      7.520000      37.20000     -3.000000      1.500000     0.9000000
    5.600000      42.00000      25.00000     8.000000      25.00000
2.000000  0.0000000E+00      15.00000    4.400000      7.800000      38.00000     -3.000000      1.600000      1.100000
    7.400000      44.00000      19.00000     8.000000      29.00000
2.000000      35.00000      50.00000    2.000000      7.580000      29.20000     -3.000000      1.200000     0.4000000
    1.300000      58.00000      21.00000     3.000000      18.00000
         1            3            0            0
43700.00      20700.00      81.00000
1.000000  0.0000000E+00      15.00000    26.70000      7.100000      69.50000     -3.000000      1.200000     0.2000000
    8.700000      24.00000      25.00000     25.00000      26.00000
2.000000  0.0000000E+00      15.00000    22.20000      7.320000      69.20000     -3.000000     0.9000000     0.2000000
    13.00000      16.00000      16.00000     44.00000      24.00000
2.000000      35.00000      50.00000    13.80000      8.000000      40.89999     -3.000000     0.5000000     0.1000000
    2.000000      58.00000      31.00000     4.000000      7.000000
         1            3            0            0
43700.00      20700.00      82.00000
1.000000  0.0000000E+00      15.00000    14.20000      7.520000      68.39999     -3.000000     0.9000000     0.2000000
    15.30000      36.00000      35.00000     3.000000      26.00000
2.000000  0.0000000E+00      15.00000    18.70000      7.160000      62.20000     -3.000000      1.200000     0.3000000
    20.10001      16.00000      19.00000     40.00000      25.00000
2.000000      35.00000      50.00000    10.80000      7.640000      39.30000     -3.000000     0.6000000     0.2000000
    2.600000      62.00000      27.00000     2.000000      9.000000
         1            3            0            0
43800.00      20700.00      83.00000
1.000000  0.0000000E+00      15.00000    21.89999      7.450000      54.10001     -3.000000     0.9000000     0.3000000
    13.10000      19.00000      31.00000     6.000000      44.00000
2.000000  0.0000000E+00      15.00000    22.70000      7.420000      52.39999     -3.000000     0.9000000     0.2000000
    12.80000      21.00000      27.00000     9.000000      43.00000
2.000000      35.00000      50.00000    41.00000      7.210000      26.60001     -3.000000     0.7000000     0.2000000
    3.600000      27.00000      15.00000     22.00000      36.00000
         1            3            0            0
43900.00      20700.00      85.00000
1.000000  0.0000000E+00      15.00000    12.00000      7.150000      32.10001     -3.000000      1.500000      1.100000
    7.100000      27.00000      28.00000     14.00000      31.00000
2.000000  0.0000000E+00      15.00000    11.10000      7.050000      32.89999     -3.000000      1.500000      1.200000
    6.900000      32.00000      23.00000     16.00000      29.00000
2.000000      35.00000      50.00000    28.00000      7.500000      23.50000     -3.000000      2.600000     0.4000000
    1.100000      52.00000      32.00000     5.000000      11.00000
         1            3            0            0
44000.00      20700.00      87.00000
1.000000  0.0000000E+00      15.00000    4.300000      6.990000      24.39999      16.39999     0.3000000     0.5000000
    2.300000      29.00000      16.00000     6.000000      51.00000
2.000000  0.0000000E+00      15.00000    7.500000      6.960000      24.50000      18.10001     0.5000000     0.5000000
    11.20000      29.00000      17.00000     6.000000      48.00000
2.000000      35.00000      50.00000   0.4000000      7.300000      27.70000     -3.000000     0.6000000     0.3000000
    1.200000      45.00000      21.00000     1.000000      34.00000
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        1           3           0           0
44000.00    20700.00    98.00000
1.000000    0.0000000E+00   15.00000    0.6000000   6.710000    22.50000    13.20000    0.4000000   0.6000000
    2.800000    26.00000    21.00000    7.000000    46.00000
2.000000    0.0000000E+00   15.00000    0.3000000   6.600000    25.20000    15.00000    0.4000000   0.7000000
    2.700000    23.00000    21.00000    7.000000    49.00000
2.000000    35.00000    50.00000    0.1000000   6.550000    27.80000    17.60001    0.7000000   0.3000000
    6.100000    42.00000    25.00000    1.000000    32.00000
        1           3           0           0
43100.00    20600.00    91.00000
1.000000    0.0000000E+00   15.00000    1.000000    5.190000    21.60001    12.70000    0.5000000   0.2000000
    3.700000    26.00000    17.00000    4.000000    51.00000
2.000000    0.0000000E+00   15.00000    0.4000000   5.290000    21.80000    10.10000    0.5000000   0.2000000
    3.700000    28.00000    16.00000    4.000000    51.00000
2.000000    35.00000    50.00000    0.6000000   5.850000    23.60001    12.10000    0.8000000   0.4000000
   0.7000000    35.00000    15.00000    3.000000    47.00000
        1           3           0           0
43110.00    20600.00    92.00000
1.000000    0.0000000E+00   15.00000    0.5000000   5.790000    25.89999    13.20000    0.7000000   0.2000000
    3.700000    23.00000    20.00000    3.000000    48.00000
2.000000    0.0000000E+00   15.00000    0.5000000   5.410000    26.10001    13.30000    0.7000000   0.2000000
    4.300000    26.00000    24.00000    3.000000    47.00000
2.000000    35.00000    50.00000    0.9000000   6.400000    14.60000    13.60000    0.5000000   0.2000000
    1.400000    29.00000    21.00000    7.000000    43.00000
        1           3           0           0
43200.00    20600.00    93.00000
1.000000    0.0000000E+00   15.00000    0.9000000   7.320000    43.39999    -3.000000   1.400000    0.5000000
    9.500000    27.00000    36.00000    6.000000    31.00000
2.000000    0.0000000E+00   15.00000    0.3000000   7.350000    45.30000    -3.000000   1.300000    0.6000000
    7.100000    33.00000    35.00000    3.000000    29.00000
2.000000    35.00000    50.00000    0.9000000   7.500000    29.70000    -3.000000   1.600000    0.3000000
    1.000000    65.00000    26.00000    1.000000    7.000000
        1           3           0           0
43200.00    20600.00    94.00000
1.000000    0.0000000E+00   15.00000    0.5000000   7.280000    42.10001    -3.000000   1.300000    0.6000000
    6.700000    37.00000    35.00000    4.000000    23.00000
2.000000    0.0000000E+00   15.00000    0.4000000   7.590000    42.70000    -3.000000   1.100000    0.7000000
    8.300000    35.00000    38.00000    3.000000    24.00000
2.000000    35.00000    50.00000    0.9000000   7.400000    26.70000    -3.000000   1.300000    0.3000000
    1.200000    54.00000    29.00000    2.000000    15.00000
        1           3           0           0
43300.00    20600.00    95.00000
1.000000    0.0000000E+00   15.00000    0.5000000   4.680000    39.89999    18.20000    1.600000    0.5000000
    9.600000    27.00000    27.00000    2.000000    44.00000
2.000000    0.0000000E+00   15.00000    0.4000000   4.600000    37.80000    12.20000    1.200000    0.5000000
    9.000000    25.00000    30.00000    10.00000    35.00000
2.000000    35.00000    50.00000    0.3000000   5.080000    22.60001    8.600000    1.100000    0.2000000
    1.400000    43.00000    9.000000    4.000000    44.00000
        1           3           0           0
43300.00    20600.00    96.00000
1.000000    0.0000000E+00   15.00000    0.7000000   4.780000    44.39999    19.60001    1.700000    0.5000000
    9.600000    33.00000    38.00000    2.000000    27.00000
2.000000    0.0000000E+00   15.00000    0.4000000   4.540000    40.70000    16.89999    1.700000    0.6000000
    10.50000    38.00000    39.00000    2.000000    22.00000
2.000000    35.00000    50.00000    0.8000000   5.520000    32.00000    23.10001    1.600000    0.3000000
    2.700000    42.00000    25.00000    3.000000    29.00000
        1           3           0           0
43400.00    20600.00    97.00000
1.000000    0.0000000E+00   15.00000    1.200000    6.600000    31.80000    20.10001    0.9000000   0.1000000
    6.700000    18.00000    43.00000    4.000000    35.00000
2.000000    0.0000000E+00   15.00000    0.6000000   6.500000    31.10001    19.39999    1.000000    0.3000000
    7.200000    14.00000    34.00000    4.000000    48.00000
2.000000    35.00000    50.00000    0.5000000   4.450000    31.30000    11.30000    0.9000000   0.4000000
    1.100000    65.00000    21.00000    1.000000    13.00000
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         1            3            0            0
43400.00        20600.00        98.00000
1.000000        0.0000000E+00   15.00000        0.2000000       7.000000        30.10001        -3.000000       1.000000        0.3000000
   5.100000        32.00000        36.00000        3.000000        29.00000
2.000000        0.0000000E+00   15.00000        0.9000000       7.400000        30.10001        -3.000000       0.9000000       0.2000000
   5.700000        27.00000        36.00000        3.000000        33.00000
2.000000        35.00000        50.00000        1.300000        5.200000        28.00000        15.90000        0.8000000       0.4000000
   1.100000        67.00000        15.00000        1.000000        17.00000
         1            3            0            0
43500.00        20600.00        99.00000
1.000000        0.0000000E+00   15.00000        4.200000        7.750000        31.70000        -3.000000       1.300000        0.8000000
   5.400000        36.00000        14.00000        24.00000        26.00000
2.000000        0.0000000E+00   15.00000        4.900000        7.610000        35.50000        -3.000000       1.300000        0.7000000
   5.800000        36.00000        17.00000        21.00000        26.00000
2.000000        35.00000        50.00000        18.60001        7.830000        13.80000        -3.000000       1.300000        0.3000000
   1.200000        55.00000        18.00000        8.000000        19.00000
         1            3            0            0
43600.00        20600.00        101.0000
1.000000        0.0000000E+00   15.00000        2.100000        4.690000        30.00000        4.700000        2.000000        0.5000000
   8.300000        42.00000        39.00000        4.000000        15.00000
2.000000        0.0000000E+00   15.00000        1.200000        6.580000        34.89999        13.00000        2.200000        0.5000000
   10.50000        27.00000        43.00000        6.000000        24.00000
2.000000        35.00000        50.00000        1.100000        4.870000        34.10001        12.90000        4.400000        0.6000000
   1.500000        74.00000        18.00000        1.000000        7.000000
         1            3            0            0
43600.00        20600.00        102.0000
1.000000        0.0000000E+00   15.00000        5.200000        4.100000        25.00000        7.700000        1.200000        0.4000000
   7.000000        32.00000        34.00000        6.000000        28.00000
2.000000        0.0000000E+00   15.00000        1.000000        4.150000        34.10001        9.500000        1.700000        0.6000000
   13.30000        40.00000        35.00000        4.000000        21.00000
2.000000        35.00000        50.00000        0.9000000       4.200000        34.80000        14.40000        5.500000        0.5000000
   1.000000        79.00000        19.00000        1.000000        2.000000
         1            3            0            0
43700.00        20600.00        103.0000
1.000000        0.0000000E+00   15.00000        1.000000        6.810000        47.89999        31.10001        1.800000        0.3000000
   11.00000        18.00000        25.00000        6.000000        51.00000
2.000000        0.0000000E+00   15.00000        2.500000        7.060000        56.00000        -3.000000       1.900000        0.5000000
   13.30000        19.00000        24.00000        5.000000        52.00000
2.000000        35.00000        50.00000        0.5000000       7.590000        27.70000        -3.000000       1.800000        0.2000000
   1.200000        43.00000        25.00000        8.000000        25.00000
         1            3            0            0
43700.00        20600.00        104.0000
1.000000        0.0000000E+00   15.00000        1.300000        6.980000        56.50000        39.20000        1.400000        0.5000000
   11.80000        29.00000        34.00000        4.000000        33.00000
2.000000        0.0000000E+00   15.00000        1.800000        6.490000        55.80000        34.50000        2.100000        0.5000000
   12.90000        20.00000        29.00000        6.000000        45.00000
2.000000        35.00000        50.00000        4.900000        7.100000        35.80000        -3.000000       0.5000000       0.3000000
   2.300000        50.00000        21.00000        7.000000        22.00000
         1            3            0
43800.00        20600.00        105.0000
1.000000        0.0000000E+00   15.00000        33.50000        7.830000        31.89999        -3.000000       1.400000        1.800000
   6.600000        25.00000        18.00000        23.00000        34.00000
2.000000        0.0000000E+00   15.00000        37.70000        7.590000        33.60001        -3.000000       1.400000        1.600000
   6.200000        24.00000        16.00000        25.00000        35.00000
2.000000        35.00000        50.00000        33.89999        7.520000        7.200000        -3.000000       0.8000000       0.3000000
  0.3000000        3.000000        1.000000        85.00000        11.00000
         1            3            0            0
43800.00        20600.00        106.0000
1.000000        0.0000000E+00   15.00000        26.10001        7.300000        38.70000        -3.000000       1.200000        1.900000
   7.500000        23.00000        17.00000        21.00000        34.00000
2.000000        0.0000000E+00   15.00000        24.20000        7.600000        36.80000        -3.000000       1.400000        2.100000
   7.600000        27.00000        19.00000        17.00000        37.00000
2.000000        35.00000        50.00000        33.60001        7.400000        26.00000        -3.000000       1.400000        0.3000000
   3.900000        31.00000        13.00000        27.00000        30.00000
```

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        1           3           0           0
43300.00    20600.00    107.0000
1.000000  0.0000000E+00  15.00000    28.39999    7.910000    51.89999   -3.000000    1.500000    0.3000000
   7.300000    34.00000    34.00000     5.000000    27.00000
2.000000  0.0000000E+00  15.00000    28.30000    7.730000    52.50000   -3.000000    1.400000    0.3000000
   7.400000    29.00000    36.00000     5.000000    30.00000
2.000000    35.00000    50.00000    46.50000    7.700000    27.39999   -3.000000    0.7000000    0.2000000
   2.100000    34.00000    23.00000    18.00000    25.00000
        1           3           0           0
44000.00    20600.00    109.0000
1.000000  0.0000000E+00  15.00000     9.500000    7.300000    34.10001   -3.000000    0.9000000    0.6000000
   5.000000    32.00000    17.00000    12.00000    39.00000
2.000000  0.0000000E+00  15.00000     8.800000    7.600000    23.70000   -3.000000    0.9000000    0.6000000
   4.500000    33.00000    14.00000    11.00000    43.00000
2.000000    35.00000    50.00000     5.800000    7.490000    27.30000   -3.000000    0.4000000    0.3000000
   2.100000    37.00000    18.00000    11.00000    34.00000
        1           3           0           0
44000.00    20600.00    110.0000
1.000000  0.0000000E+00  15.00000    0.5000000    6.390000    15.50000    9.900000    0.5000000    0.4000000
   6.900000    14.00000    7.000000    10.00000    68.00000
2.000000  0.0000000E+00  15.00000    11.70000    7.510000    30.10001   -3.000000    1.100000    0.7000000
   4.700000    30.00000    19.00000    13.00000    38.00000
2.000000    35.00000    50.00000     8.100000    7.560000    26.50000   -3.000000    0.8000000    0.2000000
   1.600000    39.00000    13.00000    23.00000    25.00000
        1           3           0           0
43100.00    20500.00    113.0000
1.000000  0.0000000E+00  15.00000     3.000000    6.500000    33.39999    30.20000    1.000000    0.3000000
   5.200000    23.00000    22.00000     5.000000    50.00000
2.000000  0.0000000E+00  15.00000    0.9000000    7.600000    37.50000   -3.000000    0.9000000    0.3000000
   6.900000    18.00000    27.00000     5.000000    50.00000
2.000000    35.00000    50.00000    0.2000000    7.490000    23.89999   -3.000000    0.8000000    0.2000000
   3.500000    26.00000    25.00000     5.000000    44.00000
        1           3           0           0
43200.00    20500.00    115.0000
1.000000  0.0000000E+00  15.00000     2.300000    7.760000    35.50000   -3.000000    1.100000    0.7000000
   5.200000    41.00000    22.00000     8.000000    29.00000
2.000000  0.0000000E+00  15.00000    0.7000000    7.460000    34.00000   -3.000000    0.9000000    0.6000000
   5.400000    39.00000    25.00000     9.000000    26.00000
2.000000    35.00000    50.00000    17.00000    7.890000    23.80000   -3.000000    0.8000000    0.3000000
   2.600000    59.00000    27.00000     6.000000     9.000000
        1           3           0           0
43310.00    20500.00    117.0000
1.000000  0.0000000E+00  15.00000    0.3000000    6.750000    39.89999    28.50000    1.200000    0.5000000
   5.400000    40.00000    31.00000     6.000000    23.00000
2.000000  0.0000000E+00  15.00000    0.2000000    6.710000    42.00000    27.50000    1.200000    0.5000000
   6.600000    41.00000    34.00000     6.000000    19.00000
2.000000    35.00000    50.00000    0.6000000    7.700000    21.60001   -3.000000    1.400000    0.3000000
   1.600000    66.00000    29.00000     4.000000     1.000000
        1           3           0           0
43400.00    20500.00    119.0000
1.000000  0.0000000E+00  15.00000    0.7000000    7.570000    33.89999   -3.000000    0.9000000    0.5000000
   4.100000    44.00000    25.00000     4.000000    26.00000
2.000000  0.0000000E+00  15.00000    0.1000000    7.020000    31.80000   -3.000000    0.8000000    0.6000000
   4.200000    44.00000    27.00000     4.000000    25.00000
2.000000    35.00000    50.00000    22.10001    7.250000    26.89999   -3.000000    1.400000    0.5000000
   2.300000    65.00000    27.00000     1.000000     8.000000
        1           3           0           0
43500.00    20500.00    121.0000
1.000000  0.0000000E+00  15.00000     1.800000    7.050000    56.89999   -3.000000    1.800000    0.6000000
   12.10000    39.00000    33.00000     2.000000    26.00000
2.000000  0.0000000E+00  15.00000     1.200000    7.110000    63.70000   -3.000000    2.300000    0.8000000
   12.20000    32.00000    34.00000     3.000000    31.00000
2.000000    35.00000    50.00000    0.5000000    6.960000    33.60001    21.00000    1.000000    0.7000000
   2.000000    57.00000    17.00000     3.000000    23.00000
```

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        1           3           0           0
43400.00    20600.00    98.00000
1.000000    0.0000000E+00   15.00000    0.2000000   7.000000    30.10001    -3.000000   1.000000    0.3000000
    5.100000    32.00000    36.00000    3.000000    29.00000
2.000000    0.0000000E+00   15.00000    0.9000000   7.400000    30.10001    -3.000000   0.9000000   0.2000000
    5.700000    27.00000    36.00000    3.000000    33.00000
2.000000    35.00000    50.00000    1.300000    5.200000    28.00000    15.90000    0.8000000   0.4000000
    1.100000    67.00000    15.00000    1.000000    17.00000
        1           3           0           0
43500.00    20600.00    99.00000
1.000000    0.0000000E+00   15.00000    4.200000    7.750000    31.70000    -3.000000   1.300000    0.8000000
    5.400000    36.00000    14.00000    24.00000    26.00000
2.000000    0.0000000E+00   15.00000    4.900000    7.610000    35.50000    -3.000000   1.300000    0.7000000
    5.800000    36.00000    17.00000    21.00000    26.00000
2.000000    35.00000    50.00000    18.60001    7.830000    13.80000    -3.000000   1.300000    0.3000000
    1.200000    55.00000    18.00000    8.000000    19.00000
        1           3           0           0
43600.00    20600.00    101.0000
1.000000    0.0000000E+00   15.00000    2.100000    4.690000    30.00000    3.700000    2.000000    0.5000000
    8.300000    42.00000    39.00000    4.000000    15.00000
2.000000    0.0000000E+00   15.00000    1.200000    6.580000    34.89999    13.00000    2.200000    0.5000000
    10.50000    27.00000    43.00000    6.000000    24.00000
2.000000    35.00000    50.00000    1.100000    4.870000    34.10001    12.90000    4.400000    0.6000000
    1.500000    74.00000    18.00000    1.000000    7.000000
        1           3           0           0
43600.00    20600.00    102.0000
1.000000    0.0000000E+00   15.00000    5.200000    4.100000    25.00000    7.700000    1.200000    0.4000000
    7.000000    32.00000    34.00000    6.000000    28.00000
2.000000    0.0000000E+00   15.00000    1.000000    4.150000    34.10001    9.500000    1.700000    0.6000000
    13.30000    40.00000    35.00000    4.000000    21.00000
2.000000    35.00000    50.00000    0.9000000   4.200000    34.80000    14.40000    5.500000    0.5000000
    1.000000    79.00000    19.00000    1.000000    2.000000
        1           3           0           0
43700.00    20600.00    103.0000
1.000000    0.0000000E+00   15.00000    1.000000    6.810000    47.89999    31.10001    1.800000    0.3000000
    11.00000    18.00000    25.00000    6.000000    51.00000
2.000000    0.0000000E+00   15.00000    2.500000    7.060000    56.00000    -3.000000   1.900000    0.5000000
    13.30000    19.00000    24.00000    5.000000    52.00000
2.000000    35.00000    50.00000    0.5000000   7.590000    27.70000    -3.000000   1.800000    0.2000000
    1.200000    43.00000    25.00000    8.000000    25.00000
        1           3           0           0
43700.00    20600.00    104.0000
1.000000    0.0000000E+00   15.00000    1.300000    6.980000    56.50000    39.20000    1.900000    0.5000000
    11.80000    29.00000    34.00000    4.000000    33.00000
2.000000    0.0000000E+00   15.00000    1.800000    6.490000    55.80000    34.50000    2.100000    0.5000000
    12.90000    20.00000    29.00000    6.000000    45.00000
2.000000    35.00000    50.00000    4.900000    7.150000    35.80000    -3.000000   0.5000000   0.3000000
    2.300000    50.00000    21.00000    7.000000    22.00000
        1           3           0           0
43800.00    20600.00    105.0000
1.000000    0.0000000E+00   15.00000    33.50000    7.830000    31.89999    -3.000000   1.400000    1.800000
    6.600000    25.00000    18.00000    23.00000    34.00000
2.000000    0.0000000E+00   15.00000    37.70000    7.590000    33.60001    -3.000000   1.400000    1.600000
    6.200000    24.00000    16.00000    25.00000    35.00000
2.000000    35.00000    50.00000    33.89999    7.520000    7.200000    -3.000000   0.8000000   0.3000000
    0.3000000   3.000000    1.000000    85.00000    11.00000
        1           3           0           0
43800.00    20600.00    106.0000
1.000000    0.0000000E+00   15.00000    26.10001    7.300000    38.70000    -3.000000   1.200000    1.800000
    7.500000    23.00000    17.00000    21.00000    34.00000
2.000000    0.0000000E+00   15.00000    24.20000    7.600000    36.60000    -3.000000   1.400000    2.100000
    7.600000    27.00000    17.00000    17.00000    37.00000
2.000000    35.00000    50.00000    33.60001    7.400000    28.00000    -3.000000   1.400000    0.3000000
    3.300000    31.00000    18.00000    27.00000    30.00000
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        1           3           0           0
43500.00    20500.00    122.0000
1.000000    0.0000000E+00   15.00000    6.600000    6.200000    50.80000    34.70000    1.700000    0.5000000
   11.60000    23.00000    27.00000    9.000000    41.00000
2.000000    0.0000000E+00   15.00000    1.500000    5.920000    51.89999    34.00000    2.300000    0.7000000
   12.10000    30.00000    30.00000    3.000000    38.00000
2.000000    35.00000    50.00000    0.7000000   7.200000    33.70000    0.9000000   0.3000000   -1.000000
   1.800000    48.00000    19.00000    6.000000    27.00000
        1           3           0           0
43600.00    20500.00    123.0000
1.000000    0.0000000E+00   15.00000    0.1000000   6.520000    46.39999    16.50000    1.300000    0.6000000
   7.700000    28.00000    29.00000    8.000000    35.00000
2.000000    0.0000000E+00   15.00000    0.3000000   7.210000    35.39999    -3.000000   1.100000    0.5000000
   7.000000    34.00000    26.00000    7.000000    33.00000
2.000000    35.00000    50.00000    0.8000000   7.000000    23.10001    -3.000000   1.100000    0.3000000
   1.300000    36.00000    21.00000    7.000000    36.00000
        1           3           0           0
43700.00    20500.00    125.0000
1.000000    0.0000000E+00   15.00000    28.70000    7.650000    29.20000    -3.000000   1.000000    1.200000
   5.600000    26.00000    14.00000    35.00000    26.00000
2.000000    0.0000000E+00   15.00000    22.60001    7.430000    29.50000    -3.000000   1.200000    1.300000
   5.700000    24.00000    15.00000    34.00000    27.00000
2.000000    35.00000    50.00000    48.60001    7.400000    17.39999    -3.000000   0.6000000   0.1000000
   1.500000    19.00000    7.000000    58.00000    16.00000
        1           3           0           0
43800.00    20500.00    127.0000
1.000000    0.0000000E+00   15.00000    13.80000    7.430000    18.60001    -3.000000   1.200000    0.8000000
   5.200000    39.00000    24.00000    11.00000    26.00000
2.000000    0.0000000E+00   15.00000    10.90000    7.200000    32.89999    -3.000000   1.100000    0.7000000
   6.900000    30.00000    28.00000    11.00000    3.000000
2.000000    35.00000    50.00000    26.20000    7.490000    27.20000    -3.000000   1.600000    0.3000000
  0.9000000    49.00000    33.00000    5.000000    13.00000
        1           3           0           0
44000.00    20500.00    131.0000
1.000000    0.0000000E+00   15.00000    6.900000    7.030000    62.80000    -3.000000   0.8000000   0.3000000
   11.00000    51.00000    27.00000    1.000000    21.00000
2.000000    0.0000000E+00   15.00000    8.900000    7.300000    71.20000    -3.000000   0.9000000   0.3000000
   12.80000    31.00000    34.00000    2.000000    33.00000
2.000000    35.00000    50.00000    17.30000    7.740000    35.39999    -3.000000   0.7000000   0.2000000
   2.500000    55.00000    29.00000    2.000000    14.00000
        1           3           0           0
43000.00    20400.00    133.0000
1.000000    0.0000000E+00   15.00000    15.40000    7.900000    38.70000    -3.000000   1.000000    0.3000000
   6.200000    31.00000    14.00000    18.00000    38.00000
2.000000    0.0000000E+00   15.00000    16.00000    7.500000    33.89999    -3.000000   0.6000000   0.2000000
   6.500000    23.00000    23.00000    16.00000    38.00000
2.000000    35.00000    50.00000    80.39999    7.810000    18.00000    -3.000000   0.3000000   0.1000000
  0.5000000    11.00000    11.00000    65.00000    13.00000
        1           3           0           0
43100.00    20400.00    135.0000
1.000000    0.0000000E+00   15.00000    1.400000    7.700000    52.00000    -3.000000   1.000000    0.3000000
   8.600000    37.00000    23.00000    7.000000    33.00000
2.000000    0.0000000E+00   15.00000    2.400000    7.600000    53.80000    -3.000000   1.200000    0.4000000
   10.70000    36.00000    19.00000    8.000000    37.00000
2.000000    35.00000    50.00000    0.8000000   7.550000    22.00000    -3.000000   0.4000000   0.2000000
   2.800000    25.00000    8.000000    11.00000    56.00000
        1           3           0           0
43200.00    20400.00    137.0000
1.000000    0.0000000E+00   15.00000    4.100000    7.710000    33.20000    -3.000000   0.9000000   0.6000000
   3.300000    41.00000    20.00000    12.00000    27.00000
2.000000    0.0000000E+00   15.00000    3.500000    7.690000    34.30000    -3.000000   1.200000    0.7000000
   4.400000    43.00000    15.00000    11.00000    31.00000
2.000000    35.00000    50.00000    1.500000    7.800000    31.70000    -3.000000   0.9000000   0.4000000
   1.200000    47.00000    18.00000    8.000000    27.00000
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     1              3              0              0
43300.00       20400.00       139.0000
1.000000   0.0000000E+00      15.00000      0.4000000      6.220000       33.50000       23.80000      1.300000      0.5000000
   4.900000       39.00000       24.00000       7.000000       30.00000
2.000000   0.0000000E+00      15.00000      0.7000000      5.750000       32.30000       20.50000      1.300000      0.6000000
   5.500000       35.00000       23.00000       7.000000       35.00000
2.000000       35.00000       50.00000      0.7000000      7.500000       27.89999      -3.000000      0.8000000      0.3000000
   1.300000       42.00000       20.00000       7.000000       31.00000
     1              3              0              0
43400.00       20400.00       141.0000
1.000000   0.0000000E+00      15.00000      0.3000000      7.400000       32.00000      -3.000000      1.100000      0.8000000
   5.000000       35.00000       18.00000       7.000000       40.00000
2.000000   0.0000000E+00      15.00000      0.5000000      7.110000       31.60001      -3.000000      1.100000      1.000000
   5.500000       33.00000       23.00000       8.000000       37.00000
2.000000       35.00000       50.00000      1.800000      7.690000       25.39999      -3.000000      1.400000      0.5000000
   1.300000       42.00000       19.00000       6.000000       33.00000
     1              3              0              0
43400.00       20400.00       142.0000
1.000000   0.0000000E+00      15.00000      0.5000000      7.000000       28.39999      -3.000000      1.000000      0.6000000
   3.800000       33.00000       22.00000       7.000000       38.00000
2.000000   0.0000000E+00      15.00000      1.100000      6.850000       31.30000       18.50000      1.200000      0.7000000
   3.900000       32.00000       20.00000       7.000000       41.00000
2.000000       35.00000       50.00000      1.000000      7.180000       26.39999      -3.000000      0.6000000      0.2000000
   1.300000       35.00000       22.00000       6.000000       36.00000
     1              3              0              0
43500.00       20400.00       143.0000
1.000000   0.0000000E+00      15.00000      0.4000000      6.700000       53.30000       36.50000      2.400000      0.6000000
   7.100000       57.00000       22.00000       2.000000       19.00000
2.000000   0.0000000E+00      15.00000      0.6000000      6.300000       55.10001       34.00000      2.600000      0.5000000
   10.30000       49.00000       28.00000       2.000000       21.00000
2.000000       35.00000       50.00000      0.2000000      7.060000       44.00000      -3.000000      2.200000      0.5000000
   1.200000       75.00000       10.00000   0.0000000E+00      14.00000
     1              3              0              0
43500.00       20400.00       144.0000
1.000000   0.0000000E+00      15.00000      1.000000      6.350000       52.70000       40.00000      2.200000      0.5000000
   8.300000       57.00000       21.00000       2.000000       20.00000
2.000000   0.0000000E+00      15.00000      0.6000000      6.900000       55.00000       37.20000      2.300000      0.5000000
   9.300000       56.00000       22.00000       2.000000       20.00000
2.000000       35.00000       50.00000      0.5000000      7.290000       26.60001      -3.000000      1.700000      0.4000000
   1.600000       64.00000       11.00000       1.000000       23.00000
     1              3              0              0
43600.00       20400.00       145.0000
1.000000   0.0000000E+00      15.00000      0.7000000      6.290000       27.60001       16.20000      0.7000000      0.2000000
   3.900000       23.00000       18.00000       7.000000       52.00000
2.000000   0.0000000E+00      15.00000      0.9000000      6.580000       30.00000       21.00000      0.9000000      0.2000000
   4.200000       23.00000       16.00000       7.000000       54.00000
2.000000       35.00000       50.00000      0.6000000      6.900000       26.10001       19.89999      0.7000000      0.2000000
   0.8000000      38.00000       8.000000       16.00000       38.00000
     1              3              0              0
43600.00       20400.00       146.0000
1.000000   0.0000000E+00      15.00000      0.2000000      6.000000       27.20000       17.50000      13.50000      0.2000000
   4.400000       23.00000       7.000000       7.000000       63.00000
2.000000   0.0000000E+00      15.00000      0.6000000      5.910000       27.80000       16.89999      0.7000000      0.2000000
   4.100000       23.00000       18.00000       7.000000       52.00000
2.000000       35.00000       50.00000      1.200000      6.800000       22.00000       16.70000      0.4000000      0.2000000
   0.7000000      26.00000       18.00000       8.000000       48.00000
     1              3              0              0
43700.00       20400.00       147.0000
1.000000   0.0000000E+00      15.00000      1.700000      6.700000       57.39999       40.50001      1.900000      0.6000000
   7.200000       58.00000       12.00000       1.000000       29.00000
2.000000   0.0000000E+00      15.00000      0.3000000      6.480000       52.89999       39.80000      1.900000      0.5000000
   5.700000       64.00000       16.00000       2.000000       18.00000
2.000000       35.00000       50.00000      0.9000000      7.400000       21.00000      -3.000000      0.7000000      0.2000000
   0.3000000      31.00000       19.00000       2.000000       48.00000
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        1           3           0           0
43710.00        20400.00    148.0000
1.000000    0.0000000E+00   15.00000    1.300000    6.980000    50.30000    35.89999    1.600000    0.5000000
   5.700000        56.00000    17.00000    2.000000    25.00000
2.000000    0.0000000E+00   15.00000    1.200000    6.680000    46.80000    33.60001    1.500000    0.5000000
   5.300000        62.00000    16.00000    2.000000    20.00000
2.000000        35.00000    50.00000    1.000000    7.190000    24.20000    -3.000000   0.6000000   0.2000000
  0.8000000        31.00000    24.00000    4.000000    41.00000
        1           3           0           0
43800.00        20400.00    149.0000
1.000000    0.0000000E+00   15.00000    11.80000    7.410000    29.00000    -3.000000   0.8000000   0.7000000
   6.000000        23.00000    13.00000    27.00000    36.00000
2.000000    0.0000000E+00   15.00000    13.80000    7.100000    26.80000    -3.000000   0.9000000   0.5000000
   5.100000        20.00000    13.00000    33.00000    34.00000
2.000000        35.00000    50.00000    49.10001    7.600000    8.700000    -3.000000   0.3000000   0.1000000
  0.6000000        13.00000    5.000000    62.00000    20.00000
        1           3           0           0
43800.00        20400.00    150.0000
1.000000    0.0000000E+00   15.00000    6.500000    7.590000    25.10001    -3.000000   1.000000    0.7000000
   4.900000        24.00000    11.00000    27.00000    37.00000
2.000000    0.0000000E+00   15.00000    7.800000    7.660000    27.39999    -3.000000   0.9000000   0.6000000
   6.100000        24.00000    14.00000    23.00000    38.00000
2.000000        35.00000    50.00000    41.39999    7.600000    12.90000    -3.000000   0.6000000   0.2000000
  0.9000000        18.00000    7.000000    51.00000    24.00000
        1           3           0           0
43900.00        20400.00    151.0000
1.000000    0.0000000E+00   15.00000    9.700000    7.590000    25.30000    -3.000000   0.7000000   0.6000000
   3.200000        28.00000    17.00000    14.00000    42.00000
2.000000    0.0000000E+00   15.00000    10.30000    7.510000    25.80000    -3.000000   0.8000000   0.5000000
   3.300000        28.00000    20.00000    13.00000    39.00000
2.000000        35.00000    50.00000    25.10001    7.400000    17.20000    -3.000000   1.000000    0.3000000
   1.100000        27.00000    2.000000    21.00000    50.00000
        1           3           0           0
43910.00        20410.00    152.0000
1.000000    0.0000000E+00   15.00000    4.100000    7.480000    27.20000    -3.000000   0.8000000   0.5000000
   3.300000        25.00000    14.00000    13.00000    48.00000
2.000000    0.0000000E+00   15.00000    3.500000    7.540000    26.70000    -3.000000   0.6000000   0.5000000
   3.300000        27.00000    16.00000    13.00000    44.00000
2.000000        35.00000    50.00000    7.500000    7.500000    22.10001    -3.000000   0.8000000   0.2000000
   1.200000        31.00000    10.00000    12.00000    47.00000
        1           3           0           0
44000.00        20400.00    153.0000
1.000000    0.0000000E+00   15.00000    48.20000    7.700000    28.30000    -3.000000   1.100000    0.2000000
   7.600000        27.00000    22.00000    21.00000    30.00000
2.000000    0.0000000E+00   15.00000    48.50000    7.760000    33.70000    -3.000000   1.000000    0.3000000
   7.100000        24.00000    23.00000    28.00000    25.00000
2.000000        35.00000    50.00000    45.20000    7.650000    29.20000    -3.000000   0.8000000   0.1000000
   3.500000        31.00000    35.00000    12.00000    22.00000
        1           3           0           0
44000.00        20400.00    154.0000
1.000000    0.0000000E+00   15.00000    23.39999    7.650000    42.50000    -3.000000   1.000000    0.2000000
   7.100000        29.00000    26.00000    15.00000    30.00000
2.000000    0.0000000E+00   15.00000    24.60001    7.550000    44.30000    -3.000000   0.9000000   0.2000000
   9.000000        28.00000    28.00000    15.00000    29.00000
2.000000        35.00000    50.00000    44.39999    7.590000    20.00000    -3.000000   1.000000    0.2000000
   1.700000        26.00000    4.000000    34.00000    36.00000
        1           3           0           0
43000.00        20310.00    155.0000
1.000000    0.0000000E+00   15.00000    11.40000    7.680000    25.39999    -3.000000   0.7000000   0.3000000
   3.400000        26.00000    14.00000    27.00000    33.00000
2.000000    0.0000000E+00   15.00000    12.60000    7.600000    25.20000    -3.000000   0.7000000   0.3000000
   3.500000        27.00000    13.00000    27.00000    33.00000
2.000000        35.00000    50.00000    10.50000    7.600000    25.89999    -3.000000   0.8000000   0.4000000
```

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        1           3           0           0
42990.00    20320.00    156.0000
1.000000  0.0000000E+00  15.00000    17.20000    7.520000    32.30000   -3.000000   0.6000000   0.3000000
   3.500000    26.00000    16.00000    25.00000    34.00000
2.000000  0.0000000E+00  15.00000    13.60000    7.300000    26.30000   -3.000000   1.100000    0.2000000
   3.700000    26.00000    16.00000    26.00000    32.00000
2.000000    35.00000    50.00000    21.89999    7.360000    25.20000   -3.000000   0.8000000   0.2000000
   1.700000    25.00000    15.00000    29.00000    31.00000
        1           3           0           0
43100.00    20300.00    157.0000
1.000000  0.0000000E+00  15.00000    19.20000    7.200000    60.39999   -3.000000   1.600000    0.9000000
   17.80000    20.00000    22.00000    15.00000    42.00000
2.000000  0.0000000E+00  15.00000    36.00000    7.100000    60.89999   -3.000000   1.500000    0.7000000
   20.50000    8.000000    13.00000    47.00000    32.00000
2.000000    35.00000    50.00000    17.70000    7.480000    55.20000   -3.000000   1.400000    0.7000000
   12.90000    23.00000    26.00000    12.00000    39.00000
        1           3           0           0
43100.00    20300.00    158.0000
1.000000  0.0000000E+00  15.00000    13.70000    7.030000    47.89999   -3.000000   0.3000000   0.5000000
   12.60000    20.00000    26.00000    16.00000    38.00000
2.000000  0.0000000E+00  15.00000    10.20000    7.390000    50.30000   -3.000000   1.300000    0.7000000
   12.70000    22.00000    32.00000    11.00000    35.00000
2.000000    35.00000    50.00000    19.00000    7.600000    24.00000   -3.000000   0.8000000   0.3000000
   6.700000    39.00000    21.00000    13.00000    27.00000
        1           3           0           0
43200.00    20300.00    159.0000
1.000000  0.0000000E+00  15.00000    19.00000    7.200000    53.30000   -3.000000   0.8000000   0.5000000
   14.20000    19.00000    21.00000    22.00000    38.00000
2.000000  0.0000000E+00  15.00000    17.10001    7.350000    50.39999   -3.000000   1.100000    0.4000000
   12.10000    14.00000    18.00000    19.00000    49.00000
2.000000    35.00000    50.00000    61.80000    7.300000    9.100000   -3.000000   0.3000000   0.2000000
  0.8000000    15.00000    1.000000    74.00000    10.00000
        1           3           0           0
43300.00    20300.00    161.0000
1.000000  0.0000000E+00  15.00000    7.000000    7.380000    23.70000   -3.000000   0.7000000   0.7000000
   2.800000    22.00000    14.00000    14.00000    51.00000
2.000000  0.0000000E+00  15.00000    6.400000    7.600000    22.00000   -3.000000   0.8000000   0.6000000
   2.600000    20.00000    16.00000    13.00000    51.00000
2.000000    35.00000    50.00000    6.300000    7.510000    22.89999   -3.000000   0.9000000   0.3000000
   1.000000    22.00000    16.00000    12.00000    50.00000
        1           3           0           0
43300.00    20300.00    162.0000
1.000000  0.0000000E+00  15.00000    5.300000    7.490000    24.60001   -3.000000   0.8000000   0.9000000
   3.500000    21.00000    13.00000    13.00000    52.00000
2.000000  0.0000000E+00  15.00000    6.200000    7.550000    22.80000   -3.000000   0.8000000   1.000000
   3.500000    24.00000    13.00000    13.00000    50.00000
2.000000    35.00000    50.00000    5.200000    7.420000    17.60001   -3.000000   0.8000000   0.3000000
  0.8000000    25.00000    14.00000    13.00000    48.00000
        1           3           0           0
43500.00    20300.00    165.0000
1.000000  0.0000000E+00  15.00000    4.500000    7.210000    37.39999   -3.000000   1.200000    1.100000
   7.900000    23.00000    21.00000    12.00000    44.00000
2.000000  0.0000000E+00  15.00000    3.700000    7.320000    38.20000   -3.000000   1.200000    1.000000
   8.200000    21.00000    23.00000    11.00000    46.00000
2.000000    35.00000    50.00000    17.50000    7.450000    19.89999   -3.000000   0.7000000   0.2000000
  0.9000000    25.00000    16.00000    17.00000    42.00000
        1           3           0           0
43600.00    20300.00    167.0000
1.000000  0.0000000E+00  15.00000    14.80000    7.650000    25.39999   -3.000000   0.7000000   0.3000000
   4.100000    24.00000    10.00000    36.00000    30.00000
2.000000  0.0000000E+00  15.00000    16.89999    7.320000    20.60001   -3.000000   0.8000000   0.2000000
   3.100000    23.00000    11.00000    36.00000    30.00000
2.000000    35.00000    50.00000    12.40000    7.400000    22.50000   -3.000000   0.8000000   0.1000000
   2.200000    25.00000    4.000000    38.00000    33.00000
```

