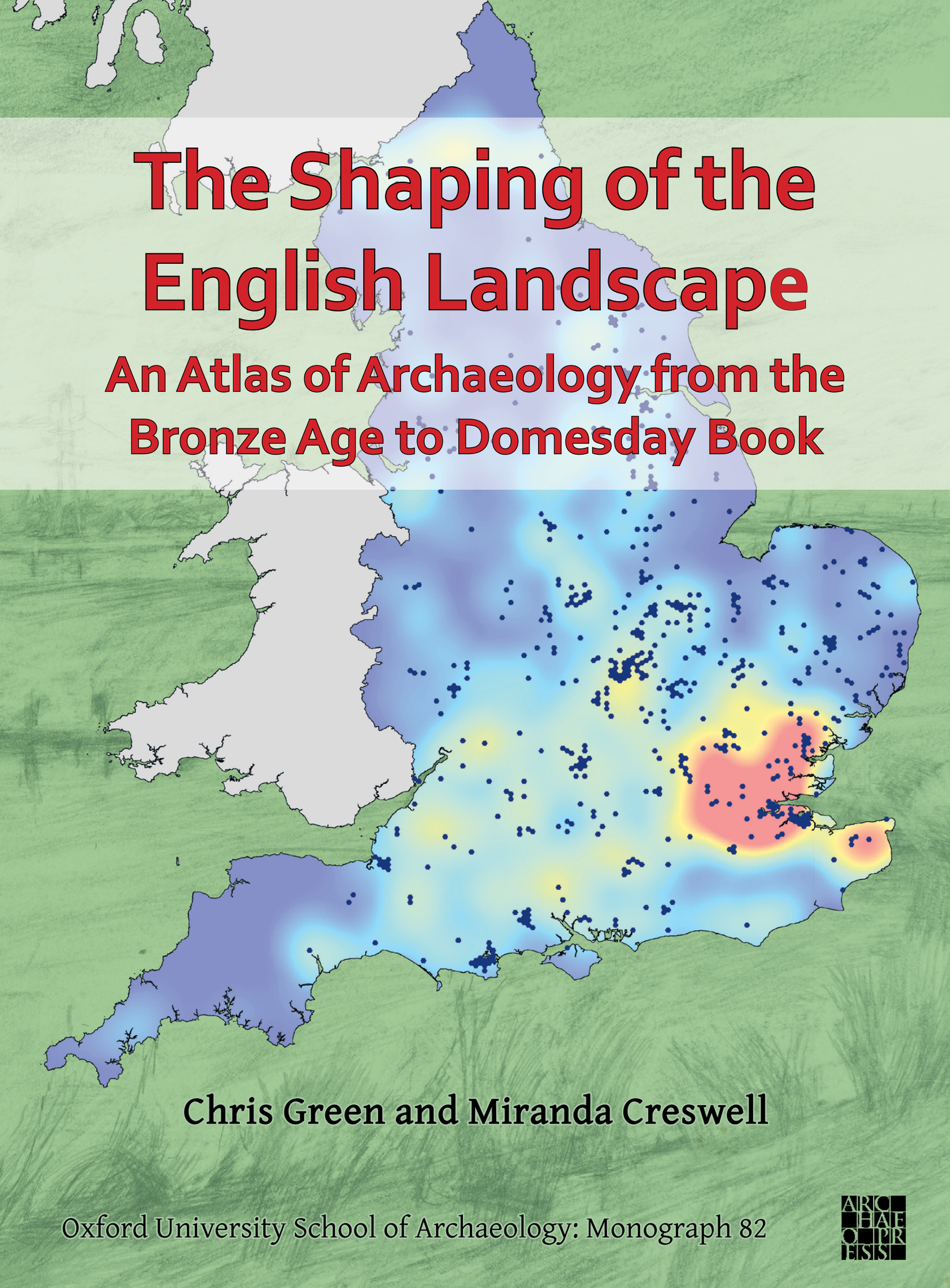


The Shaping of the English Landscape

An Atlas of Archaeology from the Bronze Age to Domesday Book

Chris Green and Miranda Creswell

Oxford University School of Archaeology: Monograph 82

The Shaping of the English Landscape

An atlas of archaeology from the Bronze Age to Domesday Book

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Introduction

by Chris Gosden

At the heart of the English Landscapes and Identities (EngLaId) project lay maps, diagrams, drawings and paintings. This is appropriate as the whole notion of landscape entered English through the Dutch notion of *landskip*, designating a painted landscape. This Atlas derives from a collaboration between an artist, Miranda Creswell, and an expert in Geographical Information Systems (GIS), Chris Green. Such a collaboration might seem to span the divide between art and science, but in fact Miranda and Chris worked across the divide, in many ways ignoring it, both educating the other.

Coming into the project relatively new to archaeology, Miranda made us all think more about shape, colour and modes of representation, and about how we present our information to be both convincing and visually stimulating. Underlying Chris's work is a mass of computation, with many of his maps combining and condensing a number of variables, getting us all to think in more complex ways about the mass of archaeological information at our disposal. Such layering and combining of influences probably helped shape Miranda's thoughts about landscape. In some of her work, Miranda has drawn one landscape from the same viewpoint but on a series of different occasions, so that each drawing combines a number of times, each with its own weather pattern, moving birds or trees. In playing with time, these drawings are deeply archaeological.

Both the maps and drawings might well be described as 'working' in the sense that they are not representations, but the research process in action. Both Chris and Miranda worked with and through their illustrations, so that they and the rest of the team thought through the materials presented here.

The Atlas is complementary to the project's other publications, throwing further light and depth on many of the issues confronted by the project as a whole. How to deal with a mass of archaeological data in addition to all the factors affecting its discovery, recovery, analysis and publication were all issues at the heart of EngLaId. Some progress was made in understanding broad influences on archaeological work (Chapter 1), but also on variations over time and space in how people in England lived in the past.

A further important aspect of the project was working with a broad range of people interested in archaeology, from school children in Liverpool and Birkenhead (p.23) to dog walkers in Didcot (p.5) and many others in between. Miranda produced some of her most interesting work in these contexts, as well as encouraging others to produce a mass of painting and drawing, as well as discussion and thought about the past.

In all, this is a unique piece of work, which is a great tribute to the skill and intelligence of Chris and Miranda, but also a testimony to their ability to work together in different but complementary ways. It is a piece of work which can inform, but above all provides enjoyment of the range and interest of archaeological evidence, creating a unique set of images, many of considerable beauty.

Acknowledgements

Landscapes and Identities: the Case of the English Landscape, 1500 BC to AD 1086 (EngLaId) was a project that ran within the School of Archaeology at the University of Oxford from 2011 to 2016. It was funded by the European Research Council (Grant Number 269797) and conducted by a project team consisting of Prof. Chris Gosden, Anwen Cooper, Tyler Franconi (from 2014), Chris Green, Letty Ten Harkel, Zena Kamash (up to 2014), and Laura Morley. Victoria Donnelly, Sarah Mallet, and Dan Stansbie were the project's three doctoral students. In the early stages of the project, the team included John Pybus and Xin Xiong of the Oxford eResearch Centre. Miranda Creswell was the project's artist.

The maps and statistics presented in this Atlas are based upon the database constructed by the project team on the EngLaId project. That database consists of records sourced from various local, national, and project repositories:

Local Historic Environment Records (HERs);

Historic England's National Record of the Historic Environment (NRHE);

Portable Antiquities Scheme (PAS);

Fitzwilliam Museum's Corpus of Early Medieval Coin Finds (EMC);

Archaeological Investigations Project (AIP);

Yates 2007 (prehistoric field systems), Palmer 2010 (Domesday Book), and Kinory 2012 (Iron Age and Roman salt processing evidence).

Where maps present data from different sources, these will be acknowledged on the relevant page and any relevant data character information outlined.

The artworks in this Atlas are original works made by Miranda Creswell.

We would like to thank the following for their assistance and/or provision of data during this project:

All of the HER officers of England;

Simon Crutchley, Lindsay Jones, Poppy Starkie, and Martin Newman at Historic England;

Dan Pett, Katie Robbins, Sam Moorhead, Mary Chester-Kadwell, Stephen Moon, and Roger Bland at the British Museum (PAS);

Martin Allen at the Fitzwilliam Museum, Cambridge (EMC);

Ehren Milner and Tim Darvill at the University of Bournemouth (AIP);

Tim Evans at the Archaeology Data Service (ADS);

David Yates;

Janice Kinory;

Keith Westcott and Crispin Flower at exeGesIS Spatial Data Management;

Ian Cartwright for photography of the artworks.

All maps contain Ordnance Survey data © Crown Copyright and Database Right 2012-2016. This data was all obtained under their Open Data license.

Links:
- Details of HERs: http://www.heritagegateway.org.uk/gateway/
- NRHE online: http://www.pastscape.org.uk/
- PAS website: https://finds.org.uk/
- EMC website: http://www-cm.fitzmuseum.cam.ac.uk/emc/
- AIP website: https://csweb.bournemouth.ac.uk/aip/aipintro.htm

References:
- Kinory, J.L. 2012. Salt Production, Distribution and Use in the British Iron Age. Oxford: British Archaeological Reports British Series 559
- Palmer, J. 2010. Electronic Edition of Domesday Book: Translation, Databases and Scholarly Commentary, 1086; Second Edition. UK Data Service, http://dx.doi.org/10.5255/UKDA-SN-5694-1
- Yates, D.T. 2007. Land, Power and Prestige: Bronze Age Field Systems in Southern England. Oxford: Oxbow

How to read the maps and artworks in this Atlas

All projects require spatial and temporal limits. EngLaId was concerned with the extent of the modern country of England and with a time period spanning the Middle Bronze Age (c.1500 BC) to the Domesday survey (AD 1086). Naturally, these limits impose restrictions on what we can say about the data gathered, but they represent natural boundaries in terms of datasets with reasonably consistent / coherent data structures and fall (just) within the bounds of sensible data manageability, taking into account the time, personnel, and funds available.

Maps which present data in hexagons should be read as showing the presence or absence of records for the particular element mapped across the previously mentioned sources within the project database (see Acknowledgements). These maps do not show the number of records of each type within each respective hexagon, simply the presence of at least one record of that type within one or more of the source datasets. Also, these maps represent the best state of our knowledge of English archaeology (in 2012), but there will undoubtedly be mistakes present, e.g. sites of incorrect date or type. Similarly, most statistics (unless otherwise stated) are based upon similar presence / absence data by 1 x 1 km grid square. The reason for this is that there is no simple way of identifying overlaps across these datasets where the same site or object appears in multiple sources, other than labour-intensive manual comparison of mapped data. For a database of this magnitude (over 900,000 records) such a task would have been impossible within the constraints of the EngLaId project.

Data presented in this way has had records for which the evidence type was recorded as solely place-name and/ or documentary removed, with the exception of the Domesday data. This is to improve internal consistency, as the inclusion of place-name / documentary evidence within HER data is highly regionally varied. All data presented in hexagons have been simplified down to a set of eight monument / site type categories, split into around 120 sub-types. The broad categories are:

1. Agriculture and subsistence
2. Religious, ritual and funerary
3. Domestic and civil
4. Architectural forms
5. Industrial
6. Communication and transport
7. Defensive
8. Other

All maps presented are projected using the British National Grid (OSGB 1936) projection defined in ArcGIS 10.

At the time of publication, an interactive version of the mapped data can be found here:
http://englaid.arch.ox.ac.uk/

The artworks were concerned with experimenting with time periods. They were deliberately made in pencil so as not to denote a particular seasonal moment which might become apparent in colour. The artworks were drawn over lengthy periods, sometimes weeks, pushing the boundaries of what is perceived to be the length of a so called 'working drawing' (Berger 2007). The drawings therefore, are meant to be read not as descriptions of a moment in time but moments of indeterminate length, echoing some of the archaeological work herein showing long time periods and large datasets. As for denoting spatiality, most drawings were made from a fixed point and are therefore conservative in their description of space.

Due to the lengthy time period of the project (five years), the artist travelled throughout England and made thirteen detailed drawings as part of a series 'Recording England' (deliberately referencing the Recording Britain project; Palmer 1946-9), so that they covered a large area as a series. The sites were chosen in collaboration with the rest of the EnglaId team and show a mixture of periods as well as both well-visited and less-visited sites, representing archaeology in England in a wide sense. The way that the sites were drawn, in the same format and materials, aimed to show them on an equal footing, so that field formations, for instance, are given the same weight as hillforts.

References:
• Palmer, A. (ed.) 1946-9. Recording Britain. Oxford: Oxford University Press
• Berger. J. 2007. Berger on Drawing. Aghabullogue, Ireland: Occasional Press

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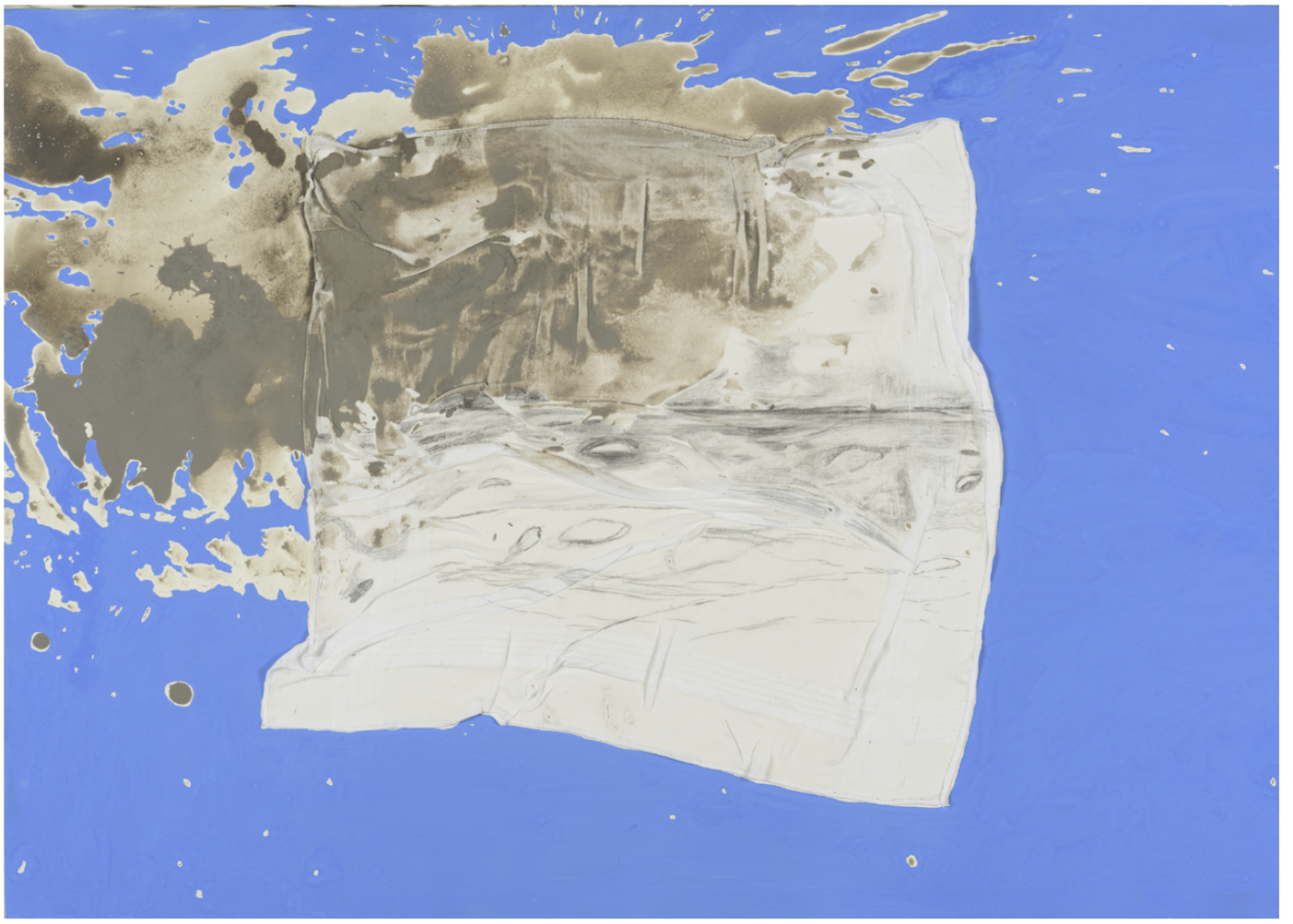
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Mud Map, the Buried and the Ephemeral. 2015.
Mud from the Isle of Wight, handkerchief and drawing. Image by Miranda Creswell.

Chapter One:

Understanding dataset structure

This chapter will present and discuss some of the factors that help to structure the relationship between archaeological data and the way in which it is gathered and constructed. In other words, we wished to understand our datasets' characters in order to become more or less confident in the patterns and structures they were showing to us.

The characterfulness of data observed was not done without a certain amount of self-observation within the group of researchers: by observing how different time periods denote different ways of gathering information through their different evidences. Early medievalists work with different source material than archaeologists working with Iron Age and Bronze Age material, and different again from researchers working with Roman material. The EnglaId group could therefore observe individual working methods at close hand within their team. Miranda Creswell took photographs of each team member's personal notes and these were observed and discussed. The result was a heightened awareness of individual working methods and their consequences. Rather than ideas of group unity and uniformity, there was a conscious decision to respect individual methodology. By 'rubbing shoulders' procedurally speaking, small and almost undiscernible working changes began to appear.

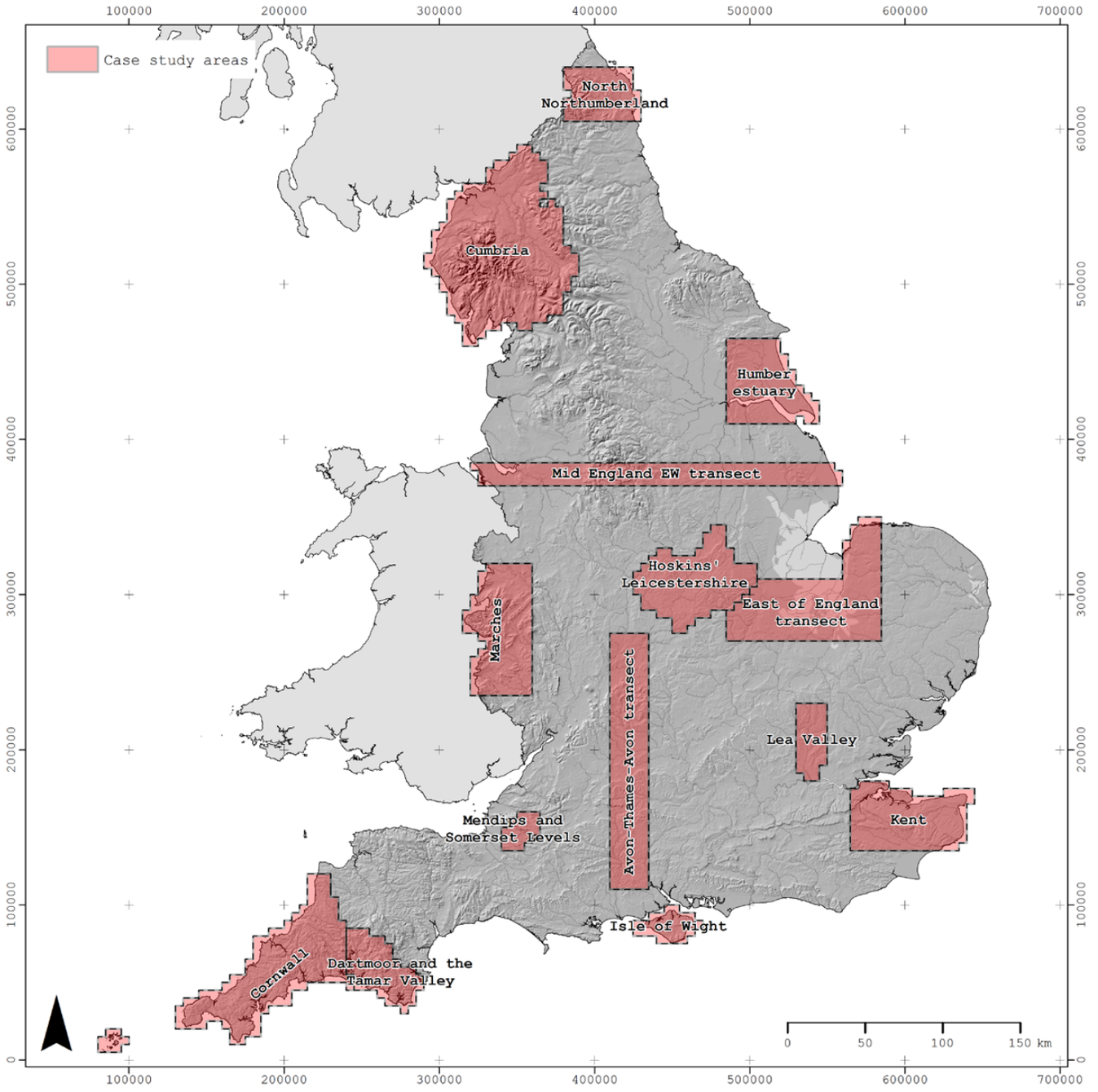


Through Maps. 2016.
This image has been made from 12 photographs of key research meetings between 2012 and 2016 at the University of Oxford. Discussions around the themes of bias and character were enabled through the use of printed maps created by Chris Green, which were brought to each meeting as a significant way to generate debate. Artwork by Miranda Creswell.

Case studies

Most of the maps presented in this Atlas include the case study areas shown below. These were the areas of England selected for further, more in-depth analysis as part of the EngLaId project.

More detail on the case studies and the various studies undertaken can be found in other EngLaId publications. They will also be referred to at various points within the Atlas.



PPG 16 Big Bang (I)

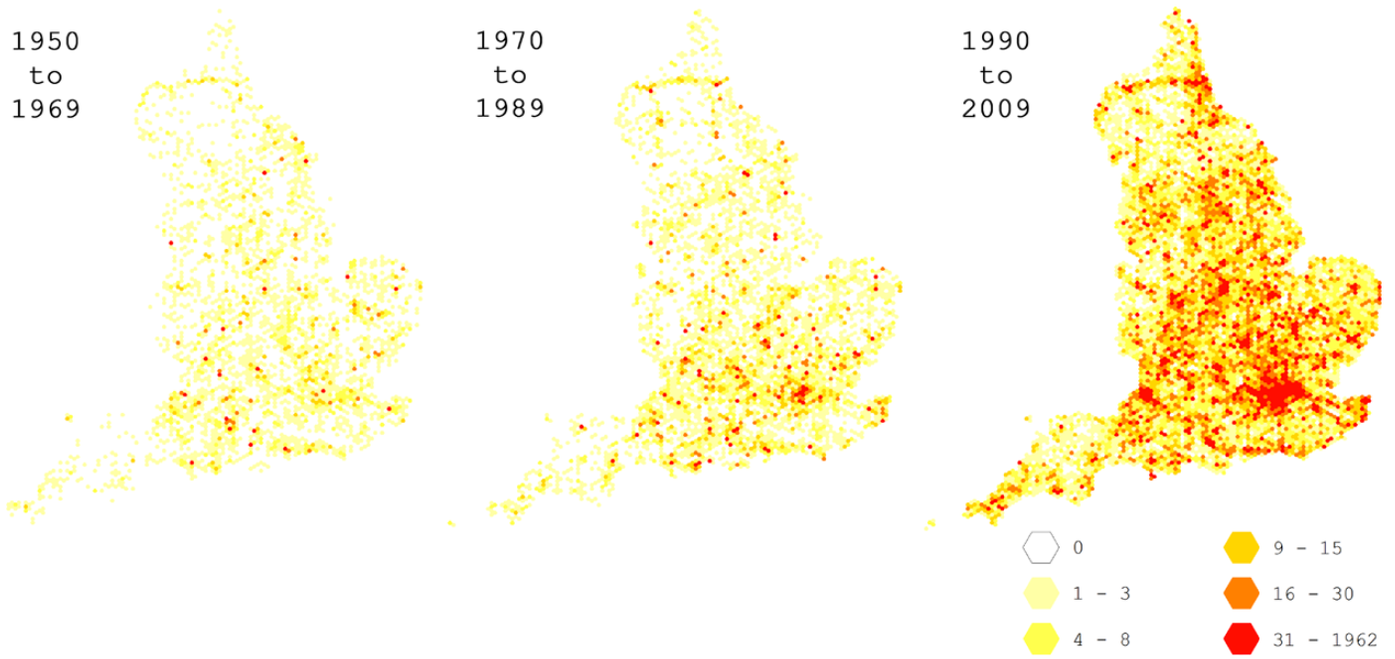
with Victoria Donnelly

Modern development provides an opportunity for archaeological investigation as part of the planning and construction process. Although PPG 16 (Planning Policy Guidance 16) was explicitly designed as a mechanism within the planning process to allow archaeological access to development sites prior to and during development, the sheer volume of investigation undertaken since the introduction of PPG 16 in 1990 was an unanticipated result. The three maps below compare the number of archaeological events recorded in the NRHE Excavation Index (Historic England 2011) from 1950 to 1969, 1970 to 1989, and 1990 to 2009 (collated by hexagons). As should immediately be apparent, the introduction of developer funding for archaeological work prior to development has resulted in a massive increase in the amount of archaeological investigations in England since 1990.

The influence of PPG 16 on archaeology is not only through the significantly increased volume of archaeological investigations that are undertaken now in comparison to the decades before 1990; PPG 16 has also had an effect on the siting of archaeological investigations. These investigations are located where development happens, and are guided by the economic and legislative drivers of development rather than by research interests. Looking at the distribution of archaeological investigations in the maps below, there is a clear difference in before and after 1990. After 1990, archaeological investigation is now spread much more broadly across the English landscape and captures archaeological evidence from many previously less intensively studied areas. By incorporating the results of development-led archaeology into the archaeological record, the overall picture of past human behaviour in England can now be based on a geographically much broader and more diverse evidence base than was previously the case.

Since PPG 16, the primary factors governing the location of archaeological fieldwork have shifted from being archaeological research questions and where "rescue" efforts were thought to prove most fruitful, to being governed largely by planning control processes. The latter form a complex mix of socio-economic factors (determining where development is most likely) and models of known archaeology (determining whether intervention would likely be needed). As a result, a large degree of structural bias has entered into the modern archaeological record, resulting in distributions that reflect both past and present conditions.

However, this bias should not be conceived of as a problem but rather as an opportunity. We therefore prefer to think of these elements as part of the characterfulness of our data (Cooper & Green 2016), using the concept of "affordance". Within archaeology, affordance is used to represent an idea of the relationship between humans and their environment as mutually constitutive (Ingold 1992). We would use it here in similar vein to represent the relationship between planning control processes and archaeological distributions as similarly mutually dependent and productive. Understanding this relationship is vital to understanding archaeological distributions in the modern day.



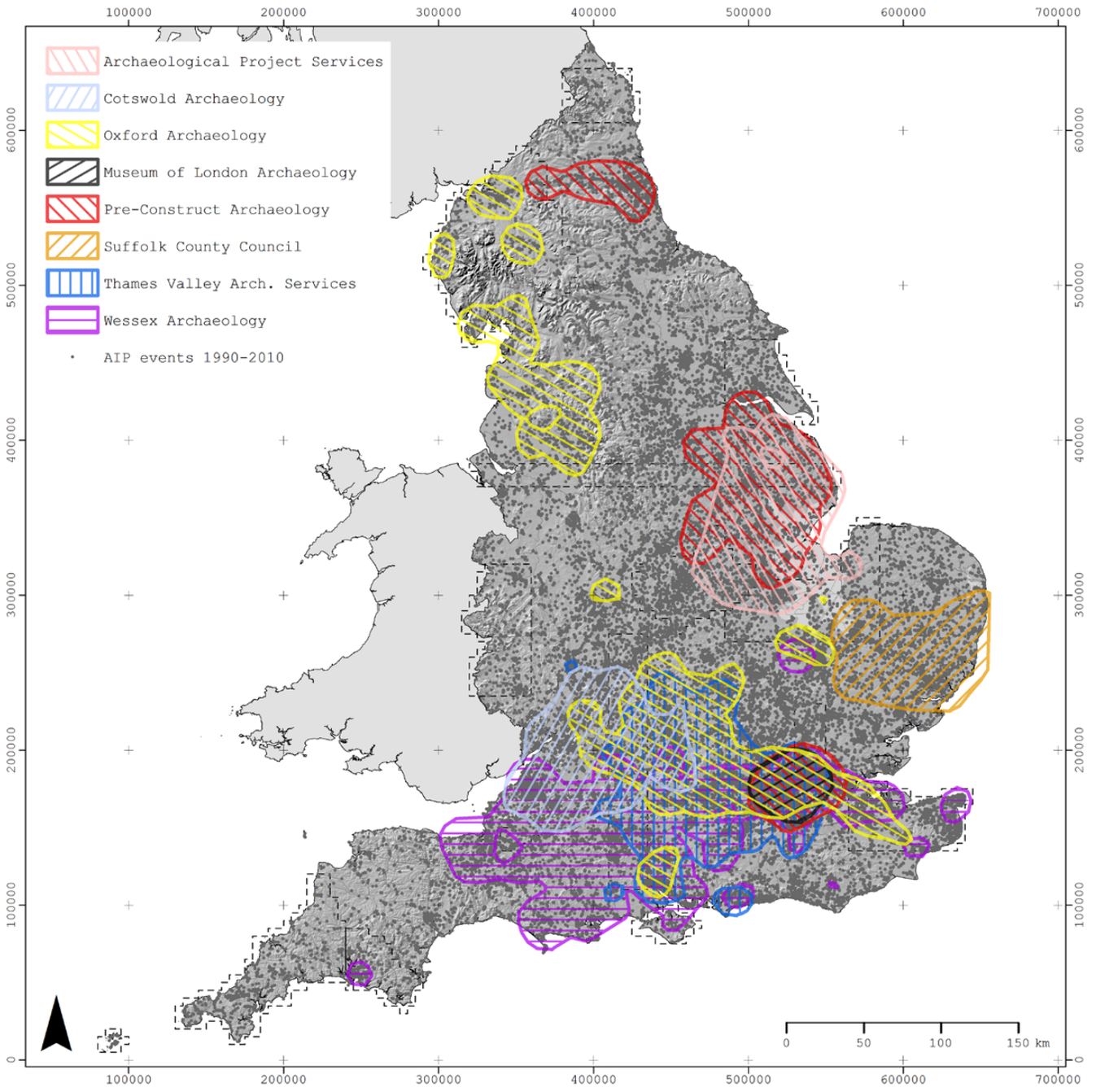
References:
• Cooper, A. & C. Green. 2016. 'Embracing the complexities of 'big data' in archaeology: the case of the English Landscape and Identities project.' Journal of Archaeological Method and Theory 23: 271–304
• Ingold, T. 1992. 'Culture and the perception of the environment.' In: E. Croll and D. Parkin (eds) Bush Base, Forest Farm: Culture, Environment, and Development, 39–56. London: Routledge
• Historic England. 2011. NRHE Excavation Index. http://archaeologydataservice.ac.uk/archives/view/304/

PPG 16 Big Bang (II)

with Victoria Donnelly

The success of development led archaeology has resulted in the growth of a complex system of decision makers and practitioners which design, manage and produce the archaeological fieldwork resulting from development. Archaeological organizations that undertake archaeological fieldwork range in size from small one-person operations to large corporate groups which employ hundreds of archaeological specialists and work on many different sites simultaneously. Many of the archaeological opportunities provided by development are awarded through a competitive tendering process and this capitalistic environment has interesting implications for the archaeological record.

This map shows the core working areas of the eight organizations which undertake archaeological fieldwork with the highest number of records in the Archaeological Investigations Project database (AIP) during the period 1990 to 2010. Each of these groups are shown to have a clearly defined territory within which they usually operate; no single organisation undertook archaeological fieldwork across all areas of England. Here the archaeological fieldwork which forms the basis of the English archaeological record is shown to be a product of a very regional approach. The largest organisations which most influence the production of overall archaeological data are mainly based within a central southern belt where the volume of development supports multiple competing groups.



References:

• AIP website: https://csweb.bournemouth.ac.uk/aip/aipintro.htm

Developer funding and archaeology

The very close bond that has come into being over the past quarter of a century between archaeological fieldwork and development (pp.3-4) has created interesting implications within the relationship between professional archaeologists and the general public. Development in an area can be highly contentious (as seen in the example below), with local people often highly resistant to the loss of beloved countryside or the expansion of their towns for new housing. Archaeologists can thus become somewhat stuck in the middle between the economic forces driving new development (often resisted by the community) and their function in providing new insights into the past of an area (often welcomed by the community).

In the case of Great Western Park, the town of Didcot (population c.25,000 in the 2011 census) saw expansion of its housing stock by around 3,300 new homes: an increase in the built area of the town of over 25%. The area on which the new development was constructed was previously mostly countryside and had been a favoured dog walking location for many local residents for several decades. As such, local resistance to the scheme was substantial and heartfelt. In some ways, the extensive archaeological fieldwork that was undertaken in advance of the development could be seen as a mitigating factor in the developer's attempt to quell local antagonism (hence the prominent featuring of archaeology on the development's website), beyond simply being a requirement of the planning conditions. How well it worked is not for us to judge here, but this introduces an interesting new complication to the relationship between commercial archaeology and development.

In essence, then, commercial archaeological fieldwork companies are almost entirely dependent on development and the planning process in order to generate work and money, but developers are also somewhat dependent on archaeologists to legitimise their practice in the eyes of the local community, especially where developments impact directly on areas of nucleated settlement. The greater power in this relationship is clearly on the side of the developers, but perhaps the position of archaeologists in the relationship is not quite as weak as some might expect: commercial imperatives also strengthen the case to undertake thorough and competent archaeological fieldwork, not simply scientific curiosity.



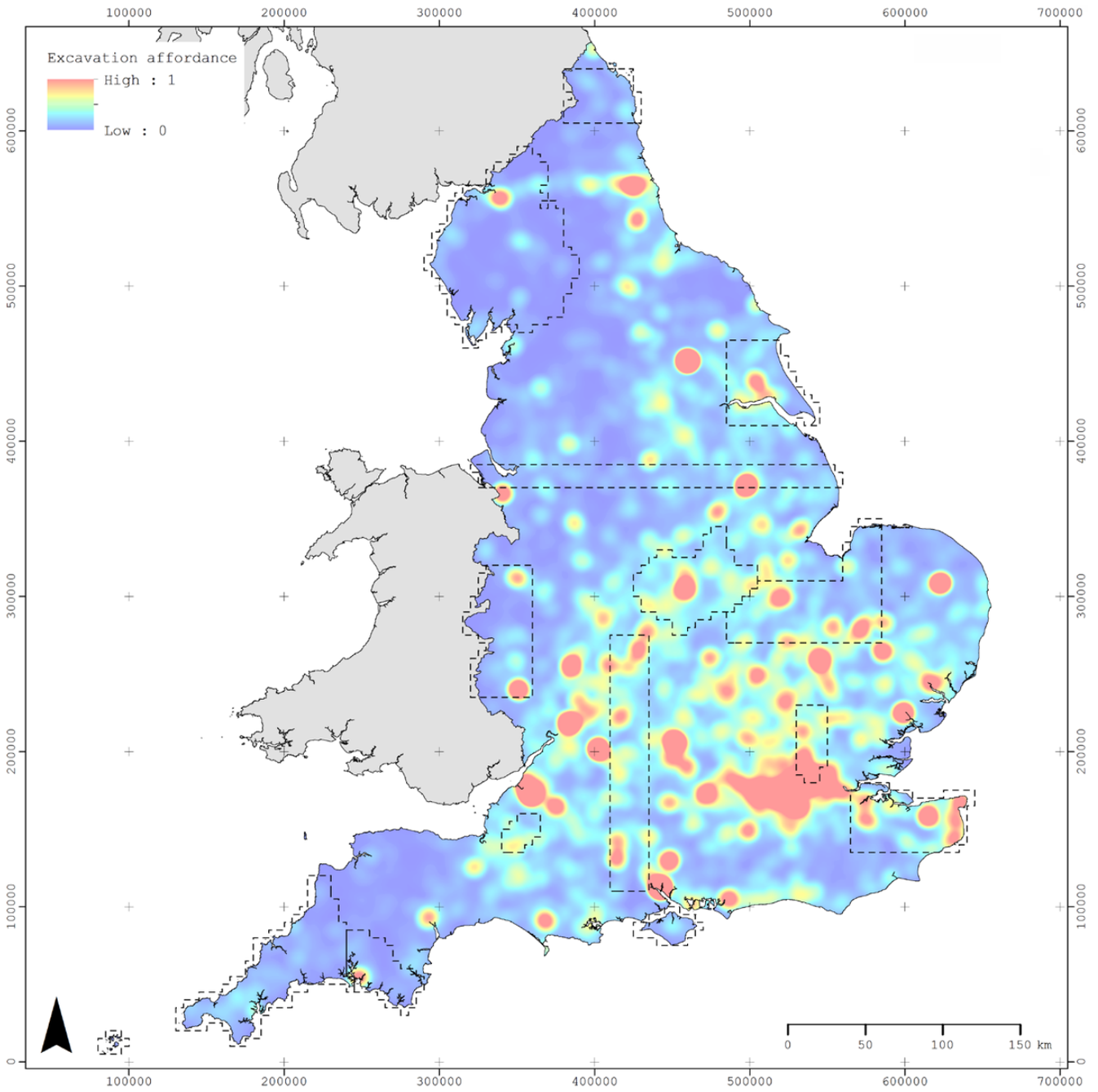
Didcot Dog Mile. 2016.
The drawing and the photograph are of the same site in Didcot with an interval of four years. The drawing is of a landscape showing an excavation by Oxford Archaeology with Iron Age pits in the foreground; the photograph shows the development (Great Western Park) that subsequently replaced the excavated landscape. The artist drew for a period of three months in 2012, gathering local interest that resulted in a community exhibition called The Didcot Dog Mile, the name of the area as known to dog walkers and the local community. Artwork by Miranda Creswell.

References:
• Great Western Park: https://www.gw-park.co.uk

Excavation

Mapping the affordances associated with excavation of archaeological material is not straightforward. Collating planning statistics, particularly at a high level of spatial resolution, is nigh impossible. As such, we had to rely on mapping the density of excavations themselves (using the NRHE Excavation Index) to try to understand the spatial structure of excavation as a phenomenon. Obviously, this is imperfect, as the argument becomes circular. However, to counteract this we have included excavations that produced material of any time period or which produced no positive archaeological results. This is the best model we could construct using the data available to us and it should not be wrong in any important way.

Areas of high value in the model are more likely to see excavation take place and are thus more likely to produce archaeological data of a detailed character: close dating, stratigraphic information, and data on artefacts and ecological remains. Areas of low value in the model will have seen less excavation take place and, as such, more of the data available to us is likely to have come from other sources, such as aerial survey.



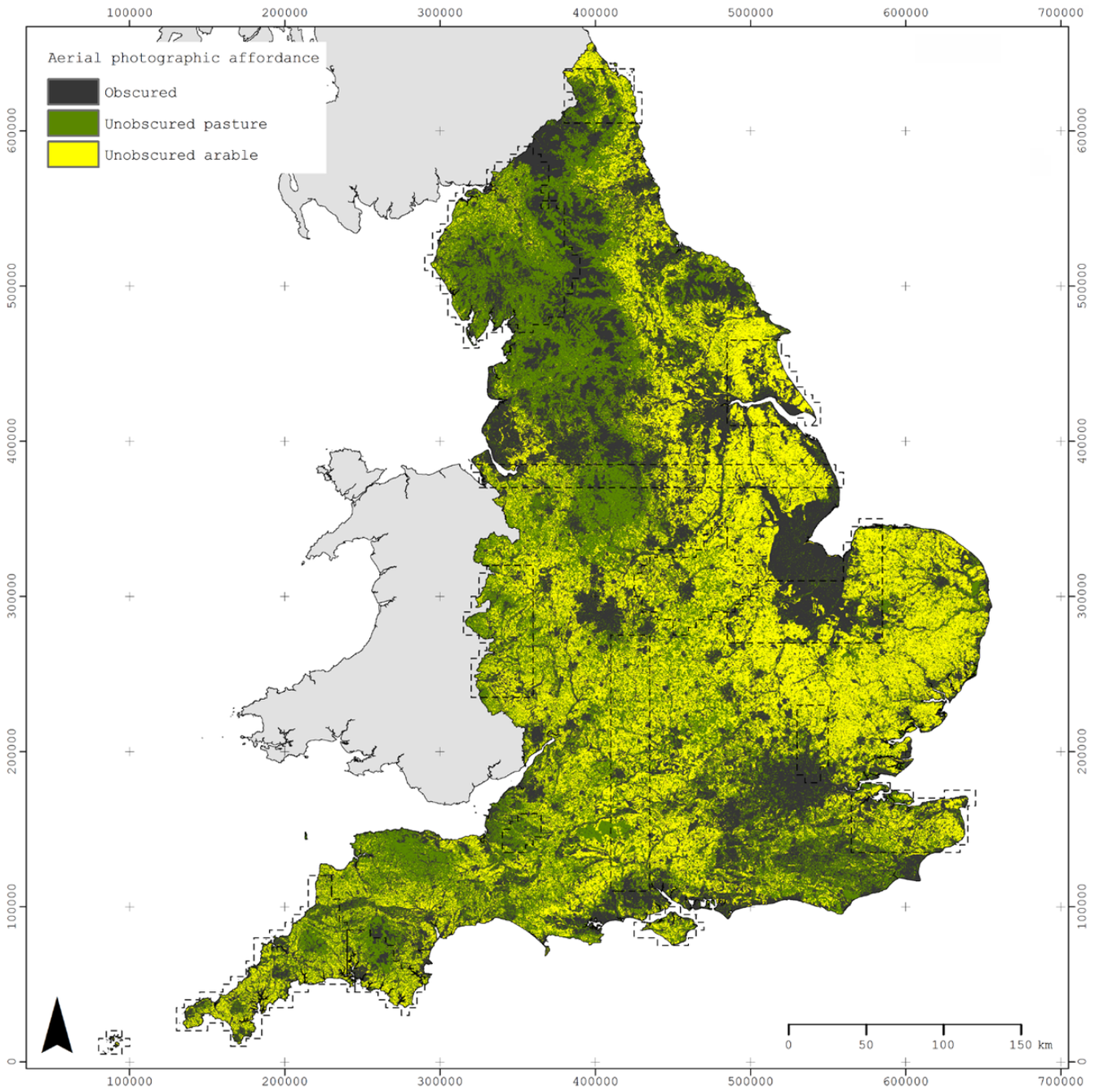
References:

• Historic England. 2011. NRHE Excavation Index. http://archaeologydataservice.ac.uk/archives/view/304/

Aerial prospection

Despite advances in technologies used to discover new archaeological sites (e.g. airborne laser scanning or geophysical survey), aerial photographic prospection remains the most common method by which new areas of archaeological interest are discovered (e.g. during the hot dry summer of 2018). However, aerial survey does not work everywhere. On arable land, if the soils are conducive, buried archaeological features may show up as patches of faster growth (ripening earlier, e.g. due to buried ditches) or slower growth (ripening later, e.g. due to buried walls). These are called 'cropmarks' and the effect is accentuated in dry summers. Equally, in very dry years buried features may show up as 'parchmarks' on pasture land. Pasture will also show earthworks, especially in slanting light conditions or under light levels of snow cover. Most other types of land cover (e.g. urban land, lakes / reservoirs, woodland) will not show archaeological features from the air (excluding standing historic buildings).

The model presented here shows unobscured arable land (liable to show cropmarks) and unobscured pasture land (liable to show earthworks or occasionally parchmarks). The other areas are obscured from the air in some way, whether by above ground features or sub-surface deposits (including soils that show few cropmarks in the arable areas; Evans 1990). It can be used to suggest whether archaeological features mapped from the air are not showing up in an area due to genuine lack of below-ground archaeology or due to the conditions being unconducive to successful aerial survey.



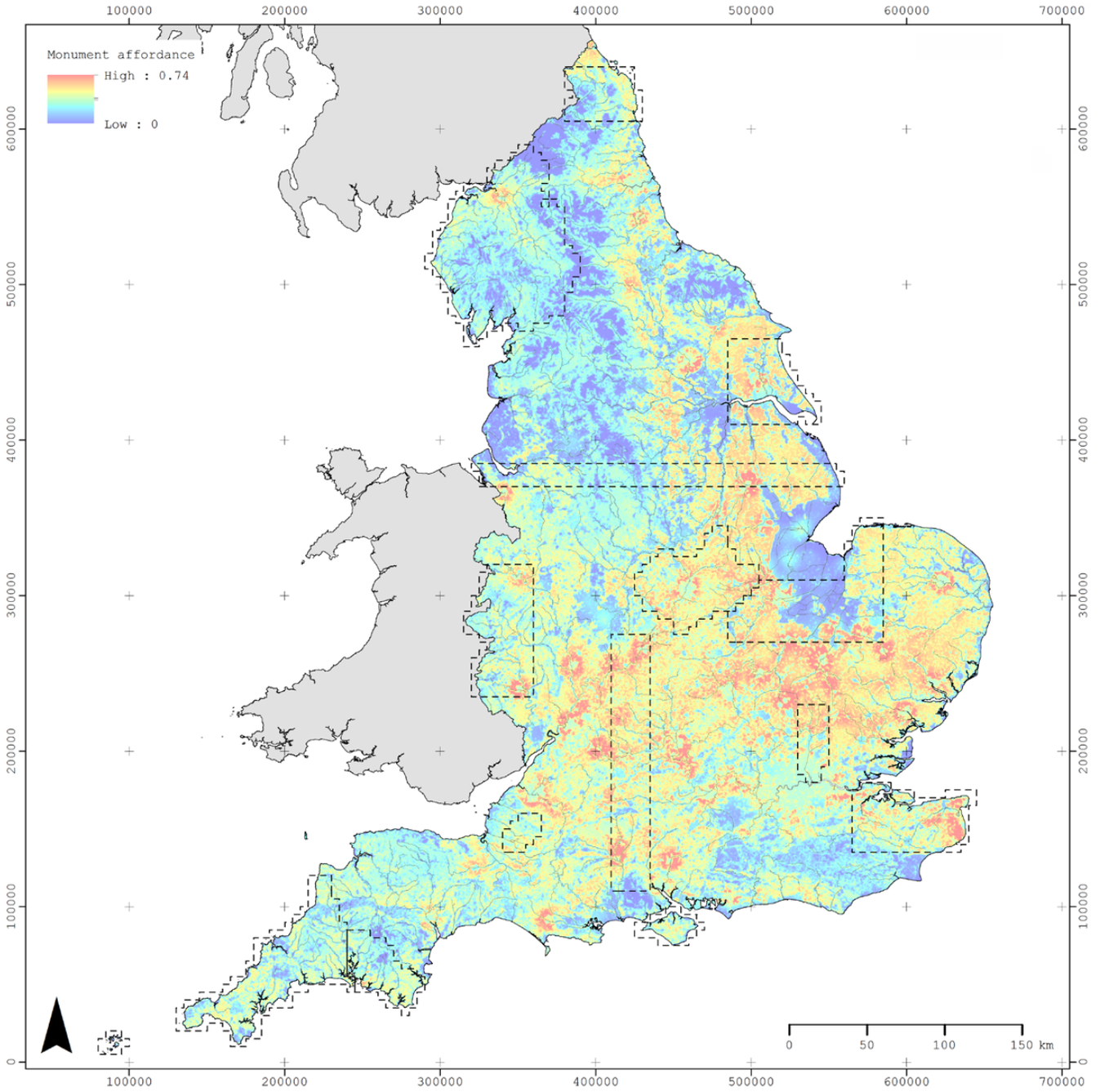
References:

• Evans, R. 1990. 'Crop patterns recorded on aerial photographs of England and Wales: their type, extent and agricultural implications.' Journal of Agricultural Science, Cambridge 115: 369-382

Monuments

It is then possible to combine the two models presented on the previous pages into a model of the potential afforded by different parts of England for the discovery of archaeological sites (by sites, we mean records of any archaeology other than single findspots). The values on the two models were weighted according to the proportion of the records in our database which record excavation or aerial survey as a source of evidence. Essentially, then, higher values in the model represent a higher opportunity for archaeology to be discovered and lower values a lower opportunity.

In this way, it starts to become possible to test the degree to which distributions are structured by the various elements of the model. Some types of site will only occur in areas of higher probability, which suggests that their distributions are highly dependent upon the modern fieldwork factors which structure our record, rather than purely due to variability in the ancient past. Other types of site will be found across all areas of the model, which suggests that they are less dependent upon modern fieldwork factors in order to be discovered, and thus being more representative of genuine distributions of ancient activity. We shall see examples of each throughout this atlas.

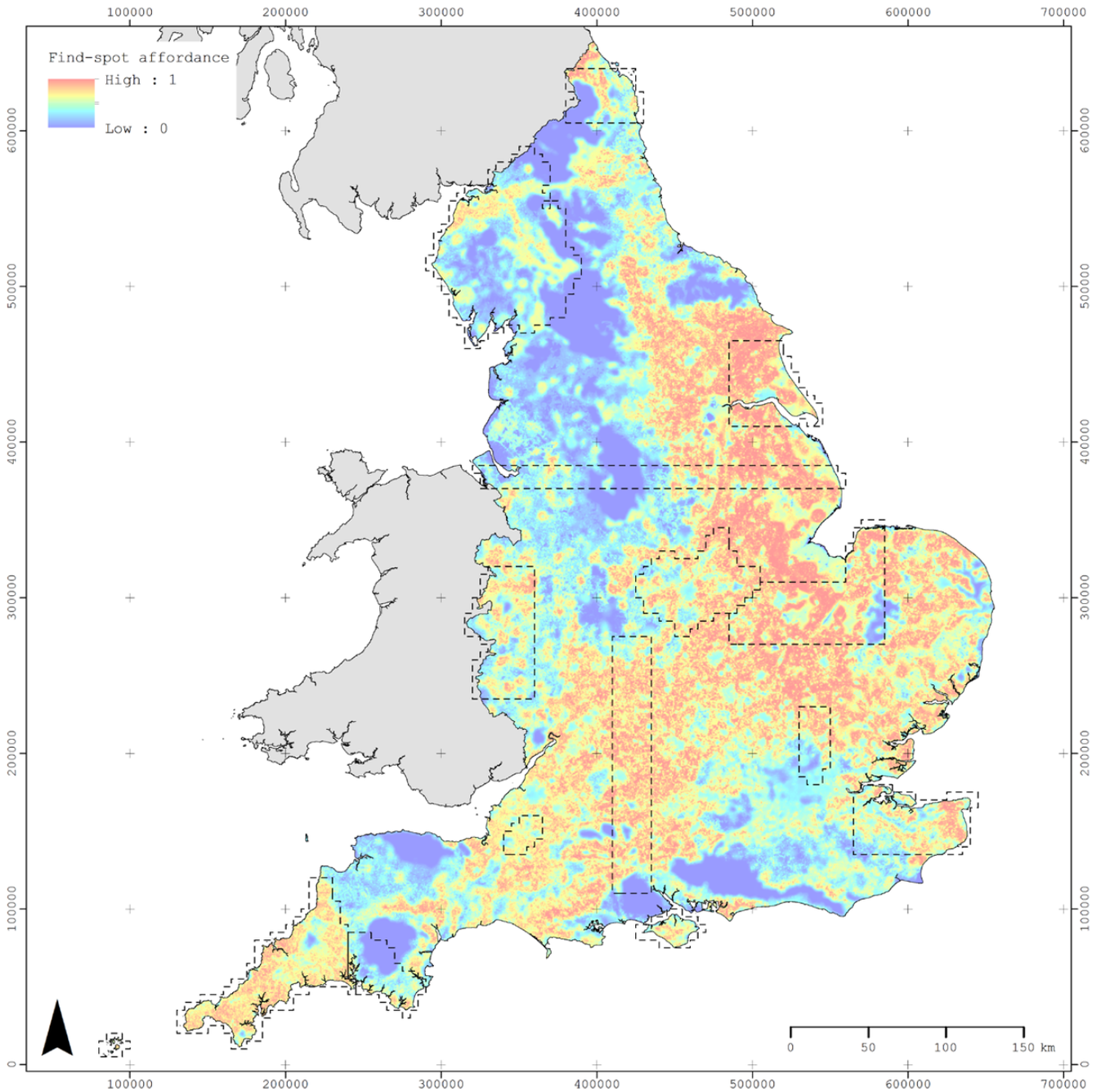


Individual find-spots

after Robbins 2012; 2013; 2014

A different model of modern affordances is needed for findspots, most examples of which in our database come from the Portable Antiquites Scheme (PAS). Excellent work by Robbins (2012; 2013; 2014) has outlined many of the factors which help to structure the distribution of records in the PAS. Some of those factors are impossible or impracticable to map nationally (e.g. proximity to metal dectorists' homes), but others are conducive to broad scale modelling.

The model presented here combines data on land cover (with arable land being the most popular ground surface for metal detecting, followed by pasture land) with data on proximity to known archaeological sites (in this instance Roman sites of any type and early medieval funerary sites) and with data on obscuration of the ground surface (e.g. by water bodies or buildings) or other constraints on metal detecting (e.g. areas where it is banned, such as scheduled monuments or national parks). As with the previous model, areas with higher values should be read as presenting greater opportunities for archaeological finds to occur, and vice versa. Again, we can then use this model to test the distributions of finds in our databases to try to assess the extent to which they are structured by modern opportunity rather than purely by ancient activity.



References:
• Robbins, K. 2012. From past to present: understanding the impact of sampling bias on data recorded by the Portable Antiquities Scheme. Unpublished PhD thesis, University of Southampton
• Robbins, K. 2013. 'Balancing the scales: exploring the variable effects of collection bias on data collected by the Portable Antiquities Scheme.' Landscapes 14(1): 54-72
• Robbins, K. 2014. Portable Antiquities Scheme: A guide for researchers. https://finds.org.uk/research/advice

Ceramic / aceramic areas over time

Other important elements that structure the nature of the English archaeological record are the various affordances associated with the dating of sites. Of these, one key area is the differential use of ceramics across different parts of England. Ceramic evidence remains the principle way by which excavated archaeological features are dated. This is because dating using pottery requires expertise, but does not generally require expensive scientific instruments (unlike radiocarbon dating for example).

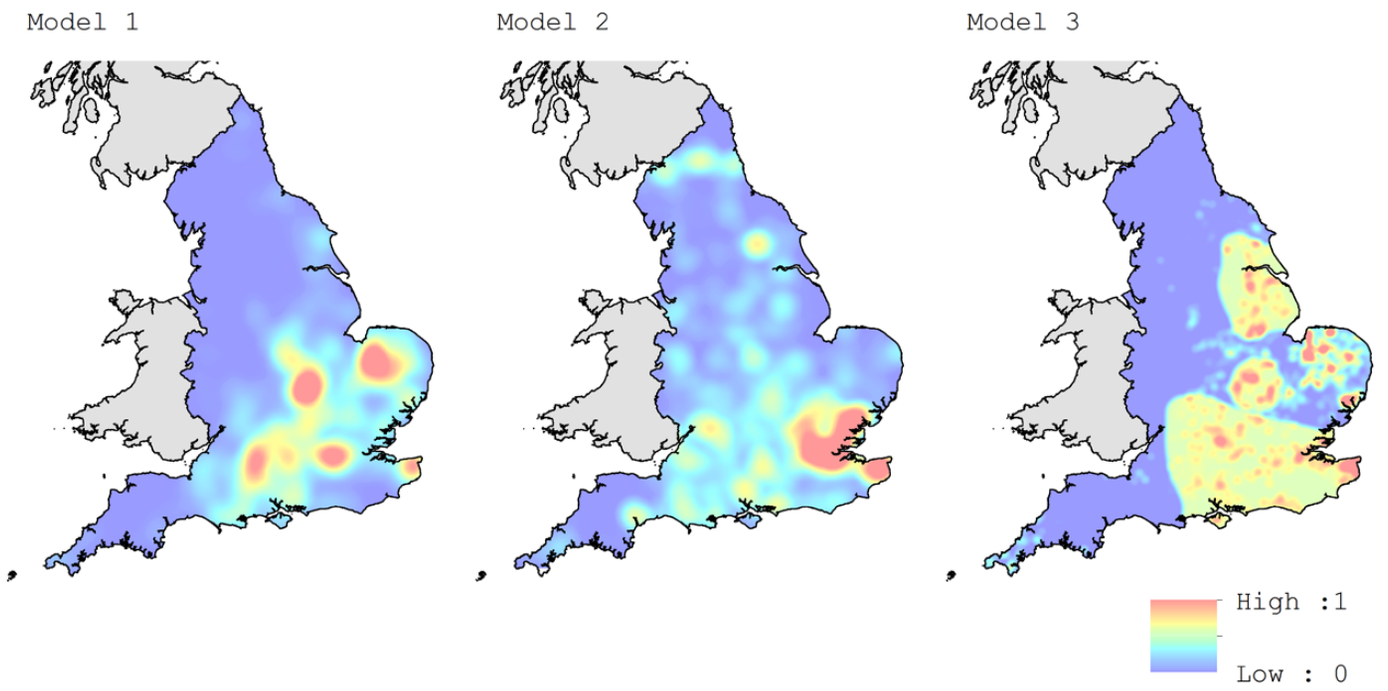
However, pottery was not used everywhere in England through all of our time period. As such, areas where little or no pottery was used are much harder to date archaeologically: they must either be dated based upon the type of site generally (an unreliable method) or via discovery of material suitable for scientific dating (which has cost implications). The models on this page show the presence or absence of widespread evidence for ceramics across our time period. We can see that pottery was most widely used in the Roman period, but used in much more restricted in areas in later prehistory and in the early medieval period.

Model 1 is of later prehistoric pottery. It shows pottery density as recorded by Earl et al. 2007.

Model 2 is of Roman pottery. It shows variety of wares based upon Tyers 1996-2014.

Model 3 is of early medieval pottery. It is a mix of density of certain types of pottery (Blinkhorn 2012; Myres 1969; Wood 2011) alongside half-weighted approximated ware regions (Vince 1993) and, as a proxy, early Anglo-Saxon cemeteries (Martin 2011).