1	3	0	0					
43600.00	20300.00	168.0000						
1.000000	0.0000000E+00	15.00000	17.70000	7.500000	20.30000	-3.000000	0.8000000	0.7000000
3.400000	23.00000	10.00000	38.00000	29.00000				
2.000000	0.0000000E+00	15.00000	22.89999	7.000000	20.20000	-3.000000	0.9000000	0.5000000
3.800000	21.00000	9.000000	39.00000	31.00000				
2.000000	35.00000	50.00000	7.700000	7.350000	18.89999	-3.000000	0.8000000	0.2000000
1.700000	26.00000	13.00000	33.00000	28.00000				
1	3	0	0					
43700.00	20300.00	169.0000						
1.000000	0.0000000E+00	15.00000	6.000000	7.600000	36.80000	-3.000000	1.000000	0.4000000
9.200000	19.00000	15.00000	30.00000	36.00000				
2.000000	0.0000000E+00	15.00000	7.500000	7.370000	35.30000	-3.000000	0.9000000	0.4000000
9.200000	15.00000	15.00000	28.00000	42.00000				
2.000000	35.00000	50.00000	31.80000	7.700000	19.70000	-3.000000	0.4000000	0.2000000
0.7000000	14.00000	0.0000000E+00	62.00000	24.00000				
1	3	0	0					
43700.00	20300.00	170.0000						
1.000000	0.0000000E+00	15.00000	10.60000	7.250000	43.80000	-3.000000	0.8000000	0.3000000
8.200000	18.00000	16.00000	32.00000	34.00000				
2.000000	0.0000000E+00	15.00000	8.900000	7.350000	34.20000	-3.000000	0.8000000	0.3000000
8.300000	18.00000	17.00000	29.00000	36.00000				
2.000000	35.00000	50.00000	24.10001	7.600000	20.50000	-3.000000	0.5000000	0.2000000
1.600000	21.00000	9.000000	46.00000	24.00000				
1	3	0	0					
43800.00	20300.00	171.0000						
1.000000	0.0000000E+00	15.00000	6.000000	6.980000	37.39999	38.20000	0.5000000	0.3000000
8.500000	17.00000	25.00000	10.00000	48.00000				
2.000000	0.0000000E+00	15.00000	2.200000	6.900000	41.39999	36.30000	0.4000000	0.5000000
7.500000	19.00000	23.00000	9.000000	49.00000				
2.000000	35.00000	50.00000	2.300000	7.350000	30.60001	-3.000000	0.3000000	0.2000000
0.9000000	24.00000	22.00000	6.000000	48.00000				
1	3	0	0					
43780.00	20280.00	172.0000						
1.000000	0.0000000E+00	15.00000	7.900000	7.790000	52.80000	-3.000000	1.300000	0.4000000
13.40000	40.00000	12.00000	19.00000	29.00000				
2.000000	0.0000000E+00	15.00000	9.200000	7.050000	36.80000	-3.000000	1.000000	0.7000000
12.20000	41.00000	15.00000	11.00000	33.00000				
2.000000	35.00000	50.00000	0.8000000	7.440000	33.89999	-3.000000	0.9000000	0.4000000
1.700000	54.00000	11.00000	5.000000	30.00000				
1	3	0	0					
43900.00	20290.00	173.0000						
1.000000	0.0000000E+00	15.00000	36.70000	7.410000	27.70000	-3.000000	0.8000000	0.2000000
5.200000	20.00000	16.00000	31.00000	31.00000				
2.000000	0.0000000E+00	15.00000	35.39999	7.400000	19.50000	-3.000000	0.8000000	0.2000000
3.900000	20.00000	15.00000	35.00000	30.00000				
2.000000	35.00000	50.00000	82.30000	7.100000	11.10000	-3.000000	0.5000000	0.0000000E
+00 0.4000000	8.000000	0.0000000E+00	76.00000	16.00000				
1	3	0	0					
43900.00	20290.00	174.0000						
1.000000	0.0000000E+00	15.00000	41.70000	7.490000	28.39999	-3.000000	0.9000000	0.4000000
6.400000	18.00000	13.00000	34.00000	35.00000				
2.000000	0.0000000E+00	15.00000	34.60001	7.600000	28.20000	-3.000000	0.8000000	0.3000000
6.100000	21.00000	18.00000	32.00000	30.00000				
2.000000	35.00000	50.00000	76.89999	7.720000	9.300000	-3.000000	0.2000000	0.1000000
0.9000000	13.00000	7.000000	63.00000	16.00000				
1	3	0	0					
44000.00	20300.00	175.0000						
1.000000	0.0000000E+00	15.00000	11.90000	7.600000	43.50000	-3.000000	1.000000	0.4000000
8.900000	24.00000	25.00000	15.00000	36.00000				
2.000000	0.0000000E+00	15.00000	9.500000	7.490000	43.20000	-3.000000	1.300000	0.3000000
6.400000	20.00000	27.00000	1.000000	52.00000				
2.000000	35.00000	50.00000	6.900000	7.500000	52.80000	-3.000000	0.8000000	0.1000000
7.300000	25.00000	22.00000	15.00000	38.00000				

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      1          3          0          0
44000.00    20300.00   176.0000
1.000000  0.0000000E+00  15.00000   40.50000   7.500000   45.30000   -3.000000  0.5000000  0.2000000
   8.600000    19.00000   30.00000   15.00000   36.00000
2.000000  0.0000000E+00  15.00000   36.89999   7.890000   44.70000   -3.000000  0.6000000  0.3000000
   9.000000    13.00000   28.00000   15.00000   39.00000
2.000000    35.00000   50.00000   55.60001   7.590000   30.30000   -3.000000  0.5000000  0.1000000
   3.800000    29.00000   23.00000   17.00000   32.00000
      1          3          0          0
43000.00    20200.00   179.0000
1.000000  0.0000000E+00  15.00000   6.700000   7.450000   29.50000   -3.000000   1.100000  0.5000000
   3.400000    30.00000   17.00000   14.00000   39.00000
2.000000  0.0000000E+00  15.00000   5.900000   7.490000   25.39999   -3.000000  0.7000000  0.4000000
   3.100000    28.00000   15.00000   13.00000   43.00000
2.000000    35.00000   50.00000   11.90000   7.400000   20.39999   -3.000000  0.7000000  0.2000000
   1.100000    26.00000   13.00000   14.00000   47.00000
      1          3          0          0
43100.00    20200.00   181.0000
1.000000  0.0000000E+00  15.00000   4.500000   7.490000   24.70000   -3.000000  0.6000000  0.3000000
   1.800000    30.00000   11.00000   34.00000   25.00000
2.000000  0.0000000E+00  15.00000   6.400000   7.400000   26.60001   -3.000000  0.6000000  0.5000000
   5.900000    28.00000   11.00000   34.00000   27.00000
2.000000    35.00000   50.00000   6.300000   7.390000   27.20000   -3.000000   1.100000  0.6000000
   4.200000    27.00000   12.00000   32.00000   29.00000
      1          3          0          0
43100.00    20200.00   182.0000
1.000000  0.0000000E+00  15.00000   4.800000   7.290000   26.80000   -3.000000  0.5000000  0.6000000
   4.400000    25.00000   11.00000   34.00000   30.00000
2.000000  0.0000000E+00  15.00000   4.500000   7.700000   25.30000   -3.000000  0.6000000  0.5000000
   3.800000    27.00000   11.00000   33.00000   29.00000
2.000000    35.00000   50.00000   10.00000   7.380000   25.30000   -3.000000  0.6000000  0.4000000
   1.800000    30.00000   9.000000   37.00000   25.00000
      1          3          0          0
43200.00    20200.00   183.0000
1.000000  0.0000000E+00  15.00000   2.500000   7.600000   49.80000   -3.000000   4.400000  0.4000000
   10.80000    20.00000   27.00000   10.00000   43.00000
2.000000  0.0000000E+00  15.00000   1.900000   7.630000   49.00000   -3.000000   1.700000  0.5000000
   9.600000    16.00000   24.00000   10.00000   50.00000
2.000000    35.00000   50.00000   20.39999   7.010000   22.89999   -3.000000  0.8000000  0.2000000
   2.600000    21.00000   15.00000   30.00000   34.00000
      1          3          0          0
43200.00    20190.00   184.0000
1.000000  0.0000000E+00  15.00000   1.700000   7.500000   32.60001   -3.000000   1.200000  0.2000000
   4.300000    25.00000   17.00000   8.000000   50.00000
2.000000  0.0000000E+00  15.00000   1.400000   7.500000   44.39999   -3.000000   1.100000  0.2000000
   5.200000    21.00000   23.00000   7.000000   49.00000
2.000000    35.00000   50.00000   1.200000   7.500000   26.00000   -3.000000  0.8000000  0.2000000
   1.400000    27.00000   19.00000   7.000000   46.00000
      1          3          0          0
43300.00    20200.00   185.0000
1.000000  0.0000000E+00  15.00000   15.30000   7.800000   53.80000   -3.000000   1.200000  0.4000000
   13.50000    26.00000   18.00000   17.00000   39.00000
2.000000  0.0000000E+00  15.00000   8.100000   7.780000   59.70000   -3.000000   1.400000  0.4000000
   13.50000    18.00000   29.00000   12.00000   41.00000
2.000000    35.00000   50.00000   49.89999   7.560000   13.20000   -3.000000   1.100000  0.1000000
  0.4000000    4.000000   1.000000   87.00000   8.000000
      1          3          0          0
43300.00    20200.00   186.0000
1.000000  0.0000000E+00  15.00000   13.70000   7.650000   55.10001   -3.000000  0.8000000  0.3000000
   12.10000    21.00000   22.00000   15.00000   42.00000
2.000000  0.0000000E+00  15.00000   11.00000   7.280000   57.80000   -3.000000  0.9000000  0.3000000
   12.90000    17.00000   23.00000   15.00000   45.00000
2.000000    35.00000   50.00000   73.70000   7.490000   8.500000   -3.000000  0.4000000  0.1000000
  0.3000000    7.000000   2.000000   79.00000   12.00000
```

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       1          3          0          0
43400.00    20200.00   187.0000
1.000000   0.0000000E+00   15.00000    13.50000    7.390000    28.00000   -3.000000    1.000000   0.5000000
 5.200000    15.00000    21.00000    20.00000    44.00000
2.000000   0.0000000E+00   15.00000    14.40000    7.180000    29.30000   -3.000000    1.000000   0.6000000
 5.100000    33.00000    12.00000    20.00000    35.00000
2.000000    35.00000   50.00000    29.20000    7.790000    18.00000   -3.000000    1.000000   0.3000000
 1.300000    39.00000    31.00000    10.00000    20.00000
       1          3          0          0
43500.00    20200.00   189.0000
1.000000   0.0000000E+00   15.00000   0.6000000    6.210000    31.20000    19.10001   0.6000000   0.2000000
 5.100000    22.00000    19.00000    7.000000    51.00000
2.000000   0.0000000E+00   15.00000   0.4000000    6.780000    29.89999    18.89999   0.8000000   0.3000000
 5.400000    18.00000    21.00000    8.000000    53.00000
2.000000    35.00000   50.00000   0.7000000    6.910000    24.60001    17.10001   0.5000000   0.2000000
 0.8000000    29.00000    15.00000    6.000000    50.00000
       1          3          0          0
43500.00    20200.00   190.0000
1.000000   0.0000000E+00   15.00000   0.1000000    5.990000    31.60001    20.70000   0.6000000   0.2000000
 4.500000    19.00000    14.00000    7.000000    60.00000
2.000000   0.0000000E+00   15.00000    1.000000    6.090000    32.39999    19.39999   0.7000000   0.3000000
 5.000000    22.00000    17.00000    8.000000    53.00000
2.000000    35.00000   50.00000    1.200000    7.490000    30.00000   -3.000000   0.6000000   0.2000000
 3.100000    37.00000    13.00000    5.000000    45.00000
       1          3          0          0
43600.00    20200.00   191.0000
1.000000   0.0000000E+00   15.00000    11.10000    7.410000    27.89999   -3.000000   0.6000000   0.4000000
 4.500000    26.00000    14.00000    28.00000    33.00000
2.000000   0.0000000E+00   15.00000    10.60000    7.690000    26.89999   -3.000000    1.000000   0.4000000
 4.800000    25.00000    13.00000    30.00000    31.00000
2.000000    35.00000   50.00000    9.000000    7.400000    20.50000   -3.000000   0.5000000   0.2000000
 1.700000    27.00000    11.00000    33.00000    30.00000
       1          3          0          0
43600.00    20180.00   192.0000
1.000000   0.0000000E+00   15.00000    6.500000    7.610000    28.00000   -3.000000   0.8000000   0.5000000
 4.000000    26.00000    15.00000    20.00000    38.00000
2.000000   0.0000000E+00   15.00000    8.000000    7.450000    29.60001   -3.000000   0.7000000   0.3000000
 4.200000    27.00000    17.00000    17.00000    39.00000
2.000000    35.00000   50.00000    5.500000    7.750000    23.30000   -3.000000   0.6000000   0.2000000
 1.400000    28.00000    17.00000    11.00000    44.00000
       1          3          0          0
43700.00    20200.00   193.0000
1.000000   0.0000000E+00   15.00000    12.20000    7.430000    26.70000   -3.000000    1.100000   0.7000000
 4.000000    35.00000    14.00000    21.00000    30.00000
2.000000   0.0000000E+00   15.00000    11.40000    7.700000    30.60001   -3.000000    1.400000   0.8000000
 5.100000    34.00000    14.00000    20.00000    32.00000
2.000000    35.00000   50.00000    20.70000    7.500000    18.80000   -3.000000    1.000000   0.4000000
 1.200000    39.00000    16.00000    25.00000    21.00000
       1          3          0          0
43700.00    20200.00   194.0000
1.000000   0.0000000E+00   15.00000    8.700000    7.600000    29.30000   -3.000000    1.500000    1.100000
 4.300000    36.00000    19.00000    19.00000    26.00000
2.000000   0.0000000E+00   15.00000    9.300000    7.380000    29.30000   -3.000000    1.200000    1.100000
 4.300000    35.00000    15.00000    21.00000    28.00000
2.000000    35.00000   50.00000    27.10001    7.690000    23.70000   -3.000000    2.900000   0.4000000
 0.9000000    56.00000    27.00000    9.000000    7.000000
       1          3          0          0
43300.00    20200.00   195.0000
1.000000   0.0000000E+00   15.00000    10.70000    7.350000    30.89999   -3.000000    1.000000   0.5000000
 5.300000    30.00000    13.00000    20.00000    37.00000
2.000000   0.0000000E+00   15.00000    9.600000    7.540000    33.80000   -3.000000    1.000000   0.5000000
 5.100000    30.00000    14.00000    20.00000    36.00000
2.000000    35.00000   50.00000    10.00000    7.600000    28.20000   -3.000000    1.000000   0.2000000
 2.100000    31.00000    14.00000    23.00000    32.00000
```

43900.00	20200.00	196.0000	0				
1.000000	0.0000000E+00	15.00000					
5.000000	29.00000	14.00000					
2.000000	0.0000000E+00	15.00000		14.40000	7.290000	31.70000	-3.000000	1.000000	0.6000000
6.100000	23.00000	7.000000		22.00000	36.00000				
2.000000	35.00000	50.00000		16.39999	7.700000	32.20000	-3.000000	1.300000	0.7000000
2.400000	28.00000	13.00000		20.00000	45.00000				
1	3	0		30.20000	7.480000	25.39999	-3.000000	0.7000000	0.2000000
43900.00	20200.00	197.0000		30.00000	29.00000				
1.000000	0.0000000E+00	15.00000	0						
5.500000	30.00000	10.00000		10.90000	7.500000	33.50000	-3.000000	0.6000000	0.3000000
2.000000	0.0000000E+00	15.00000		30.00000	30.00000				
5.500000	31.00000	11.00000		14.20000	7.590000	36.89999	-3.000000	0.7000000	0.2000000
2.000000	35.00000	50.00000		30.00000	28.00000				
1.500000	12.00000	4.000000		55.39999	7.700000	15.50000	-3.000000	0.3000000	0.1000000
1	3	0		58.00000	31.00000				
43900.00	20200.00	198.0000	0						
1.000000	0.0000000E+00	15.00000		8.400000	7.500000	33.60001	-3.000000	0.6000000	0.2000000
5.400000	29.00000	9.000000		32.00000	29.00000				
2.000000	0.0000000E+00	15.00000		10.30000	7.390000	30.20000	-3.000000	0.7000000	0.2000000
6.400000	26.00000	15.00000		29.00000	30.00000				
2.000000	35.00000	50.00000		66.39999	7.510000	22.89999	-3.000000	0.2000000	0.1000000
0.8000000	12.00000	2.000000		67.00000	19.00000				
1	3	0	0						
44000.00	20190.00	199.0000		16.70000	7.200000	35.39999	-3.000000	0.5000000	0.3000000
1.000000	0.0000000E+00	15.00000		23.00000	43.00000				
7.600000	18.00000	16.00000		15.30000	7.610000	40.20000	-3.000000	0.7000000	0.4000000
2.000000	0.0000000E+00	15.00000		19.00000	44.00000				
9.500000	18.00000	19.00000		76.39999	7.590000	12.50000	-3.000000	0.4000000	0.1000000
2.000000	35.00000	50.00000		59.00000	19.00000				
0.6000000	12.00000	10.00000		0					
1	3	0							
44000.00	20190.00	200.0000		23.39999	7.490000	28.30000	-3.000000	0.5000000	0.1000000
1.000000	0.0000000E+00	15.00000		42.00000	27.00000				
5.500000	22.00000	9.000000		25.20000	7.490000	27.20000	-3.000000	0.6000000	0.1000000
2.000000	0.0000000E+00	15.00000		40.00000	29.00000				
5.900000	22.00000	9.000000		38.60001	8.000000	16.39999	-3.000000	0.3000000	0.1000000
2.000000	35.00000	50.00000		53.00000	25.00000				
1.600000	16.00000	6.000000		0					
1	3	0							
43000.00	20100.00	201.0000		0.8000000	7.400000	26.10001	-3.000000	0.5000000	0.3000000
1.000000	0.0000000E+00	15.00000		9.000000	51.00000				
3.400000	23.00000	17.00000		0.5000000	7.200000	24.39999	-3.000000	0.6000000	0.3000000
2.000000	0.0000000E+00	15.00000		8.000000	69.00000				
3.400000	19.00000	6.000000		5.000000	7.480000	18.39999	-3.000000	0.5000000	0.2000000
2.000000	35.00000	50.00000		11.00000	52.00000				
1.000000	24.00000	13.00000		0					
1	3	0							
43000.00	20100.00	202.0000		0.7000000	7.580000	25.00000	-3.000000	0.4000000	0.2000000
1.000000	0.0000000E+00	15.00000		8.000000	53.00000				
3.400000	21.00000	18.00000		0.9000000	7.180000	27.10001	-3.000000	0.4000000	0.2000000
2.000000	0.0000000E+00	15.00000		10.00000	55.00000				
3.800000	21.00000	14.00000		0.3000000	7.690000	22.30000	-3.000000	0.4000000	0.2000000
2.000000	35.00000	50.00000		7.000000	52.00000				
1.000000	23.00000	18.00000		0					
1	3	0							
43100.00	20100.00	203.0000		1.300000	7.390000	46.89999	-3.000000	0.8000000	0.2000000
1.000000	0.0000000E+00	15.00000		6.000000	41.00000				
8.900000	24.00000	29.00000		1.200000	7.300000	49.39999	-3.000000	0.9000000	0.3000000
2.000000	0.0000000E+00	15.00000		6.000000	48.00000				
8.700000	22.00000	24.00000		5.600000	7.500000	22.39999	-3.000000	0.9000000	0.3000000
2.000000	35.00000	50.00000		18.00000	42.00000				
1.400000	23.00000	17.00000							

1	3	0	0					
43200.00	20100.00	205.0000						
1.000000	0.0000000E+00	15.00000	8.600000	7.690000	62.20000	-3.000000	1.000000	0.3000000
10.60000	37.00000	31.00000	6.000000	26.00000				
2.000000	0.0000000E+00	15.00000	6.600000	7.730000	58.39999	-3.000000	1.200000	0.4000000
10.70000	32.00000	31.00000	6.000000	31.00000				
2.000000	35.00000	50.00000	13.30000	7.600000	35.10001	-3.000000	0.6000000	0.2000000
2.700000	38.00000	17.00000	9.000000	36.00000				
1	3	0	0					
43200.00	20100.00	206.0000						
1.000000	0.0000000E+00	15.00000	4.300000	7.800000	57.70000	-3.000000	0.9000000	0.3000000
8.000000	30.00000	19.00000	4.000000	47.00000				
2.000000	0.0000000E+00	15.00000	3.100000	7.800000	54.39999	-3.000000	0.8000000	0.3000000
6.800000	37.00000	28.00000	5.000000	30.00000				
2.000000	35.00000	50.00000	3.000000	7.690000	32.89999	-3.000000	0.4000000	0.1000000
1.300000	36.00000	18.00000	12.00000	34.00000				
1	3	0	0					
43300.00	20100.00	207.0000						
1.000000	0.0000000E+00	15.00000	5.300000	7.820000	63.39999	-3.000000	1.000000	0.5000000
9.700000	60.00000	16.00000	3.000000	21.00000				
2.000000	0.0000000E+00	15.00000	15.20000	7.400000	71.50000	-3.000000	1.300000	0.6000000
8.000000	52.00000	10.00000	5.000000	33.00000				
2.000000	35.00000	50.00000	2.200000	7.430000	31.60001	-3.000000	0.3000000	0.2000000
1.200000	45.00000	15.00000	11.00000	29.00000				
1	3	0	0					
43300.00	20100.00	208.0000						
1.000000	0.0000000E+00	15.00000	7.500000	7.400000	59.20000	-3.000000	1.700000	0.6000000
9.500000	68.00000	16.00000	8.000000	8.000000				
2.000000	0.0000000E+00	15.00000	2.200000	7.680000	41.50000	1.400000	-1.000000	0.3000000
9.400000	47.00000	19.00000	9.000000	25.00000				
2.000000	35.00000	50.00000	7.100000	7.400000	30.39999	-3.000000	3.800000	0.1000000
1.700000	39.00000	6.000000	19.00000	36.00000				
1	3	0	0					
43400.00	20100.00	209.0000						
1.000000	0.0000000E+00	15.00000	0.8000000	6.990000	66.50000	48.80000	1.000000	0.2000000
9.300000	41.00000	26.00000	5.000000	28.00000				
2.000000	0.0000000E+00	15.00000	0.3000000	6.410000	56.10001	53.50000	1.100000	0.3000000
9.300000	40.00000	30.00000	4.000000	27.00000				
2.000000	35.00000	50.00000	1.500000	7.310000	28.30000	-3.000000	0.3000000	0.2000000
0.8000000	33.00000	21.00000	8.000000	37.00000				
1	3	0	0					
43400.00	20100.00	210.0000						
1.000000	0.0000000E+00	15.00000	0.7000000	7.020000	61.20000	-3.000000	1.200000	0.3000000
8.700000	48.00000	23.00000	4.000000	25.00000				
2.000000	0.0000000E+00	15.00000	1.100000	6.950000	58.39999	50.80000	1.100000	0.3000000
10.20000	32.00000	21.00000	4.000000	43.00000				
2.000000	35.00000	50.00000	11.30000	7.590000	24.50000	-3.000000	0.4000000	0.2000000
0.3000000	29.00000	13.00000	12.00000	46.00000				
1	3	0	0					
43500.00	20100.00	211.0000						
1.000000	0.0000000E+00	15.00000	0.7000000	6.800000	81.70000	68.89999	1.600000	0.5000000
13.70000	43.00000	28.00000	5.000000	24.00000				
2.000000	0.0000000E+00	15.00000	0.9000000	6.890000	80.39999	67.39999	1.500000	0.3000000
14.20000	46.00000	28.00000	1.000000	25.00000				
2.000000	35.00000	50.00000	1.300000	7.200000	62.89999	-3.000000	0.3000000	0.2000000
1.100000	42.00000	19.00000	9.000000	30.00000				
1	3	0	0					
43600.00	20100.00	213.0000						
1.000000	0.0000000E+00	15.00000	19.50000	7.490000	29.30000	-3.000000	0.9000000	0.4000000
5.300000	24.00000	12.00000	21.00000	43.00000				
2.000000	0.0000000E+00	15.00000	19.89999	7.430000	31.60001	-3.000000	0.9000000	0.6000000
5.000000	22.00000	14.00000	21.00000	43.00000				
2.000000	35.00000	50.00000	16.50000	7.520000	20.60000	-3.000000	0.7000000	0.3000000
1.500000	29.00000	19.00000	19.00000	33.00000				

1	3	0	0					
43600.00	20100.00	214.0000						
1.000000	0.0000000E+00	15.00000	18.89999	7.540000	28.30000	-3.000000	0.9000000	0.4000000
4.500000	23.00000	14.00000	21.00000	42.00000				
2.000000	0.0000000E+00	15.00000	19.60001	7.580000	29.00000	-3.000000	1.200000	0.4000000
5.000000	18.00000	14.00000	21.00000	47.00000				
2.000000	35.00000	50.00000	31.20000	7.490000	15.10000	-3.000000	0.6000000	0.5000000
1.300000	23.00000	9.000000	32.00000	36.00000				
1	3	0	0					
43700.00	20110.00	215.0000						
1.000000	0.0000000E+00	15.00000	20.89999	7.800000	60.70000	-3.000000	1.200000	0.4000000
12.60000	45.00000	20.00000	2.000000	32.00000				
2.000000	0.0000000E+00	15.00000	23.39999	8.180000	61.30000	-3.000000	1.200000	0.4000000
14.50000	31.00000	38.00000	2.000000	29.00000				
2.000000	35.00000	50.00000	2.400000	7.510000	54.00000	-3.000000	1.300000	0.4000000
1.900000	73.00000	15.00000	2.000000	9.000000				
1	3	0	0					
43700.00	20110.00	216.0000						
1.000000	0.0000000E+00	15.00000	2.900000	7.500000	60.00000	-3.000000	0.9000000	0.4000000
10.80000	37.00000	16.00000	7.000000	40.00000				
2.000000	0.0000000E+00	15.00000	0.9000000	7.370000	62.39999	-3.000000	0.9000000	0.4000000
10.20000	29.00000	24.00000	8.000000	39.00000				
2.000000	35.00000	50.00000	53.60001	7.690000	18.39999	-3.000000	0.6000000	0.2000000
0.9000000	19.00000	9.000000	56.00000	16.00000				
1	3	0	0					
43800.00	20100.00	217.0000						
1.000000	0.0000000E+00	15.00000	0.6000000	7.350000	37.39999	-3.000000	1.600000	0.4000000
8.500000	41.00000	20.00000	6.000000	33.00000				
2.000000	0.0000000E+00	15.00000	1.300000	7.370000	35.80000	-3.000000	1.700000	0.6000000
4.700000	43.00000	19.00000	5.000000	33.00000				
2.000000	35.00000	50.00000	5.600000	7.450000	28.80000	-3.000000	3.500000	0.4000000
1.200000	59.00000	17.00000	5.000000	19.00000				
1	3	0	0					
43900.00	20100.00	219.0000						
1.000000	0.0000000E+00	15.00000	0.6000000	6.200000	39.50000	38.89999	2.900000	0.6000000
6.900000	47.00000	19.00000	3.000000	31.00000				
2.000000	0.0000000E+00	15.00000	0.8000000	6.390000	46.80000	27.10001	2.600000	0.5000000
5.100000	50.00000	20.00000	2.000000	28.00000				
2.000000	35.00000	50.00000	1.000000	6.900000	44.20000	34.10001	4.000000	0.5000000
1.300000	64.00000	17.00000	1.000000	18.00000				
1	3	0	0					
43910.00	20110.00	220.0000						
1.000000	0.0000000E+00	15.00000	0.4000000	7.100000	39.60001	-3.000000	2.600000	0.4000000
4.400000	43.00000	20.00000	4.000000	33.00000				
2.000000	0.0000000E+00	15.00000	0.2000000	7.000000	37.20000	25.30000	2.500000	0.6000000
4.500000	42.00000	18.00000	4.000000	36.00000				
2.000000	35.00000	50.00000	9.700000	7.600000	31.70000	-3.000000	3.200000	0.4000000
1.300000	57.00000	18.00000	2.000000	23.00000				
1	3	0	0					
44000.00	20100.00	221.0000						
1.000000	0.0000000E+00	15.00000	1.300000	7.000000	42.89999	-3.000000	2.200000	0.5000000
6.100000	42.00000	20.00000	4.000000	34.00000				
2.000000	0.0000000E+00	15.00000	0.4000000	6.840000	45.00000	33.39999	2.700000	0.8000000
11.50000	35.00000	14.00000	9.000000	42.00000				
2.000000	35.00000	50.00000	0.5000000	7.020000	33.10001	-3.000000	2.200000	0.6000000
1.900000	54.00000	17.00000	4.000000	25.00000				
1	3	0	0					
44000.00	20100.00	222.0000						
1.000000	0.0000000E+00	15.00000	1.900000	7.120000	44.10001	-3.000000	2.000000	0.5000000
5.100000	46.00000	20.00000	8.000000	26.00000				
2.000000	0.0000000E+00	15.00000	8.800000	6.800000	46.50000	29.30000	1.400000	0.4000000
8.100000	22.00000	23.00000	7.000000	48.00000				
2.000000	35.00000	50.00000	1.700000	7.300000	38.80000	-3.000000	2.200000	0.5000000
9.500000	54.00000	16.00000	3.000000	29.00000				

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       1          3          0          0
43000.00    20000.00   223.0000
1.000000   0.0000000E+00  15.00000    20.89999    7.500000    61.50000   -3.000000   1.100000   0.4000000
   13.60000    37.00000    27.00000    4.000000    32.00000
2.000000   0.0000000E+00  15.00000    20.60001    7.280000    67.20000   -3.000000   1.200000   0.4000000
   14.50000    33.00000    34.00000    4.000000    29.00000
2.000000    35.00000   50.00000    2.500000    7.520000    56.20000   -3.000000   0.6000000   0.3000000
   1.900000    81.00000    10.00000    1.000000    8.000000
       1          3          0          0
43000.00    20000.00   224.0000
1.000000   0.0000000E+00  15.00000    6.700000    7.510000    73.89999   -3.000000   1.400000   0.5000000
   12.10000    55.00000    23.00000    2.000000    21.00000
2.000000   0.0000000E+00  15.00000    7.900000    7.820000    78.10001   -3.000000   1.500000   0.5000000
   13.70000    38.00000    31.00000    4.000000    28.00000
2.000000    35.00000   50.00000    2.100000    7.690000    62.30000   -3.000000   1.100000   0.3000000
   2.300000    85.00000    13.00000  0.0000000E+00  2.000000
       1          3          0          0
43100.00    20000.00   225.0000
1.000000   0.0000000E+00  15.00000    3.900000    7.580000    75.00000   -3.000000   1.900000   0.6000000
   13.30000    43.00000    18.00000    2.000000    37.00000
2.000000   0.0000000E+00  15.00000    4.800000    7.720000    87.80000   -3.000000   1.900000   0.5000000
   13.00000    28.00000    33.00000    3.000000    36.00000
2.000000    35.00000   50.00000   0.8000000    7.690000    57.50000   -3.000000   0.8000000   0.3000000
   1.300000    73.00000    16.00000    1.000000    10.00000
       1          3          0          0
43100.00    20000.00   226.0000
1.000000   0.0000000E+00  15.00000    4.700000    7.680000    72.80000   -3.000000   1.400000   0.5000000
   12.90000    47.00000    32.00000    2.000000    19.00000
2.000000   0.0000000E+00  15.00000    4.400000    7.710000    88.70000   -3.000000   1.900000   0.5000000
   13.40000    28.00000    31.00000    3.000000    38.00000
2.000000    35.00000   50.00000    2.300000    7.600000    55.10001   -3.000000   0.7000000   0.3000000
   1.800000    73.00000    18.00000    1.000000    7.000000
       1          3          0          0
43200.00    20000.00   227.0000
1.000000   0.0000000E+00  15.00000    1.600000    7.510000    50.10001   -3.000000   0.8000000   0.3000000
   7.700000    38.00000    18.00000    9.000000    35.00000
2.000000   0.0000000E+00  15.00000   0.9000000    7.180000    50.39999   -3.000000   0.7000000   0.3000000
   5.400000    35.00000    20.00000    11.00000    34.00000
2.000000    35.00000   50.00000    1.700000    7.120000    30.10001   -3.000000   0.3000000   0.2000000
   1.300000    36.00000    10.00000    12.00000    42.00000
       1          3          0          0
43300.00    20000.00   229.0000
1.000000   0.0000000E+00  15.00000    19.50000    7.510000    64.60001   -3.000000   0.8000000   0.4000000
   13.10000    39.00000    31.00000    4.000000    26.00000
2.000000   0.0000000E+00  15.00000    17.80000    7.700000    57.30000   -3.000000   0.8000000   0.4000000
   12.60000    26.00000    35.00000    4.000000    35.00000
2.000000    35.00000   50.00000    4.400000    7.680000    34.10001   -3.000000   0.5000000   0.2000000
   1.100000    45.00000    15.00000    16.00000    24.00000
       1          3          0          0
43400.00    20000.00   231.0000
1.000000   0.0000000E+00  15.00000   0.4000000    5.930000    74.30000    56.70000   2.200000   0.5000000
   13.40000    47.00000    15.00000    1.000000    37.00000
2.000000   0.0000000E+00  15.00000   0.5000000    6.200000    74.50000    64.70000   2.100000   0.4000000
   13.20000    46.00000    28.00000    2.000000    24.00000
2.000000    35.00000   50.00000   0.3000000    7.260000    60.20000   -3.000000   0.8000000   0.4000000
   2.100000    80.00000    13.00000  0.0000000E+00  7.000000
       1          3          0          0
43500.00    20000.00   233.0000
1.000000   0.0000000E+00  15.00000    30.60001    7.750000    67.10001   -3.000000   0.7000000   0.2000000
   16.39999    36.00000    25.00000    2.000000    37.00000
2.000000   0.0000000E+00  15.00000    27.80000    7.680000    68.10001   -3.000000   0.7000000   0.2000000
   16.20000    30.00000    36.00000    3.000000    31.00000
2.000000    35.00000   50.00000   0.5000000    7.510000    57.20000   -3.000000   0.6000000   0.4000000
   1.900000    81.00000    12.00000    1.000000    7.000000
```

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         1          3          0          0
43600.00       20000.00   235.0000
1.000000   0.0000000E+00  15.00000    11.50000    7.750000    60.89999   -3.000000   1.000000   0.4000000
   12.90000       41.00000   24.00000    4.000000   31.00000
2.000000   0.0000000E+00  15.00000    13.00000    7.650000    61.70000   -3.000000   1.000000   0.4000000
   11.20000       35.00000   31.00000    3.000000   32.00000
2.000000       35.00000   50.00000    2.900000    7.050000    34.70000   -3.000000   0.6000000  0.2000000
  0.7000000       43.00000   15.00000    7.000000   35.00000
         1          3          0          0
43700.00       20000.00   237.0000
1.000000   0.0000000E+00  15.00000    0.3000000   7.340000    41.00000   -3.000000   1.700000   0.3000000
   9.900000       19.00000   12.00000    13.00000   55.00000
2.000000   0.0000000E+00  15.00000    6.600000    7.330000    43.10001   -3.000000   1.400000   0.8000000
   10.00000       13.00000   20.00000    14.00000   48.00000
2.000000       35.00000   50.00000    7.100000    7.650000    31.60001   -3.000000   1.000000   0.4000000
   1.300000       31.00000   5.000000    18.00000   46.00000
         1          3          0          0
43700.00       20000.00   238.0000
1.000000   0.0000000E+00  15.00000    6.300000    7.100000    41.39999   -3.000000   1.000000   0.2000000
   8.200000       23.00000   12.00000    14.00000   51.00000
2.000000   0.0000000E+00  15.00000    3.800000    7.610000    40.30000   -3.000000   1.200000   0.6000000
   8.600000       20.00000   20.00000    12.00000   48.00000
2.000000       35.00000   50.00000    7.400000    7.320000    23.10001   -3.000000   0.9000000  0.3000000
   1.500000       28.00000   13.00000    15.00000   44.00000
         1          3          0          0
43800.00       20000.00   239.0000
1.000000   0.0000000E+00  15.00000    0.2000000   6.000000    51.60001    33.30000   3.000000   0.5000000
   9.000000       45.00000   22.00000    3.000000   30.00000
2.000000   0.0000000E+00  15.00000    0.2000000   5.790000    48.10001    30.20000   2.600000   0.5000000
   7.900000       36.00000   23.00000    3.000000   38.00000
2.000000       35.00000   50.00000    1.200000    6.640000    44.39999    30.20000   2.800000   0.4000000
   3.600000       57.00000   21.00000    1.000000   21.00000
         1          3          0          0
43800.00       20000.00   240.0000
1.000000   0.0000000E+00  15.00000    2.000000    6.330000    46.20000    36.89999   3.200000   0.4000000
   6.700000       42.00000   16.00000    3.000000   39.00000
2.000000   0.0000000E+00  15.00000    0.9000000   6.510000    47.89999    32.89999   2.900000   0.5000000
   7.700000       42.00000   21.00000    4.000000   33.00000
2.000000       35.00000   50.00000    0.6000000   7.090000    35.80000   -3.000000   3.500000   0.4000000
  0.8000000       49.00000   14.00000    5.000000   32.00000
         1          3          0          0
43900.00       19990.00   241.0000
1.000000   0.0000000E+00  15.00000    1.600000    7.420000    52.10001   -3.000000   2.600000   0.3000000
   10.90000       27.00000   18.00000    11.00000   45.00000
2.000000   0.0000000E+00  15.00000    0.4000000   7.200000    54.50000   -3.000000   2.400000   0.6000000
   9.500000       22.00000   20.00000    10.00000   48.00000
2.000000       35.00000   50.00000    9.900000    7.500000    34.50000   -3.000000   3.700000   0.4000000
   1.300000       49.00000   17.00000    5.000000   29.00000
         1          3          0          0
44000.00       20000.00   243.0000
1.000000   0.0000000E+00  15.00000    0.9000000   7.100000    50.50000   -3.000000   1.800000   0.6000000
   10.00000       35.00000   21.00000    7.000000   37.00000
2.000000   0.0000000E+00  15.00000    0.8000000   7.060000    48.10001   -3.000000   1.800000   0.5000000
   8.400000       29.00000   23.00000    8.000000   40.00000
2.000000       35.00000   50.00000    3.300000    7.050000    32.39999   -3.000000   1.300000   0.4000000
   1.200000       37.00000   12.00000    11.00000   40.00000
```

APPENDIX 9.2

Computer printouts with the fitting of elliptical functions to find a semi-variogram model for cases of anisotropy.