All models have been normalised to vary between 0 (lowest values within the dataset) to 1 (highest values within the dataset). All three models are variously out of date due to lack of availability of updated collated data. This is particularly the case with Model 3. However, these are the best possible models we could produce within the data and time constraints of EngLaId. All three models suggest that dating sites through the study of pottery assemblages should generally be much more practical in southern and eastern parts of England than in northern and western parts.



References:
• Blinkhorn, P. 2012. The Ipswich Ware Project: Ceramics, Trade and Society in Middle Saxon England. Medieval Pottery Research Group Occasional Papers, London: Medieval Pottery Research Group
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• Tyers, P.A. 1996–2014. Potsherd. http://potsherd.net/atlas/potsherd
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Quality / quantity of dating evidence

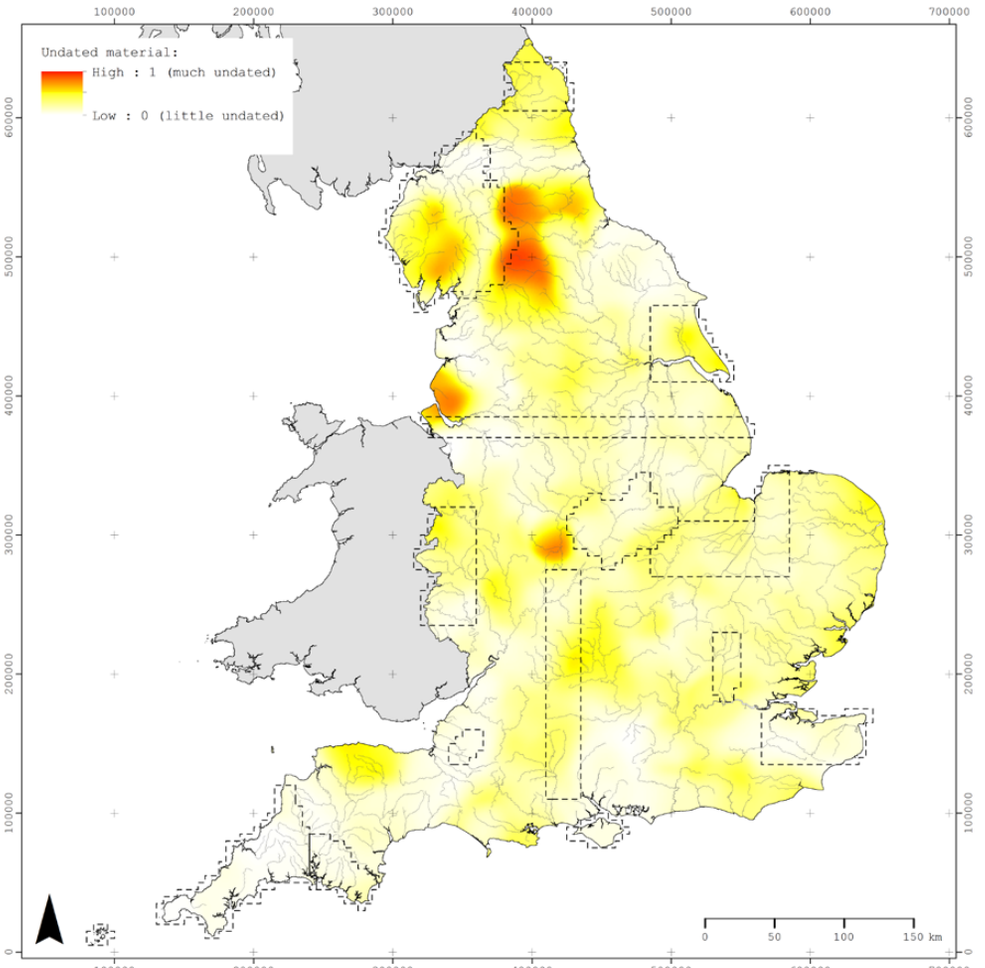
with Zena Kamash

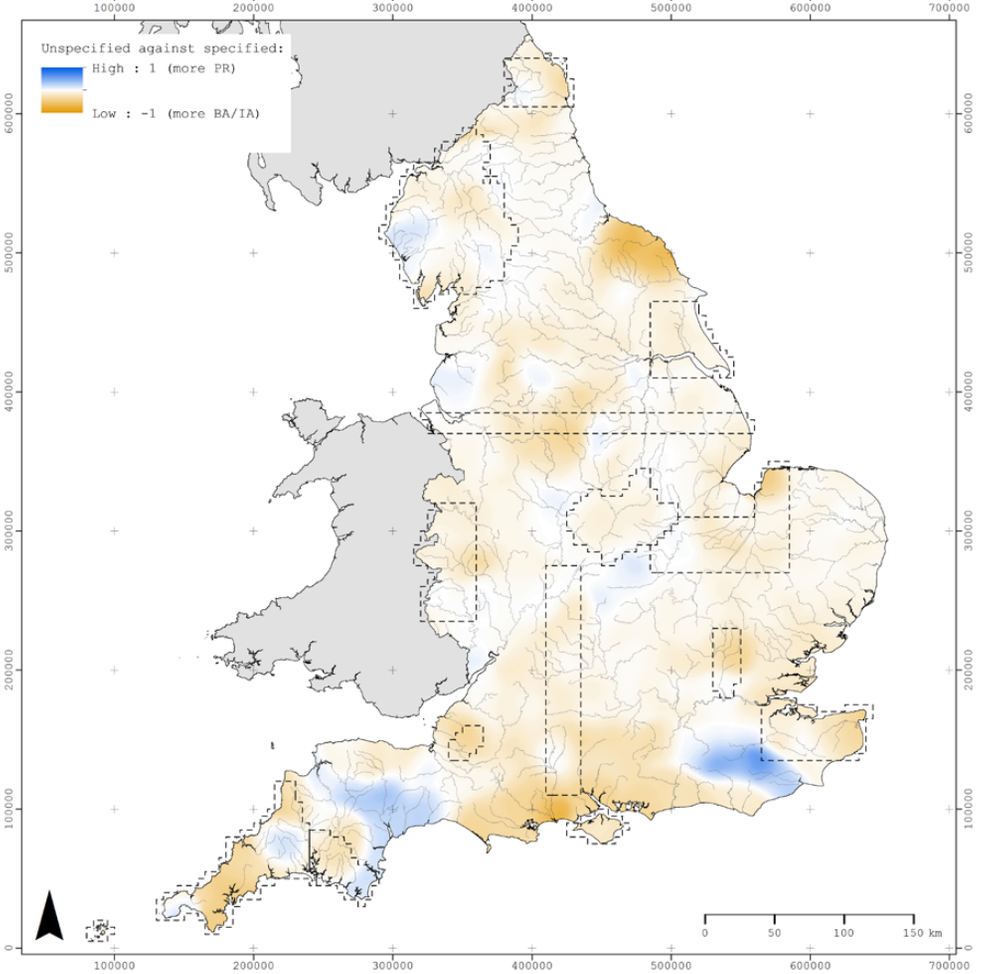
The quality and quantity of dating evidence varies regionally across England. This is largely due to the different types of fieldwork that are more or less common in different regions, as extensive survey will tend to produce less clear-cut dates than excavation. Two ways of examining this issue are by looking at the proportion of records of undated or uncertain date (as a proportion of all records) or by looking at the ratio between unspecified 'prehistoric' and specified prehistoric (i.e. in our case, 'Bronze Age' or 'Iron Age') dates.

The first map here is shaded according to the proportion of undated / uncertainly dated types by 1 x 1 km grid square. It clearly shows that the urban areas of the north west and the West Midlands, and the upland areas of northern Britain (particularly the Pennines) show a higher proportion of undated records than the rest of the country.

The second map here is shaded to show the ratio between unspecific and specific prehistoric dates, again by 1x1km grid square. Here, we can see that parts of the south west and also the Weald show particularly high proportions of unspecified prehistoric material.

Together, these two maps can be used to show us which parts of the country might falsely show up as being of low activity levels at particular points in time, largely due to there being less opportunity to conduct excavation which might improve the dating of sites discovered using aerial or ground-based survey methods, or due to lack of suitable materials for dating sites precisely. That is to say, it may appear that little is going on in an area at a particular point in time, but that might simply be because the sites that exist are only very coarsely dated (or not dated at all).







Gonalston, the Trent Valley, Nottinghamshire. 2012 to 2014.
This site was excavated in 1996 in advance of gravel extraction at Hoveringham Quarry. The view that was drawn was once the site of a gravel island, with many early field systems, plus housing and occupation from the late Iron Age to the Roman period. After the excavation and gravel extraction, the site was flooded and is now a series of lakes, with much wildlife, and bordered by a railway line. Drawing by Miranda Creswell.

Chapter Two:

The temporalities and agency of landscape

Modern archaeological scholarship has tended to downplay the influence of the environment on past human activity, out of a desire not to appear to suggest that human life in the past was overly structured by environmental conditions ('environmental determinism'). However, the environment does have a structuring influence on the way in which people interact with their landscape, but in a mutually constitutive way. As mentioned in Chapter 1, the environment presents opportunities ('affordances') to human agents in their daily activity (Ingold 1992).

The landscape of England is varied both on its surface and in its below ground structure, and has also changed over time. This variation in landscape character thus provides different opportunities for human activity, both in the past and in the present. On one level, this could be conceived of as the landscape itself possessing a sense of agency, or at least it possessing a type of forceful character that makes certain activities easier or harder to accomplish. This chapter will outline some of the structural characteristics of the English landscape, including sub-surface elements. It will also look at how some elements of the English landscape have changed over time.



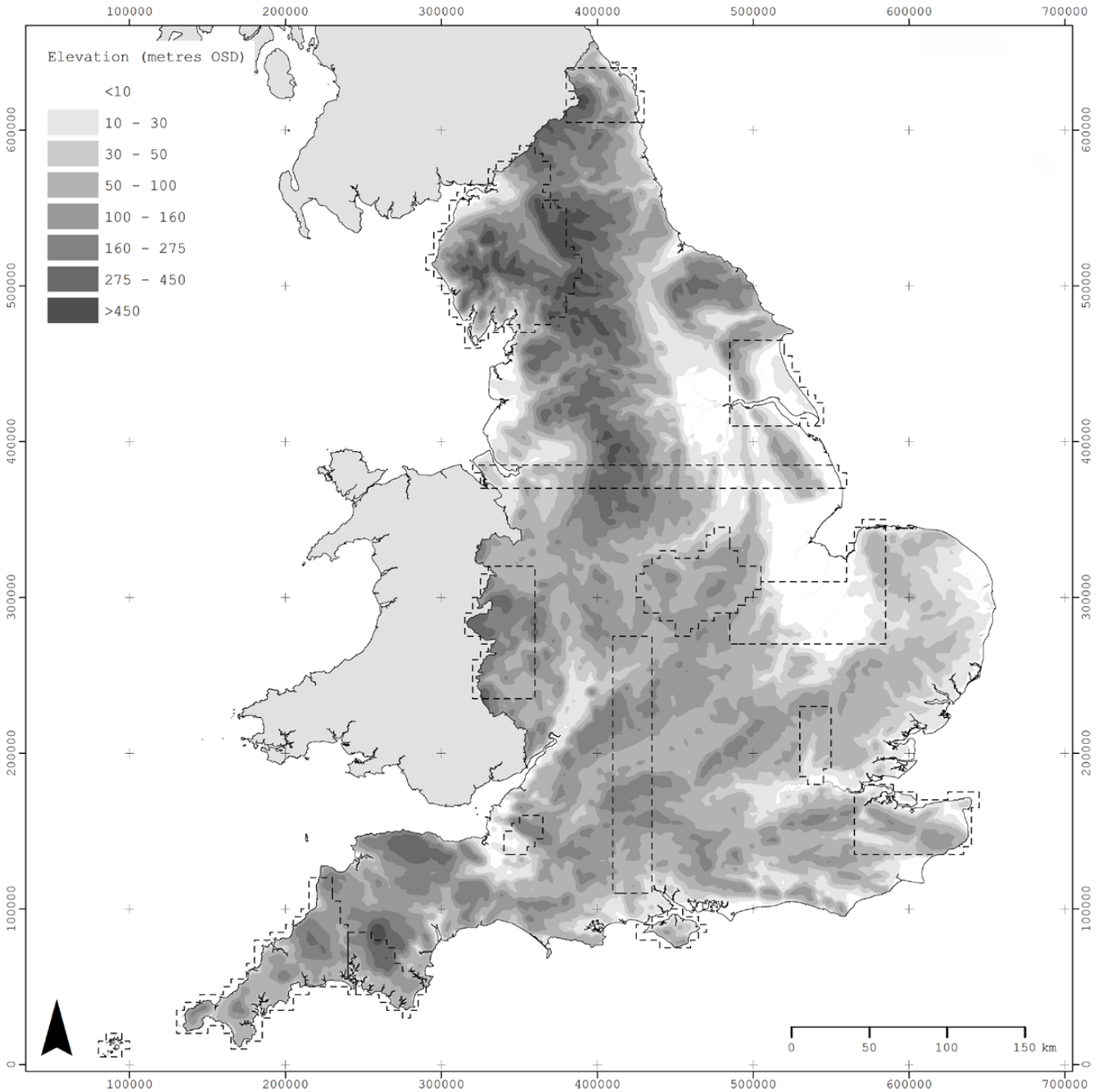


Yeavering Bell After Winter Storm. 2014.
Photographs by Miranda Creswell.

References:
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Landscape character (I) - elevation

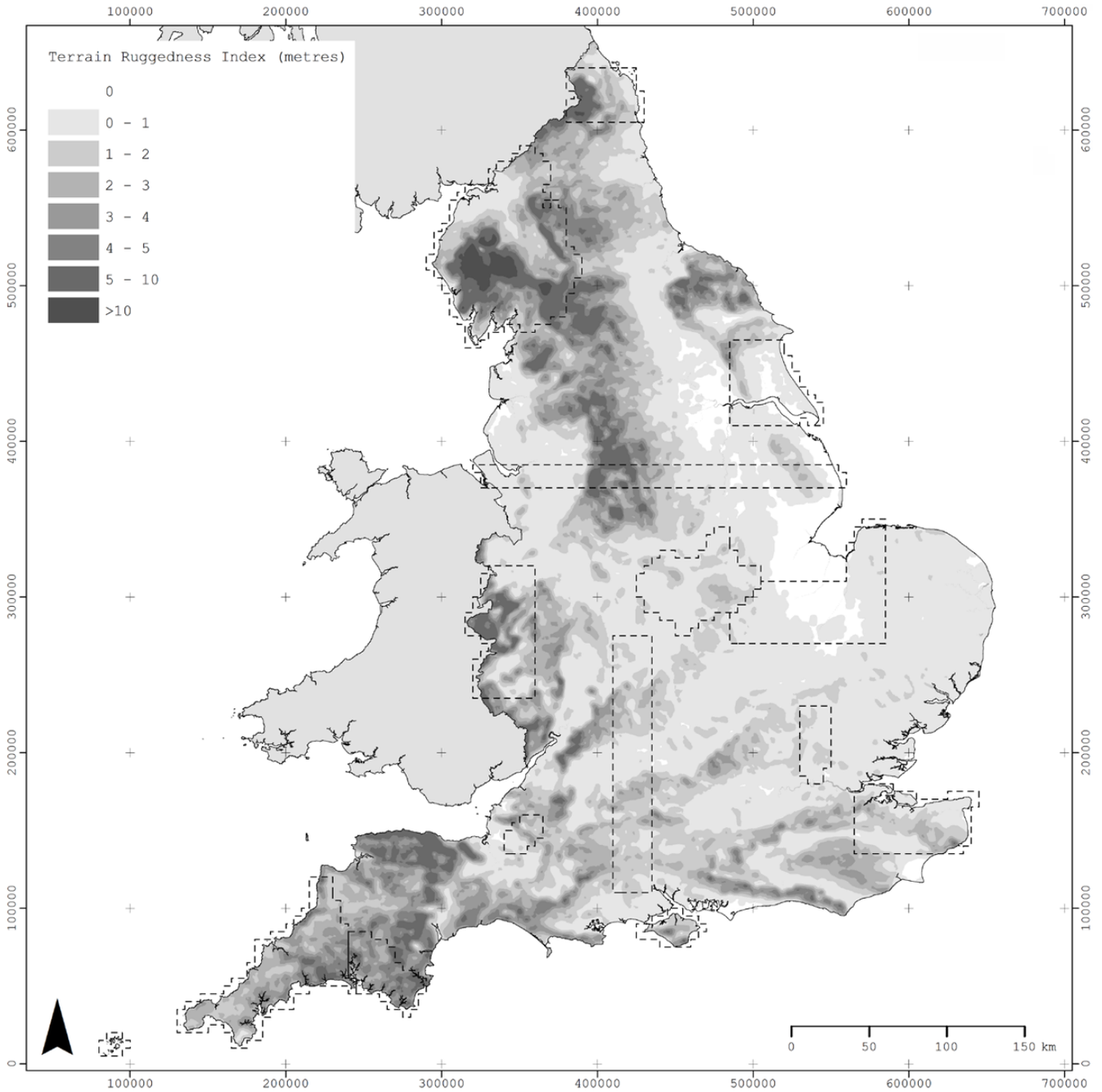
Probably the most obvious way in which the landscape of England varies across space is in its elevation. There are substantial low lying areas on the coastlines, many of which would have been undrained and marshy during our time period, notably the Somerset Levels, the East Anglian Fens, and parts of East Yorkshire. There are also considerable areas of rolling hills, rising to uplands proper in the north, west, and south-west. Some of these uplands would have been more conducive to arable agriculture at times in the past when the climate was warmer, but for farming purposes they were largely only suitable for rearing stock through most of our time period.



Landscape character (II) - ruggedness

We can see the difference between more rolling countryside as opposed to rugged uplands by looking at measures of terrain roughness. In this instance, Wilson's Terrain Ruggedness Index (TRI) is defined as the average difference between each pixel on the elevation model and its eight neighbours (Wilson et. al. 2007). This is a very simplistic measure and the results are highly dependent upon the size of pixels, but the model produced is useful.

By comparing terrain roughness against pure elevation, we are able to see that the south-west, the Welsh borders, the Pennine ridge, and the Cumbrian fells are all much more ruggedly upland in character than the areas of relatively high elevation in other parts of the country. This has connotations in terms of travel time and accessibility (see Chapter 6), which makes it more difficult to conduct both trade (which could be seen as a problem from the perspective of a resident) and invasion (which could be seen as a benefit from the perspective of a resident defender).



References:

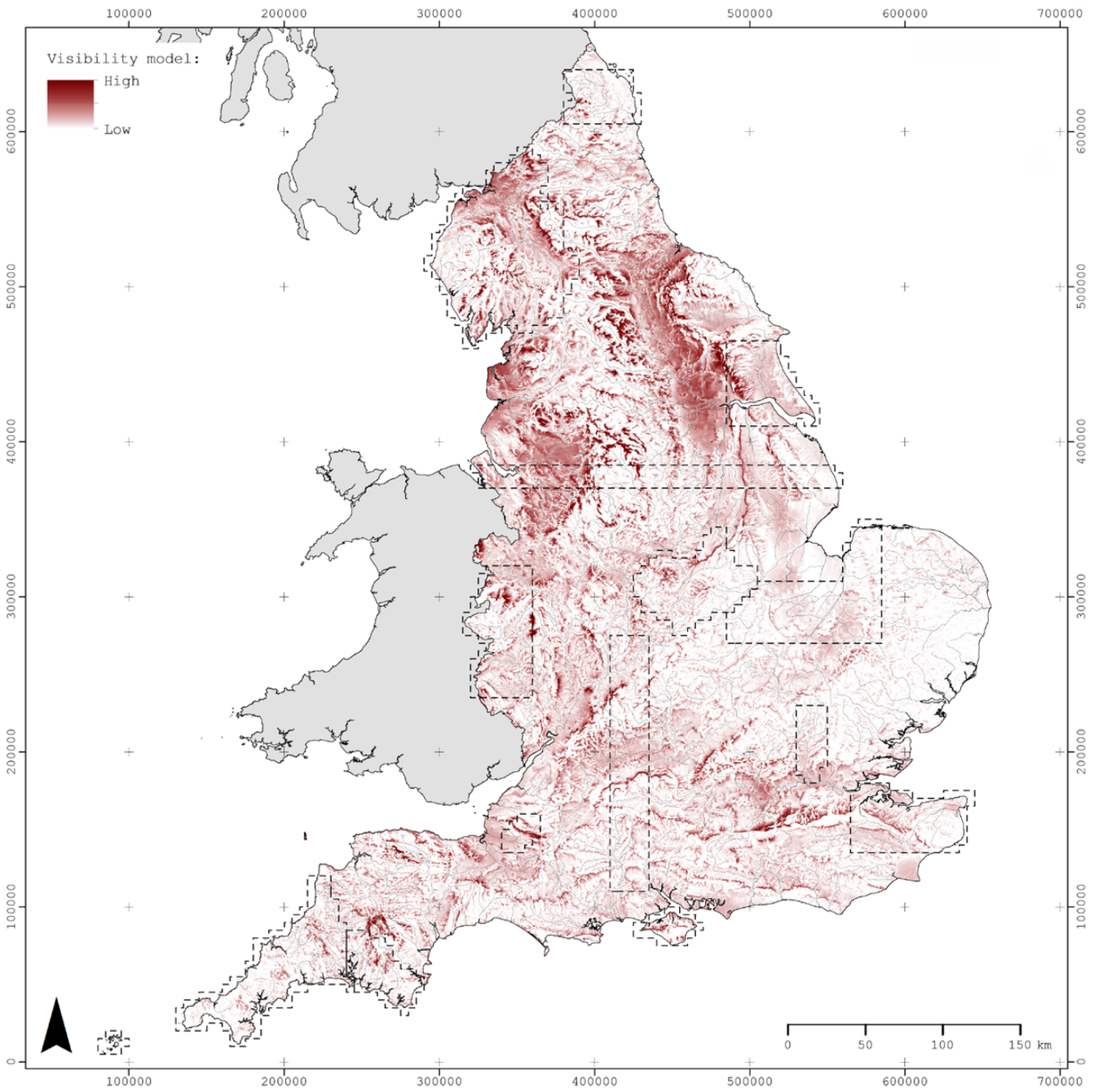
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Landscape character (III) - visibility

Another aspect of landscape character that can be of archaeological interest is visibility. Visibility analysis of ancient landscapes is somewhat hamstrung by lack of detailed data about the extent of view-blocking forests and woodlands, but can still be of analytical relevance. A 'total viewshed' is a model which describes the extent to which areas of the landscape are visible from their surrounding areas (or vice versa), by calculating the area visible from every pixel on a digital elevation model and then summing the results (Conolly & Lake 2006: 228).

However, calculating a total viewshed for a very large area remains computationally very intensive. As such, the model presented here has been calculated using 'peaks' (pixels higher than all eight neighbours) and 'pits' (pixels lower than all eight neighbours) on the elevation model as observer locations (thinned out to keep only the highest peak / lowest pit within 1.5km of each other). Although an approximation, the model produced is analytically useful.

On the map, darker areas are more visible in character than lighter areas. Past vegetation cover could easily alter the results, but this does not invalidate the model. Of particular interest are the intensely visually open character of the Solway, Mersey and Yorkshire Ouse basins.



References:

• Conolly, J. & M. Lake. 2006. Geographical Information Systems in Archaeology. Cambridge: Cambridge University Press

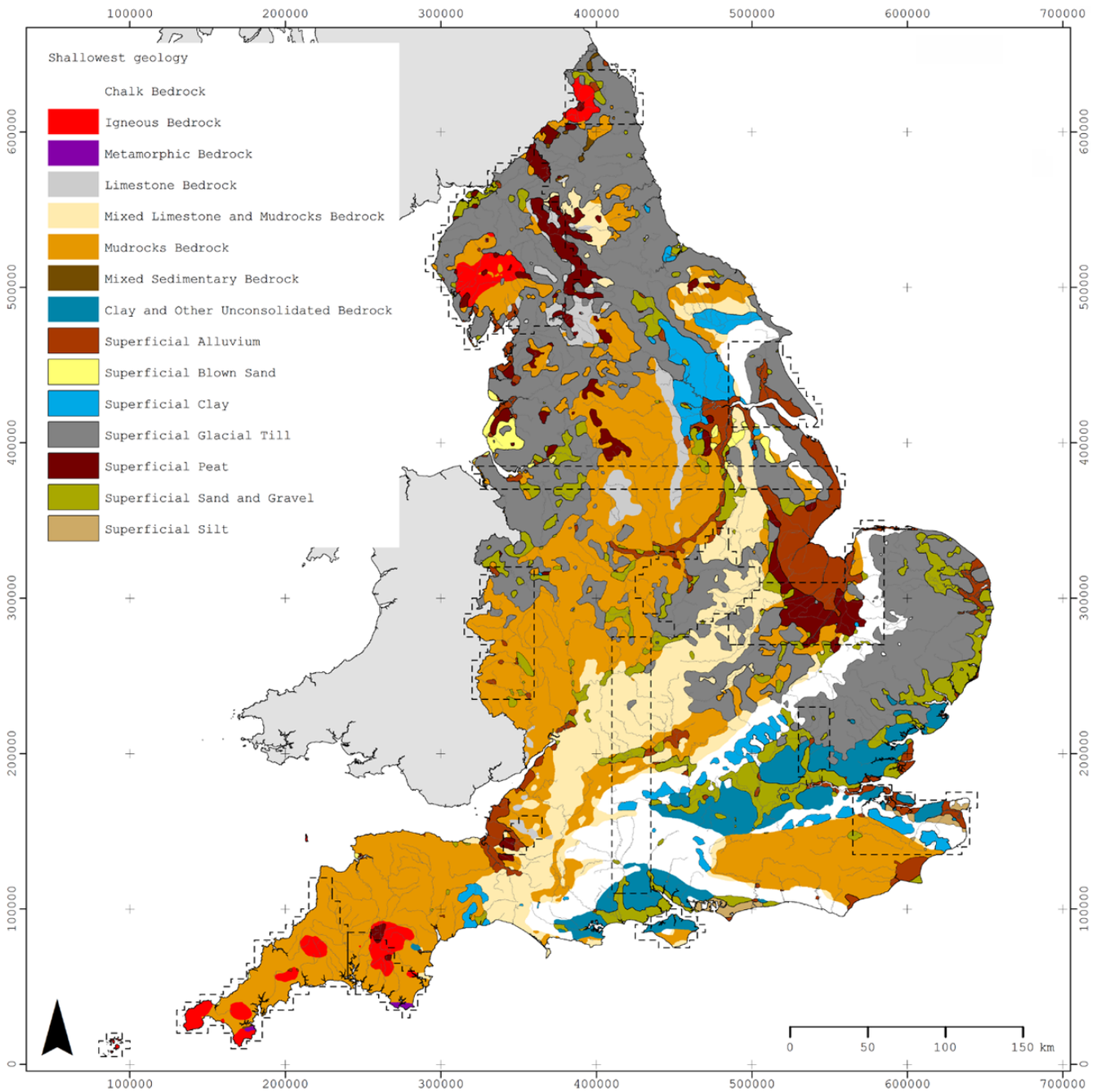
Geology

based upon British Geological Survey 2007

Another, somewhat less visible, characteristic of the English landscape is its geology. Naturally, bedrock exists everywhere, but in large parts of England it is obscured by superficial deposits. We have thus modelled geology using a 'shallowest' concept, with superficial being used where it exists and bedrock elsewhere (after Rippon et al. 2015).

In this model, peat covers parts of upland England, with peat and alluvium also covering parts of the lowest elevations in Somerset, the Fens, and Yorkshire in particular. Glacial tills cover large parts of the north and east. The uplands of Northumberland, Cumbria, and the south-west also show intrusions of hard igneous bedrock. Most of the western two-thirds of England (and the Weald) are made up of limestone and what we have called 'mudrocks' (e.g. sandstones). Large areas of clays and other unconsolidated bedrocks cover the lower Thames valley and estuary and southern Hampshire. Between the clays and the mudrocks exist broad seams of chalk.

Sands and gravels are especially important to archaeology, as they have been very widely quarried in recent decades, resulting in large commercial archaeology projects.



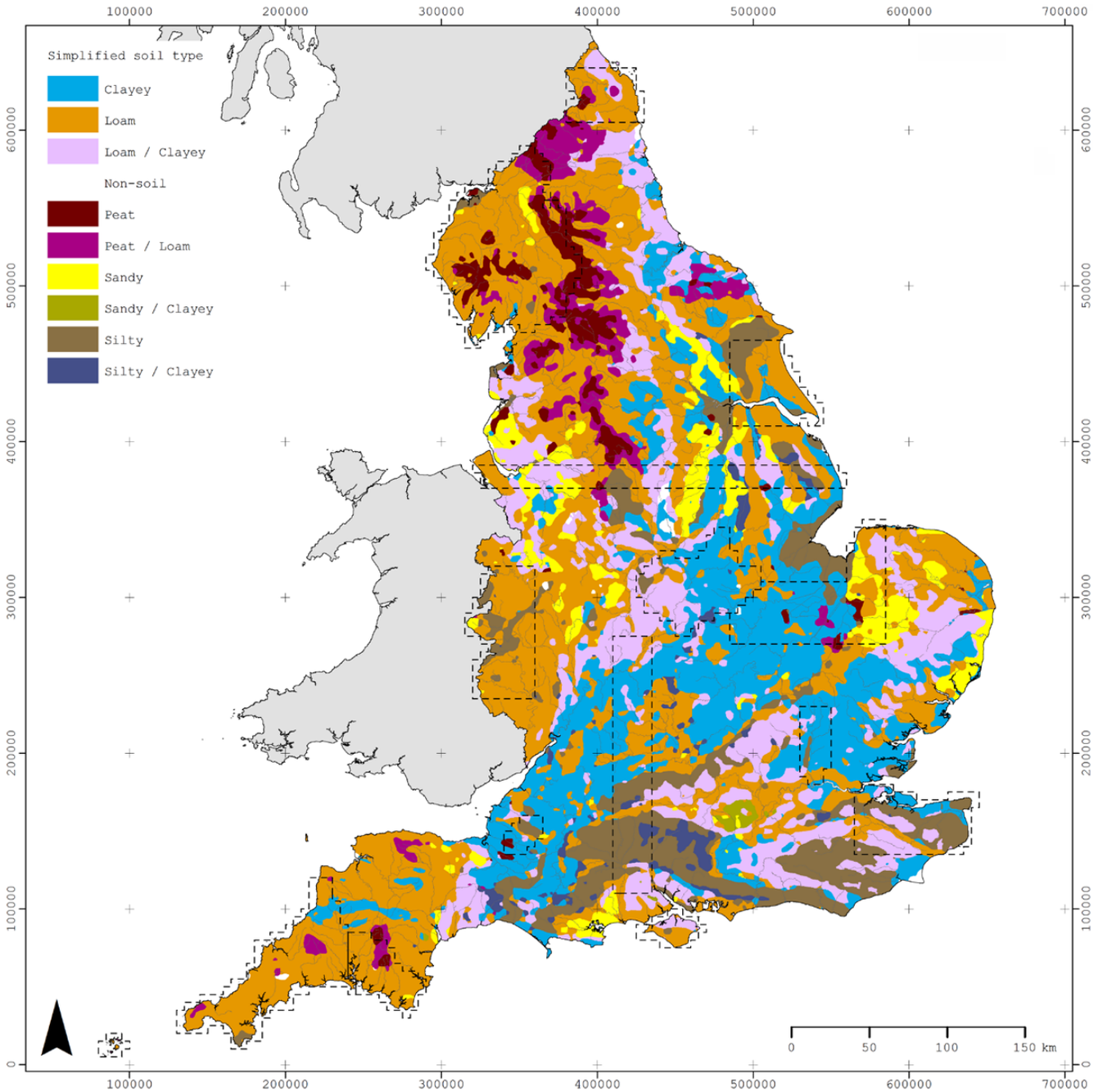
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• Rippon, S., C. Smart & B. Pears. 2015. The Fields of Britannia: Continuity and Change in the Late Roman and Early Medieval Landscape. Oxford: Oxford University Press

Soils

based upon Cranfield University 2015

Above the geology of England are soils of very varied character. Western and northern England is characterised by loamy soils with large deposits of peat. Central and eastern England sees extensive deposits of more clayey soils. Large silty deposits also exist towards the south coast and under the former larger extent of the Wash (see p.19). Sandy soils are relatively uncommon, but extensive in certain localised areas.

Taken together, the soils and shallowest geology of England provide a series of opportunities for different types of farming practices and building traditions. The areas of peat have expanded across our time period (although now they are declining due to drainage and other land management practices). Clayey soils are often seen as being harder to plough and so requiring of more advanced heavy ploughing technologies in order to be used for arable farming. However, the sheer amount of clayey soils across eastern England suggests that this cannot have been entirely the case in the past.



References:

• Cranfield University. 2015. National Soil Map of England and Wales – NATMAP. http://www.landis.org.uk/data/natmap.cfm

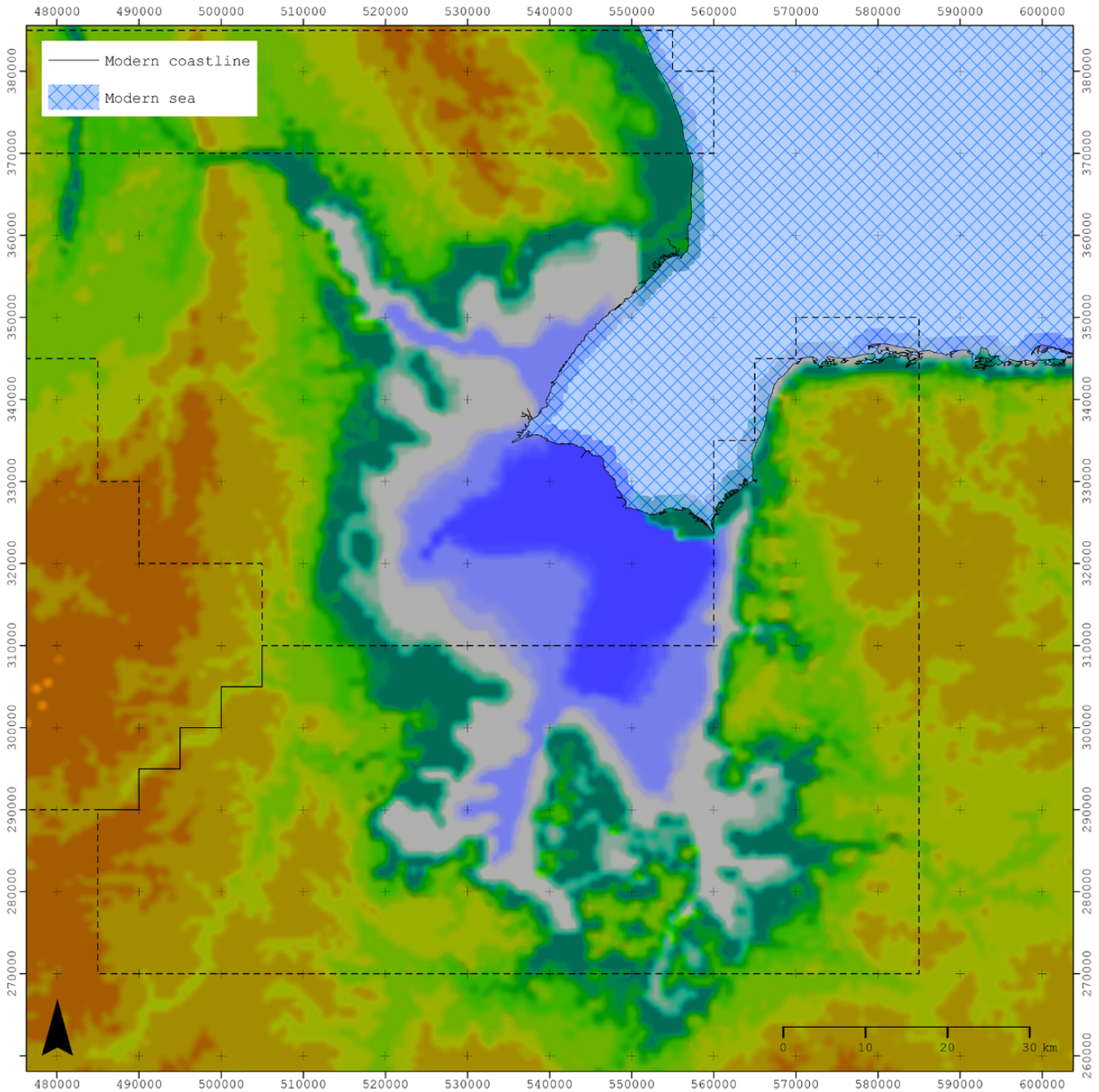
Changing coastlines

based upon Sturt et al. 2013

The coastline of England has changed rather drastically in places over the course of our time period (Sturt et al. 2013). Loss of coastal land to the sea (extensive across large parts of eastern England) is hard to assess and quantify, but drainage of former areas of sea is easier to model through programmes of sediment coring.

Most notable through our time period is the former extent of the Wash, which was vastly larger than it is today. As a result, most of this area should be considered as either forming open sea or salt marshes during the period covered by EngLaId. Although affording opportunities for fishing and fowling, it was certainly not the rich farmland that it is today.

As such, we have plotted the former extent of the Wash on most of our maps, so that it can be more easily understood that any lack of archaeological activity in that area will be due to it formerly being at least partially underwater.



References:

• Sturt, F., D. Garrow & S. Bradley. 2013. 'New models of North West European Holocene palaeogeography and inundation.' Journal of Archaeological Science 40(11): 3963–3976

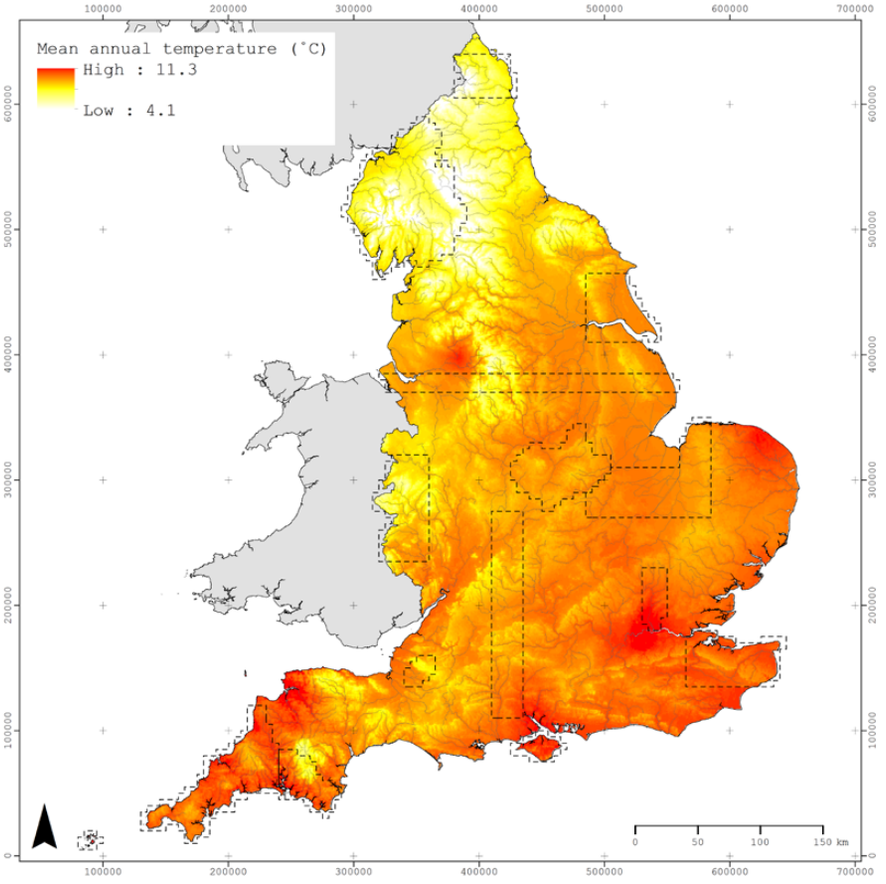
Climate (I)

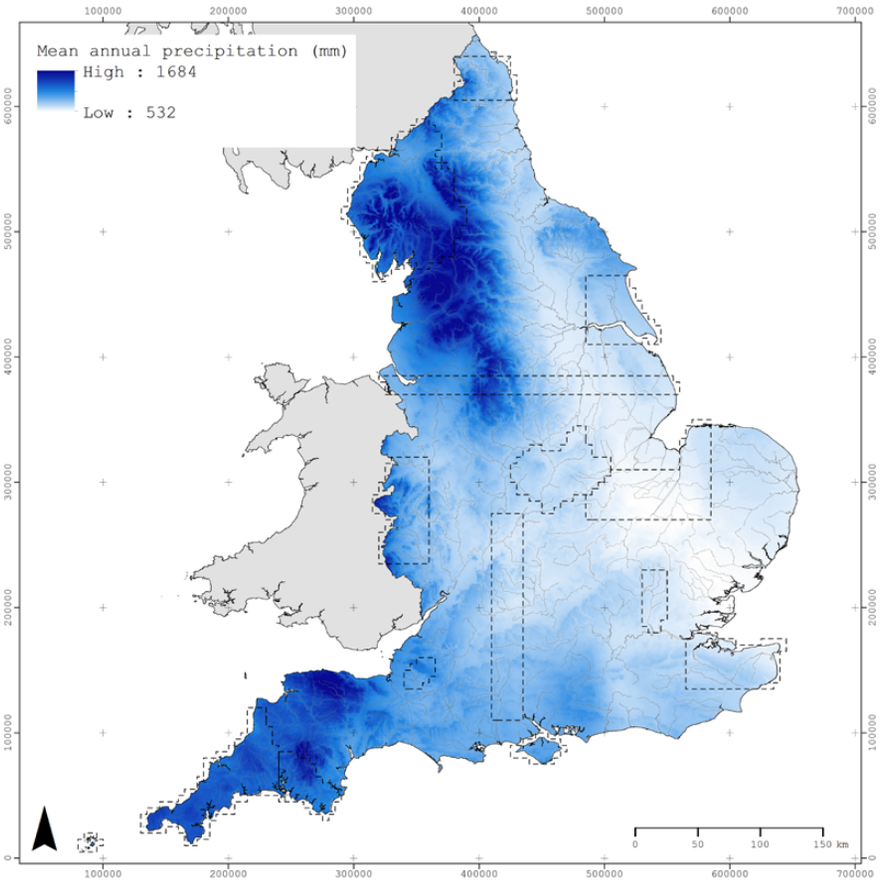
with Tyler Franconi

These two maps show national variation in mean annual precipitation and mean annual temperatures, derived from modern data available on WorldClim.org. These data were collected over the course of the 20th and 21st centuries and therefore can only loosely be extrapolated to the more distant past. We must also keep in mind that modern cities tend to raise temperatures, and therefore the 'hotspots' of London and Manchester that are clearly visible in the map are modern artefacts rather than anything applicable to the pre-modern period.

Caveats aside, we see spatial differentiation in both temperature and rainfall. Generally speaking, it is warmer in the south than in the north, particularly in the southwest where average summer temperatures hover around 20°C, as a result of the oceanic climate of the region. Mean temperatures drop both by elevation and latitude—upland zones are cooler than lowlands, and Cumbria and Northumberland are cooler than the south.

Likewise, it rains more in the southwest and northwest than it does along the eastern and southern coasts. This again correlates well to elevation, as upland areas receive more rainfall, but it also highlights the influence of different air masses on precipitation patterns. The maritime and tropical winds of the south and west blow in more rain than the continental winds of the North Sea.





References:

• Worldclim website: http://www.worldclim.org/

Climate (II)

with Tyler Franconi

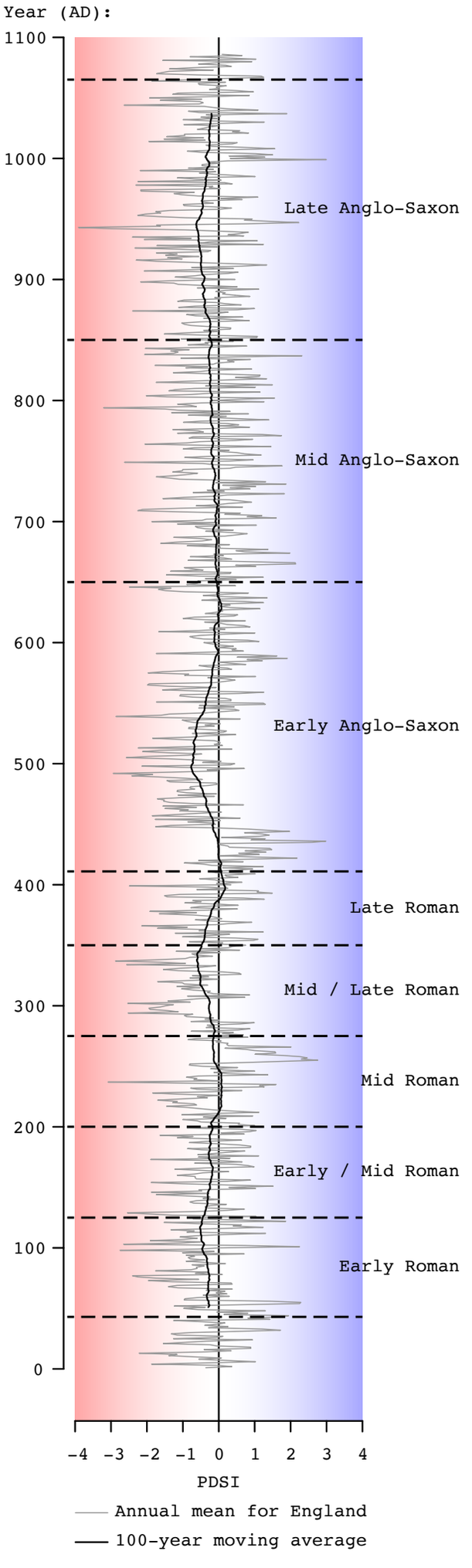
The Old World Drought Atlas (Cook et al. 2015) is an assessment of periods of extreme drought and extreme wetness in Europe since the start of the Roman period based on dendrochronological records of fluctuations in temperature and precipitation. Patterns of climatic activity are expressed using the Palmer Drought Severity Index (PDSI, see Palmer 1965), which provides annual minima, maxima, and mean scores of moisture by year, here for the period of AD 1-1100.

Moisture scores above 0 indicate wetness, while scores below 0 indicate drought. The scale reaches to 14 and -14 as extreme values, but anything rating above 4 is considered severely wet while anything below -4 is considered extremely dry. Thus, when graphing the mean annual value for long periods of time, we can see both inter-annual variation and centennial-scale fluctuations in climate activity within England.

The mean PDSI score for the Early Roman period hovered close to 0, with increasing dryness until c. AD 200. This pattern has been recognised as the 'Roman Climatic Optimum' across much of Europe (Manning 2013), and is interpreted as significant factor in the success of Rome in these centuries. The Middle and Late Roman periods show more fluctuation, with increased wetness in the second half of the third century and then again from c. AD 400 onwards.

The post-Roman period is one of the most significantly wet periods in the timeline, and the Early Anglo-Saxon period sees a gradual drying over the course of the sixth and seventh centuries before then stabilizing in the Middle Saxon period. The end of the EngLaId period sees continued drying, with the exception of an episode of wetness c. AD 1000.

Climatic fluctuations are a key element in the shaping of society, changing daily weather patterns, annual growing seasons, and seasonal river activity, to name only several considerations. Understanding the impact of climate change on Roman and early medieval societies adds another layer of depth to archaeological and historical interpretations.



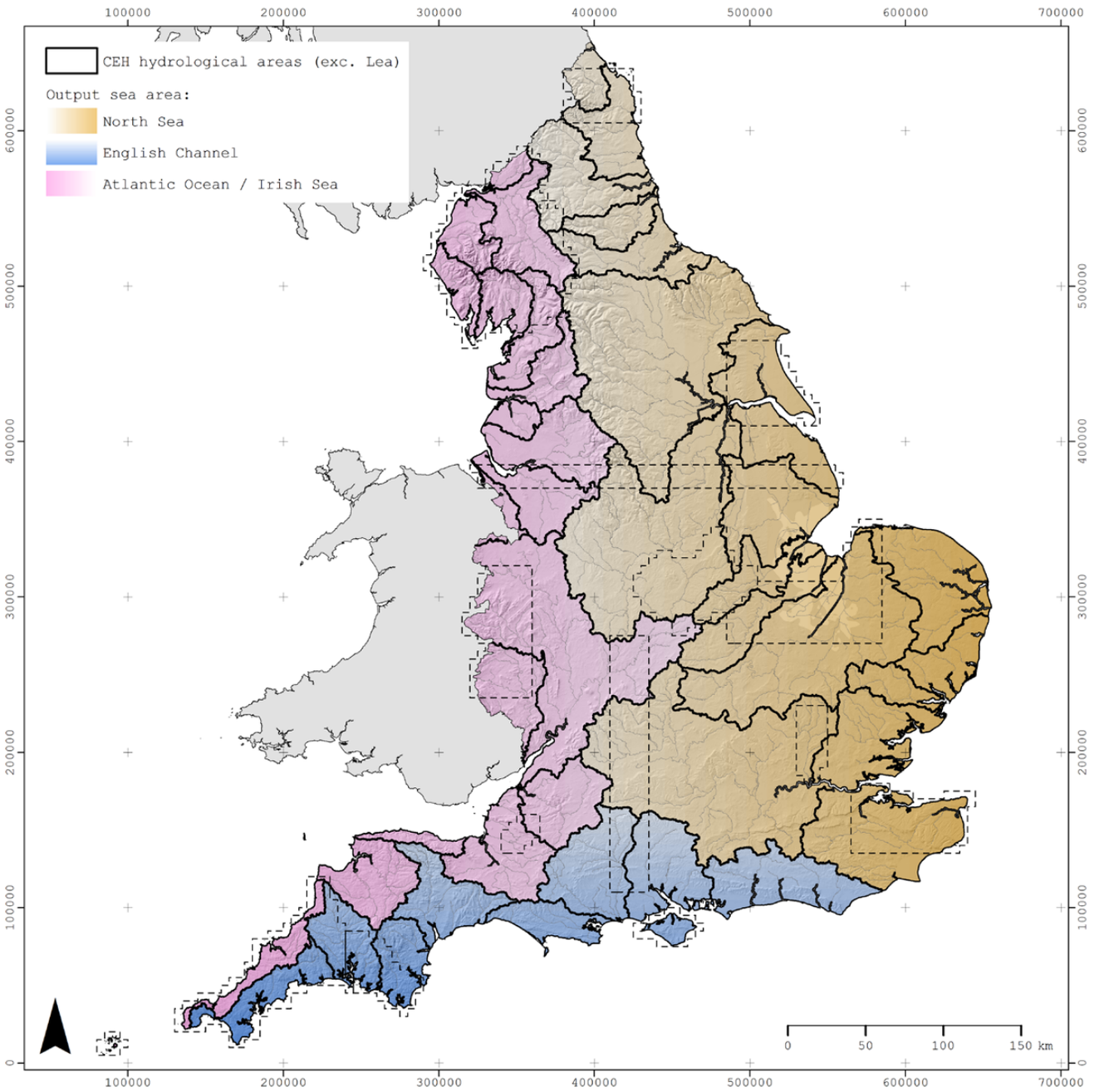
References:
• Cook, E.R. et al. 2015. 'Old World megadroughts and pluvials during the Common Era.' Science Advances 1.10 (DOI: 10.1126/sciadv.1500561)
• Manning, S. 2013. 'The Roman world and climate: context, relevance of climate change, and some issues.' In: W.V. Harris (ed.), The Ancient Mediterranean Environment between Science and History (Columbia Studies in the Classical Tradition 39). Leiden; Boston, 103–172
• Palmer, W.C. 1965. 'Meteorological drought.' US Department of Commerce Research Paper 45: 1-58

Riverine geographies (I)

with Tyler Franconi

River basins are discreet geographical zones in which land is drained by a single river system, thus dividing the landscape into many separate hydrological units. This map shows the 47 major basin zones of England divided into three main directions of flow: east towards the North Sea, south towards the English Channel, and west towards the Atlantic/Irish Sea. These directional watersheds are determined by topography, with the main east/west division running down the line of the Pennines and Peak district and then through the Cotswolds, while the south is divided along the chalk ridgeways in the east and moorlands in the west. The largest river basins in the country, the Thames, Trent, and Yorkshire Ouse, flow to the east, emptying into the North Sea. The rivers that drain the western and southern coasts are generally much smaller, with the exception of the Severn. The size of these basins has much to do with the slope of the land, with the flatter lowlands of the east coast allowing for larger basin development than the more rugged south and west coasts.

The river basins are based on the Centre for Ecology and Hydrology's 'hydrological areas', but with the Lea basin merged into the Thames basin.



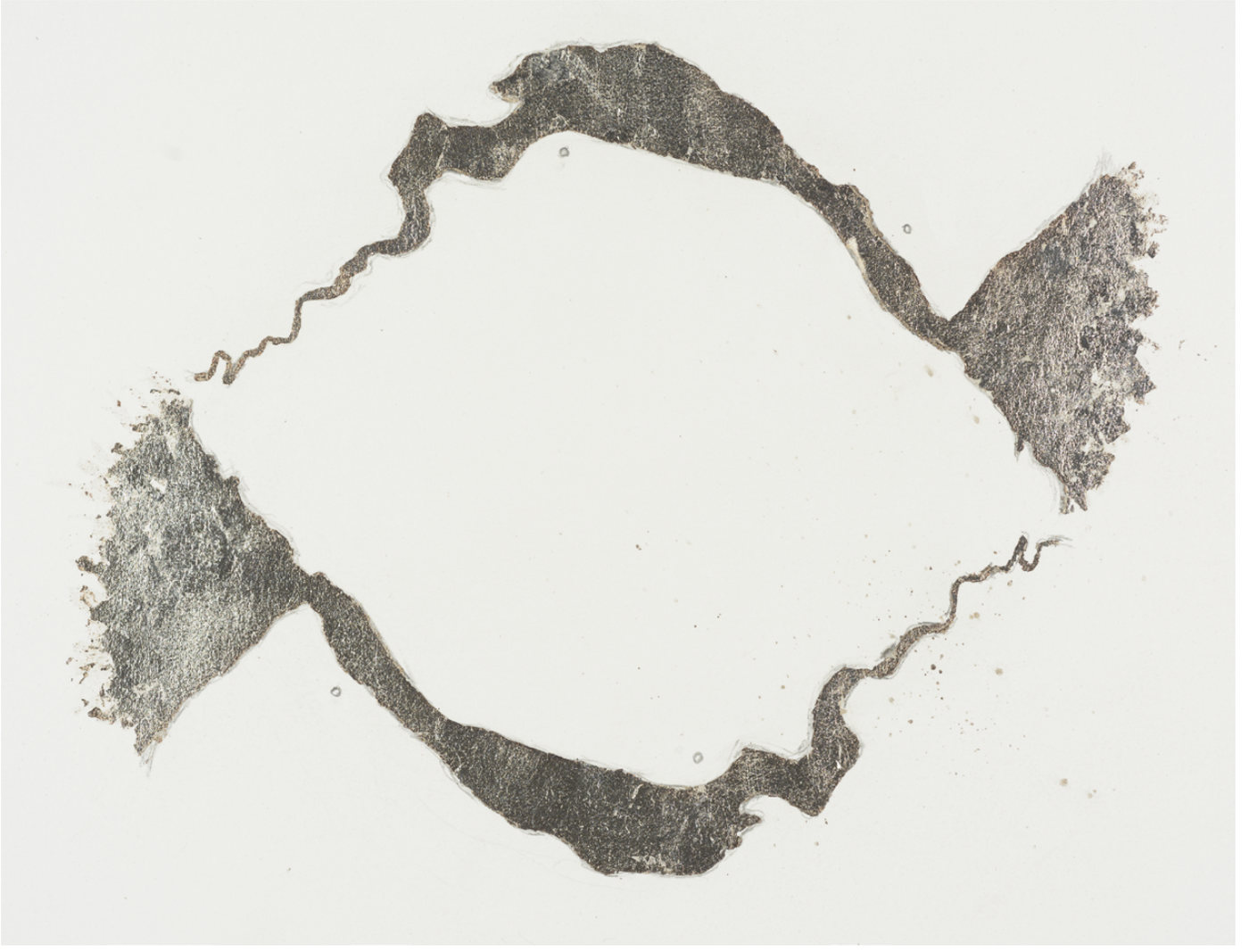
References:

• Centre for Ecology and Hydrology website: http://www.ceh.ac.uk/

Riverine geographies (II)

Rivers can function in a number of ways within archaeological analysis, whether as framing devices for study (p.22), as barriers (p.25) to movement / communication (p.67) or as conduits for movement / communication (p.68) In a landscape as wet as that of England, it is impossible to paint an accurate picture of past life and identity without considering rivers and smaller waterways.

How rivers affected past lived experience was highly contextual, with (for example) access to watercraft partially determining whether a river might form a disruption to communication or an arterial communication route. The importance of rivers to daily life undoubtedly varied in degree over time, but must always have been of some significance in the past of England.



The River Mersey, North and South, South and North. 2015.

The image is made with silver leaf, the upper image is of the river Mersey as seen on a map with a Northern outlook, the bottom part of the image is the river as seen with a Southern outlook. This image formed part of a community project involving Oxton St Saviour's school in Birkenhead and St Christopher's primary school in Speke, Liverpool.