Elliptical Function.

SPLT

SD m GRID

SAS

12:39 WEDNESDAY, JULY 9, 1986 1

OBS	THETA	W
1	0.0000	0.640
2	0.7854	0.541
3	1.5708	1.161
4	2.3562	0.000

Elliptical Function.

SLT

SD in GRID

SAS

12:39 WEDNESDAY, JULY 9, 1986 1

OBS	THETA	W
1	0.0000	0.640
2	0.7854	0.541
3	1.5708	1.161
4	2.3562	0.000

Elliptical Function.

SLT

50 m GRID

OBS	THETA	W
1	0.0000	0.640
2	0.7854	0.541
3	1.5708	1.161
4	2.3562	0.000

Elliptical Function.

SLT

SD m GRID

SAS

12:39 WEDNESDAY, JULY 9, 1986 1

OBS	THETA	W
1	0.0000	0.640
2	0.7854	0.541
3	1.5708	1.161
4	2.3562	0.000

NON-LINEAR LEAST SQUARES GRID SEARCH DEPENDENT VARIABLE W

A	B	PHI	RESIDUAL SS
1.0	0.2	1.1781	0.399044030264
0.2	1.0	2.7489	0.399044113376
0.9	0.2	1.1781	0.403339011547
0.2	0.9	2.7489	0.40333908427
0.9	0.3	1.1781	0.409233302306
0.3	0.9	2.7489	0.40923336464
1.0	0.1	1.1781	0.413149916863
0.1	1.0	2.7489	0.413150010364
1.0	0.3	1.1781	0.414938284291
0.3	1.0	2.7489	0.414938357014
1.1	0.2	1.1781	0.42474898182
0.2	1.1	2.7489	0.424749075321
0.9	0.1	1.1781	0.427444861414
0.1	0.9	2.7489	0.427444944526
1.1	0.1	1.1781	0.428854905151
0.1	1.1	2.7489	0.428855009041
0.8	0.3	1.1781	0.433528253159
0.3	0.8	2.7489	0.433528305104
0.8	0.2	1.1781	0.437633925668
0.2	0.8	2.7489	0.437633988002
0.9	0.4	1.1781	0.44512773369
0.4	0.9	2.7489	0.445127785635
1.1	0.3	1.1781	0.450643199114
0.3	1.1	2.7489	0.450643282226
1.0	0.0	1.1781	0.457255944088
0.0	1.0	2.7489	0.457256047978
0.8	0.4	1.1781	0.459422721276
0.4	0.8	2.7489	0.459422762832
1.0	0.4	1.1781	0.460832678944
0.4	1.0	2.7489	0.460832741277
1.1	0.0	1.1781	0.462960969108
0.0	1.1	2.7489	0.462961083387
0.8	0.1	1.1781	0.471739738803
0.1	0.8	2.7489	0.471739811526
1.2	0.1	1.1781	0.474559826277
0.1	1.2	2.7489	0.474559940556
1.2	0.2	1.1781	0.480453866214
0.2	1.2	2.7489	0.480453970104
0.9	0.0	1.1781	0.481550851907
0.0	0.9	2.7489	0.481550945408
0.7	0.3	1.1781	0.487823136851
0.3	0.7	2.7489	0.487823178407
1.2	0.0	1.1781	0.498665926966
0.0	1.2	2.7489	0.498666051634
0.7	0.2	1.1781	0.501928772628
0.2	0.7	2.7489	0.501928824573
0.7	0.4	1.1781	0.503717641699
0.4	0.7	2.7489	0.503717672866
1.1	0.4	1.1781	0.506537557035
0.4	1.1	2.7489	0.506537629758
0.9	0.5	1.1781	0.511022305701
0.5	0.9	2.7489	0.511022347257

NON-LINEAR LEAST SQUARES GRID SEARCH DEPENDENT VARIABLE W

A	B	PHI	RESIDUAL SS
1.0	0.2	1.1781	0.399044030264
0.2	1.0	2.7489	0.399044113376
0.9	0.2	1.1781	0.403339011547
0.2	0.9	2.7489	0.40333908427
0.9	0.3	1.1781	0.409233302306
0.3	0.9	2.7489	0.40923336464
1.0	0.1	1.1781	0.413149916863
0.1	1.0	2.7489	0.413150010364
1.0	0.3	1.1781	0.414938284291
0.3	1.0	2.7489	0.414938357014
1.1	0.2	1.1781	0.42474898182
0.2	1.1	2.7489	0.424749075321
0.9	0.1	1.1781	0.427444861414
0.1	0.9	2.7489	0.427444944526
1.1	0.1	1.1781	0.428854905151
0.1	1.1	2.7489	0.428855009041
0.8	0.3	1.1781	0.433528253159
0.3	0.8	2.7489	0.433528305104
0.8	0.2	1.1781	0.437633925668
0.2	0.8	2.7489	0.437633988002
0.9	0.4	1.1781	0.44512773369
0.4	0.9	2.7489	0.445127785635
1.1	0.3	1.1781	0.450643199114
0.3	1.1	2.7489	0.450643282226
1.0	0.0	1.1781	0.457255944088
0.0	1.0	2.7489	0.457256047978
0.8	0.4	1.1781	0.459422721276
0.4	0.8	2.7489	0.459422762832
1.0	0.4	1.1781	0.460832678944
0.4	1.0	2.7489	0.460832741277
1.1	0.0	1.1781	0.462960969108
0.0	1.1	2.7489	0.462961083387
0.8	0.1	1.1781	0.471739738803
0.1	0.8	2.7489	0.471739811526
1.2	0.1	1.1781	0.474559826277
0.1	1.2	2.7489	0.474559940556
1.2	0.2	1.1781	0.480453866214
0.2	1.2	2.7489	0.480453970104
0.9	0.0	1.1781	0.481550851907
0.0	0.9	2.7489	0.481550945408
0.7	0.3	1.1781	0.487823136851
0.3	0.7	2.7489	0.487823178407
1.2	0.0	1.1781	0.498665926966
0.0	1.2	2.7489	0.498666051634
0.7	0.2	1.1781	0.501928772628
0.2	0.7	2.7489	0.501928824573
0.7	0.4	1.1781	0.503717641699
0.4	0.7	2.7489	0.503717672866
1.1	0.4	1.1781	0.506537557035
0.4	1.1	2.7489	0.506537629758
0.9	0.5	1.1781	0.511022305701
0.5	0.9	2.7489	0.511022347257

NON-LINEAR LEAST SQUARES GRID SEARCH DEPENDENT VARIABLE W

A	B	PHI	RESIDUAL SS
1.0	0.2	1.1781	0.399044030264
0.2	1.0	2.7489	0.399044113376
0.9	0.2	1.1781	0.403339011547
0.2	0.9	2.7489	0.40333908427
0.9	0.3	1.1781	0.409233302306
0.3	0.9	2.7489	0.40923336464
1.0	0.1	1.1781	0.413149916863
0.1	1.0	2.7489	0.413150010364
1.0	0.3	1.1781	0.414938284291
0.3	1.0	2.7489	0.414938357014
1.1	0.2	1.1781	0.42474898182
0.2	1.1	2.7489	0.424749075321
0.9	0.1	1.1781	0.427444861414
0.1	0.9	2.7489	0.427444944526
1.1	0.1	1.1781	0.428854905151
0.1	1.1	2.7489	0.428855009041
0.8	0.3	1.1781	0.433528253159
0.3	0.8	2.7489	0.433528305104
0.8	0.2	1.1781	0.437633925668
0.2	0.8	2.7489	0.437633988002
0.9	0.4	1.1781	0.44512773369
0.4	0.9	2.7489	0.445127785635
1.1	0.3	1.1781	0.450643199114
0.3	1.1	2.7489	0.450643282226
1.0	0.0	1.1781	0.457255944088
0.0	1.0	2.7489	0.457256047978
0.8	0.4	1.1781	0.459422721276
0.4	0.8	2.7489	0.459422762832
1.0	0.4	1.1781	0.460832678944
0.4	1.0	2.7489	0.460832741277
1.1	0.0	1.1781	0.462960969108
0.0	1.1	2.7489	0.462961083387
0.8	0.1	1.1781	0.471739738803
0.1	0.8	2.7489	0.471739811526
1.2	0.1	1.1781	0.474559826277
0.1	1.2	2.7489	0.474559940556
1.2	0.2	1.1781	0.480453866214
0.2	1.2	2.7489	0.480453970104
0.9	0.0	1.1781	0.481550851907
0.0	0.9	2.7489	0.481550945408
0.7	0.3	1.1781	0.487823136851
0.3	0.7	2.7489	0.487823178407
1.2	0.0	1.1781	0.498665926966
0.0	1.2	2.7489	0.498666051634
0.7	0.2	1.1781	0.501928772628
0.2	0.7	2.7489	0.501928824573
0.7	0.4	1.1781	0.503717641699
0.4	0.7	2.7489	0.503717672866
1.1	0.4	1.1781	0.506537557035
0.4	1.1	2.7489	0.506537629758
0.9	0.5	1.1781	0.511022305701
0.5	0.9	2.7489	0.511022347257

NON-LINEAR LEAST SQUARES GRID SEARCH DEPENDENT VARIABLE W

A	B	PHI	RESIDUAL SS
1.0	0.2	1.1781	0.399044030264
0.2	1.0	2.7489	0.399044113376
0.9	0.2	1.1781	0.403339011547
0.2	0.9	2.7489	0.40333908427
0.9	0.3	1.1781	0.409233302306
0.3	0.9	2.7489	0.40923336464
1.0	0.1	1.1781	0.413149916863
0.1	1.0	2.7489	0.413150010364
1.0	0.3	1.1781	0.414938284291
0.3	1.0	2.7489	0.414938357014
1.1	0.2	1.1781	0.42474898182
0.2	1.1	2.7489	0.424749075321
0.9	0.1	1.1781	0.427444861414
0.1	0.9	2.7489	0.427444944526
1.1	0.1	1.1781	0.428854905151
0.1	1.1	2.7489	0.428855009041
0.8	0.3	1.1781	0.433528253159
0.3	0.8	2.7489	0.433528305104
0.8	0.2	1.1781	0.437633925668
0.2	0.8	2.7489	0.437633988002
0.9	0.4	1.1781	0.44512773369
0.4	0.9	2.7489	0.445127785635
1.1	0.3	1.1781	0.450643199114
0.3	1.1	2.7489	0.450643282226
1.0	0.0	1.1781	0.457255944088
0.0	1.0	2.7489	0.457256047978
0.8	0.4	1.1781	0.459422721276
0.4	0.8	2.7489	0.459422762832
1.0	0.4	1.1781	0.460832678944
0.4	1.0	2.7489	0.460832741277
1.1	0.0	1.1781	0.462960969108
0.0	1.1	2.7489	0.462961083387
0.8	0.1	1.1781	0.471739738803
0.1	0.8	2.7489	0.471739811526
1.2	0.1	1.1781	0.474559826277
0.1	1.2	2.7489	0.474559940556
1.2	0.2	1.1781	0.480453866214
0.2	1.2	2.7489	0.480453970104
0.9	0.0	1.1781	0.481550851907
0.0	0.9	2.7489	0.481550945408
0.7	0.3	1.1781	0.487823136851
0.3	0.7	2.7489	0.487823178407
1.2	0.0	1.1781	0.498665926966
0.0	1.2	2.7489	0.498666051634
0.7	0.2	1.1781	0.501928772628
0.2	0.7	2.7489	0.501928824573
0.7	0.4	1.1781	0.503717641699
0.4	0.7	2.7489	0.503717672866
1.1	0.4	1.1781	0.506537557035
0.4	1.1	2.7489	0.506537629758
0.9	0.5	1.1781	0.511022305701
0.5	0.9	2.7489	0.511022347257

0.8	0.5	1.1781	0.515317330018
0.5	0.8	2.7489	0.515317361185
1.2	0.3	1.1781	0.516348046776
0.3	1.2	2.7489	0.516348140277
0.3	0.9	2.3562	0.535201028076
0.9	0.3	0.7854	0.535203324565
0.8	0.0	1.1781	0.535845692564
0.0	0.8	2.7489	0.535845775676

BEST 60 ITERATIONS

0.8	0.5	1.1781	0.515317330018
0.5	0.8	2.7489	0.515317361185
1.2	0.3	1.1781	0.516348046776
0.3	1.2	2.7489	0.516348140277
0.3	0.9	2.3562	0.535201028076
0.9	0.3	0.7854	0.535203324565
0.8	0.0	1.1781	0.535845692564
0.0	0.8	2.7489	0.535845775676

BEST 60 ITERATIONS

0.8	0.5	1.1781	0.515317330018
0.5	0.8	2.7489	0.515317361185
1.2	0.3	1.1781	0.516348046776
0.3	1.2	2.7489	0.516348140277
0.3	0.9	2.3562	0.535201028076
0.9	0.3	0.7854	0.535203324565
0.8	0.0	1.1781	0.535845692564
0.0	0.8	2.7489	0.535845775676

BEST 60 ITERATIONS

NON-LINEAR LEAST SQUARES ITERATIVE PHASE

DEPENDENT VARIABLE: W METHOD: GAUSS-NEWTON

ITERATION	A	B	PHI	RESIDUAL SS
0	1	0.2	1.1781	0.39904403026
1	0.96097399	0.21002796	1.1692632	0.39690042956
2	0.96104028	0.20996167	1.168687	0.39690004628
3	0.96104053	0.20996142	1.1686871	0.39690004628

NOTE: CONVERGENCE CRITERION MET.

NON-LINEAR LEAST SQUARES ITERATIVE PHASE

DEPENDENT VARIABLE: W METHOD: GAUSS-NEWTON

ITERATION	A	B	PHI	RESIDUAL SS
0	1	0.2	1.1781	0.39904403026
1	0.96097399	0.21002796	1.1692632	0.39690042956
2	0.96104028	0.20996167	1.168687	0.39690004628
3	0.96104053	0.20996142	1.1686871	0.39690004628

NOTE: CONVERGENCE CRITERION MET.

NON-LINEAR LEAST SQUARES ITERATIVE PHASE

DEPENDENT VARIABLE: W METHOD: GAUSS-NEWTON

ITERATION	A	B	PHI	RESIDUAL SS
0	1	0.2	1.1781	0.39904403026
1	0.96097399	0.21002796	1.1692632	0.39690042956
2	0.96104028	0.20996167	1.168687	0.39690004628
3	0.96104053	0.20996142	1.1686871	0.39690004628

NOTE: CONVERGENCE CRITERION MET.

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS DEPENDENT VARIABLE W

INITIAL GUESSED VALUES.

A: 0. TO 2 BY 0.1

B: 0 TO 2 BY 0.1

PHI: 0 TO π BY π/8 (0.3927

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	3	1.6533019537	0.5511006512
RESIDUAL	1	0.3969000463	0.3969000463
UNCORRECTED TOTAL	4	2.0502020000	
(CORRECTED TOTAL)	3	0.6789610000	

PARAMETER	ESTIMATE	ASYMPTOTIC STD. ERROR	ASYMPTOTIC 95 % CONFIDENCE INTERVAL LOWER	UPPER
A	0.961040533	0.54559631320	-5.9713062229	7.8933872862
B	0.209961418	0.54559442408	-6.7223613345	7.1422841701
PHI	1.168687061	0.59311743132	-6.3674630279	8.7048371495

ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

CORR	A	B	PHI
A	1.0000	-0.3333	-0.0000
B	-0.3333	1.0000	0.0000
PHI	-0.0000	0.0000	1.0000

File complete

PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP

$$W(\theta) = 0.961 \cos^2(\theta - 1.168) + 0.2099 \sin^2(\theta - 1.168)$$

INITIAL GUESSED VALUES.

A: 0 TO 2 BY 0.1

B: 0 TO 2 BY 0.1

PHI: 0 TO π BY $\pi/8$ (0.3927

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS DEPENDENT VARIABLE W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	3	1.6533019537	0.5511006512
RESIDUAL	1	0.3969000463	0.3969000463
UNCORRECTED TOTAL	4	2.0502020000	
(CORRECTED TOTAL)	3	0.6789610000	

PARAMETER	ESTIMATE	ASYMPTOTIC STD. ERROR	ASYMPTOTIC 95 % CONFIDENCE INTERVAL LOWER	UPPER
A	0.961040533	0.54559631320	-5.9713062229	7.8933872882
B	0.209961418	0.54559442408	-6.7223613345	7.1422841701
PHI	1.168687061	0.59311743132	-6.3674630279	8.7048371495

ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

CORR	A	B	PHI
A	1.0000	-0.3333	-0.0000
B	-0.3333	1.0000	0.0000
PHI	-0.0000	0.0000	1.0000

File complete

PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP

$$W(\theta) = 0.961 \cos^2(\theta - 1.168) + 0.2099 \sin^2(\theta - 1.168)$$

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS DEPENDENT VARIABLE W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	3	1.6533019537	0.5511006512
RESIDUAL	1	0.3969000463	0.3969000463
UNCORRECTED TOTAL	4	2.0502020000	
(CORRECTED TOTAL)	3	0.6789610000	

INITIAL GUESSED VALUES.

A: 0 TO 2 BY 0.1

B: 0 TO 2 BY 0.1

PHI: 0 TO π BY $\pi/8$ (0.3927

PARAMETER	ESTIMATE	ASYMPTOTIC STD. ERROR	ASYMPTOTIC 95 % CONFIDENCE INTERVAL LOWER	UPPER
A	0.961040533	0.54559631320	-5.9713062229	7.8933872882
B	0.209961418	0.54559442408	-6.7223613345	7.1422841701
PHI	1.168687061	0.59311743132	-6.3674630279	8.7049371495

ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

CORR	A	B	PHI
A	1.0000	-0.3333	-0.0000
B	-0.3333	1.0000	0.0000
PHI	-0.0000	0.0000	1.0000

File complete

PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP

$$w(\theta) = 0.961 \cos^2(\theta - 1.168) + 0.2099 \sin^2(\theta - 1.168)$$

FOR ANISOTROPY IN: SILT

OBS	THETA	W
1	0.0000	0.6160
2	0.3926	0.7313
3	0.7854	0.4940
4	1.1780	1.3420
5	1.5708	1.2460
6	1.9663	0.6920
7	2.3562	0.0500
8	2.7480	0.4735

FOR ANISOTROPY IN: SILT

OBS	THETA	W
1	0.0000	0.6160
2	0.3926	0.7313
3	0.7854	0.4940
4	1.1780	1.3420
5	1.5708	1.2460
6	1.9663	0.6920
7	2.3562	0.0500
8	2.7480	0.4735

ELLIPTIC FUNCTION: (A**2*COSQR(T-P)+B**2*SINSQR(T-P))**1/2 0:30 WEDNESDAY, JULY 16, 1986 1

FOR ANISOTROPY IN: SILT

OBS	THETA	W
1	0.0000	0.6160
2	0.3926	0.7313
3	0.7854	0.4940
4	1.1780	1.3420
5	1.5708	1.2460
6	1.9663	0.6920
7	2.3562	0.0500
8	2.7480	0.4735

FOR ANISOTROPY IN: SILT

OBS	THETA	W
1	0.0000	0.6160
2	0.3926	0.7313
3	0.7854	0.4940
4	1.1780	1.3420
5	1.5708	1.2460
6	1.9663	0.6920
7	2.3562	0.0500
8	2.7480	0.4735

FOR ANISOTROPY IN: SILT

NON-LINEAR LEAST SQUARES GRID SEARCH DEPENDENT VARIABLE W

A	B	PHI	RESIDUAL SS
1.01	0.51	1.1781	0.737301244527
0.51	1.01	2.7489	0.737301654516
1.01	0.01	1.1781	0.782370768012
0.01	1.01	2.7489	0.78237239743
0.01	1.01	2.3562	0.870713350563
1.01	0.01	0.7854	0.870719900562
0.51	1.01	2.3562	0.93631787373
1.01	0.51	0.7854	0.93632204531
0.51	1.01	0.0000	0.975613942934
1.01	0.51	1.5708	0.975617677073
0.51	1.01	3.1416	0.975621411243
0.01	1.01	0.0000	1.26369832255
1.01	0.01	1.5708	1.26370427143
0.01	1.01	3.1416	1.26371021883
0.51	1.01	0.3927	1.4657636043
1.01	0.51	1.9635	1.46576872193
0.51	0.51	1.5708	1.54044194
0.51	0.51	1.9635	1.54044194
0.51	0.51	2.3562	1.54044194
0.51	0.51	0.0000	1.54044194
0.51	0.51	0.3927	1.54044194
0.51	0.51	0.7854	1.54044194
0.51	0.51	1.1781	1.54044194
0.51	0.51	2.7489	1.54044194
0.51	0.51	3.1416	1.54044194
0.51	1.01	1.9635	1.55373194467
1.01	0.51	0.3927	1.55373858986
1.51	0.01	1.1781	1.60933510828
0.01	1.51	2.7489	1.60933731639
1.51	0.51	1.1781	1.73676556737
0.51	1.51	2.7489	1.736766994
0.01	1.51	2.3562	1.73759101498
1.51	0.01	0.7854	1.73760081685
0.51	0.01	1.1781	1.95375556526
0.01	0.51	2.7489	1.95375646378
1.01	1.01	1.1781	1.97564194
1.01	1.01	1.5708	1.97564194
1.01	1.01	2.3562	1.97564194
1.01	1.01	0.3927	1.97564194
1.01	1.01	0.7854	1.97564194
1.01	1.01	1.9635	1.97564194
1.01	1.01	2.7489	1.97564194
1.01	1.01	3.1416	1.97564194
1.01	1.01	0.0000	1.97564194
0.01	0.51	2.3562	2.00225502535
0.51	0.01	0.7854	2.00225932513
0.51	1.01	0.7854	2.00532197
1.01	0.51	2.3562	2.00532659905
0.01	1.01	0.3927	2.01579223125
1.01	0.01	1.9635	2.01579363201

FOR ANISOTROPY IN: SILT

NON-LINEAR LEAST SQUARES GRID SEARCH DEPENDENT VARIABLE W

A	B	PHI	RESIDUAL SS
1.01	0.51	1.1781	0.737301244527
0.51	1.01	2.7489	0.737301654516
1.01	0.01	1.1781	0.782370768012
0.01	1.01	2.7489	0.78237239743
0.01	1.01	2.3562	0.870713350568
1.01	0.01	0.7854	0.870719900562
0.51	1.01	2.3562	0.93631787373
1.01	0.51	0.7854	0.93632204531
0.51	1.01	0.0000	0.975613942934
1.01	0.51	1.5708	0.975617677078
0.51	1.01	3.1416	0.975621411243
0.01	1.01	0.0000	1.26369832255
1.01	0.01	1.5708	1.26370427148
0.01	1.01	3.1416	1.26371021883
0.51	1.01	0.3927	1.4657636043
1.01	0.51	1.9635	1.46576872193
0.51	0.51	1.5708	1.54044194
0.51	0.51	1.9635	1.54044194
0.51	0.51	2.3562	1.54044194
0.51	0.51	0.0000	1.54044194
0.51	0.51	0.3927	1.54044194
0.51	0.51	0.7854	1.54044194
0.51	0.51	1.1781	1.54044194
0.51	0.51	2.7489	1.54044194
0.51	0.51	3.1416	1.54044194
0.51	1.01	1.9635	1.55373194467
1.01	0.51	0.3927	1.55373858986
1.51	0.01	1.1781	1.60933510828
0.01	1.51	2.7489	1.60933731839
1.51	0.51	1.1781	1.73676556737
0.51	1.51	2.7489	1.736766999
0.01	1.51	2.3562	1.73759101498
1.51	0.01	0.7854	1.73760081685
0.51	0.01	1.1781	1.95375556526
0.01	0.51	2.7489	1.95375646378
1.01	1.01	1.1781	1.97564194
1.01	1.01	1.5708	1.97564194
1.01	1.01	2.3562	1.97564194
1.01	1.01	0.3927	1.97564194
1.01	1.01	0.7854	1.97564194
1.01	1.01	1.9635	1.97564194
1.01	1.01	2.7489	1.97564194
1.01	1.01	3.1416	1.97564194
1.01	1.01	0.0000	1.97564194
0.01	0.51	2.3562	2.00225502535
0.51	0.01	0.7854	2.00225932612
0.51	1.01	0.7854	2.00532197
1.01	0.51	2.3562	2.00532659905
0.01	1.01	0.3927	2.01579229
1.01	0.01	1.9635	2.01579934201

FOR ANISOTROPY IN: SILT

NON-LINEAR LEAST SQUARES GRID SEARCH DEPENDENT VARIABLE W

A	B	PHI	RESIDUAL SS
1.01	0.51	1.1781	0.737301244527
0.51	1.01	2.7489	0.737301654516
1.01	0.01	1.1781	0.782370768012
0.01	1.01	2.7489	0.78237239743
0.01	1.01	2.3562	0.870713350568
1.01	0.01	0.7854	0.870719900562
0.51	1.01	2.3562	0.93631787373
1.01	0.51	0.7854	0.93632204531
0.51	1.01	0.0000	0.975613942934
1.01	0.51	1.5708	0.975617677078
0.51	1.01	3.1416	0.975621411243
0.01	1.01	0.0000	1.26369832255
1.01	0.01	1.5708	1.26370427148
0.01	1.01	3.1416	1.26371021883
0.51	1.01	0.3927	1.4657636043
1.01	0.51	1.9635	1.46576872193
0.51	0.51	1.5708	1.54044194
0.51	0.51	1.9635	1.54044194
0.51	0.51	2.3562	1.54044194
0.51	0.51	0.0000	1.54044194
0.51	0.51	0.3927	1.54044194
0.51	0.51	0.7854	1.54044194
0.51	0.51	1.1781	1.54044194
0.51	0.51	2.7489	1.54044194
0.51	0.51	3.1416	1.54044194
0.51	1.01	1.9635	1.55373194467
1.01	0.51	0.3927	1.55373858986
1.51	0.01	1.1781	1.60933510828
0.01	1.51	2.7489	1.60933731839
1.51	0.51	1.1781	1.73676556737
0.51	1.51	2.7489	1.736766999
0.01	1.51	2.3562	1.73759101498
1.51	0.01	0.7854	1.73760081685
0.51	0.01	1.1781	1.95375556526
0.01	0.51	2.7489	1.95375646378
1.01	1.01	1.1781	1.97564194
1.01	1.01	1.5708	1.97564194
1.01	1.01	2.3562	1.97564194
1.01	1.01	0.3927	1.97564194
1.01	1.01	0.7854	1.97564194
1.01	1.01	1.9635	1.97564194
1.01	1.01	2.7489	1.97564194
1.01	1.01	3.1416	1.97564194
1.01	1.01	0.0000	1.97564194
0.01	0.51	2.3562	2.00225502535
0.51	0.01	0.7854	2.00225832812
0.51	1.01	0.7854	2.00532197
1.01	0.51	2.3562	2.00532659908
0.01	1.01	0.3927	2.01579229
1.01	0.01	1.9635	2.01579936301

FOR ANISOTROPY IN: SILT

NON-LINEAR LEAST SQUARES ITERATIVE PHASE

DEPENDENT VARIABLE: W METHOD: GAUSS-NEWTON

ITERATION	A	B	PHI	RESIDUAL SS
0	1.01	0.51	1.1781	0.73730124453
1	1.0526243	0.26933161	1.1229419	0.62343957402
2	1.0350467	0.27985664	1.0894058	0.61932383008
3	1.0404633	0.26071492	1.0871272	0.61935396838
4	1.0395021	0.26401271	1.0818601	0.61926750687
5	1.0403651	0.2606288	1.0820085	0.61927615066
6	1.0401441	0.26149194	1.081125	0.61927416586
7	1.0403054	0.26085062	1.0812367	0.6192737943
8	1.0402536	0.26105645	1.0810801	0.61927372242
9	1.0402852	0.26093043	1.0811142	0.61927370806
10	1.0402735	0.26097694	1.081085	0.61927370514

NOTE: CONVERGENCE CRITERION MET.

FOR ANISOTROPY IN: SILT

NON-LINEAR LEAST SQUARES ITERATIVE PHASE

DEPENDENT VARIABLE: W METHOD: GAUSS-NEWTON

ITERATION	A	B	PHI	RESIDUAL SS
0	1.01	0.51	1.1781	0.73730124453
1	1.0526243	0.26933161	1.1229419	0.62343957402
2	1.0350467	0.27985664	1.0894058	0.61932383008
3	1.0404633	0.26071492	1.0871272	0.61935396838
4	1.0395021	0.26401271	1.0818601	0.61926750687
5	1.0403651	0.2606288	1.0820085	0.61927615066
6	1.0401441	0.26149194	1.081125	0.61927416586
7	1.0403054	0.26085062	1.0812367	0.6192737943
8	1.0402536	0.26105645	1.0810801	0.61927372242
9	1.0402852	0.26093043	1.0811142	0.61927370805
10	1.0402735	0.26097694	1.081085	0.61927370514

NOTE: CONVERGENCE CRITERION MET.

FOR ANISOTROPY IN: SILT

NON-LINEAR LEAST SQUARES ITERATIVE PHASE

DEPENDENT VARIABLE: W METHOD: GAUSS-NEWTON

ITERATION	A	B	PHI	RESIDUAL SS
0	1.01	0.51	1.1781	0.73730124453
1	1.0526243	0.26933161	1.1229419	0.62343957402
2	1.0350467	0.27985664	1.0894058	0.61932383008
3	1.0404633	0.26071492	1.0871272	0.61925396838
4	1.0395021	0.26401271	1.0818601	0.61926750687
5	1.0403651	0.2606288	1.0820085	0.61927615066
6	1.0401441	0.26149194	1.081125	0.61927416586
7	1.0403054	0.26085062	1.0812367	0.6192737943
8	1.0402536	0.26105645	1.0810801	0.61927372242
9	1.0402852	0.26093043	1.0811142	0.61927370806
10	1.0402735	0.26097694	1.081085	0.61927370514

NOTE: CONVERGENCE CRITERION MET.

ELLIPTIC FUNCTION: (A**2*COSQR(T-P)+B**2*SINSQR(T-P))**1/2 0:36 WEDNESDAY, JULY 16, 1986 4
FOR ANISOTROPY IN: SILT

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS DEPENDENT VARIABLE W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	3	4.5930642349	1.5326980783
RESIDUAL	5	0.6192737051	0.1238547410
UNCORRECTED TOTAL	8	5.2173379400	
(CORRECTED TOTAL)	7	1.2343670600	

PARAMETER	ESTIMATE	ASYMPTOTIC STD. ERROR	ASYMPTOTIC 95 % CONFIDENCE INTERVAL LOWER	UPPER
A	1.040273543	0.19676229345	0.56019243516	1.5203546009
B	0.260376936	0.30432261962	-.52129792379	1.0432517959
PHI	1.081095010	0.22593665184	0.50015054240	1.6620194764

ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

CORR	A	B	PHI
A	1.0000	-0.2726	-0.0166
B	-0.2726	1.0000	0.0405
PHI	-0.0166	0.0405	1.0000

File complete

BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB

$$W(\theta) = \left[(1.04)^2 \cos^2(\theta - 1.08) + (0.260)^2 \sin^2(\theta - 1.08)\right]^{1/2}$$

FOR ANISOTROPY IN: SILT

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS DEPENDENT VARIABLE W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	3	4.5980642349	1.5326880783
RESIDUAL	5	0.6192737051	0.1238547410
UNCORRECTED TOTAL	8	5.2173379400	
(CORRECTED TOTAL)	7	1.2343670600	

PARAMETER	ESTIMATE	ASYMPTOTIC STD. ERROR	ASYMPTOTIC 95 % CONFIDENCE INTERVAL LOWER	UPPER
A	1.040273543	0.19676239345	0.56019248516	1.5203546008
B	0.260976936	0.30432261962	-.52129792379	1.0432517958
PHI	1.081085010	0.22599665184	0.50015054240	1.6620194784

ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

CORR	A	B	PHI
A	1.0000	-0.2726	-0.0166
B	-0.2726	1.0000	0.0405
PHI	-0.0166	0.0405	1.0000

File complete

$$W(\theta_j) = \left[(1.04)^2 \cos^2(\theta - 1.08) + (0.260)^2 \sin^2(\theta - 1.08)\right]^{\frac{1}{2}}$$

FOR ANISOTROPY IN: SILT

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS DEPENDENT VARIABLE W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	3	4.5930642349	1.5326880783
RESIDUAL	5	0.6192737051	0.1238547410
UNCORRECTED TOTAL	8	5.2173379400	
(CORRECTED TOTAL)	7	1.2343670600	

PARAMETER	ESTIMATE	ASYMPTOTIC STD. ERROR	ASYMPTOTIC 95 % CONFIDENCE INTERVAL LOWER	UPPER
A	1.040273543	0.18676239345	0.56019248516	1.5203546008
B	0.260976936	0.30432261962	-.52129792379	1.0432517958
PHI	1.081085010	0.22599685184	0.50015054240	1.6620194784

ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

CORR	A	B	PHI
A	1.0000	-0.2726	-0.0166
B	-0.2726	1.0000	0.0405
PHI	-0.0166	0.0405	1.0000

File complete

$$W(\theta_i) = \left[(1.04)^2 \cos^2(\theta - 1.08) + (0.260)^2 \sin^2(\theta - 1.08)\right]^{1/2}$$

APPENDIX 9.3

Lists the soil class to which individual points in the sampling grids were allocated.

Appendix 9.3

Soil Class corresponding to each grid point in the 50m grid

Site Number	Soil Class	Class Identifier
15042	BCg - 3/2	3
65014	BEg - 3	4
15043	BCg - 3/2	3
65015	BCg - 2/3	3
15044	CSG - 2	6
65016	BCT - 4/5	1
15045	BCT - 4/5	1
65018	BCg - 3	3
65019	BEg - 3	4
65020	BEg - 3	4
65021	BCg - 3	2
65022	BCg - 3	2
65023	BCT - 4/5	1
65024	BCT - 4/5	1
45014	NSG - 2	7
65027	NSG - 2	7
15052	NSG - 2	7
65028	CSG - 2	6
55015	BCg - 3	2
65029	BCg - 2	3
15053	BCT - 4/5	1
65031	NSG - 2	7
65032	NSG - 2	7
65033	NSG - 2	7
65034	BCg - 3/2	3
65035	BCg - 2/3	3
65036	BCg - 2/3	3
65037	BC(g) - 3/4	2
15054	BEg - 3/2	5
65040	NSG - 2	6
15060	BEg - 3/2	5
65041	CSG - 2	6
15061	BCg - 2/3	3
65042	BCg - 3	2
15062	BCg - 3/4	2
65044	BEg - 3	4
65045	BEg - 3/2	5
65046	NSG - 2	6
65047	NSG - 2	7
65048	NSG - 2	7
65049	NSG - 2	7
65050	BEg 3/2	5
55018	BEg - 2	5
65053	BEg - 3	4
15069	BEg - 3	4
65054	BEg - 3	4
45019	BEg - 3	4

65055	BEg - 3	4
15070	BEg - 2/3	5
65057	BEg - 2/3	5
65058	BEg - 3/2	5
65059	BEg - 3	4
65060	BEg - 3	4
65061	BEg - 3	4
65062	BEg - 3	4
65063	BEg - 3/2	5
15077	NGG1 - 2	8
65066	NGG1 - 2/3	8
15078	BEg - 3	4
65067	NGG1 - 2	8
15079	BEg - 2/3	5
65068	BEg - 3	4
15080	BEg - 3	4
65070	BEg - 2	5
65071	NGG1 - 2	8
65072	NGG1 - 2	8
65073	NGG1 - 2	8
65074	NGG1 - 2	8
65075	NGG1 - 2	8
65076	NGG1 - 2	8
45022	BEg - 3	4
65079	NGG2 - 2	9
15087	NGG2 - 2	9
65080	NGG1 - 2	8
55022	NGG1 - 2	8
65081	NGG1 - 2	8
15088	NGG1 - 2	8
65083	NGG1 - 2	8
65084	BEg - 2	5
65085	NGG1 - 2	8
65086	NGG2 - 2	9
65087	NGG1 - 2	8
65088	NGG1 - 2	8
65089	NGG1 - 2	
15095	NGG1 - 2	8
65092	BEg - 2	5
15096	NGG1 - 2	8
65093	NGG2 - 2	9
15097	NGG2 - 2	9
65094	NGG2 - 2	9
15098	NGG2 - 2	9
65096	NGG1 - 2	8
65097	NGG1 - 2	8
65098	NGG1 - 2	8
65099	NGG2 - 2	9
65100	NGG2 - 2	9
65101	NGG2 - 2	9
55025	NGG1 - 2	8
65105	NGG1 - 2	8
15105	NGG1 - 2	8

65106	NGG2 - 2	9
21164	NGG1 - 2	8
65107	NGG2 - 2	9
15106	NGG2 - 2	9

Appendix 9.3

Soil Class corresponding to each grid point in the 100m grid

Site Number	Soil Class	Class Identifier
15001	BCg - 2/3	3
15002	BEg - 3	4
15003	BEg - 3	4
15004	BEg - 2	5
15005	BEg - 2	5
15006	NGG1 - 2	8
15007	BEg - 2/3	5
15008	NSG - 2	7
15009	NSG - 2	7
15010	NSG - 2	7
15011	BCg - 2/3	3
15012	BEg - 3	4
15013	BCg - 2/3	3
45005	BEg - 3	4
15014	BEg - 3	4
55006	BEg - 3	4
15015	BEg - 2	5
45006	NGG1 - 2	8
15016	NSG - 2	7
55007	BEg - 2/3	5
15017	BEg - 2/3	5
45007	CSG - 2	6
15018	BCg - 2	3
55008	BEg - 2	5
15019	BC(g) - 3/4	2
15020	BCg - 3	2
15021	BEg - 2	5
15022	BCg - 3	2
15023	BEg - 3	4
15024	BEg - 2	5
15025	NSG - 2	7
15026	BEg - 3	4
15027	BCg - 2/3	3
15028	BCT - 5	1
15029	BCT - 4	1
15030	BCg - 3	2
15031	BEg - 3	4
55009	BC(g) - 3/4	2
15032	BEg - 3	4
45010	BEg - 3	4
15033	BCg - 3/4	2
55010	BCg - 2/3	3
15034	NSG - 2	7
45011	BCg - 3	2
15035	BCT - 4/5	1
55011	BCT - 4/5	1
15036	BCT - 5	1

15037	BCg - 3	2
15038	BEg - 4	4
15039	BCg - 2/3	3
15041	NGG1 - 2	8
15042	BCg - 3/2	3
15043	BCg - 3/2	3
15033	CSG - 2	6
15045	BCT - 4/5	1
15046	BCT - 4/5	1
15047	BCg - 2/3	3
15048	BCg - 2/3	3
15049	BEg - 3	4
45013	BEg - 3	4
15050	BEg - 2	5
55014	BEg - 3	4
15051	NGG1 - 1	8
45014	NSG - 2	7
15052	NSG - 2	7
55015	BCg - 3	2
15053	BCT - 4/5	1
45015	BCg - 3/4	2
15054	CSG - 2	6
55016	BEg - 2/3	5
15055	BEg - 3	4
15056	BEg - 2	5
00121	BEg - 3	4
15057	BEg - 2	5
15058	BEg - 3	4
15059	BEg - 3/2	5
15060	BEg - 3/2	5
15061	BCg - 2/3	3
15062	BCg - 3/4	2
15063	BCg - 2	3
15064	NSG - 2	7
15065	NSG - 2	7
15066	BEg - 3	4
55017	BEg - 2	5
15067	BEG - 3	4
45018	BEg - 2	5
15068	NGG1 - 2	8
55018	BEg - 2	5
15069	BEg - 3	4
45019	BEg - 3	4
15070	BEg - 2/3	5
55019	NSG - 2	7
15071	NSG - 2	7
45020	NSG - 2	7
15022	BEg - 2/3	5
15073	BCg - 3	2
15074	BEg - 3	4
15075	BEg - 3	4
15076	BEg - 3	4
15077	NGG1 - 2	8

15078	BEg - 3	4
15079	BEg - 2/3	5
15080	BEg - 3	4
15081	BEg - 2/3	5
15082	BEg - 3	4
15083	BC(g) - 3/4	2
15084	BEg - 3	4
45021	BEg - 2/3	5
15085	NGG2 - 2	9
55021	BEg - 2	5
15086	Disturbed	5
45022	BEg - 3	4
15087	NGG2 - 2	9
55022	NGG1 - 2	8
15088	NGG1 - 2	8
45023	BEg - 2	5
55023	BEg - 3	
15090	BEg - 3	4
15091	BEg - 3	4
15092	BEg 2/3	5
15093	NGG1 - 2	8
15044	NGG1 - 2	8
15095	NGG1 - 2	8
15096	NGG2 - 2	9
15097	NGG2 - 2	9
15098	NGG2 - 2N	9
15099	CGG - 2	10
15100	CGG - 2	10
15101	CGG - 2	10
15102	BCg - 3	2
55024	BEg - 2/3	5
15103	BEg - 2	5
45025	NGG1 - 2	8
15104	NGG1 - 2	8
55025	NGG1 - 2	8
15105	NGG1 - 2	8
21164	NGG1 - 2	8
15106	NGG2 - 2	9
55026	NGG2 - 2	9
15107	CGG - 2	10
45026	NGG1 - 2	8

Appendix 9.3

Soil Class corresponding to each grid point in the 200m grid

Site Number	Soil Class	Class Identifier
45001	BCg - 2/3	3
55001	BCg - 3	2
45002	BEg - 2	5
55002	NSG - 2	7
45003	BCg - 2/3	3
55003	NSG - 2	7
45004	NSG - 2	7
55004	BCT - 5	1
55005	BCg - 3	2
45005	BEg - 3	4
55006	BEg - 3	4
45006	NGGl - 2	8
55007	BEg - 2/3	5
45007	CSG - 2	6
55008	BEg - 2	5
45008	BC(g) - 3/4	2
45009	BCg - 2/3	3
55009	BC(g) - 3/4	2
45010	BEg - 3	4
45501	BCg - 2/3	3
45011	BCg - 3	2
55011	BCT - 4/5	1
45012	BCg - 2/3	3
55012	BC(g) - 3/4	2
55013	BEg - 3	4
45013	BEg - 3	4
55014	BEg - 3	4
45014	NSG - 2	7
55015	BCg - 3	2
45015	BCg - 3/4	2
55016	BEg - 2/3	5
45017	BEg - 3	4
55017	BEg - 2	5
45018	BEg - 2	5
55018	BEg - 2	5
45019	BEg - 3	4
55019	NSG - 2	7
45020	NSG - 2	7
55020	BEg - 3	4
45021	BEg - 2/3	5
55021	BEg - 2	5
45022	BEg - 3	4
55022	NGGl - 2	8
45023	BEg - 2	5
45024	BEg - 2/3	5
55024	BEg - 2/3	5

45025	NGG1 - 2	8
55025	NGG1 - 2	8
21164	NGG1 - 2	8
55026	NGG2 - 2	9
45026	NGG1 - 2	8
45027	NGG2 - 2	9
55027	NGG2 - 2	9
45028	NGG1 - 2	8
55028	NGG1 - 2	8
45029	NGG1 - 2	8
55029	NGG1 - 2	8
45030	NGG2 - 2	9
55030	NGG2 - 2	9
55031	BCg - 2/3	3
45031	NGG2 - 2	9
55032	NGG1 - 2	8
45032	NGG2 - 2	9
55033	NGG2 - 2	9
45033	NGG1 - 2	8
55034	NGG2 - 2	9
45035	NGG1 - 2	8
55035	NGG1 - 2	8
45036	NGG2 - 2	9
55036	NGG2 - 2	9
45037	NGG2 - 2	9
55037	NGG1 - 2	8
45038	NGG1 - 2	8
55038	BCg - 3	2
55039	NGG1 - 2	8
45039	NGG1 - 2	8
55040	NGG1 - 2	8
45040	NGG1 - 2	8
55041	NGG1 - 2	8
45041	NGG2 - 2	9
45042	BCg - 3	2
21189	BCg - 3	2
55043	BCg - 2/3	3
45043	NGG1 - 2	8
45044	BCg - 3	2
55045	BCT - 4/5	1
45045	BCG - 4/5	1
55046	BCT 4/5	1

APPENDIX 9.4

List of sites from the 3 sampling grids at Yelford, grouped within each mapping unit.