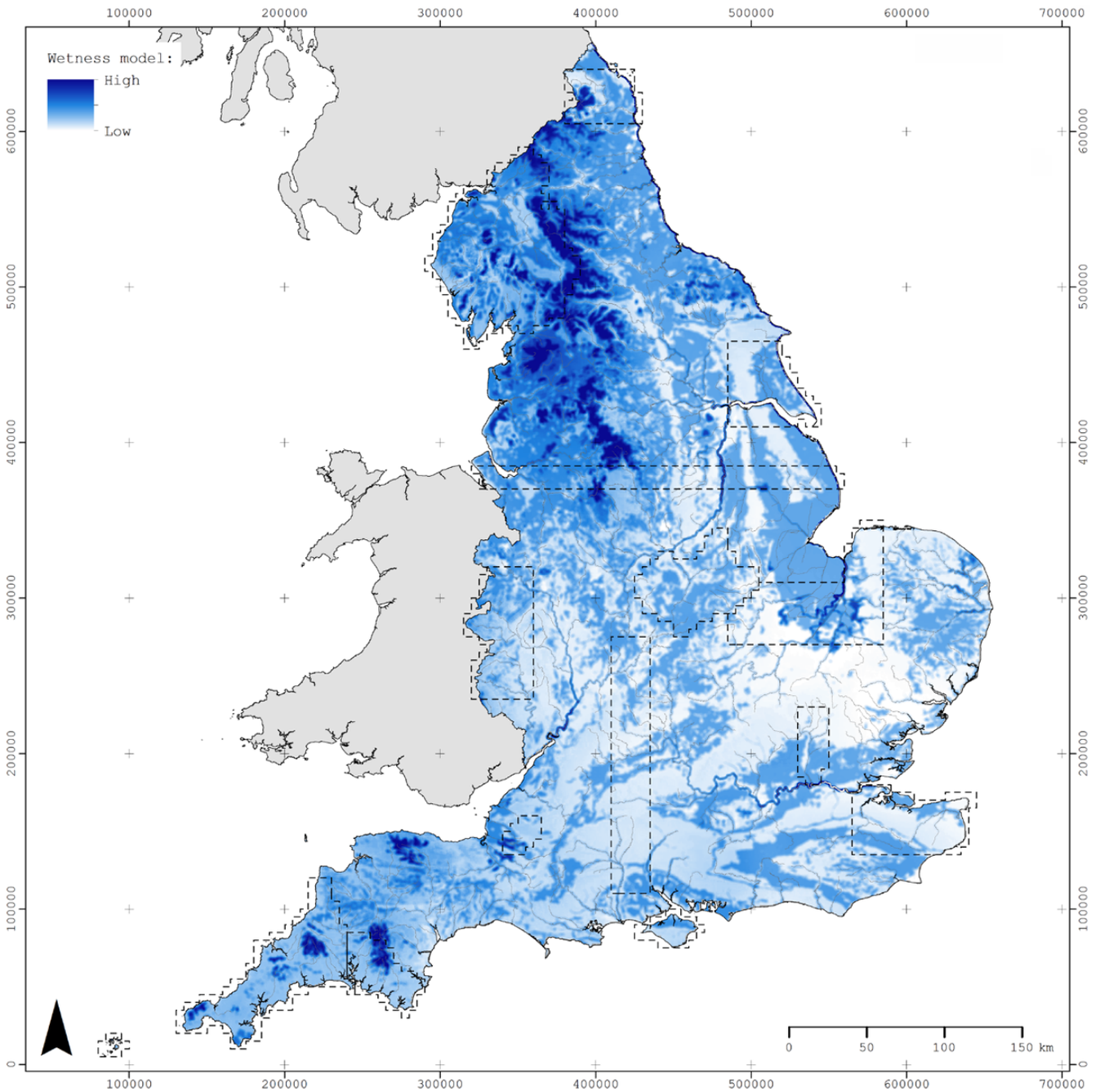
The project focused on the river Mersey and explored the influences of the 'riverscape' on modern-day local identities, informed by its use in the past. The riverscape of one community is formed of a view across the Mersey of the other community, and vice versa.

Working with Year 5 and Year 6 pupils from the two schools, artworks by each pupil were displayed in a public exhibition, alongside Miranda Creswell's own artwork and EngLaId maps showing past Mersey landscapes, at the Williamson Art Gallery and Museum, Birkenhead. Image by Miranda Creswell.

Landscape character (IV) - wetness

Another way in which we might characterise the English landscape is in terms of how wet it is. The model presented here is built from a combination of modern precipitation (p.20), soil wetness (based upon the same data as seen on p.18) - with wet soils being given a high index, seasonally wet soils a medium index, dry soils a low index, and stony soils a very low index - and flow accumulation calculated from the elevation model (p.14).

In the map, darker blue areas are wetter across these three metrics. Obviously, this model is based upon modern data, so its applicability to the past is not absolute. However, although elements such as the actual amount of precipitation will have varied over time, the areas where relatively more rain falls today are probably very similar to the areas where more rain fell in the past, despite fluctuations in climate. As such, on this scale and at this resolution, the model should be reasonably robust. The obvious large exception is the Wash, which was much larger during our time period of interest, but this has been dealt with using alternative methods (see p. 19).

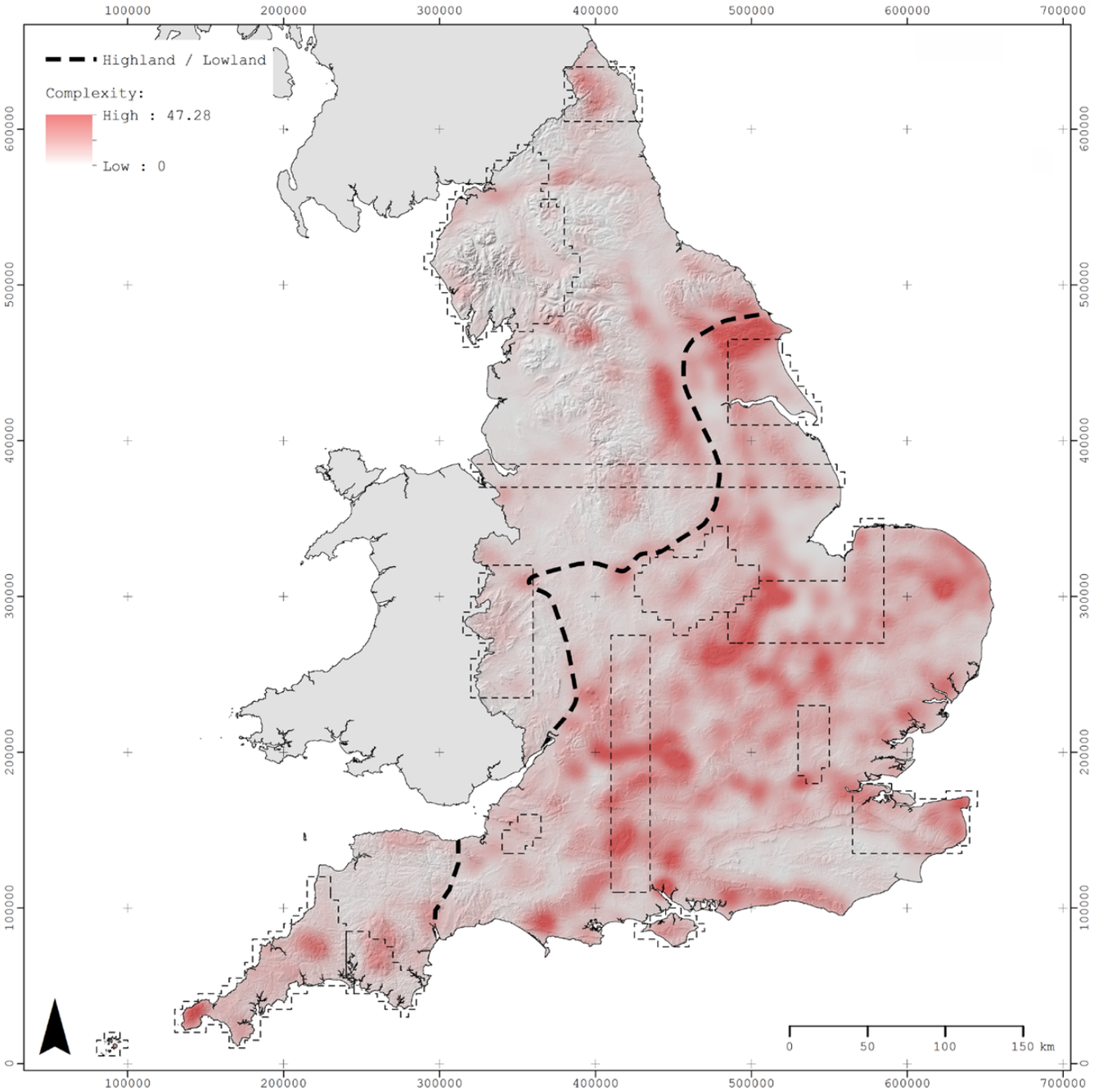


Highland / lowland Britain

with Chris Gosden, after Fox 1932

Originally coined by Fox (1932), Britain has often been characterised as divided between a Highland Zone and a Lowland Zone, the former covering the north and west, the latter across the south-east. Fox's Highland Zone was characterised by more continuity in cultural practices, with new ideas being assimilated into older ways of life. His Lowland Zone, by contrast, was characterised by periods of rapid cultural change, with new ideas replacing older ways of life, possibly through invasion by new peoples.

Although we would not subscribe to this simple model, there are clear differences between the Highland and Lowland Zones within England. A simple measure of the complexity of our dataset is the count of the number of types of archaeological site per square kilometre. The map here shows this as a density surface overlain with an approximation of the dividing line between Fox's zones. From this, we can see that the Lowland Zone of England is characterised by higher and denser archaeological complexity, with the exception of The Weald in Kent. Partly, this is due to the modern structuring influences discussed in Chapter 1, but it also partly a reflection of genuine differences in patterns of past practice, as we shall come to see later in this Atlas.



References:

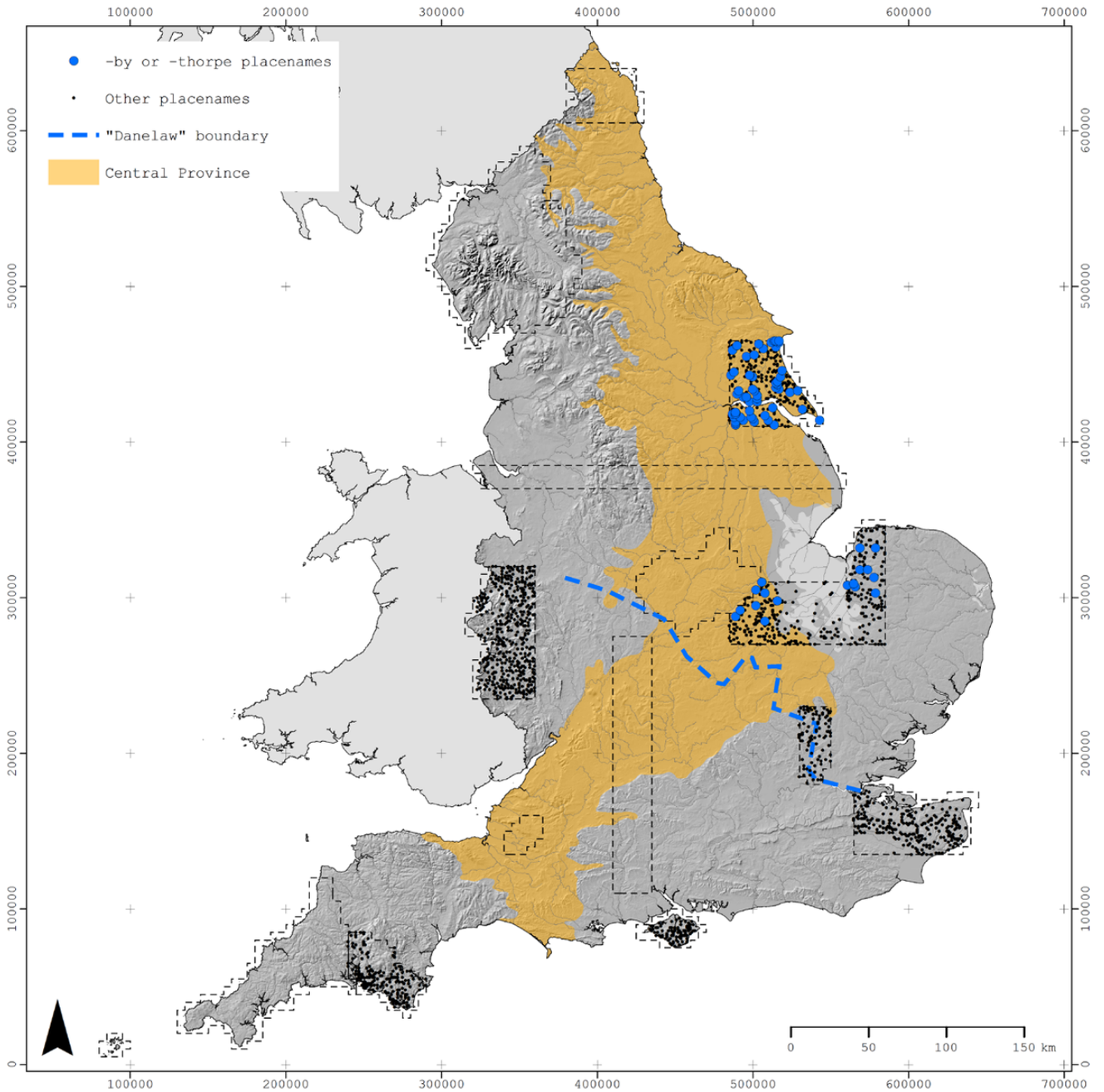
• Fox, C. 1932. The Personality of Britain: its Influence on Inhabitant and Invader in Prehistoric and Early Historic Times. Cardiff: National Museum of Wales

Regionality

with Letty ten Harkel and Roger Glyde

In c. AD 866, King Alfred of Wessex and the Viking leader Guthrum drew up a treaty that divided England in two: an 'English' controlled kingdom to the south, and 'Danish' controlled territories to the north. The boundary was defined as running 'up the Thames, then along the Lea to its source, then in a straight line to Bedford, then up the Ouse to Watling Street' (Keynes & Lapidge 1983: 171). Place-name evidence reflects this division, with Old Norse elements occurring mainly north of this line (e.g. Hadley 2006: 3).

The image below maps Domesday place-names in seven case study areas; those with the probably Old Norse elements –by and –thorpe (both meaning 'settlement') are highlighted. Interestingly, linguistic regionality does not necessarily correspond to other forms of regional difference. Thus the so-called Central Province (Roberts & Wrathmell) of predominantly nucleated villages and open fields (as opposed to dispersed settlement) is diagonally opposed to the linguistic pattern, even though they probably originated in the same period.



References:

• Hadley, D.M. 2006. The Vikings in England: settlement, society and culture. Manchester: Manchester University Press
• Keynes, S. & M. Lapidge. 1983. Alfred the Great: Asser's Life of King Alfred and Other Contemporary Sources. London: Penguin
• Roberts & Wrathmell: https://historicengland.org.uk/research/current-research/heritage-science/Atlas-of-Rural-Settlement-in-England/

Chapter Three:

Landscape and settlement

This chapter looks at settlement patterns throughout our time period. To some extent, people have been living all across England since the Mesolithic, so what we are really mapping here is how settled and permanent their homes were and the degree to which evidence for them has survived to the present day.

At the start of our time period, in the Bronze Age, settlements tended to be small. Some larger settlements existed in the Iron Age, but what we might recognise as towns today first appeared in the English landscape during the Roman period. Therefore, the narrative of this chapter will partly be one of increasingly nucleated and permanent settlement: many of the towns founded in the Roman period still exist today.



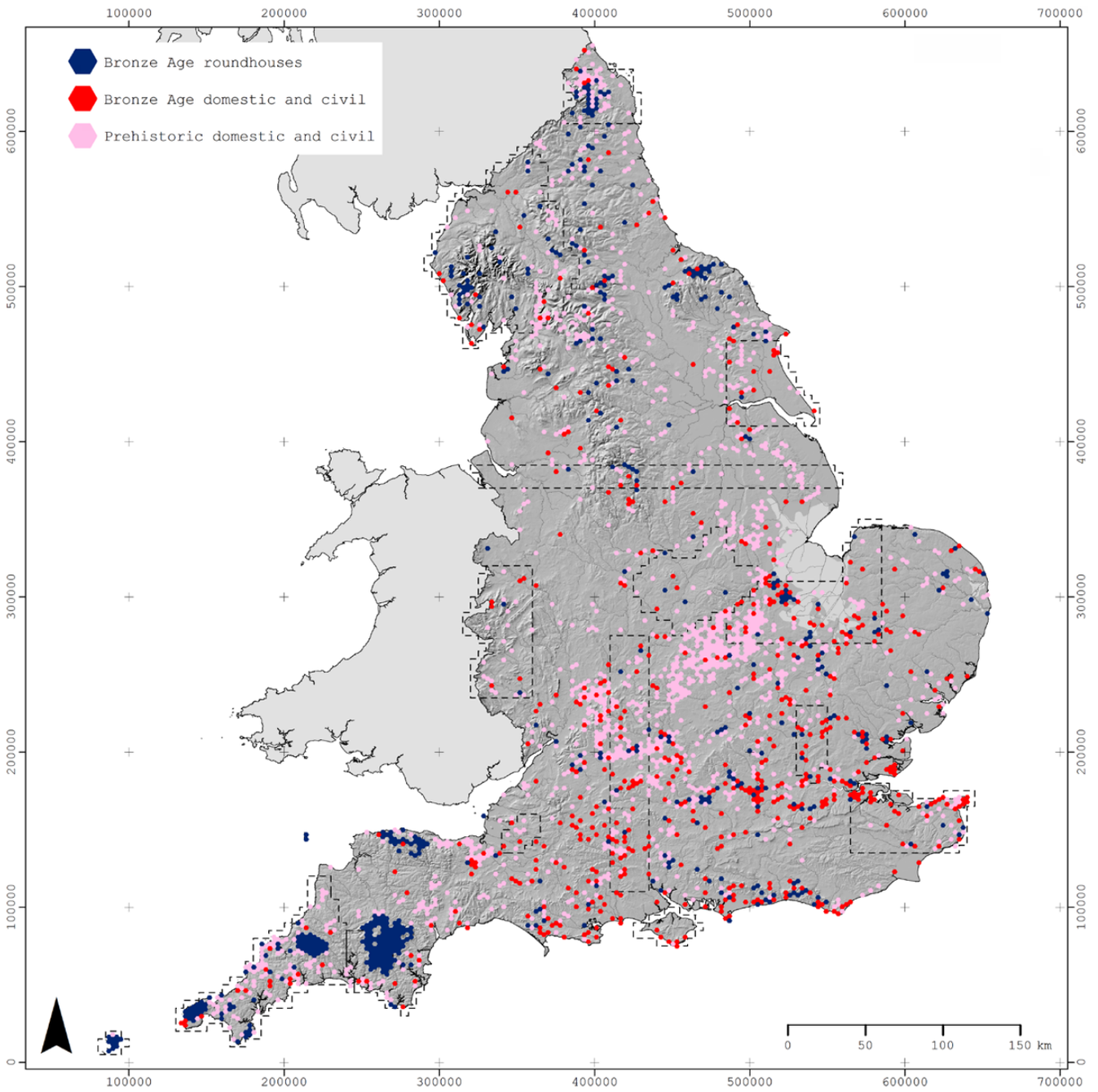
Carn Euny, Winter. 2015.
The remains of interlocking dwelling houses or 'courtyard houses' peculiar to West Penwith, Cornwall, occupied from the late Iron Age to the Roman period. Four day drawing by Miranda Creswell.

Settlement - Bronze Age

Evidence for settlement in the Bronze Age is much sparser than for our three succeeding periods. Here we see records for roundhouses of Bronze Age date plotted over the broad 'domestic and civil' category from our monument thesaurus. Also plotted behind these is data of unspecified prehistoric date for the same category.

Clusters of intense settlement in the south west are obvious, particularly on the Isles of Scilly, the Penwith peninsula, Bodmin Moor, Dartmoor and Exmoor. Scattered evidence for settlement is otherwise spread across the country, with a somewhat greater density in the Thames basin. Evidence for settlement is particularly sparse in the West Midlands and Lancashire.

Unspecified prehistoric settlement evidence shows a very strong cluster in Northamptonshire, with the modern county boundaries standing out rather clearly. This is more likely to be an artefact of categorization rather than a genuine pattern of past practice.

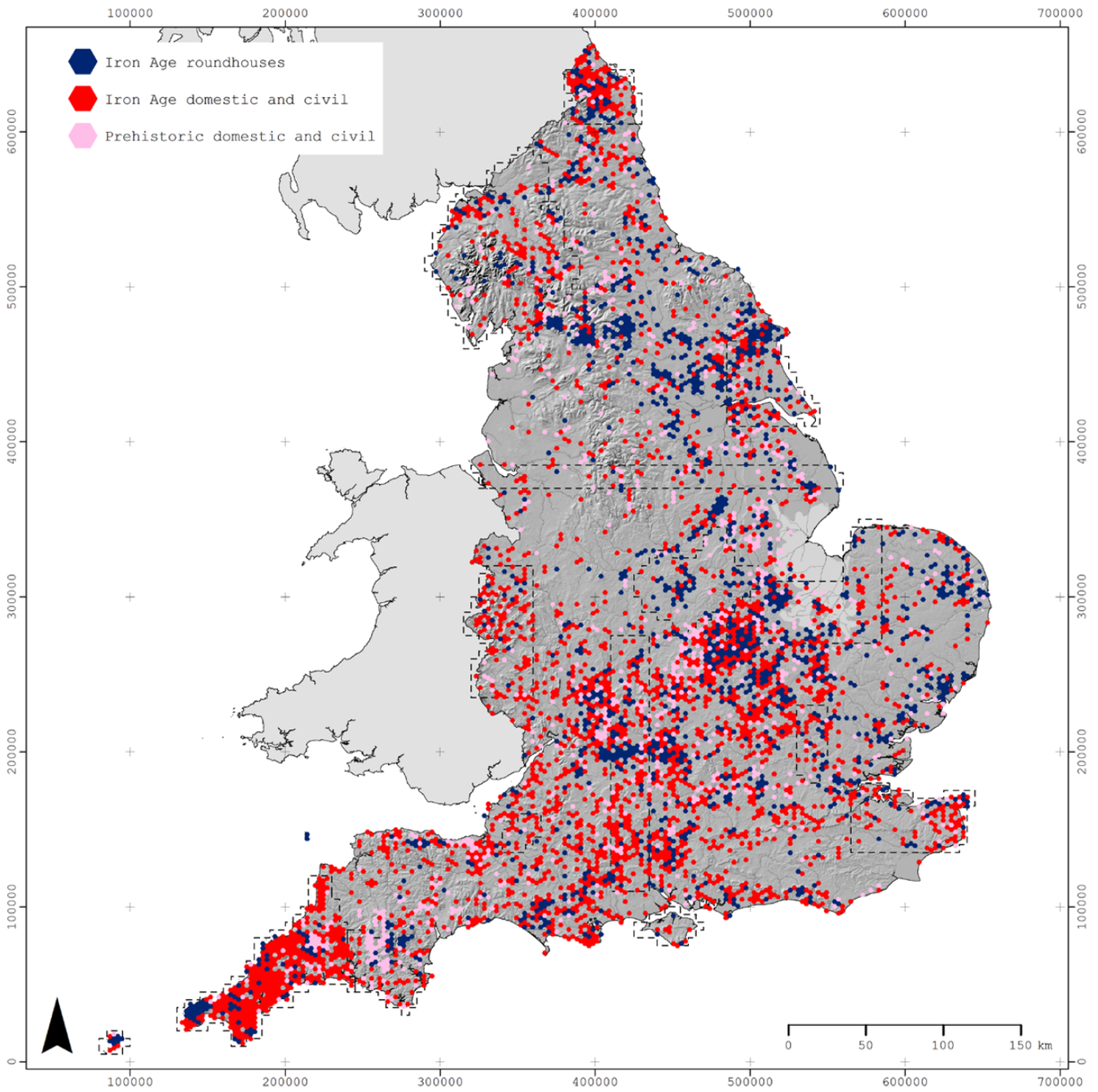


Settlement - Iron Age

Evidence for settlement in the Iron Age is much denser than during the preceding Bronze Age. Again, roundhouses (here including ring ditch records, excluded from the Bronze Age as being more likely to record barrows during that period) have been plotted over the 'domestic and civil' category for the Iron Age and for unspecified prehistory. Evidence is widespread across England, with notable gaps in the Weald, Staffordshire, Cheshire, and Lancashire.

Cornwall stands out this time as an obvious modern county boundary in the 'domestic and civil' category, with much denser evidence than in its neighbouring county (Devon). Again, this is likely to be in part an artefact of categorization practice.

Overall, settlement appears much more stable and dense in the Iron Age, although this pattern will be partly influenced by the greater visibility of Iron Age archaeological remains (being younger and thus less liable to later destruction).

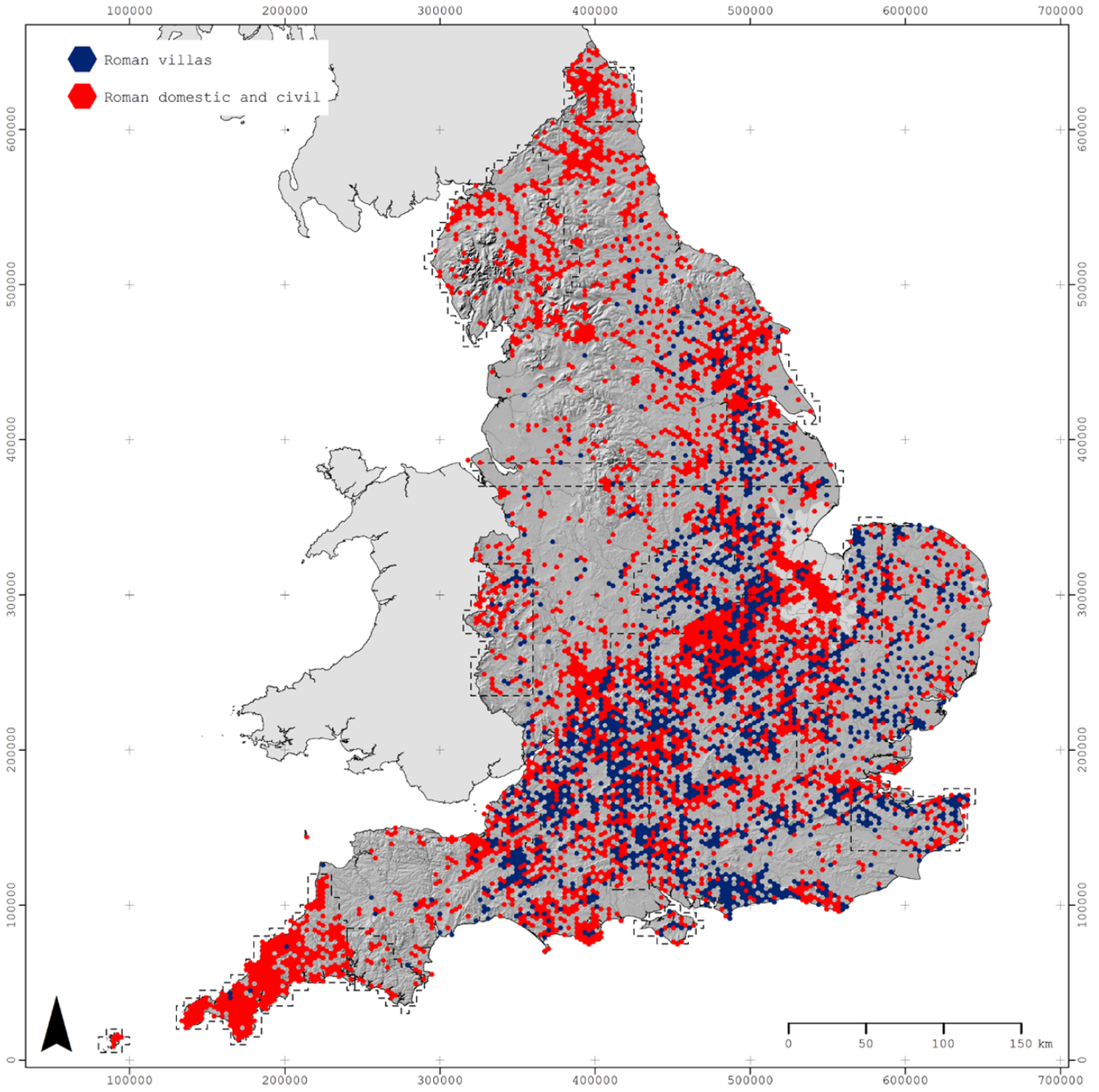


Settlement - Roman

Evidence for Roman period settlement is certainly the densest and most widespread during the EngLaId time-frame. Here, the 'domestic and civil' category (which again shows some modern categorization artefacts in Cornwall and Northamptonshire) has been overlaid with areas recording evidence for villas. These sites are very much a phenomenon of 'lowland' England, with the few records in the north and west being both rare and in many cases less convincing. The major gap in the lowland zone is again the Weald.

Villas seem a reasonable proxy for how domestic, settled and agrarian the economy of lowland England was during the Roman period. Other settlement evidence is quite dense in 'highland' western and northern England, but again with notable scarcity in Staffordshire, Cheshire, and Lancashire, alongside Devon.

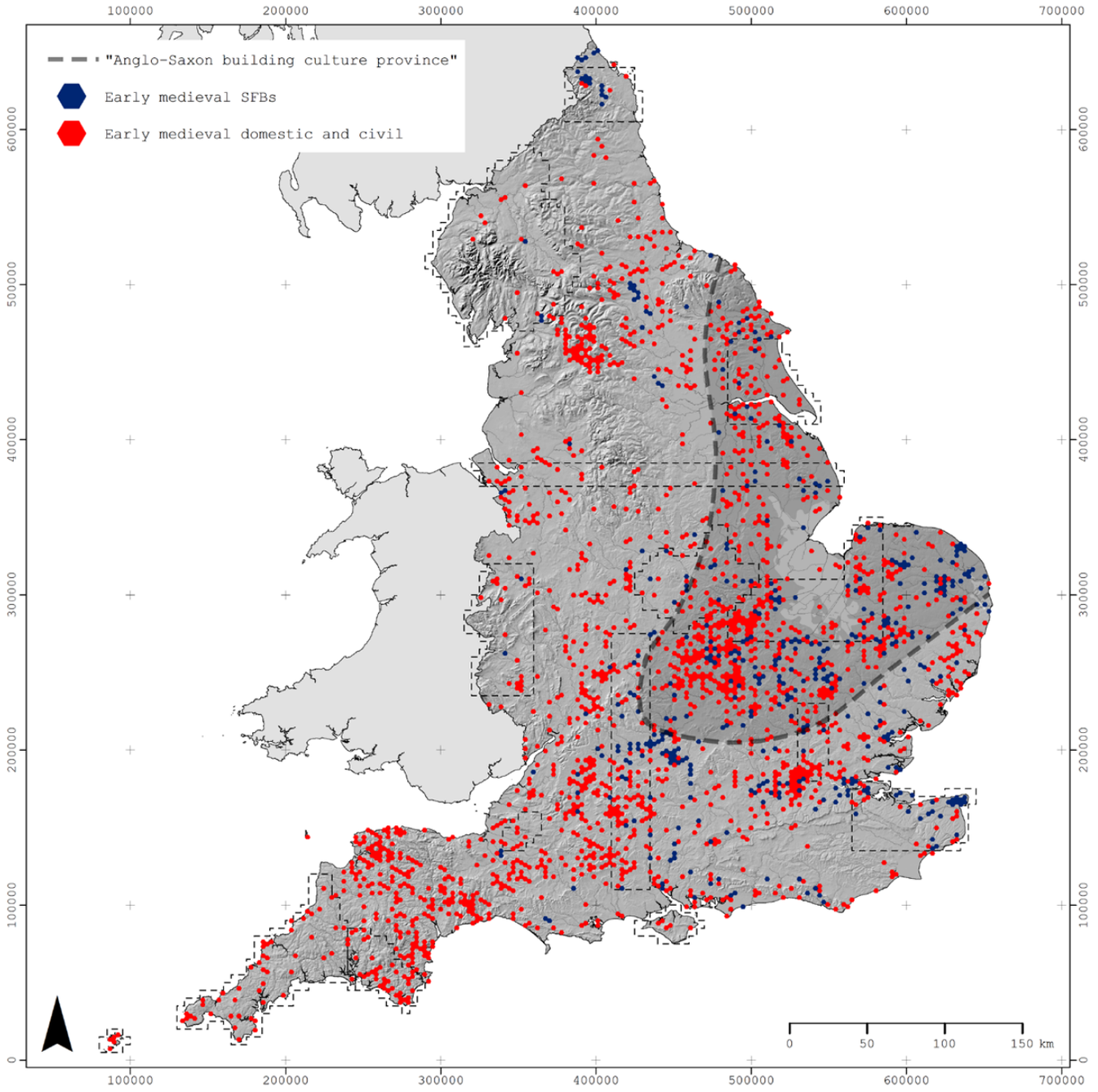
Overall, one can assume that during our time period of interest, England was most densely populated and economically rich under Roman rule.



Settlement - early medieval

Settlement evidence in the early medieval period returns to a sparser and less widespread state than for the preceding Roman period, although some may be undiscovered below modern settlements with their origins in this period. Here, the 'domestic and civil' category shows a rather distinct bias towards southern and eastern England, with the exception of the western Yorkshire Dales. Excluding records based purely on place-name evidence has reduced the density of evidence in Cornwall. As with all previous settlement distributions, the Weald remains largely devoid of settlement evidence.

Above the 'domestic and civil' category we have plotted sunken-featured buildings (SFBs), which are also known as Grubenhäuser. These small, semi-subterranean buildings have been plotted as a proxy for Blair's 'Anglo-Saxon building culture province' (2017), which could be seen as the area most strongly influenced by continental connections (whether cultural or migratory). These are also seen outside Blair's zone, most obviously in Northumberland, but this is also an area traditionally seen as strongly connected to the continent at this time.



References:

• Blair, J. 2017. Building Anglo-Saxon England. Princeton, NJ: Princeton University Press

Enclosing space

with Letty ten Harkel

The broad scale remit of the EngLaId project required a methodological approach that was tailored to dealing with a large amount of data. The solution was a GIS-driven approach, whereby distributions of monument types or artefacts are effectively plotted as dots (or densities) on maps (see many examples in this book). In essence, this method of visualisation is as old as the discipline of archaeology itself.

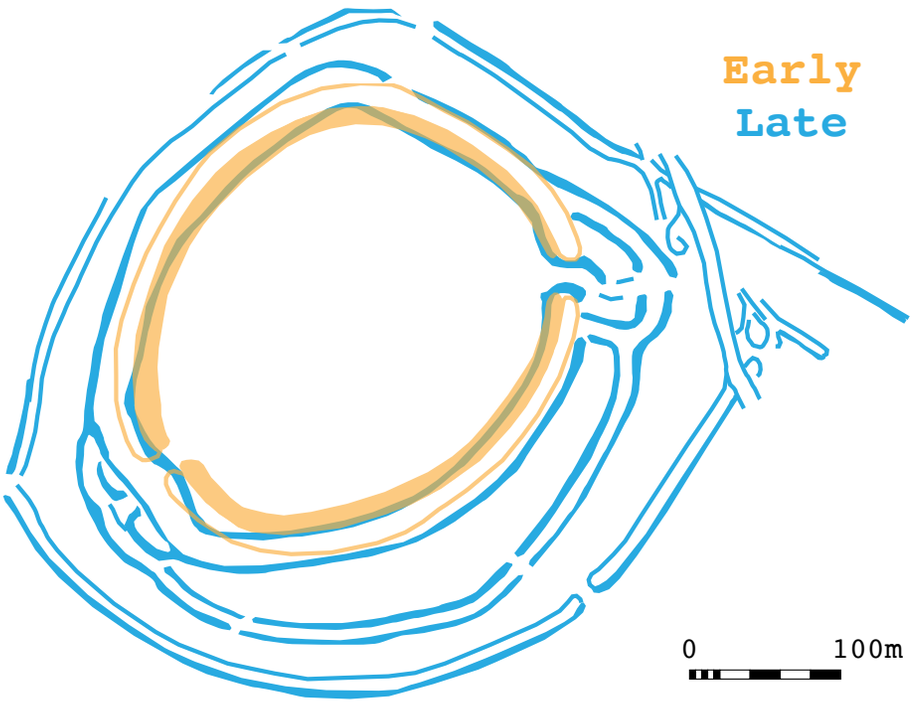
As the schematic ground plan of Danebury demonstrates, top-down vertical viewpoints have clear advantages. Their abstract nature is well suited to drawing out certain aspects of their interpretation, such as different building phases. Their morphology can be used to create typologies of enclosed settlements. However, a question that was asked from the 1990s, when so-called phenomenological approaches became fashionable in archaeology, was how such abstract, top-down views relate to horizontal grounded perspectives, in other words, to lived experience?

Horizontal grounded perception of a landscape can bear little obvious relation to the more ordered view presented by a top-down perspective as shown on a map. Enclosed space seen from above tempts the viewer into thinking of this as a designed and planned enclosure, but it is often difficult to prove how much planning has taken place. We naturally think of these two perspectives as being separate: either 'ordered' (seen from above) or 'disordered' (seen from ground level), but could enclosures have been designed to be disordered as well as ordered, playing on both these viewpoints at the same time? In other words, could complexity have been used in the landscape by design?

An example of a 'designed disordering' could be the unaligned, double north east gate at Danebury depicted here. This was a key element in the defence of the hillfort in the Iron Age, playing on the visual disorientation felt by a human when entering the fort. This entry point into the enclosure is a deliberate and sophisticated defence tool (still used as a military tactic today), which can only have been designed from a top down viewpoint or an imagined abstract shape together with knowledge of the horizontal level perspective.



Danebury Defences. 2013.
Drawing depicting the unaligned, double north-east gate of Danebury hillfort, founded c.500 BC. Image by Miranda Creswell.



Plan of Danebury hillfort (after Cunliffe 2005: 377; 385).

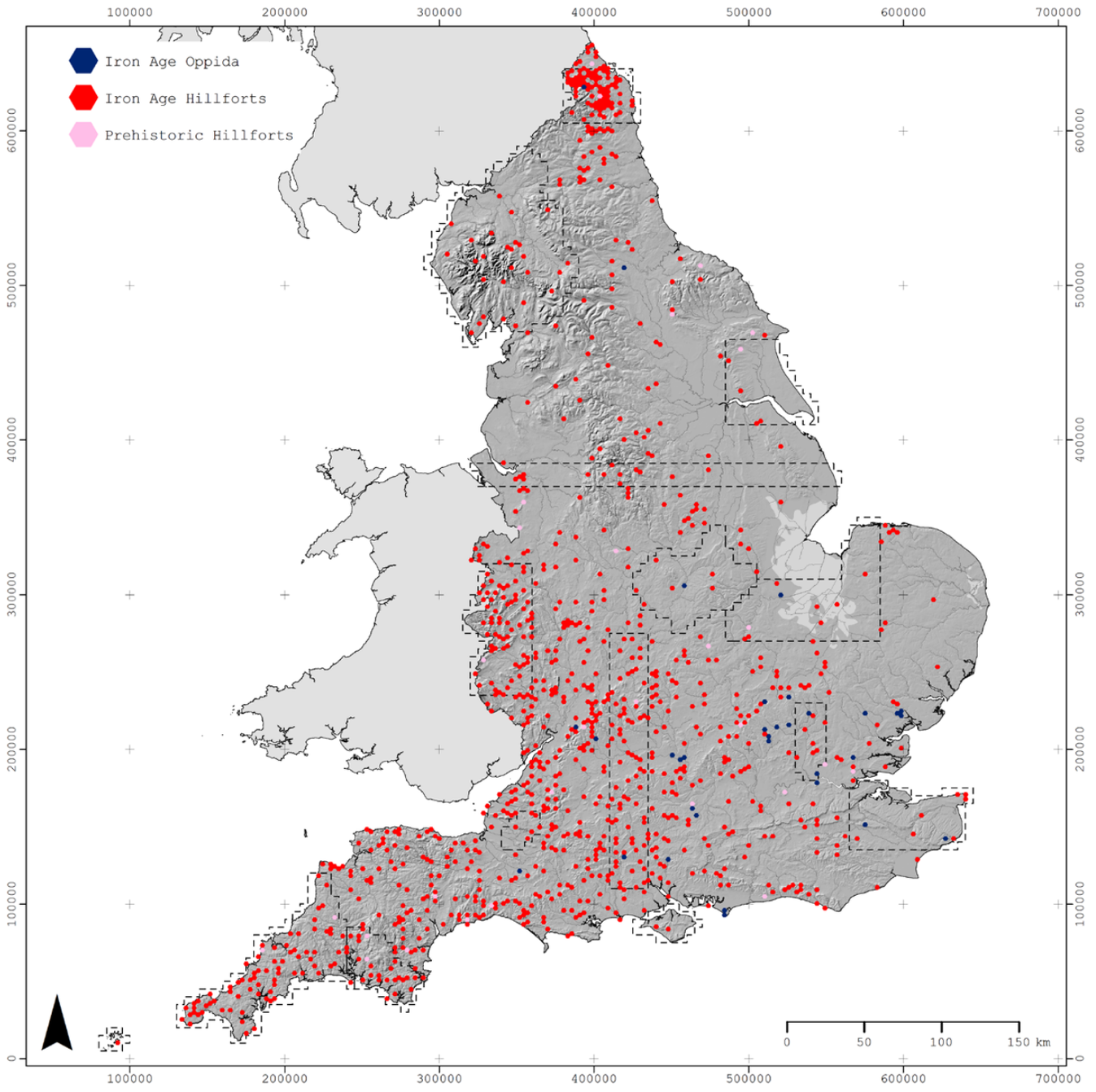
References:

• Cunliffe, B. 2005. Iron Age Communities in Britain: an account of England, Scotland and Wales from the seventh century BC until the Roman Conquest. Fourth Edition. London: Routledge

Hillforts and Oppida

Hillforts are predominantly a phenomenon of the earlier Iron Age (see the online Atlas referenced below). As the name suggests, they tend to occur at higher elevations and they may be assumed to be defensive in character, at least in part. In England, they tend to occur most commonly in the south-western quarter of the country, although they are also very common in Northumberland (albeit the northern examples tend to be much smaller). Some hillforts appear to have been more densely occupied than others. Hillforts tend to survive as extant earthworks and are probably most commonly excavated for research purposes (rather than commercially), as development only rarely threatens hilltops.

Oppida, by contrast, are a later Iron Age phenomenon, occurring mostly in south-eastern England. They are large areas of activity delineated by enclosure ditches, although not necessarily fully enclosed. They are much less common than hillforts and may feature large quantities of imports from the European mainland when excavated, alongside evidence for local production.



References:

• Atlas of Hillforts of Britain and Ireland: http://hillforts.arch.ox.ac.uk

Ptolemy's Geography

In his Geography (of the then known world) of the mid second century AD, Claudius Ptolemy became the first scientist (whose work has survived to the modern day) to map Britain with some degree of accuracy. The Geography consists of lists of coordinates that record the outline of coasts and the location of islands and major settlements. The map presented here takes those coordinates (as listed in Rivet & Smith 1979) and plots them on the OS National Grid, by correcting the original coordinates for Ptolemy's errors in calculating the circumference of the Earth and then re-centring the data using Roman London as a common point. Some extra points have been added to the coastline to make sure that all settlements are on dry land.

Taking into account the considerable difficulties involved in making accurate measurements of geographic location (particularly longitude) in the ancient world, Ptolemy (and those whose previous work he used) achieved a reasonable representation of the shape of Britain, with one obvious exception: the twisting of Scotland. Probably the greatest use of the Geography to modern scholarship, however, is in its provision of lists of important settlements. Those that can be confidently identified with their modern equivalents are marked on the map.



References:

• Rivet, A.L.F. & C. Smith. 1979. The Place-names of Roman Britain. London: Batsford

Maps, hearsay, and memory

with Zena Kamash

Although little is known of Ptolemy's (see p.34) life, we do know that he lived in Alexandria and probably never came to Britain. His map of the British Isles is therefore constructed through knowledge gleaned from others (perhaps accounts or logs of sailors), as opposed to land and sea observations made by himself. Just as Ptolemy pieced together geography using current accounts and those from past events, interestingly so do archaeologists, but with substantially more data in the present day.

Although with the added twist of not looking at evidence directly and instead memorising features in the landscape, Miranda Creswell has produced three drawings of Cottam Fields in Lincolnshire, that also piece together accounts and past events in a visual format.

In each work there are two spatial images. One is a drawing of the landscape as it can be seen currently, from the artist's view, the other is a map in silver leaf of Iron Age / Roman field formations made by the artist from an original map based upon aerial photographic data.

The difference between each of the three drawings is an interval of five days, in which the artist then attempts to recreate the previous drawing from memory, without directly looking at it. One observation is that the horizon lines and textures of the ground and sky are memorized accurately in each drawing, whereas the number of cooling towers and the direction of the post in the foreground are not. The objective of this project was to open up for discussion the idea of knowledge and memory of place handed down from different source materials and over time, and how knowledge changes through this. In doing so, this breaks down the assumption that memory (and archaeology) is unchanging: both memory and our understandings of landscape mutate over time.

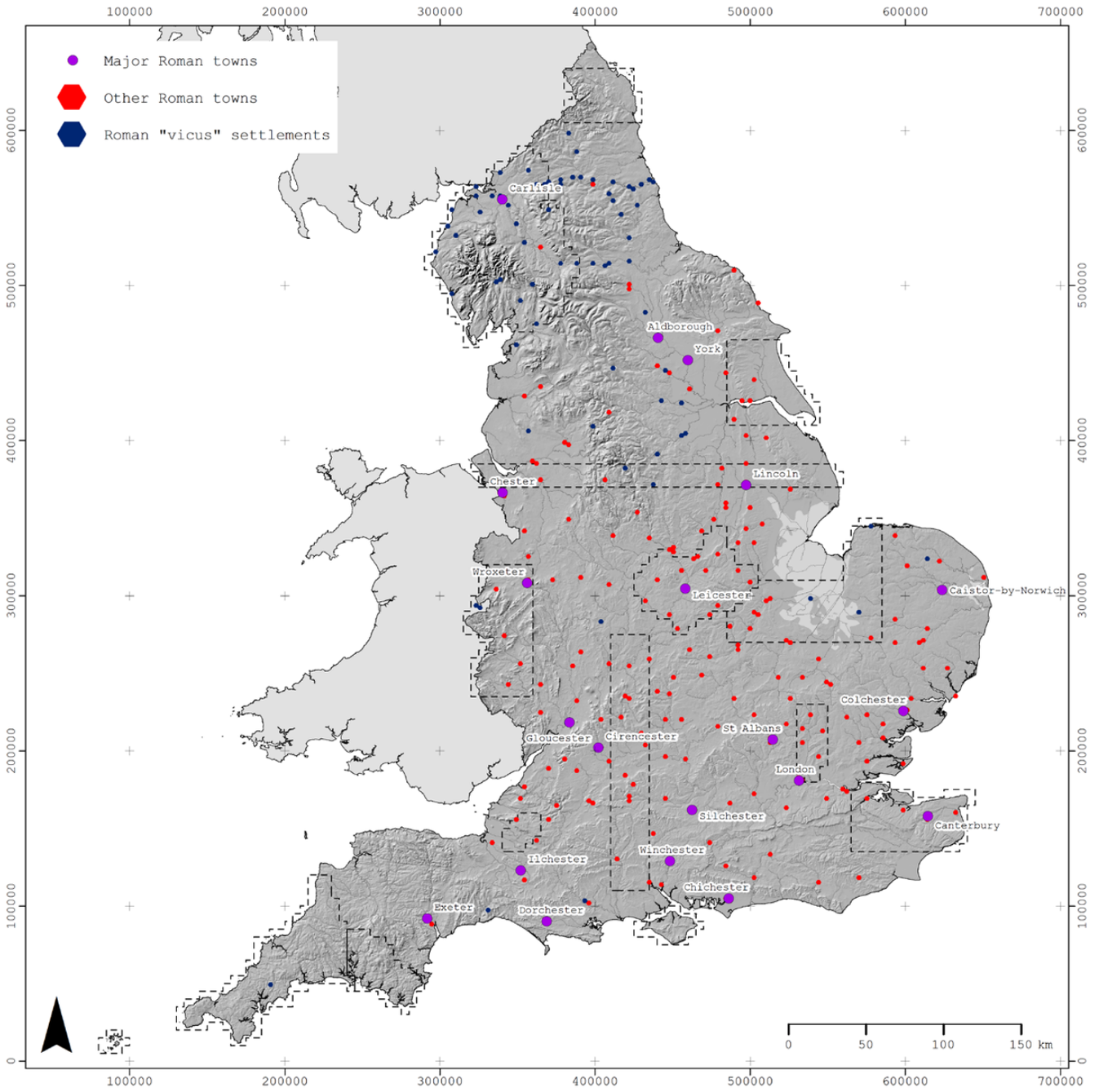


Cottam Fields Forever 1, 2, 3. 2016. Silver leaf and pencil. Artwork by Miranda Creswell.

Roman towns

The earliest appearance of settlements in England that we might recognise as towns occurred during the Roman period. The map below shows the major towns of that era, alongside hexagons recording the presence of a record defined as a 'town' (mostly the so-called 'small towns' of Roman Britain) and hexagons recording the presence of a record defined as a 'vicus' settlement (i.e. a civilian settlement associated with a military fort).

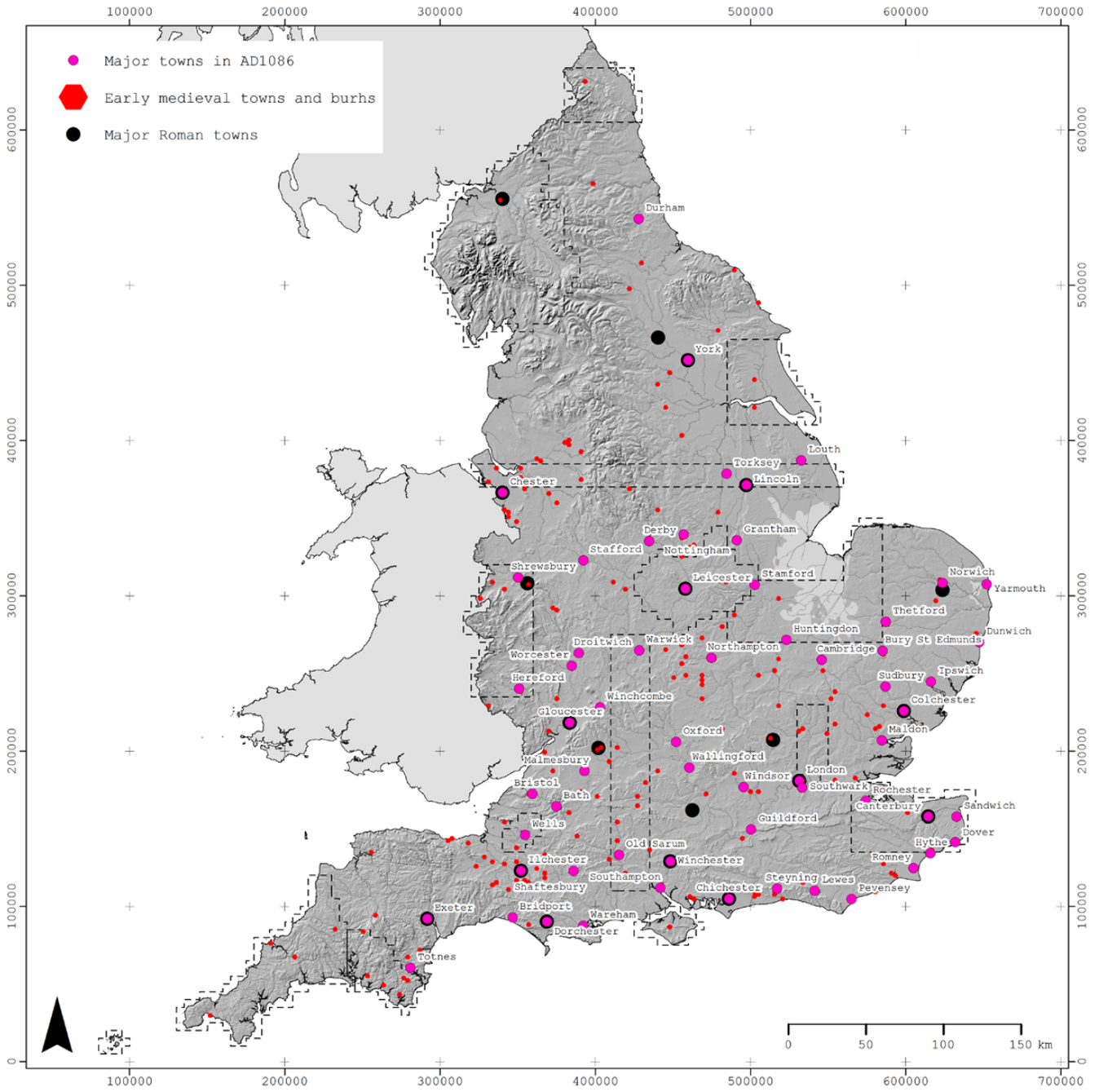
As we can see, on the evidence we have, there was little non-military nucleated settlement in the north and west of England during the Roman period. Where nucleated settlement did exist in these regions, it was closely associated with the military in the form of vicus settlements attached to forts. This is not to say that settlement was not present in northern and western England (see p.<?>), simply that it was largely of a more dispersed character.



Early medieval towns

In this map, we see the major towns of AD1086 as described by Reynolds (1977: 35). We have also mapped records within our database of towns and 'burhs' (defended sites that mostly became towns). These latter two datasets are substantially incomplete due to the fact that most of the towns of the early medieval period remain towns today and discovering foundation dates for a modern settlement is very difficult (due to the modern settlement activity). Also, towns are often not recorded as a specific site type within HERs, but rather as a collection of domestic and other structures (e.g. houses, churches, etc.).

When mapped against the major Roman towns (see p.36), we can see that most of these saw either continued or renewed settlement in the early medieval period, albeit sometimes on a different local site. The two exceptions we see are Aldborough (which is today a small village) and Silchester (which remains unsettled to this day, although there is a small village nearby): why larger scale settlement did not continue at these towns is not certain.



References:

• Reynolds, S. 1977. An Introduction to the History of English Medieval Towns. Oxford: Oxford University Press

The rise of the village

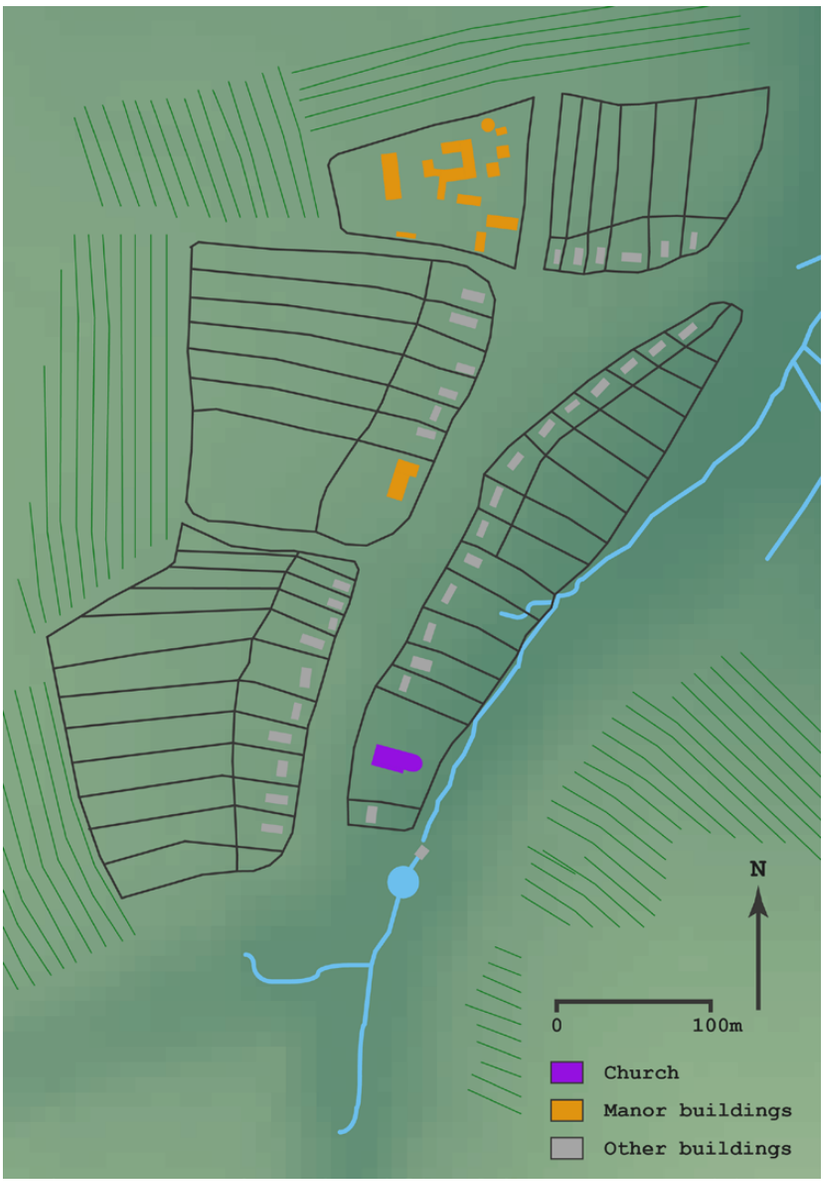
with Letty ten Harkel

Towards the end of the early medieval period, a new settlement form appeared – the medieval village, many of which still exist today. The term 'village' is ill-defined, and is sometimes also applied to conglomerations of rural settlement in earlier time periods. In the context of the EngLaId project, however, 'village' is understood to denote a rural nucleated settlement that is focused around a village church and churchyard, and sometimes a manor house, bringing together the worlds of the living and the dead in a new way (Ten Harkel et al. 2017).

The image shows a drawing of the village of Wharram Percy (see Wrathmell 2016 for summary of the major publications), a famous early medieval settlement that was the flagship excavation of the Medieval Settlement Research Group for several decades. The properties are organised along a road or trackway, with the manor house and the church at opposite ends in an expression of joint authority. Each house is situated within a toft (a house plot), often with an adjoining croft (a small enclosed field). The church was central to the village community, making both a visual (the tower) and audible (the church bells) impact on the landscape. The village was surrounded by open fields, which were communally farmed and represented a cognitive change towards the agrarian landscape in comparison to earlier periods, during which smaller enclosed fields were the norm.

Villages have received much scholarly attention from medieval archaeologists and historians, but they were not the only type of settlement in the early medieval period. The research by Roberts and Wrathmell (see p.26) concluded that they only became the dominant settlement form in a central 'province' running from the south-west to the north-east. Elsewhere, dispersed farmsteads and small hamlets remained the norm.

Yet it was the medieval village that has most captured the interest and imagination of several generations of scholars and members of the public, possibly because they represent a settlement form that has become so archetypal of the English rural landscape. Deserted medieval villages (DMVs) like Wharram Percy provided unique opportunities to research the lives and eventual demise of past communities who lived in settlements not unlike our own, and were a major impetus for the development of the discipline of medieval archaeology (Beresford & Hurst 1971).



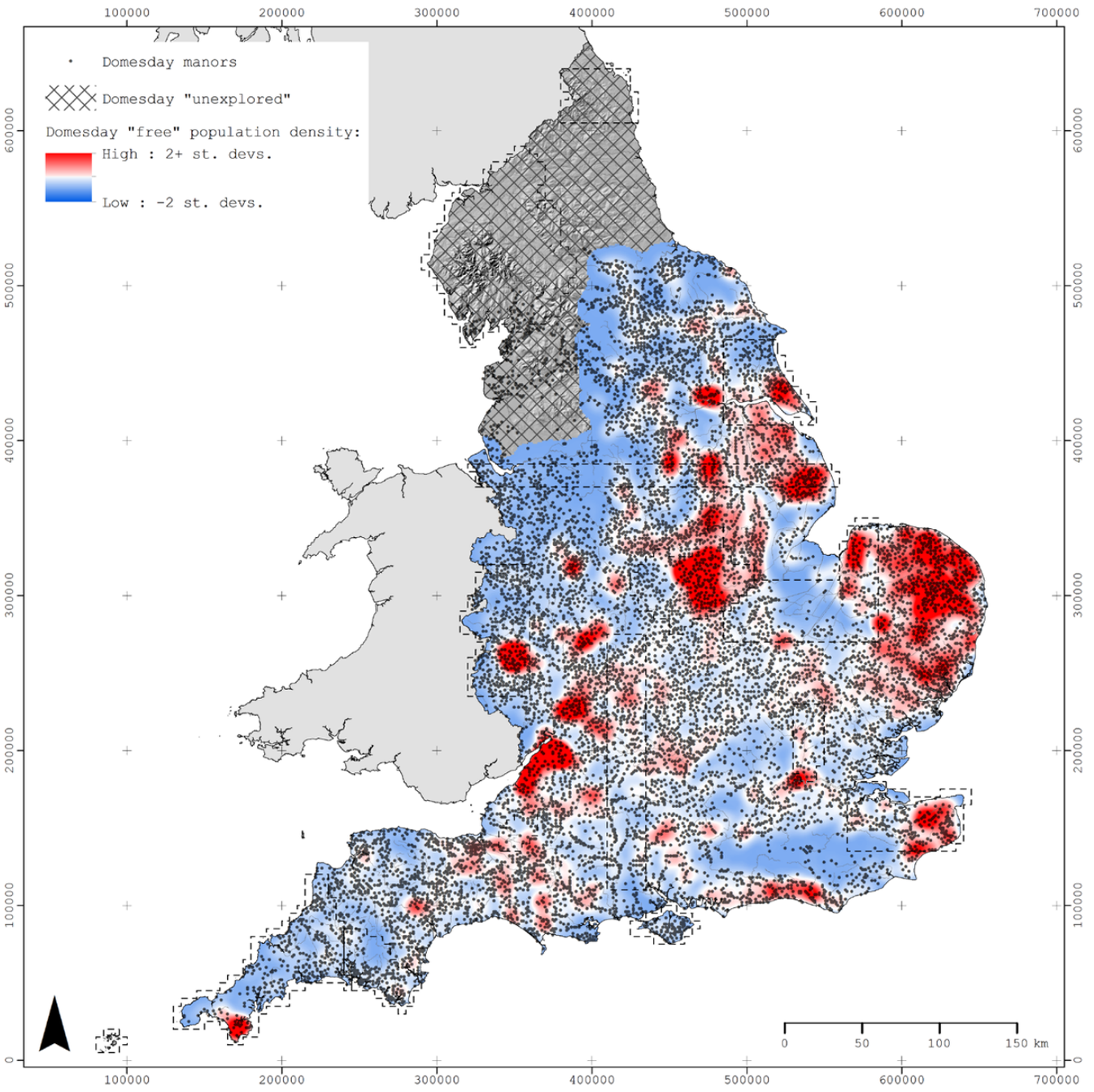
References:
• Beresford, M.W. & J. Hurst. 1971. Deserted Medieval Villages: Studies. London: Lutterworth Press
• Medieval Settlement Research Group: https://medieval-settlement.com/
• Ten Harkel, L., T. Franconi & C. Gosden. 2017. 'Fields, ritual and religion: holistic approaches to the rural landscape in long-term perspective (c. 1500 BC – AD 1086).' Oxford Journal of Archaeology 36(4): 413-437; DOI: 10.1111/ojoa.12122
• Wharram Percy: http://www.english-heritage.org.uk/visit/places/wharram-percy-deserted-medieval-village/
• Wrathmell, S. 2016. 'Wharram. A study of settlement on the Yorkshire Wolds: a commentary on the published reports.' Medieval Settlement Research 31: 70-3

Domesday Book

with Letty ten Harkel

After the Norman Conquest of AD1066, William the Conqueror ordered that a survey of England took place, to 'ascertain how many hundreds of hides there were in the shire, or what land and livestock the king himself had in the land, or what dues he ought to have in 12 months from the shire' (Anglo-Saxon Chronicle E: 1085, trans. Swanton). The results were worked into a survey that became known as the Domesday Book, its name (meaning 'book of judgment') reflecting the esteem in which it was held. It was the first large-scale written survey of the English countryside, containing an impressive amount of detail about the size of communities, quantities of agricultural land and other taxable assets.

The map shows manors recorded in Domesday Book over a model of population density derived from the Domesday data. This excludes slaves, so should only be seen as the 'free' population, and takes no account of potential variation in household size. The minimally surveyed areas of Lancashire and Cumbria were excluded from the model due to the low density of records, as were other northern areas where no survey took place. In the model, red areas are above the mean average and blue areas below. The model adds another layer of interpretation to simple maps of estate locations, suggesting that the areas of highest population density were East Anglia, Kent, and the so-called 'Central Province' (see p.26).



References:
• The Anglo-Saxon Chronicles. Ed. and trans. by M. Swanton. 2000. London: Phoenix Press
• Green, C., C. Gosden, A. Cooper, T. Franconi, L. ten Harkel, Z. Kamash & A. Lowerre. 2017. 'Understanding the spatial patterning of English archaeology: modelling mass data, 1500 BC to AD 1086.' Archaeological Journal 174(1): 244-280; DOI: 10.1080/00665983.2016.1230436



Bamburgh Castle and village. January 2014.
Bamburgh Castle and the village of Bamburgh, in Northumberland, is also the site of an Anglo-Saxon cemetery, with pre-Norman stone buildings. The drawing was made over a period of five days as seen inland from the north, looking south. Drawing by Miranda Creswell.

Chapter Four:

Landscapes and foodways

Food production is fundamental to human existence. The earliest surviving extensive monumental evidence of food production in England came in the Middle Bronze Age, at the very start of our period of interest, when field systems were created on a large scale in parts of the country. Field systems were not necessarily just about food production, but also probably conveyed ideas about land ownership and possibly had ritual connotations (Ten Harkel et al. 2017).

This chapter will look at field systems in detail, followed by sections looking at the influence of soils on farming practices, food production and consumption in relation to archaeological assemblages, and isotopic evidence for past diet.



Chopped Landscape. 2014.
The image forms part of a series, 'Chop marks', in which the artist has collected and made imagery on used kitchen chopping boards. She has drawn imagined landscapes as suggested by the chop marks left by the previous owner. All the materials used (chalk, powdered graphite and wood) originate from the landscape and refer indirectly to past meal production by the trace of a knife preparing food to eat. Artwork by Miranda Creswell.

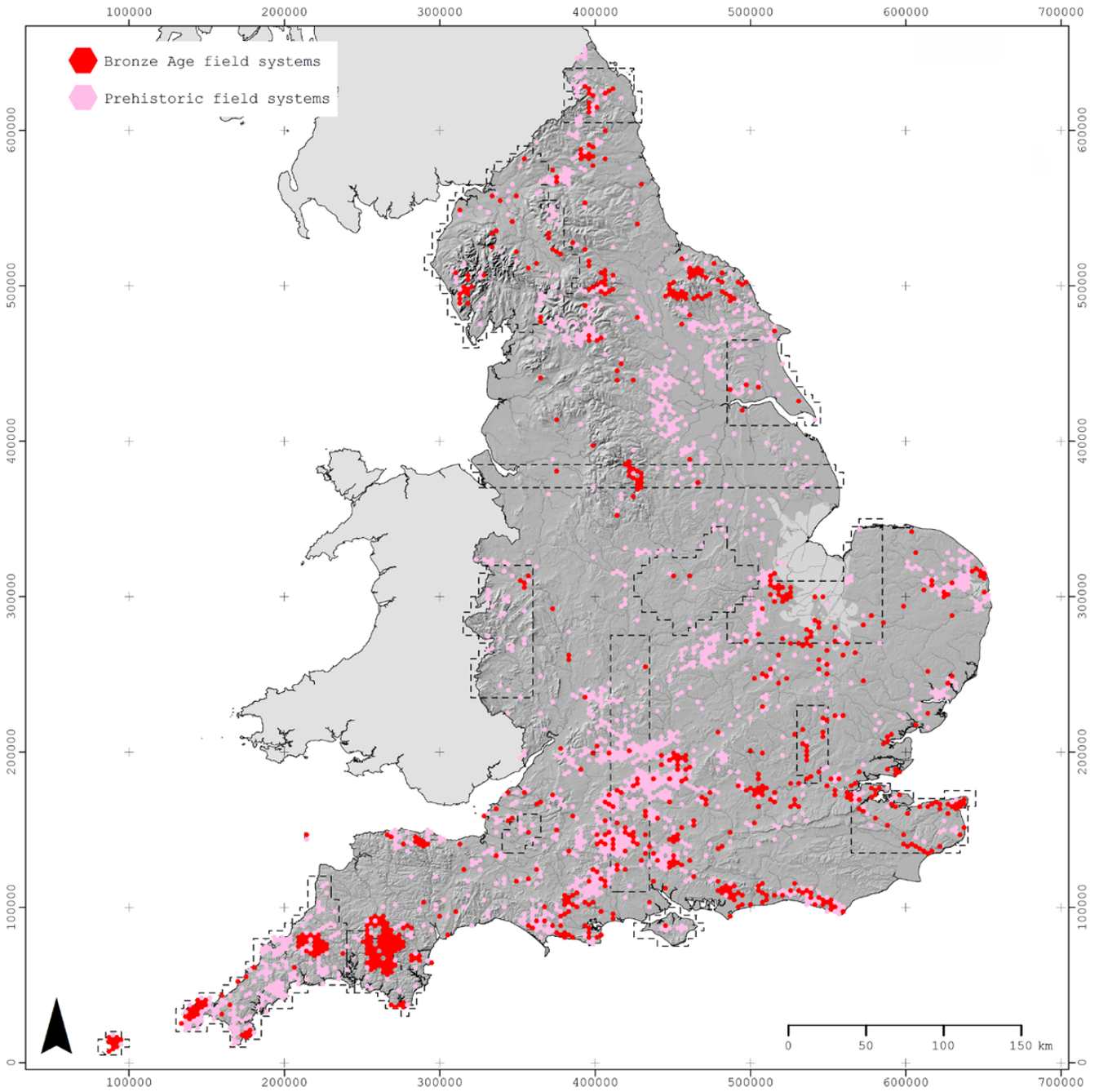
References:

• Ten Harkel, L., T. Franconi, & C. Gosden. 2017. 'Fields, ritual, and religion: holistic approaches to the rural landscape in long-term perspective (c. 1500 BC – AD 1086).' Oxford Journal of Archaeology 36(4)

Field systems - Bronze Age

Evidence for field systems of Bronze Age data in England is widespread, but not dense. They can be roughly divided into surviving earthworks in upland areas (generally less securely dated in the north) and excavated examples from lowland areas (see Yates 2007 for much more on these excavated examples). It seems likely that the original extent of field systems in the Bronze Age was far greater than that which survives.

Some of the field system records which have been given an unspecified prehistoric date may also be Bronze Age in origin, but the distribution of such data is closer to that of Iron Age / Roman field systems (see p.43), so that is perhaps the more likely date for the majority of those records.

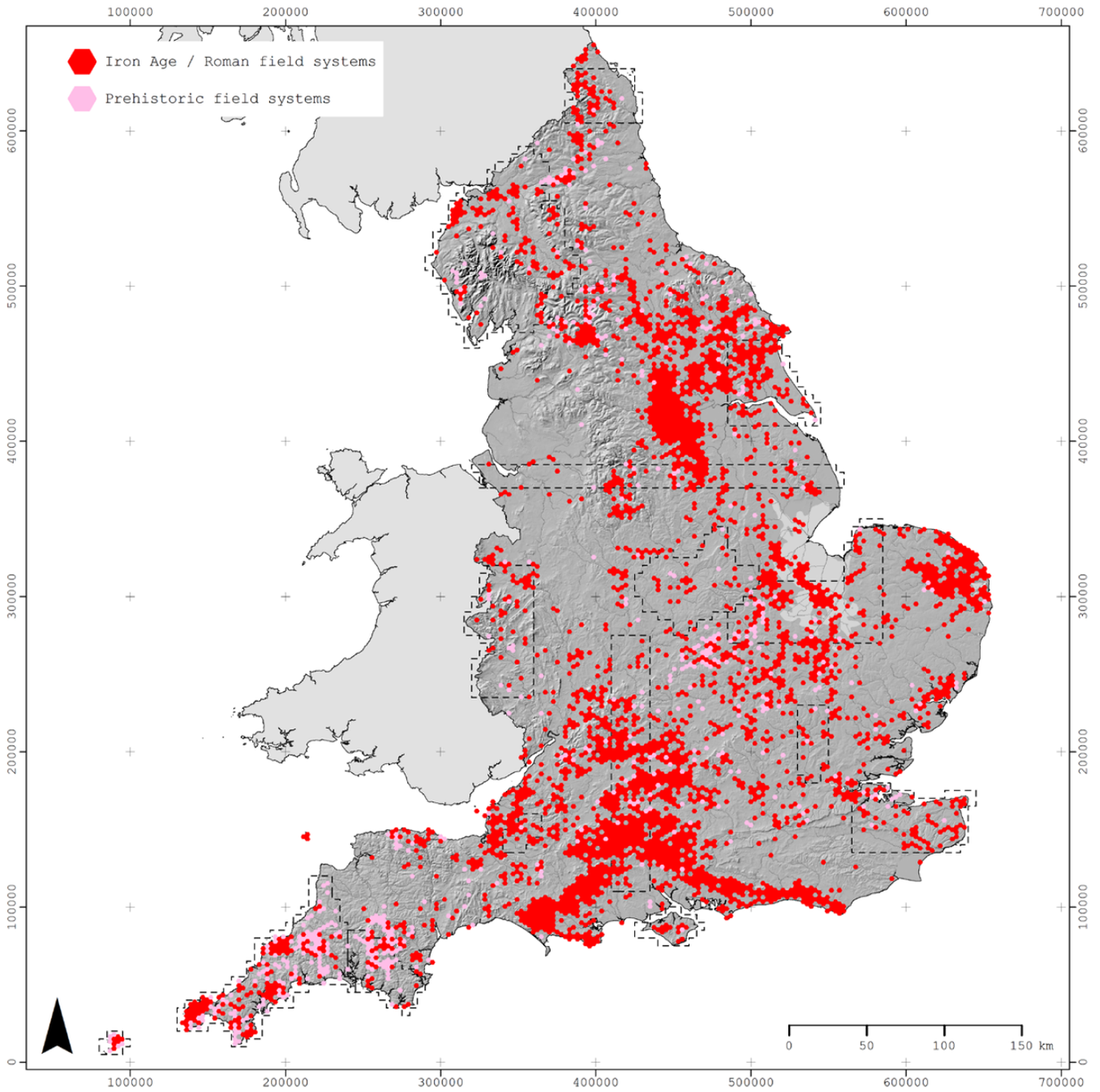


References:

• Yates, D.T. 2007. Land, Power and Prestige: Bronze Age Field Systems in Southern England. Oxford: Oxbow

Field systems - Iron Age/Roman

Evidence for field systems in the Iron Age and Roman periods is far more extensive than for the Bronze Age. Iron Age and Roman field systems are considered here as a common phenomenon, as they tend to be in similar locations and their dating is often not straightforward. Particular concentrations may be noted in central southern England, in the Humber/Trent basin, and in eastern East Anglia. Most of these field systems survive as cropmarks or earthworks: as such, their dating is not particularly robust (due to lack of excavation and/or lack of clear evidence for date of construction even when excavated) and so some may have earlier (or perhaps later) origins.



Field systems (I) - the dataset

A set of forty field systems of either Bronze Age, Iron Age/Roman, or undetermined prehistoric or Roman date were selected for further analysis. These were digitized (based upon aerial photographic transcriptions or excavated plans) and a series of analytical metrics were extracted.

The example shown is the field system at Milston Down on the Salisbury Plain Training Area (see McOmish et al. 2002 for more information). The digitised lines (banks/ditches) that divide up the field system are shown in white (thick). From these, an eroded buffer was created to define the approximate total enclosed area of the field system. 'Nodes', that is junctions between lines and changes of direction in lines were extracted using an automated process. Data on the orientation (from 0-180˚, as the lines have no defined direction) and length of lines was also extracted. Another metric extracted was the enclosed area of each plot, which first required the automated closing of gaps between lines (the thin white lines).

For this field system, the orientation was focussed on two 'peaks' at around 26˚ and 117˚ east of north (McOmish et al. suggested 28˚), the enclosed area was around 72 ha, there were 2.42 lines per ha., 2.89 nodes per ha., and 225.29m of line length per ha. These metrics could all then be compared across the set of forty field systems.



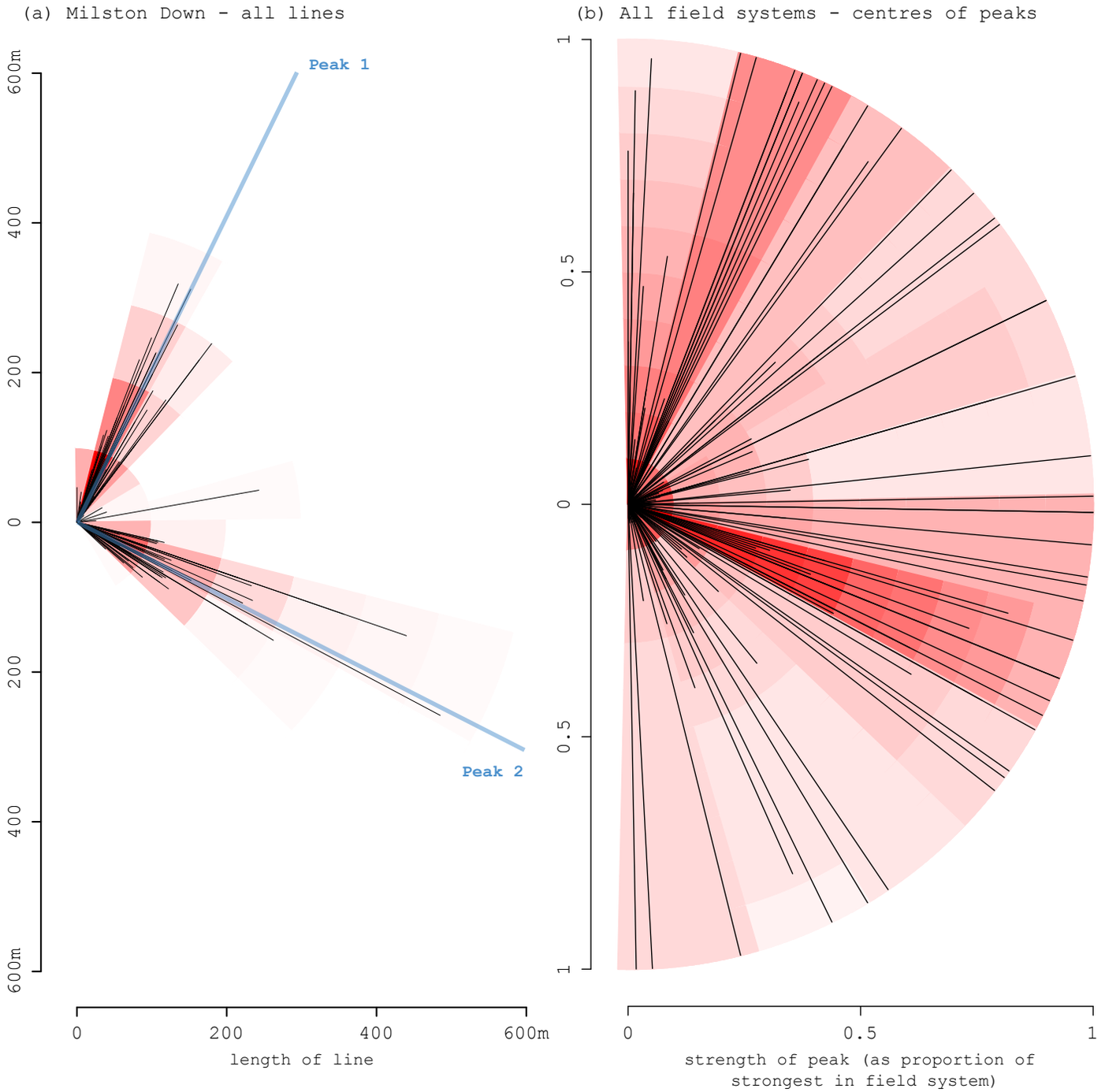
References:

• McOmish, D., D. Field & G. Brown. 2002. The Field Archaeology of the Salisbury Plain Training Area. Swindon: English Heritage

Field systems (II) - orientation

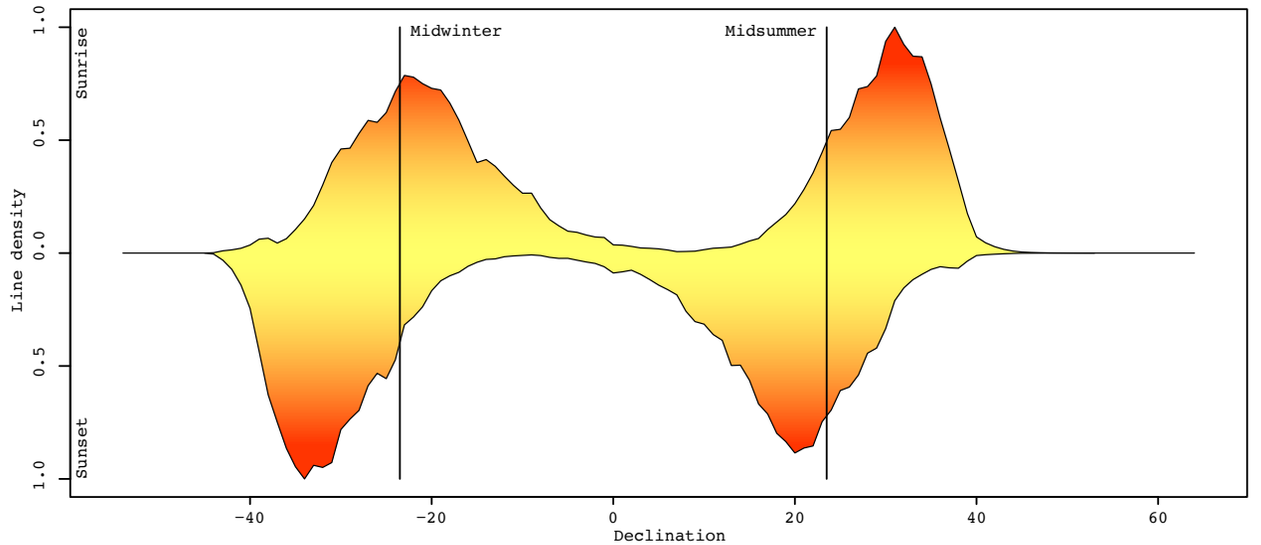
Orientations of the lines within any particular field system were initially studied by graphing the lines from a single common origin point (rather than in their spatial location). Figure (a) below shows the graph for Milston Down (see p.44). The two 'peaks' in the orientation graph have been labelled: a peak was defined every time the graph of summed length per degree of orientation (smoothed) passed above the mean value for a particular field system; the orientations graphed here were the highest summed values within those two peaks. Most of the field systems studied had two strong peaks, usually at approximately perpendicular orientations. Some field systems had varying amounts of subsidiary peaks (up to ten peaks in total in one case), but these were usually weak.

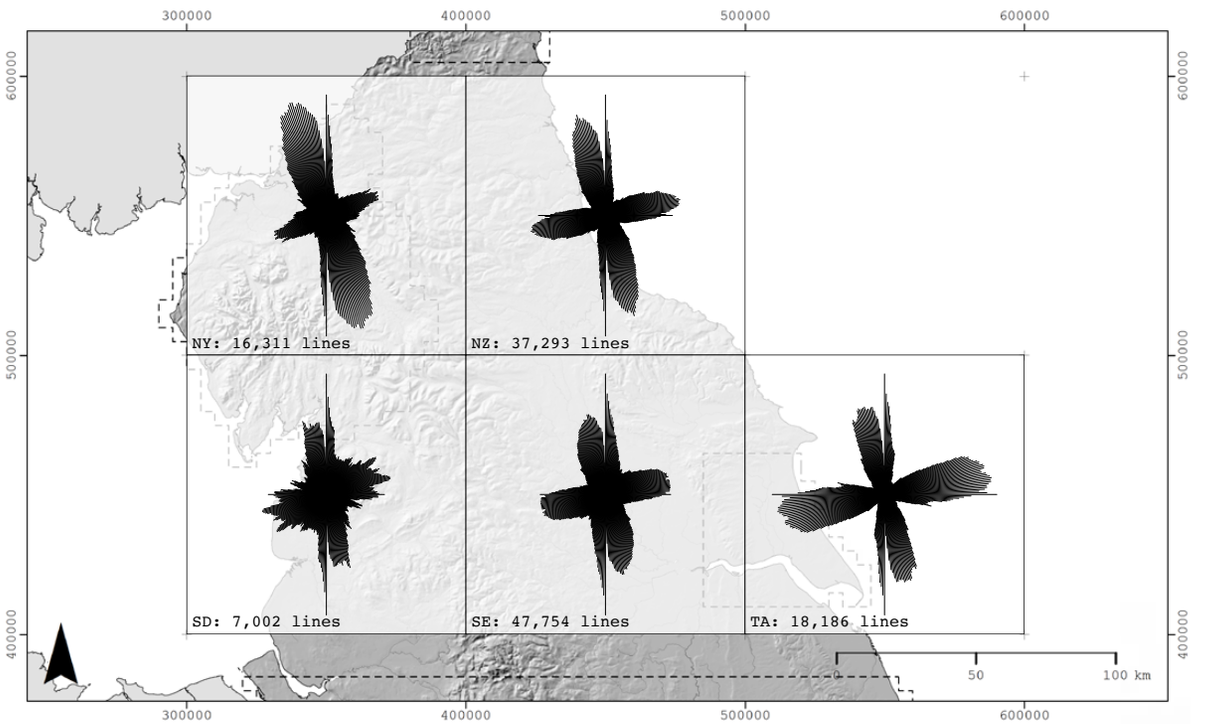
When all peaks for all forty field systems were graphed in a similar way (b), it became apparent that there was a dominant pair of perpendicular orientations across many of the field systems, focused on approximately 100-130˚ and 10-40˚. The former band of orientation seemed the more important, as it was more commonly encountered than its perpendicular associate. What could this focus of orientation represent?



Field systems (III) - orientation cont.

The celestial declination of an astronomical object (such as the sun) is its vertical position on the celestial 'sphere'. We can calculate the associated declination for rising/setting objects, using the formula given in Ruggles (1999: 22), for each field system boundary line and sum the total length of lines per degree of declination. When plotted against the declination values for sunrise and sunset on the solstices, two field systems analysed appear very strongly aligned on Midwinter sunrise/Midsummer sunset c.1500BC (which occur opposite each other in the sky). The example shown as a graph here is for the field system at Figheldean in the Salisbury Plain Training Area (the other strong case is Longstreet, in the same region). Other field systems in the dataset show some tendency towards solstitial orientations, even through into the Iron Age/Roman period. This does not really account for all of the field systems showing a tendency towards 100-130˚ (see p.45), but it does suggest that a vague solstitial alignment may have been deemed important during the layout of certain field systems.Interestingly, ridge and furrow of the medieval period north of the Humber also shows a bias towards particular orientations of its plough strips, this time approximately cardinal (see map below). Hall states that the open field systems of Yorkshire were indisputably planned on a large scale at some point before the thirteenth century (2014: 53). His argument is largely based upon the long length of the strips, but it is also apparent that the orientation of the strips was also quite strictly controlled. Here, then, we see another example of alignment of fields being considered important during their laying out, again perhaps for cosmological reasons?





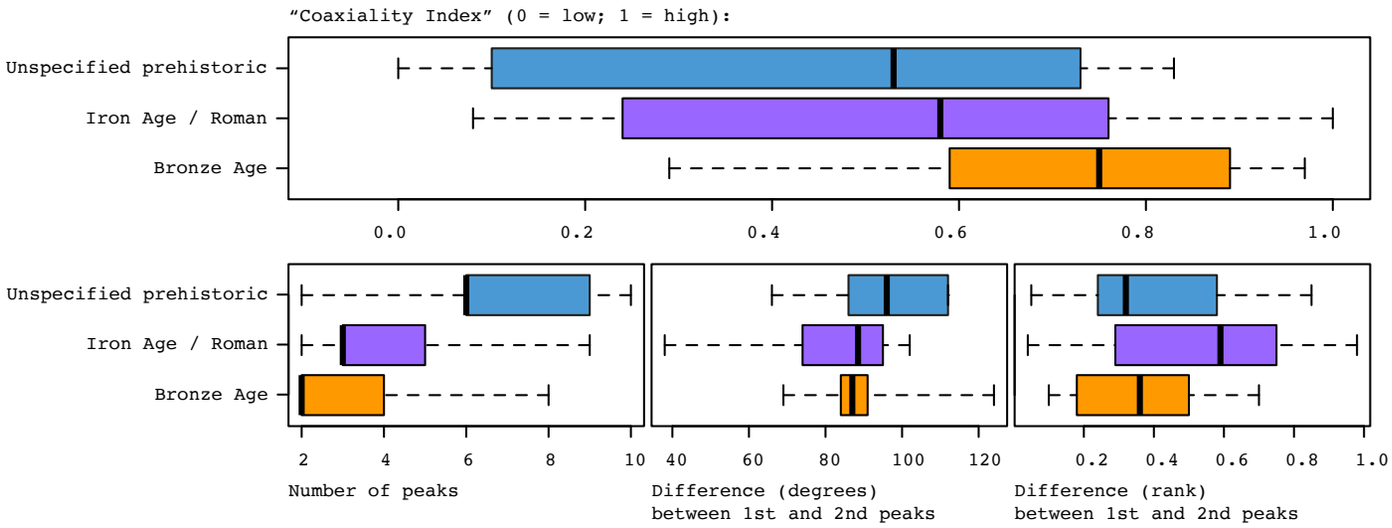
References:

• Hall, D. 2014. The Open Fields of England. Oxford: Oxford University Press
• Ruggles, C.L.N. 1999. Astronomy in Prehistoric Britain and Ireland. New Haven, CT: Yale University Press

Field systems (IV)

The other metrics recorded for the set of forty field systems can be examined in a number of different ways. For example, when divided up into three groups by broad period (Bronze Age, Iron Age/Roman, and unspecified prehistoric), we can see some differences between the field systems over time. The Bronze Age field systems tend towards having less 'peaks' in orientation, with half of the fields only having two peaks. They also tend towards perpendicularity between those strongest two peaks, with over half of the field systems of that date having their first and second peaks around 90˚ apart. The Iron Age/Roman field systems tend towards having slightly more peaks and towards slightly less perpendicularity (whilst remaining fairly perpendicular), but see a 'stronger' second peak on average than the Bronze Age field systems. Unspecified prehistoric field systems tend to be least regular, with more and weaker subsidiary peaks in orientation.

These three metrics can be combined to give an 'Index of Coaxiality', with higher index fields having fewer, stronger, more perpendicular peaks. Here we see that Bronze Age field systems are most 'coaxial', followed by Iron Age/Roman field systems (with a great deal of 'coaxiality' remaining), with unspecified prehistoric fields showing greatest variation (and lowest values for 'coaxiality'). However, as the dating of field systems is highly problematic, the question remains as to whether perhaps the so-called 'Bronze Age' field systems appear more 'coaxial' on the Index due to their being assigned to the Bronze Age due to their monumental regularity, which would become a self-fulfilling prophecy.

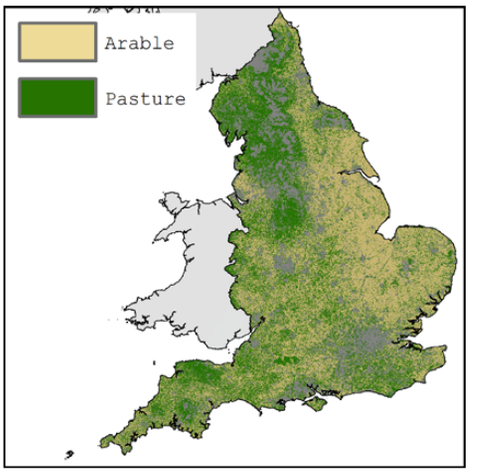




Gibbett Moor. 2014.
Drawing made over two winters. Once Bronze Age settlement, now unpopulated moor. Drawing by Miranda Creswell.

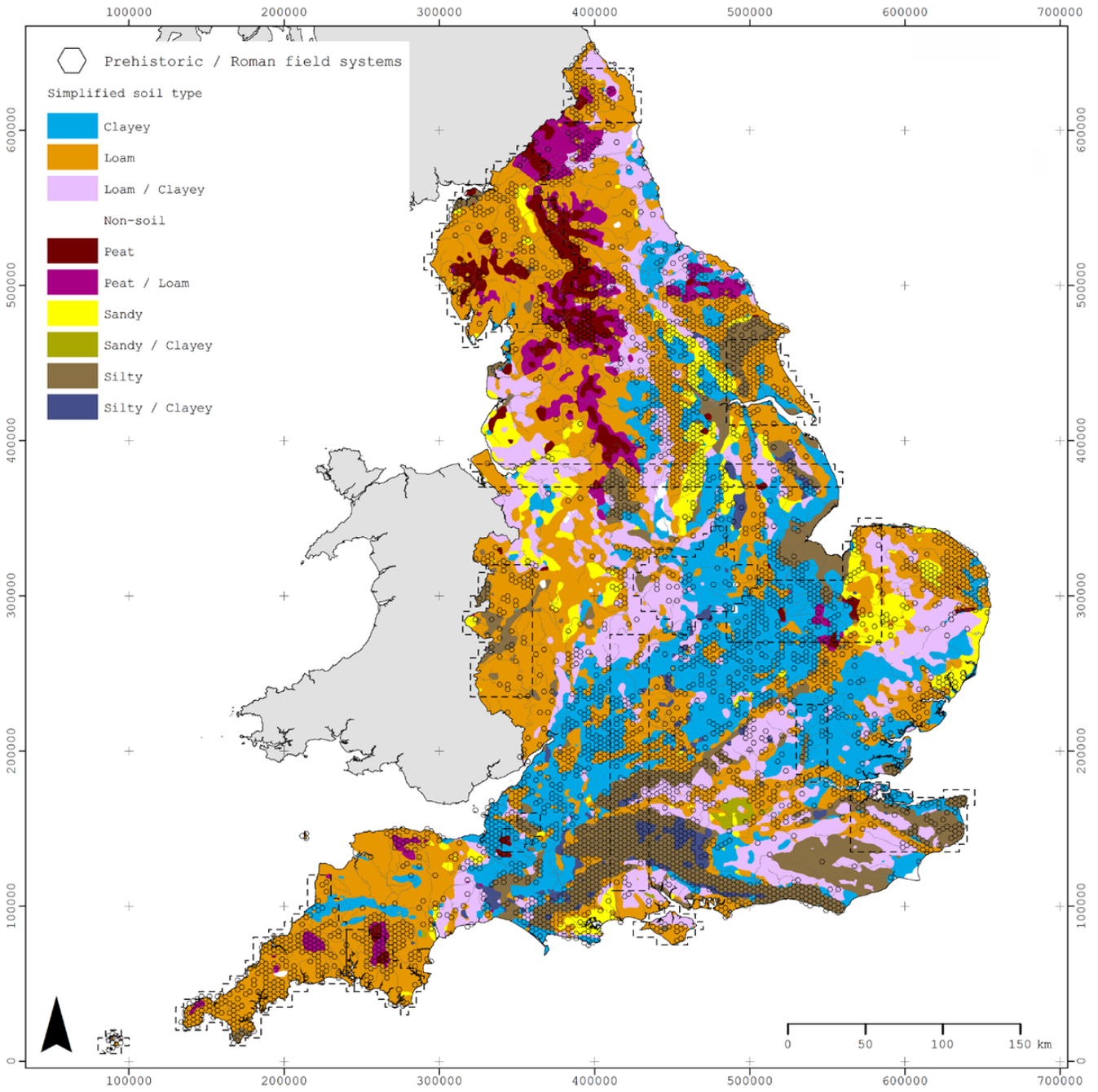
Soils and agriculture

Modern arable farming is focused on eastern England, particularly in the long belt from Yorkshire down to the Home Counties. By contrast, western and northern England shows more mixed regimes with significant areas of grazing land, especially in the north west.



Although it is not clear whether prehistoric through to Roman field systems were used for arable, grazing, or mixed farming, they do seem to be more common in areas used for arable or mixed farming in the present day. When compared against soils (see p.18), we can see no overall bias towards particular types of soils nationally in prehistoric/Roman field systems, but there is a very clear bias in some local/regional cases. In particular, the extensive field systems of southern England seem to very closely adhere to silty soils. Field systems on clay are much rarer than in modern farming.

There is a degree of preservational bias here, with modern arable farming more likely to destroy evidence of past field systems than grazing activity, but there is also a powerful affordance factor, with crop marks (inevitably) far more likely to appear where crops are present. The picture is very complex.

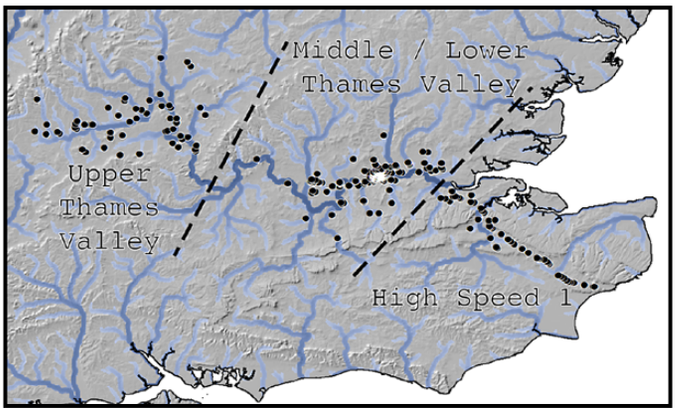


Assemblages and food (I)

with Dan Stansbie

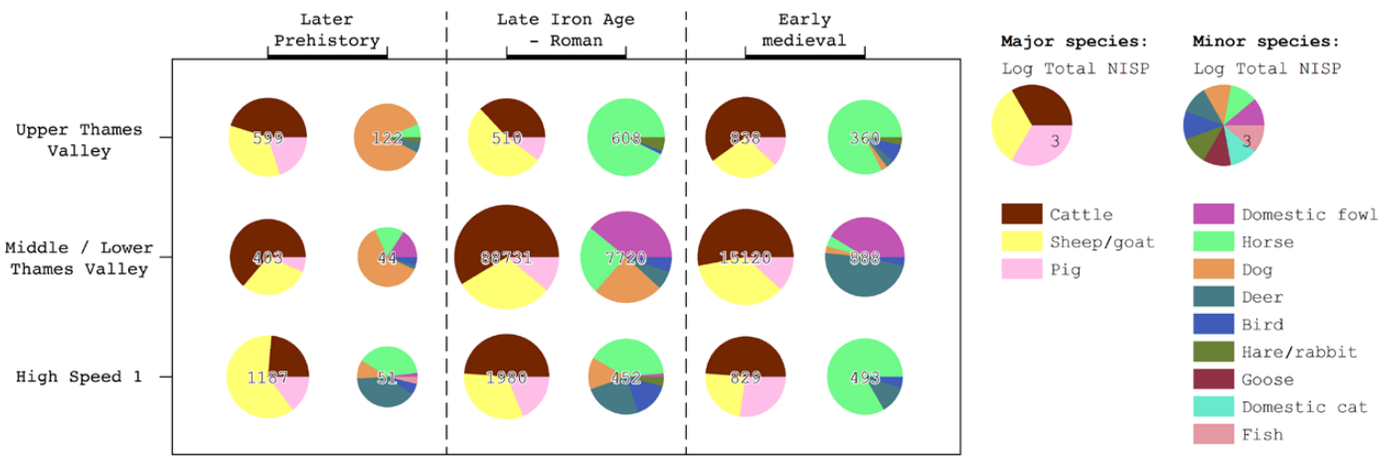
It has become an axiom of British archaeology that the results of developer-funded fieldwork are under-utilised in research: thus, several projects have recently attempted to redress this perceived imbalance (e.g. EngLaId; Bradley et al. 2015; Rippon et al. 2015; Smith et al. 2016). These projects have all demonstrated beyond doubt the transformative effect of the data produced by developer-funded work on our understanding. These two pages briefly summarise a project that used ceramic, animal bone, and charred plant data from digital archives generated by developer-funded archaeology to address a series of questions about food production and consumption over the later prehistoric and early historic periods in southern England (for three regional case studies, encompassing the Upper Thames Valley, the Middle and Lower Thames Valley and the route of High Speed 1 in Kent). The results suggest that regional ecosystems had a long-term influence on processes of food production and consumption, which displayed considerable continuities across the boundaries of traditional archaeological periods. However, while there were long-term continuities in the use of plants and animals, the expression of social relationships seen in fields, settlements, and ceramics followed a cyclical pattern.

In later prehistory the Thames Valley saw a predominance of cattle throughout, but with significant numbers of sheep, which in the Middle/Lower Thames increased in the early medieval period. Sheep were most common in the later prehistoric period in Kent, with cattle becoming the most common species from the Late Iron Age onwards. Pigs were more common in the Upper Thames Valley than in Kent and very much less common in the Middle/Lower Thames Valley than in either of the other two regions. Later prehistoric contrasts in minor and wild species seem to suggest that Kent was more favourable for game than the Thames Valley case study area, with wild species more common in Kent. Another contrast is the difference in abundance of dogs, which would seem to relate to a specific cultural preference for the butchery and deposition of dogs in the Upper Thames Valley.



In the Late Iron Age to Roman period animal husbandry seems to have become more homogenous, with cattle becoming dominant in Kent and remaining dominant in the Thames Valley. However, there was continuity among the more minor species, with wild animals continuing to be more important in Kent (as we shall also see with cereal cultivation on p.50). In the early medieval period the balance of the three major domesticates was subtly but significantly different in each of the three regions. In the Upper Thames Valley there was a significant shift from sheep to cattle, with a very slight decline in pig, whereas in the Middle/Lower Thames Valley the shift between cattle and sheep was in the opposite direction, while pigs increased slightly. In Kent there was a decline in sheep, while the numbers of cattle appeared to remain approximately the same, but the increase in pig was much steeper than in the Thames Valley. There were also subtle variations in minor and wild species; numbers of deer and wild birds appear to have been greater in Kent and in the Middle/Lower Thames Valley.

The size of pie charts has been set to vary by the logarithm of NISP (Number of Identifiable Specimens) due to large numerical variation.



References:
• Bradley, R., C. Haselgrove, M. Vander Linden, & L. Webley. 2016. The Later Prehistory of Northwest Europe: the Evidence of Recent Fieldwork. Oxford: Oxford University Press
• Rippon, S., C. Smart, & B. Pears. 2015. The Fields of Britannia: Continuity and Change in the Late Roman and Early Medieval Landscape. Oxford: Oxford University Press
• Smith, A., M. Allen, T. Brindle, & M. Fulford. 2016. The Rural Settlement of Roman Britain: New Visions of the Countryside of Roman Britain. Britannia Monographs 29

Assemblages and food (II)

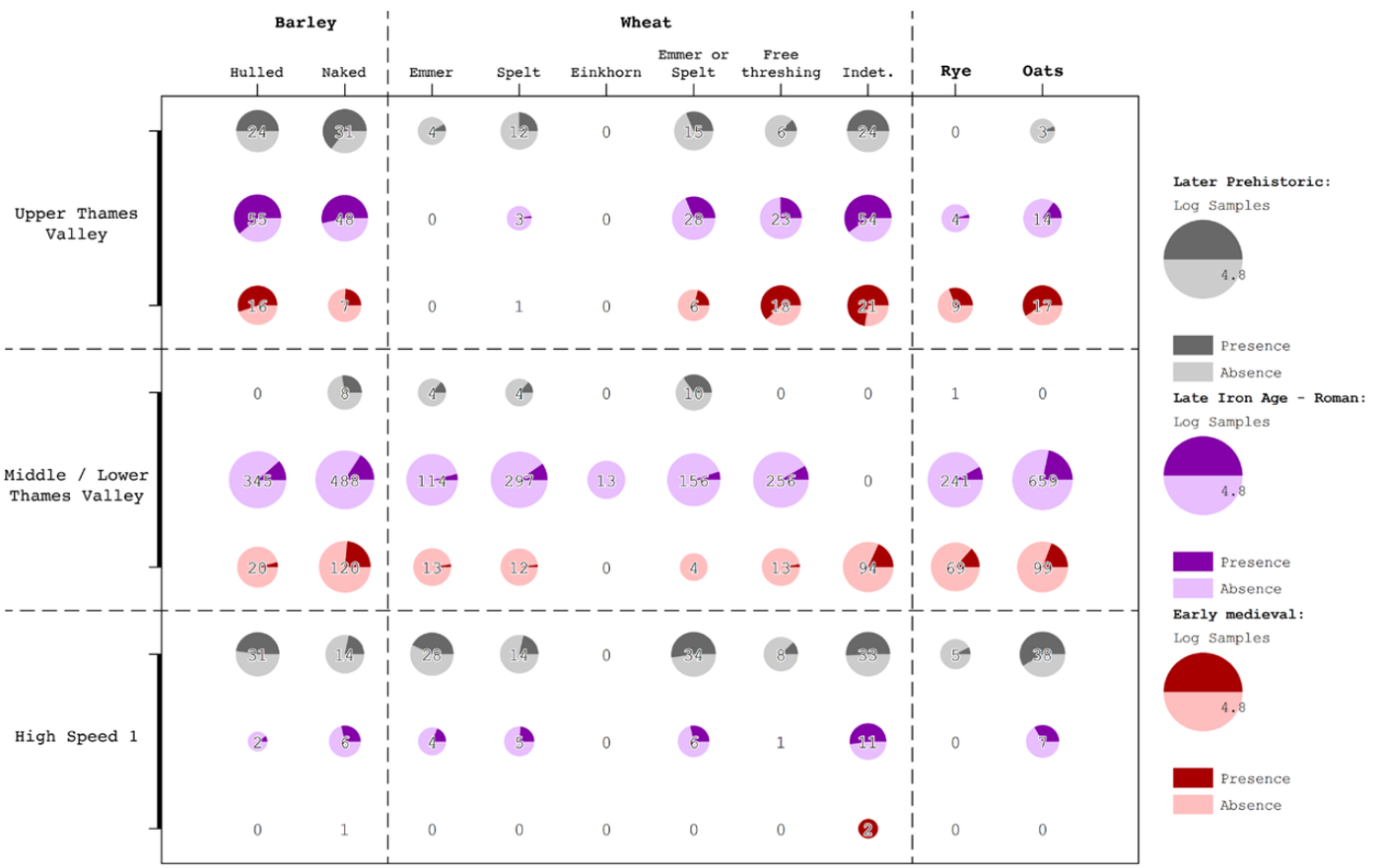
with Dan Stansbie

The following analysis is based on a simple calculation of the abundance of different plant species/land races by presence/absence per sample. In summary, the major trends detected are as follows. In the Upper Thames Valley late prehistoric sites see a slight preponderance of barley, with wheat (most probably spelt). These ratios are reversed in the late Iron Age and Roman periods, with spelt more abundant than barley. In the early medieval period, free-threshing wheat is most abundant, followed by barley, oats and rye. In the Middle/Lower Thames wheat (both spelt and emmer) is slightly more abundant than barley in late prehistory; in the late Iron Age and Roman periods wheat (probably spelt) is most abundant and then oats, barley and emmer wheat; in the early medieval period oats are most abundant, with bread wheat and rye, but barley is found in small amounts. Finally in Kent (High Speed 1) in late prehistory oats and then wheat (predominantly emmer) are most abundant, with barley and rye present in relatively few samples; in the late Iron Age and Roman periods wheat predominates (emmer and some spelt) and then barley; for the early medieval period data are too sparse to come to any conclusions.

The maximum difference between regions was found in the later prehistoric period and the greatest similarities in the Roman period. Given the paucity of much of the early medieval charred grain data a regional comparison of early medieval cereal grain cultivation in all three case study areas is not very reliable. However, broad continuities between late prehistory and the Late Iron Age-Roman period can be seen and the most profound change occurs in the early medieval period, a change that is backed up by other recent archaeobotanical work on the period (McKerracher 2015). This may well be linked to a change in field type, with some 'open fields' originating in the later part of the early medieval period.

Other differences may have been more influenced by culinary practices than by soils. Overall, wheats are more suited to making bread, with barley and rye useful for brewing beer, and these may well have been the main uses of these crops. However, ultimately all of these crops are capable of a variety of different uses including baking and brewing, but also of being boiled or simmered to create a variety of porridges, potages and gruels, or mixed with other ingredients to create batters or even something like pasta. We should therefore envisage the possibility of a wide range of different cuisines, which perhaps deployed different elements of all of these cooking methods varying regionally and over time, and also by social status.

The size of pie charts has been set to vary by the logarithm of sample counts due to large numerical variation.



References:

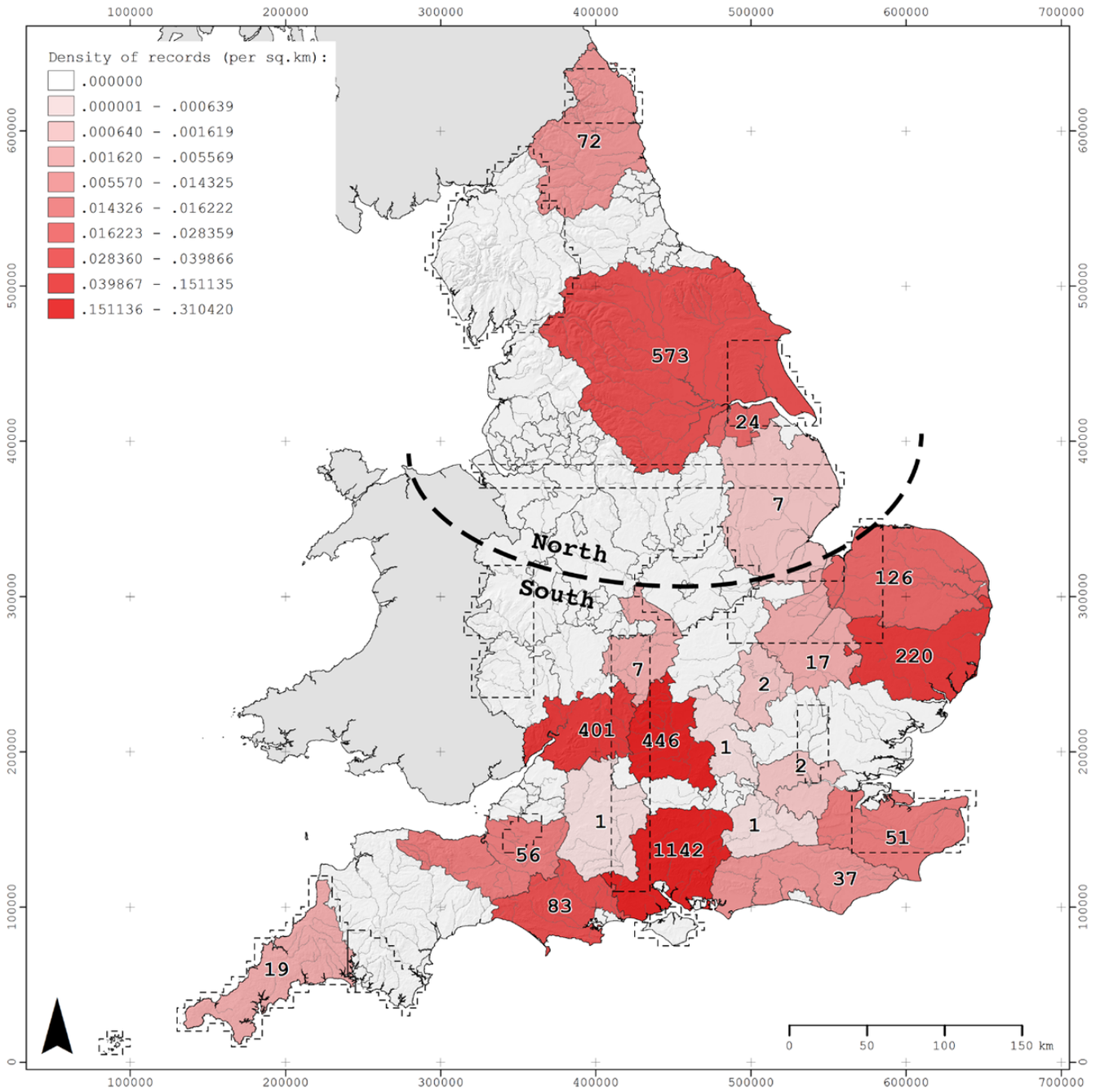
• McKerracher, M. 2016. 'Bread and surpluses: the Anglo-Saxon 'bread wheat thesis' reconsidered.' Environmental Archaeology 21(1): 88–102; DOI: 10.1179/1749631414Y.0000000054

Stable isotopes and diet (I)

with Sarah Mallet

These two pages briefly summarise a project that collated the results of stable isotope analyses in respect of carbon and nitrogen, with the intention of understanding broad-scale differences in diet over the long term. The map shows the geographic origins of the samples used in the isotopic analyses collated for this project (based on studies which took place between 1998 and 2014). The data are biased toward southern England and Yorkshire and there are large parts of the country that are not covered. The reasons for this distribution are partly the result of modern archaeological practice (p.6) and also of variation in soil types (p.18), since samples can only be recovered from excavation in soils that preserve bones well.

Stable isotope analysis is the study of the relative abundances of different isotopes of different elements in human tissues. The assumption behind them is that different environments, such as terrestrial/marine ecosystems, or agricultural systems, or foraging strategies, will have different isotopic signatures, which will be passed to the foodstuffs produced or grown in these environments and then metabolized to the individual consuming these foods. Stable isotope ratios, especially of carbon ($\partial^{13}C$) and nitrogen ($\partial^{15}N$), in body tissues (here bone collagen) therefore reflect those of the food they are derived from, allowing us to reconstruct the diet of the individual (see Sealy 2001).



References:

• Sealy, J. 2001. Handbook of Archaeological Sciences. London: Wiley

Stable isotopes and diet (II)

with Sarah Mallet

This dataset was divided between northern and southern regions marked on the map to reflect the different cultural and environmental factors, and the isotopic data were analysed accordingly. Should similar isotopic trends be systematically repeated across various landscapes there will be a strong case to hypothesise that these trends may be representative of the whole country. On the contrary, should it be established that isotopic patterns differ from one region to another, for reasons other than environmental factors, the existence of dietary regional variation between the different regions investigated here would lead to the assumption that degrees of regional variation also existed in the rest of the country.

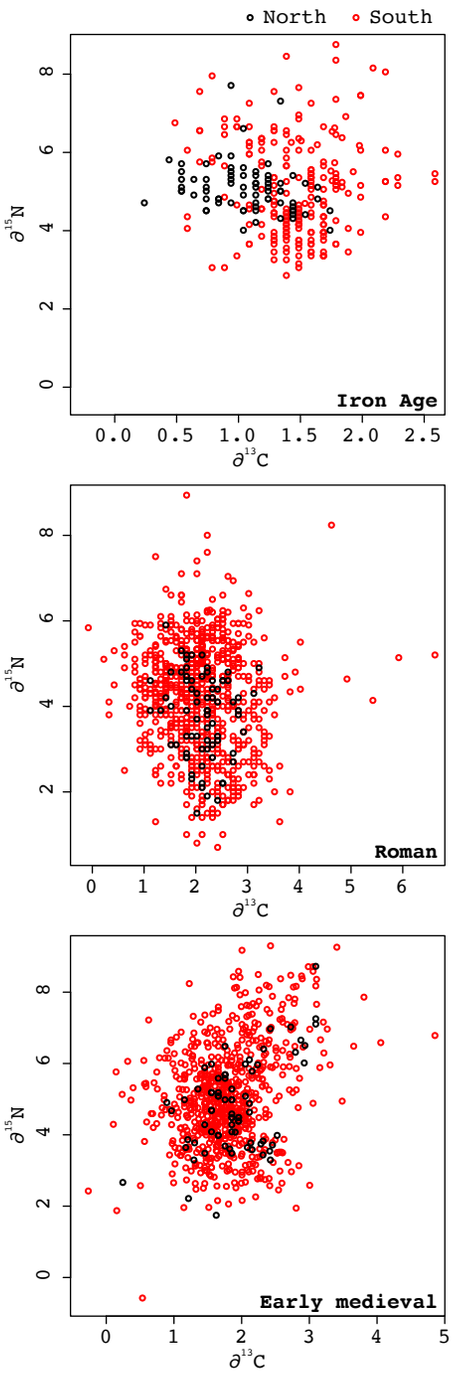
To conduct a dietary comparison that is both valid and significant, we must thus make sure that we measure the diet signal and not environmental 'background noise'. In order to do this, it is necessary to construct an environmental baseline for each site with the faunal values acting as a control group (Casey & Post 2011). This allows for a more in-depth comparison of the human data, and enables understanding of the environment in which subsistence took place. Here, cattle were chosen to construct this baseline as they are well represented at most sites. Because a large dataset is analysed here, the human values were not averaged to retain a sense of how much variation there was within the human population, and each human data point was compared against the average of northern or southern cattle for its own period.