Appendix 9.4a -

List of Sites within the Mapping Units in the 50m Grid, Yelford

BCT 4-5	BEg 3-2	BCg- (2)	BCg 3/4	NSg-2	BEg-3(2)	NGG1(2)	NGG2-2
65016	65014	15042	65037	45014	15059	15077	65093
15045	65019	65018	15062	65027	65044	65066	15097
65023		15043		15052	65045	65067	65094
65024		65015		65031	65050	65071	15098
15053		15044		65032	55018	65072	65099
		65021		65033	45018	65073	65100
		65022		65040	45053	65074	65101
		65028		15060	15069	65075	65102
		55015		65046	65054	65076	21164
		65029		65047	45019	65079	65107
		65035		65048	65055	15087	
		65036		65049	15070	65080	
		15061			65057	55022	
		65042			65058	65081	
					65059	15088	
					65060	65085	
					65061	65086	
					65062	65087	
					65063	65088	
					15078	65089	
					15079	65096	
					65068	65097	
					15080	65098	
					65070	55025	
					45022	65105	
					65092	15105	
						65106	

Appendix 9.4b -

List of Sites within the Mapping Units in the 100m Grid, Yelford

BCT 4/5	BEg-3(2)	BCg-3(2)	BCg 3/4	CSG-2	CGG-2	NGG2-2	NGG1-2	NSG-2
15028	55007	15011	45015	15054	15099	45026	15006	15012
15029	15017	45007	15062	15063	15100	15097	45006	55008
15035	45003	15018			15101	15106	15024	15010
15011	55002	15027			15107	55026	15051	15009
15046	15007	15030					15068	15008
15045	15058	55010					15077	15016
15053	15059	45016					15087	15025
	15060	15042					15022	15034
	55018	15043					15088	15064
	15069	15044					15085	15065
	45019	15047					15093	55019
	15070	45012					15094	15071
	45002	15048					15095	45028
	15002	55015					45025	45014
	15003	55016					15104	15052
	15004	15061					55025	
	15005	15083					21164	
	45005	55023						
	15014	15078						
	55000	15079						
	15015	15080						
	15021	15081						
	15022	15082						
	15023	45023						
	15031	15001						
	15032	15013						
	45010	15019						
	15037	15020						
	15038	55009						
	15039	45009						
	15040							
	15049							
	45013							
	15050							
	55014							
	15005							
	15056							
	00121							
	15057							
	15066							
	55017							
	15067							
	45018							
	15072							
	15073							
	15074							
	15015							
	15076							
	15084							
	45021							
	55021							
	15086							

Appendix 9.4b -

List of Sites within the Mapping Units in the 100m Grid, Yelford

BCT 4/5	BEg-3(2)	BCg-3(2)	BCg 3/4	CSG-2	CGG-2	NGG2-2	NGG1-2	NSG-2
	45022							
	15090							
	15091							
	15092							
	15102							
	55024							
	15103							

Appendix 9.4c -

List of Sites within the Mapping Units in the 200m Grid, Yelford

BCT4-5	BCg-3	NGG1-2	NGG2-2	BEg-3(2)	BCg-3(2)	NSG-2	BEg-2(3)	BC(g)3-4
55045	55044	45035	45027	45002	45001	45014	45004	45008
45045	45044	55035	55027	45005	55005		55008	55012
55046	45042	55039	45030	55006	55001		55016	45017
55011	45034	45039	55030	55009	45003			
55004	21189	55040	55031	45010	55003			
	55043	45040	45031	55013	45007			
		45038	55032	45013	55010			
		45043	45032	55014	45011			
		45028	55033	45017	45012			
		45025	45033	55017	55015			
		55028	55036	45018	45015			
		55025	45036	55020				
		45029	55036	45021				
		55022	45037	55021				
		21104	55037	45022				
		45026		45024				
				55021				
				45006				
				55007				
				55018				
				45019				
				45023				
				55023				

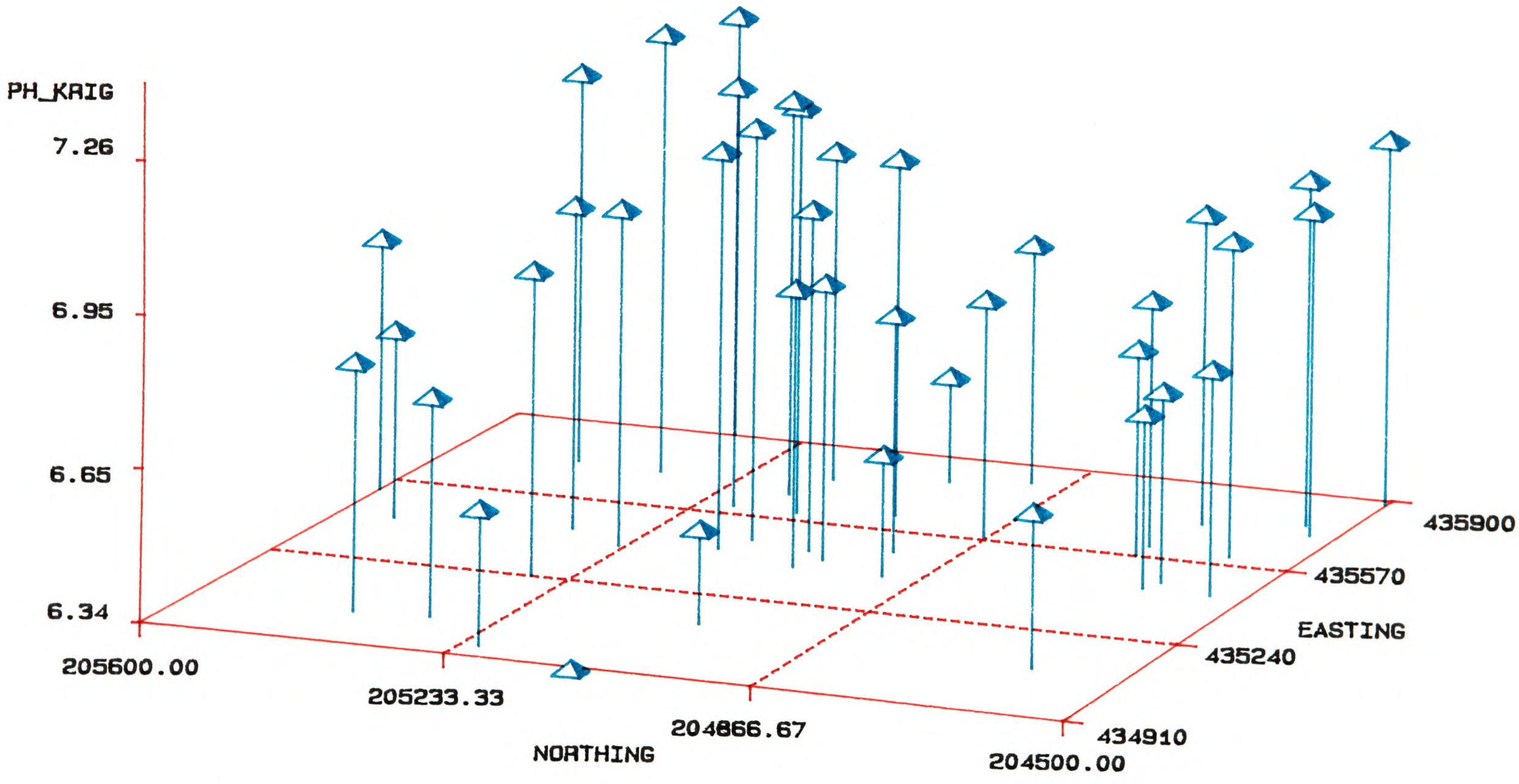
APPENDIX 9.5

3-D plots of the Kriging estimates at the random check points in the three grids at Yelford. Estimation variances of the Kriging estimates at the random check points for 8 soil properties.

pH

KRIGING ESTIMATES

0–15cm.

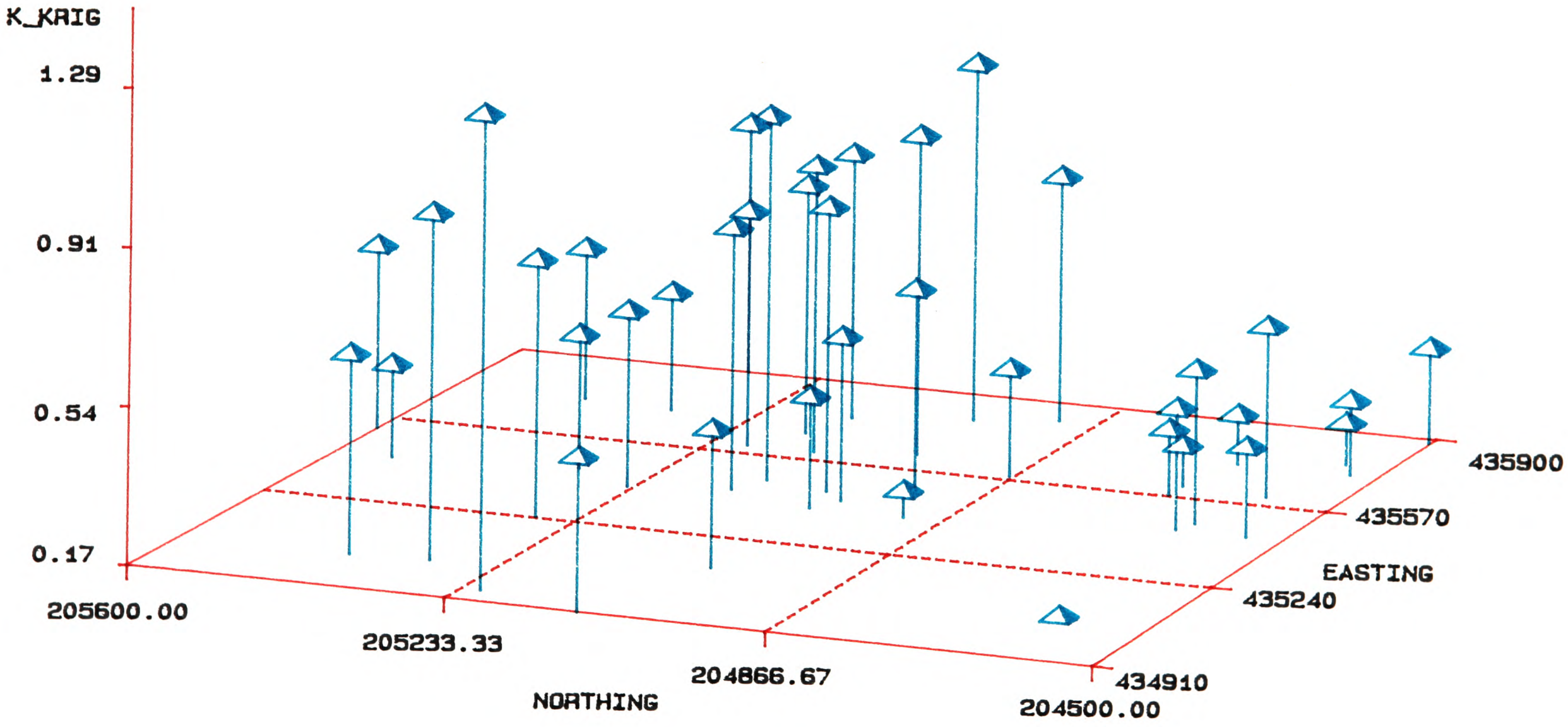


100 m GRID, YELFORD

POTASSIUM

KRIGING ESTIMATES

0–15cm.

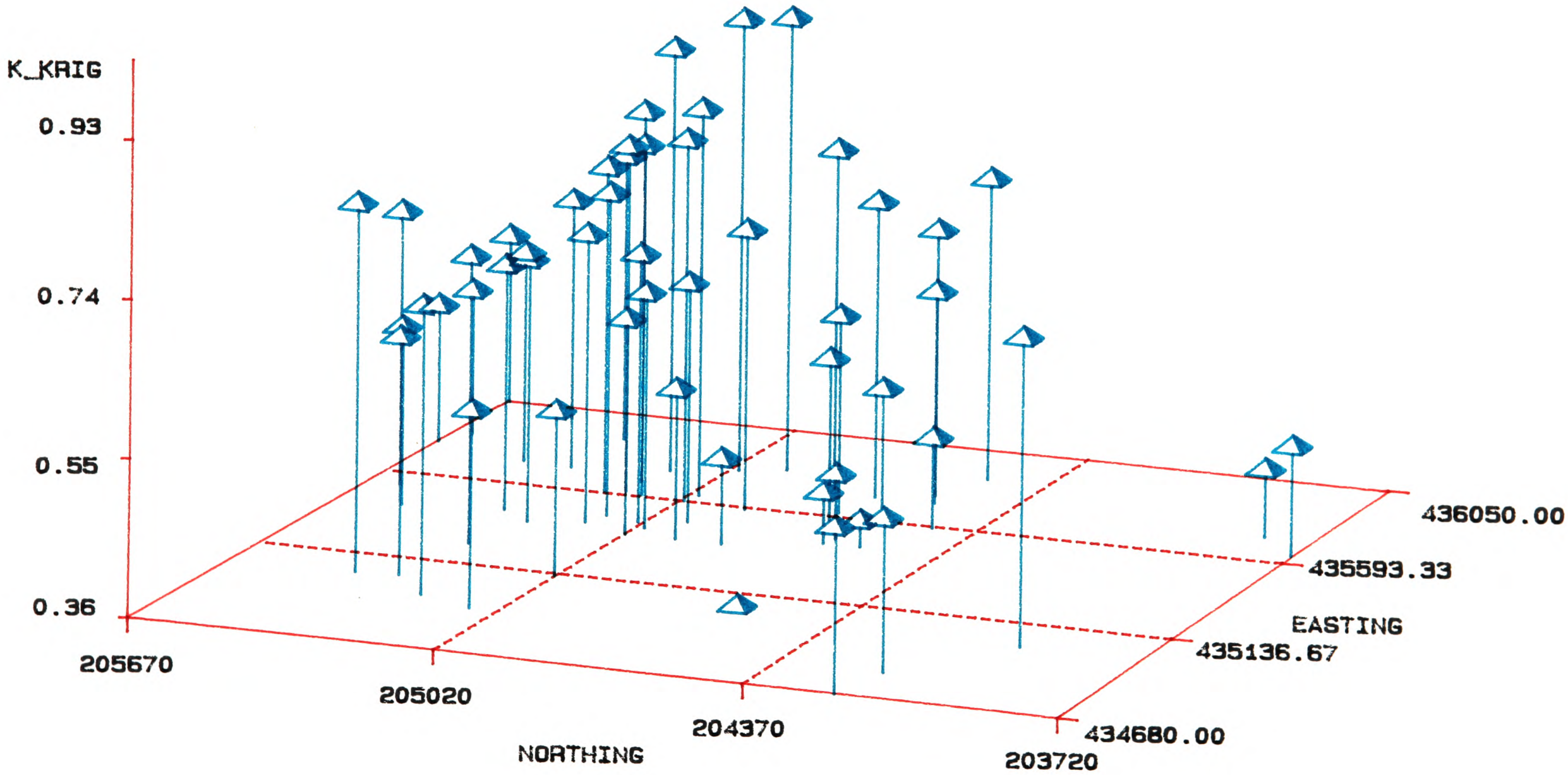


100 m GRID, YELFORD

POTASSIUM

KRIGING ESTIMATES

0–15cm.

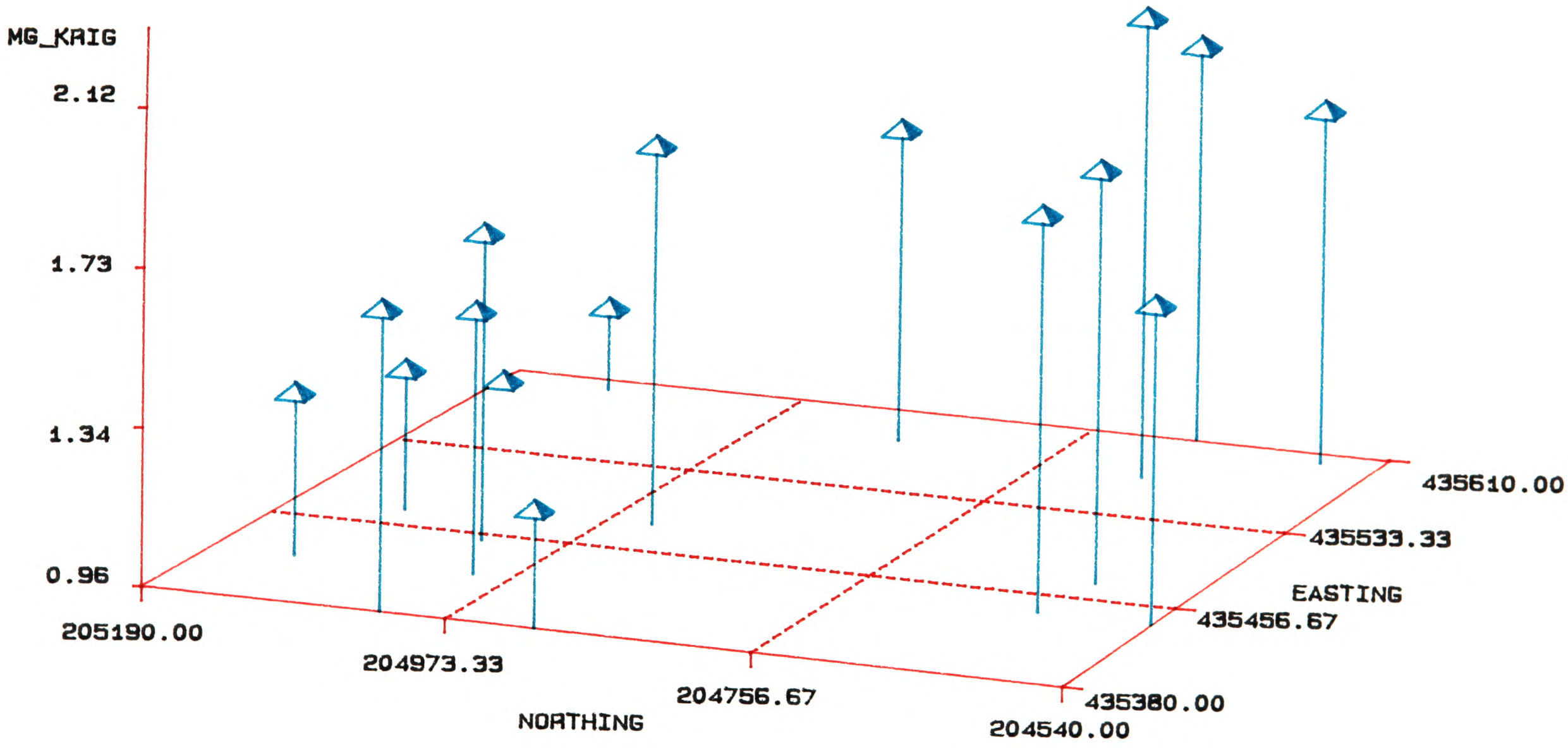


200 m GRID, YELFORD

MAGNESIUM

KRIGING ESTIMATES

0–15cm.

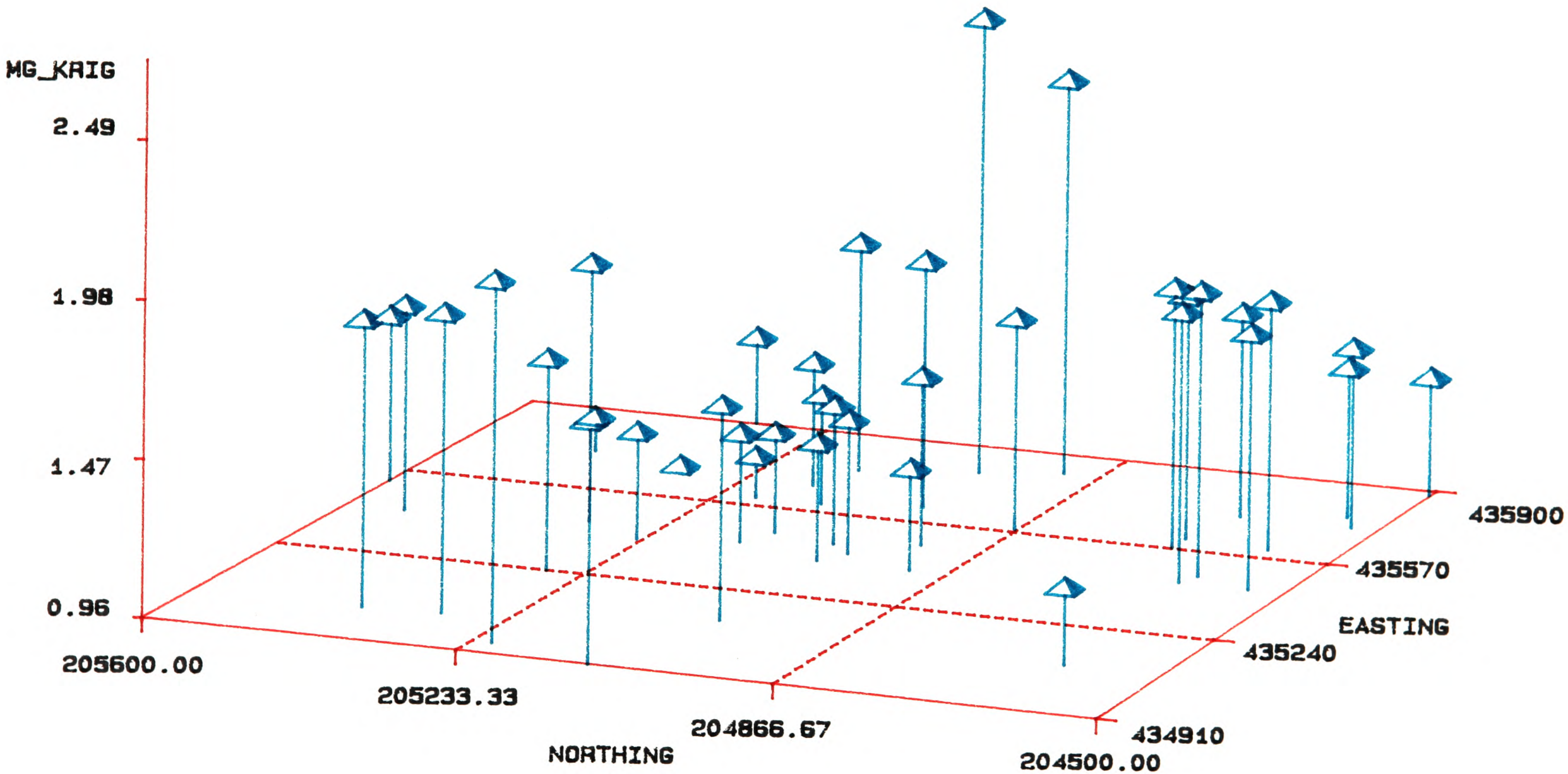


50 m GRID, YELFORD

MAGNESIUM

KRIGING ESTIMATES

0–15cm.

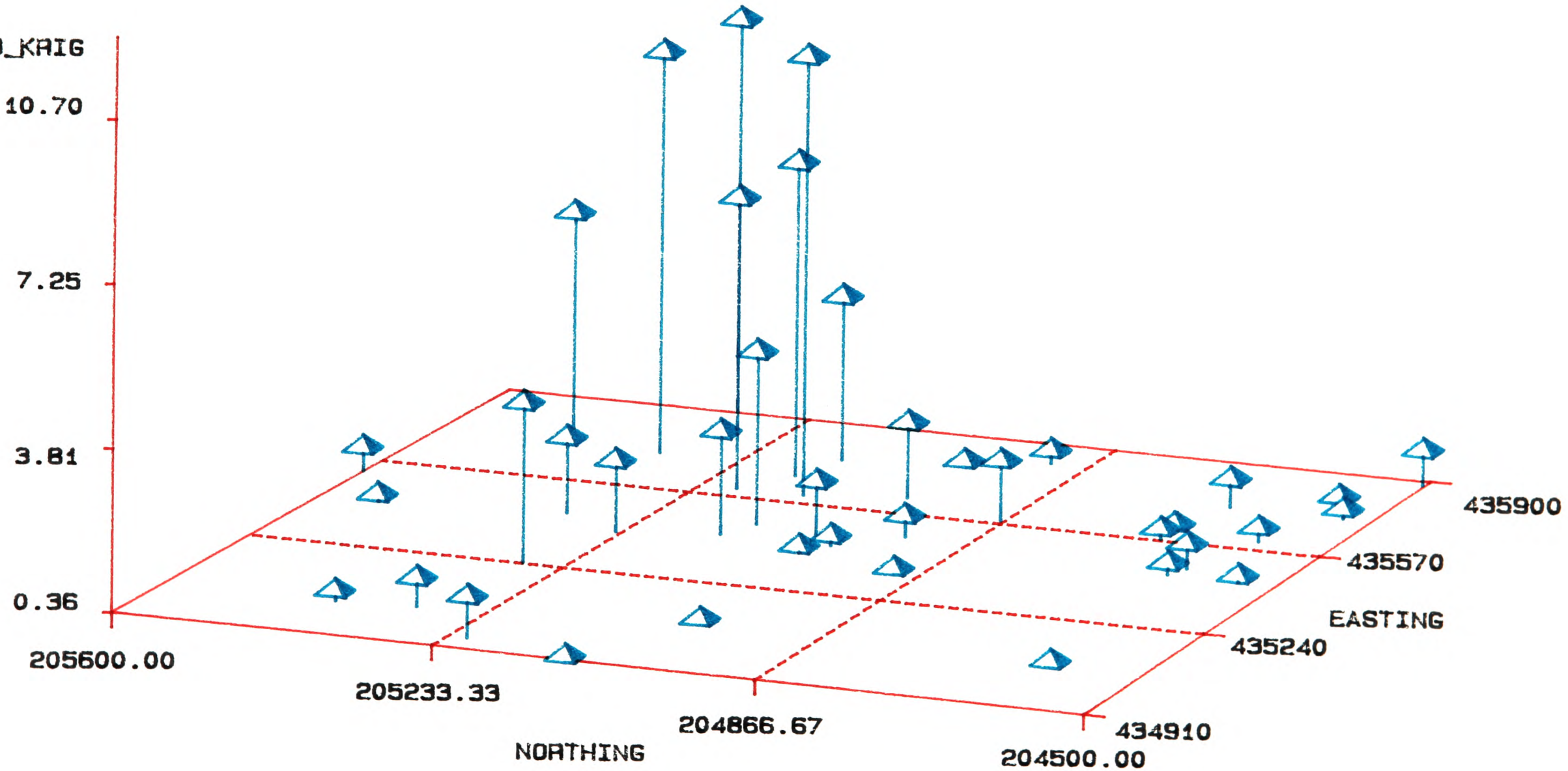


100 m GRID, YELFORD

CARBONATE

KRIGING ESTIMATES

0–15cm.

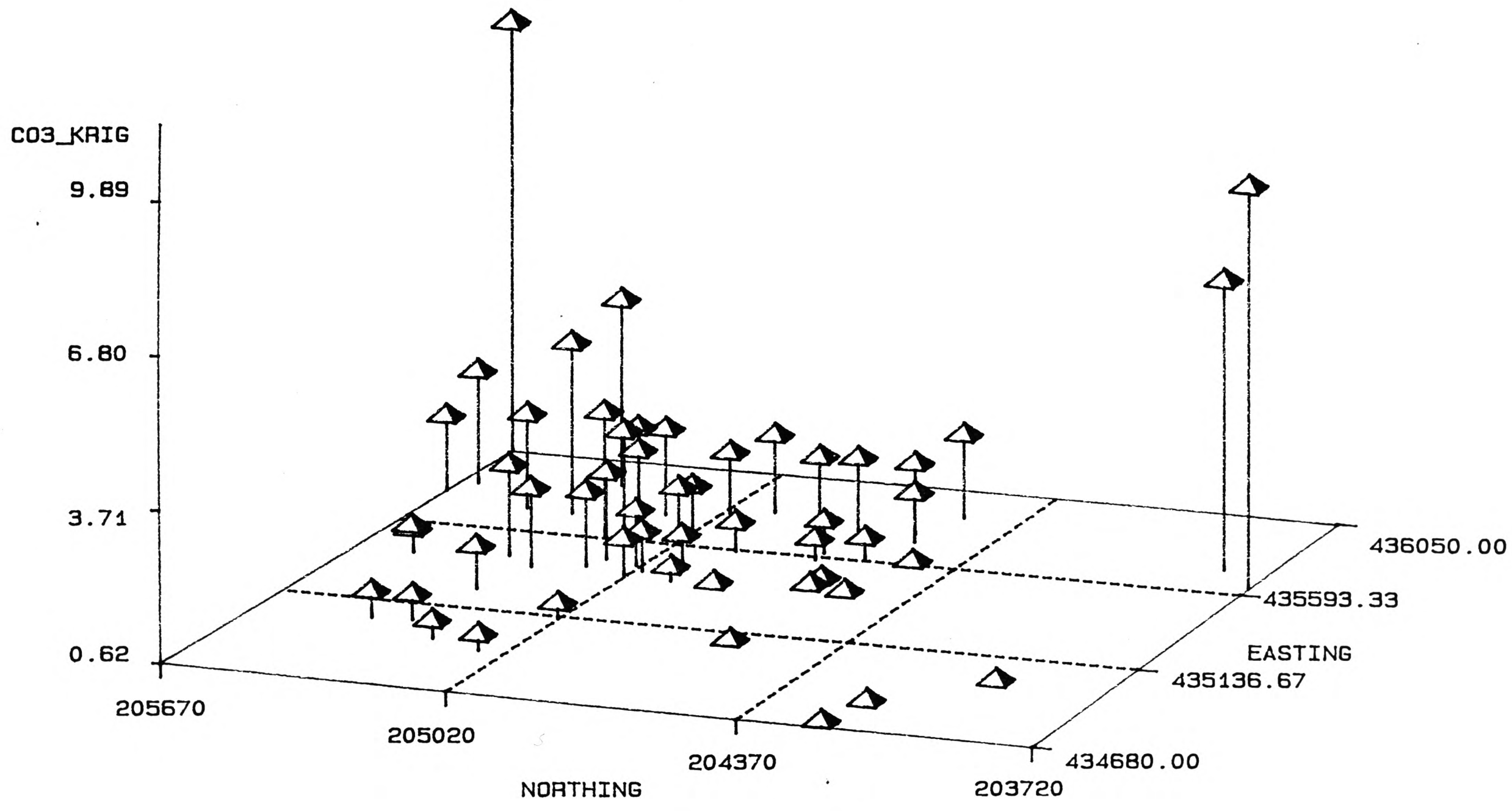


100 m GRID, YELFORD

CARBONATE

KRIGING ESTIMATES

0–15cm.

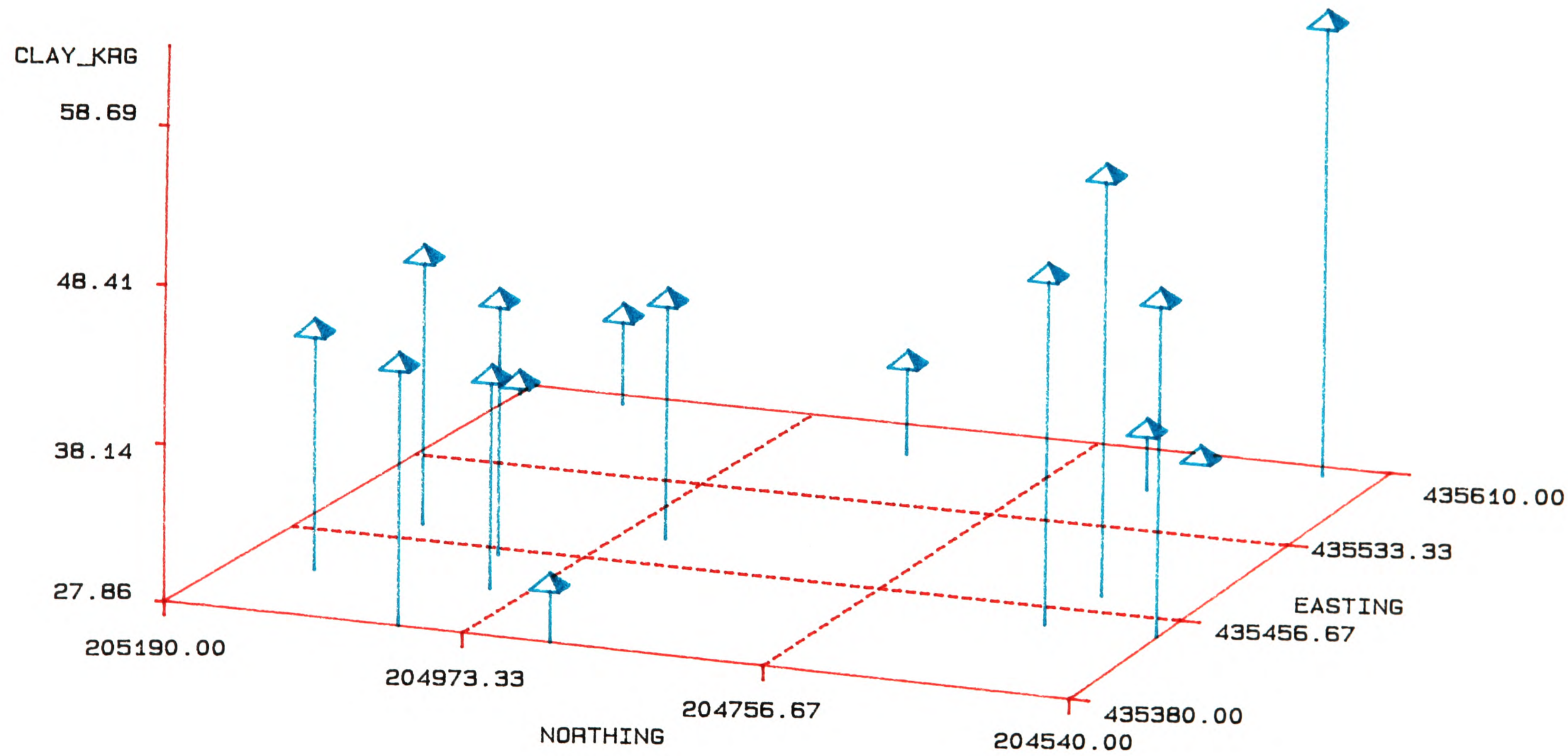


200 m GRID, YELFORD

CLAY

KRIGING ESTIMATES

0–15cm.