In all three periods, there are statistically significant differences between north and south, with the human data displaying the smallest spacing in nitrogen from the baseline being systematically in the south ($\partial^{15}N$ human-cattle < 4‰). It is particularly marked in the Roman period with samples displaying less than 3‰ enrichment compared to the baseline. Although high nitrogen is usually associated with higher status diets (i.e. consuming more animal products), this could also result from the possibility that the north was more intensively farmed (i.e. the land was worked harder) due to overall poorer agricultural conditions, which would have undoubtedly raised the nitrogen values of the crops (suggested in Van der Veen 1992). It is worth noting here that the cattle in any period did not show any significant difference between the south and the north and these difference in offsets are therefore likely to reflect differences in diet.

Three models can be suggested to explain this difference between the south and the north:

- Population in the south consumed low nitrogen food that affected their overall nitrogen ratios.
- Cereals were manured more intensively in the north, but this did not affect the animals. While this is consistent with the evidence that the north may have been farmed more intensively, it seems somewhat unlikely that it would not have affected the domesticated animals at all.
- Cereal values were 'naturally' higher due to more intensive farming, but again, this should have affected the animals.

Consumption of pulses is a particularly satisfying solution here as distribution maps of Iron Age peas and beans show them to be concentrated in the south; they are absent from northern archaeobotanical assemblages. Pulses are also notably absent in the medieval archaeological record (see Rippon et al. 2015). If legumes disappeared from southern diets after the Roman period, then the isotopic difference between the north and the south would be reduced, like it is here. Again, it is therefore unnecessary to assume that variation in $\partial^{15}N$ is necessarily due to patterns in animal product consumption.



References:

- Casey, M.M. & D.M. Post. 2011. 'The problem of isotopic baseline: reconstructing the diet and trophic position of fossil animals.' Earth-Science Reviews 106: 131–148
- Rippon, S., C. Smart, & B. Pears. 2015. The Fields of Britannia: Continuity and Discontinuity in the Pays and Regions of Roman Britain. Oxford: Oxford University Press
- Van der Veen, M. 1992. Crop Husbandry Regimes. An Archaeobotanical Study of Farming in Northern England: 1000 BC - AD 500. Sheffield, JR Collis Publications

Chapter Five:

Landscape and belief

This chapter will look at the relationship between people, landscape, and formal ritual sites, including sites used in the treatment of the dead.

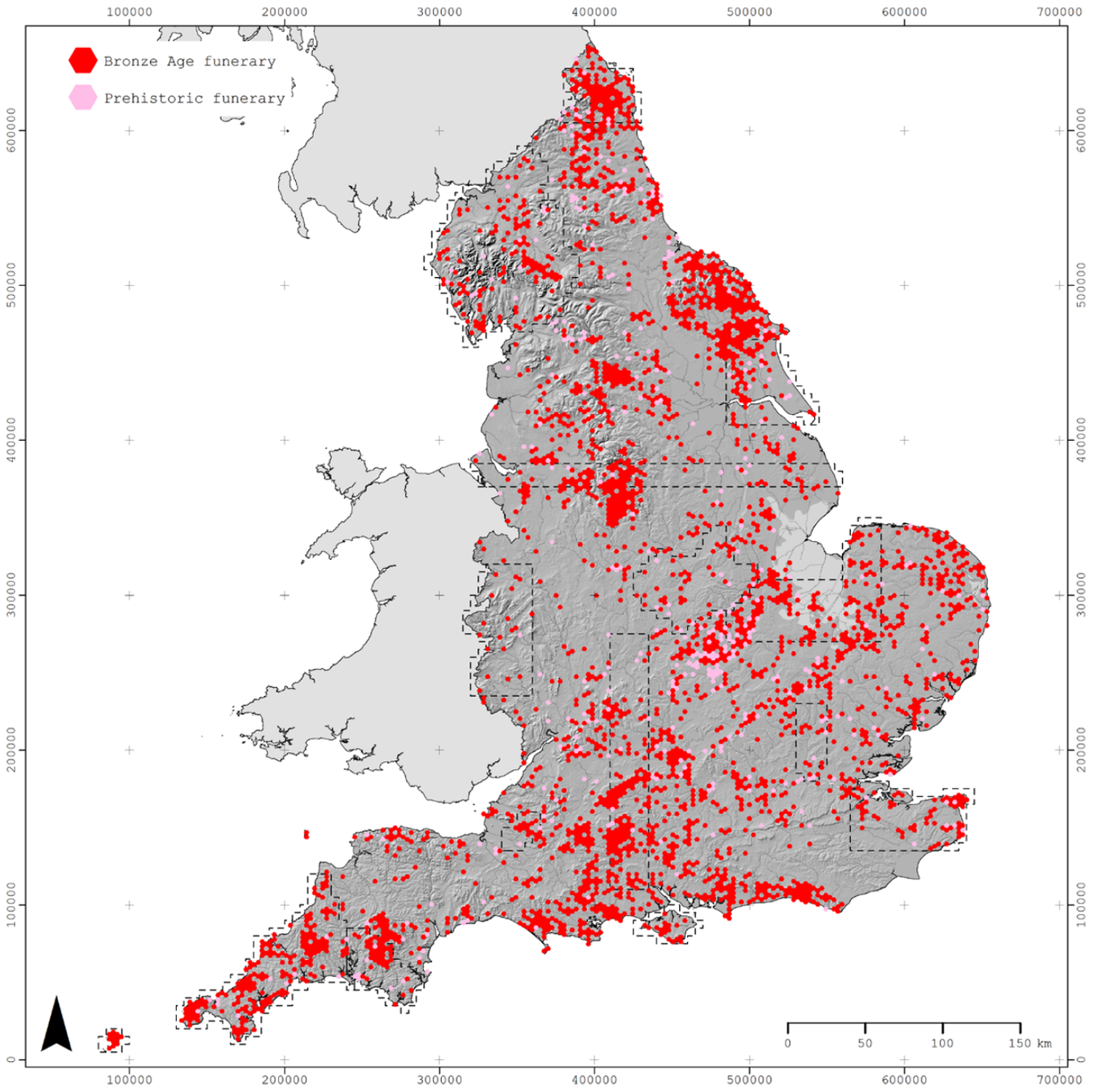


Taplow. 2013/2014.
Drawing of the 7th century AD Taplow Anglo-Saxon burial mound, the large hoard from which is in the British Museum (excavated in 1883). The site is within a later churchyard with Christian burial monuments. The Victorian house, Taplow Court, next to this site is now the Soka Gakkai UK National Centre, home to a lay Buddhist Society. This image was drawn over a period of six months by Miranda Creswell.

Funerary evidence - Bronze Age

Funerary evidence for the Bronze Age is very widespread across England, albeit with some obvious extensive largely empty areas (notably the Weald and the West Midlands). Many of these records represent earlier Bronze Age barrows, although barrows were not explicitly included as a category in the data selected. As such, much of this material (but not all) probably pre-dates the EngLaId period of interest (being from 1500 BC onwards).

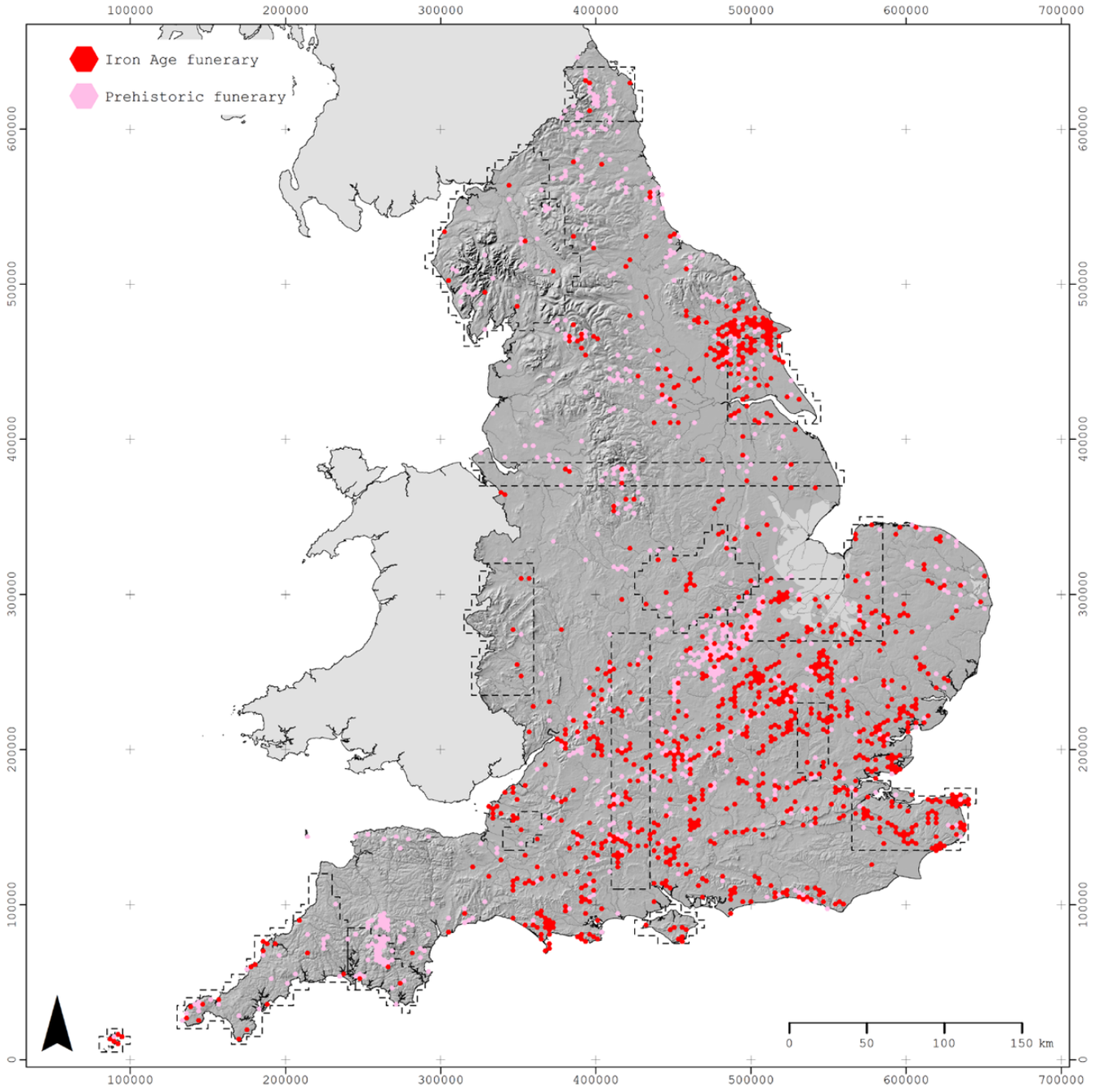
Nevertheless, it is apparent that funerary evidence is one of the most common types of evidence for Bronze Age archaeology, being much more widespread than settlement evidence, for example (see p.28). From this, we can conclude that Bronze Age people lived in almost all parts of England, but they lived lifestyles that left relatively little trace of their day-to-day lives that has survived into the modern day.



Funerary evidence - Iron Age

Funerary evidence for the Iron Age is sparse across England, especially in the north and west of the country (with the exception of East Yorkshire). This is in stark contrast to the preceding Bronze Age (p.54) and also in stark contrast to evidence for Iron Age settlement (see p.29).

Where and how Iron Age people disposed of their dead in the highland zone of England remains unknown and cannot be entirely explained by the capacity of soils to preserve or destroy organic remains (although this is probably a fairly important factor). Some funerary rites, such as excarnation (where bodies are laid out for consumption by natural forces, including birds and/or animals), leave little archaeological trace and, as such, could have been how Iron Age people in part of England dealt with their dead.

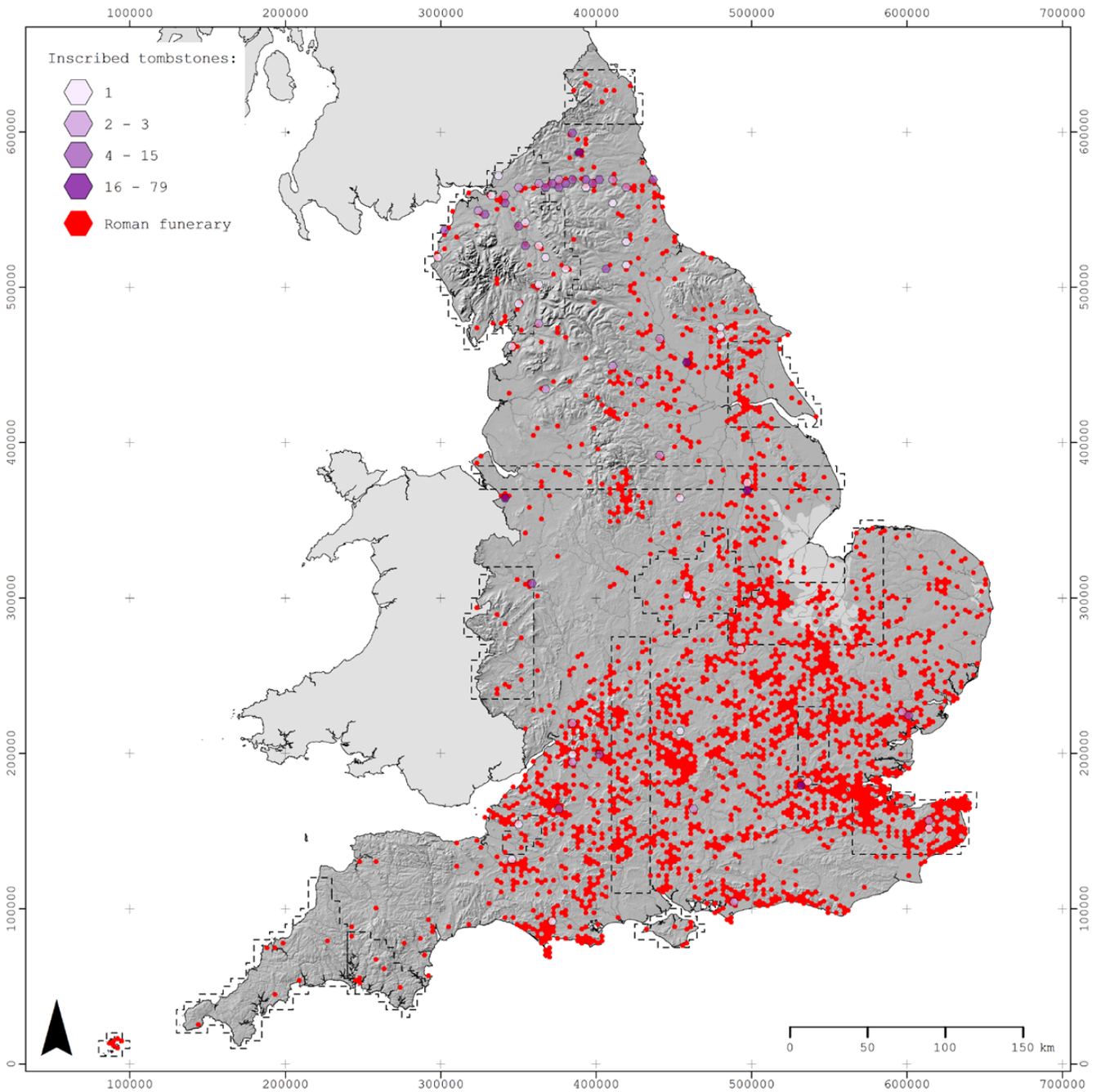


Funerary evidence - Roman

with Tyler Franconi

Funerary evidence of the Roman period is very dense within the lowland half of England, suggesting that the population density of these areas was relatively high and that human remains were disposed of using archaeologically visible practices. Again, the highland zone of England features much sparser evidence, with the obvious exception of areas around military sites (e.g. Hadrian's Wall in the north). This could perhaps suggest continuity of funerary practices from the Iron Age, due to the similar lack of evidence in that part of the country (see p.55), and is probably also partly due to soils in that area preserving bone more poorly than those of the lowlands.

Over this, we have plotted the number of inscribed tombstones recorded within Volume 1 of the Roman Inscriptions of Britain (Collingwood & Wright 1965), which documents inscribed Roman stonework found in Britain prior to 1955. These are mostly in the vicinity of Hadrian's Wall, with scattered examples from elsewhere in England.



References:

• Collingwood, R.G. & R.P. Wright. 1965. The Roman Inscriptions of Britain, I, Inscriptions on Stone. Oxford: Clarendon Press

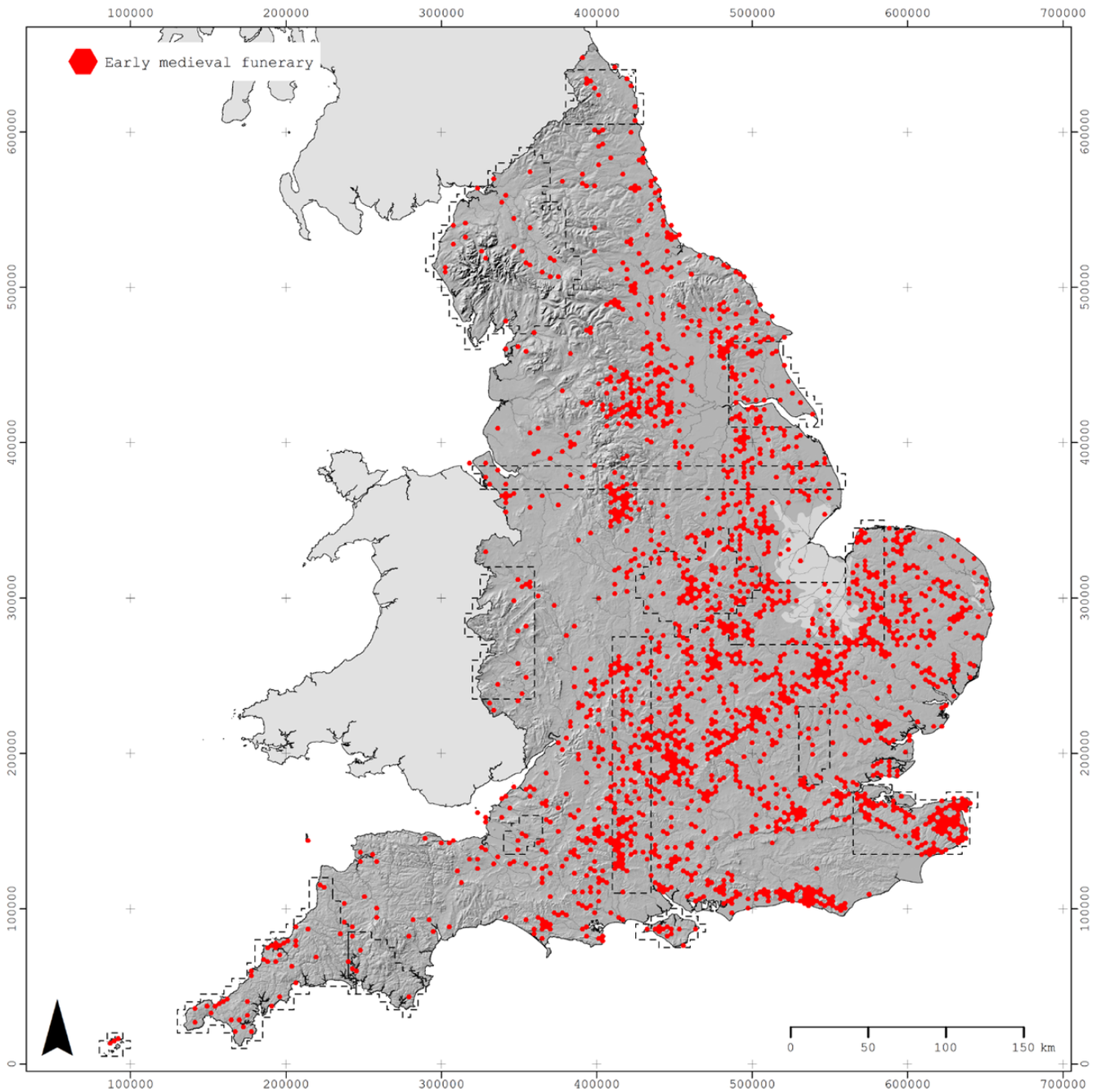
• Roman Inscriptions of Britain (vol.1) website: https://romaninscriptionsofbritain.org/

Funerary evidence - early medieval

with Letty Ten Harkel

Funerary evidence for the early medieval period is again fairly widespread, particularly in the eastern half of England. As with all four periods of interest, the West Midlands and the Weald remain notable gaps in the evidence, and evidence is again sparse in the north and west (albeit arguably less so).

Many different funeral rites are represented in this data, from furnished cremation and inhumation cemeteries of the Early Anglo-Saxon period (5th to early 7th century AD) through so-called 'field cemeteries' - largely unfurnished burials that were not found in association with any church (Ten Harkel et al. 2017) - into the standardised Christian practice of churchyard burial in the later Anglo-Saxon period. In areas subject to Viking settlement, this later period also witnessed some limited furnished burial rites again, but on the whole the evidence for 'Viking' burial in England remains thin on the ground (Richards 2002). Sometimes new discoveries are still made, however, as happened in 2004 when a metal-detectorist discovered a hitherto unknown 'Viking' burial ground near the village of Cumwhitton in Cumbria, making an important contribution to our understanding of the early medieval period in the North-West of England.



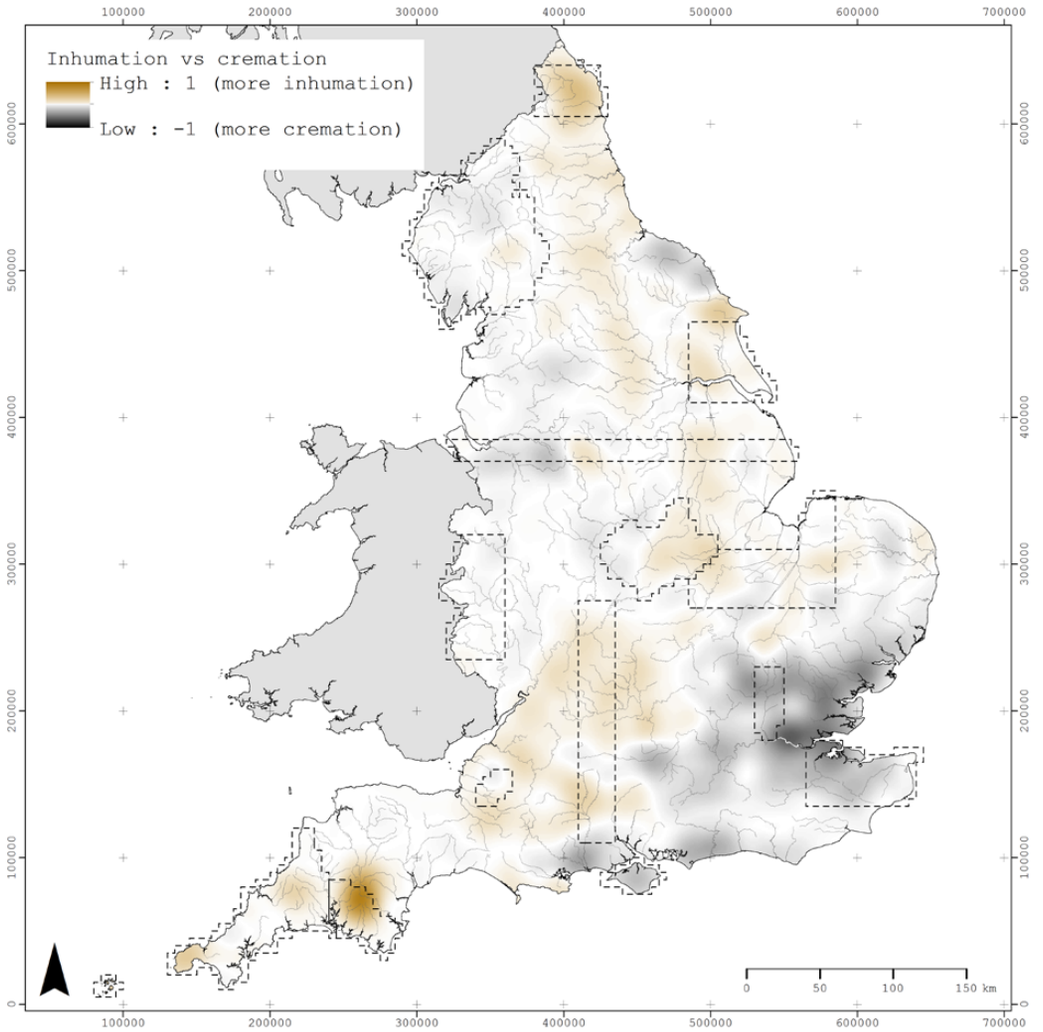
References:

• Richards, J.D. 2002. 'The case of the missing Vikings: Scandinavian burial in the Danelaw.' In: S. Lucy & A. Reynolds (eds.) Burial in Early Medieval England and Wales. Society for Medieval Archaeology Monograph, 17, London: SMA, 156–70

• Ten Harkel, L., T. Franconi & C. Gosden. 2017. 'Fields, ritual and religion: holistic approaches to the rural landscape in long-term perspective (c. 1500 BC – AD 1086).' Oxford Journal of Archaeology 36(4): 413-437; DOI: 10.1111/ojoa.12122

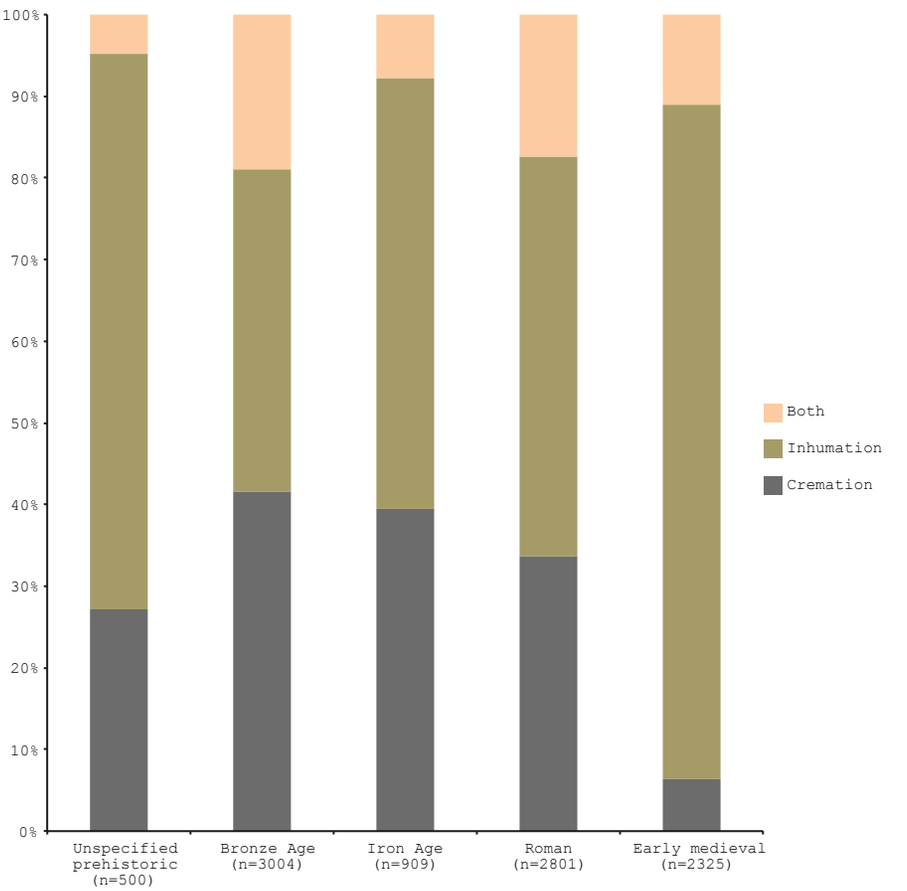
Inhumation versus cremation

The two main methods of dealing with human remains throughout our time period of interest that are visible in archaeological evidence were inhumation (i.e. burial of usually unaltered human remains) and cremation (i.e. the burial of burnt human remains). When looked at in the long term from the Bronze Age to the early medieval period, cremation appears to have been more commonly practiced in south east England (and possibly in the north west, although evidence there is sparse), with inhumation the more common rite through south western, central and north eastern England. Of particular note is the emphasis on cremation as a practice in the area of the Thames estuary, especially as this coincides with areas that may have featured much woodland (needed as fuel for cremation pyres) in the later medieval period (p.87).



Over time, the balance between cremation and inhumation does not vary a great deal, with the exception of the increasing emphasis on (and eventual monopoly of) inhumation as a funerary practice in the early medieval period. However, this graph is based upon data binned into 1 x 1 km grid squares, so the (often) large cremation cemeteries of the Early Anglo-Saxon period are showing a lesser effect than they might if counted on a 'grave by grave' basis. Also, the relatively small amount of data for the Iron Age (also see p.55) suggests that other, less archaeologically visible rites must have been taking place during much of that period, such as excarnation of human remains or deposition of bodies or cremated ashes into water.

The relative lack of any strong patterning in the north west is partly due to soil conditions that are poor for preserving bone.



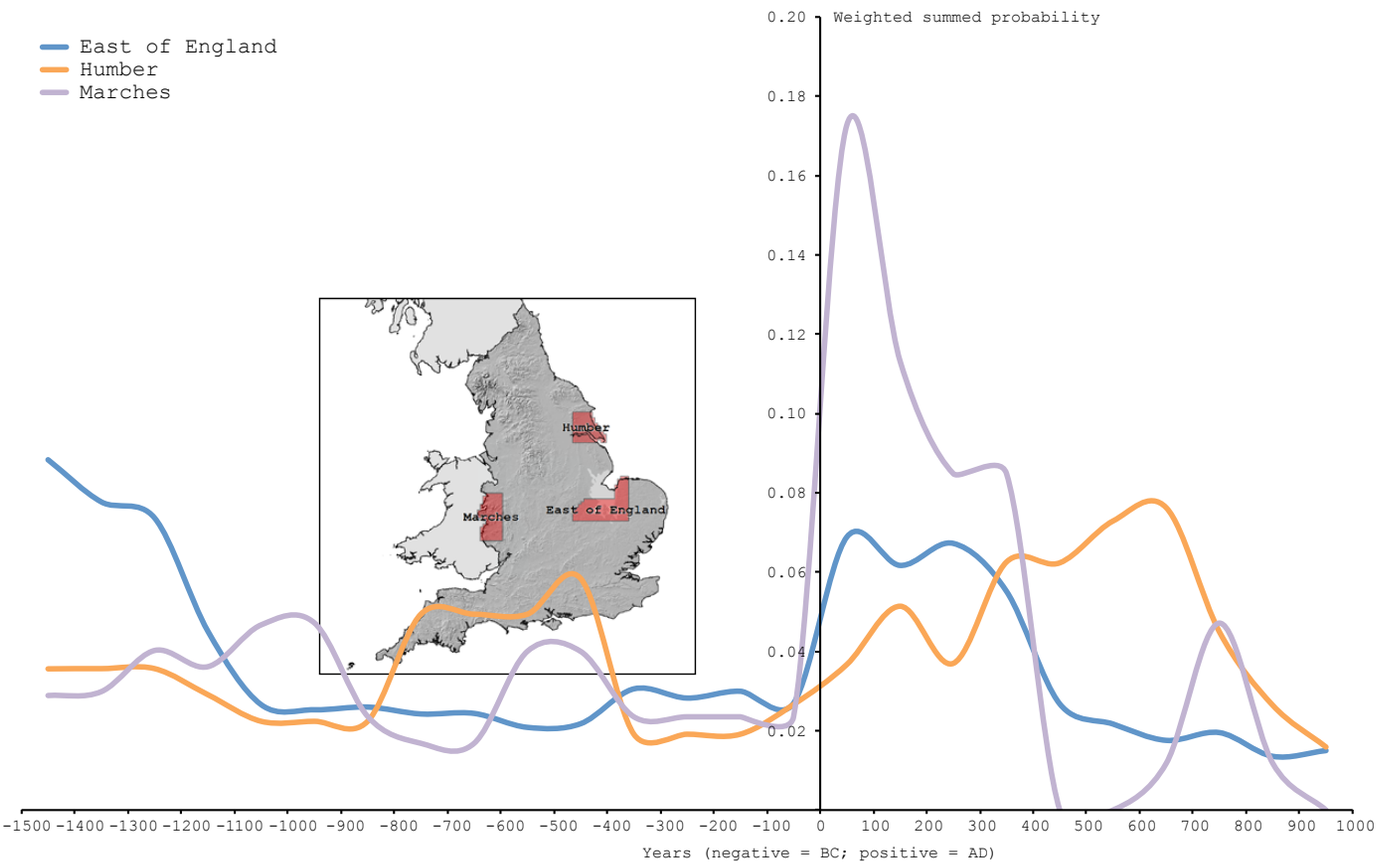
Barrow relationships (I)

with Anwen Cooper

The main aim of examining round barrow relationships in three different case study areas (the Marches, Humber and the East of England) was to gain an understanding of what people did at round barrows and also how round barrows shaped landscape development over the period 1500 BC to AD 1086. We chose round barrows as a focus for this study since they are a key enduring, and easily recognisable element of English landscapes throughout this period (and often through to the present day). For this reason they play a vital role in highlighting the multi-temporal qualities of landscapes (Olivier 2001; 2011). One important aspect of this study was to look at the long term rhythm of people's engagements with round barrows; to reveal when (and where) round barrows were an important element of landscape practice.

The image below provides a broad brush visualisation of variations in the intensity of meaningful activity at round barrows over our study period in the three case study areas using a 'fuzzy' temporal model (see also Green 2011). In brief, 'fuzzy' temporal models consider the probability that archaeological phenomena (in this case episodes of later activity at round barrows) belong to one or more time-slices of equal length (e.g. 50 years) across a given study period. A very specifically dated item – a deposit of Roman coins with a limited issue period at a round barrow – would be given a probability of 1 (100%) of belonging to the time-slice AD 100–150. Meanwhile for more coarsely dated entities – an Iron Age settlement spanning the period 450–150 BC that developed close to a round barrow – the probability would be shared between the relevant 50-year time-slices (e.g. this settlement would have a probability of 0.167 [16.7%] of belonging to each of the time-slices 450–400 BC, 400–350 BC, etc.). By summing the temporal probabilities of all of the archaeological phenomena under consideration, compelling and empirically-grounded impressions of broad rhythms of practice can be generated.

Key patterns to highlight here are the unusually high intensity of Middle Bronze Age (1500 to 1150 BC) activity at round barrows in the East of England, the surges in activity at round barrows during the Middle Iron Age (400 to 100 BC) and again in the early medieval period (after AD 410) in Humber, and the high frequency of Roman period (AD 43 to 410) activity at round barrows in the Marches.

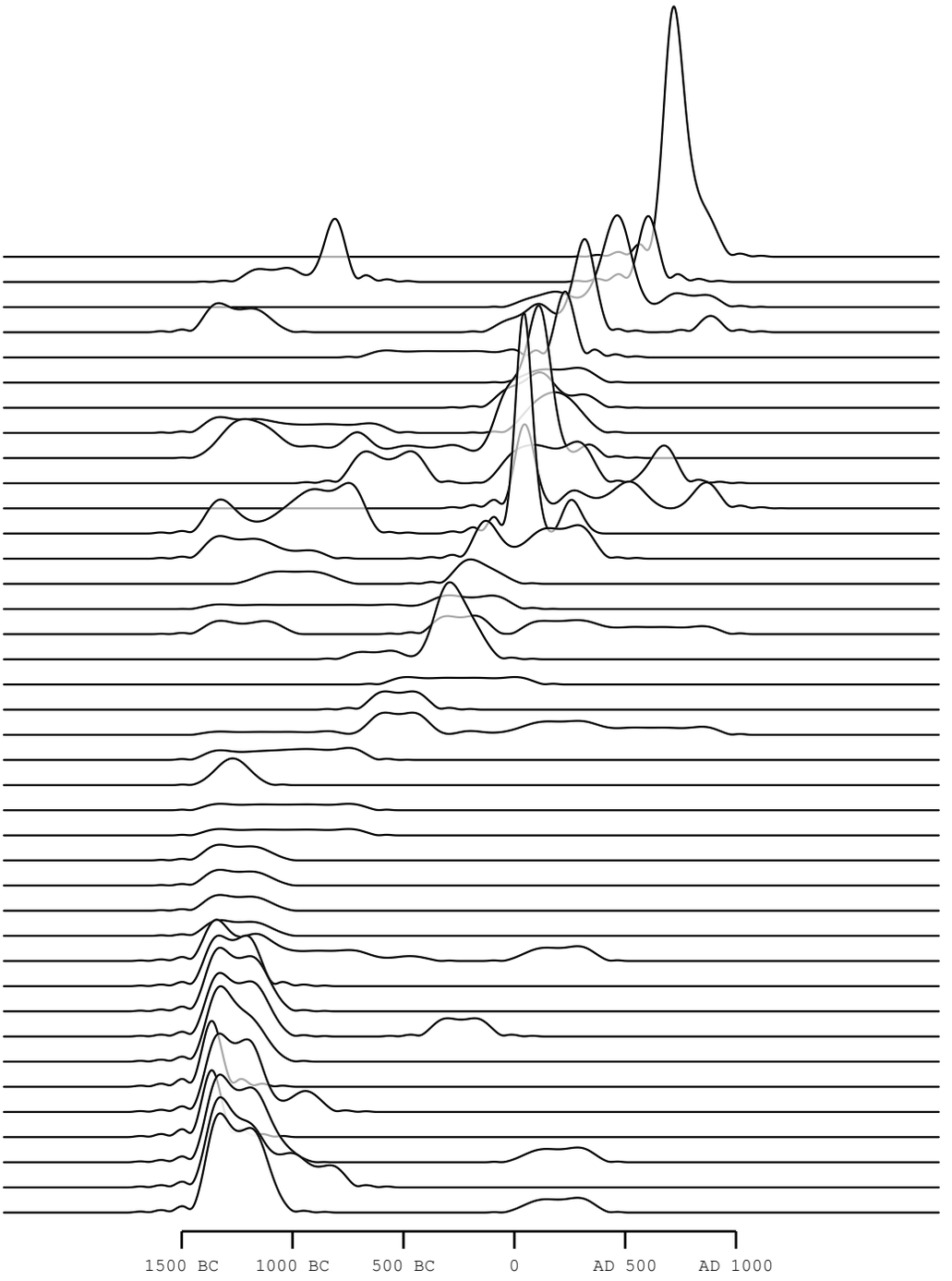


References:
• Cooper, A. 2016. 'Other types of meaning: relationships between round barrows and landscapes from 1500 BC – AC 1086.' Cambridge Archaeological Journal 26(4): 665–696; DOI: 10.1017/S0959774316000433
• Cooper, A. 2016. 'Held in place: round barrows in the later Bronze Age of lowland Britain.' Proceedings of the Prehistoric Society 82: 291–322; DOI: 10.1017/ppr.2016.9
• Green, C. 2011. Winding Dali's Clock: the construction of a fuzzy temporal-GIS for archaeology. BAR International Series 2234
• Olivier, L. 2001. 'Duration, memory and the nature of the archaeological record.' In: H. Karlsson (ed.), It's About Time: The concept of time in archaeology: 61–70. Goteborg: Bricoleur Press
• Olivier, L. 2011. The Dark Abyss of Time: Archaeology and Memory. Lanham: AltaMira Press

Barrow relationships (II)

with Anwen Cooper

Our second round barrow relationships image is inspired at a broad level by Peter Saville's cover art for Joy Division's debut studio album *Unknown Pleasures* (Factory Records 1979). More seriously, it uses a 'fuzzy' temporal model, once again, to broach the important issue of how histories developed at individual round barrow sites in the East of England case study area: whether certain sites became meaningful to people over extended time periods such that they attracted further activity. Each line represents the trajectory of meaningful activities recorded at individual round barrow 'sites' (single barrows or pairs / groups of barrows) in this area. Marked 'peaks' occur where more than one episode of activity occurred at the same round barrow site during the same broad time frame. The key point to take from this image is that no round barrow sites were a focus for activity throughout the period 1500 BC to AD 1086 or even over considerable parts of this period. Rather episodes of activity at round barrows were usually sporadic and isolated. Only very rarely is it possible to suggest that certain round barrows or barrow cemeteries became important to people over extended time periods. Traces of earlier activity at round barrows (pockets of cremated bone, material deposits, etc.) were typically encountered afresh rather than being built on or referred to directly during later activities.



References:

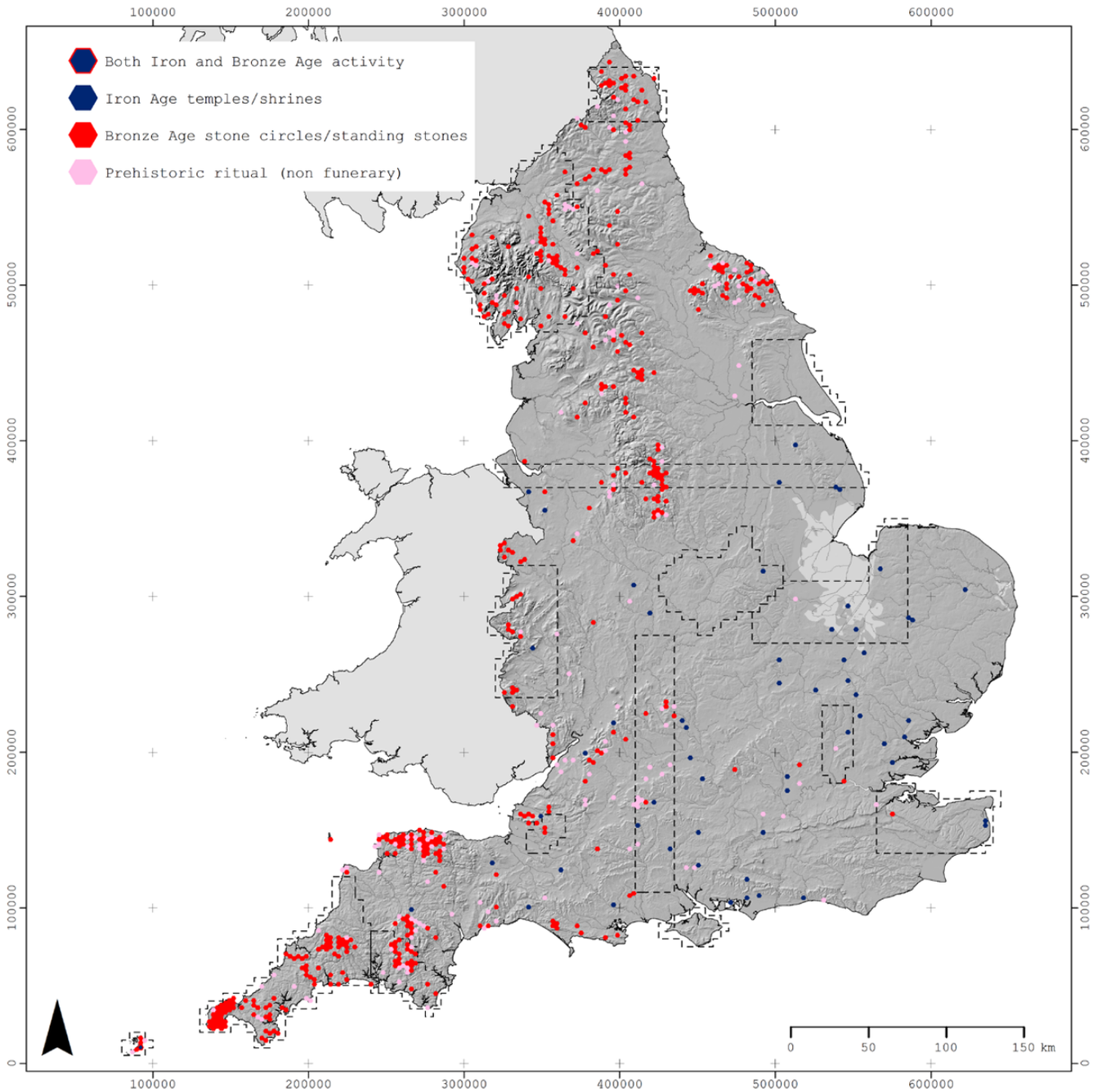
• Cooper, A. 2016. 'Other types of meaning: relationships between round barrows and landscapes from 1500 BC – AC 1086.' Cambridge Archaeological Journal 26(4): 665–696; DOI: 10.1017/S0959774316000433

• Cooper, A. 2016. 'Held in place: round barrows in the later Bronze Age of lowland Britain.' Proceedings of the Prehistoric Society 82: 291–322; DOI: 10.1017/ppr.2016.9

Ritual sites - prehistoric

Non-funerary ritual sites in later prehistory can largely be divided up on a period basis. The map here shows unspecified prehistoric non-funerary ritual sites overlain with Bronze Age stone circles (which may actually have had some funerary character) and standing stones, and Iron Age temples and shrines. One single hexagon (on the Isles of Scilly) contains both the Iron and Bronze Age site types just outlined.

The distributions of the Bronze Age and Iron Age monuments are also largely distinct, with Iron Age temples and shrines largely just present (albeit sparsely) in the south eastern half of England and Bronze Age standing stones and stone circles present mostly in the uplands of western and northern England. To some extent, this may be an accident of preservation, with upland sites likely to be less subject to later removal than lowland sites, due to less pressure from later arable farming activity, for example.

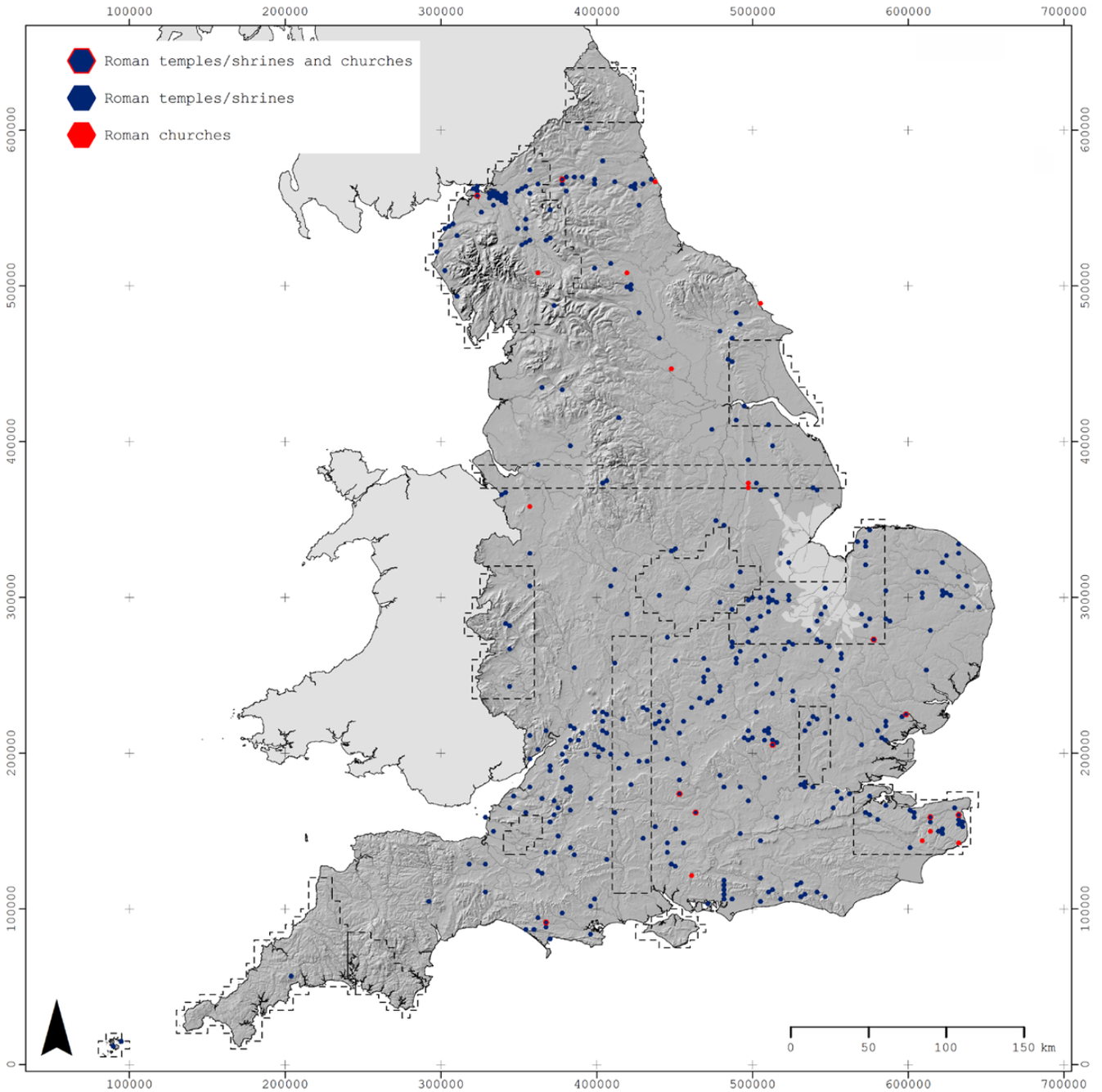


Roman temples and churches

with Zena Kamash

Non-funerary ritual sites of the Roman period can be split between (generally earlier, but not exclusively so) pagan monuments and (later) Christian churches. Temples and shrines are most common in southern and eastern England, and along the course of Hadrian's Wall in the north. They are particularly common through a band running up from Somerset to the Wash. These temples include both Roman-style temples and Romano-Celtic temples: there is considerable debate over the continuity in religious space between the Iron Age and Roman periods (Smith 2001; Kamash et al. 2010; Kamash 2016). Here again collective memory (see p.35) may have played a role in structuring how religious practices were enacted and where sites were located in the landscape. This also gives us pause to consider how helpful the strictures of our traditional period labels are.

Roman era churches are much less common. Furthermore, in many cases the evidence for the relevant building being a church is also rather speculative (e.g. being based upon building or enclosure shape / orientation). As such, the churches mapped here should be read more as a set of possible Roman churches than as a definitive dataset.



References:

• Smith, A. 2001. The Differential Use of Constructed Sacred Space in Southern Britain, from the late Iron Age to the 4th Century AD. BAR British Series 318

• Kamash, Z., C. Gosden & G. Lock. 2010. 'Continuity and religious practices in Roman Britain: the case of the rural religious complex at Marcham/ Frilford, Oxfordshire.' Britannia 41: 95-125

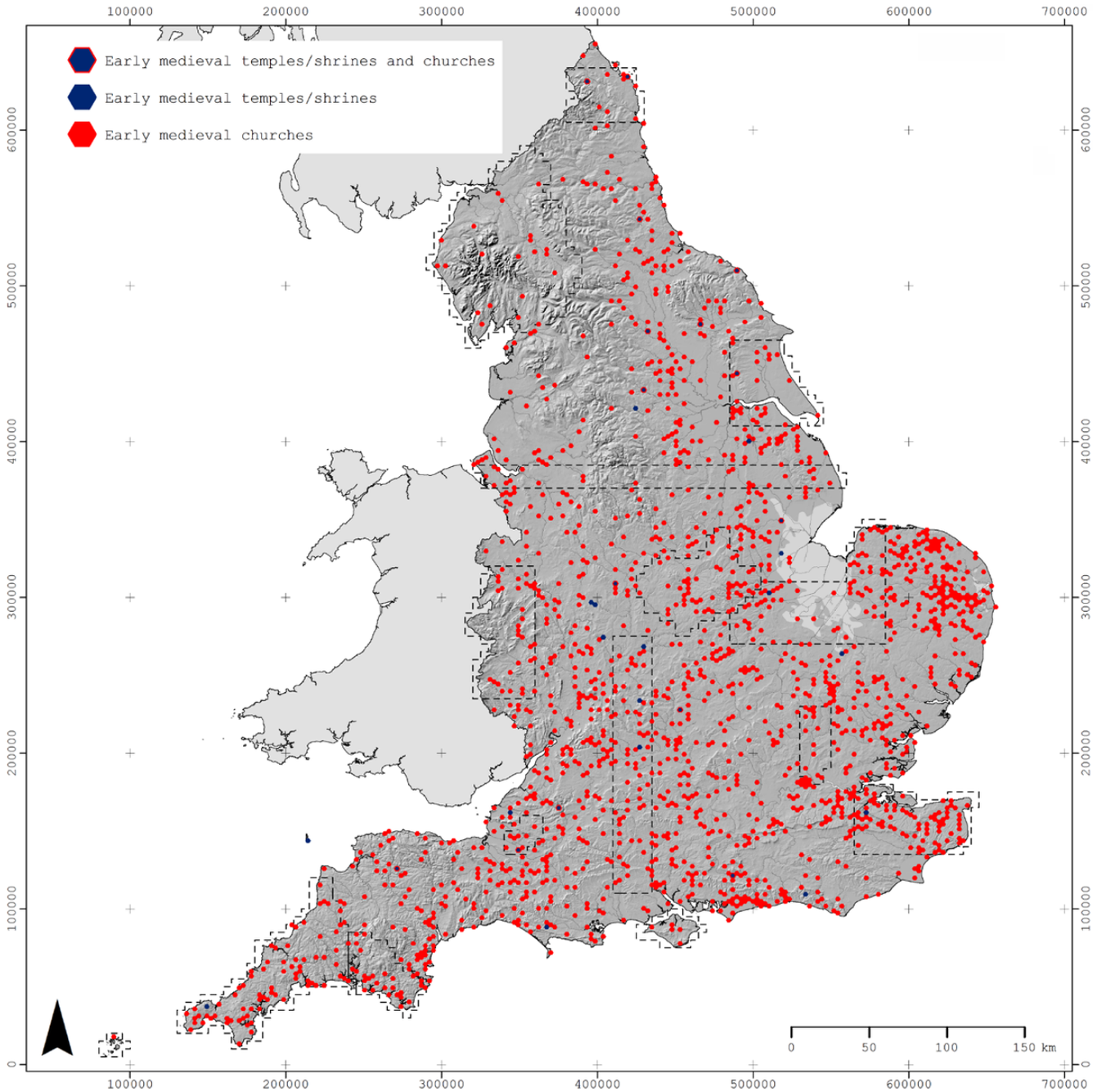
• Kamash, Z. 2016. 'From the individual to the collective: religion and memory in Roman Britain.' In: K. Galinsky (ed.) Cultural Memories in the Roman Empire. Los Angeles: Getty Museum Press, 153-169.

Early medieval churches and temples

In the early medieval period, there are a few records of earlier pagan temples and shrines, but the majority of evidence is of later Christian churches, abbeys and monasteries (some or even most of the shrines may also be Christian). Evidence for early medieval churches is very widespread across all of England, with the slight exceptions of the north west and the Weald in Kent.

Obviously, churches cannot be classed as non-funerary ritual monuments, as burial within churchyards was the norm right up until the increasingly secular funerary practices of the twentieth century. Indeed, as such, perhaps we could include churches as an evidence type in distributions of early medieval funerary activity (p.57), perhaps reducing any bias towards pre-Christian practices in that dataset.

The mixed ritual character of medieval churches, representing aspects including worship, healing, weddings / baptisms, and burial, perhaps suggests that we are a little too quick to categorise earlier ritual monuments according to their function, as they may also have represented a little bit of all types of ritual activity. Indeed, classifying churches as purely ritual could itself be seen as rather short-sighted (see Ten Harkel et al. 2017).



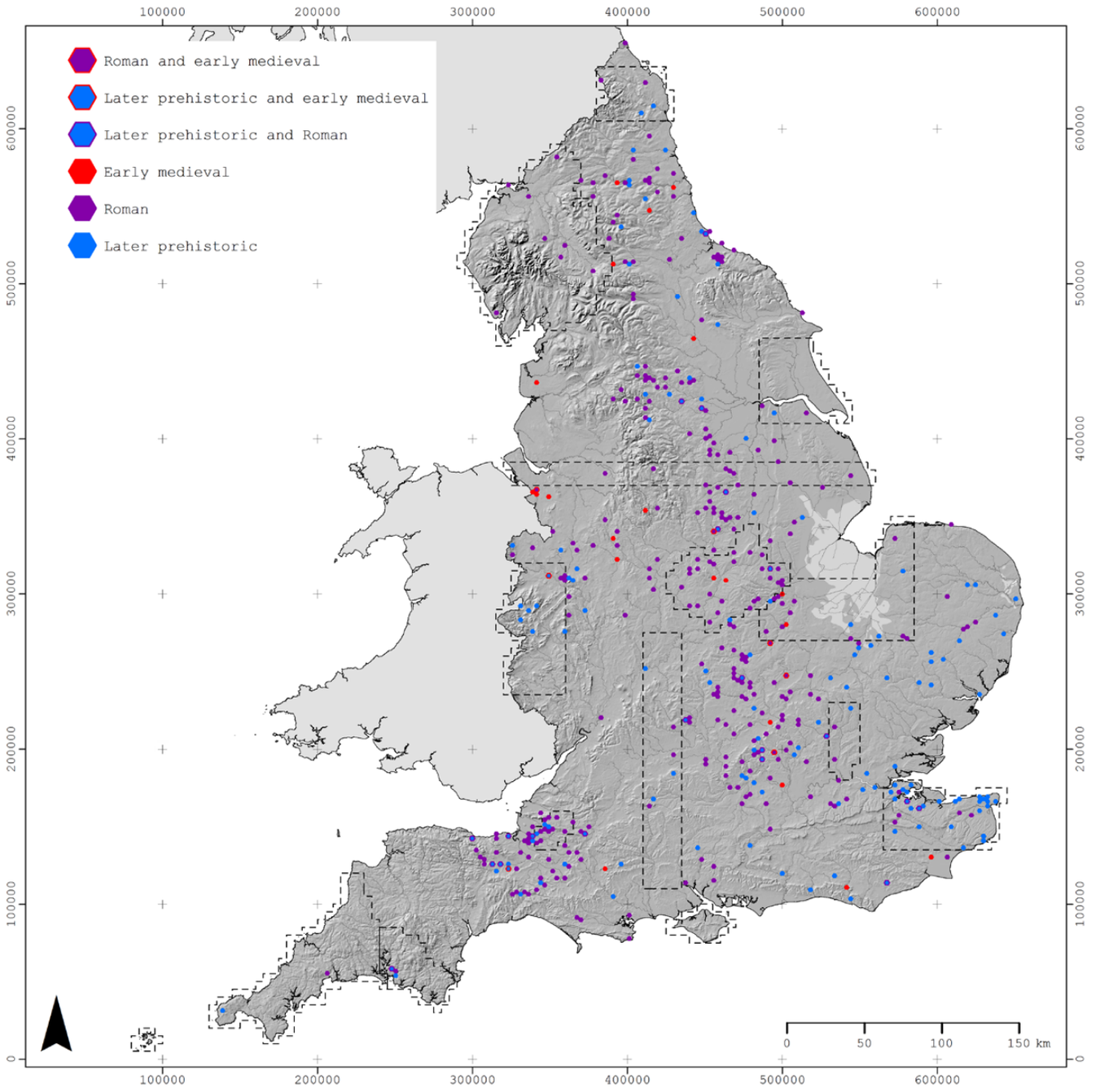
References:
• Ten Harkel, L., T. Franconi & C. Gosden. 2017. 'Fields, ritual and religion: holistic approaches to the rural landscape in long-term perspective (c. 1500 BC – AD 1086).' Oxford Journal of Archaeology 36(4): 413-437; DOI: 10.1111/ojoa.12122

Hoarding (I) - introduction

Hoarding (which we will return to later at pp.90-92) is an example of a practice that can be ascribed a ritual character, but whether it is likely to be varies by period. Iron Age and Bronze Age hoarding is largely today seen as a ritual practice, whereas early medieval hoarding is more often assigned a pragmatic character (of hiding wealth from threats). Roman hoarding practices fall somewhere in between in terms of the character assigned to them by archaeologists. The reality is probably somewhere between the two extreme viewpoints, with early medieval hoarding probably having at least a partially ritual character in some cases and some later prehistoric hoards being of a more pragmatic nature.

The map shows the presence of evidence for hoarding across time in our database. The picture is undoubtedly incomplete, as hoards are sometimes recorded using different terminologies (e.g. 'artefact scatter') or as a series of separate records for each find. Later prehistoric (i.e. Bronze and Iron Age) hoarding is sparse but widespread across England, with perhaps a particular hotspot along the Kent coast. Roman hoarding is seen most commonly in Somerset and in a long band up the centre of the country, as well as in the vicinity of Hadrian's Wall. Early medieval hoarding seems least common, with little obvious spatial patterning. Reasons for hoarding may, however, vary on a case-by-case basis and, as such, perhaps little regional variation should be expected.

The patterns seen here are partly influenced by different opportunities / affordances relating to metal detecting (see p.9).



Chapter Six:

Landscape, mobility, and defence

This chapter looks at the ways in which people moved through the English landscape in the past and the ways in which people tried to control or restrict movement through the construction of defensive monuments.



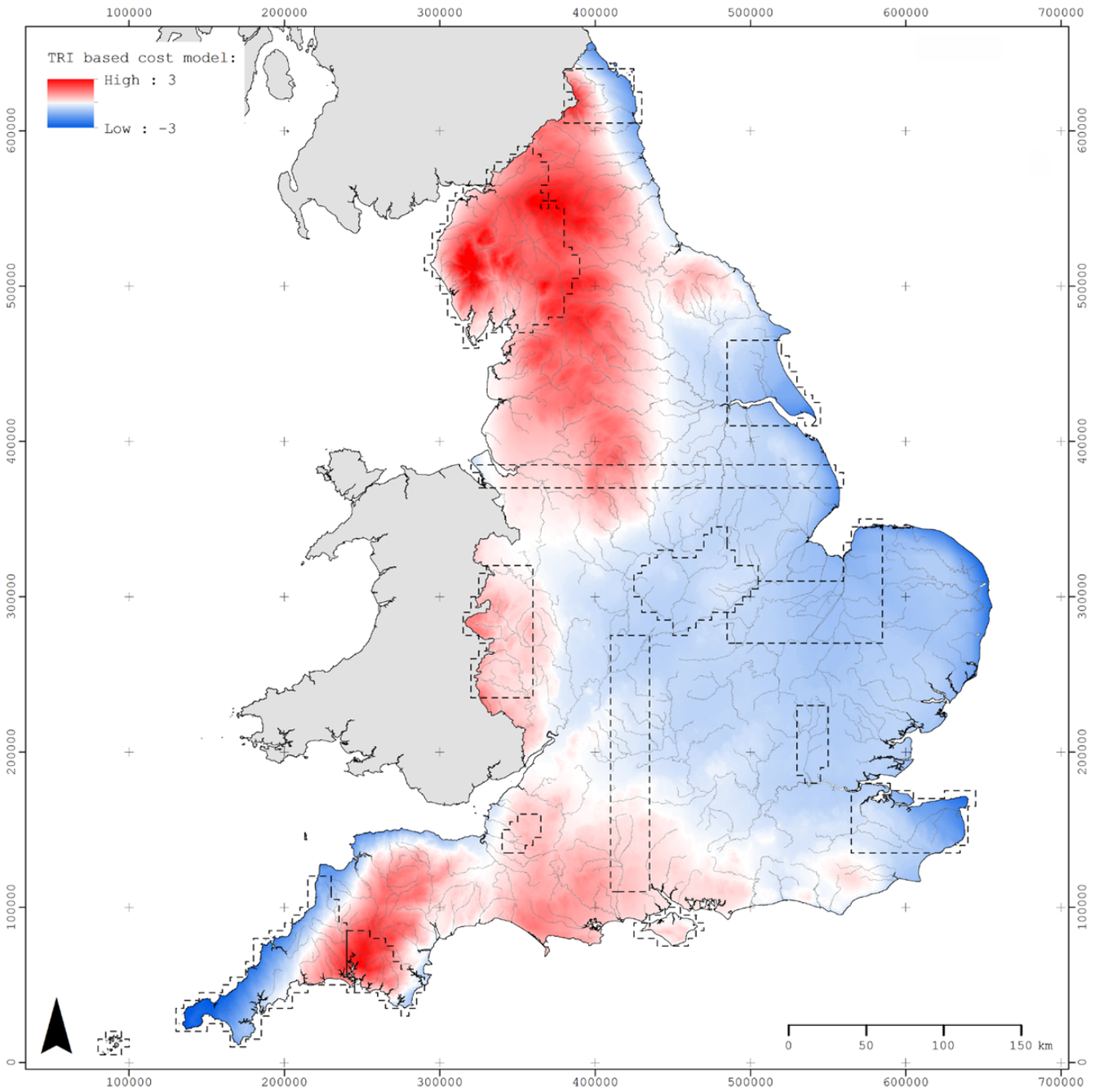
Reculver, Kent. 2015.
Drawing of the twin 12th century towers of Reculver, amidst the ruins of a Roman 'Saxon Shore' fort overlooking the Wantsum Channel, which once divided this area of Kent from the Isle of Thanet. The coastal footpath is the course of a Roman road. Image by Miranda Creswell.

Landscape accessibility (I)

with Tyler Franconi

When travelling over ground (rather than on water), the landscape of England is not all equally accessible. We can model accessibility using GIS. This is conventionally done in a very mechanistic way using cost allocations determined according to the specific energy expended on traversing different degrees of slope. For simplicity and to avoid some of the problems associated with slope-based cost modelling (and also due to the relatively coarse resolution data used to make the model feasible to run), the model presented below is based upon terrain ruggedness (see p.15), to which a straightforward eight-part (1-8) reclassification into eight groups of equal numbers of pixels was applied to define the cost of travel across any pixel.

To create the model, a stack of cost distance surfaces were created from over 6,000 starting points arrayed on a hexagonal grid. These were then summed together and normalised (to remove the very stark edge effect) using a similar summed stack created using a flat cost allocation. For cross comparability with and in common with the maps that follow (pp.<?>-<?>), the map presented here is displayed using z-scores: that is variation each side of the mean value in units of standard deviations. As such, negative values should be read as being below average cost and positive values as being above average cost. The following models were all created using the same procedure. The model thus gives a sense of how difficult the terrain of England would be to cross (in terms of ruggedness) when travelling from any one point to another.



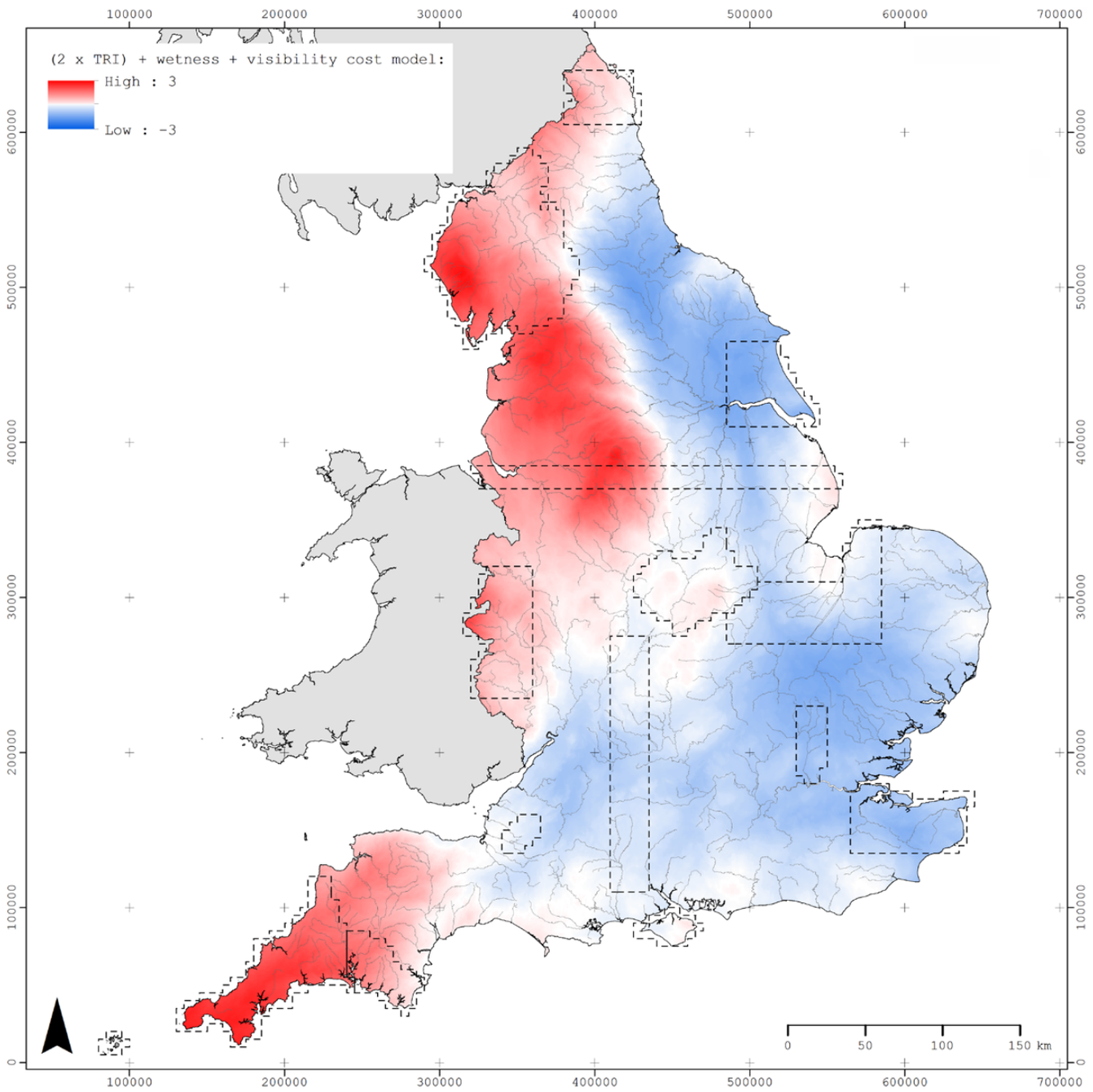
Landscape accessibility (II)

with Tyler Franconi

The terrain ruggedness based model (p.66) remains, however, an oversimplification of travel cost across England. Ignoring water-based transport for now (see p.68), there are other factors that might increase travel cost that we are also able to model. Some further factors (such as vegetation cover) remain unmodelled due to lack of reliable data.

Particularly for wheeled transport, the wetness of the environment can also increase travel cost. The environmental wetness model presented earlier (p.24) was thus built into a composite cost allocation with the terrain ruggedness data. Another factor which can increase travel cost (at least conceptually if not energetically) is how visually open the landscape is. This is suggested by the favour given to visually prominent sites for trackways in prehistory (p. 69). As such, the visibility model presented earlier (p.16) was also built into the cost allocation, with highly visible areas being given a low cost and vice versa. Due to its presumed primacy, the ruggedness cost was given a double weighting over the wetness and visiblity costs.

The cost model was then generated in the same way as for the other models and the results are mapped below. Two interesting things stand out: first, the obvious division of the model into a low-cost and a high-cost half, largely along the lines of the Highland and Lowland zones (see p.25). Secondly and more importantly, we begin to see here some of the routes of communication which also come out in the archaeological models to follow (pp.69-72), suggesting that this model of landscape accessibility is interpretatively useful for predicting key routeways in the past.



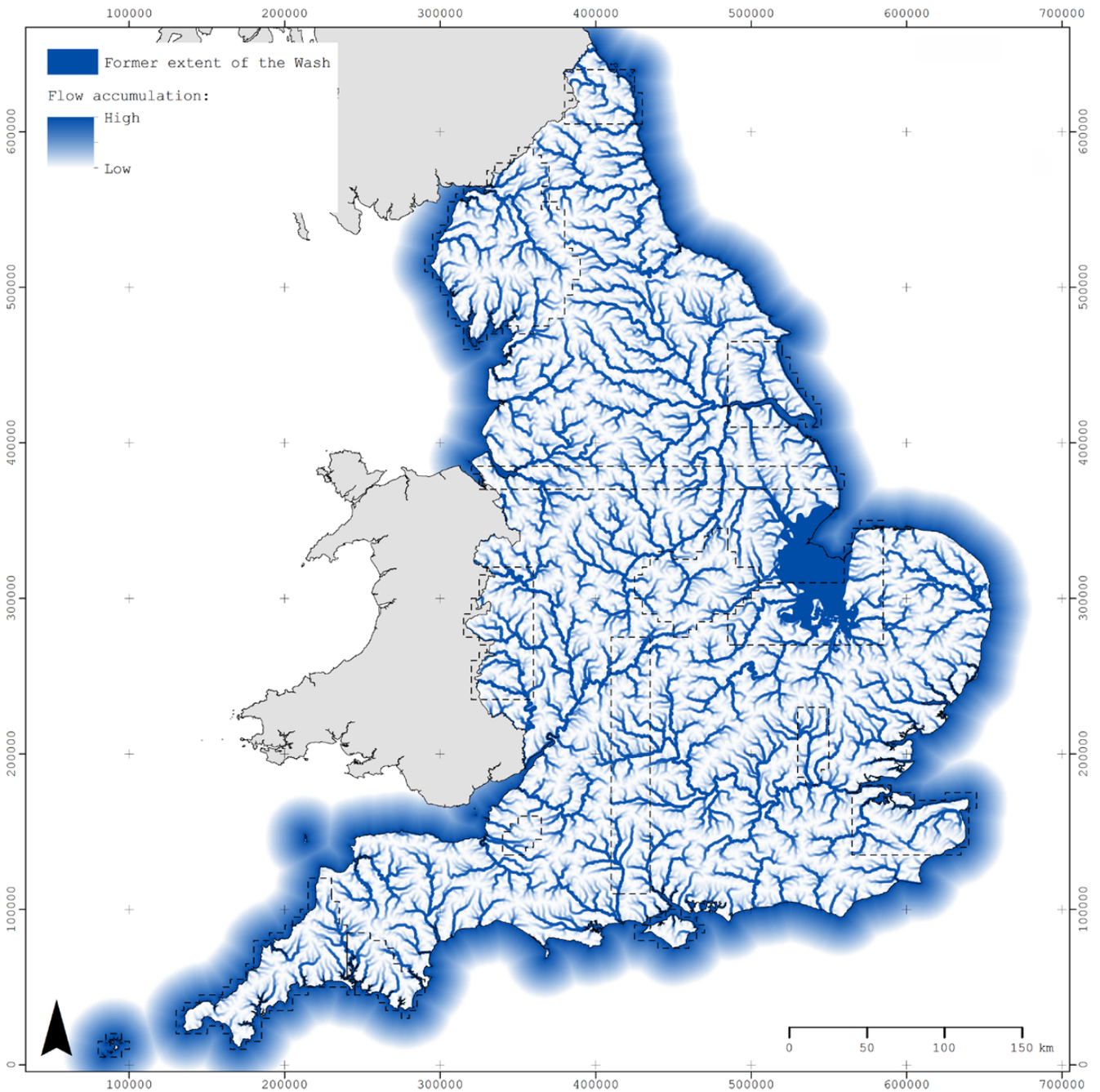
Riverine and coastal transport

with Tyler Franconi

Clearly, England is a very wet country in which it is very hard to position yourself far from the nearest water source. As such, the rivers and streams of England would have been used for transportation from a very early period, especially when dealing with the transport of large and/or bulky materials. How accessible the waterways of England were to transportation depends upon a number of factors, including the size of vessel used, the fierceness of flow of the river, and whether one was travelling up or down stream. These factors are too complex to make modelling of water-based transport simple. In some areas, low velocity river valleys may provide the best corridors for land-based movement.

Therefore, the map presented here shows a simple and coarse flow accumulation model derived from our elevation data (see p.14). The idea is simply that the darker the blue colouring, the more likely it is that water-based transport was possible in the past. Essentially, with a small vessel (especially if small enough to be portaged), people in the past would never have been far from a potentially navigable waterway in England.

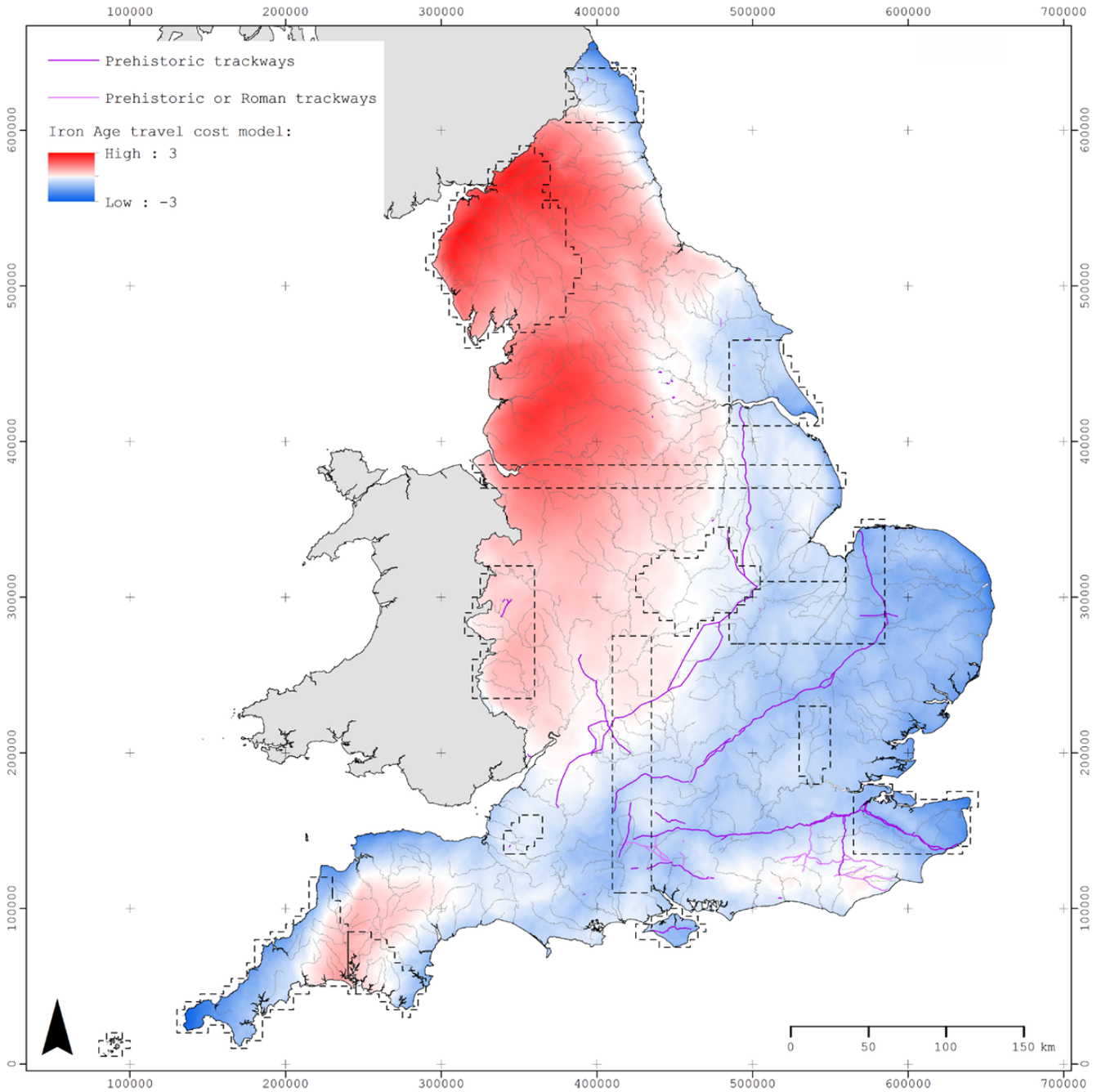
In the models that follow (pp. 69-72), if riverine or coastal transport was particularly important during the period of interest, one would expect to see corridors of low cost appear along the relevant rivers or around the relevant coasts, as those models are based entirely upon archaeological evidence on the assumption that archaeological evidence accumulates along corridors of communication.



Prehistoric routeways

The origins of the great ridgeways/trackways of England are hard to date precisely, but they are generally considered to originate at some point during later prehistory. The three long distance routes that are known of all have one end in central southern England and their other ends, respectively, on the Humber estuary, the Wash, and the Kentish coast. However, these three routes provide a very limited picture of travel and communication in prehistoric England.

As such, we constructed a model of relative travel 'cost' for the Iron Age in England based upon the density of archaeological evidence in our data (using a similar method to that used to fill gaps in the Roman road network by Orengo & Livarda 2016). This relies upon an assumption that more archaeological material implies greater connectivity and, thus, lower travel cost. Areas of higher cost could be argued to be less travelled and settled in the past, and vice versa. The justification for this model is that people travelling across territory unknown to them in the past would have needed to rely upon local guidance and established routeways in order to navigate and clearly this would have been easier in areas with denser and more settled local populations.



References:

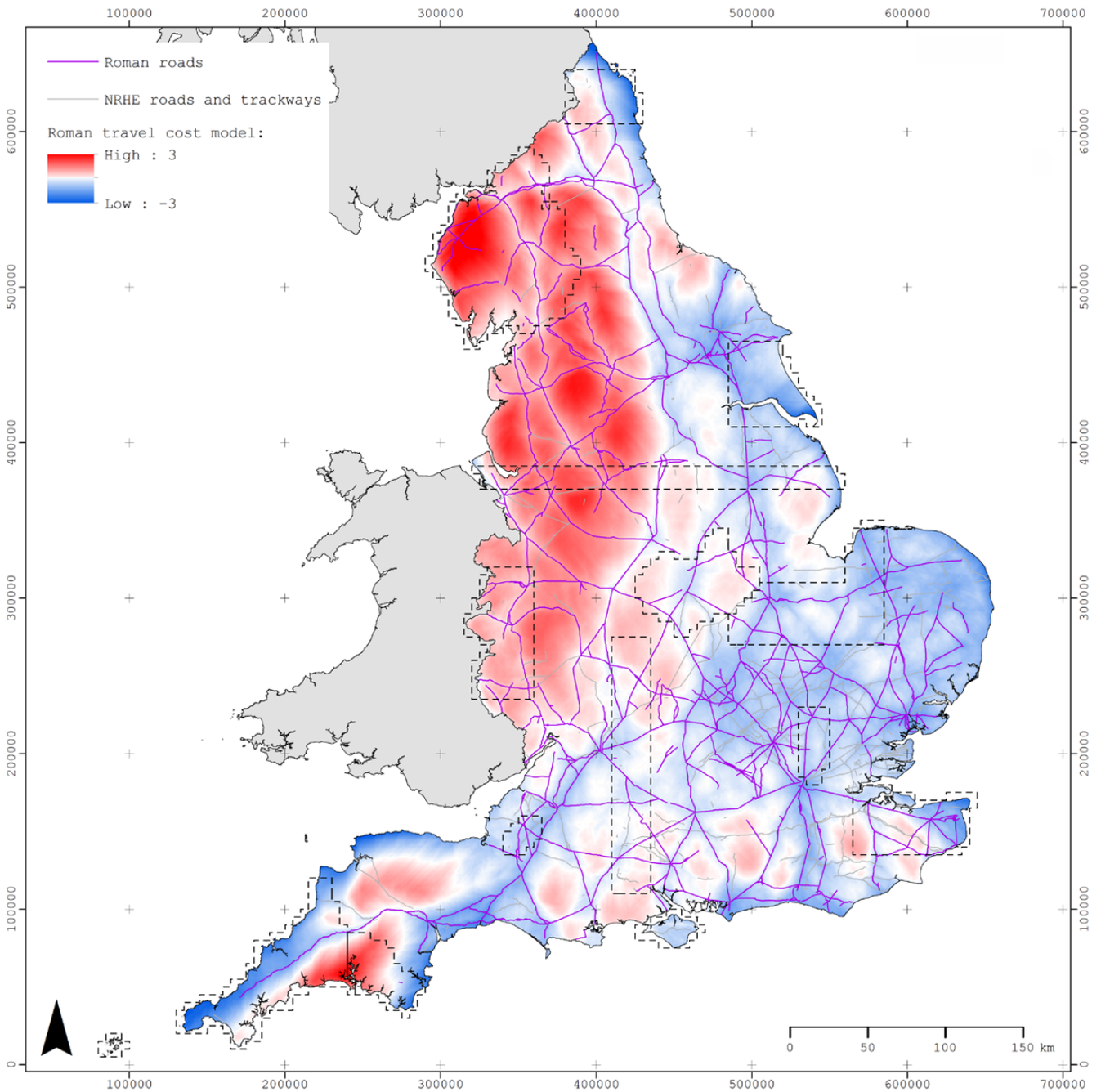
• Orengo, H.A., & A. Livarda. 2016. 'The seeds of commerce: A network analysis-based approach to the Romano-British transport system.' Journal of Archaeological Science 66: 21–35

Roman roads

The Roman road network is the first formalised transport system that we know of in Britain. The map below shows Roman roads recorded in our dataset. A problem with Roman roads is that there has been a tendency for any reasonably straight road to be assumed to be of Roman origin, but this is often not the case. Therefore, roads recorded as 'supposed' or 'possible' have been filtered out (this dataset was used to compare against modern roads on p.72).

In an attempt to understand to some degree the level of use and settlement density around the road network in the Roman period, a model of travel cost was constructed, based upon the density of records of Roman date in the EngLaId database (as with the Iron Age example on p. 69).

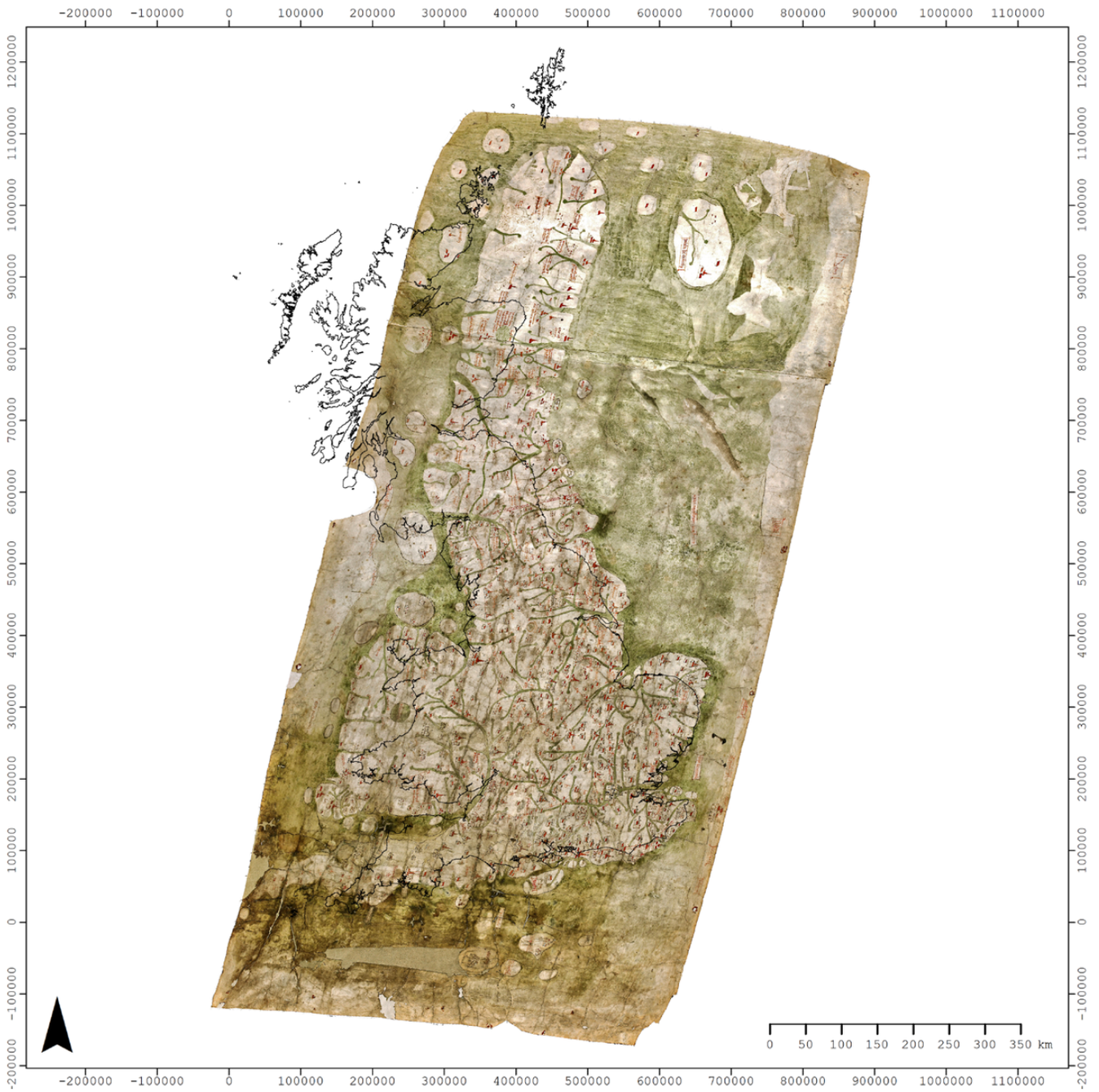
We can see from comparison of these datasets that connectivity appears strongest in southern and eastern England, and up into Yorkshire. Roads show up as relatively lower cost routes through northern and western England (unsurprising, as roads are included within the density dataset), but these appear less densely settled / connected than those in lowland England.



The Gough Map

The image below shows The Gough Map rotated and coarsely rectified using three common points: London, York, and Chester. The Gough Map dates to some point during the medieval period (probably between the 12th and 15th centuries) and shows many settlements within England. In some ways, it is a clear improvement over Ptolemy's Geography (see p.34), but not an immense one considering that over a millennium had passed between the creation of the two documents.

It is presented here as it features a number of red lines marked with distances, which have been conventionally described as roads. However, this viewpoint is largely mistaken and they probably better represent distance lines; in any event, a map such as this would make a poor aid to navigation, with local knowledge a much better guide (Delano-Smith et al. 2017: 15-18). As such, people in the past probably found it easiest to navigate across landscapes which they did not know well by sticking to well established routes and moving through areas where local knowledge could be easily acquired: the best proxy we have for this would be density of archaeological evidence.



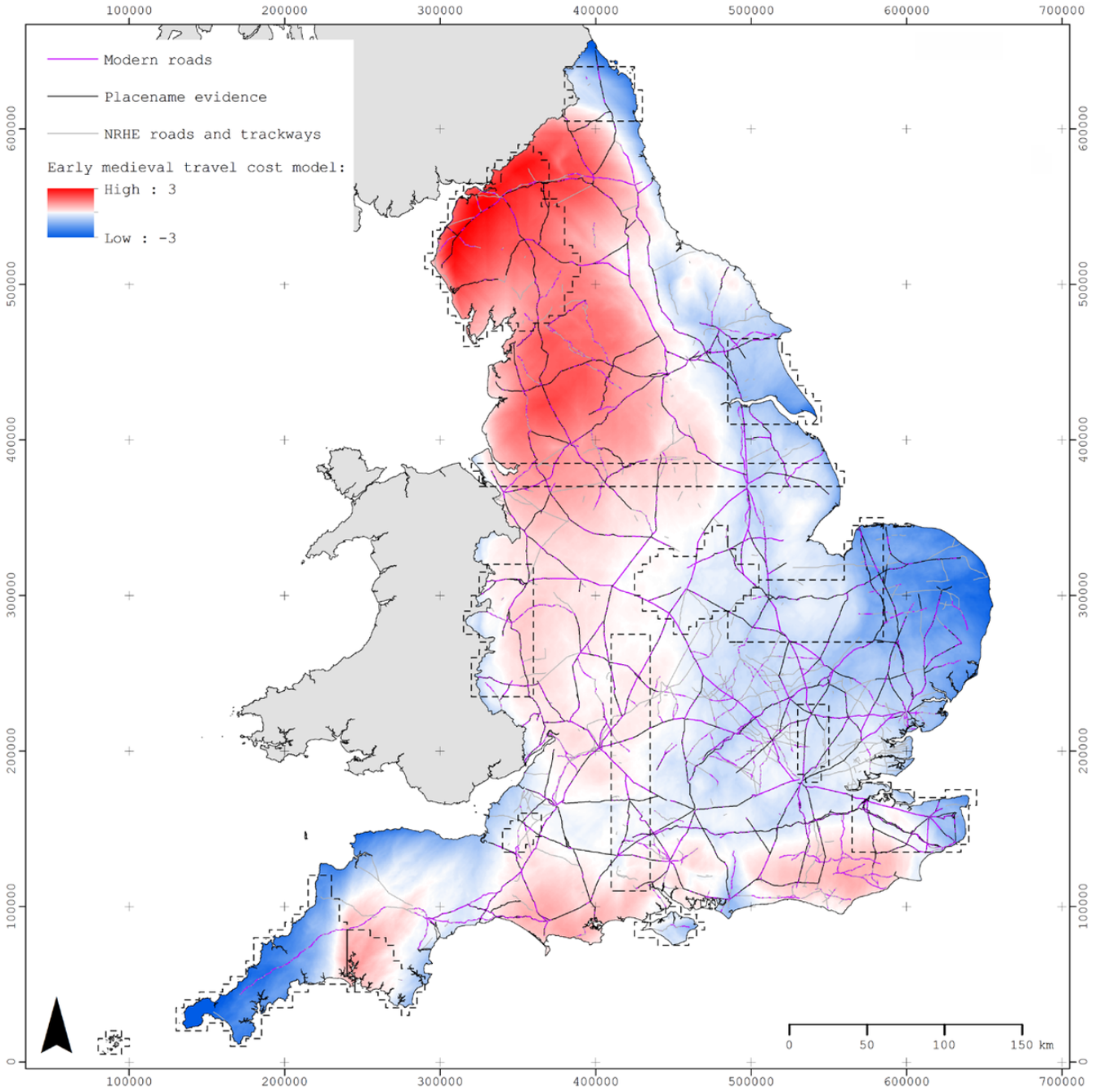
References:

• Delano-Smith, C. et al. 2017. 'New light on the medieval Gough Map of Britain.' Imago Mundi 69(1): 1–36; DOI: 10.1080/03085694.2017.1242838
• Gough Map: public domain image via Wikimedia Commons; https://commons.wikimedia.org/wiki/File:Gough_Kaart_(hoge_resolutie).jpg

Roman roads in the early medieval period

There are several obvious ways of trying to understand which Roman roads (and prehistoric trackways) were still in use in the early medieval period. Starting from roads and trackways in our dataset, one possible method would be filtering out those which feature suggestive place-name evidence (Cole 2013: routes therein that are not in our filtered dataset are not included). However, this produces an incomplete picture when we consider the routes that are still in use today, particularly in the Home Counties and Cornwall. Modern usage of routes seems a reasonable basis for a model, as it is unlikely that any routes that fell out of use would come back into use at a later time, due to intervening loss of memory and destruction. This will not give a complete picture, however, as some routes will have fallen out of use since the early medieval period.

Another possibility is considering the relationship between these routes and the density of archaeological evidence. The background to this map shows a model of relative travel 'cost' across England based upon similar assumptions to the models presented previously (see pp.69-70). When comparing this against the route networks, it becomes fairly clear that the routeways across eastern England are most likely to have seen extensive usage for travel and communication in the early medieval period. This is also the area with most extensive preservation of routes in the modern road network (albeit rebuilt on multiple occasions in all cases).



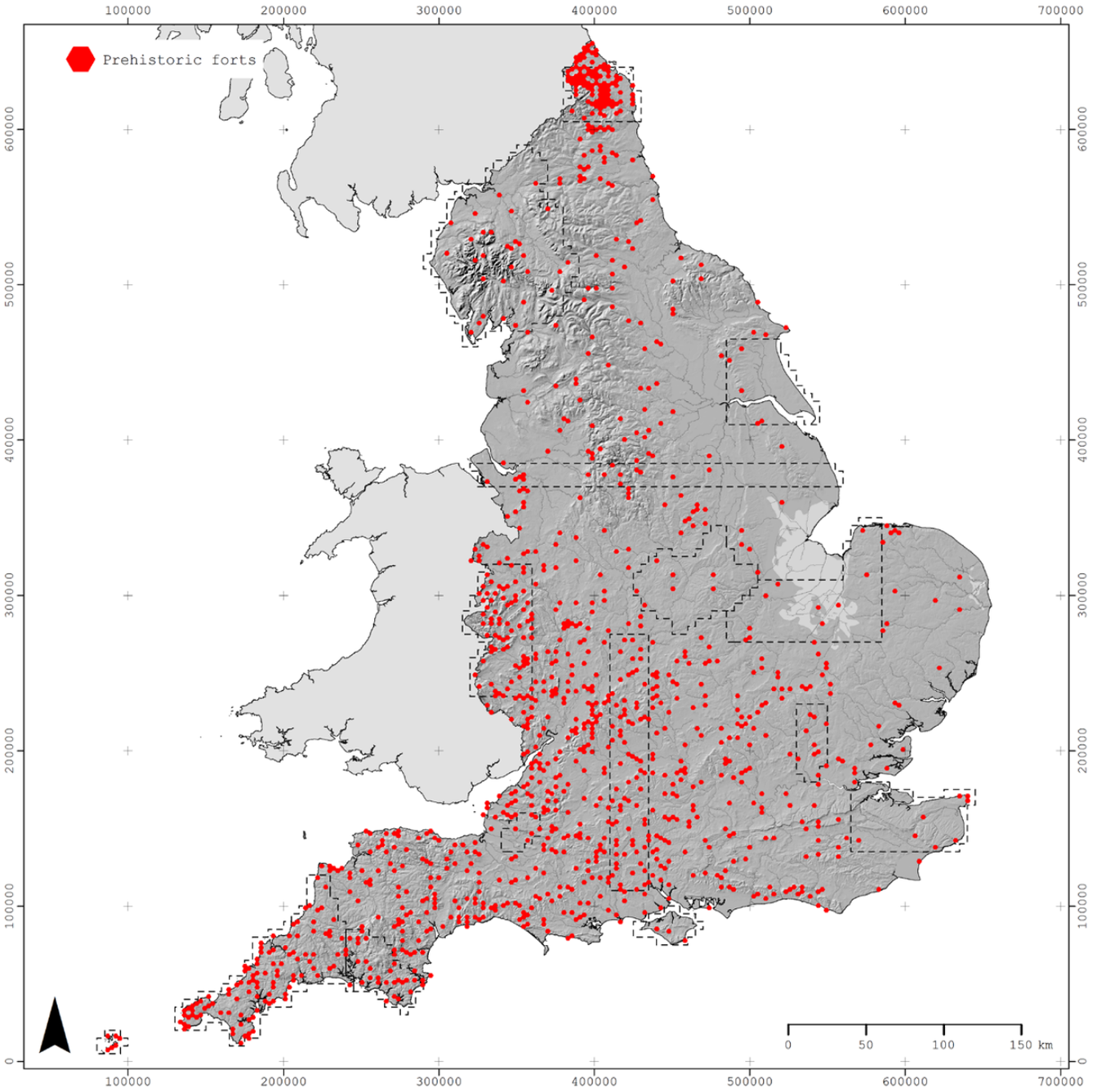
References:

• Cole, A. 2013. The Place-Name Evidence for a Routeway Network in Early Medieval England. BAR British Series 589

Fortification - prehistoric

Later prehistoric fortifications (mostly being of Iron Age date) can be roughly divided up into hillforts (see p.33) and other types of fort, such as promontory forts. The distribution mapped here shows all types of prehistoric fortification of all dates. It is substantially dominated by the distribution of hillforts (see also the online Atlas referenced below), but also features some differences, most notably the promontory forts of the south western peninsula. In England, prehistoric fortifications are most widespread in the south western half of England, and in Northumberland.

Some of these forts would have featured settlement, but others may not have done. All forts are clearly constructed to at least give off an image of defensibility, but the impression of this aspect may have been more important than the actuality.

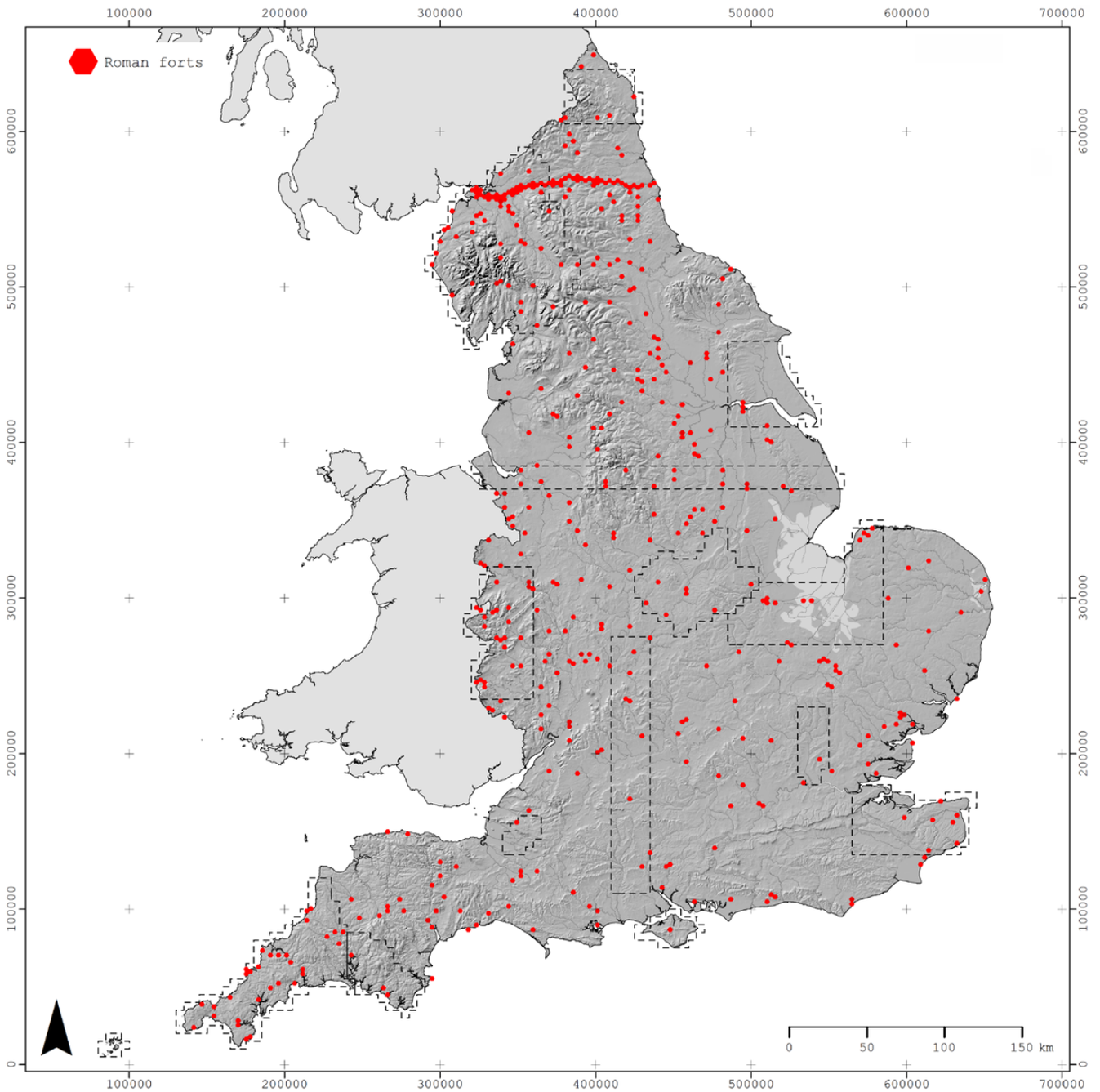


References:
• Atlas of Hillforts of Britain and Ireland: http://hillforts.arch.ox.ac.uk

Fortification - Roman

Fortifications of the Roman era are almost all of an imperial character, being created to house divisions of the Roman army. Some were very short lived and others persisted until the end of Roman rule. Some of those shown may in fact be Roman period reoccupation of earlier fortifications, especially in the south west where prehistoric forts were so common (p.73). Some of the forts seen along the coasts were forts of the so-called 'Saxon Shore', built to protect the province from maritime raiders in the later Roman period. One element that is not shown is that many towns were also fortified, especially later on in the Roman period.

The most obvious feature on this map, however, is Hadrian's Wall. This massive fortification spanned the country from coast to coast and marked the edge of formal Roman control. However, Roman forts existed beyond the wall (and not just during the period when the frontier was in Scotland at the Antonine Wall), so the border should not be thought of in similar terms to the strict borders of most modern states, as the area beyond the Wall was clearly subject to some level of imperial control.

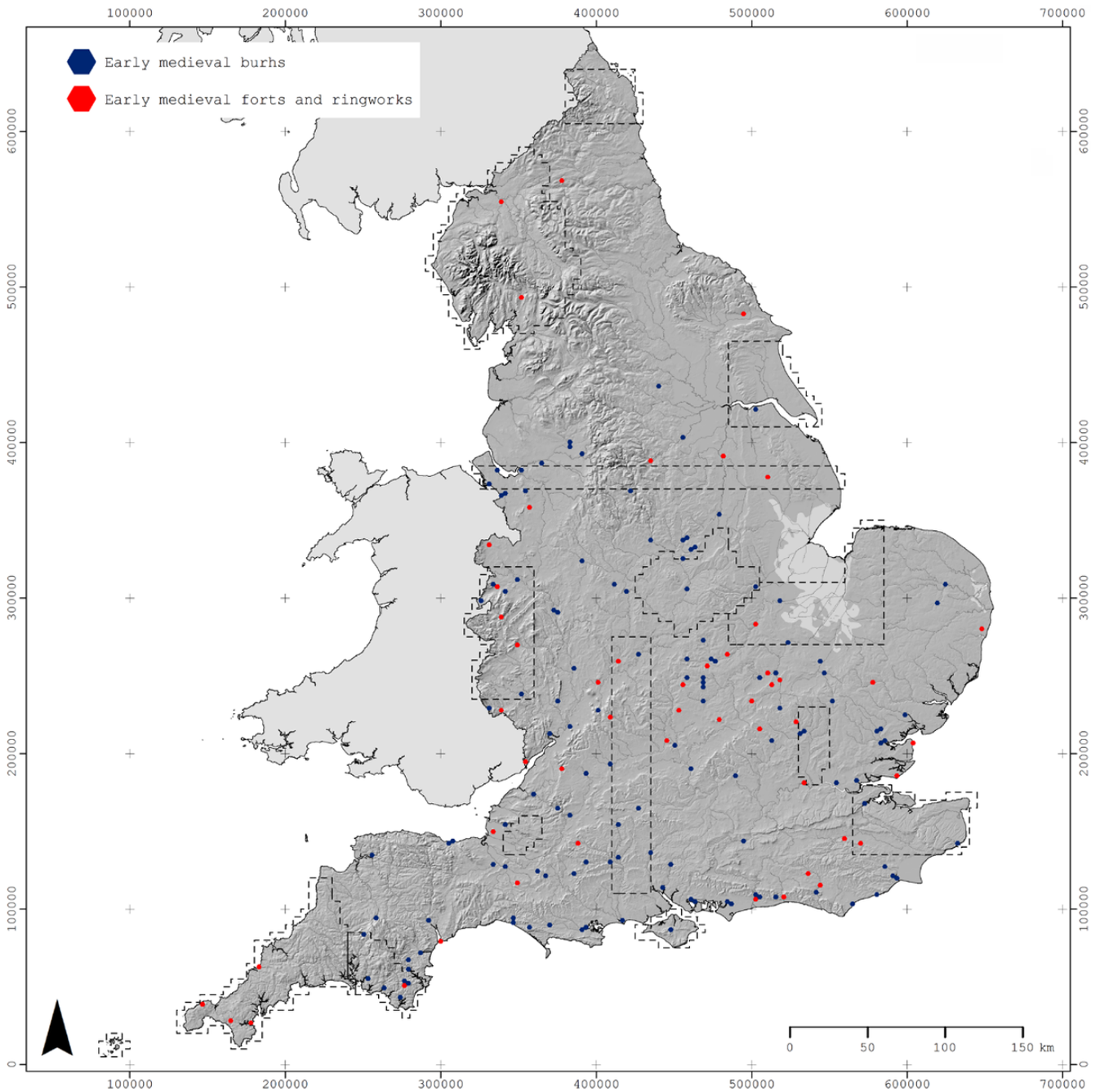


Fortification - early medieval

with Letty Ten Harkel

Fortifications of the early medieval period are much less common than those of the Roman or prehistoric eras (pp.73-74). Here, we have mapped early medieval forts and ringworks, some of which were of very short-lived character, perhaps just providing a base for an army on campaign or over winter. We have also mapped records we have for 'burhs', which were the fortifications and fortified settlements initially created by Alfred the Great in the face of Viking aggression. Some of these were reused Roman or prehistoric fortifications and others were new foundations. Our data records more burhs than are detailed in the list known as the 'Burghal Hideage' (Baker & Brookes 2013), which probably dates to the reign of Alfred's son and daughter.

The 'burhs' shown on this map must, thus, also include fortified settlements outside the political control of Wessex and Mercia, such as those constructed by Vikings or by local magnates. Towards the very end of the EngLaId period, a significant increase in the construction of fortifications took place, as the tradition of motte-and-bailey castles seems to have arrived in England in the wake of the Norman Conquest of AD 1066. These are not included here, as AD1065 was the cut-off date for our data collection to avoid introducing very large numbers of later medieval records into our database (with most of our data providers using AD 1065 for the end of the early medieval period).



References:

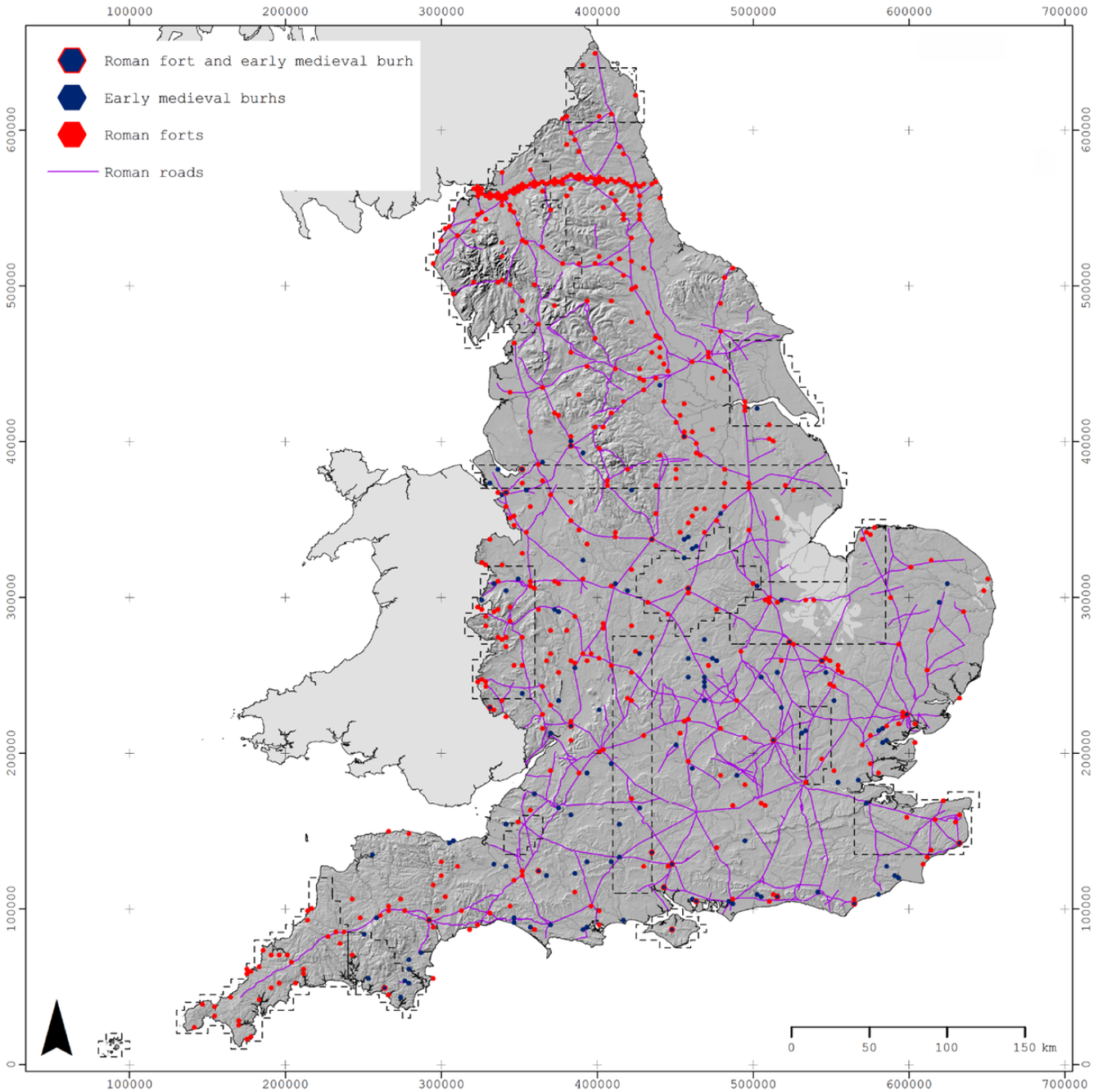
• Baker, J.T. & S. Brookes. 2013. *Beyond the Burghal Hidage: Anglo-Saxon Civil Defence in the Viking age*. Leiden: Brill.

Routeways and fortification

The two key elements of defence and control of territory are fortification and communication. As such, it should be of little surprise that both Roman forts and early medieval burhs are very often sited on the course of or close to Roman roads, many of which were still in use in the early medieval period (see p.72). In fact, in some cases where fortifications are not on roads, the more likely case is that the route of the road has been lost, rather than that there was never a road there. Notably, but again unsurprisingly, many fortifications occur at junctions or nodes in the road network, which would maximise mobility of troops (see Baker & Brookes 2013).

It also seems to be the case that fortifications are more densely situated in the areas of England with less accessible terrain (see pp.66-67), which again makes tactical sense, as travel to meet any sources of danger would take longer and, as such, a defensive force could only feasibly protect a smaller area of space in less accessible countryside.

It should be noted that this map shows all relevant fortifications recorded in the EngLaId database, some of which would only have been in use for a short period of time (notably most Roman sites in south-eastern England).