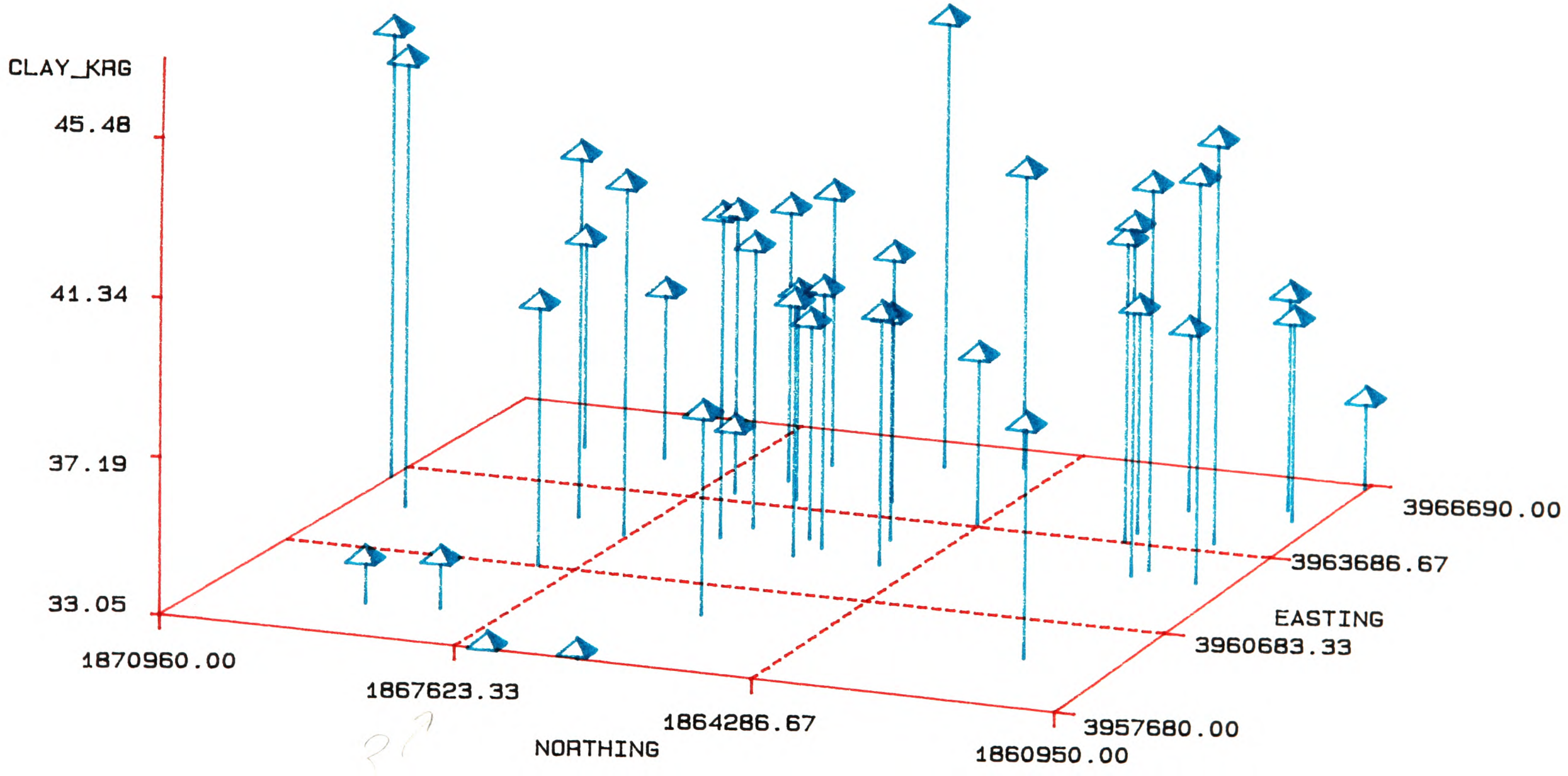


50 m GRID, YELFORD

CLAY

KRIGING ESTIMATES

0–15cm.

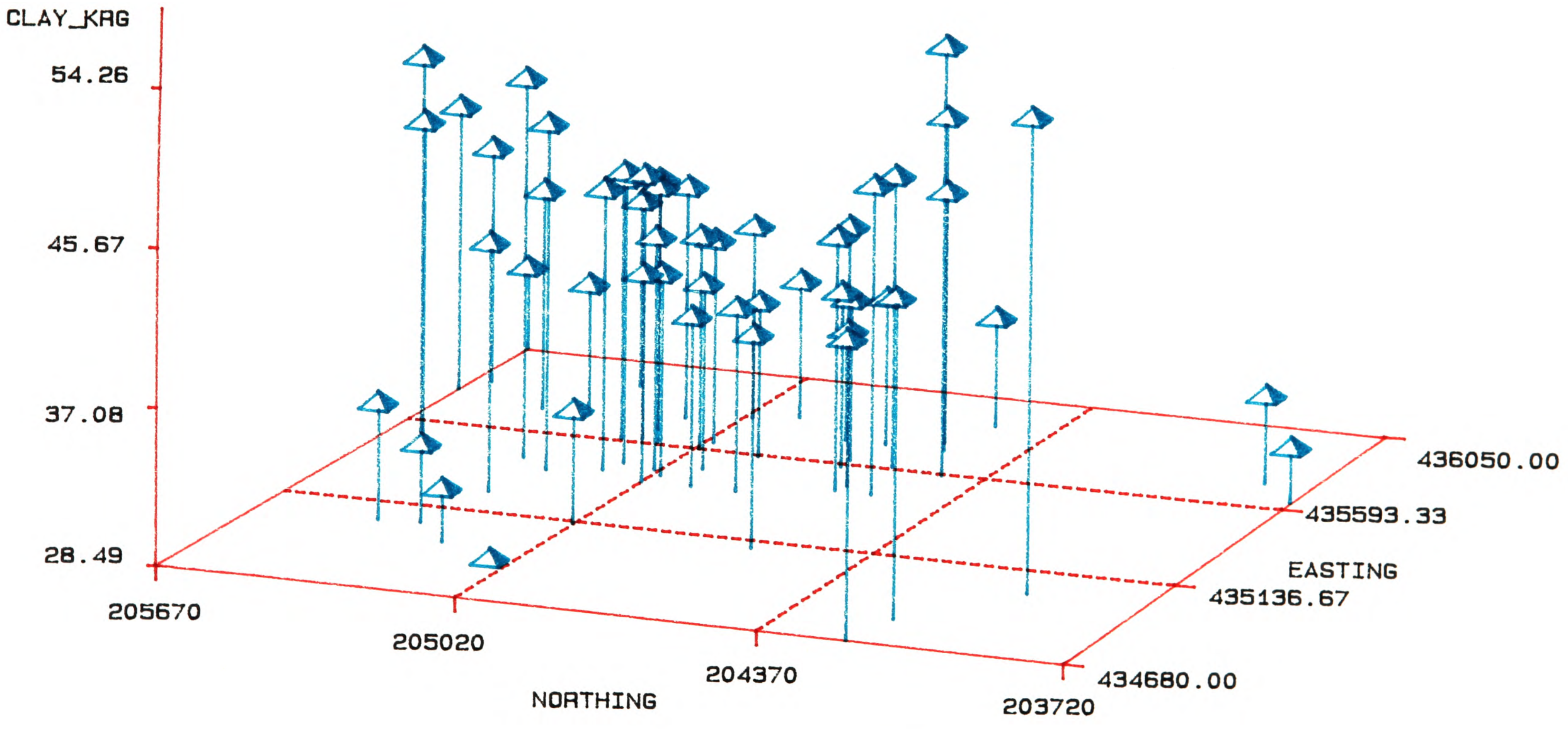


100 m GRID, YELFORD

CLAY

KRIGING ESTIMATES

0–15cm.

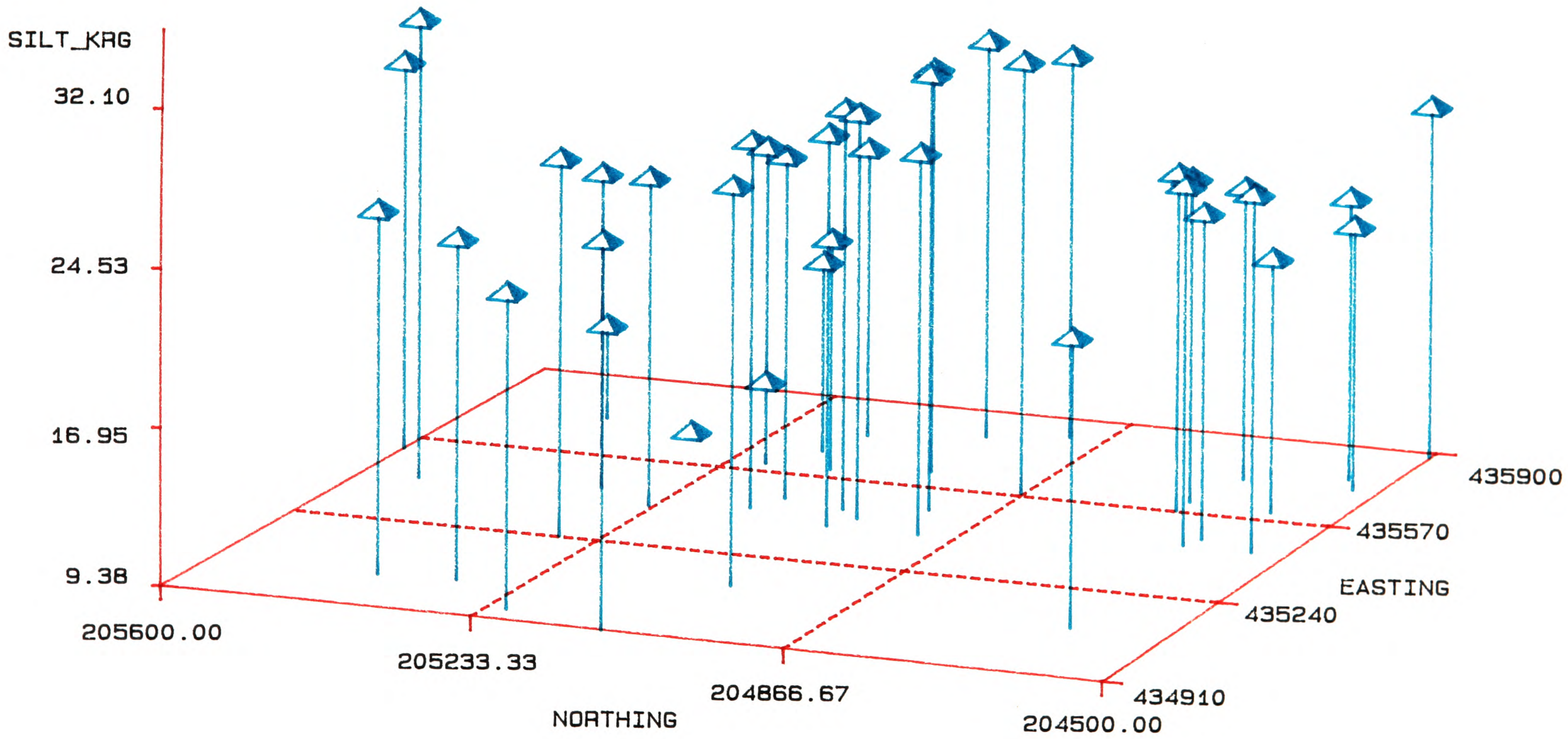


200 m GRID, YELFORD

SILT

KRIGING ESTIMATES

0–15cm.

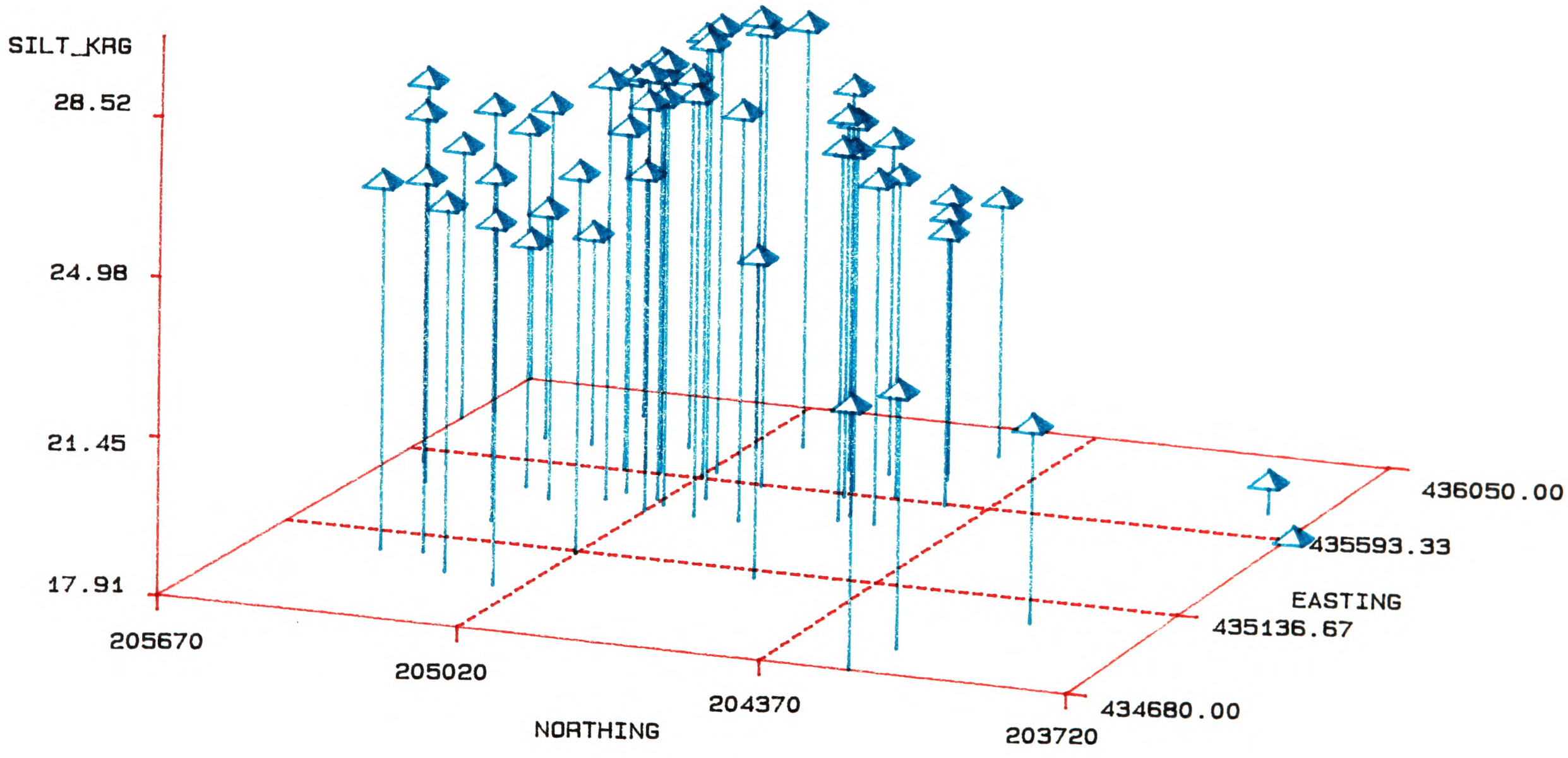


100 m GRID, YELFORD

SILT

KRIGING ESTIMATES

0–15cm.

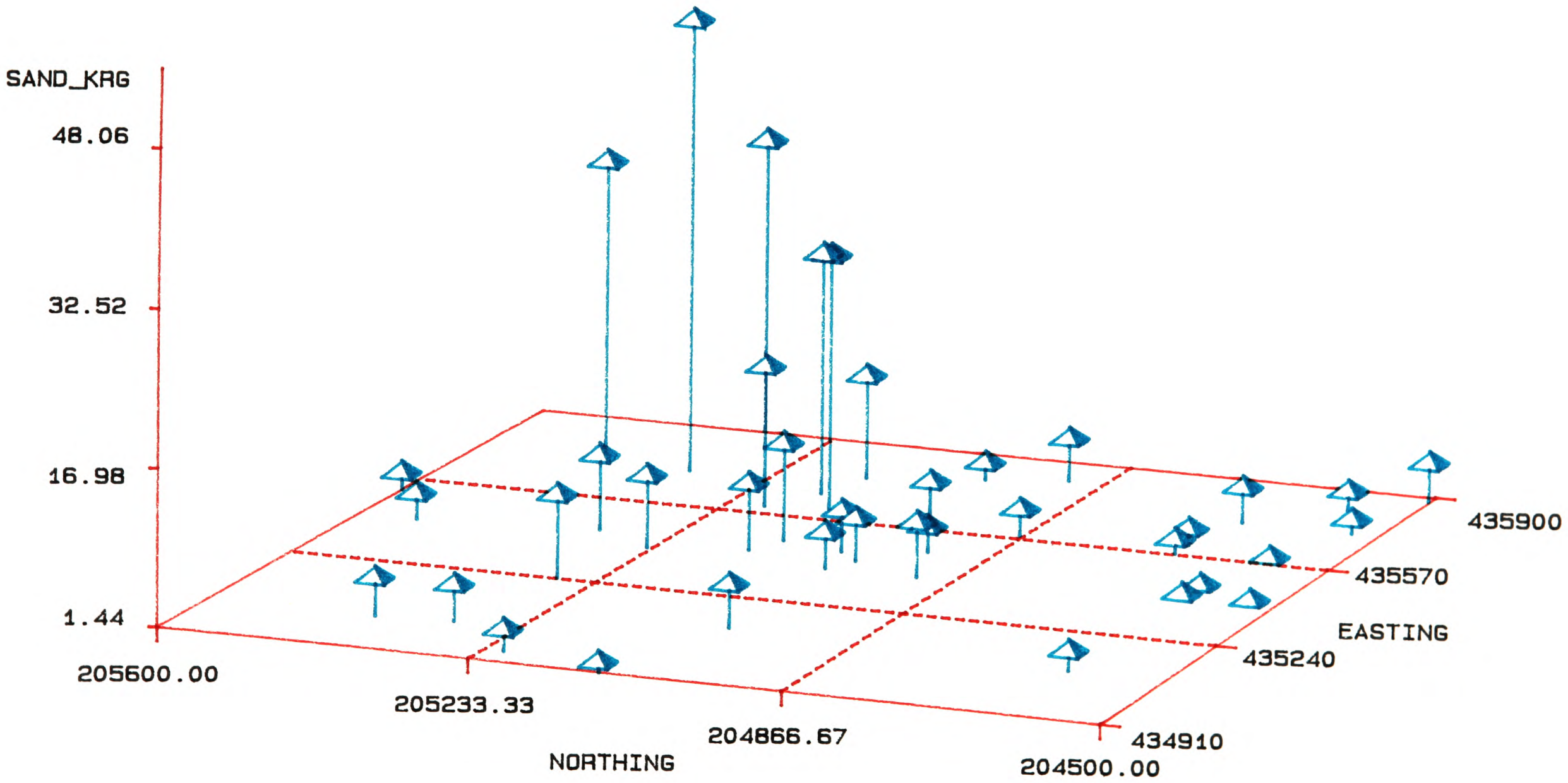


200 m GRID, YELFORD

SAND

KRIGING ESTIMATES

0–15cm.



100 m GRID, YELFORD

Appendix 9.5 Estimation variances of soil properties interpolated by Kriging at the random check points in the 50 m grid at Yelford

NORTHING	EASTING	pH	K*	Mg	$^{*}CO_3^{*}$	CLAY	SILT*	SAND*	OM
0.205110E+06	0.435470E+06	0.839597E-01		0.115989E+00		0.165435E+02			0.250694E+01
0.205130E+06	0.435420E+06	0.856073E-01		0.119566E+00		0.191029E+02			0.254939E+01
0.205190E+06	0.435600E+06	0.874623E-01		0.115997E+00		0.106252E+02			0.263540E+01
0.205020E+06	0.435380E+06	0.874683E-01		0.123799E+00		0.209342E+02			0.259525E+01
0.205000E+06	0.435420E+06	0.830657E-01		0.113740E+00		0.151315E+02			0.248583E+01
0.204940E+06	0.435480E+06	0.828937E-01		0.113745E+00		0.159531E+02			0.248006E+01
0.204910E+06	0.435380E+06	0.826973E-01		0.113542E+00		0.159526E+02			0.247393E+01
0.204870E+06	0.435580E+06	0.864508E-01		0.121585E+00		0.213459E+02			0.257123E+01
0.204680E+06	0.435570E+06	0.835405E-01		0.114947E+00		0.173741E+02			0.249882E+01
0.204680E+06	0.435610E+06	0.886353E-01		0.123266E+00		0.178827E+02			0.264064E+01
0.204620E+06	0.435440E+06	0.814623E-01		0.110154E+00		0.133973E+02			0.244594E+01
0.204610E+06	0.435470E+06	0.832658E-01		0.114572E+00		0.162590E+02			0.248915E+01
0.204580E+06	0.435600E+06	0.860424E-01		0.117444E+00		0.153786E+02			0.257703E+01
0.204540E+06	0.435440E+06	0.817083E-01		0.110418E+00		0.129175E+02			0.245369E+01
0.205110E+06	0.435600E+06	0.839571E-01		0.112506E+00		0.106188E+02			0.252432E+01
0.205030E+06	0.435450E+06	0.807657E-01		0.109579E+00		0.150576E+02			0.242510E+01

* VALUES NOT INTERPOLATED BY KRIGING DUE TO ANISOTROPIC VARIATION AT THIS SCALE.

Appendix 9.5 Estimation variances of soil properties interpolated by Kriging at the random check points in the 100 m grid at Yelford

NORTHING	EASTING	pH	K	Mg	$^{=}CO_3$	CLAY	SILT	SAND	OM
0.205400E+06	0.435030E+06	0.121960E+00	0.636314E-01	0.221379E+00	0.268481E+01	0.420277E+02	0.150246E+02	0.193664E+02	0.269412E+01
0.205330E+06	0.435710E+06	0.121428E+00	0.642284E-01	0.220431E+00	0.270379E+01	0.420268E+02	0.150271E+02	0.197813E+02	0.268482E+01
0.205110E+06	0.435470E+06	0.121504E+00	0.642075E-01	0.220622E+00	0.270309E+01	0.420174E+02	0.150254E+02	0.197765E+02	0.268558E+01
0.205020E+06	0.435120E+06	0.124535E+00	0.658154E-01	0.225223E+00	0.277230E+01	0.434417E+02	0.154330E+02	0.199516E+02	0.276057E+01
0.204660E+06	0.435720E+06	0.122253E+00	0.692206E-01	0.221453E+00	0.287406E+01	0.433691E+02	0.154739E+02	0.223925E+02	0.271757E+01
0.205440E+06	0.435720E+06	0.120462E+00	0.682954E-01	0.218787E+00	0.282989E+01	0.425315E+02	0.151869E+02	0.222708E+02	0.267105E+01
0.205310E+06	0.435040E+06	0.123444E+00	0.700089E-01	0.223312E+00	0.290715E+01	0.439295E+02	0.156723E+02	0.225451E+02	0.274735E+01
0.205210E+06	0.434950E+06	0.122781E+00	0.688508E-01	0.222490E+00	0.285999E+01	0.433549E+02	0.154628E+02	0.221903E+02	0.272497E+01
0.205320E+06	0.435440E+06	0.122270E+00	0.692201E-01	0.221482E+00	0.287411E+01	0.433593E+02	0.154815E+02	0.223920E+02	0.271790E+01
0.205320E+06	0.435900E+06	0.125047E+00	0.583035E-01	0.227759E+00	0.252062E+01	0.414982E+02	0.148738E+02	0.162061E+02	0.274107E+01
0.205240E+06	0.435390E+06	0.122029E+00	0.677005E-01	0.221219E+00	0.282180E+01	0.429374E+02	0.153393E+02	0.215994E+02	0.270780E+01
0.205030E+06	0.434910E+06	0.121603E+00	0.590343E-01	0.221441E+00	0.252622E+01	0.408707E+02	0.146124E+02	0.169400E+02	0.266857E+01
0.205000E+06	0.435790E+06	0.118661E+00	0.475584E-01	0.217336E+00	0.213396E+01	0.375799E+02	0.135002E+02	0.110769E+02	0.257180E+01
0.204910E+06	0.435820E+06	0.121064E+00	0.586571E-01	0.220623E+00	0.251337E+01	0.406309E+02	0.145366E+02	0.168601E+02	0.265539E+01
0.204610E+06	0.435090E+06	0.119673E+00	0.517641E-01	0.218734E+00	0.227752E+01	0.387542E+02	0.139021E+02	0.132585E+02	0.260568E+01
0.204550E+06	0.435760E+06	0.123854E+00	0.729800E-01	0.224592E+00	0.300009E+01	0.444338E+02	0.158375E+02	0.243068E+02	0.275631E+01
0.205130E+06	0.435420E+06	0.121864E+00	0.665278E-01	0.221020E+00	0.278238E+01	0.426372E+02	0.152358E+02	0.209923E+02	0.270067E+01
0.205190E+06	0.435600E+06	0.118874E+00	0.476071E-01	0.217545E+00	0.213745E+01	0.376570E+02	0.135327E+02	0.110882E+02	0.257766E+01
0.205020E+06	0.435380E+06	0.121268E+00	0.625882E-01	0.220352E+00	0.264775E+01	0.415902E+02	0.148783E+02	0.189350E+02	0.267541E+01
0.205000E+06	0.435420E+06	0.120391E+00	0.567406E-01	0.219364E+00	0.244855E+01	0.400575E+02	0.143552E+02	0.158823E+02	0.263809E+01
0.204940E+06	0.435480E+06	0.122270E+00	0.692201E-01	0.221482E+00	0.287411E+01	0.433459E+02	0.154782E+02	0.223920E+02	0.271790E+01
0.204910E+06	0.435380E+06	0.120666E+00	0.585799E-01	0.219671E+00	0.251125E+01	0.405420E+02	0.145208E+02	0.168439E+02	0.264983E+01
0.204870E+06	0.435580E+06	0.121867E+00	0.665239E-01	0.221036E+00	0.278210E+01	0.426420E+02	0.152374E+02	0.209897E+02	0.270061E+01
0.204680E+06	0.435570E+06	0.121864E+00	0.665278E-01	0.221020E+00	0.278238E+01	0.426363E+02	0.152355E+02	0.209923E+02	0.270067E+01
0.204660E+06	0.435610E+06	0.120668E+00	0.585785E-01	0.219677E+00	0.251117E+01	0.405434E+02	0.145189E+02	0.168435E+02	0.264983E+01
0.204620E+06	0.435440E+06	0.122287E+00	0.692292E-01	0.221608E+00	0.287332E+01	0.433487E+02	0.154727E+02	0.223908E+02	0.271747E+01
0.204610E+06	0.435470E+06	0.121546E+00	0.641762E-01	0.220839E+00	0.270079E+01	0.420124E+02	0.150170E+02	0.197672E+02	0.268502E+01
0.204580E+06	0.435600E+06	0.120636E+00	0.567584E-01	0.220143E+00	0.244720E+01	0.400779E+02	0.143449E+02	0.158952E+02	0.263984E+01
0.205130E+06	0.435750E+06	0.120367E+00	0.695556E-01	0.218647E+00	0.286795E+01	0.426920E+02	0.152434E+02	0.230712E+02	0.267037E+01
0.204530E+06	0.435720E+06	0.123739E+00	0.665936E-01	0.224956E+00	0.278615E+01	0.429226E+02	0.153315E+02	0.210018E+02	0.273333E+01
0.205000E+06	0.435520E+06	0.126734E+00	0.585323E-01	0.230500E+00	0.253772E+01	0.419411E+02	0.150566E+02	0.162123E+02	0.278111E+01
0.204500E+06	0.435830E+06	0.129681E+00	0.584087E-01	0.237151E+00	0.253511E+01	0.420317E+02	0.151996E+02	0.161763E+02	0.284170E+01
0.205290E+06	0.435240E+06	0.122112E+00	0.691734E-01	0.221268E+00	0.287206E+01	0.432985E+02	0.154603E+02	0.223853E+02	0.271409E+01
0.205530E+06	0.435410E+06	0.125530E+00	0.699636E-01	0.226912E+00	0.291623E+01	0.446517E+02	0.158863E+02	0.219455E+02	0.279450E+01
0.204540E+06	0.435440E+06	0.124172E+00	0.724477E-01	0.225030E+00	0.298318E+01	0.443832E+02	0.158234E+02	0.240351E+02	0.276209E+01
0.205150E+06	0.435670E+06	0.121139E+00	0.712653E-01	0.219616E+00	0.293440E+01	0.434146E+02	0.154941E+02	0.236708E+02	0.269640E+01
0.205000E+06	0.435630E+06	0.120924E+00	0.631508E-01	0.219694E+00	0.266581E+01	0.416505E+02	0.149007E+02	0.192597E+02	0.267072E+01
0.205110E+06	0.435600E+06	0.118552E+00	0.475822E-01	0.217020E+00	0.213587E+01	0.375852E+02	0.135091E+02	0.110879E+02	0.257094E+01
0.205030E+06	0.435450E+06	0.122657E+00	0.716739E-01	0.221919E+00	0.295831E+01	0.440260E+02	0.157063E+02	0.236739E+02	0.273409E+01

Appendix 9.5 Estimation variances of soil properties interpolated by Kriging at the random check points in the 200 m grid at Yelford

NORTHING	EASTING	pH*	K	Mg	*CO_3	CLAY	SILT	SAND	OM
0.205630E+06	0.435840E+06		0.178453E+00	0.187306E+00	0.625906E+01	0.543172E+02	0.165169E+02	0.416269E+02	0.212132E+01
0.205400E+06	0.435030E+06		0.180251E+00	0.195899E+00	0.654859E+01	0.593000E+02	0.166835E+02	0.426863E+02	0.229625E+01
0.205330E+06	0.435710E+06		0.173734E+00	0.177903E+00	0.588846E+01	0.476804E+02	0.159987E+02	0.399236E+02	0.190405E+01
0.205110E+06	0.435470E+06		0.175048E+00	0.179597E+00	0.593796E+01	0.480116E+02	0.161138E+02	0.402561E+02	0.191875E+01
0.205020E+06	0.435120E+06		0.180433E+00	0.199035E+00	0.666468E+01	0.616159E+02	0.167381E+02	0.430770E+02	0.237512E+01
0.204660E+06	0.435720E+06		0.176256E+00	0.182177E+00	0.604196E+01	0.500006E+02	0.162422E+02	0.407005E+02	0.198394E+01
0.204460E+06	0.435530E+06		0.176649E+00	0.186486E+00	0.622088E+01	0.539971E+02	0.163172E+02	0.412464E+02	0.211259E+01
0.204150E+06	0.434810E+06		0.176945E+00	0.187564E+00	0.626525E+01	0.548987E+02	0.163547E+02	0.414073E+02	0.214245E+01
0.203970E+06	0.435010E+06		0.176920E+00	0.187839E+00	0.627666E+01	0.551827E+02	0.163510E+02	0.414359E+02	0.215121E+01
0.203820E+06	0.435720E+06		0.177061E+00	0.185805E+00	0.619636E+01	0.533823E+02	0.163584E+02	0.412251E+02	0.209212E+01
0.203720E+06	0.435630E+06		0.176749E+00	0.185094E+00	0.616831E+01	0.528415E+02	0.163245E+02	0.411031E+02	0.207470E+01
0.205440E+06	0.435720E+06		0.173064E+00	0.177191E+00	0.588877E+01	0.494183E+02	0.159362E+02	0.397285E+02	0.194817E+01
0.205310E+06	0.435040E+06		0.179105E+00	0.190192E+00	0.631634E+01	0.543991E+02	0.165261E+02	0.418900E+02	0.213626E+01
0.205210E+06	0.434950E+06		0.179154E+00	0.191481E+00	0.638612E+01	0.562839E+02	0.165514E+02	0.420638E+02	0.219472E+01
0.205320E+06	0.435440E+06		0.176184E+00	0.184234E+00	0.613197E+01	0.521067E+02	0.162511E+02	0.409423E+02	0.205105E+01
0.205320E+06	0.435900E+06		0.174660E+00	0.177222E+00	0.584027E+01	0.458362E+02	0.160761E+02	0.399451E+02	0.185058E+01
0.205240E+06	0.435390E+06		0.177110E+00	0.187702E+00	0.626783E+01	0.549043E+02	0.163613E+02	0.414370E+02	0.214239E+01
0.205030E+06	0.434910E+06		0.176940E+00	0.180835E+00	0.595327E+01	0.471243E+02	0.162691E+02	0.405757E+02	0.199719E+01
0.205000E+06	0.435790E+06		0.175584E+00	0.184308E+00	0.616636E+01	0.540219E+02	0.162182E+02	0.408903E+02	0.210457E+01
0.204910E+06	0.435820E+06		0.176937E+00	0.185422E+00	0.618151E+01	0.530707E+02	0.163407E+02	0.411780E+02	0.209177E+01
0.204610E+06	0.435090E+06		0.176588E+00	0.185995E+00	0.620240E+01	0.535922E+02	0.163044E+02	0.411849E+02	0.209921E+01
0.204750E+06	0.435720E+06		0.176280E+00	0.183345E+00	0.609135E+01	0.511319E+02	0.162605E+02	0.408440E+02	0.202022E+01
0.204550E+06	0.435760E+06		0.177512E+00	0.186180E+00	0.620940E+01	0.534705E+02	0.163906E+02	0.413292E+02	0.209559E+01
0.205130E+06	0.435420E+06		0.176681E+00	0.186178E+00	0.620848E+01	0.537059E+02	0.163102E+02	0.412150E+02	0.210252E+01
0.205010E+06	0.435590E+06		0.175426E+00	0.185297E+00	0.620062E+01	0.546415E+02	0.162112E+02	0.409789E+02	0.212756E+01
0.204810E+06	0.435380E+06		0.177035E+00	0.187992E+00	0.628430E+01	0.553476E+02	0.163607E+02	0.414682E+02	0.215623E+01
0.205190E+06	0.435600E+06		0.175273E+00	0.185530E+00	0.621004E+01	0.548709E+02	0.162055E+02	0.409933E+02	0.213492E+01
0.205020E+06	0.435380E+06		0.177237E+00	0.188323E+00	0.628933E+01	0.552897E+02	0.163781E+02	0.415190E+02	0.215551E+01
0.205000E+06	0.435420E+06		0.177022E+00	0.188011E+00	0.628676E+01	0.554061E+02	0.163580E+02	0.414775E+02	0.215727E+01
0.204940E+06	0.435480E+06		0.175530E+00	0.181843E+00	0.603134E+01	0.499815E+02	0.161782E+02	0.405805E+02	0.198285E+01
0.204910E+06	0.435380E+06		0.176698E+00	0.185798E+00	0.619080E+01	0.532684E+02	0.163072E+02	0.411700E+02	0.208851E+01
0.204870E+06	0.435580E+06		0.176058E+00	0.185636E+00	0.619273E+01	0.536009E+02	0.162661E+02	0.410926E+02	0.209939E+01
0.204680E+06	0.435570E+06		0.176383E+00	0.185264E+00	0.616924E+01	0.528800E+02	0.162802E+02	0.410704E+02	0.207656E+01
0.204680E+06	0.435610E+06		0.176576E+00	0.186203E+00	0.620895E+01	0.537528E+02	0.163082E+02	0.412035E+02	0.210495E+01
0.204620E+06	0.435440E+06		0.176792E+00	0.187245E+00	0.625274E+01	0.546990E+02	0.163363E+02	0.413520E+02	0.213466E+01
0.204610E+06	0.435470E+06		0.176644E+00	0.186431E+00	0.622007E+01	0.539797E+02	0.163141E+02	0.412425E+02	0.211141E+01
0.204550E+06	0.435600E+06		0.176971E+00	0.188023E+00	0.628553E+01	0.554075E+02	0.163598E+02	0.414647E+02	0.215783E+01
0.204130E+06	0.434680E+06		0.177449E+00	0.186011E+00	0.620403E+01	0.534016E+02	0.163921E+02	0.413034E+02	0.209331E+01
0.205670E+06	0.436050E+06		0.184639E+00	0.191701E+00	0.641259E+01	0.580728E+02	0.171833E+02	0.423737E+02	0.212410E+01
0.205670E+06	0.435780E+06		0.179671E+00	0.188901E+00	0.630396E+01	0.543196E+02	0.166324E+02	0.419830E+02	0.212659E+01
0.205130E+06	0.435750E+06		0.172347E+00	0.175734E+00	0.583010E+01	0.492436E+02	0.158997E+02	0.395209E+02	0.190919E+01
0.204550E+06	0.435720E+06		0.176049E+00	0.180775E+00	0.598406E+01	0.487416E+02	0.162149E+02	0.405120E+02	0.194283E+01
0.205600E+06	0.435520E+06		0.177489E+00	0.186085E+00	0.621360E+01	0.536769E+02	0.163986E+02	0.413424E+02	0.210045E+01
0.204500E+06	0.435880E+06		0.179333E+00	0.181647E+00	0.598231E+01	0.466474E+02	0.164954E+02	0.410696E+02	0.188362E+01
0.205280E+06	0.435240E+06		0.177982E+00	0.186538E+00	0.619286E+01	0.525282E+02	0.163952E+02	0.413588E+02	0.206879E+01
0.205530E+06	0.435410E+06		0.177304E+00	0.186584E+00	0.622705E+01	0.539633E+02	0.163794E+02	0.413480E+02	0.211150E+01
0.204940E+06	0.435440E+06		0.176436E+00	0.185393E+00	0.617496E+01	0.529850E+02	0.162863E+02	0.410999E+02	0.208021E+01
0.205150E+06	0.435670E+06		0.173157E+00	0.177439E+00	0.589668E+01	0.494365E+02	0.159429E+02	0.397724E+02	0.194967E+01
0.205000E+06	0.435630E+06		0.174979E+00	0.183879E+00	0.615004E+01	0.538351E+02	0.161613E+02	0.407828E+02	0.210010E+01
0.205150E+06	0.435610E+06		0.174651E+00	0.183242E+00	0.612297E+01	0.534274E+02	0.161294E+02	0.406442E+02	0.208518E+01
0.205110E+06	0.435600E+06		0.174470E+00	0.182065E+00	0.607556E+01	0.524539E+02	0.161032E+02	0.404307E+02	0.205321E+01
0.205030E+06	0.435450E+06		0.176435E+00	0.186204E+00	0.621389E+01	0.539579E+02	0.163017E+02	0.411986E+02	0.211025E+01

* VALUES NOT INTERPOLATED DUE TO ANISOTROPIC VARIATION

APPENDIX 9.6

Set of tables listing information about Knots, observed values, fitted values by spline surface and residuals from trend for Carbonate, Silt and Sand for the 3 sampling grids.

Appendix 9.6 Modelling the TREND by fitting a BICUBIC SPLINE SURFACE to the variation of CARBONATE over the 50m grid at Y

BICUBIC SPLINE SURFACE, CARBONATE, 50 m GRID.