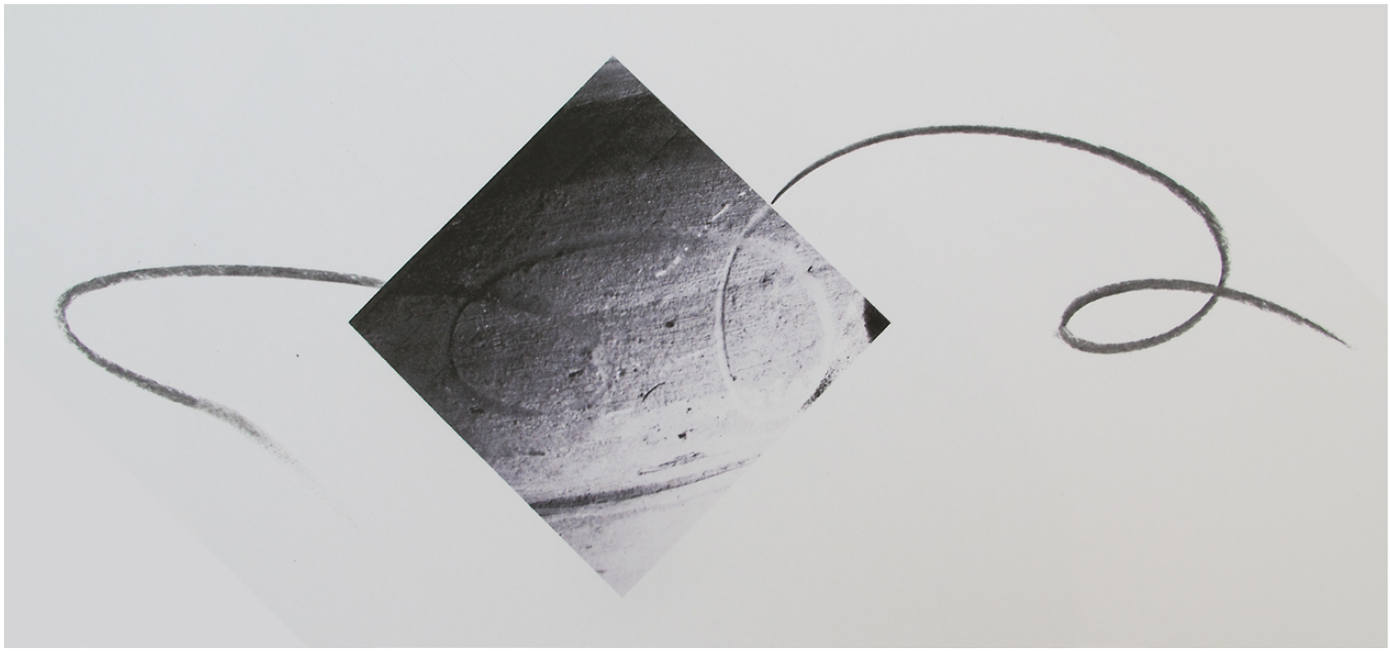
References:

• Baker, J.T. & S. Brookes. 2013. Beyond the Burghal Hidage: Anglo-Saxon Civil Defence in the Viking Age. Leiden: Brill.

Chapter Seven:

Landscape and making things

This chapter looks at the production of material products by people in the past, with a particularly focus on metal and pottery production.



Two Loops, Two Times. 2013-2017.
Image of an Iron Age sherd of pottery excavated at Steane Park, Northamptonshire, in 2013, next to a contemporary drawing. Images by Miranda Creswell.



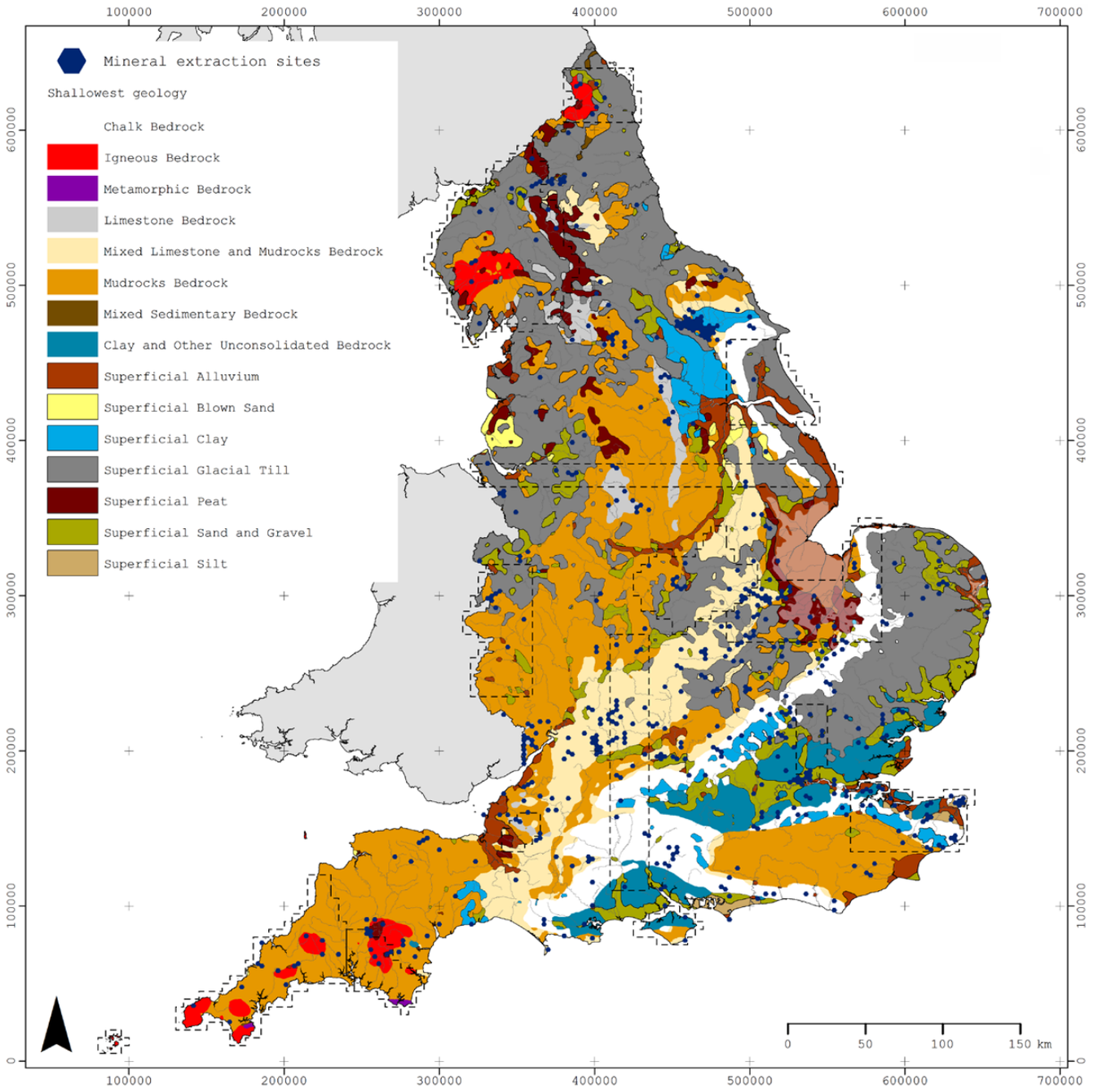
Bird With Gold Leaf. 2016.
Artwork with an image of a bird standing on the ground with a leafy branch in its beak copied from a 'Brancaster type' gold ring; Roman late 4th to early 5th century AD, collection of the British Museum. Created in gold leaf and pencil on paper and presented next to a map by Chris Green of counts of unique PAS finder names per 10 x 10 km square for England, approximating to variation in numbers of metal detectorists across England. Artwork by Miranda Creswell.

Mineral extraction sites

with Zena Kamash

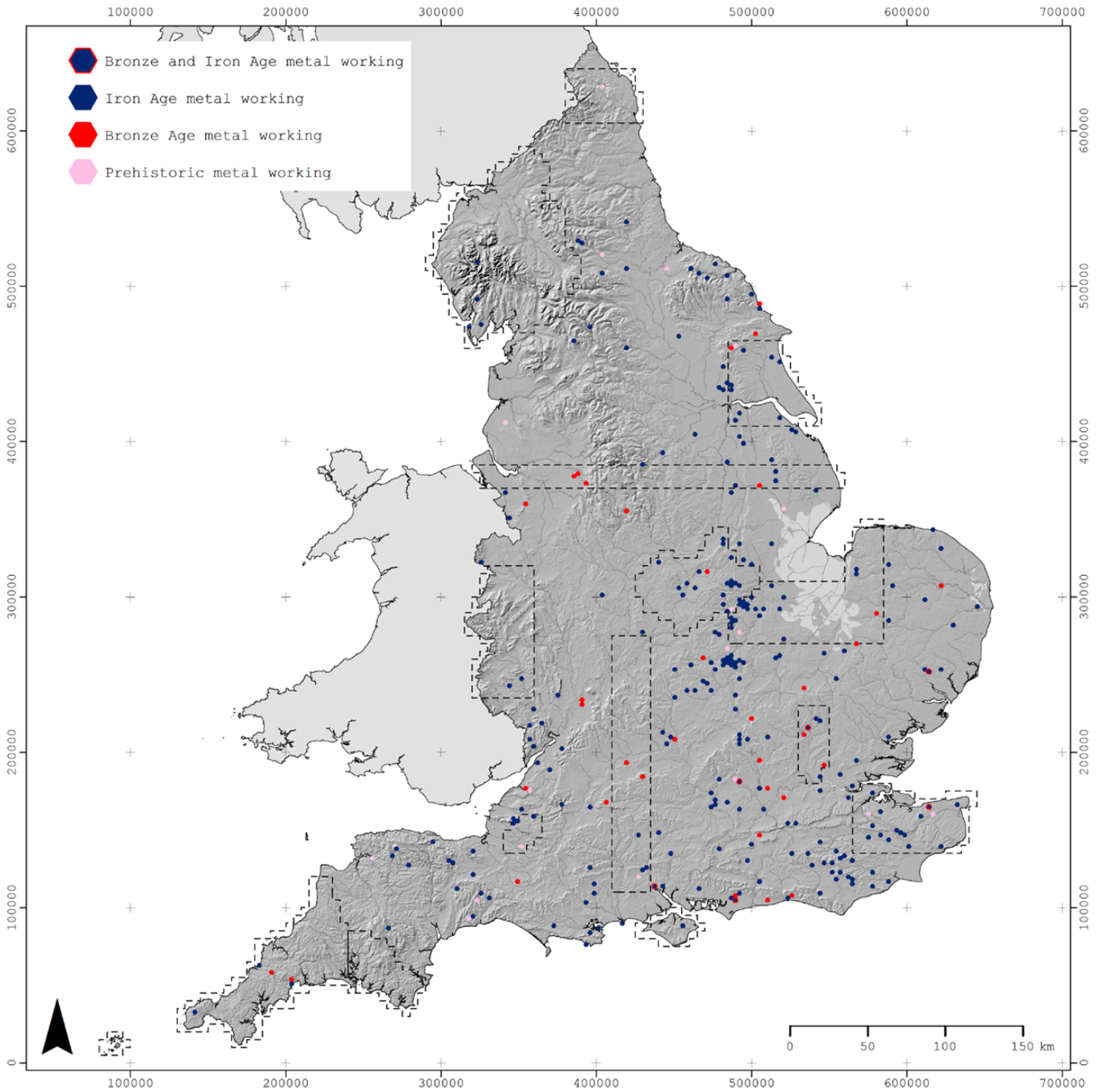
Mineral extraction sites and quarries (of all EngLaId periods) are distributed across England. They are most dense in the southern Midlands and down into Kent, along with a particular large cluster (of apparently Roman/early medieval date) in Yorkshire. They do not appear to show any obvious bias towards particular geologies (see p.17). The period with most sites of this type is the Roman era. Mineral extraction in the Roman period was heavily controlled by the imperial administration and may have been one of the key reasons why Britain was important as a province. As such, this peak in Roman period activity may have been driven by factors external to the island.

The products of these quarries and other extraction sites would have gone on to be used in a variety of industrial processes, including as building material and as the raw material for metal production.



Metal working - prehistoric

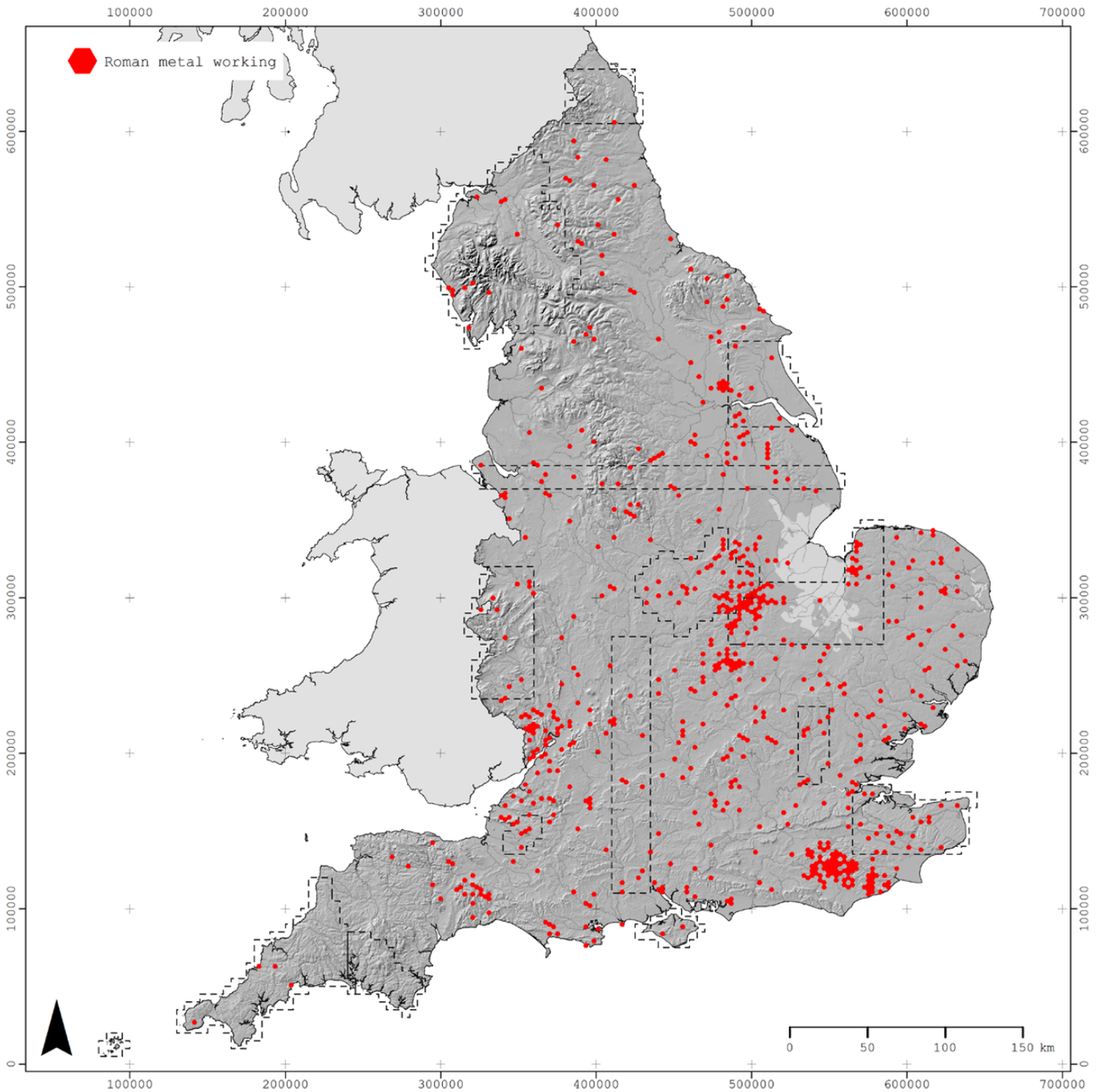
Evidence for metal working in the Bronze Age in our data is rather sparse: too sparse to show any believable spatial patterning. Iron Age evidence is much more common, and rather biased towards the eastern half of England, with the exception of some material around the Severn estuary. Northamptonshire appears as something of a peak in density, and we begin to see the appearance of iron working in the Weald in Kent / Sussex (see p.80).



Metal working - Roman

Evidence for metal working in the Roman period is much more widespread than in prehistory (p.79). Three distinct clusters of particularly dense evidence are very obvious, which were all starting to appear in the prehistoric evidence: the Weald in Kent/Sussex, Northamptonshire, and the Forest of Dean in Gloucestershire. This is the one category within our data that shows up densely in the Weald in particular, which is otherwise a largely blank space in most distributions of our evidence.

As with early medieval metal working (p.81), production of metal objects undoubtedly also took place in the large towns and also at many military sites, which may not have been recorded in our database due to not being the primary function of those sites.



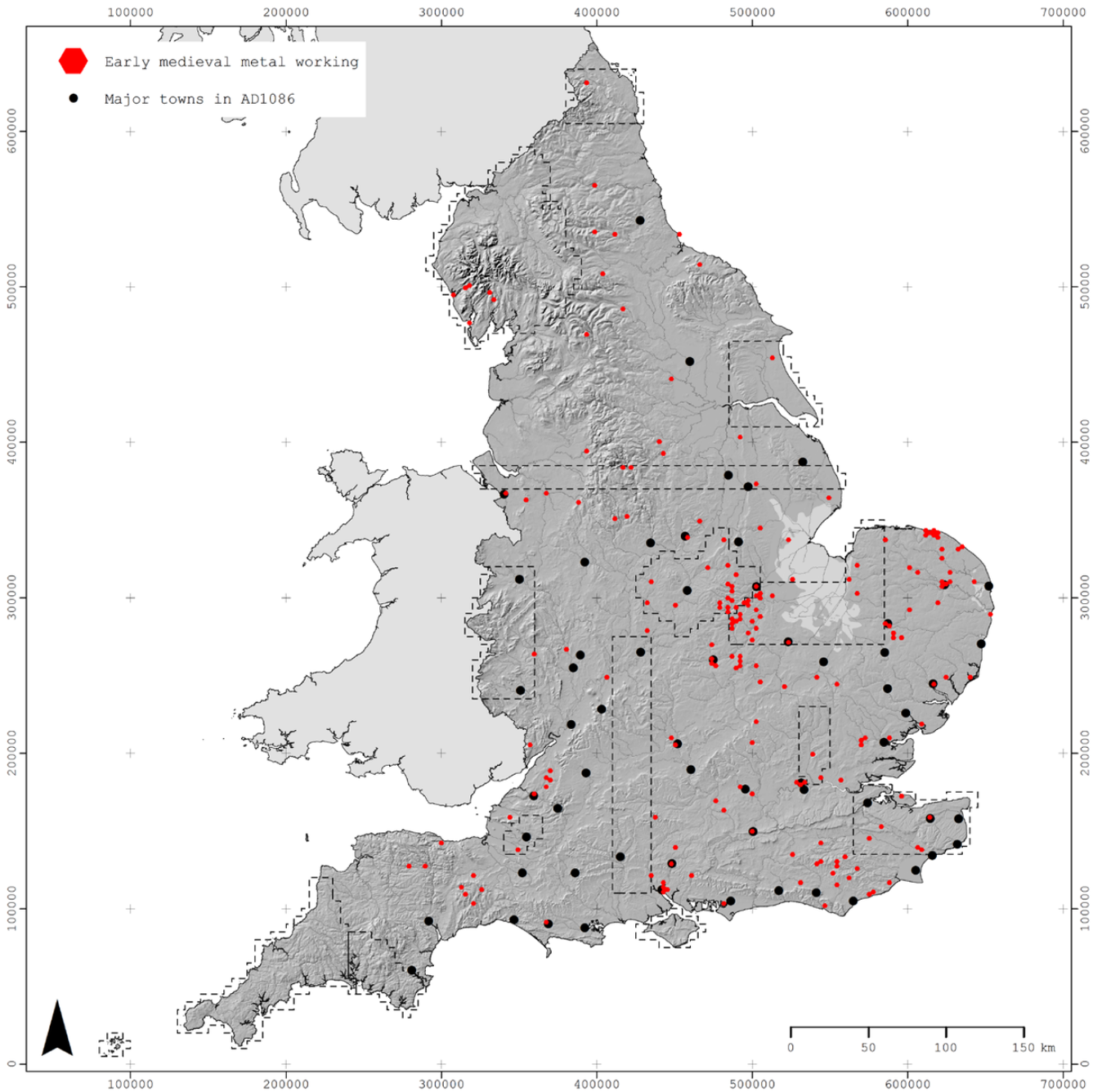
Metal working - early medieval

with Letty Ten Harkel

Evidence for metal working in our data for the early medieval period is also fairly sparse. It is notable that the cluster seen in the Roman period in Northamptonshire (p.80) remains, as to some degree does that in the Weald.

A notable gap in our evidence, however, is industrial activity within most of the large towns of medieval England. As such, we have also mapped the major towns of AD 1086 (see p.37), as most of these would have featured the presence of ferrous metal working, at least towards the end of our time period of interest.

As iron was used for so many different purposes, ferrous metalworking would also have taken place in many villages and on monastic sites (not mapped here). Non-ferrous metalworking was more specialised and evidence is largely restricted to high-status sites such as Lincoln, York, Thetford, Northampton, Winchester and London (Bayley et al. 2008: 52), as well as certain monastic sites. By the end of our period, mint signatures on coins suggest that minting – a form of silver working – took place in many of the towns, and was thus relatively widespread.



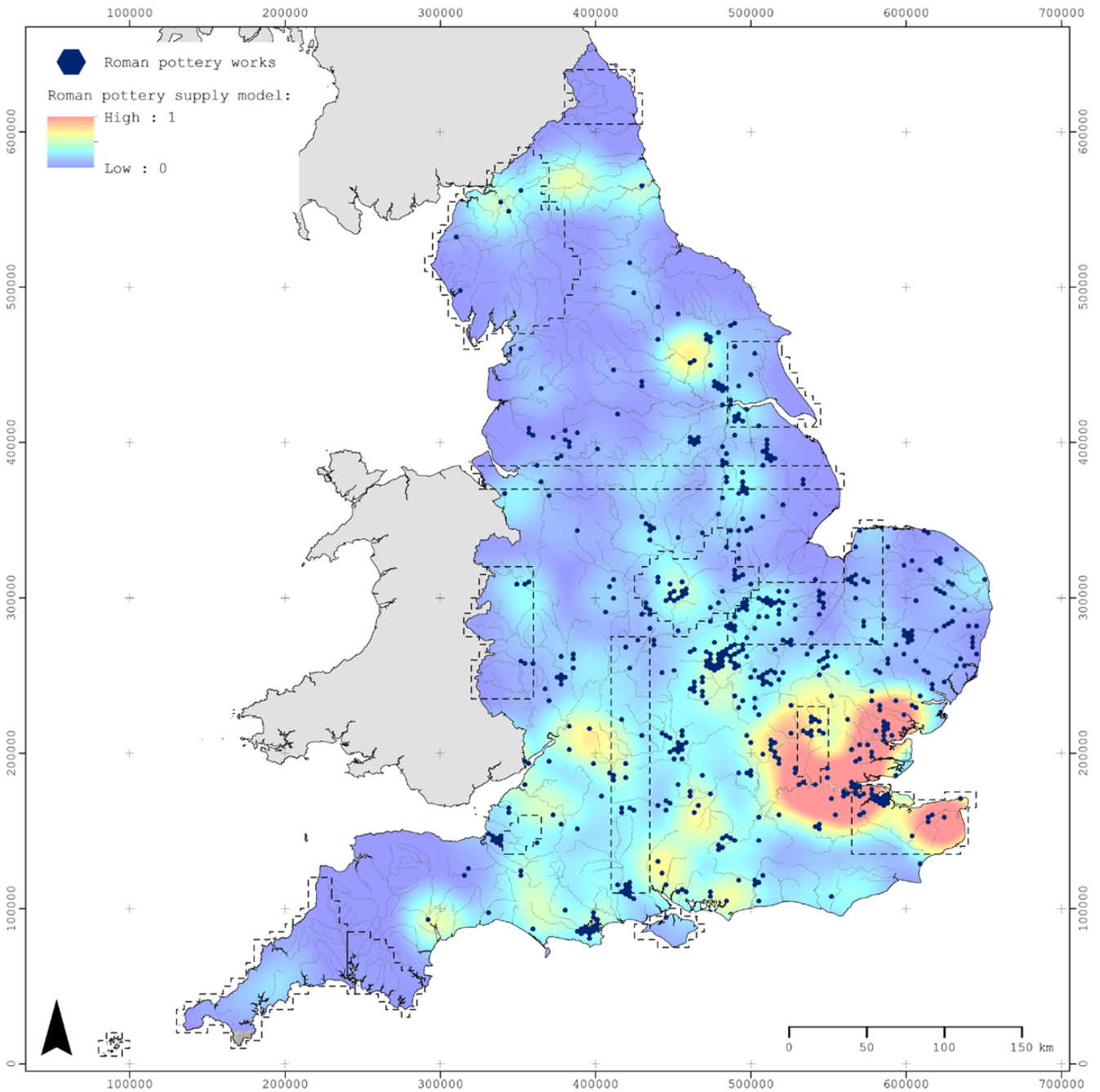
References:

• Bayley, J., D. Crossley & M. Ponting. 2008. Metals and Metalworking: A Research Framework for Archaeometallurgy. The Historical Metallurgy Society Occasional Publication 6. London: Historical Metallurgy Society

Pottery manufacture - Roman

Pottery manufacture in the Roman period was very widespread in the southern half of England, and sporadic across the north. The areas where pottery was produced appear quite strongly clustered, reflecting either local industrial collaboration or control.

When mapped against a coarse model of British manufactured pottery supply (see p.10 for a model including imported wares; source listed below), which effectively displays in this case the variety of pottery being deposited archaeologically (rather than the amount), we can see that areas with access to more types of pottery generally were often also the same areas with many local pottery producers, with some exceptions (particularly in East Anglia).

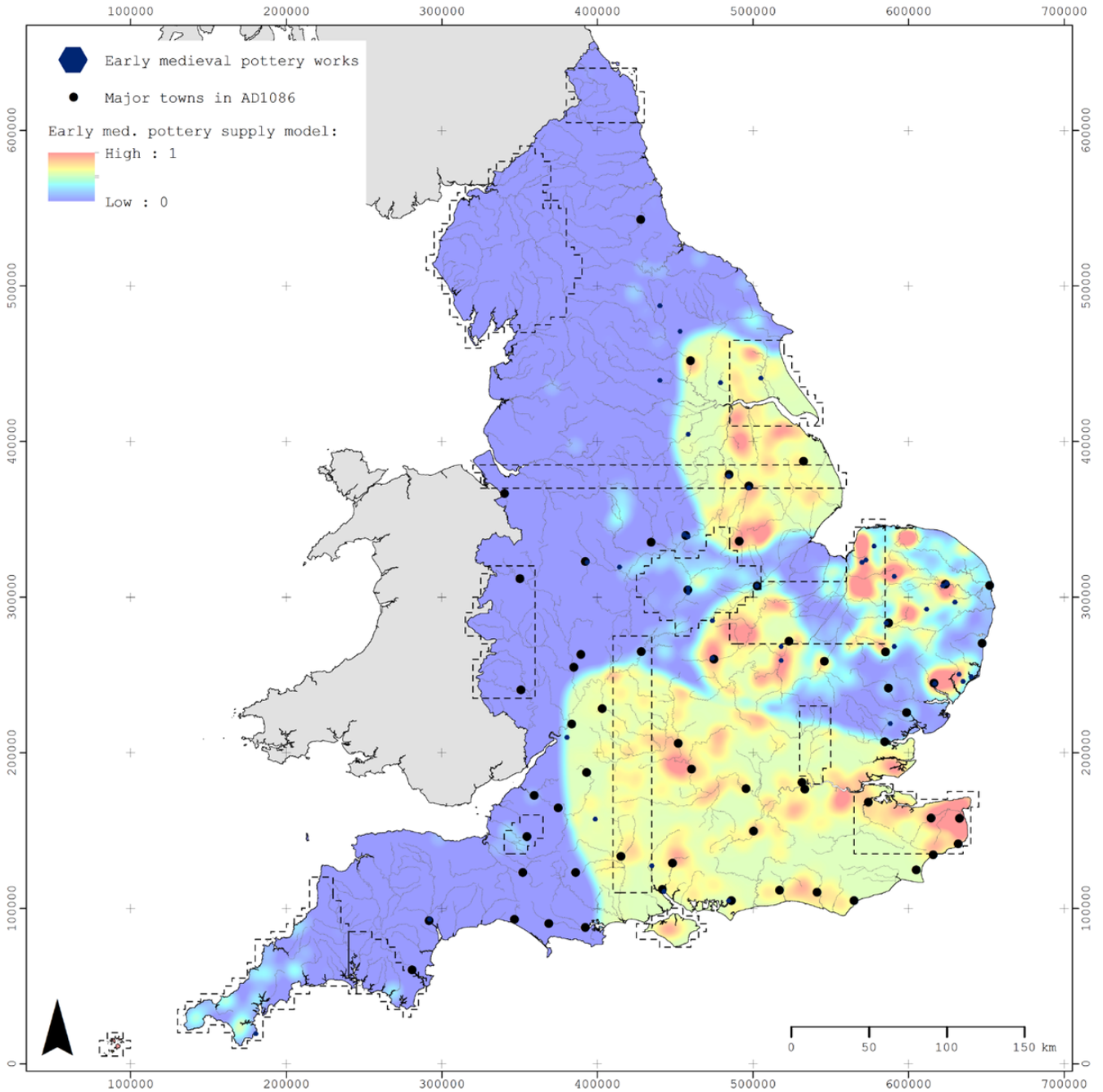


References:

• Tyers, P.A. 1996–2014. Potsherd. http://potsherd.net/atlas/potsherd

Pottery manufacture - early medieval

Early medieval pottery manufacturing sites are rather sparse within our data and presumably largely represent the return of wheel-manufactured wares towards the end of our period of interest. As with metal working, we have again plotted the towns of AD 1086 (pp.37 & 81), as at least some of these must also have seen the manufacture of pottery towards the end of our time period. When plotted against our model of pottery supply for the period (see p.10; sources listed below), there is little obvious relationship between manufacture and deposition, although this will partly reflect the fact that the model includes earlier types of pottery than the likely dating of the production sites.

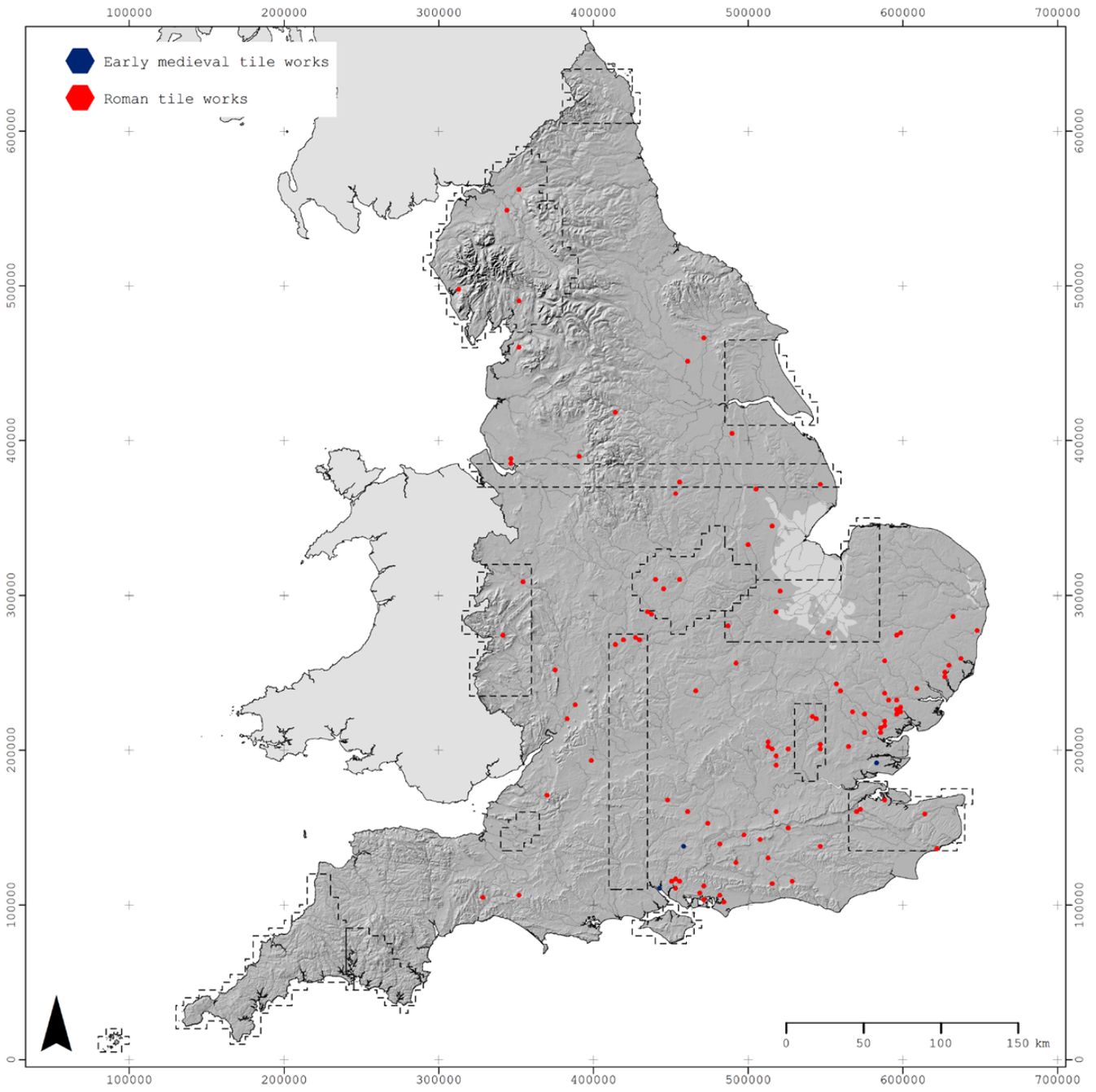


References:
• Blinkhorn, P. 2012. The Ipswich Ware Project: Ceramics, Trade and Society in Middle Saxon England. Medieval Pottery Research Group Occasional Papers, London: Medieval Pottery Research Group
• Martin, T. 2011. Identity and the Cruciform Brooch in Early Anglo-Saxon England: an Investigation of Style, Mortuary Context, and Use. Unpublished PhD thesis, University of Sheffield
• Myres, J.N.L. 1969. Anglo-Saxon Pottery and the Settlement of England. Oxford: Clarendon Press
• Vince, A. 1993. 'Forms, functions and manufacturing techniques of late ninth- and tenth- century wheelthrown pottery in England and their origins.' In: D. Piton (ed.) Travaux du Groupe de Recherches et D'Etudes sur la Céramique dans le Nord - Pas-de-Calais; Actes du Collque D'Outreau (10–12 Avril 1992): 151–64. Numéro hors-série de Nord-Ouest Archéologie
• Wood, I. 2011. Changing The Fabric of Life in Post-Roman and Early Medieval Cornwall: An Investigation into Social Change through Petrographic Analysis. Unpublished PhD thesis, University of Exeter

Tile works

Very few tile works are recorded for the early medieval period, suggesting that little tile production took place in England during that time. This is perhaps not surprising as relatively little building in stone took place in England from the end of the Roman period until quite some time after the Norman conquest.

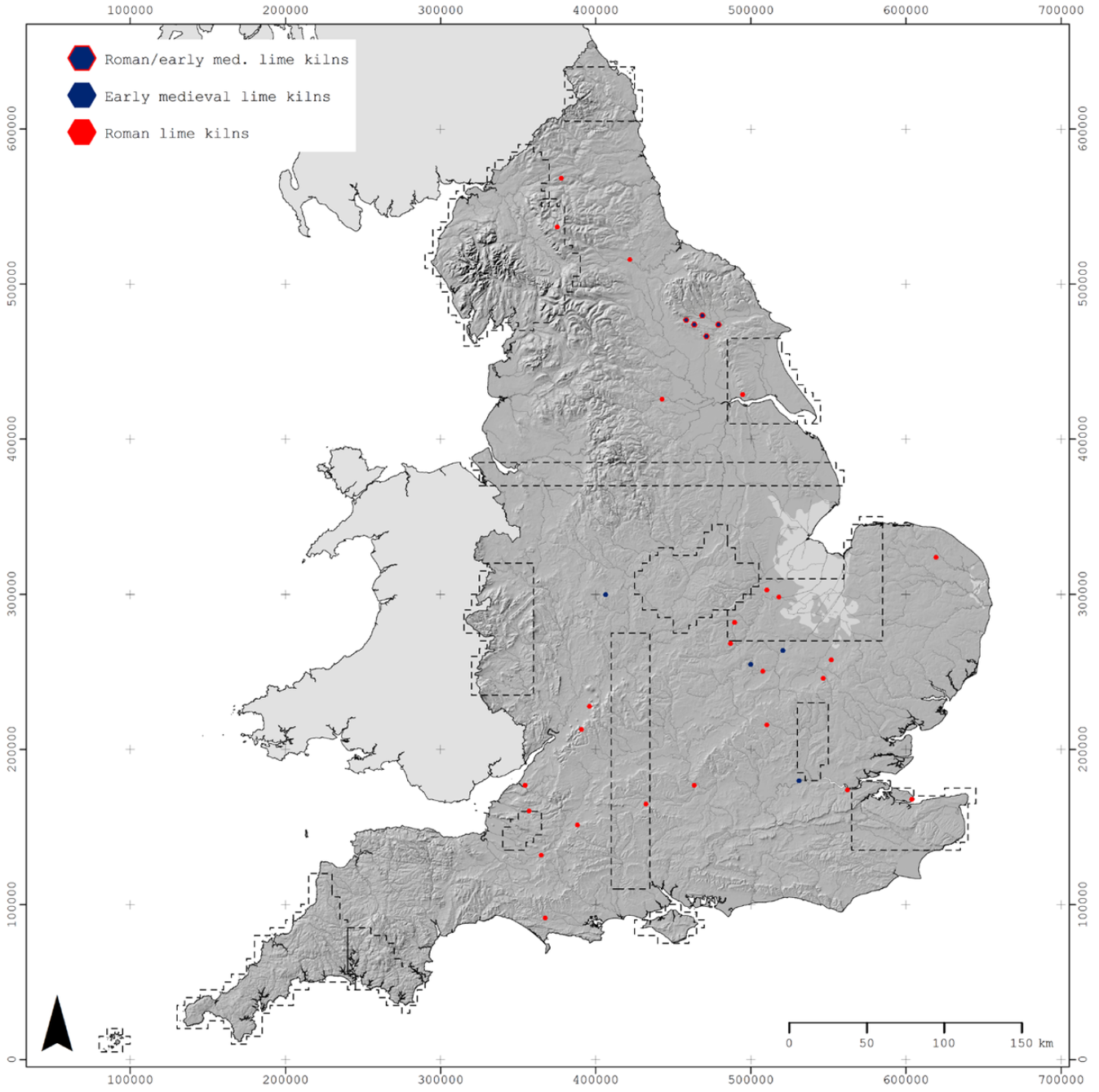
Roman tile works are fairly widespread in south-eastern England and sparsely distributed across the rest of the country. Particular foci of production appear to be north of the Solent and in Essex. The sparseness of the distribution overall suggests that either tiles travelled a (relatively) long way from their point of manufacture to their point of use (and eventual deposition) or that our record of tile production in the Roman period requires further study and enhancement (again, perhaps production within larger types of site is under-represented in our database).



Lime kilns

Lime kilns within our data are sparsely distributed across England through both the Roman and early medieval periods. Many parts of the country (notably the south west and the north west) show no evidence whatsoever.

As with mineral extraction (p.78), there is a notable cluster of data in Yorkshire at the end of the Vale of Pickering. Again, this appears to be of both Roman and early medieval date. The recurrence of this cluster across different site types, albeit related ones, presumably represents the work of a specific research project. If industrial production in this area was as intensive as the data suggests, perhaps we still have a lot more to learn about the scale of production in other areas of England.



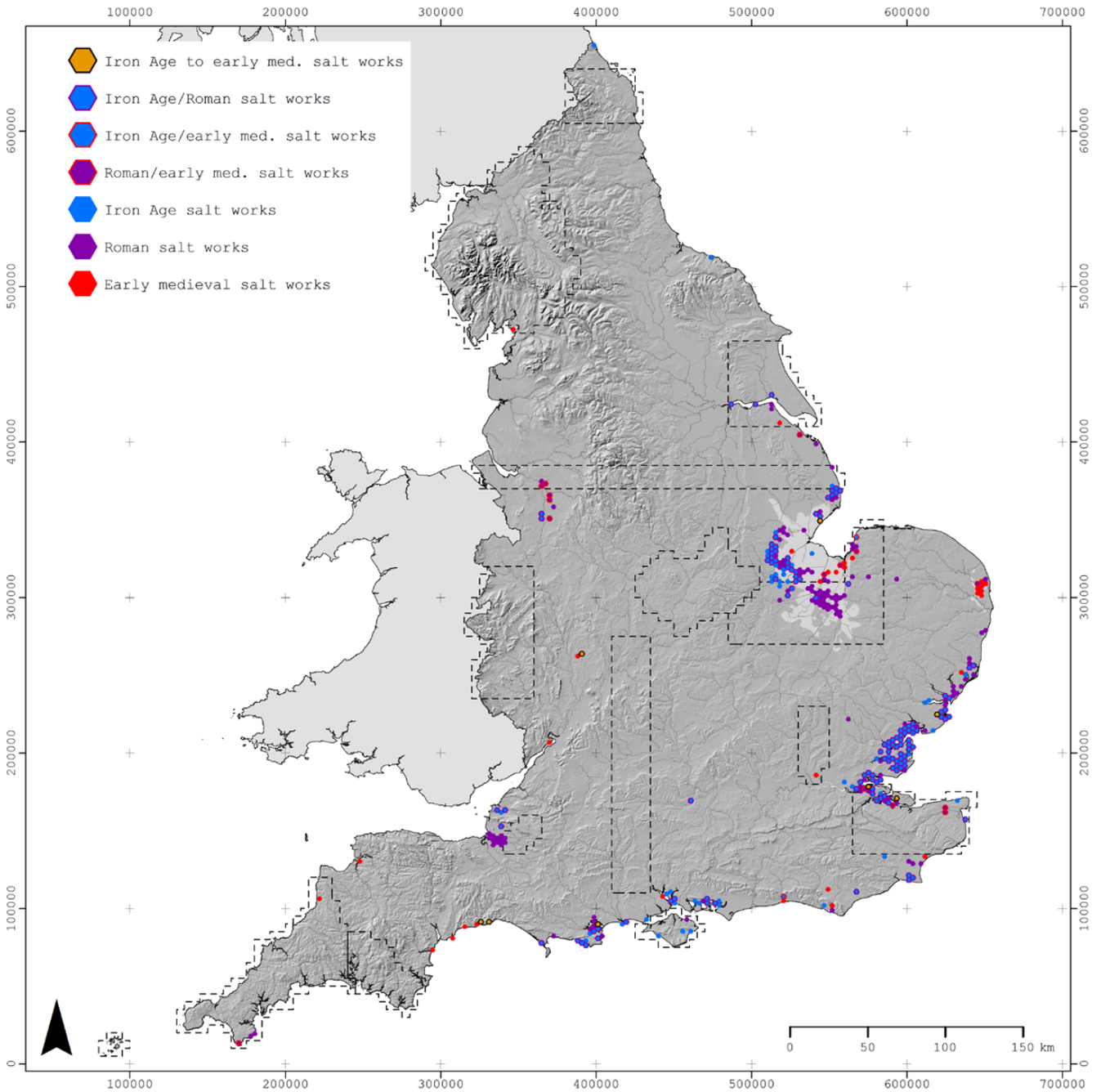
Salt production

with Janice Kinory

The production of salt for preserving food was vital for the longer term storage of reserve food supplies prior to the invention of refrigeration. Salt production took place in England throughout the EngLaId time period, the evidence for which is most intense in the Iron Age and Roman periods. The inland sites on the map below largely represent the deposition of briquetage, the coarse ceramic vessels used in evaporative salt manufacture, presumably away from the actual place of production. The extensive coastal distribution of salt production sites represents evidence of primary production.

Several coastal areas appear to have been involved in intensive salt production in the Iron Age and Roman periods, most obviously around the edges of the former extent of the Wash and along the coast of Essex / Suffolk. There are also smaller but no less dense clusters on the south coast and in Somerset. Evidence for early medieval production is more sparse, although appears particularly extensive around the Norfolk Broads.

The results of all of this industrial effort must have been traded extensively across the rest of England and could, perhaps, represent the base of wealth for the great later Iron Age tribes of the Fens (the Iceni/Corieltauvi) and Essex/Suffolk (the Catuvellauni/ Trinovantes).



References:

• Kinory, J.L. 2012. Salt Production, Distribution and Use in the British Iron Age. BAR British Series 559

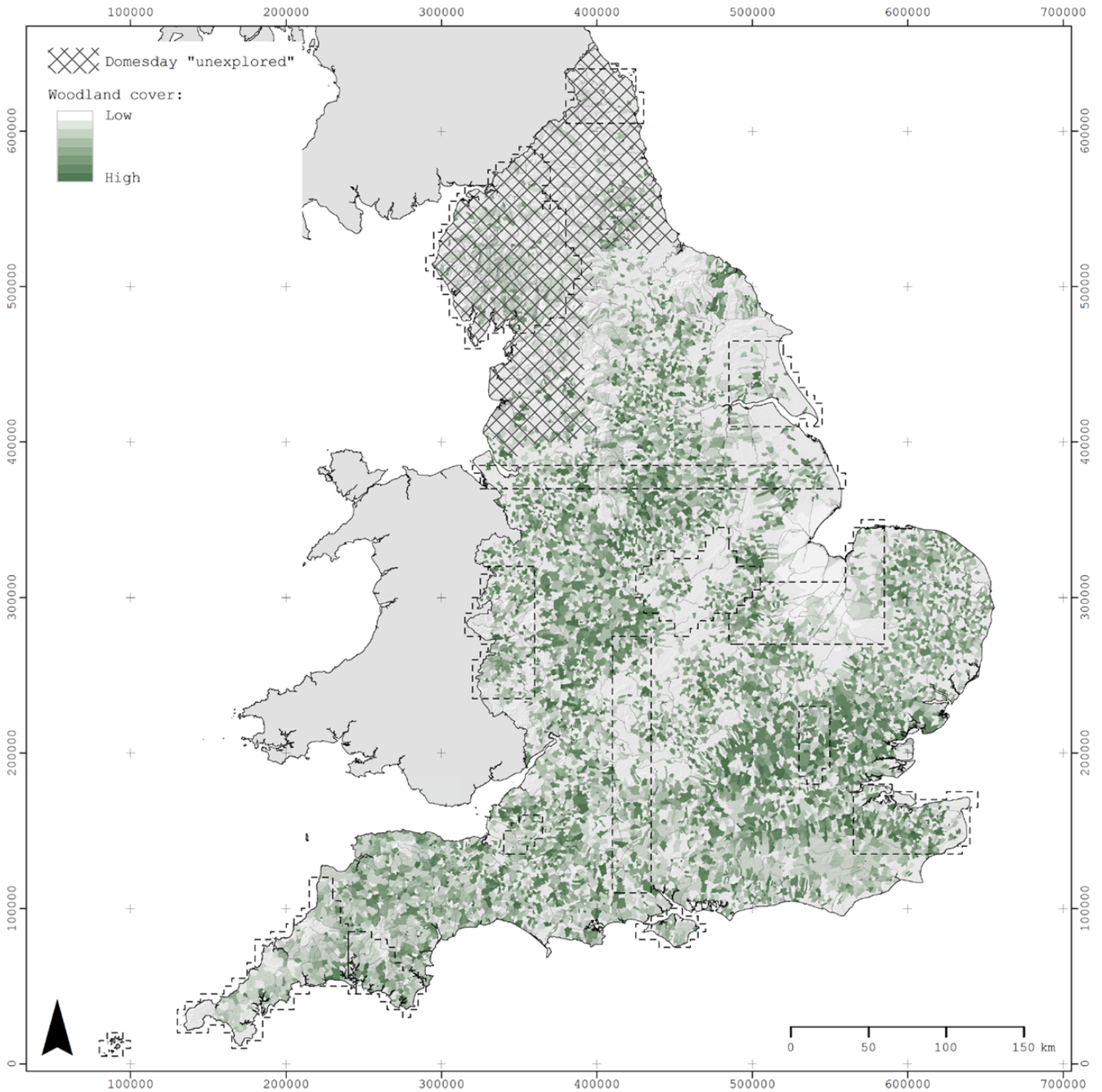
Woodland

after Roberts & Wrathmell 2000

One thing that almost all of these industrial/manufacturing processes have in common is the need for fuel to provide heat. In the majority of cases, this will have been provided by charcoal (or perhaps unmodified wood). Charcoal requires trees for its production, as it is made by the careful partial burning of wood.

Evidence for how much tree cover there was in the environment during the EngLaId period is patchy at best, so we must look to a proxy. In this instance, we have remapped data derived from placenames and from Domesday Book by Roberts & Wrathmell (2000: fig 24) and binned it into 19th century AD parishes (Burton et al. 2002), as these are thought to have roots in the medieval period. Essentially, the darker green areas on the map have evidence for more woodland than the lighter green areas. The north western part of England has been partially masked out due to the limited Domesday survey in that area (p.39).

The picture presented is not perfected and cannot be argued to apply absolutely to the EngLaId period of interest, but it does begin to provide a sense of where there was perhaps more woodland in pre-medieval England, with thus greater possibilities for fuelling manufacturing processes.



References:

• Burton, N., J. Westwood & P. Carter. 2002. GIS of the Ancient Parishes of England and Wales, 1500-1850 [dataset]. Colchester, Essex: UK Data Archive [distributor]. SN: 4828

• Roberts, B.K. & S. Wrathmell. 2000. An Atlas of Rural Settlement in England. London: English Heritage



Wittenham Clumps, Oxfordshire. 2012 to 2013.
View from Wittenham Clumps (an Iron Age hillfort) on Round Hill, overlooking the Thames Valley and Dorchester on Thames (on the right hand side of the picture). The valley has records of archaeology and human occupation for all periods from the Neolithic onwards. Alongside the river is Dyke Hills, an important Iron Age oppidum (p.33). Drawing by Miranda Creswell.

Chapter Eight:

Landscape and material culture

This chapter looks at the distribution of material culture as it was deposited in the English landscape, the final life stage in the biographies of the products which we considered the manufacture of in the previous chapter.



Revolving Horse. 2016.
Drawing made from observations of a Celtic coin displayed in the Ashmolean Museum, Oxford, dating to approximately 50 BC. The coin forms part of the Henley Hoard found by a metal detectorist in a field near Henley, Oxfordshire. The image of the horse is perhaps reminiscent of the White Horse of Uffington as engraved into the chalk landscape. Drawing by Miranda Creswell.

Hoarding (II) - landscape character

Following on from the introduction to hoarding in Chapter Five (p.64), we will now explore some other aspects of hoarding practice in a little more depth. One aspect of hoarding practice that can be examined in more detail is the landscape character of areas where hoard deposition took place in the past.

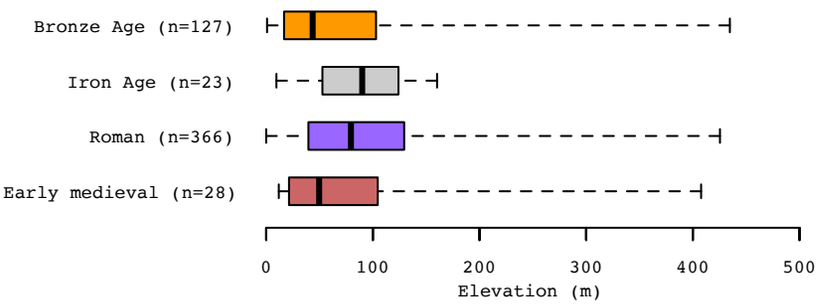
The graphs here display various statistics of 1 x 1 km grid squares containing records of hoards, by broad period: elevation (see p.14), terrain ruggedness (see p.15), visual openness (see p.16), wetness (see p.24), and affordances/opportunites relating to metal detecting (see p.9). The counts of grid squares of each period are also noted in brackets after the period names.

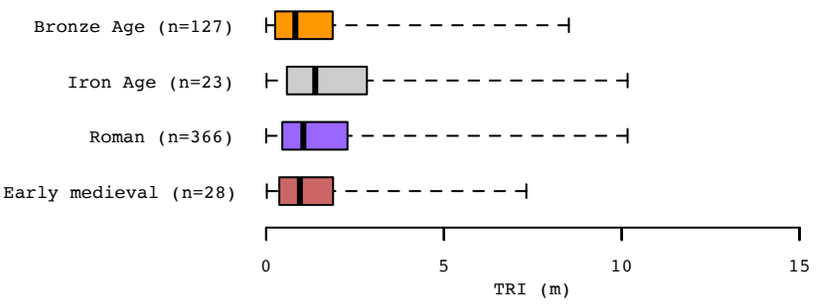
Overall, Iron Age and Roman hoarding appears to take place at higher elevations (although still not at particularly extreme heights), with Iron Age hoarding also appearing to favour somewhat more rugged landscapes. Visual openness appears most important to Bronze Age and Roman hoarding and not at all important to Iron Age hoarding. Possibly Iron Age hoards were placed in locations known to be hard to see/hidden?

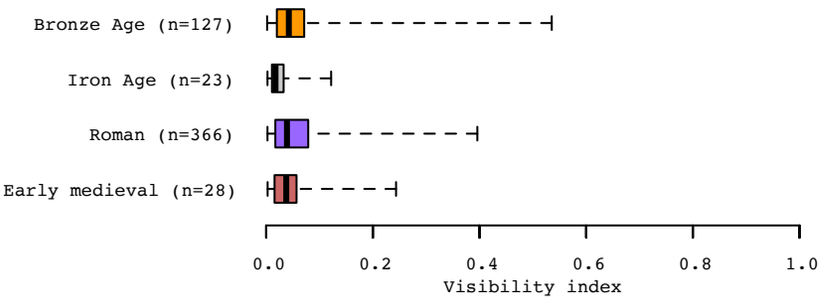
Considering the long-held association between prehistoric deposition of metal objects and watery places, surprisingly, wetness of the landscape does not appear particularly significant in the Bronze or Iron Ages. However, as the wetness model takes into account precipitation and soil moisture, perhaps it speaks to a somewhat different type of wetness than specifically riverine / lacustrine environments.

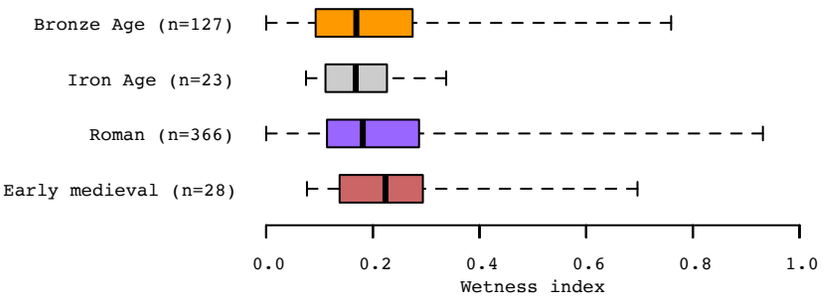
Hoarding of all periods has a tendency to take place in areas of relatively high find-spot affordance, but the model is not as close a fit as it would be for single find-spots, as many hoards were found before the widespread uptake of metal detecting as a hobby.

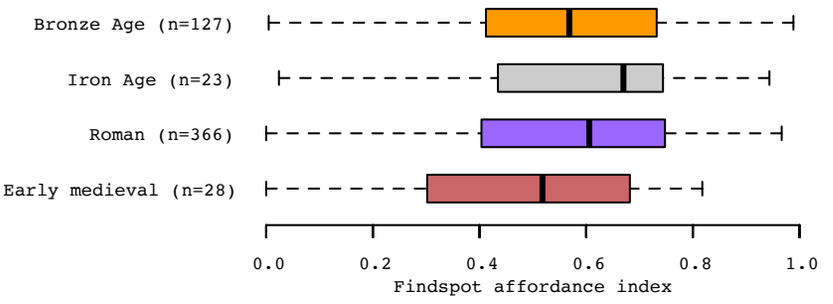
Finally, it should be noted that the number of grid squares containing Iron Age hoards or early medieval hoards is relatively low (of course, some squares could contain multiple hoards as this analysis was done on a presence / absence basis), so these results are less robust than for Bronze Age or Roman hoarding.











Hoarding (III) - temporality

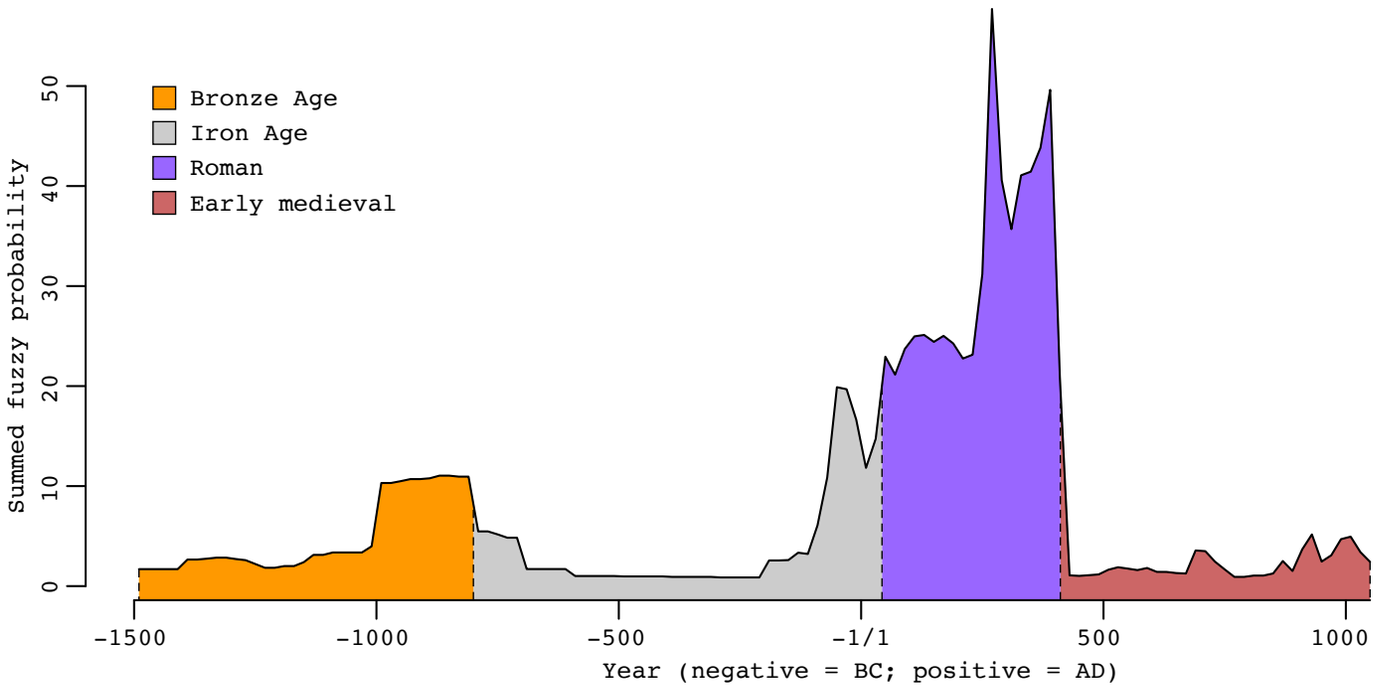
As the map (p.64) and graphs (p.90) previously presented may suggest, the deposition of hoards was not a constant process across our entire time period of interest. The graph below should provide a sense of variation in hoarding deposition over time. It is somewhat complex, so requires some explanation.