INTERIOR X-KNOTS

2.0480E+04
2.0490E+04
2.0500E+04
2.0508E+04
2.0517E+04

INTERIOR Y-KNOTS

4.3536E+04
4.3543E+04
4.3549E+04
4.3556E+04

SUM OF SQUARES OF RESIDUAL RHS 5.3068E+01

RANK 63

NORTHING	EASTING	OBSERVED	SPLINE FIT	RESIDUALS
2.0460E+04	4.3530E+04	7.0000E-01	5.5612E-01	-1.4388E-01
2.0470E+04	4.3530E+04	8.0000E-01	1.1451E+00	3.4508E-01
2.0450E+04	4.3530E+04	8.0000E-01	7.8830E-01	-1.1705E-02
2.0475E+04	4.3530E+04	1.9000E+00	1.2298E+00	-6.7016E-01
2.0475E+04	4.3535E+04	5.0000E-01	1.3348E+00	8.3482E-01
2.0470E+04	4.3535E+04	1.4000E+00	1.4020E+00	2.0473E-03
2.0465E+04	4.3530E+04	8.0000E-01	8.5149E-01	5.1487E-02
2.0445E+04	4.3535E+04	2.4000E+00	2.2619E+00	-1.3812E-01
2.0460E+04	4.3535E+04	6.0000E-01	5.2082E-01	-7.9178E-02
2.0455E+04	4.3530E+04	4.0000E-01	4.6604E-01	6.6043E-02
2.0455E+04	4.3535E+04	9.0000E-01	3.1932E-01	-5.8068E-01
2.0450E+04	4.3535E+04	2.0000E-01	7.7518E-01	5.7518E-01
2.0470E+04	4.3540E+04	4.0000E-01	5.7906E-01	1.7906E-01
2.0460E+04	4.3540E+04	5.0000E-01	7.9921E-01	2.9921E-01
2.0450E+04	4.3540E+04	5.0000E-01	6.0923E-01	1.0923E-01
2.0475E+04	4.3540E+04	4.0000E-01	4.1940E-01	1.9397E-02
2.0465E+04	4.3540E+04	9.0000E-01	7.1956E-01	-1.8044E-01
2.0455E+04	4.3540E+04	1.1000E+00	7.7633E-01	-3.2367E-01
2.0475E+04	4.3545E+04	4.0000E-01	4.6809E-01	6.8088E-02
2.0470E+04	4.3545E+04	5.0000E-01	4.9119E-01	-8.8125E-03
2.0464E+04	4.3544E+04	6.0000E-01	5.6815E-01	-3.1846E-02
2.0460E+04	4.3545E+04	9.0000E-01	7.3279E-01	-1.6721E-01
2.0455E+04	4.3545E+04	4.0000E-01	6.7708E-01	2.7708E-01
2.0451E+04	4.3546E+04	5.0000E-01	3.5982E-01	-1.4018E-01
2.0460E+04	4.3550E+04	1.7000E+00	1.1538E+00	-5.4619E-01
2.0450E+04	4.3550E+04	3.0000E-01	1.4336E-01	-1.5664E-01
2.0470E+04	4.3550E+04	5.0000E-01	5.1764E-01	1.7642E-02
2.0475E+04	4.3550E+04	4.0000E-01	2.2663E-01	-1.7337E-01
2.0475E+04	4.3555E+04	4.0000E-01	5.5175E-01	1.5175E-01
2.0470E+04	4.3555E+04	4.0000E-01	5.3358E-01	1.3358E-01
2.0466E+04	4.3551E+04	6.0000E-01	7.8762E-01	1.8762E-01
2.0465E+04	4.3555E+04	2.0000E-01	4.8475E-01	2.8475E-01
2.0460E+04	4.3555E+04	1.1000E+00	4.8900E-01	-6.1100E-01
2.0455E+04	4.3550E+04	4.0000E-01	9.8332E-01	5.8332E-01
2.0455E+04	4.3555E+04	4.0000E-01	6.3004E-01	2.3004E-01
2.0450E+04	4.3555E+04	1.0000E+00	9.9160E-01	-8.4022E-03
2.0470E+04	4.3560E+04	4.0000E-01	7.0261E-01	3.0261E-01

2.0460E+04	4.3560E+04	8.0000E-01	7.4809E-01	-5.1912E-02
2.0450E+04	4.3560E+04	6.0000E-01	5.5049E-01	-4.9511E-02
2.0475E+04	4.3560E+04	1.1000E+00	9.1108E-01	-1.8892E-01
2.0465E+04	4.3560E+04	9.0000E-01	6.9126E-01	-2.0874E-01
2.0455E+04	4.3560E+04	6.0000E-01	7.4414E-01	1.4414E-01
2.0480E+04	4.3530E+04	4.0000E-01	8.9873E-01	4.9873E-01
2.0480E+04	4.3535E+04	1.0000E-01	4.3107E-01	3.3107E-01
2.0480E+04	4.3540E+04	5.0000E-01	2.8225E-01	-2.1775E-01
2.0485E+04	4.3540E+04	1.0000E-01	2.1634E-01	1.1634E-01
2.0485E+04	4.3545E+04	1.9000E+00	1.2197E+00	-6.8035E-01
2.0480E+04	4.3545E+04	5.0000E-01	6.9293E-01	1.9293E-01
2.0480E+04	4.3550E+04	1.0000E-01	2.9742E-01	1.9742E-01
2.0485E+04	4.3555E+04	5.0000E-01	2.5971E-01	-2.4029E-01
2.0485E+04	4.3555E+04	5.0000E-01	2.5971E-01	-2.4029E-01
2.0480E+04	4.3555E+04	5.0000E-01	4.5557E-01	-4.4431E-02
2.0480E+04	4.3560E+04	2.6000E+00	1.4456E+00	-1.1544E+00
2.0480E+04	4.3570E+04	6.0000E-01	5.9850E-01	-1.4959E-03
2.0480E+04	4.3560E+04	2.0000E-01	1.4456E+00	1.2456E+00
2.0495E+04	4.3530E+04	1.0000E-01	7.7355E-01	6.7355E-01
2.0495E+04	4.3535E+04	1.2900E+01	1.1955E+01	-9.4507E-01
2.0490E+04	4.3535E+04	7.0000E-01	3.2819E+00	2.5819E+00
2.0490E+04	4.3540E+04	3.0000E-01	2.9863E-01	-1.3723E-03
2.0495E+04	4.3540E+04	5.0000E-01	4.9515E-01	-4.8512E-03
2.0495E+04	4.3545E+04	3.5000E+00	1.9870E+00	-1.5130E+00
2.0490E+04	4.3545E+04	5.0000E-01	1.7696E+00	1.2696E+00
2.0490E+04	4.3550E+04	9.0000E-01	8.4525E-01	-5.4748E-02
2.0495E+04	4.3550E+04	3.0000E-01	2.5992E-01	-4.0077E-02
2.0495E+04	4.3555E+04	3.0000E-01	1.1785E+00	8.7851E-01
2.0490E+04	4.3555E+04	4.0000E-01	3.7248E-01	-2.7517E-02
2.0490E+04	4.3560E+04	2.3000E+00	2.1607E+00	-1.3927E-01
2.0495E+04	4.3560E+04	7.0000E-01	9.2137E-01	2.2137E-01
2.0500E+04	4.3530E+04	1.7000E+00	1.2180E+00	-4.8200E-01
2.0505E+04	4.3530E+04	1.0000E-01	2.7007E-01	1.7007E-01
2.0500E+04	4.3535E+04	2.0000E-01	3.1816E-01	1.1816E-01
2.0500E+04	4.3540E+04	3.0000E-01	3.0014E-01	1.3940E-04
2.0505E+04	4.3545E+04	4.0000E-01	6.1901E-01	2.1901E-01
2.0505E+04	4.3545E+04	1.2000E+00	6.1901E-01	-5.8099E-01
2.0500E+04	4.3545E+04	5.0000E-01	1.5402E+00	1.0402E+00
2.0500E+04	4.3550E+04	1.8000E+00	1.8624E+00	6.2436E-02
2.0505E+04	4.3555E+04	7.0000E-01	4.3611E+00	3.6611E+00
2.0505E+04	4.3550E+04	6.4000E+00	6.3675E+00	-3.2531E-02
2.0505E+04	4.3555E+04	7.7000E+00	4.3611E+00	-3.3389E+00
2.0500E+04	4.3555E+04	3.4000E+00	2.5740E+00	-8.2602E-01
2.0500E+04	4.3560E+04	1.7000E+00	1.5438E+00	-1.5619E-01
2.0505E+04	4.3560E+04	6.4000E+00	6.4410E+00	4.1001E-02
2.0510E+04	4.3530E+04	9.0000E-01	8.7692E-01	-2.3076E-02
2.0515E+04	4.3530E+04	6.0000E-01	6.0054E-01	5.3818E-04
2.0515E+04	4.3535E+04	5.0000E-01	5.0001E-01	6.7651E-06
2.0510E+04	4.3535E+04	2.0000E-01	1.9999E-01	-1.1124E-05
2.0510E+04	4.3540E+04	1.0000E+00	1.0002E+00	2.0675E-04
2.0515E+04	4.3540E+04	6.0000E-01	5.9987E-01	-1.2574E-04
2.0510E+04	4.3545E+04	2.1000E+00	2.1472E+00	4.7231E-02
2.0510E+04	4.3550E+04	3.6000E+00	3.6126E+00	1.2649E-02
2.0515E+04	4.3555E+04	7.2000E+00	8.1556E+00	9.5556E-01
2.0515E+04	4.3550E+04	9.2000E+00	9.1949E+00	-5.1116E-03
2.0515E+04	4.3555E+04	9.1000E+00	8.1556E+00	-9.4444E-01
2.0510E+04	4.3555E+04	6.5000E+00	6.4397E+00	-6.0313E-02
2.0510E+04	4.3560E+04	1.1900E+01	1.1909E+01	8.8766E-03
2.0515E+04	4.3560E+04	9.4000E+00	9.3913E+00	-8.6518E-03
2.0520E+04	4.3530E+04	2.2000E+00	2.2000E+00	5.5511E-17
2.0520E+04	4.3535E+04	2.0000E-01	2.0000E-01	1.5266E-16
2.0520E+04	4.3540E+04	1.3000E+00	1.3000E+00	2.4980E-16
2.0520E+04	4.3545E+04	7.3000E+00	7.3000E+00	3.3307E-16
2.0520E+04	4.3550E+04	1.3800E+01	1.3800E+01	-2.2204E-16

2.0520E+04	4.3555E+04	6.5000E+00	6.5000E+00	2.2204E-16
2.0520E+04	4.3560E+04	1.0500E+01	1.0500E+01	2.2204E-16

SUM OF SQUARED RESIDUALS 5.3276E+01

		-1.4535E+00	-2.2181E+00
SPLINE COEFFS		1.4255E+00	
		-4.2993E+00	
1.7299E+00		7.5396E+00	-1.6884E+00
7.4896E+00		-1.1020E+01	-2.7313E+02
-2.2971E+00		-8.1781E-01	3.5850E+01
2.3125E+00			-2.1741E+01
-4.5167E+00			2.6417E+01
8.3940E+00		-1.1480E+00	-1.7428E+01
-9.6315E+00		-8.6416E+00	4.6060E+01
-9.8245E-01		-1.0483E+00	5.1608E+00
		1.2584E+00	
		3.5148E+00	
-1.3509E+00		-5.4816E+00	4.6858E+00
-1.2411E+01		1.5868E+01	4.1903E+02
5.6157E+00		1.8238E+00	-4.8529E+01
-1.9338E+00			3.3046E+01
7.5681E+00			-3.1987E+01
-8.9145E+00		2.5645E+00	4.4764E+01
1.4074E+01		8.9743E+01	-4.8936E+00
1.3864E+00		-1.3772E+01	-2.6683E+00
		9.3664E+00	
		-6.8434E+00	
3.3657E+00		1.2792E+01	-7.0197E+00
1.4703E+01		-2.0127E+01	-4.0761E+02
-2.6319E+02			
2.1012E+02			
4.2874E+01			
-1.8560E+01			
-7.3972E+00			
-3.1076E-01			
2.2000E+00			
-3.7603E+00			
4.0208E+00			
-2.0451E+00			
2.1809E+01			
-1.0296E+01			
3.5212E+01			
3.1813E+00			

Appendix 9.6. Modelling the TREND by fitting a BICUBIC SPLINE SURFACE to the variation of CARBONATE over the 200m grid at

BICUBIC SPLINE SURFACE, CARBONATE, 200m GRID

INTERIOR X-KNOTS

2.0410E+04
2.0450E+04
2.0496E+04
2.0534E+04

INTERIOR Y-KNOTS

4.3503E+04
4.3556E+04
4.3585E+04

SUM OF SQUARES OF RESIDUAL RHS 1.9289E+02

RANK 53

NORTHING	EASTING	OBSERVED	SPLINE FIT	RESIDUALS
2.0350E+04	4.3450E+04	1.3000E+00	1.3451E+00	4.5145E-02
2.0390E+04	4.3450E+04	4.0000E-01	8.4187E-01	4.4187E-01
2.0390E+04	4.3490E+04	9.0000E-01	1.2236E+00	3.2359E-01
2.0370E+04	4.3470E+04	8.0000E-01	8.7748E-02	-7.1225E-01
2.0350E+04	4.3490E+04	1.0000E+00	8.3925E-01	-1.6075E-01
2.0390E+04	4.3470E+04	9.0000E-01	5.8308E-01	-3.1692E-01
2.0370E+04	4.3450E+04	5.0000E-01	4.0918E-01	-9.0822E-02
2.0370E+04	4.3490E+04	6.0000E-01	1.4699E+00	8.6991E-01
2.0350E+04	4.3470E+04	1.8000E+00	1.8728E+00	7.2771E-02
2.0390E+04	4.3530E+04	4.0000E-01	-6.5477E-01	-1.0548E+00
2.0370E+04	4.3510E+04	1.1000E+00	1.1370E+00	3.7039E-02
2.0370E+04	4.3550E+04	1.9000E+00	3.6953E+00	1.7953E+00
2.0350E+04	4.3530E+04	8.3000E+00	7.8766E+00	-4.2341E-01
2.0390E+04	4.3510E+04	5.0000E-01	7.2568E-01	2.2568E-01
2.0390E+04	4.3550E+04	1.0000E+00	7.3868E-01	-2.6132E-01
2.0370E+04	4.3530E+04	8.0000E-01	-3.0889E-01	-1.1089E+00
2.0351E+04	4.3509E+04	2.0000E+00	2.3521E+00	3.5205E-01
2.0350E+04	4.3550E+04	1.1400E+01	1.1501E+01	1.0107E-01
2.0390E+04	4.3570E+04	5.0000E-01	7.3005E+00	6.8005E+00
2.0350E+04	4.3570E+04	8.1000E+00	9.1827E+00	1.0827E+00
2.0370E+04	4.3570E+04	2.2000E+01	1.6842E+01	-5.1583E+00
2.0370E+04	4.3590E+04	7.4000E+00	8.5250E+00	1.1250E+00
2.0390E+04	4.3590E+04	4.8000E+00	3.6626E+00	-1.1374E+00
2.0350E+04	4.3590E+04	8.7000E+00	8.4228E+00	-2.7723E-01
2.0430E+04	4.3450E+04	4.0000E-01	4.5778E-01	5.7779E-02
2.0430E+04	4.3490E+04	9.0000E-01	6.0554E-01	-2.9446E-01
2.0410E+04	4.3470E+04	7.0000E-01	1.2383E+00	5.3828E-01
2.0430E+04	4.3470E+04	1.1000E+00	6.6524E-01	-4.3476E-01
2.0410E+04	4.3450E+04	1.4000E+00	1.0846E+00	-3.1545E-01
2.0411E+04	4.3491E+04	8.0000E-01	7.2738E-01	-7.2621E-02
2.0430E+04	4.3530E+04	1.2000E+00	1.3859E+00	1.8593E-01
2.0410E+04	4.3510E+04	9.0000E-01	8.1748E-01	-8.2516E-02
2.0410E+04	4.3550E+04	2.0000E-01	3.4249E-01	1.4249E-01
2.0430E+04	4.3510E+04	1.0000E+00	9.1780E-01	-8.2201E-02
2.0430E+04	4.3550E+04	6.0000E-01	5.2588E-01	-7.4117E-02
2.0410E+04	4.3530E+04	8.0000E-01	1.3175E+00	5.1749E-01
2.0430E+04	4.3570E+04	7.0000E-01	-1.2058E+00	-1.9058E+00
2.0410E+04	4.3570E+04	5.0000E-01	-2.6465E+00	-3.1465E+00
2.0410E+04	4.3590E+04	6.0000E-01	4.7803E-02	-5.5220E-01

2.0430E+04	4.3590E+04	1.3000E+00	1.8402E+00	5.4019E-01
2.0490E+04	4.3470E+04	5.5000E+00	3.3749E+00	-2.1251E+00
2.0470E+04	4.3490E+04	6.0000E-01	7.7652E-01	1.7652E-01
2.0450E+04	4.3470E+04	4.0000E-01	4.0542E-01	5.4152E-03
2.0490E+04	4.3490E+04	8.0000E-01	8.0100E-01	1.0018E-03
2.0470E+04	4.3470E+04	8.0000E-01	1.9144E+00	1.1144E+00
2.0450E+04	4.3490E+04	8.0000E-01	6.7593E-01	-1.2407E-01
2.0450E+04	4.3550E+04	3.0000E-01	5.4013E-01	2.4013E-01
2.0490E+04	4.3510E+04	1.3000E+00	5.6422E-01	-7.3578E-01
2.0490E+04	4.3550E+04	9.0000E-01	7.6033E-01	-1.3967E-01
2.0470E+04	4.3530E+04	8.0000E-01	5.1591E-01	-2.8409E-01
2.0450E+04	4.3510E+04	4.0000E-01	9.1541E-01	5.1541E-01
2.0490E+04	4.3530E+04	4.0000E-01	1.1324E+00	7.3236E-01
2.0470E+04	4.3510E+04	9.0000E-01	7.9786E-01	-1.0214E-01
2.0470E+04	4.3550E+04	5.0000E-01	2.5226E-01	-2.4774E-01
2.0450E+04	4.3530E+04	8.0000E-01	5.2666E-01	-2.7334E-01
2.0470E+04	4.3570E+04	1.6000E+00	1.6990E+00	9.9043E-02
2.0490E+04	4.3570E+04	1.1000E+00	-1.0512E+00	-2.1512E+00
2.0450E+04	4.3570E+04	1.0000E+00	3.4125E+00	2.4125E+00
2.0490E+04	4.3590E+04	1.4000E+00	3.3569E+00	1.9569E+00
2.0450E+04	4.3590E+04	1.4000E+00	4.9888E+00	3.5888E+00
2.0470E+04	4.3590E+04	1.0800E+01	4.9422E+00	-5.8578E+00
2.0530E+04	4.3470E+04	2.8000E+00	1.5331E+00	-1.2669E+00
2.0510E+04	4.3490E+04	5.0000E-01	6.9708E-01	1.9708E-01
2.0530E+04	4.3490E+04	7.0000E-01	7.3354E-01	3.3544E-02
2.0510E+04	4.3470E+04	4.0000E-01	2.5649E+00	2.1649E+00
2.0531E+04	4.3511E+04	1.6000E+00	1.0527E+00	-5.4729E-01
2.0530E+04	4.3550E+04	4.2000E+00	4.0531E+00	-1.4694E-01
2.0510E+04	4.3530E+04	9.0000E-01	1.6937E+00	7.9366E-01
2.0530E+04	4.3530E+04	1.7000E+00	1.9133E+00	2.1331E-01
2.0510E+04	4.3550E+04	3.6000E+00	3.0698E+00	-5.3023E-01
2.0510E+04	4.3570E+04	2.1000E+00	2.8147E+00	7.1473E-01
2.0530E+04	4.3570E+04	8.5000E+00	7.0834E+00	-1.4166E+00
2.0509E+04	4.3571E+04	5.0000E-01	2.4569E+00	1.9569E+00
2.0530E+04	4.3590E+04	5.4000E+00	3.2335E+00	-2.1665E+00
2.0510E+04	4.3610E+04	1.9000E+00	1.9004E+00	4.1770E-04
2.0530E+04	4.3610E+04	5.1000E+00	5.1000E+00	-4.5929E-05
2.0510E+04	4.3590E+04	9.0000E-01	3.0805E+00	2.1805E+00
2.0570E+04	4.3470E+04	7.0000E+00	6.9694E+00	-3.0563E-02
2.0551E+04	4.3491E+04	1.3000E+00	1.3357E+00	3.5725E-02
2.0570E+04	4.3490E+04	1.2000E+00	1.1841E+00	-1.5869E-02
2.0550E+04	4.3470E+04	3.6000E+00	3.9571E+00	3.5712E-01
2.0570E+04	4.3510E+04	8.0000E-01	8.4224E-01	4.2241E-02
2.0570E+04	4.3550E+04	5.0000E-01	5.5463E-01	5.4635E-02
2.0550E+04	4.3530E+04	1.5000E+00	1.6946E+00	1.9458E-01
2.0570E+04	4.3530E+04	7.0000E-01	6.2069E-01	-7.9313E-02
2.0550E+04	4.3550E+04	1.0000E-01	-2.8805E-02	-1.2881E-01
2.0550E+04	4.3570E+04	1.2000E+00	1.0303E+00	-1.6973E-01
2.0570E+04	4.3570E+04	1.0000E+00	9.4662E-01	-5.3377E-02
2.0550E+04	4.3570E+04	4.0000E-01	1.0303E+00	6.3027E-01
2.0570E+04	4.3590E+04	6.0000E-01	5.4431E-01	-5.5689E-02
2.0550E+04	4.3610E+04	1.6200E+01	1.6200E+01	4.1876E-05
2.0570E+04	4.3610E+04	1.6600E+01	1.6600E+01	-1.1146E-05
2.0550E+04	4.3590E+04	8.0000E-01	1.4450E+00	6.4497E-01

SUM OF SQUARED RESIDUALS 1.9290E+02

		-4.2141E+01	-4.2310E+00
SPLINE COEFFS		2.7768E+01	4.5747E+00
		5.9519E-01	2.6322E+01
1.3451E+00			-1.5746E+01
3.8165E+00			-1.2876E+02
-5.3556E+00		-2.2028E+00	

1.7618E+01	-3.2708E+00	
3.8113E+00	6.1711E+00	4.7650E+01
1.2425E+01	-6.7037E+00	-1.3928E+01
2.4177E-01	2.0129E+01	1.7712E+01
	6.2843E+01	-8.0792E+00
	-3.6113E+03	-6.5926E+00
-7.9470E-01		6.2897E+00
-6.9382E+00		7.6440E+01
1.7162E+01	1.8673E+01	
-2.8389E+01	3.2548E+00	
7.4100E+01	-2.9998E+00	2.7135E+01
-4.7585E+01	6.1588E+00	3.1936E-01
-1.0234E+00	-2.0099E+01	1.4285E+00
	1.7480E+01	-5.1722E-03
	3.5080E+02	1.6549E+00
2.9572E+00		-8.7512E-01
6.3397E+00		1.6600E+01
-8.6524E+00	-1.4200E+01	
1.6412E+01	4.6521E+00	

APPENDIX 9.6 .

BICUBIC SPLINE SURFACE, SILT 50 m GRID.

INTERIOR X-KNOTS

2.0470E+04
2.0476E+04
2.0495E+04
2.0508E+04

INTERIOR Y-KNOTS

4.3539E+04
4.3550E+04
4.3556E+04

SUM OF SQUARES OF RESIDUAL RHS 6.0008E+02

RANK 50

X	Y	DATA	FIT	RESIDUALS
2.0460E+04	4.3530E+04	2.6000E+01	2.5426E+01	-5.7407E-01
2.0450E+04	4.3530E+04	3.0000E+01	2.9619E+01	-3.8089E-01
2.0465E+04	4.3530E+04	2.6000E+01	2.4995E+01	-1.0046E+00
2.0445E+04	4.3535E+04	2.3000E+01	2.3561E+01	5.6106E-01
2.0460E+04	4.3535E+04	3.0000E+01	2.8336E+01	-1.6641E+00
2.0455E+04	4.3530E+04	2.6000E+01	2.7063E+01	1.0632E+00
2.0455E+04	4.3535E+04	2.4000E+01	2.6862E+01	2.8621E+00
2.0450E+04	4.3535E+04	2.7000E+01	2.5130E+01	-1.8695E+00
2.0460E+04	4.3540E+04	2.9000E+01	2.7080E+01	-1.9200E+00
2.0450E+04	4.3540E+04	2.8000E+01	2.6512E+01	-1.4880E+00
2.0465E+04	4.3540E+04	2.9000E+01	2.9375E+01	3.7495E-01
2.0464E+04	4.3544E+04	2.6000E+01	2.6270E+01	2.6969E-01
2.0460E+04	4.3545E+04	2.4000E+01	2.3546E+01	-4.5424E-01
2.0455E+04	4.3540E+04	2.3000E+01	2.5531E+01	2.5306E+00
2.0455E+04	4.3545E+04	2.5000E+01	2.3377E+01	-1.6227E+00
2.0451E+04	4.3546E+04	2.4000E+01	2.6594E+01	2.5937E+00
2.0460E+04	4.3550E+04	2.1000E+01	2.3756E+01	2.7562E+00
2.0450E+04	4.3550E+04	2.7000E+01	2.5795E+01	-1.2051E+00
2.0466E+04	4.3551E+04	3.1000E+01	2.8957E+01	-2.0433E+00
2.0465E+04	4.3555E+04	3.3000E+01	2.9507E+01	-3.4932E+00
2.0460E+04	4.3555E+04	2.3000E+01	2.6188E+01	3.1880E+00
2.0455E+04	4.3550E+04	2.4000E+01	2.2646E+01	-1.3535E+00
2.0455E+04	4.3555E+04	2.4000E+01	2.2390E+01	-1.6098E+00
2.0450E+04	4.3555E+04	1.8000E+01	1.8814E+01	8.1394E-01
2.0460E+04	4.3560E+04	2.1000E+01	2.3856E+01	2.8565E+00
2.0450E+04	4.3560E+04	2.1000E+01	2.1332E+01	3.3235E-01
2.0465E+04	4.3560E+04	2.8000E+01	2.5773E+01	-2.2268E+00
2.0455E+04	4.3560E+04	2.4000E+01	2.2274E+01	-1.7260E+00
2.0470E+04	4.3530E+04	2.5000E+01	2.6059E+01	1.0594E+00
2.0475E+04	4.3530E+04	2.8000E+01	2.8106E+01	1.0622E-01
2.0475E+04	4.3535E+04	2.7000E+01	2.7514E+01	5.1397E-01
2.0470E+04	4.3535E+04	2.9000E+01	2.8831E+01	-1.6943E-01
2.0470E+04	4.3540E+04	3.0000E+01	3.0630E+01	6.3033E-01
2.0475E+04	4.3540E+04	2.9000E+01	2.9779E+01	7.7943E-01
2.0475E+04	4.3545E+04	3.1000E+01	3.0833E+01	-1.6700E-01
2.0470E+04	4.3545E+04	3.0000E+01	2.9399E+01	-6.0141E-01
2.0470E+04	4.3550E+04	2.9000E+01	3.0396E+01	1.3956E+00
2.0475E+04	4.3550E+04	3.3000E+01	3.2078E+01	-9.2239E-01
2.0475E+04	4.3555E+04	3.2000E+01	3.2134E+01	1.3428E-01
2.0470E+04	4.3555E+04	3.0000E+01	3.1646E+01	1.6462E+00

2.0470E+04	4.3560E+04	2.7000E+01	2.7717E+01	7.1733E-01
2.0475E+04	4.3560E+04	2.9000E+01	2.9330E+01	3.2978E-01
2.0480E+04	4.3530E+04	2.8000E+01	2.7982E+01	-1.8066E-02
2.0490E+04	4.3530E+04	2.4000E+01	2.3737E+01	-2.6285E-01
2.0490E+04	4.3535E+04	2.7000E+01	2.8697E+01	1.6974E+00
2.0485E+04	4.3535E+04	2.6000E+01	2.7597E+01	1.5967E+00
2.0485E+04	4.3535E+04	3.0000E+01	2.7597E+01	-2.4033E+00
2.0480E+04	4.3535E+04	2.7000E+01	2.7002E+01	1.6724E-03
2.0490E+04	4.3540E+04	2.9000E+01	2.7384E+01	-1.6164E+00
2.0480E+04	4.3540E+04	2.9000E+01	2.8439E+01	-5.6090E-01
2.0490E+04	4.3545E+04	2.9000E+01	2.8120E+01	-8.8007E-01
2.0485E+04	4.3540E+04	2.8000E+01	2.7540E+01	-4.5992E-01
2.0485E+04	4.3545E+04	2.5000E+01	2.9176E+01	4.1759E+00
2.0480E+04	4.3545E+04	3.2000E+01	3.0466E+01	-1.5336E+00
2.0480E+04	4.3550E+04	3.0000E+01	3.1753E+01	1.7529E+00
2.0490E+04	4.3550E+04	3.4000E+01	2.8753E+01	-5.2468E+00
2.0490E+04	4.3555E+04	3.0000E+01	2.8812E+01	-1.1880E+00
2.0485E+04	4.3555E+04	3.3000E+01	3.0098E+01	-2.9021E+00
2.0485E+04	4.3555E+04	2.7000E+01	3.0098E+01	3.0979E+00
2.0480E+04	4.3555E+04	3.1000E+01	3.1409E+01	4.0888E-01
2.0490E+04	4.3560E+04	2.9000E+01	3.0056E+01	1.0561E+00
2.0480E+04	4.3560E+04	3.0000E+01	3.0130E+01	1.2981E-01
2.0480E+04	4.3570E+04	3.2000E+01	3.2002E+01	1.6423E-03
2.0480E+04	4.3560E+04	3.1000E+01	3.0130E+01	-8.7019E-01
2.0500E+04	4.3530E+04	2.2000E+01	2.6792E+01	4.7923E+00
2.0505E+04	4.3530E+04	3.4000E+01	3.0986E+01	-3.0137E+00
2.0500E+04	4.3535E+04	2.9000E+01	3.0117E+01	1.1166E+00
2.0495E+04	4.3530E+04	2.6000E+01	2.3655E+01	-2.3454E+00
2.0495E+04	4.3535E+04	3.1000E+01	2.9698E+01	-1.3025E+00
2.0500E+04	4.3540E+04	2.9000E+01	3.0133E+01	1.1329E+00
2.0505E+04	4.3545E+04	3.0000E+01	3.1433E+01	1.4330E+00
2.0505E+04	4.3545E+04	2.9000E+01	3.1433E+01	2.4330E+00
2.0500E+04	4.3545E+04	3.2000E+01	3.0536E+01	-1.4642E+00
2.0495E+04	4.3540E+04	2.9000E+01	2.8268E+01	-7.3209E-01
2.0495E+04	4.3545E+04	2.7000E+01	2.8459E+01	1.4585E+00
2.0500E+04	4.3550E+04	2.9000E+01	2.9738E+01	7.3781E-01
2.0505E+04	4.3555E+04	3.7000E+01	2.7318E+01	-9.6823E+00
2.0505E+04	4.3550E+04	2.8000E+01	2.9495E+01	1.4953E+00
2.0505E+04	4.3555E+04	1.5000E+01	2.7318E+01	1.2318E+01
2.0500E+04	4.3555E+04	2.7000E+01	2.8271E+01	1.2709E+00
2.0495E+04	4.3550E+04	2.7000E+01	2.8469E+01	1.4690E+00
2.0495E+04	4.3555E+04	2.8000E+01	2.8162E+01	1.6165E-01
2.0500E+04	4.3560E+04	3.0000E+01	2.9928E+01	-7.2413E-02
2.0505E+04	4.3560E+04	2.7000E+01	2.7437E+01	4.3716E-01
2.0495E+04	4.3560E+04	3.1000E+01	3.0003E+01	-9.9663E-01
2.0520E+04	4.3530E+04	2.9000E+01	2.8941E+01	-5.8965E-02
2.0510E+04	4.3530E+04	3.3000E+01	3.3277E+01	2.7724E-01
2.0520E+04	4.3535E+04	2.5000E+01	2.4895E+01	-1.0549E-01
2.0515E+04	4.3530E+04	3.2000E+01	3.2334E+01	3.3408E-01
2.0515E+04	4.3535E+04	2.8000E+01	2.8050E+01	5.0499E-02
2.0510E+04	4.3535E+04	3.0000E+01	2.9408E+01	-5.9209E-01
2.0520E+04	4.3540E+04	2.3000E+01	2.2928E+01	-7.2260E-02
2.0510E+04	4.3540E+04	3.2000E+01	3.0514E+01	-1.4859E+00
2.0520E+04	4.3545E+04	1.9000E+01	1.8530E+01	-4.7011E-01
2.0515E+04	4.3540E+04	2.5000E+01	2.7026E+01	2.0262E+00
2.0510E+04	4.3545E+04	3.1000E+01	2.7549E+01	-3.4509E+00
2.0520E+04	4.3550E+04	1.5000E+01	1.4677E+01	-3.2342E-01
2.0510E+04	4.3550E+04	2.8000E+01	2.3983E+01	-4.0171E+00
2.0520E+04	4.3555E+04	1.4000E+01	1.3428E+01	-5.7242E-01
2.0515E+04	4.3555E+04	1.9000E+01	1.6648E+01	-2.3520E+00
2.0515E+04	4.3550E+04	1.2000E+01	1.5587E+01	3.5869E+00
2.0515E+04	4.3555E+04	1.2000E+01	1.6648E+01	4.6480E+00
2.0510E+04	4.3555E+04	2.8000E+01	2.3079E+01	-4.9211E+00
2.0520E+04	4.3560E+04	1.0000E+01	9.9910E+00	-8.9612E-03

2.0510E+04	4.3560E+04	2.0000E+01	1.9737E+01	-2.6256E-01
2.0515E+04	4.3560E+04	1.0000E+01	1.0159E+01	1.5933E-01

SUM OF SQUARED RESIDUALS 6.0008E+02

SPLINE COEFFS			
		5.7889E+01	3.7100E+01
	-1.4453E+02		3.9547E+01
	1.8141E+03		2.2796E+01
3.2806E+01			4.6566E+01
1.8204E+01			-3.0386E+01
2.9595E+01		3.1784E+01	
5.2188E+01		2.3152E+01	
-1.3394E+01		2.6694E+01	3.2389E+01
6.5484E+01		3.7059E+01	2.5871E+01
5.6085E+00		2.7310E+01	3.5358E+01
		5.4119E+01	1.0944E+00
		-2.4049E+02	2.5564E+01
2.7129E+01			-2.9679E+01
3.0074E+01			-9.2491E+00
1.7847E+01		1.6329E+01	
7.3475E+00		3.7316E+01	
2.8308E+01		2.0840E+01	2.8941E+01
1.3894E+01		2.4956E+01	2.4318E+01
8.8977E-01		2.3213E+01	2.5978E+01
		6.6861E+01	1.3433E+01
		-3.6901E+02	1.4400E+01
2.1861E+01			2.8436E+00
2.9473E+01			-1.9370E+00
4.0640E+01		3.6522E+01	
1.7964E+01		2.5488E+01	

Appendix 9.6 .

BICUBIC SPLINE SURFACE, SILT, 100 m GRID.

INTERIOR X-KNOTS

2.0479E+04
2.0511E+04
2.0551E+04

INTERIOR Y-KNOTS

4.3516E+04
4.3545E+04
4.3580E+04

SUM OF SQUARES OF RESIDUAL RHS 1.4190E+03

RANK 49

X	Y	DATA	FIT	RESIDUALS
2.0470E+04	4.3480E+04	2.5000E+01	2.3194E+01	-1.8064E+00
2.0470E+04	4.3500E+04	2.4000E+01	2.4370E+01	3.7007E-01
2.0460E+04	4.3480E+04	2.1000E+01	2.2740E+01	1.7403E+00
2.0460E+04	4.3490E+04	2.3000E+01	2.3073E+01	7.2693E-02
2.0460E+04	4.3500E+04	2.5000E+01	2.2799E+01	-2.2011E+00
2.0460E+04	4.3510E+04	2.3000E+01	2.2738E+01	-2.6197E-01
2.0450E+04	4.3480E+04	1.8000E+01	1.7968E+01	-3.1593E-02
2.0450E+04	4.3500E+04	2.5000E+01	2.5990E+01	9.9021E-01
2.0470E+04	4.3490E+04	2.6000E+01	2.5608E+01	-3.9232E-01
2.0450E+04	4.3510E+04	2.5000E+01	2.6494E+01	1.4938E+00
2.0470E+04	4.3510E+04	2.3000E+01	2.2350E+01	-6.5021E-01
2.0450E+04	4.3490E+04	2.5000E+01	2.3813E+01	-1.1870E+00
2.0469E+04	4.3521E+04	2.2000E+01	2.2578E+01	5.7806E-01
2.0470E+04	4.3540E+04	3.0000E+01	2.7811E+01	-2.1890E+00
2.0460E+04	4.3520E+04	2.1000E+01	2.3683E+01	2.6826E+00
2.0460E+04	4.3530E+04	2.6000E+01	2.5392E+01	-6.0764E-01
2.0460E+04	4.3540E+04	2.9000E+01	2.6285E+01	-2.7147E+00
2.0451E+04	4.3520E+04	2.8000E+01	2.6801E+01	-1.1986E+00
2.0450E+04	4.3540E+04	2.8000E+01	2.8973E+01	9.7332E-01
2.0470E+04	4.3530E+04	2.5000E+01	2.4962E+01	-3.8387E-02
2.0450E+04	4.3530E+04	3.0000E+01	2.8683E+01	-1.3174E+00
2.0470E+04	4.3560E+04	2.7000E+01	2.6742E+01	-2.5848E-01
2.0460E+04	4.3550E+04	2.1000E+01	2.4794E+01	3.7945E+00
2.0460E+04	4.3560E+04	2.1000E+01	2.1761E+01	7.6149E-01
2.0460E+04	4.3570E+04	2.4000E+01	2.0436E+01	-3.5637E+00
2.0450E+04	4.3560E+04	2.1000E+01	2.2134E+01	1.1338E+00
2.0450E+04	4.3550E+04	2.7000E+01	2.6396E+01	-6.0439E-01
2.0470E+04	4.3570E+04	2.3000E+01	2.4758E+01	1.7584E+00
2.0470E+04	4.3550E+04	2.9000E+01	2.8461E+01	-5.3911E-01
2.0450E+04	4.3570E+04	2.1000E+01	2.0309E+01	-6.9112E-01
2.0470E+04	4.3580E+04	2.5000E+01	2.4716E+01	-2.8416E-01
2.0460E+04	4.3580E+04	2.3000E+01	2.4174E+01	1.1737E+00
2.0460E+04	4.3590E+04	3.1000E+01	2.9577E+01	-1.4233E+00
2.0450E+04	4.3580E+04	2.5000E+01	2.5170E+01	1.6957E-01
2.0450E+04	4.3590E+04	2.7000E+01	2.7406E+01	4.0592E-01
2.0470E+04	4.3590E+04	2.6000E+01	2.5811E+01	-1.8910E-01
2.0510E+04	4.3480E+04	2.3000E+01	2.3373E+01	3.7282E-01
2.0510E+04	4.3500E+04	2.5000E+01	2.8073E+01	3.0733E+00
2.0500E+04	4.3480E+04	2.4000E+01	2.1430E+01	-2.5700E+00
2.0500E+04	4.3490E+04	3.6000E+01	2.7329E+01	-8.6709E+00
2.0500E+04	4.3510E+04	3.1000E+01	2.7876E+01	-3.1239E+00

2.0490E+04	4.3480E+04	1.6000E+01	2.1107E+01	5.1072E+00
2.0490E+04	4.3500E+04	3.1000E+01	2.8637E+01	-2.3634E+00
2.0480E+04	4.3480E+04	2.5000E+01	2.1937E+01	-3.0625E+00
2.0479E+04	4.3489E+04	2.4000E+01	2.7784E+01	3.7840E+00
2.0480E+04	4.3500E+04	2.7000E+01	2.7189E+01	1.8908E-01
2.0481E+04	4.3511E+04	2.3000E+01	2.3765E+01	7.6550E-01
2.0510E+04	4.3490E+04	2.8000E+01	2.6169E+01	-1.8310E+00
2.0490E+04	4.3510E+04	2.4000E+01	2.5950E+01	1.9500E+00
2.0490E+04	4.3490E+04	2.5000E+01	2.8449E+01	3.4489E+00
2.0510E+04	4.3520E+04	2.9000E+01	2.8728E+01	-2.7222E-01
2.0510E+04	4.3540E+04	3.2000E+01	2.5936E+01	-6.0636E+00
2.0500E+04	4.3520E+04	2.4000E+01	2.6842E+01	2.8422E+00
2.0500E+04	4.3530E+04	2.2000E+01	2.6773E+01	4.7732E+00
2.0500E+04	4.3540E+04	2.9000E+01	2.7459E+01	-1.5409E+00
2.0490E+04	4.3520E+04	2.8000E+01	2.4603E+01	-3.3971E+00
2.0490E+04	4.3540E+04	2.9000E+01	2.9248E+01	2.4801E-01
2.0480E+04	4.3520E+04	2.1000E+01	2.2845E+01	1.8452E+00
2.0480E+04	4.3530E+04	2.8000E+01	2.5672E+01	-2.3277E+00
2.0480E+04	4.3540E+04	2.9000E+01	2.9683E+01	6.8304E-01
2.0510E+04	4.3530E+04	3.3000E+01	2.7537E+01	-5.4633E+00
2.0490E+04	4.3530E+04	2.4000E+01	2.6255E+01	2.2550E+00
2.0510E+04	4.3560E+04	2.0000E+01	2.3780E+01	3.7800E+00
2.0500E+04	4.3550E+04	2.9000E+01	2.8594E+01	-4.0561E-01
2.0500E+04	4.3560E+04	3.0000E+01	2.9721E+01	-2.7879E-01
2.0500E+04	4.3570E+04	3.0000E+01	3.0229E+01	2.2945E-01
2.0490E+04	4.3560E+04	2.9000E+01	3.2655E+01	3.6554E+00
2.0480E+04	4.3550E+04	3.0000E+01	3.2028E+01	2.0283E+00
2.0480E+04	4.3560E+04	3.0000E+01	3.1702E+01	1.7024E+00
2.0480E+04	4.3570E+04	3.2000E+01	2.9543E+01	-2.4570E+00
2.0510E+04	4.3570E+04	2.7000E+01	2.4340E+01	-2.6600E+00
2.0490E+04	4.3550E+04	3.4000E+01	3.1736E+01	-2.2641E+00
2.0509E+04	4.3571E+04	3.2000E+01	2.5286E+01	-6.7144E+00
2.0510E+04	4.3550E+04	2.8000E+01	2.4497E+01	-3.5032E+00
2.0490E+04	4.3570E+04	3.3000E+01	3.1726E+01	-1.2736E+00
2.0510E+04	4.3580E+04	2.7000E+01	2.6731E+01	-2.6930E-01
2.0500E+04	4.3580E+04	2.8000E+01	2.9502E+01	1.5024E+00
2.0500E+04	4.3590E+04	3.2000E+01	2.9044E+01	-2.9563E+00
2.0490E+04	4.3580E+04	2.8000E+01	2.8703E+01	7.0267E-01
2.0479E+04	4.3581E+04	2.6000E+01	2.5959E+01	-4.0576E-02
2.0480E+04	4.3590E+04	1.8000E+01	2.2800E+01	4.7997E+00
2.0490E+04	4.3590E+04	2.8000E+01	2.4830E+01	-3.1701E+00
2.0510E+04	4.3590E+04	3.1000E+01	3.1262E+01	2.6203E-01
2.0550E+04	4.3480E+04	2.1000E+01	2.1538E+01	5.3845E-01
2.0550E+04	4.3500E+04	2.4000E+01	2.7923E+01	3.9234E+00
2.0539E+04	4.3481E+04	2.6000E+01	2.9012E+01	3.0120E+00
2.0540E+04	4.3490E+04	3.4000E+01	2.6442E+01	-7.5578E+00
2.0540E+04	4.3500E+04	2.8000E+01	2.6530E+01	-1.4697E+00
2.0540E+04	4.3510E+04	2.6000E+01	2.8324E+01	2.3242E+00
2.0530E+04	4.3480E+04	3.2000E+01	2.9923E+01	-2.0773E+00
2.0530E+04	4.3500E+04	2.6000E+01	2.6439E+01	4.3865E-01
2.0520E+04	4.3480E+04	2.5000E+01	2.6971E+01	1.9708E+00
2.0520E+04	4.3490E+04	2.1000E+01	2.6056E+01	5.0564E+00
2.0520E+04	4.3500E+04	2.5000E+01	2.7127E+01	2.1269E+00
2.0531E+04	4.3511E+04	2.4000E+01	2.8321E+01	4.3214E+00
2.0530E+04	4.3490E+04	2.8000E+01	2.6492E+01	-1.5081E+00
2.0540E+04	4.3520E+04	2.4000E+01	3.0729E+01	6.7291E+00
2.0550E+04	4.3520E+04	2.9000E+01	3.2613E+01	3.6132E+00
2.0550E+04	4.3540E+04	3.0000E+01	3.3042E+01	3.0420E+00
2.0540E+04	4.3520E+04	4.8000E+01	3.0729E+01	-1.7271E+01
2.0540E+04	4.3530E+04	3.7000E+01	3.2118E+01	-4.8816E+00
2.0540E+04	4.3540E+04	3.1000E+01	3.0175E+01	-8.2453E-01
2.0530E+04	4.3520E+04	2.1000E+01	3.0015E+01	9.0149E+00
2.0530E+04	4.3540E+04	2.8000E+01	2.7641E+01	-3.5870E-01
2.0520E+04	4.3520E+04	3.4000E+01	2.9628E+01	-4.3716E+00

2.0520E+04	4.3530E+04	2.9000E+01	2.8787E+01	-2.1267E-01
2.0520E+04	4.3540E+04	2.3000E+01	2.6031E+01	3.0312E+00
2.0550E+04	4.3530E+04	3.7000E+01	3.3697E+01	-3.3031E+00
2.0530E+04	4.3530E+04	2.8000E+01	3.0398E+01	2.3982E+00
2.0550E+04	4.3560E+04	2.2000E+01	2.5231E+01	3.2314E+00
2.0540E+04	4.3550E+04	2.4000E+01	2.2736E+01	-1.2638E+00
2.0540E+04	4.3560E+04	1.3000E+01	1.2209E+01	-7.9054E-01
2.0540E+04	4.3570E+04	7.0000E+00	5.5767E+00	-1.4233E+00
2.0530E+04	4.3560E+04	9.0000E+00	1.0755E+01	1.7546E+00
2.0520E+04	4.3550E+04	1.5000E+01	2.1256E+01	6.2565E+00
2.0520E+04	4.3560E+04	1.0000E+01	1.6175E+01	6.1751E+00
2.0520E+04	4.3570E+04	1.3000E+01	1.4314E+01	1.3139E+00
2.0550E+04	4.3570E+04	2.1000E+01	2.1372E+01	3.7199E-01
2.0530E+04	4.3550E+04	2.1000E+01	2.0257E+01	-7.4324E-01
2.0550E+04	4.3570E+04	2.4000E+01	2.1372E+01	-2.6280E+00
2.0550E+04	4.3550E+04	3.0000E+01	2.9933E+01	-6.6611E-02
2.0530E+04	4.3570E+04	1.0000E+01	5.6420E+00	-4.3580E+00
2.0550E+04	4.3580E+04	2.0000E+01	2.0859E+01	8.5931E-01
2.0540E+04	4.3580E+04	1.0000E+01	1.0018E+01	1.8233E-02
2.0540E+04	4.3590E+04	2.0000E+01	1.9474E+01	-5.2569E-01
2.0530E+04	4.3580E+04	1.1000E+01	1.1600E+01	6.0006E-01
2.0520E+04	4.3580E+04	1.7000E+01	1.9279E+01	2.2790E+00
2.0520E+04	4.3590E+04	2.3000E+01	2.8362E+01	5.3618E+00
2.0530E+04	4.3590E+04	2.6000E+01	2.2930E+01	-3.0702E+00
2.0550E+04	4.3590E+04	2.2000E+01	2.2505E+01	5.0525E-01
2.0560E+04	4.3480E+04	2.4000E+01	2.4467E+01	4.6706E-01
2.0559E+04	4.3491E+04	2.5000E+01	2.2264E+01	-2.7365E+00
2.0560E+04	4.3500E+04	2.3000E+01	2.5071E+01	2.0712E+00
2.0560E+04	4.3510E+04	3.2000E+01	3.0866E+01	-1.1335E+00
2.0551E+04	4.3491E+04	2.5000E+01	2.4983E+01	-1.6556E-02
2.0560E+04	4.3520E+04	3.2000E+01	3.5083E+01	3.0827E+00
2.0560E+04	4.3530E+04	4.0000E+01	3.5869E+01	-4.1309E+00
2.0560E+04	4.3550E+04	2.8000E+01	3.0691E+01	2.6909E+00
2.0560E+04	4.3560E+04	2.8000E+01	2.7352E+01	-6.4828E-01
2.0560E+04	4.3570E+04	2.7000E+01	2.6181E+01	-8.1907E-01
2.0560E+04	4.3580E+04	2.9000E+01	2.9342E+01	3.4168E-01
2.0560E+04	4.3590E+04	2.4000E+01	2.4000E+01	0.0000E+00

SUM OF SQUARED RESIDUALS 1.4190E+03

		3.5504E+01	3.8856E+01
SPLINE COEFFS		1.7532E+01	2.9853E+01
		1.2280E+01	5.5374E+01
1.7968E+01			2.8131E+01
2.7980E+01			3.0224E+01
2.3978E+01		1.9954E+01	
3.4246E+01		2.0353E+01	
1.0775E+01		4.5441E+01	2.4467E+01
3.3405E+01		7.5454E+00	1.5670E+01
2.7406E+01		3.7768E+01	3.9879E+01
		3.8408E+01	3.3631E+01
		4.5060E+01	2.0514E+01
2.5509E+01			3.4456E+01
1.6302E+01			2.4000E+01
2.2457E+01		3.9899E+01	
2.5737E+01		2.3018E+01	
8.7638E+00		2.0445E+01	
3.2046E+01		4.9292E+01	
3.4530E+01		-5.4951E+01	
		1.3307E+01	
		7.2741E+00	
2.0945E+01			
4.7521E+01			

1.9490E+00	1.1075E+01	
4.9349E+01	2.7410E+01	

APPENDIX. 9.6. Modelling the TREND with a BICUBIC SPLINE SURFACE fit to the variation of SILT over the 200m grid at Yelfo

BICUBIC SPLINE SURFACE, SILT, 200 m GRID.

INTERIOR X-KNOTS

2.0410E+04
2.0483E+04
2.0557E+04

INTERIOR Y-KNOTS

4.3476E+04
4.3529E+04
4.3582E+04

SUM OF SQUARES OF RESIDUAL RHS 6.7929E+02

RANK 48

NORTHING	EASTING	OBSERVED	SPLINE FIT	RESIDUALS
2.0350E+04	4.3450E+04	2.6000E+01	2.5647E+01	-3.5303E-01
2.0390E+04	4.3450E+04	2.6000E+01	2.3617E+01	-2.3829E+00
2.0370E+04	4.3470E+04	2.6000E+01	2.6942E+01	9.4150E-01
2.0390E+04	4.3470E+04	2.6000E+01	2.6378E+01	3.7844E-01
2.0370E+04	4.3450E+04	2.6000E+01	2.7475E+01	1.4751E+00
2.0350E+04	4.3470E+04	2.1000E+01	2.1051E+01	5.0957E-02
2.0390E+04	4.3490E+04	1.7000E+01	2.4447E+01	7.4475E+00
2.0370E+04	4.3510E+04	2.2000E+01	2.1762E+01	-2.3840E-01
2.0350E+04	4.3490E+04	2.7000E+01	2.7514E+01	5.1362E-01
2.0390E+04	4.3510E+04	1.9000E+01	2.1722E+01	2.7215E+00
2.0370E+04	4.3490E+04	3.4000E+01	2.6396E+01	-7.6036E+00
2.0351E+04	4.3509E+04	2.1000E+01	2.3373E+01	2.3730E+00
2.0390E+04	4.3530E+04	2.0000E+01	2.0441E+01	4.4070E-01
2.0390E+04	4.3570E+04	2.4000E+01	1.9389E+01	-4.6110E+00
2.0370E+04	4.3550E+04	1.5000E+01	1.9776E+01	4.7758E+00
2.0350E+04	4.3530E+04	1.7000E+01	1.6574E+01	-4.2582E-01
2.0350E+04	4.3570E+04	1.5000E+01	1.3840E+01	-1.1604E+00
2.0390E+04	4.3550E+04	2.2000E+01	2.1252E+01	-7.4809E-01
2.0370E+04	4.3530E+04	2.3000E+01	1.8511E+01	-4.4889E+00
2.0370E+04	4.3570E+04	1.6000E+01	2.0191E+01	4.1906E+00
2.0350E+04	4.3550E+04	1.5000E+01	1.4279E+01	-7.2106E-01
2.0370E+04	4.3590E+04	1.6000E+01	1.6436E+01	4.3612E-01
2.0390E+04	4.3590E+04	1.7000E+01	1.7092E+01	9.1654E-02
2.0350E+04	4.3590E+04	1.4000E+01	1.3867E+01	-1.3262E-01
2.0450E+04	4.3470E+04	2.1000E+01	2.2779E+01	1.7788E+00
2.0430E+04	4.3450E+04	2.3000E+01	2.2496E+01	-5.0375E-01
2.0410E+04	4.3470E+04	2.6000E+01	2.3714E+01	-2.2865E+00
2.0470E+04	4.3470E+04	2.7000E+01	2.3991E+01	-3.0087E+00
2.0430E+04	4.3470E+04	2.2000E+01	2.2460E+01	4.6025E-01
2.0410E+04	4.3450E+04	2.2000E+01	2.3751E+01	1.7515E+00
2.0470E+04	4.3490E+04	2.6000E+01	2.5180E+01	-8.2027E-01
2.0450E+04	4.3510E+04	2.5000E+01	2.4623E+01	-3.7658E-01
2.0430E+04	4.3490E+04	2.4000E+01	2.2830E+01	-1.1699E+00
2.0410E+04	4.3510E+04	2.1000E+01	2.2488E+01	1.4885E+00
2.0470E+04	4.3510E+04	2.3000E+01	2.5348E+01	2.3484E+00
2.0450E+04	4.3490E+04	2.5000E+01	2.3791E+01	-1.2088E+00
2.0430E+04	4.3510E+04	2.7000E+01	2.3569E+01	-3.4307E+00
2.0411E+04	4.3491E+04	2.4000E+01	2.2873E+01	-1.1265E+00
2.0450E+04	4.3550E+04	2.7000E+01	2.7619E+01	6.1948E-01
2.0470E+04	4.3530E+04	2.5000E+01	2.7333E+01	2.3329E+00

2.0470E+04	4.3570E+04	2.3000E+01	2.9301E+01	6.3009E+00
2.0430E+04	4.3530E+04	2.4000E+01	2.4415E+01	4.1498E-01
2.0430E+04	4.3570E+04	2.0000E+01	2.0361E+01	3.6051E-01
2.0410E+04	4.3550E+04	2.5000E+01	2.1991E+01	-3.0093E+00
2.0470E+04	4.3550E+04	2.9000E+01	2.9766E+01	7.6611E-01
2.0450E+04	4.3530E+04	3.0000E+01	2.6169E+01	-3.8313E+00
2.0450E+04	4.3570E+04	2.1000E+01	2.5270E+01	4.2703E+00
2.0430E+04	4.3550E+04	2.2000E+01	2.4429E+01	2.4294E+00
2.0410E+04	4.3530E+04	2.1000E+01	2.2414E+01	1.4136E+00
2.0410E+04	4.3570E+04	2.1000E+01	1.7847E+01	-3.1534E+00
2.0450E+04	4.3590E+04	2.7000E+01	2.3508E+01	-3.4921E+00
2.0410E+04	4.3590E+04	1.9000E+01	1.7836E+01	-1.1643E+00
2.0470E+04	4.3590E+04	2.6000E+01	2.6818E+01	8.1776E-01
2.0430E+04	4.3590E+04	1.7000E+01	2.0159E+01	3.1590E+00
2.0530E+04	4.3470E+04	2.5000E+01	2.4471E+01	-5.2950E-01
2.0490E+04	4.3470E+04	2.3000E+01	2.5414E+01	2.4137E+00
2.0550E+04	4.3470E+04	1.9000E+01	1.9176E+01	1.7641E-01
2.0510E+04	4.3470E+04	2.6000E+01	2.6055E+01	5.5377E-02
2.0551E+04	4.3491E+04	2.5000E+01	2.5417E+01	4.1734E-01
2.0531E+04	4.3511E+04	2.4000E+01	2.5155E+01	1.1548E+00
2.0510E+04	4.3490E+04	2.8000E+01	2.6935E+01	-1.0650E+00
2.0490E+04	4.3510E+04	2.4000E+01	2.5449E+01	1.4494E+00
2.0530E+04	4.3490E+04	2.8000E+01	2.6907E+01	-1.0932E+00
2.0490E+04	4.3490E+04	2.5000E+01	2.6356E+01	1.3562E+00
2.0550E+04	4.3530E+04	3.7000E+01	3.5485E+01	-1.5152E+00
2.0550E+04	4.3570E+04	2.1000E+01	2.0420E+01	-5.7981E-01
2.0530E+04	4.3550E+04	2.1000E+01	2.5254E+01	4.2540E+00
2.0510E+04	4.3530E+04	3.3000E+01	2.7588E+01	-5.4122E+00
2.0510E+04	4.3570E+04	2.7000E+01	2.4850E+01	-2.1497E+00
2.0490E+04	4.3550E+04	3.4000E+01	2.9118E+01	-4.8818E+00
2.0550E+04	4.3570E+04	2.4000E+01	2.0420E+01	-3.5798E+00
2.0550E+04	4.3550E+04	3.0000E+01	3.0426E+01	4.2567E-01
2.0530E+04	4.3530E+04	2.8000E+01	2.9472E+01	1.4720E+00
2.0530E+04	4.3570E+04	1.0000E+01	2.0382E+01	1.0382E+01
2.0509E+04	4.3571E+04	3.2000E+01	2.5150E+01	-6.8502E+00
2.0510E+04	4.3550E+04	2.8000E+01	2.6263E+01	-1.7371E+00
2.0490E+04	4.3530E+04	2.4000E+01	2.7584E+01	3.5844E+00
2.0490E+04	4.3570E+04	3.3000E+01	2.9234E+01	-3.7664E+00
2.0550E+04	4.3610E+04	1.8000E+01	1.8002E+01	2.1079E-03
2.0530E+04	4.3590E+04	2.6000E+01	2.7124E+01	1.1235E+00
2.0510E+04	4.3610E+04	2.9000E+01	2.9031E+01	3.0642E-02
2.0490E+04	4.3590E+04	2.8000E+01	2.9028E+01	1.0280E+00
2.0550E+04	4.3590E+04	2.2000E+01	2.2015E+01	1.5350E-02
2.0530E+04	4.3610E+04	2.0000E+01	1.9968E+01	-3.1719E-02
2.0510E+04	4.3590E+04	3.1000E+01	2.9300E+01	-1.7001E+00
2.0570E+04	4.3470E+04	1.9000E+01	1.9000E+01	1.1089E-12
2.0570E+04	4.3510E+04	2.6000E+01	2.6565E+01	5.6508E-01
2.0570E+04	4.3490E+04	2.7000E+01	2.6935E+01	-6.5340E-02
2.0570E+04	4.3550E+04	2.4000E+01	2.6115E+01	2.1149E+00
2.0570E+04	4.3530E+04	2.4000E+01	2.2385E+01	-1.6147E+00
2.0570E+04	4.3570E+04	3.2000E+01	3.0673E+01	-1.3271E+00
2.0570E+04	4.3590E+04	2.5000E+01	2.5335E+01	3.3497E-01
2.0570E+04	4.3610E+04	1.5000E+01	1.4992E+01	-7.8128E-03

SUM OF SQUARED RESIDUALS 7.0308E+02

		7.4776E+00	-3.0357E+01
SPLINE COEFFS	-1.4917E+01		7.8827E+01
	8.6839E+02		1.2904E+01
2.5647E+01			1.5180E+01
1.0981E+01			2.1515E-02
3.8928E+01	1.0452E+02		
9.3290E+00	2.0165E+01		

1.7137E+01	3.2206E+01	9.7967E+02
8.0162E+00	1.9621E+01	-1.6246E+01
1.2709E+02	5.8833E+01	4.6456E+01
	2.3461E+01	7.7777E+00
	-8.9256E+01	4.2554E+01
3.3544E+01		1.7176E+01
3.2068E+01		1.4992E+01
3.2814E+01	-2.5668E+03	
7.2448E+00	9.6667E+01	
3.8029E+01	3.1509E-01	
7.5546E+00	4.5906E+01	
2.2890E+01	-1.4021E+01	
	5.0631E+01	
	5.1215E+01	
-3.7531E-02		
2.1096E+01		
1.5503E+01	-5.7084E+03	
3.0229E+01	1.4978E+02	

Appendix 9.6. Modelling of the trend by fitting a BICUBIC SPLINE SURFACE, to the variation of COARSE SAND, 50 m GRID, at Yelford.

INTERIOR X-KNOTS

2.0470E+04
2.0495E+04
2.0508E+04
2.0518E+04

INTERIOR Y-KNOTS

4.3535E+04
4.3543E+04
4.3556E+04

SUM OF SQUARES OF RESIDUALS = 4.0877E+02
RANK = 53

NORTHING	EASTING	OBSERVED	FIT BY THE SPLINE	RESIDUAL
2.0460E+04	4.3530E+04	3.0000E+00	2.7229E+00	-2.7712E-01
2.0460E+04	4.3530E+04	3.0000E+00	2.7229E+00	-2.7712E-01
2.0450E+04	4.3530E+04	1.0000E+00	7.9229E-01	-2.0771E-01
2.0450E+04	4.3530E+04	1.0000E+00	7.9229E-01	-2.0771E-01
2.0465E+04	4.3530E+04	2.0000E+00	2.2270E+00	2.2698E-01
2.0465E+04	4.3530E+04	2.0000E+00	2.2270E+00	2.2698E-01
2.0455E+04	4.3530E+04	2.0000E+00	2.5660E+00	5.6605E-01
2.0455E+04	4.3530E+04	2.0000E+00	2.5660E+00	5.6605E-01
2.0460E+04	4.3540E+04	1.0000E+00	1.0112E+00	1.1150E-02
2.0460E+04	4.3540E+04	1.0000E+00	1.0112E+00	1.1150E-02
2.0450E+04	4.3540E+04	2.0000E+00	1.8302E+00	-1.6977E-01
2.0450E+04	4.3540E+04	2.0000E+00	1.8302E+00	-1.6977E-01
2.0445E+04	4.3535E+04	2.0000E+00	1.8450E+00	-1.5500E-01
2.0445E+04	4.3535E+04	2.0000E+00	1.8450E+00	-1.5500E-01
2.0465E+04	4.3540E+04	2.0000E+00	1.1589E+00	-8.4108E-01
2.0465E+04	4.3540E+04	2.0000E+00	1.1589E+00	-8.4108E-01
2.0460E+04	4.3535E+04	2.0000E+00	1.5574E+00	-4.4262E-01
2.0460E+04	4.3535E+04	2.0000E+00	1.5574E+00	-4.4262E-01
2.0455E+04	4.3535E+04	2.0000E+00	2.0815E+00	8.1515E-02
2.0455E+04	4.3535E+04	2.0000E+00	2.0815E+00	8.1515E-02
2.0455E+04	4.3540E+04	1.0000E+00	1.2854E+00	2.8541E-01
2.0455E+04	4.3540E+04	1.0000E+00	1.2854E+00	2.8541E-01
2.0450E+04	4.3535E+04	2.0000E+00	2.3269E+00	3.2690E-01
2.0450E+04	4.3535E+04	2.0000E+00	2.3269E+00	3.2690E-01
2.0460E+04	4.3550E+04	2.0000E+00	1.7530E+00	-2.4697E-01
2.0460E+04	4.3550E+04	2.0000E+00	1.7530E+00	-2.4697E-01
2.0450E+04	4.3550E+04	2.0000E+00	1.4773E+00	-5.2270E-01
2.0450E+04	4.3550E+04	2.0000E+00	1.4773E+00	-5.2270E-01
2.0464E+04	4.3544E+04	2.0000E+00	2.3595E+00	3.5950E-01
2.0464E+04	4.3544E+04	2.0000E+00	2.3595E+00	3.5950E-01
2.0466E+04	4.3551E+04	2.0000E+00	2.7799E+00	7.7992E-01
2.0466E+04	4.3551E+04	2.0000E+00	2.7799E+00	7.7992E-01
2.0465E+04	4.3555E+04	3.0000E+00	2.8952E+00	-1.0480E-01
2.0465E+04	4.3555E+04	3.0000E+00	2.8952E+00	-1.0480E-01
2.0460E+04	4.3545E+04	2.0000E+00	1.7410E+00	-2.5903E-01
2.0460E+04	4.3545E+04	2.0000E+00	1.7410E+00	-2.5903E-01
2.0460E+04	4.3555E+04	2.0000E+00	2.2155E+00	2.1553E-01
2.0460E+04	4.3555E+04	2.0000E+00	2.2155E+00	2.1553E-01
2.0455E+04	4.3545E+04	1.0000E+00	1.1897E+00	1.8970E-01
2.0455E+04	4.3545E+04	1.0000E+00	1.1897E+00	1.8970E-01
2.0455E+04	4.3550E+04	1.0000E+00	1.2545E+00	2.5448E-01
2.0455E+04	4.3550E+04	1.0000E+00	1.2545E+00	2.5448E-01

2.0455E+04	4.3555E+04	2.0000E+00	1.6737E+00	-3.2631E-01
2.0455E+04	4.3555E+04	2.0000E+00	1.6737E+00	-3.2631E-01
2.0451E+04	4.3546E+04	1.0000E+00	1.2748E+00	2.7480E-01
2.0451E+04	4.3546E+04	1.0000E+00	1.2748E+00	2.7480E-01
2.0450E+04	4.3555E+04	1.0000E+00	1.3917E+00	3.9175E-01
2.0450E+04	4.3555E+04	1.0000E+00	1.3917E+00	3.9175E-01
2.0460E+04	4.3560E+04	2.0000E+00	3.0446E+00	1.0446E+00
2.0460E+04	4.3560E+04	2.0000E+00	3.0446E+00	1.0446E+00
2.0450E+04	4.3560E+04	1.0000E+00	7.3089E-01	-2.6911E-01
2.0450E+04	4.3560E+04	1.0000E+00	7.3089E-01	-2.6911E-01
2.0465E+04	4.3560E+04	5.0000E+00	3.5056E+00	-1.4944E+00
2.0465E+04	4.3560E+04	5.0000E+00	3.5056E+00	-1.4944E+00
2.0455E+04	4.3560E+04	2.0000E+00	2.2029E+00	2.0293E-01
2.0455E+04	4.3560E+04	2.0000E+00	2.2029E+00	2.0293E-01
2.0480E+04	4.3530E+04	3.0000E+00	4.3367E+00	1.3367E+00
2.0480E+04	4.3530E+04	3.0000E+00	4.3367E+00	1.3367E+00
2.0470E+04	4.3530E+04	3.0000E+00	2.0426E+00	-9.5744E-01
2.0470E+04	4.3530E+04	3.0000E+00	2.0426E+00	-9.5744E-01
2.0490E+04	4.3530E+04	7.0000E+00	6.6777E+00	-3.2229E-01
2.0490E+04	4.3530E+04	7.0000E+00	6.6777E+00	-3.2229E-01
2.0475E+04	4.3530E+04	3.0000E+00	2.8678E+00	-1.3222E-01
2.0475E+04	4.3530E+04	3.0000E+00	2.8678E+00	-1.3222E-01
2.0490E+04	4.3540E+04	8.0000E+00	7.4423E+00	-5.5768E-01
2.0490E+04	4.3540E+04	8.0000E+00	7.4423E+00	-5.5768E-01
2.0480E+04	4.3540E+04	5.0000E+00	4.8882E+00	-1.1182E-01
2.0480E+04	4.3540E+04	5.0000E+00	4.8882E+00	-1.1182E-01
2.0470E+04	4.3540E+04	1.0000E+00	1.8802E+00	8.8019E-01
2.0470E+04	4.3540E+04	1.0000E+00	1.8802E+00	8.8019E-01
2.0490E+04	4.3535E+04	8.0000E+00	6.2140E+00	-1.7860E+00
2.0490E+04	4.3535E+04	8.0000E+00	6.2140E+00	-1.7860E+00
2.0485E+04	4.3535E+04	5.0000E+00	5.6186E+00	6.1856E-01
2.0485E+04	4.3535E+04	5.0000E+00	5.6186E+00	6.1856E-01
2.0485E+04	4.3535E+04	4.0000E+00	5.6186E+00	1.6186E+00
2.0485E+04	4.3535E+04	4.0000E+00	5.6186E+00	1.6186E+00
2.0485E+04	4.3540E+04	7.0000E+00	6.4316E+00	-5.6841E-01
2.0485E+04	4.3540E+04	7.0000E+00	6.4316E+00	-5.6841E-01
2.0480E+04	4.3535E+04	5.0000E+00	4.2115E+00	-7.8854E-01
2.0480E+04	4.3535E+04	5.0000E+00	4.2115E+00	-7.8854E-01
2.0475E+04	4.3535E+04	3.0000E+00	2.6189E+00	-3.8109E-01
2.0475E+04	4.3535E+04	3.0000E+00	2.6189E+00	-3.8109E-01
2.0475E+04	4.3540E+04	3.0000E+00	3.2313E+00	2.3131E-01
2.0475E+04	4.3540E+04	3.0000E+00	3.2313E+00	2.3131E-01
2.0470E+04	4.3535E+04	1.0000E+00	1.4671E+00	4.6709E-01
2.0470E+04	4.3535E+04	1.0000E+00	1.4671E+00	4.6709E-01
2.0480E+04	4.3550E+04	5.0000E+00	4.8067E+00	-1.9325E-01
2.0480E+04	4.3550E+04	5.0000E+00	4.8067E+00	-1.9325E-01
2.0490E+04	4.3550E+04	4.0000E+00	5.0509E+00	1.0509E+00
2.0490E+04	4.3550E+04	4.0000E+00	5.0509E+00	1.0509E+00
2.0470E+04	4.3550E+04	4.0000E+00	3.5915E+00	-4.0851E-01
2.0470E+04	4.3550E+04	4.0000E+00	3.5915E+00	-4.0851E-01
2.0490E+04	4.3545E+04	5.0000E+00	5.1455E+00	1.4553E-01
2.0490E+04	4.3545E+04	5.0000E+00	5.1455E+00	1.4553E-01
2.0490E+04	4.3555E+04	3.0000E+00	4.5443E+00	1.5443E+00
2.0490E+04	4.3555E+04	3.0000E+00	4.5443E+00	1.5443E+00
2.0485E+04	4.3545E+04	6.0000E+00	5.1816E+00	-8.1840E-01
2.0485E+04	4.3545E+04	6.0000E+00	5.1816E+00	-8.1840E-01
2.0485E+04	4.3555E+04	4.0000E+00	4.7431E+00	7.4311E-01
2.0485E+04	4.3555E+04	4.0000E+00	4.7431E+00	7.4311E-01
2.0485E+04	4.3555E+04	6.0000E+00	4.7431E+00	-1.2569E+00
2.0485E+04	4.3555E+04	6.0000E+00	4.7431E+00	-1.2569E+00
2.0480E+04	4.3545E+04	4.0000E+00	4.9686E+00	9.6861E-01
2.0480E+04	4.3545E+04	4.0000E+00	4.9686E+00	9.6861E-01
2.0480E+04	4.3555E+04	5.0000E+00	4.5975E+00	-4.0247E-01
2.0480E+04	4.3555E+04	5.0000E+00	4.5975E+00	-4.0247E-01

2.0475E+04	4.3545E+04	4.0000E+00	4.4870E+00	4.8705E-01
2.0475E+04	4.3545E+04	4.0000E+00	4.4870E+00	4.8705E-01
2.0475E+04	4.3550E+04	4.0000E+00	4.3275E+00	3.2748E-01
2.0475E+04	4.3550E+04	4.0000E+00	4.3275E+00	3.2748E-01
2.0475E+04	4.3555E+04	4.0000E+00	4.1869E+00	1.8692E-01
2.0475E+04	4.3555E+04	4.0000E+00	4.1869E+00	1.8692E-01
2.0470E+04	4.3545E+04	5.0000E+00	3.7174E+00	-1.2826E+00
2.0470E+04	4.3545E+04	5.0000E+00	3.7174E+00	-1.2826E+00
2.0470E+04	4.3555E+04	4.0000E+00	3.5906E+00	-4.0935E-01
2.0470E+04	4.3555E+04	4.0000E+00	3.5906E+00	-4.0935E-01
2.0490E+04	4.3560E+04	5.0000E+00	4.3285E+00	-6.7153E-01
2.0490E+04	4.3560E+04	5.0000E+00	4.3285E+00	-6.7153E-01
2.0480E+04	4.3560E+04	5.0000E+00	4.5362E+00	-4.6382E-01
2.0480E+04	4.3560E+04	5.0000E+00	4.5362E+00	-4.6382E-01
2.0480E+04	4.3570E+04	6.0000E+00	5.9969E+00	-3.1447E-03
2.0480E+04	4.3570E+04	6.0000E+00	5.9969E+00	-3.1447E-03
2.0470E+04	4.3560E+04	4.0000E+00	3.8353E+00	-1.6473E-01
2.0470E+04	4.3560E+04	4.0000E+00	3.8353E+00	-1.6473E-01
2.0480E+04	4.3560E+04	3.0000E+00	4.5362E+00	1.5362E+00
2.0480E+04	4.3560E+04	3.0000E+00	4.5362E+00	1.5362E+00
2.0475E+04	4.3560E+04	4.0000E+00	4.2129E+00	2.1293E-01
2.0475E+04	4.3560E+04	4.0000E+00	4.2129E+00	2.1293E-01
2.0500E+04	4.3530E+04	4.0000E+00	4.4852E+00	4.8521E-01
2.0500E+04	4.3530E+04	4.0000E+00	4.4852E+00	4.8521E-01
2.0505E+04	4.3530E+04	3.0000E+00	3.0210E+00	2.1020E-02
2.0505E+04	4.3530E+04	3.0000E+00	3.0210E+00	2.1020E-02
2.0495E+04	4.3530E+04	7.0000E+00	6.2858E+00	-7.1416E-01
2.0495E+04	4.3530E+04	7.0000E+00	6.2858E+00	-7.1416E-01
2.0500E+04	4.3540E+04	7.0000E+00	6.4140E+00	-5.8600E-01
2.0500E+04	4.3540E+04	7.0000E+00	6.4140E+00	-5.8600E-01
2.0500E+04	4.3535E+04	3.0000E+00	3.0663E+00	6.6277E-02
2.0500E+04	4.3535E+04	3.0000E+00	3.0663E+00	6.6277E-02
2.0495E+04	4.3535E+04	5.0000E+00	5.3717E+00	3.7172E-01
2.0495E+04	4.3535E+04	5.0000E+00	5.3717E+00	3.7172E-01
2.0495E+04	4.3540E+04	6.0000E+00	7.5012E+00	1.5012E+00
2.0495E+04	4.3540E+04	6.0000E+00	7.5012E+00	1.5012E+00
2.0500E+04	4.3550E+04	4.0000E+00	4.7348E+00	7.3483E-01
2.0500E+04	4.3550E+04	4.0000E+00	4.7348E+00	7.3483E-01
2.0505E+04	4.3555E+04	4.0000E+00	6.9010E+00	2.9010E+00
2.0505E+04	4.3555E+04	4.0000E+00	6.9010E+00	2.9010E+00
2.0505E+04	4.3545E+04	3.0000E+00	4.6123E+00	1.6123E+00
2.0505E+04	4.3545E+04	3.0000E+00	4.6123E+00	1.6123E+00
2.0505E+04	4.3545E+04	6.0000E+00	4.6123E+00	-1.3877E+00
2.0505E+04	4.3545E+04	6.0000E+00	4.6123E+00	-1.3877E+00
2.0505E+04	4.3550E+04	6.0000E+00	6.2342E+00	2.3425E-01
2.0505E+04	4.3550E+04	6.0000E+00	6.2342E+00	2.3425E-01
2.0505E+04	4.3555E+04	8.0000E+00	6.9010E+00	-1.0990E+00
2.0505E+04	4.3555E+04	8.0000E+00	6.9010E+00	-1.0990E+00
2.0500E+04	4.3545E+04	5.0000E+00	4.5135E+00	-4.8648E-01
2.0500E+04	4.3545E+04	5.0000E+00	4.5135E+00	-4.8648E-01
2.0500E+04	4.3555E+04	6.0000E+00	3.5227E+00	-2.4773E+00
2.0500E+04	4.3555E+04	6.0000E+00	3.5227E+00	-2.4773E+00
2.0495E+04	4.3545E+04	5.0000E+00	4.8799E+00	-1.2009E-01
2.0495E+04	4.3545E+04	5.0000E+00	4.8799E+00	-1.2009E-01
2.0495E+04	4.3550E+04	6.0000E+00	4.8437E+00	-1.1563E+00
2.0495E+04	4.3550E+04	6.0000E+00	4.8437E+00	-1.1563E+00
2.0495E+04	4.3555E+04	4.0000E+00	3.9217E+00	-7.8284E-02
2.0495E+04	4.3555E+04	4.0000E+00	3.9217E+00	-7.8284E-02
2.0500E+04	4.3560E+04	4.0000E+00	3.0434E+00	-9.5656E-01
2.0500E+04	4.3560E+04	4.0000E+00	3.0434E+00	-9.5656E-01
2.0505E+04	4.3560E+04	8.0000E+00	8.9963E+00	9.9634E-01
2.0505E+04	4.3560E+04	8.0000E+00	8.9963E+00	9.9634E-01
2.0495E+04	4.3560E+04	3.0000E+00	3.4520E+00	4.5202E-01
2.0495E+04	4.3560E+04	3.0000E+00	3.4520E+00	4.5202E-01

2.0510E+04	4.3530E+04	4.0000E+00	3.9744E+00	-2.5615E-02
2.0510E+04	4.3530E+04	4.0000E+00	3.9744E+00	-2.5615E-02
2.0515E+04	4.3530E+04	4.0000E+00	4.0006E+00	5.9743E-04
2.0515E+04	4.3530E+04	4.0000E+00	4.0006E+00	5.9743E-04
2.0510E+04	4.3540E+04	4.0000E+00	3.9161E+00	-8.3926E-02
2.0510E+04	4.3540E+04	4.0000E+00	3.9161E+00	-8.3926E-02
2.0515E+04	4.3535E+04	6.0000E+00	6.0000E+00	-2.7667E-05
2.0515E+04	4.3535E+04	6.0000E+00	6.0000E+00	-2.7667E-05
2.0515E+04	4.3540E+04	7.0000E+00	7.0011E+00	1.1369E-03
2.0515E+04	4.3540E+04	7.0000E+00	7.0011E+00	1.1369E-03
2.0510E+04	4.3535E+04	4.0000E+00	4.0030E+00	3.0390E-03
2.0510E+04	4.3535E+04	4.0000E+00	4.0030E+00	3.0390E-03
2.0510E+04	4.3550E+04	1.2000E+01	1.1331E+01	-6.6887E-01
2.0510E+04	4.3550E+04	1.2000E+01	1.1331E+01	-6.6887E-01
2.0515E+04	4.3555E+04	1.6000E+01	2.4502E+01	8.5023E+00
2.0515E+04	4.3555E+04	1.6000E+01	2.4502E+01	8.5023E+00
2.0515E+04	4.3550E+04	2.9000E+01	2.9011E+01	1.0863E-02
2.0515E+04	4.3550E+04	2.9000E+01	2.9011E+01	1.0863E-02
2.0515E+04	4.3555E+04	3.3000E+01	2.4502E+01	-8.4977E+00
2.0515E+04	4.3555E+04	3.3000E+01	2.4502E+01	-8.4977E+00
2.0510E+04	4.3545E+04	6.0000E+00	6.3235E+00	3.2352E-01
2.0510E+04	4.3545E+04	6.0000E+00	6.3235E+00	3.2352E-01
2.0510E+04	4.3555E+04	1.8000E+01	1.7927E+01	-7.3375E-02
2.0510E+04	4.3555E+04	1.8000E+01	1.7927E+01	-7.3375E-02
2.0510E+04	4.3560E+04	2.8000E+01	2.7615E+01	-3.8490E-01
2.0510E+04	4.3560E+04	2.8000E+01	2.7615E+01	-3.8490E-01
2.0515E+04	4.3560E+04	3.4000E+01	3.4008E+01	8.0622E-03
2.0515E+04	4.3560E+04	3.4000E+01	3.4008E+01	8.0622E-03
2.0520E+04	4.3530E+04	7.0000E+00	7.0000E+00	0.0000E+00
2.0520E+04	4.3530E+04	7.0000E+00	7.0000E+00	0.0000E+00
2.0520E+04	4.3540E+04	1.1000E+01	1.1000E+01	-8.8818E-16
2.0520E+04	4.3540E+04	1.1000E+01	1.1000E+01	-8.8818E-16
2.0520E+04	4.3535E+04	1.2000E+01	1.2000E+01	0.0000E+00
2.0520E+04	4.3535E+04	1.2000E+01	1.2000E+01	0.0000E+00
2.0520E+04	4.3550E+04	3.0000E+01	3.0000E+01	8.8818E-16
2.0520E+04	4.3550E+04	3.0000E+01	3.0000E+01	8.8818E-16
2.0520E+04	4.3545E+04	2.3000E+01	2.3000E+01	-4.4409E-16
2.0520E+04	4.3545E+04	2.3000E+01	2.3000E+01	-4.4409E-16
2.0520E+04	4.3555E+04	3.4000E+01	3.4000E+01	0.0000E+00
2.0520E+04	4.3555E+04	3.4000E+01	3.4000E+01	0.0000E+00
2.0520E+04	4.3560E+04	4.1000E+01	4.1000E+01	8.8818E-16
2.0520E+04	4.3560E+04	4.1000E+01	4.1000E+01	8.8818E-16

SUM OF SQUARED RESIDUALS 4.0877E+02

SPLINE COEFFS			
	1.2566E+01	8.3609E+00	
	-5.2170E+00	2.7162E+01	
	2.0682E+01	1.5016E+00	
-3.5626E+00	-2.1773E+02	3.4866E+00	
8.4672E-01		3.4815E+01	
2.4370E+00		1.0189E+02	
2.5751E+00	1.1351E+01	8.6974E+00	
3.8791E+00	6.2170E-01		
-7.3914E+00	2.0218E+01		
-6.1254E-01	-5.6255E-01	-4.5500E+00	
	1.3305E+01	1.5410E+02	
	-9.0344E+00	-1.4045E+02	
6.3822E+00	1.9704E+02	2.1941E+02	
3.2578E+00		-1.0063E+02	
4.5172E+00		1.4607E+01	
-2.7403E+00	-4.1877E-01	1.7014E+01	
1.7223E+00	-1.5621E+01		
3.6575E+00	5.0728E+00		

3.9290E+01	2.0125E+00	7.0000E+00
	8.0142E+00	3.2110E+01
	-2.2877E+01	-4.0855E+00
-3.2727E+00	2.6504E+02	2.8069E+01
7.0893E+00		3.3765E+01
-1.2045E+01		4.3039E+01
1.7556E+02		

Appendix 9.6. Modelling the TREND by fitting a BICUBIC SPLINE SURFACE to the variation COARSE SAND, 100m GRID at YELFORD.

BICUBIC SPLINE SURFACE, SAND, 100 m GRID.

INTERIOR X-KNOTS

2.0459E+04
2.0486E+04
2.0523E+04
2.0548E+04

INTERIOR Y-KNOTS

4.3490E+04
4.3516E+04
4.3553E+04

SUM OF SQUARES OF RESIDUAL RHS 3.0122E+03

RANK 56

NORTHING	EASTING	OBSERVED	SPLINE FIT	RESIDUAL
2.0450E+04	4.3480E+04	3.0000E+00	3.0000E+00	0.0000E+00
2.0450E+04	4.3480E+04	3.0000E+00	3.0000E+00	0.0000E+00
2.0450E+04	4.3500E+04	2.0000E+00	2.1659E+00	1.6593E-01
2.0450E+04	4.3500E+04	2.0000E+00	2.1659E+00	1.6593E-01
2.0450E+04	4.3510E+04	2.0000E+00	1.1032E+00	-8.9682E-01
2.0450E+04	4.3510E+04	2.0000E+00	1.1032E+00	-8.9682E-01
2.0450E+04	4.3490E+04	2.0000E+00	1.9724E+00	-2.7647E-02
2.0451E+04	4.3520E+04	2.0000E+00	4.4997E+00	2.4997E+00
2.0451E+04	4.3520E+04	2.0000E+00	4.4997E+00	2.4997E+00
2.0450E+04	4.3540E+04	2.0000E+00	1.0276E+00	-9.7237E-01
2.0450E+04	4.3540E+04	2.0000E+00	1.0276E+00	-9.7237E-01
2.0450E+04	4.3550E+04	2.0000E+00	1.7405E+00	-2.5950E-01
2.0450E+04	4.3550E+04	2.0000E+00	1.7405E+00	-2.5950E-01
2.0450E+04	4.3530E+04	1.0000E+00	3.8899E-01	-6.1101E-01
2.0450E+04	4.3530E+04	1.0000E+00	3.8899E-01	-6.1101E-01
2.0450E+04	4.3560E+04	1.0000E+00	2.1373E+00	1.1373E+00
2.0450E+04	4.3560E+04	1.0000E+00	2.1373E+00	1.1373E+00
2.0450E+04	4.3580E+04	5.0000E+00	3.7267E+00	-1.2733E+00
2.0450E+04	4.3580E+04	5.0000E+00	3.7267E+00	-1.2733E+00
2.0450E+04	4.3590E+04	6.0000E+00	6.4339E+00	4.3394E-01
2.0450E+04	4.3590E+04	6.0000E+00	6.4339E+00	4.3394E-01
2.0450E+04	4.3570E+04	2.0000E+00	2.5479E+00	5.4785E-01
2.0450E+04	4.3570E+04	2.0000E+00	2.5479E+00	5.4785E-01
2.0480E+04	4.3480E+04	3.0000E+00	2.3223E+00	-6.7765E-01
2.0480E+04	4.3480E+04	3.0000E+00	2.3223E+00	-6.7765E-01
2.0479E+04	4.3489E+04	9.0000E+00	5.2720E+00	-3.7280E+00
2.0479E+04	4.3489E+04	9.0000E+00	5.2720E+00	-3.7280E+00
2.0470E+04	4.3480E+04	3.0000E+00	3.4982E+00	4.9819E-01
2.0470E+04	4.3480E+04	3.0000E+00	3.4982E+00	4.9819E-01
2.0460E+04	4.3480E+04	4.0000E+00	3.8923E+00	-1.0770E-01
2.0460E+04	4.3480E+04	4.0000E+00	3.8923E+00	-1.0770E-01
2.0480E+04	4.3500E+04	3.0000E+00	3.7272E+00	7.2715E-01
2.0480E+04	4.3500E+04	3.0000E+00	3.7272E+00	7.2715E-01
2.0481E+04	4.3511E+04	6.0000E+00	4.4456E+00	-1.5544E+00
2.0481E+04	4.3511E+04	6.0000E+00	4.4456E+00	-1.5544E+00
2.0470E+04	4.3500E+04	3.0000E+00	3.0077E+00	7.6616E-03
2.0470E+04	4.3500E+04	3.0000E+00	3.0077E+00	7.6616E-03
2.0460E+04	4.3490E+04	3.0000E+00	2.4467E+00	-5.5332E-01

2.0460E+04	4.3490E+04	3.0000E+00	2.4467E+00	-5.5332E-01
2.0460E+04	4.3500E+04	3.0000E+00	2.6879E+00	-3.1211E-01
2.0460E+04	4.3500E+04	3.0000E+00	2.6879E+00	-3.1211E-01
2.0460E+04	4.3510E+04	4.0000E+00	5.6955E+00	1.6955E+00
2.0460E+04	4.3510E+04	4.0000E+00	5.6955E+00	1.6955E+00
2.0470E+04	4.3490E+04	3.0000E+00	5.9404E+00	2.9404E+00
2.0470E+04	4.3490E+04	3.0000E+00	5.9404E+00	2.9404E+00
2.0470E+04	4.3510E+04	3.0000E+00	2.5930E+00	-4.0704E-01
2.0470E+04	4.3510E+04	3.0000E+00	2.5930E+00	-4.0704E-01
2.0480E+04	4.3520E+04	4.0000E+00	4.5293E+00	5.2928E-01
2.0480E+04	4.3520E+04	4.0000E+00	4.5293E+00	5.2928E-01
2.0480E+04	4.3530E+04	3.0000E+00	4.1775E+00	1.1775E+00
2.0480E+04	4.3530E+04	3.0000E+00	4.1775E+00	1.1775E+00
2.0480E+04	4.3540E+04	5.0000E+00	3.4407E+00	-1.5593E+00
2.0480E+04	4.3540E+04	5.0000E+00	3.4407E+00	-1.5593E+00
2.0480E+04	4.3550E+04	5.0000E+00	2.7392E+00	-2.2608E+00
2.0480E+04	4.3550E+04	5.0000E+00	2.7392E+00	-2.2608E+00
2.0469E+04	4.3521E+04	3.0000E+00	3.2777E+00	2.7775E-01
2.0469E+04	4.3521E+04	3.0000E+00	3.2777E+00	2.7775E-01
2.0470E+04	4.3540E+04	1.0000E+00	4.4232E+00	3.4232E+00
2.0470E+04	4.3540E+04	1.0000E+00	4.4232E+00	3.4232E+00
2.0460E+04	4.3520E+04	1.2000E+01	6.9927E+00	-5.0073E+00
2.0460E+04	4.3520E+04	1.2000E+01	6.9927E+00	-5.0073E+00
2.0460E+04	4.3530E+04	3.0000E+00	4.9837E+00	1.9837E+00
2.0460E+04	4.3530E+04	3.0000E+00	4.9837E+00	1.9837E+00
2.0460E+04	4.3540E+04	1.0000E+00	1.8141E+00	8.1411E-01
2.0460E+04	4.3540E+04	1.0000E+00	1.8141E+00	8.1411E-01
2.0460E+04	4.3550E+04	2.0000E+00	-1.1984E-01	-2.1198E+00
2.0460E+04	4.3550E+04	2.0000E+00	-1.1984E-01	-2.1198E+00
2.0470E+04	4.3530E+04	3.0000E+00	3.7888E+00	7.8881E-01
2.0470E+04	4.3530E+04	3.0000E+00	3.7888E+00	7.8881E-01
2.0470E+04	4.3550E+04	4.0000E+00	5.0397E+00	1.0397E+00
2.0470E+04	4.3550E+04	4.0000E+00	5.0397E+00	1.0397E+00
2.0480E+04	4.3560E+04	5.0000E+00	2.5358E+00	-2.4642E+00
2.0480E+04	4.3560E+04	5.0000E+00	2.5358E+00	-2.4642E+00
2.0480E+04	4.3570E+04	6.0000E+00	3.7323E+00	-2.2677E+00
2.0480E+04	4.3570E+04	6.0000E+00	3.7323E+00	-2.2677E+00
2.0479E+04	4.3581E+04	8.0000E+00	8.5269E+00	5.2689E-01
2.0479E+04	4.3581E+04	8.0000E+00	8.5269E+00	5.2689E-01
2.0480E+04	4.3590E+04	1.7000E+01	1.4971E+01	-2.0287E+00
2.0480E+04	4.3590E+04	1.7000E+01	1.4971E+01	-2.0287E+00
2.0470E+04	4.3560E+04	4.0000E+00	5.6991E+00	1.6991E+00
2.0470E+04	4.3560E+04	4.0000E+00	5.6991E+00	1.6991E+00
2.0470E+04	4.3580E+04	1.0000E+01	1.1097E+01	1.0973E+00
2.0470E+04	4.3580E+04	1.0000E+01	1.1097E+01	1.0973E+00
2.0460E+04	4.3560E+04	2.0000E+00	1.2831E+00	-7.1689E-01
2.0460E+04	4.3560E+04	2.0000E+00	1.2831E+00	-7.1689E-01
2.0460E+04	4.3570E+04	5.0000E+00	5.0818E+00	8.1777E-02
2.0460E+04	4.3570E+04	5.0000E+00	5.0818E+00	8.1777E-02
2.0460E+04	4.3580E+04	9.0000E+00	8.5401E+00	-4.5989E-01
2.0460E+04	4.3580E+04	9.0000E+00	8.5401E+00	-4.5989E-01
2.0460E+04	4.3590E+04	9.0000E+00	8.8988E+00	-1.0116E-01
2.0460E+04	4.3590E+04	9.0000E+00	8.8988E+00	-1.0116E-01
2.0470E+04	4.3570E+04	4.0000E+00	7.2698E+00	3.2698E+00
2.0470E+04	4.3570E+04	4.0000E+00	7.2698E+00	3.2698E+00
2.0470E+04	4.3590E+04	1.8000E+01	1.8533E+01	5.3299E-01
2.0470E+04	4.3590E+04	1.8000E+01	1.8533E+01	5.3299E-01
2.0520E+04	4.3480E+04	6.0000E+00	5.8085E+00	-1.9154E-01
2.0520E+04	4.3480E+04	6.0000E+00	5.8085E+00	-1.9154E-01
2.0510E+04	4.3480E+04	5.0000E+00	4.4488E+00	-5.5124E-01
2.0510E+04	4.3480E+04	5.0000E+00	4.4488E+00	-5.5124E-01
2.0500E+04	4.3480E+04	2.0000E+00	2.8821E+00	8.8209E-01
2.0500E+04	4.3480E+04	2.0000E+00	2.8821E+00	8.8209E-01
2.0490E+04	4.3480E+04	2.0000E+00	1.9288E+00	-7.1232E-02

2.0490E+04	4.3480E+04	2.0000E+00	1.9288E+00	-7.1232E-02
2.0520E+04	4.3490E+04	5.0000E+00	3.9363E+00	-1.0637E+00
2.0520E+04	4.3490E+04	5.0000E+00	3.9363E+00	-1.0637E+00
2.0520E+04	4.3500E+04	3.0000E+00	6.6871E+00	3.6871E+00
2.0520E+04	4.3500E+04	3.0000E+00	6.6871E+00	3.6871E+00
2.0510E+04	4.3500E+04	6.0000E+00	6.3572E+00	3.5724E-01
2.0510E+04	4.3500E+04	6.0000E+00	6.3572E+00	3.5724E-01
2.0500E+04	4.3490E+04	1.0000E+00	2.1758E+00	1.1758E+00
2.0500E+04	4.3490E+04	1.0000E+00	2.1758E+00	1.1758E+00
2.0500E+04	4.3510E+04	6.0000E+00	5.2332E+00	-7.6682E-01
2.0500E+04	4.3510E+04	6.0000E+00	5.2332E+00	-7.6682E-01
2.0490E+04	4.3500E+04	3.0000E+00	4.6607E+00	1.6607E+00
2.0490E+04	4.3500E+04	3.0000E+00	4.6607E+00	1.6607E+00
2.0510E+04	4.3490E+04	3.0000E+00	2.6552E+00	-3.4475E-01
2.0510E+04	4.3490E+04	3.0000E+00	2.6552E+00	-3.4475E-01
2.0490E+04	4.3510E+04	8.0000E+00	5.7128E+00	-2.2872E+00
2.0490E+04	4.3510E+04	8.0000E+00	5.7128E+00	-2.2872E+00
2.0490E+04	4.3490E+04	2.0000E+00	2.8260E+00	8.2596E-01
2.0490E+04	4.3490E+04	2.0000E+00	2.8260E+00	8.2596E-01
2.0520E+04	4.3520E+04	2.0000E+00	2.4492E+00	4.4916E-01
2.0520E+04	4.3520E+04	2.0000E+00	2.4492E+00	4.4916E-01
2.0520E+04	4.3530E+04	7.0000E+00	6.9347E+00	-6.5286E-02
2.0520E+04	4.3530E+04	7.0000E+00	6.9347E+00	-6.5286E-02
2.0520E+04	4.3540E+04	1.1000E+01	1.4581E+01	3.5807E+00
2.0520E+04	4.3540E+04	1.1000E+01	1.4581E+01	3.5807E+00
2.0520E+04	4.3550E+04	3.0000E+01	2.2593E+01	-7.4068E+00
2.0520E+04	4.3550E+04	3.0000E+01	2.2593E+01	-7.4068E+00
2.0510E+04	4.3520E+04	6.0000E+00	3.0812E+00	-2.9188E+00
2.0510E+04	4.3520E+04	6.0000E+00	3.0812E+00	-2.9188E+00
2.0510E+04	4.3540E+04	4.0000E+00	1.2328E+01	8.3276E+00
2.0510E+04	4.3540E+04	4.0000E+00	1.2328E+01	8.3276E+00
2.0500E+04	4.3520E+04	8.0000E+00	4.8340E+00	-3.1660E+00
2.0500E+04	4.3520E+04	8.0000E+00	4.8340E+00	-3.1660E+00
2.0500E+04	4.3530E+04	4.0000E+00	6.0685E+00	2.0685E+00
2.0500E+04	4.3530E+04	4.0000E+00	6.0685E+00	2.0685E+00
2.0500E+04	4.3540E+04	7.0000E+00	7.8262E+00	8.2621E-01
2.0500E+04	4.3540E+04	7.0000E+00	7.8262E+00	8.2621E-01
2.0500E+04	4.3550E+04	4.0000E+00	8.8118E+00	4.8118E+00
2.0500E+04	4.3550E+04	4.0000E+00	8.8118E+00	4.8118E+00
2.0490E+04	4.3520E+04	3.0000E+00	5.8496E+00	2.8496E+00
2.0490E+04	4.3520E+04	3.0000E+00	5.8496E+00	2.8496E+00
2.0490E+04	4.3540E+04	8.0000E+00	3.9902E+00	-4.0098E+00
2.0490E+04	4.3540E+04	8.0000E+00	3.9902E+00	-4.0098E+00
2.0510E+04	4.3530E+04	4.0000E+00	6.7191E+00	2.7191E+00
2.0510E+04	4.3530E+04	4.0000E+00	6.7191E+00	2.7191E+00
2.0490E+04	4.3550E+04	4.0000E+00	2.7400E+00	-1.2600E+00
2.0490E+04	4.3550E+04	4.0000E+00	2.7400E+00	-1.2600E+00
2.0510E+04	4.3550E+04	1.2000E+01	1.6941E+01	4.9409E+00
2.0510E+04	4.3550E+04	1.2000E+01	1.6941E+01	4.9409E+00
2.0490E+04	4.3530E+04	7.0000E+00	5.1541E+00	-1.8459E+00
2.0490E+04	4.3530E+04	7.0000E+00	5.1541E+00	-1.8459E+00
2.0520E+04	4.3560E+04	4.1000E+01	2.8197E+01	-1.2803E+01
2.0520E+04	4.3560E+04	4.1000E+01	2.8197E+01	-1.2803E+01
2.0520E+04	4.3570E+04	3.4000E+01	2.8802E+01	-5.1980E+00
2.0520E+04	4.3570E+04	3.4000E+01	2.8802E+01	-5.1980E+00
2.0520E+04	4.3580E+04	2.1000E+01	2.1930E+01	9.3033E-01
2.0520E+04	4.3580E+04	2.1000E+01	2.1930E+01	9.3033E-01
2.0520E+04	4.3590E+04	1.0000E+01	5.1043E+00	-4.8957E+00
2.0520E+04	4.3590E+04	1.0000E+01	5.1043E+00	-4.8957E+00
2.0510E+04	4.3560E+04	2.8000E+01	1.7846E+01	-1.0154E+01
2.0510E+04	4.3560E+04	2.8000E+01	1.7846E+01	-1.0154E+01
2.0510E+04	4.3580E+04	7.0000E+00	9.6523E+00	2.6523E+00
2.0510E+04	4.3580E+04	7.0000E+00	9.6523E+00	2.6523E+00
2.0500E+04	4.3560E+04	4.0000E+00	7.9015E+00	3.9015E+00

2.0500E+04	4.3560E+04	4.0000E+00	7.9015E+00	3.9015E+00
2.0500E+04	4.3570E+04	5.0000E+00	5.7416E+00	7.4160E-01
2.0500E+04	4.3570E+04	5.0000E+00	5.7416E+00	7.4160E-01
2.0500E+04	4.3580E+04	4.0000E+00	4.0230E+00	2.3044E-02
2.0500E+04	4.3580E+04	4.0000E+00	4.0230E+00	2.3044E-02
2.0500E+04	4.3590E+04	4.0000E+00	4.4502E+00	4.5017E-01
2.0500E+04	4.3590E+04	4.0000E+00	4.4502E+00	4.5017E-01
2.0490E+04	4.3560E+04	5.0000E+00	1.8119E+00	-3.1881E+00
2.0490E+04	4.3560E+04	5.0000E+00	1.8119E+00	-3.1881E+00
2.0490E+04	4.3580E+04	7.0000E+00	3.7809E+00	-3.2191E+00
2.0490E+04	4.3580E+04	7.0000E+00	3.7809E+00	-3.2191E+00
2.0510E+04	4.3570E+04	8.0000E+00	1.4938E+01	6.9382E+00
2.0510E+04	4.3570E+04	8.0000E+00	1.4938E+01	6.9382E+00
2.0490E+04	4.3590E+04	6.0000E+00	8.3458E+00	2.3458E+00
2.0490E+04	4.3590E+04	6.0000E+00	8.3458E+00	2.3458E+00
2.0509E+04	4.3571E+04	2.0000E+00	1.3363E+01	1.1363E+01
2.0509E+04	4.3571E+04	2.0000E+00	1.3363E+01	1.1363E+01
2.0510E+04	4.3590E+04	5.0000E+00	3.4425E+00	-1.5575E+00
2.0510E+04	4.3590E+04	5.0000E+00	3.4425E+00	-1.5575E+00
2.0490E+04	4.3570E+04	5.0000E+00	1.8813E+00	-3.1187E+00
2.0490E+04	4.3570E+04	5.0000E+00	1.8813E+00	-3.1187E+00
2.0539E+04	4.3481E+04	8.0000E+00	7.7398E+00	-2.6025E-01
2.0539E+04	4.3481E+04	8.0000E+00	7.7398E+00	-2.6025E-01
2.0530E+04	4.3480E+04	6.0000E+00	6.3794E+00	3.7941E-01
2.0530E+04	4.3480E+04	6.0000E+00	6.3794E+00	3.7941E-01
2.0540E+04	4.3490E+04	6.0000E+00	6.6072E+00	6.0719E-01
2.0540E+04	4.3490E+04	6.0000E+00	6.6072E+00	6.0719E-01
2.0540E+04	4.3500E+04	5.0000E+00	6.3113E+00	1.3113E+00
2.0540E+04	4.3500E+04	5.0000E+00	6.3113E+00	1.3113E+00
2.0540E+04	4.3510E+04	7.0000E+00	6.9091E+00	-9.0932E-02
2.0540E+04	4.3510E+04	7.0000E+00	6.9091E+00	-9.0932E-02
2.0530E+04	4.3500E+04	4.0000E+00	6.4578E+00	2.4578E+00
2.0530E+04	4.3500E+04	4.0000E+00	6.4578E+00	2.4578E+00
2.0531E+04	4.3511E+04	9.0000E+00	5.1519E+00	-3.8481E+00
2.0531E+04	4.3511E+04	9.0000E+00	5.1519E+00	-3.8481E+00
2.0530E+04	4.3490E+04	7.0000E+00	5.6222E+00	-1.3778E+00
2.0530E+04	4.3490E+04	7.0000E+00	5.6222E+00	-1.3778E+00
2.0540E+04	4.3520E+04	3.0000E+00	6.5436E+00	3.5436E+00
2.0540E+04	4.3520E+04	3.0000E+00	6.5436E+00	3.5436E+00
2.0540E+04	4.3520E+04	6.0000E+00	6.5436E+00	5.4364E-01
2.0540E+04	4.3520E+04	6.0000E+00	6.5436E+00	5.4364E-01
2.0540E+04	4.3530E+04	4.0000E+00	5.5929E+00	1.5929E+00
2.0540E+04	4.3530E+04	4.0000E+00	5.5929E+00	1.5929E+00
2.0540E+04	4.3540E+04	5.0000E+00	7.3374E+00	2.3374E+00
2.0540E+04	4.3540E+04	5.0000E+00	7.3374E+00	2.3374E+00
2.0540E+04	4.3550E+04	1.4000E+01	1.5252E+01	1.2518E+00
2.0540E+04	4.3550E+04	1.4000E+01	1.5252E+01	1.2518E+00
2.0530E+04	4.3520E+04	1.7000E+01	4.4163E+00	-1.2584E+01
2.0530E+04	4.3520E+04	1.7000E+01	4.4163E+00	-1.2584E+01
2.0530E+04	4.3540E+04	6.0000E+00	1.2136E+01	6.1360E+00
2.0530E+04	4.3540E+04	6.0000E+00	1.2136E+01	6.1360E+00
2.0530E+04	4.3550E+04	1.6000E+01	2.1718E+01	5.7180E+00
2.0530E+04	4.3550E+04	1.6000E+01	2.1718E+01	5.7180E+00
2.0530E+04	4.3530E+04	6.0000E+00	6.5590E+00	5.5901E-01
2.0530E+04	4.3530E+04	6.0000E+00	6.5590E+00	5.5901E-01
2.0540E+04	4.3560E+04	3.5000E+01	3.1686E+01	-3.3143E+00
2.0540E+04	4.3560E+04	3.5000E+01	3.1686E+01	-3.3143E+00
2.0540E+04	4.3570E+04	4.9000E+01	4.7373E+01	-1.6266E+00
2.0540E+04	4.3570E+04	4.9000E+01	4.7373E+01	-1.6266E+00
2.0540E+04	4.3580E+04	3.6000E+01	4.6197E+01	1.0197E+01
2.0540E+04	4.3580E+04	3.6000E+01	4.6197E+01	1.0197E+01
2.0540E+04	4.3590E+04	1.9000E+01	1.1949E+01	-7.0506E+00
2.0540E+04	4.3590E+04	1.9000E+01	1.1949E+01	-7.0506E+00
2.0530E+04	4.3560E+04	4.1000E+01	3.5181E+01	-5.8186E+00

2.0530E+04	4.3560E+04	4.1000E+01	3.5181E+01	-5.8186E+00
2.0530E+04	4.3580E+04	4.0000E+01	4.0354E+01	3.5380E-01
2.0530E+04	4.3580E+04	4.0000E+01	4.0354E+01	3.5380E-01
2.0530E+04	4.3590E+04	3.0000E+00	8.9649E+00	5.9649E+00
2.0530E+04	4.3590E+04	3.0000E+00	8.9649E+00	5.9649E+00
2.0530E+04	4.3570E+04	4.6000E+01	4.5234E+01	-7.6611E-01
2.0530E+04	4.3570E+04	4.6000E+01	4.5234E+01	-7.6611E-01
2.0560E+04	4.3480E+04	7.0000E+00	6.9998E+00	-1.5401E-04
2.0560E+04	4.3480E+04	7.0000E+00	6.9998E+00	-1.5401E-04
2.0550E+04	4.3480E+04	1.4000E+01	1.4033E+01	3.3265E-02
2.0550E+04	4.3480E+04	1.4000E+01	1.4033E+01	3.3265E-02
2.0559E+04	4.3491E+04	7.0000E+00	6.9632E+00	-3.6815E-02
2.0559E+04	4.3491E+04	7.0000E+00	6.9632E+00	-3.6815E-02
2.0560E+04	4.3500E+04	7.0000E+00	7.1011E+00	1.0106E-01
2.0560E+04	4.3500E+04	7.0000E+00	7.1011E+00	1.0106E-01
2.0560E+04	4.3510E+04	6.0000E+00	6.4011E+00	4.0110E-01
2.0560E+04	4.3510E+04	6.0000E+00	6.4011E+00	4.0110E-01
2.0550E+04	4.3500E+04	7.0000E+00	7.3354E+00	3.3536E-01
2.0550E+04	4.3500E+04	7.0000E+00	7.3354E+00	3.3536E-01
2.0551E+04	4.3491E+04	6.0000E+00	5.7384E+00	-2.6161E-01
2.0551E+04	4.3491E+04	6.0000E+00	5.7384E+00	-2.6161E-01
2.0560E+04	4.3520E+04	7.0000E+00	5.4525E+00	-1.5475E+00
2.0560E+04	4.3520E+04	7.0000E+00	5.4525E+00	-1.5475E+00
2.0560E+04	4.3530E+04	3.0000E+00	4.3627E+00	1.3627E+00
2.0560E+04	4.3530E+04	3.0000E+00	4.3627E+00	1.3627E+00
2.0560E+04	4.3550E+04	3.0000E+00	3.2490E+00	2.4902E-01
2.0560E+04	4.3550E+04	3.0000E+00	3.2490E+00	2.4902E-01
2.0550E+04	4.3520E+04	7.0000E+00	4.1420E+00	-2.8580E+00
2.0550E+04	4.3520E+04	7.0000E+00	4.1420E+00	-2.8580E+00
2.0550E+04	4.3540E+04	5.0000E+00	5.3201E+00	3.2006E-01
2.0550E+04	4.3540E+04	5.0000E+00	5.3201E+00	3.2006E-01
2.0550E+04	4.3530E+04	3.0000E+00	4.1395E+00	1.1395E+00
2.0550E+04	4.3530E+04	3.0000E+00	4.1395E+00	1.1395E+00
2.0550E+04	4.3550E+04	7.0000E+00	7.0838E+00	8.3846E-02
2.0550E+04	4.3550E+04	7.0000E+00	7.0838E+00	8.3846E-02
2.0560E+04	4.3560E+04	5.0000E+00	3.9472E+00	-1.0528E+00
2.0560E+04	4.3560E+04	5.0000E+00	3.9472E+00	-1.0528E+00
2.0560E+04	4.3570E+04	5.0000E+00	5.4275E+00	4.2747E-01
2.0560E+04	4.3570E+04	5.0000E+00	5.4275E+00	4.2747E-01
2.0560E+04	4.3580E+04	7.0000E+00	7.2258E+00	2.2584E-01
2.0560E+04	4.3580E+04	7.0000E+00	7.2258E+00	2.2584E-01
2.0560E+04	4.3590E+04	9.0000E+00	8.8746E+00	-1.2542E-01
2.0560E+04	4.3590E+04	9.0000E+00	8.8746E+00	-1.2542E-01
2.0550E+04	4.3560E+04	1.1000E+01	8.8413E+00	-2.1587E+00
2.0550E+04	4.3560E+04	1.1000E+01	8.8413E+00	-2.1587E+00
2.0550E+04	4.3580E+04	1.3000E+01	1.0470E+01	-2.5302E+00
2.0550E+04	4.3580E+04	1.3000E+01	1.0470E+01	-2.5302E+00
2.0550E+04	4.3570E+04	8.0000E+00	1.0110E+01	2.1098E+00
2.0550E+04	4.3570E+04	8.0000E+00	1.0110E+01	2.1098E+00
2.0550E+04	4.3570E+04	1.0000E+01	1.0110E+01	1.0979E-01
2.0550E+04	4.3570E+04	1.0000E+01	1.0110E+01	1.0979E-01
2.0550E+04	4.3590E+04	8.0000E+00	9.5026E+00	1.5026E+00
2.0550E+04	4.3590E+04	8.0000E+00	9.5026E+00	1.5026E+00

SUM OF SQUARED RESIDUALS 3.0122E+03

	5.2009E+00	5.4081E+00
SPLINE COEFFS	-1.2494E+01	1.9781E+01
	2.7485E+01	-6.7971E+00
	8.1248E+00	3.1389E+01
	2.9948E+01	-4.1962E+01
3.0000E+00		1.4516E+02
6.2339E-01		1.7310E+01

3.8849E+00	-1.1191E+00	
-1.6689E+00	1.2032E+00	
3.0952E+00	-3.4218E+00	2.0447E+01
1.8400E+00	2.7986E+01	-1.1292E+01
6.4339E+00	-3.1698E+01	2.2545E+01
	-1.5046E+00	-1.8708E+01
	3.2197E+00	3.9401E+01
3.0229E+00		-8.0792E+01
-3.6956E+00		4.5156E+00
-8.6941E+00	7.7614E+00	
3.7915E+01	-1.4403E+01	
-4.2225E+01	2.7251E+01	6.9998E+00
1.5658E+01	-3.4612E+01	7.9689E+00
-9.7124E+00	7.6808E+01	7.4039E+00
	-5.8715E-01	6.0076E+00
	9.5352E-01	8.1060E-01
5.3154E+00		7.1257E+00
1.5904E+01		8.8746E+00

Appendix 9.6. Modelling the TREND by fitting a BICUBIC SPLINE SURFACE to the variation of COARSE SAND, 200 m GRID.

BICUBIC SPLINE SURFACE, SAND, 200 m GRID

INTERIOR X-KNOTS

2.0387E+04
2.0459E+04
2.0496E+04
2.0532E+04

INTERIOR Y-KNOTS

4.3503E+04
4.3556E+04
4.3583E+04

SUM OF SQUARES OF RESIDUAL RHS 6.9349E+02

RANK 53

NORTHING	EASTING	OBSERVED	SPLINE FIT	RESIDUALS
2.0350E+04	4.3450E+04	8.0000E+00	8.2496E+00	2.4963E-01
2.0370E+04	4.3470E+04	3.0000E+00	2.5685E+00	-4.3153E-01
2.0350E+04	4.3490E+04	3.0000E+00	4.3517E+00	1.3517E+00
2.0370E+04	4.3450E+04	3.0000E+00	3.0272E+00	2.7181E-02
2.0370E+04	4.3490E+04	3.0000E+00	3.4923E+00	4.9231E-01
2.0350E+04	4.3470E+04	6.0000E+00	4.9112E+00	-1.0888E+00
2.0370E+04	4.3510E+04	5.0000E+00	3.8759E+00	-1.1241E+00
2.0370E+04	4.3550E+04	1.3000E+01	1.1971E+01	-1.0291E+00
2.0350E+04	4.3530E+04	2.6000E+01	2.2943E+01	-3.0571E+00
2.0370E+04	4.3530E+04	4.0000E+00	4.8313E+00	8.3133E-01
2.0351E+04	4.3509E+04	9.0000E+00	9.8233E+00	8.2329E-01
2.0350E+04	4.3550E+04	2.8000E+01	3.0668E+01	2.6684E+00
2.0350E+04	4.3570E+04	2.7000E+01	2.6152E+01	-8.4800E-01
2.0370E+04	4.3570E+04	2.8000E+01	2.8256E+01	2.5581E-01
2.0370E+04	4.3590E+04	2.5000E+01	2.7139E+01	2.1388E+00
2.0350E+04	4.3590E+04	2.9000E+01	2.8854E+01	-1.4566E-01
2.0450E+04	4.3470E+04	4.0000E+00	3.0896E+00	-9.1039E-01
2.0430E+04	4.3450E+04	3.0000E+00	2.9275E+00	-7.2546E-02
2.0430E+04	4.3490E+04	2.0000E+00	2.1610E+00	1.6098E-01
2.0410E+04	4.3470E+04	3.0000E+00	3.0290E+00	2.8971E-02
2.0390E+04	4.3450E+04	3.0000E+00	3.0386E+00	3.8558E-02
2.0390E+04	4.3490E+04	2.0000E+00	2.4153E+00	4.1527E-01
2.0450E+04	4.3490E+04	2.0000E+00	2.2986E+00	2.9859E-01
2.0430E+04	4.3470E+04	3.0000E+00	2.5472E+00	-4.5280E-01
2.0410E+04	4.3450E+04	2.0000E+00	2.0927E+00	9.2666E-02
2.0411E+04	4.3491E+04	2.0000E+00	1.9949E+00	-5.0726E-03
2.0390E+04	4.3470E+04	3.0000E+00	3.2337E+00	2.3365E-01
2.0450E+04	4.3550E+04	2.0000E+00	3.1357E+00	1.1357E+00
2.0450E+04	4.3510E+04	2.0000E+00	2.2318E+00	2.3176E-01
2.0430E+04	4.3530E+04	2.0000E+00	9.5774E-01	-1.0423E+00
2.0410E+04	4.3510E+04	2.0000E+00	1.4089E+00	-5.9113E-01
2.0410E+04	4.3550E+04	2.0000E+00	1.4229E+00	-5.7706E-01
2.0390E+04	4.3530E+04	2.0000E+00	2.6722E+00	6.7224E-01
2.0450E+04	4.3530E+04	1.0000E+00	1.3053E+00	3.0534E-01
2.0430E+04	4.3510E+04	1.0000E+00	1.4964E+00	4.9642E-01
2.0430E+04	4.3550E+04	2.0000E+00	1.9523E+00	-4.7729E-02
2.0410E+04	4.3530E+04	2.0000E+00	1.7560E+00	-2.4398E-01
2.0390E+04	4.3510E+04	2.0000E+00	2.0135E+00	1.3540E-02
2.0390E+04	4.3550E+04	3.0000E+00	3.8692E+00	8.6923E-01

2.0430E+04	4.3570E+04	1.0000E+00	2.8401E+00	1.8401E+00
2.0390E+04	4.3570E+04	4.0000E+00	5.0972E+00	1.0972E+00
2.0450E+04	4.3570E+04	2.0000E+00	7.2065E+00	5.2065E+00
2.0410E+04	4.3570E+04	2.0000E+00	-1.8365E+00	-3.8365E+00
2.0450E+04	4.3590E+04	6.0000E+00	7.8279E+00	1.8279E+00
2.0410E+04	4.3590E+04	6.0000E+00	6.5616E+00	5.6157E-01
2.0430E+04	4.3590E+04	2.0000E+00	5.5622E+00	3.5622E+00
2.0390E+04	4.3590E+04	1.8000E+01	1.3734E+01	-4.2658E+00
2.0490E+04	4.3470E+04	8.0000E+00	8.0049E+00	4.8667E-03
2.0470E+04	4.3490E+04	3.0000E+00	2.0927E+00	-9.0730E-01
2.0490E+04	4.3490E+04	2.0000E+00	2.3034E+00	3.0344E-01
2.0470E+04	4.3470E+04	4.0000E+00	5.7588E+00	1.7588E+00
2.0490E+04	4.3510E+04	8.0000E+00	5.3044E+00	-2.6956E+00
2.0490E+04	4.3550E+04	4.0000E+00	3.6606E+00	-3.3942E-01
2.0470E+04	4.3530E+04	3.0000E+00	3.7115E+00	7.1155E-01
2.0490E+04	4.3530E+04	7.0000E+00	6.9711E+00	-2.8939E-02
2.0470E+04	4.3510E+04	3.0000E+00	3.5631E+00	5.6313E-01
2.0470E+04	4.3550E+04	4.0000E+00	2.8968E+00	-1.1032E+00
2.0470E+04	4.3570E+04	4.0000E+00	5.5648E-01	-3.4435E+00
2.0490E+04	4.3570E+04	5.0000E+00	-5.4872E+00	-1.0487E+01
2.0490E+04	4.3590E+04	6.0000E+00	1.0318E+01	4.3180E+00
2.0470E+04	4.3590E+04	1.8000E+01	1.0442E+01	-7.5583E+00
2.0530E+04	4.3470E+04	6.0000E+00	7.1990E+00	1.1990E+00
2.0510E+04	4.3490E+04	3.0000E+00	4.3806E+00	1.3806E+00
2.0530E+04	4.3490E+04	7.0000E+00	6.6477E+00	-3.5229E-01
2.0510E+04	4.3470E+04	7.0000E+00	5.4061E+00	-1.5939E+00
2.0531E+04	4.3511E+04	9.0000E+00	6.6091E+00	-2.3909E+00
2.0530E+04	4.3550E+04	1.6000E+01	1.5004E+01	-9.9557E-01
2.0510E+04	4.3530E+04	4.0000E+00	8.2281E+00	4.2281E+00
2.0530E+04	4.3530E+04	6.0000E+00	6.7154E+00	7.1536E-01
2.0510E+04	4.3550E+04	1.2000E+01	1.0489E+01	-1.5113E+00
2.0510E+04	4.3570E+04	8.0000E+00	1.5024E+01	7.0235E+00
2.0530E+04	4.3570E+04	4.6000E+01	3.4284E+01	-1.1716E+01
2.0509E+04	4.3571E+04	2.0000E+00	1.3572E+01	1.1572E+01
2.0530E+04	4.3590E+04	3.0000E+00	1.9087E+00	-1.0913E+00
2.0510E+04	4.3610E+04	7.0000E+00	7.0045E+00	4.5162E-03
2.0530E+04	4.3610E+04	1.5000E+01	1.5000E+01	-2.4090E-04
2.0510E+04	4.3590E+04	5.0000E+00	5.1306E+00	1.3061E-01
2.0570E+04	4.3470E+04	1.7000E+01	1.7041E+01	4.0998E-02
2.0551E+04	4.3491E+04	6.0000E+00	6.3280E+00	3.2798E-01
2.0570E+04	4.3490E+04	8.0000E+00	7.9652E+00	-3.4762E-02
2.0550E+04	4.3470E+04	2.3000E+01	2.2616E+01	-3.8429E-01
2.0570E+04	4.3510E+04	8.0000E+00	7.9819E+00	-1.8063E-02
2.0570E+04	4.3550E+04	5.0000E+00	5.0360E+00	3.6046E-02
2.0550E+04	4.3530E+04	3.0000E+00	3.9462E+00	9.4618E-01
2.0570E+04	4.3530E+04	7.0000E+00	6.9221E+00	-7.7883E-02
2.0550E+04	4.3550E+04	7.0000E+00	6.5182E+00	-4.8176E-01
2.0550E+04	4.3570E+04	8.0000E+00	1.0943E+01	2.9432E+00
2.0570E+04	4.3570E+04	4.0000E+00	3.5914E+00	-4.0857E-01
2.0550E+04	4.3570E+04	1.0000E+01	1.0943E+01	9.4317E-01
2.0570E+04	4.3590E+04	6.0000E+00	5.9626E+00	-3.7437E-02
2.0550E+04	4.3610E+04	2.5000E+01	2.5000E+01	3.7068E-04
2.0570E+04	4.3610E+04	3.3000E+01	3.3000E+01	-3.3536E-05
2.0550E+04	4.3590E+04	8.0000E+00	8.3491E+00	3.4907E-01

SUM OF SQUARED RESIDUALS 6.9349E+02

	-6.9611E+01		2.3429E+01
SPLINE COEFFS	6.2582E+01		-1.2874E+01
	2.7457E+00		1.3812E+02
8.2496E+00			-1.5623E+02
5.3645E+00			1.1529E+02
-4.1657E+00	-6.8661E+00		

4.2703E+01	-1.4748E+00	
1.5428E+01	1.1901E+01	1.2288E+02
4.1846E+01	-1.7422E+01	1.6310E+01
1.6842E+00	7.0929E+01	-1.0362E+01
	-1.8833E+02	1.1577E+01
	3.6606E+03	-3.8794E+01
1.4296E+00		7.2603E+01
-1.6382E+00		-8.9405E+00
1.2983E+01	5.8718E+01	
-1.0485E+01	-3.9588E+00	
8.6799E+01	5.5849E-01	5.2406E+01
-7.4548E+00	2.1655E+01	4.4538E+00
-5.6566E-01	-6.2635E+01	1.0650E+01
	9.8515E+01	4.9000E+00
	-2.5358E+02	2.3969E+00
6.3733E+00		8.6507E+00
9.6049E+00		3.3000E+01
-1.1546E+01	-3.4984E+01	
1.9298E+01	1.1508E-01	