The dataset used was records for hoards in our database that had specified start and end dates (reflecting the period during which the deposition of the hoard must have taken place at some specific point). As such, records which only had a period designation to express their date were excluded. This means that the data was mainly made up of HER records (but not all HER records) and PAS records.

As the start / end dates in this case reflect the uncertainty around the deposition date (rather than an extended single period of activity), we then calculated the percentage probability (as a decimal) of each hoard record falling within a series of 20 year time-slices from 1500 BC to AD 1060. For example, a hoard with a date bracket covering AD 30 to AD 90 would be assigned probabilities as follows (see Green 2011 for extensive discussion on the method):
AD 20 to 39 - 10 years out of 60 year time-span for record = 0.1667 (i.e. 16.7%)
AD 40 to 59 - 20 years out of 60 year time-span for record = 0.3333 (i.e. 33.3%)
AD 60 to 79 - 20 years out of 60 year time-span for record = 0.3333 (i.e. 33.3%)
AD 80 to 99 - 10 years out of 60 year time-span for record = 0.1667 (i.e. 16.7%)

For each 20 year time-slice, the probabilities (between 0 and 1) for every hoard were then summed together and the results graphed against time. As such, the values on the y-axis of the graphs should not be read as the total number of hoards deposited at any point, but rather the probable number of hoards deposited. The methodology does have some issues, most obviously the tendency for more precisely dated records to show higher 'spikes' than more coarsely dated records: this explains in part the steep increase in summed probability around 200 BC when coins began to be minted and thus deposited in hoards (as coins can be more precisely dated than, say, weapons). However, the overall pattern (especially within a single time period) is not invalidated by this caveat.

From the analysis, thus, we can conclude that hoarding as a practice saw peaks in England in the late Bronze Age, the late Iron Age, and throughout the Roman period (but most especially in the latter half of the same). The later small peaks in the early medieval period also align quite nicely with the peaks in Viking raiding / invasion, perhaps explaining in part why early medieval scholars largely view hoarding as a pragmatic practice. However, it is also apparent that deposition of hoards was probably taking place at (at least) a low level throughout the EngLaId time period, not just during periods of 'political' upheaval.



References:
• Green, C.T. 2011. Winding Dali's Clock: the Construction of a Fuzzy Temporal-GIS for Archaeology. BAR International Series 2234

Hoarding (IV) - structure

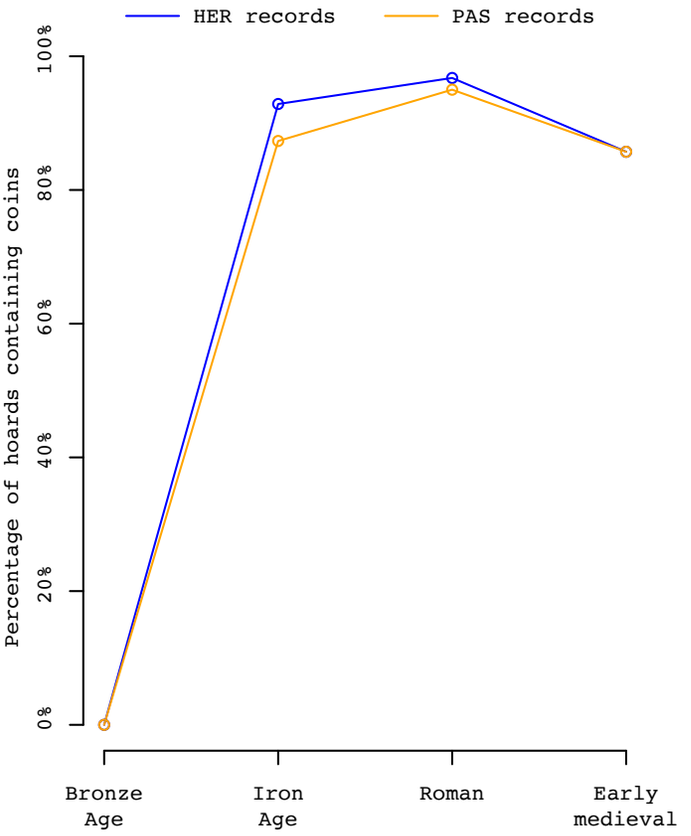
Structurally, the main change in hoard composition over time through the EngLaId period comes with the introduction of coinage in the Iron Age (see p.93). From that point onwards, the vast majority of hoards deposited contain at least one coin. That is not to say that they consist only of coins, however. The percentage of hoards containing coins is very similar in both the HER and PAS datasets, suggesting that these figures are fairly robust:
Bronze Age hoards - 0%
Iron Age hoards - 93% (HER) / 87% (PAS)
Roman hoards - 97% (HER) / 95% (PAS)
Early medieval hoards - 86% (HER) / 86% (PAS)

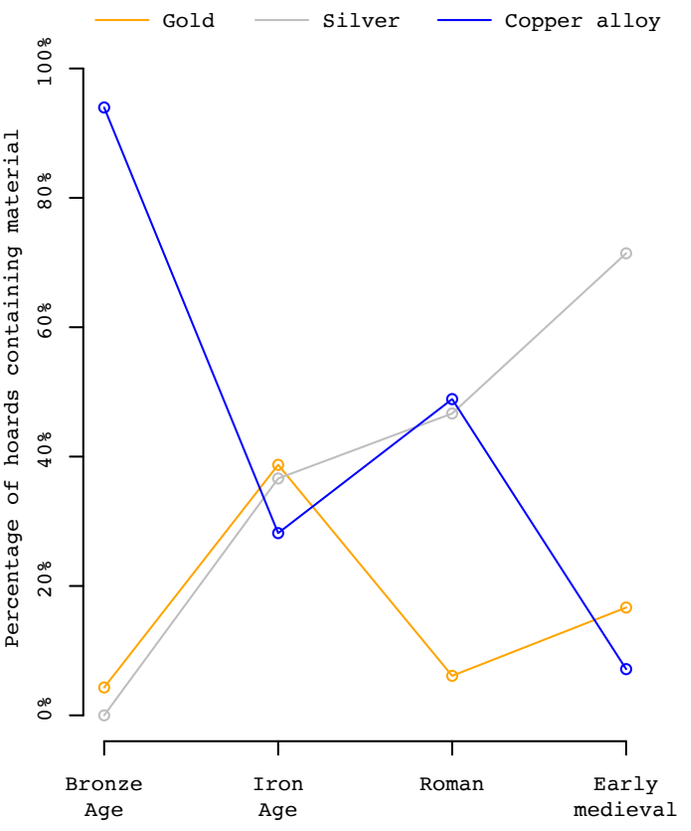
These percentages were extracted by searching for 'coin' in both find lists and in descriptive fields. Non-coin records were then checked manually as this was easily feasible due to their low numbers: a few had been missed where the coins were referred to by type (e.g. 'pennies' or 'denarii'). In the HER data, hoards that contained no coins (from the Iron Age onwards), tended to consist of:
Iron Age - currency bars
Roman - vessels / pewter
Early medieval - ingots / hack metal / jewellery

The material structure of hoards changed immensely over time, based on PAS data only (due to it being the only dataset with relatively consisted recorded finds materials across all of England, but thus meaning that only hoards found since the inception of the PAS in 1997 are included). In the Bronze Age, almost all hoards contain copper alloy objects (those that do not were either just made up of gold objects or have no material recorded), with just a very few hoards containing gold objects and no silver objects at all. In the Iron Age, gold and silver become much more common, whilst copper alloy objects are less regularly found; this is the period where the highest percentage of hoards contain gold.

The regularity of appearance of gold drops again in the Roman period, with copper alloys and silver both increasing in importance again. Finally, in the early medieval period, copper alloy objects become very rare in hoards, with silver dominating the material signature. Gold increases slightly in importance compared to the Roman period, at least when considered as a percentage (a good example being the Staffordshire Hoard).

Overall, we see a picture over time of hoards in the Bronze Age largely consisting of objects made from copper alloys (with, obviously, no coins included); Iron Age hoards feature a mix of materials and mostly include coins; Roman hoards are largely coin based and largely composed of silver and copper alloys; early medieval hoards feature somewhat less coins and are dominated by silver objects, with around 17% of hoards containing gold.





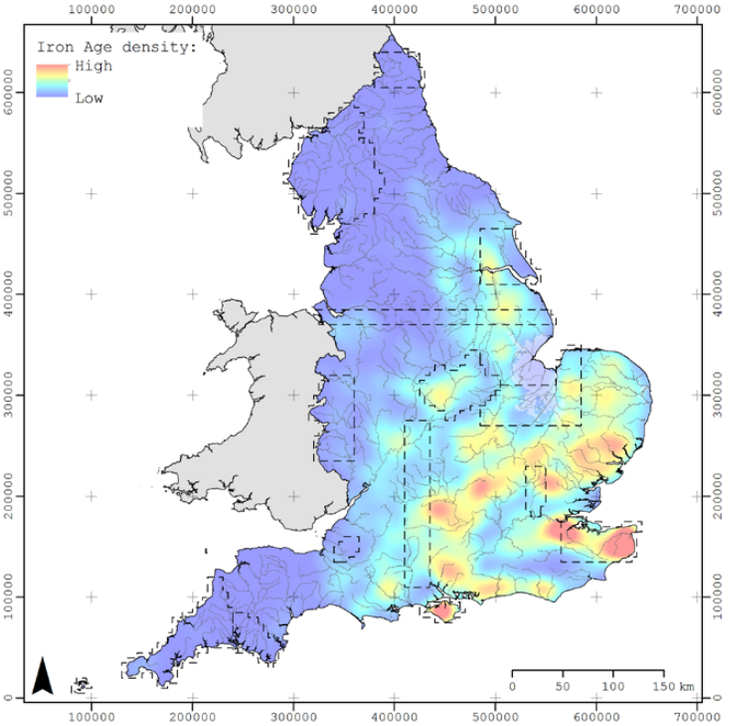
Coinage - Iron Age

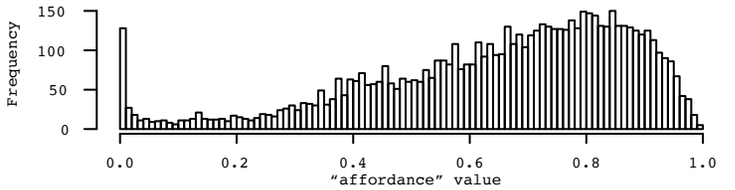
with John Talbot

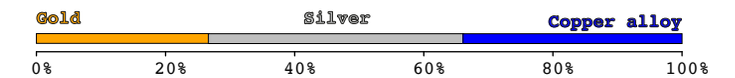
Minting of coinage in England first occurred in the later Iron Age. The map shows the density of 1 x 1 km grid cells that contain records of Iron Age coinage in the EngLaId database, with the colours scaled to match the distributions of Roman and early medieval coinage that follow (p.94 & 95). The overall pattern is very similar to that for the two later periods and is heavily influenced by the affordances relating to metal detecting (p. 9). However, the regional detail still shows some interesting patterning. In particular, we see a band of high density of deposition that starts in Kent, crosses the Thames estuary into East Anglia, then spreads west across southern central England, finishing on the South Downs and on the Isle of Wight. This accords quite well with the major centres of activity of the historically attested tribal groupings of southern England.

Looking at PAS records in particular, we can see that Iron Age coinage is fairly evenly split between gold, silver, and copper alloy materials, as also seen in contemporary hoards (p.92). The high level of deposition of gold coins compared to later periods suggests that these must have been deliberately deposited in the ground, rather than stemming from accidental loss. This suggests that coinage in the Iron Age period probably was used for ritual functions as well as in economic activity.

The illustration is an image of the obverse of an early Icenian (i.e. minted by the Iceni people of East Anglia) gold coin which is commonly known as a right-facing Norfolk Wolf Stater (or British JA Stater). British Iron Age coins were usually struck from dies which were much bigger than the resultant coins and the illustration combines photographs of three different coins to show the overall design on the original die. The image represents an abstracted head; to the left are representations of locks of hair, in the centre a wreath, to the upper right the face and to the lower right a cloak, probably surmounted by a representation of an elaborate Fibula (brooch).









References:

• Talbot, J. 2017. Made for Trade: a New View of Icenian Coinage. Oxford: Oxbow

Coinage - Roman

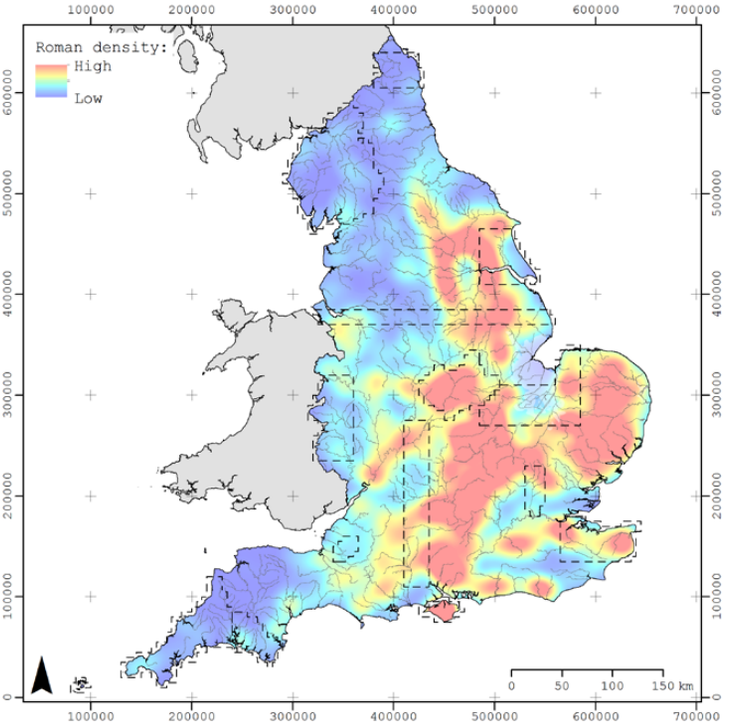
The density of 1 x 1 km grid squares containing Roman coinage shows a similar overall pattern to the preceding Iron Age and succeeding early medieval periods (plotted to the same colour scale on p.93 & 95), and as such is also highly influenced by affordances relating to metal detecting (p.9). The density of deposition of Roman coinage was, however, of a much more intense character than during the other time periods, with very widespread high densities across eastern England. Some areas shown as featuring low densities of Roman coinage are clearly a result of the bias towards metal-detected material: for example, the Hadrian's Wall frontier saw the circulation of large amounts of coinage, but metal-detecting is illegal within the scheduled area of the ancient monument and so coins are unlikely to be recorded there in the PAS.

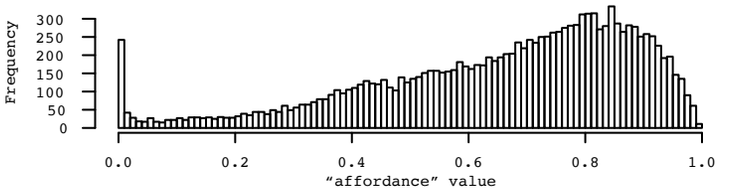
As with hoards (p.92), the material character of these records (in the PAS only) is highly dominated by copper alloy coins, with a relatively small proportion of silver coins and very few gold coins. The preponderance of immense numbers of relatively low value coinage suggests that coins had a primarily economic function in the Roman period, albeit with some ritual purposes still adhering to them (in terms of some hoarding practice and in terms of promoting the cult of imperial leadership). The material signature does suggest that the majority of deposition represents casual loss, however, with higher value coins less commonly deposited due to the greater tendency to search for a dropped item if it is of greater monetary value.

The majority of coinage circulating in England in the Roman period was minted on the continent rather than locally, with the exception of during the floruit of the 'Brittanic Empire' of Carausius and Allectus in the late 3rd century AD.

Coin A: A nummus of Magnentius dating to AD 350 to 352, minted in Trier. Copper alloy. Found in the vicinity of Wakefield, Yorkshire. Original image: West Yorkshire Archaeology Advisory Service via PAS.

Coin B: A denarius of Augustus dating to 15 to 13 BC, minted in Lyon. Silver. Found in the vicinity of Chichester, West Sussex. Original image: Sussex Archaeological Society via PAS.











References:

• Coin A - PAS ID: SWYOR-A98AF7; https://finds.org.uk/database/artefacts/record/id/429497
• Coin B - PAS ID: SUSS-B2C6E3; https://finds.org.uk/database/artefacts/record/id/437217

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Coinage - early medieval

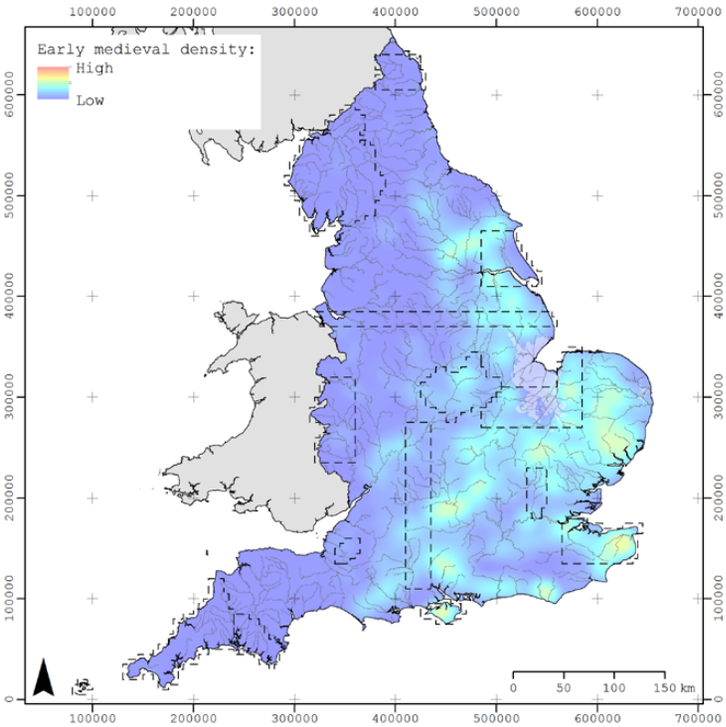
Coinage became rare in England during the first couple of centuries after the end of Roman rule, with production only reappearing during the 7th century. The overall pattern of 1 x 1 km grid squares containing early medieval coins is broadly similar to the preceding periods (plotted to the same colour scale on p.93 & 94) and again highly structured by affordances relating to metal detecting (p.<?>). There are no areas of comparably high density as seen in the Iron Age in the south east and in the Roman period in the eastern half of England. Of particularly note is the extremely low densitites of early medieval coinage in western and northern England.

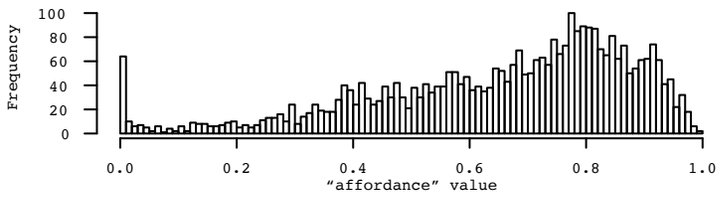
As with the preceding periods, the material signature of early medieval coins in the PAS is very similar to that for hoards of the same period (p.92), being dominated by silver coins. This suggests a different situation to the earlier eras, with coinage having a less ritual character than during the Iron Age (whilst still featuring ritual iconography, e.g. Christian symbols), but also not likely to be part of a fully developed monetary economy to the same extent as it was during the Roman period. The relatively high value of the majority of the coinage suggests economic exchange at a relatively high social level and for relatively high value transactions. Obvious examples would be the paying of Danegeld to Viking raiders or the paying of wergild as recompense for crimes committed.

During this period, most coinage was minted locally in the larger towns (p.37), although some coinage did arrive in England from the continent (especially before the 8th century) or even from much farther lands (e.g. Byzantine coins or Arabic dirhams).

Coin A: A shilling (or thyrmsa) dating to AD 650 to 675, probably minted in Kent. Gold. Found in Wiltshire and now in Wiltshire Museum, Devizes. Original image: Salisbury and South Wiltshire Museum via PAS.

Coin B: A halfpenny of Edward the Elder dating to AD 899 to 924, minted by Wulfheard. Silver. Found on the Isle of Wight. Original image: PAS.









References:

• Coin A - PAS ID: WILT-DEDC91; https://finds.org.uk/database/artefacts/record/id/767816
• Coin B - PAS ID: IOW-43BDDE; https://finds.org.uk/database/artefacts/record/id/744208#1

• Edited coin images used under Creative Commons BY 2.0 licence: https://creativecommons.org/licenses/by/2.0/

Find-spot deposition over time

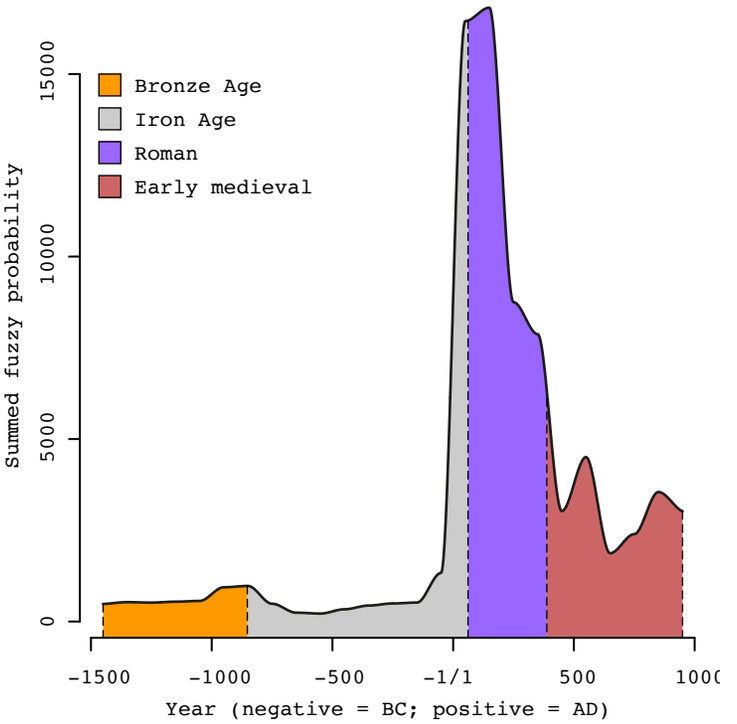
When looked at over the long term, deposition of single (or small groups of) finds shows some interesting temporal patterns. The graph here uses the same calculation technique described when we examined hoard deposition over time (see p.91): calculating the probability of each find record falling within a set of time-slices and then summing the total probability (this time multiplied by the number of finds per record). Coins have been excluded from this analysis as otherwise all other patterns are hidden by the immense spike in deposition during the Roman period.

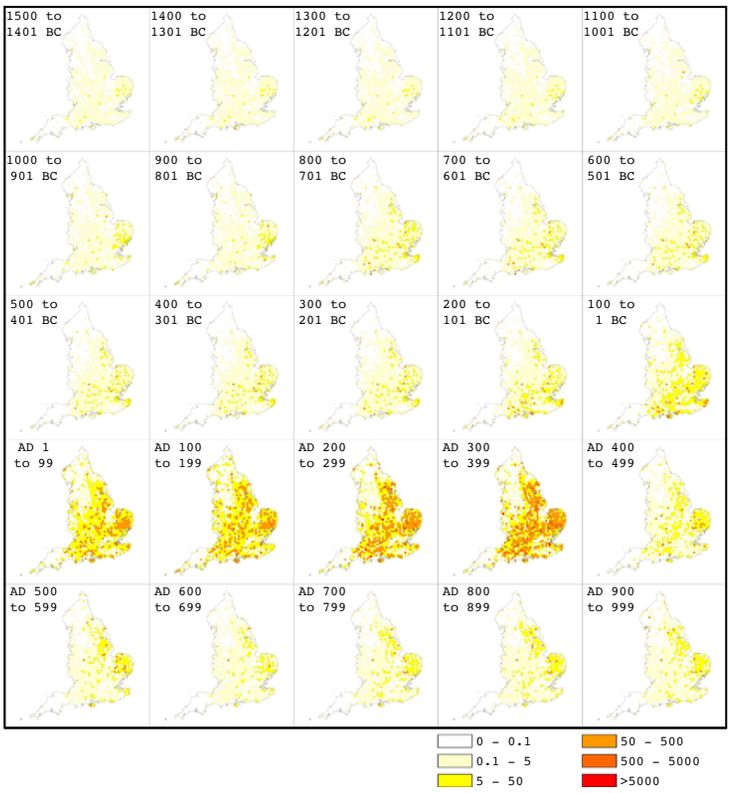
Over the long term, we see quite a low level of deposition through prehistory, although this is partly explained by the less precise dating of most prehistoric finds and the excision of the later Iron Age coin data. The latest Iron Age and early Roman period then shows a huge spike in deposition, which continues until around the 3rd or 4th century AD. There is a drop in deposition after the end of Roman rule, followed by a spike in the 6th century AD: the drop is partly a false message caused by conventional dating brackets for certain types of find that are now believed to actually span much of the 5th century AD as well (Toby Martin *pers. comm.*). Overall, despite a lull in the 7th / 8th centuries AD, early medieval deposition of finds is significantly more intense than that during prehistory.

However, this pattern also shows variation over space as well as time. The set of 25 maps also presented here were also created using the probabilistic treatment of time, but this time the results were summed by 5km hexagonal bins (see p.105). Coins were included in the analysis this time as the data was better able to weather the Roman depositional spike in this format. These maps are based purely on PAS data, so subject to the affordances associated with metal detecting (p.9), which structure the results to some degree, but comparison between time-slices still shows some interesting and valid patterns.

Deposition during the Bronze Age and earlier Iron Age time-slices is fairly low-level and reasonably evenly spread across England, with the exception of the far north and south-west, where relatively few finds are discovered (or at least reported to the PAS). The late Iron Age begins to show a greater density of deposition in southern and eastern England, which increases in intensity into the Roman period, across a similar territory. In the early medieval period, deposition remains fairly intense, but now more obviously clustered around Yorkshire, Lincolnshire, and East Anglia.

As such, although the graph presented here suggests that early medieval find deposition was more intense than in prehistory, this is largely only true for the eastern counties of England, with deposition in the west and north being much more comparable between prehistory and the post-Roman era.





References:

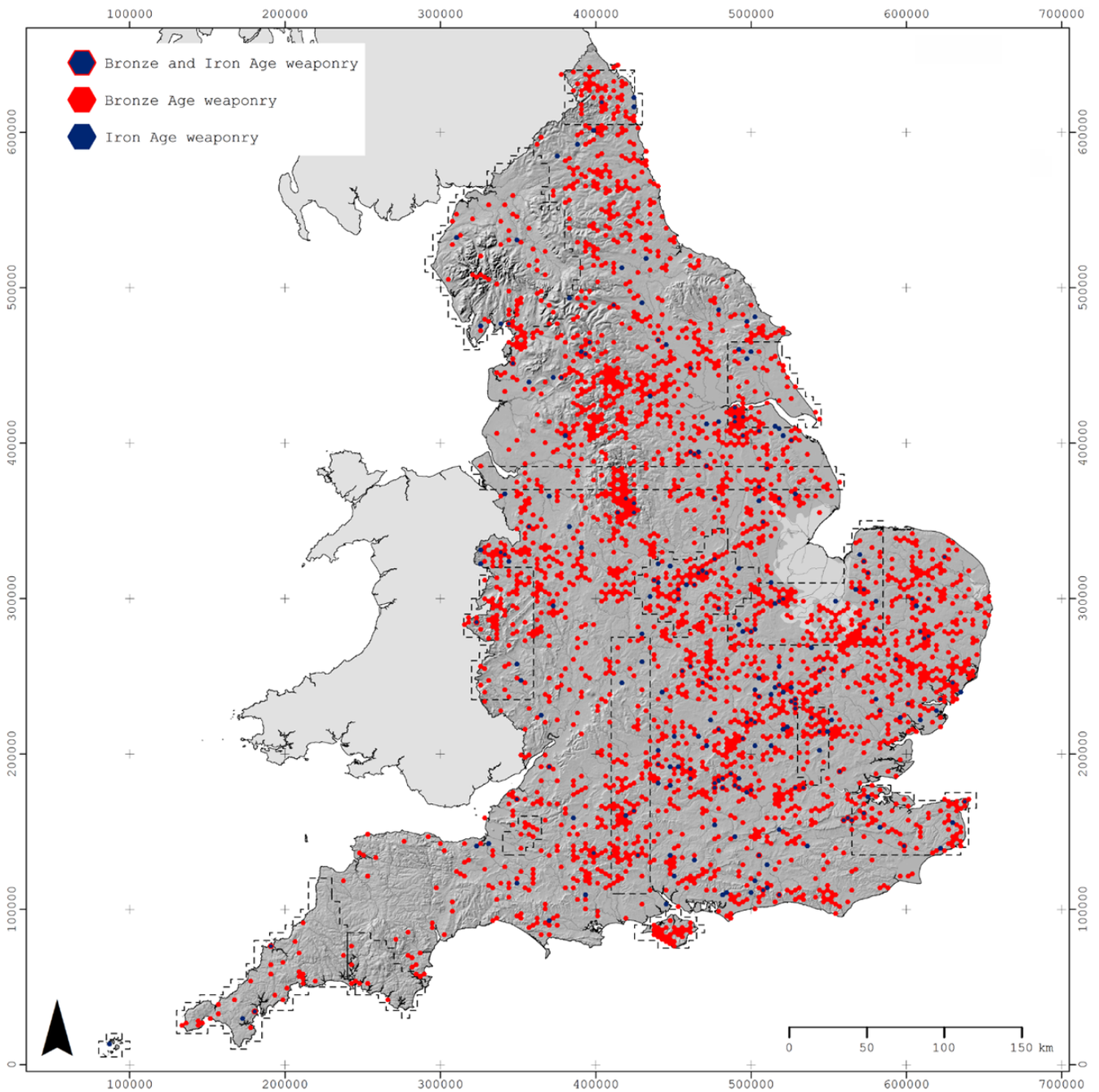
• Cooper, A. & C. Green 2017. 'Big questions for large, complex datasets: approaching time and space using composite object assemblages.' Internet Archaeology 45, http://intarch.ac.uk/journal/issue45/1/index.html

Weaponry - prehistoric

Finds were categorised in our database using 'soft' categories; in other words, a particular type of find could be assigned more than one category. This is probably most relevant for weaponry, as we included axes in both the tool and weaponry categories, as most types of axe could very easily be used as both a tool and as a weapon. As such, the map below features axes as well as other types of object that are much more straightforwardly considered weapons (e.g. swords or spears).

The Bronze Age distribution is very widespread indeed, probably being the most common type of Bronze Age evidence in England, alongside funerary monuments (p.54). Many of these finds will be axes, but other types of weapon were also common in the Bronze Age. The most obvious spatial pattern is the lack of evidence in the south west of England, which is interesting due to the large amount of funerary and settlement (p.28) evidence in that area.

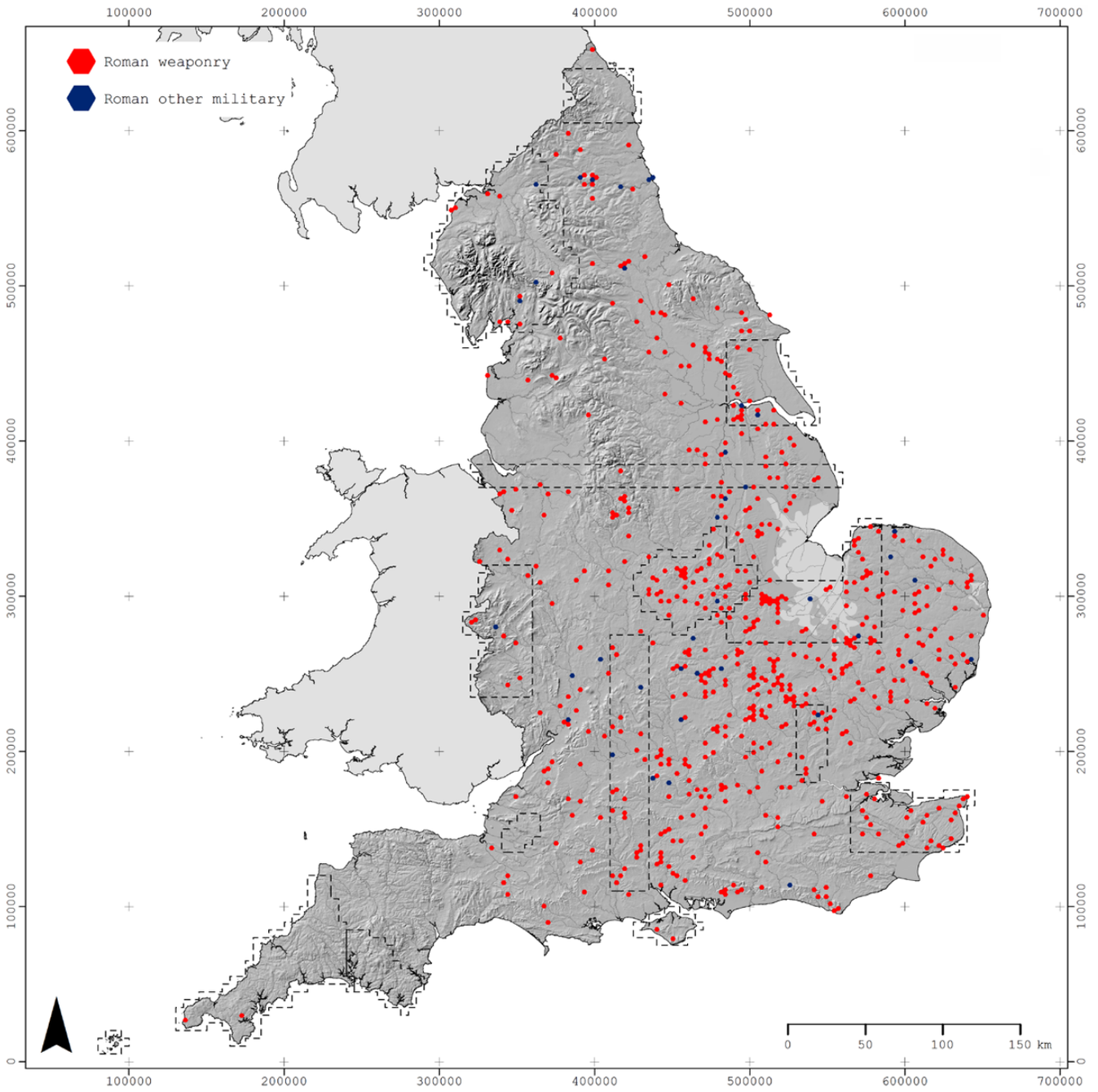
Evidence for weaponry in the Iron Age is very sparse across England. In part, this will be because most Iron Age weapons were made from iron and metal detectorists screen out iron when they are working (as iron is very common and, when corroded, not particularly attractive to many peoples' aesthetic tastes). However, it does also suggest that whatever reasons caused people to deposit so many weapons in the Bronze Age had faded by the Iron Age.



Weaponry - Roman

The distribution of Roman period weaponry (and other military equipment; shown where no weapons present) is biased towards the eastern half of England. This is surprising as the Roman military was concentrated in northern and western Britain. In part this pattern is due to many northern HERs not recording finds details in their databases, so it is probable that more evidence for military implements does in fact exist in the north and west, but that we simply did not have access to this data. As with the Iron Age (p.97), this is unlikely to be related to metal-detecting patterns, as detectorists filter out iron when they scan for metal and the vast majority of weapons would be made from iron (or iron alloys, i.e. steel) at this time.

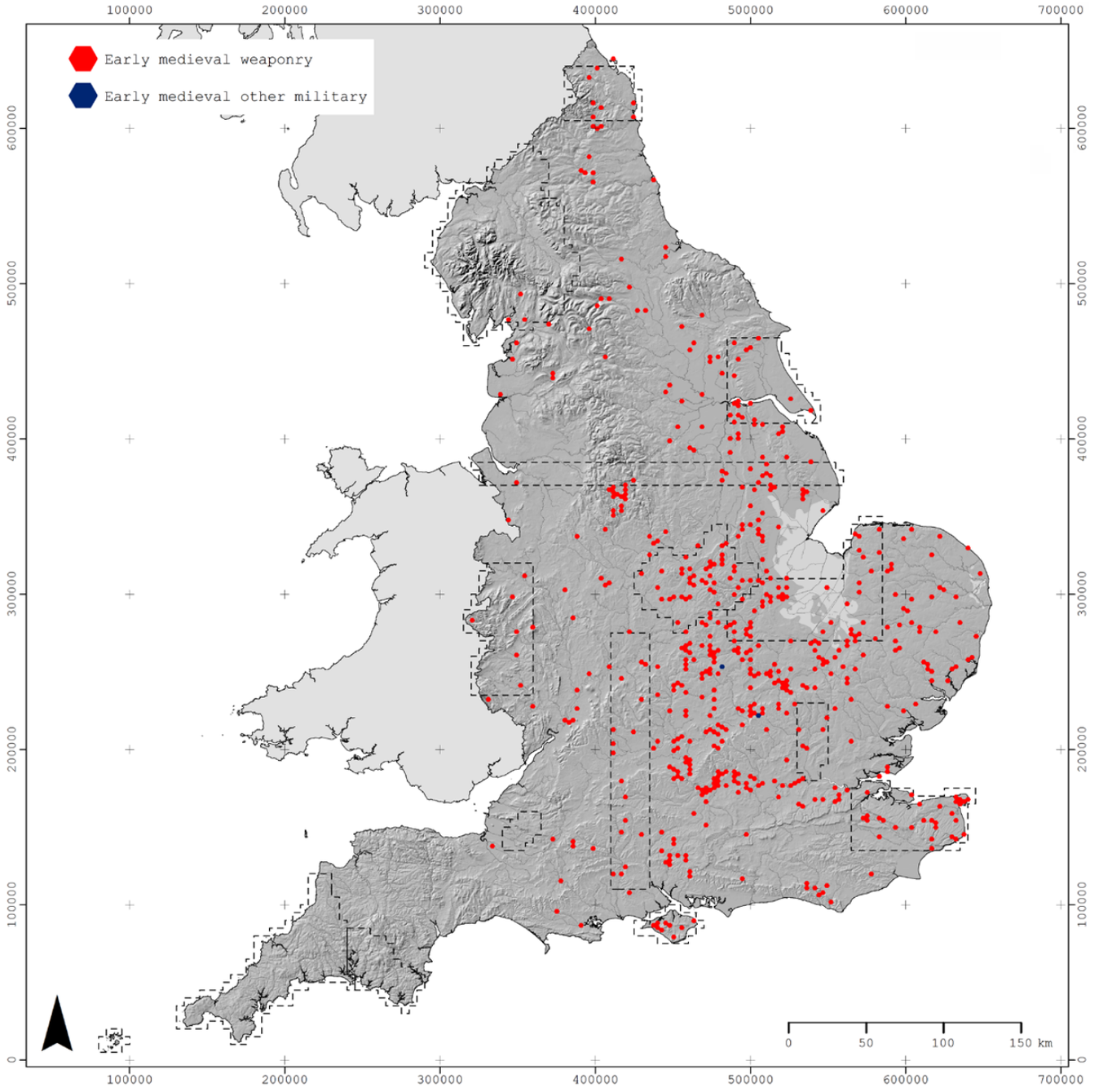
Despite this, it is interesting that so much weaponry was deposited in southern and eastern England under Roman rule, in an ostensibly civilian/demilitarised landscape (at least after the 1st century AD).



Weaponry - early medieval

In the early medieval period, evidence for the deposition of weaponry (and other military equipment; shown where no weapons present) is very strongly clustered around the eastern half of central England. Much of this evidence must represent furnished burial of the pagan period, when people were regularly buried with weapons, perhaps as an indication of social status. This practice largely died out a few decades after the conversion of the Anglo-Saxons to Christianity. The distribution of early medieval weaponry in England is fairly similar to that for sunken-feature buildings (p.31), which were also a feature of the earlier part of the period.

As with the Roman period (p.98), very little evidence for deposition of early medieval weaponry in the west and north of England exists in our database. Again, this will partly reflect HER database structure/policy, but the sparse evidence that does exist suggests that this is not entirely the case. As with Roman and Iron Age weaponry, most early medieval weaponry was made of iron or steel, so metal detecting patterns should not unduly bias this data.



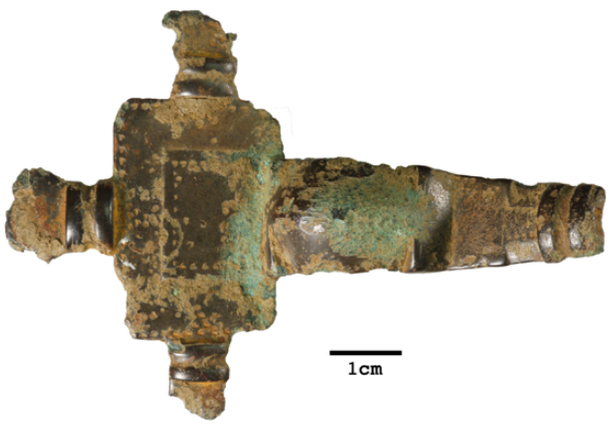
Personal decorative items

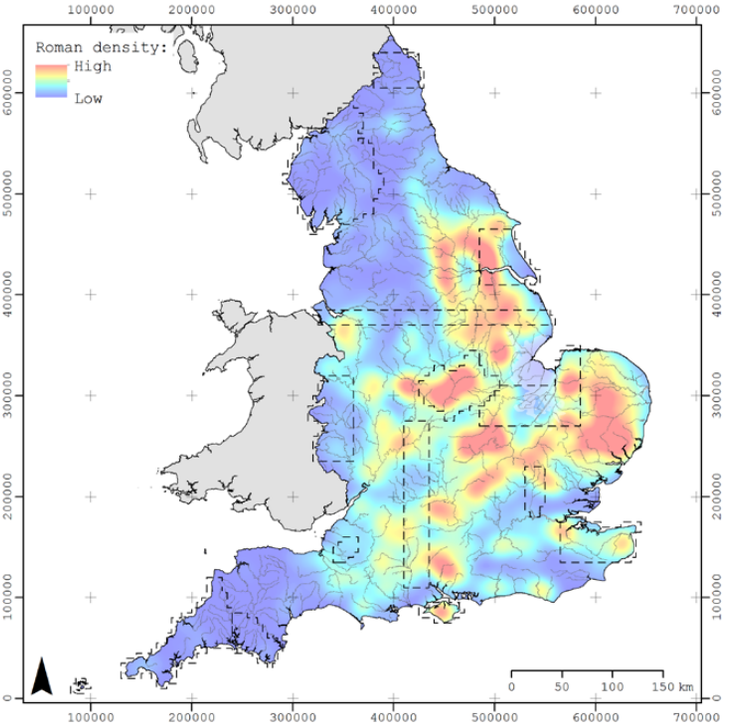
Personal decorative items (mostly being brooches of various types) are another very commonly discovered type of artefact. Here, we compare the density of 1 x 1 km grid squares containing evidence for Roman and early medieval personal decorative items, with both maps drawn to the same colour scale. Both distributions are partially structured by the affordances associated with metal detecting (p.9), but the significant differences between them prove that differences in past practice also influence where such items are discovered.

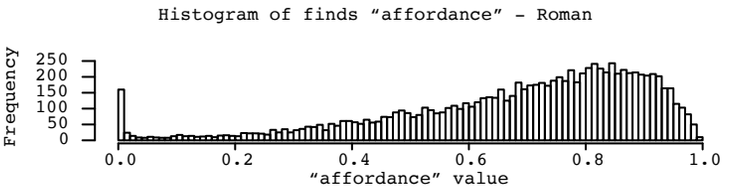
In both cases, the eastern half of England sees much denser evidence, but the strongest peaks in the Roman period model are much more widespread than the strongest peaks in the early medieval model, which are focussed on East Anglia, Lincolnshire and Kent. In the latter period, areas of strong Roman military influence (notably Chester and near Hadrian's Wall) no longer see as much deposition as they did during the Roman era.

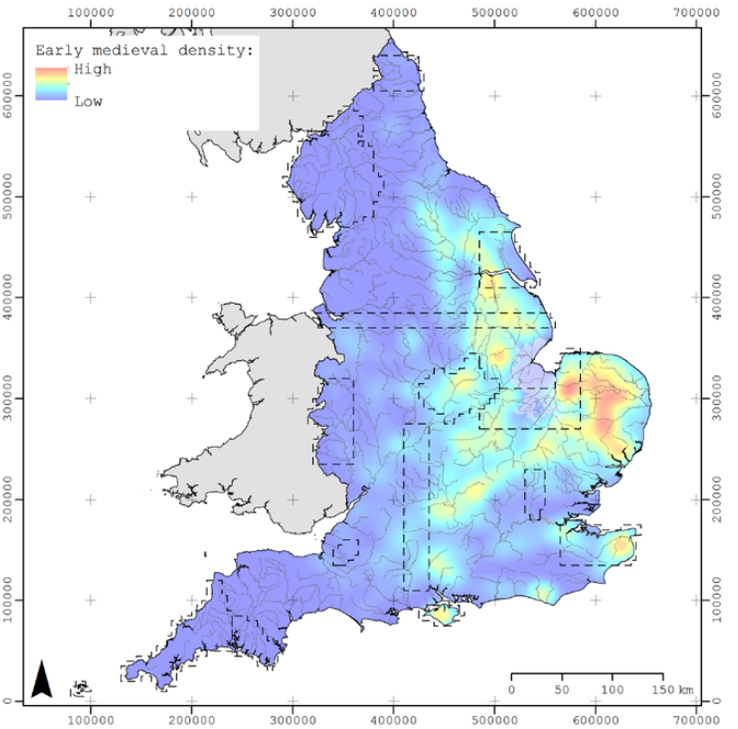
In both cases, much of the material must originate in funerary contexts, although casual loss or disposal of broken objects will also be a factor.

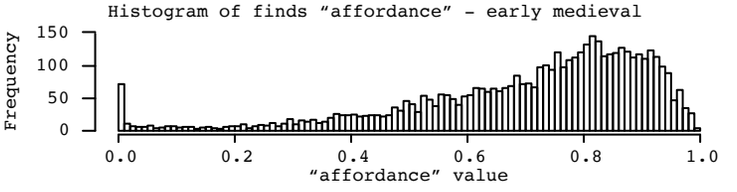
Brooch: Early medieval 'cruciform' or 'small-long' brooch, partly damaged, c. AD 400 to 600. Found in the vicinity of North Lincolnshire. Original image: West Yorkshire Archaeology Advisory Service via PAS.











References:
• Brooch - PAS ID: SWYOR-7EBBD2; https://finds.org.uk/database/artefacts/record/id/801860
• Edited brooch image used under Creative Commons BY 2.0 licence: https://creativecommons.org/licenses/by/2.0/

Site prospection from find-spots (I)

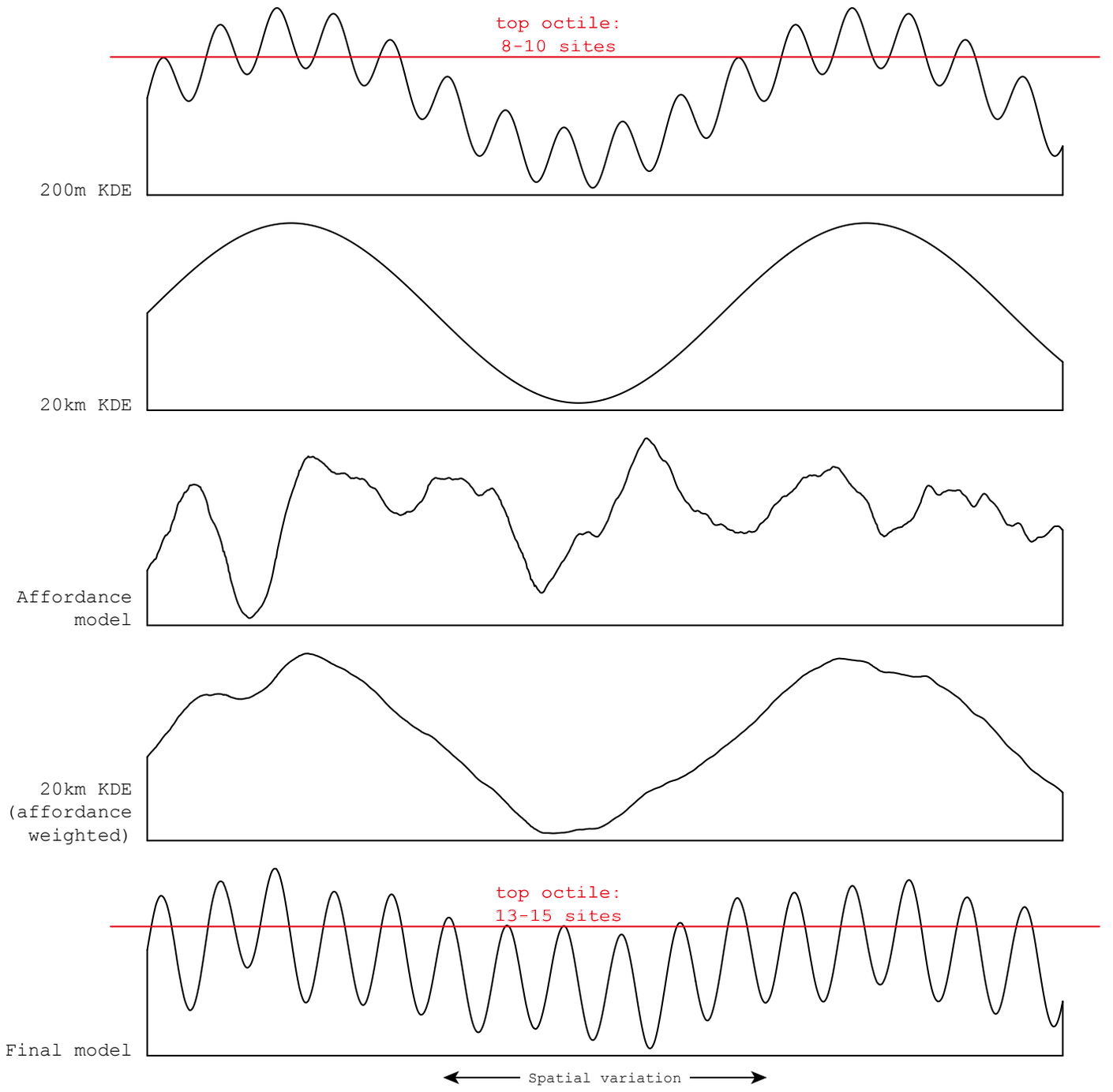
with Anwen Cooper

One very useful feature of find-spots such as those generated by the PAS is in their usage to discover sites of potential interest for further research or for protection from development. Many different ways of doing this exist, but these are mostly problematic due to their arbitrary nature or due to their very local applicability. We therefore came up with a new method that attempts to define 'global' significance (by which we mean across an entire dataset, not across the entire planet) of local concentrations of find-spots in a manner which takes into account regional variation and affordances (see Cooper & Green 2017 for more detail on the background and method).

Essentially, the method works by creating two kernel density estimate (KDE) surfaces: one which reflects local densities (using a 200m kernel in this instance) and one which reflects regional densities (using a 20km kernel in this instance, i.e. 100 times the size). The regional model is then weighted using the find-spot affordance model (p.9), and both the local and affordance-weighted regional models normalised to vary between 0 and 1 by dividing by their respective maximum values. It is then possible to re-weight the local model to take into account regional variation by dividing it by the regional model:

A = 200m KDE; B = (20km KDE) x ((Affordance / 2) + 0.5)

Final model = (A / max(A)) / (B / max(B))



References:

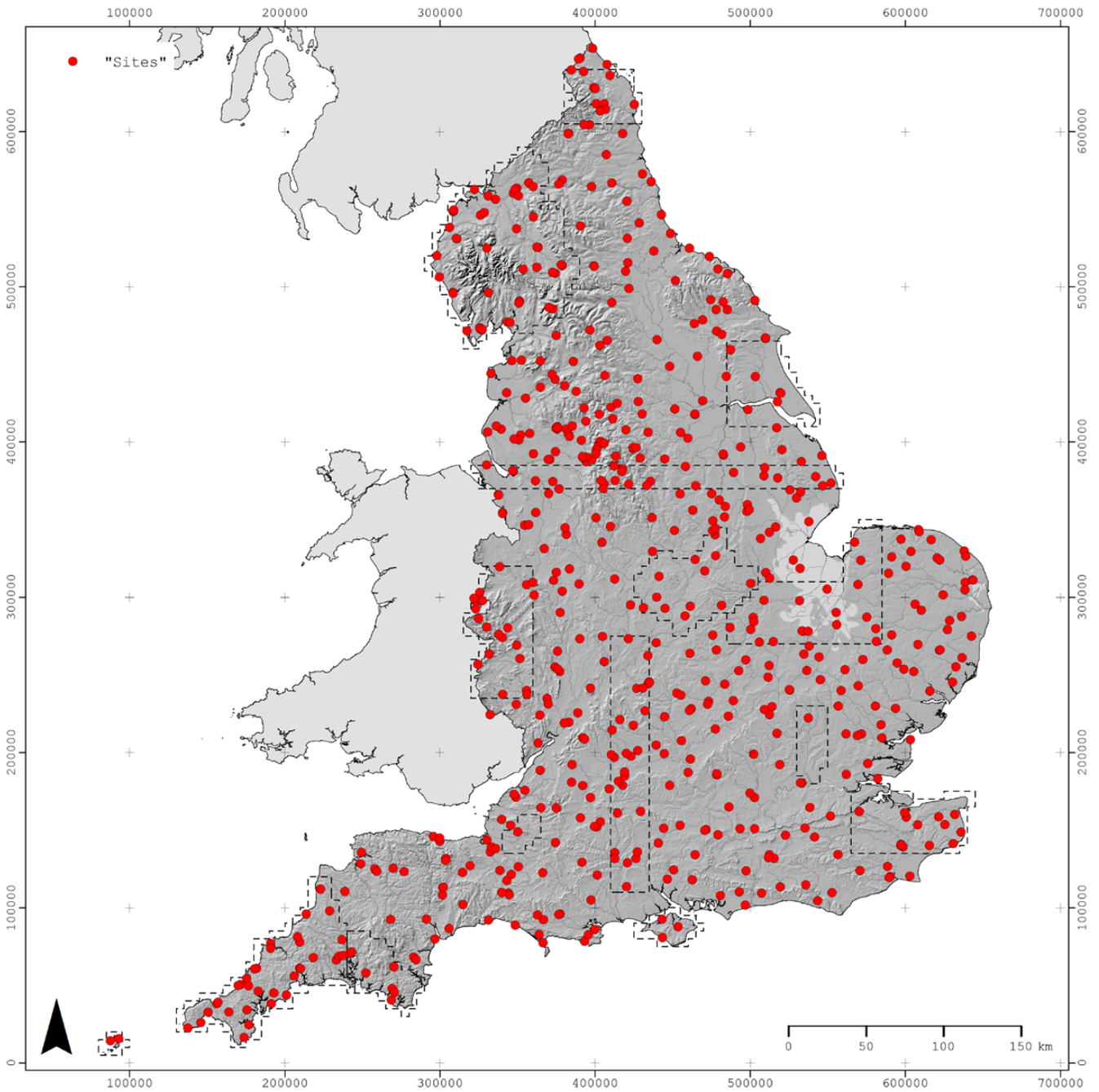
• Cooper, A. & C. Green 2017. 'Big questions for large, complex datasets: approaching time and space using composite object assemblages.' Internet Archaeology 45, http://intarch.ac.uk/journal/issue45/1/index.html

Site prospection from find-spots (II)

with Anwen Cooper

The final model (see p.101) was then reclassified to extract the highest 1/8th of values (the top octile) as a measure of 'abnormal densities above background scatter' (Millett 1991), and these areas then converted to points to define the sites for further investigation or potential protection. The results for the Roman period for England can be seen below.

The advantage of this method is that it can be applied to case studies of any size and in any region, as the model scales well and, by taking into account regional variation, more meaningful and less arbitrary results are produced than when modelling on an ad hoc basis.



References:
• Cooper, A. & C. Green 2017. 'Big questions for large, complex datasets: approaching time and space using composite object assemblages.' Internet Archaeology 45, http://intarch.ac.uk/journal/issue45/1/index.html
• Millett, M. 1991 'Pottery: population or supply pattern? The Ager Tarraconensis approach.' In: G. Barker & J. Lloyd (eds) Roman Landscapes: Archaeological Survey in the Mediterranean Region: 18-26. British School at Rome: Archaeological Monographs

Chapter Nine:
Data, art and cartography



Two Views of One Landscape. 2013.
Drawing of views over Lower Everleigh and Longstreet on Salisbury Plain. Radial graph of the same site using archaeological features drawn from aerial photographs as part of Historic England's National Mapping Programme. Drawn image by Miranda Creswell; radial graph by Chris Green. Images show artwork before and after fitting of clock mechanism: this artwork was sold in aid of The Art Room, a charity aimed at 5 to 16 year olds who are experiencing emotional and behavioural difficulties.

Data gathering

Chris Green

Historic Environment Records (HERs)

Gathering HER data for the EngLaId project took a team of 5-6 people more than a year. Extracting data from HERs was expedited greatly by the commissioning of a query for the HBSMR database package used by over two thirds of HERs from the software developer (exeGesIS Spatial Data Management). Without this, data gathering would have involved substantially more visits in person to HER offices and the whole process would have taken considerably longer (and cost more in the long run). We would highly recommend that any person considering gathering data from multiple HERs for a project to discuss their requirements with relevant HER officers at an early stage and to seriously consider writing costs into their budget for query development and/or HER staff time.

Historic England (HE)

HE datasets were gathered directly from the relevant departments. HE were originally approached for NMP data, but it became apparent that NRHE data would also be of significant importance: partly because it identifies the features drawn for the NMP and partly because there are a large number of records for English archaeology which are represented in the NRHE but not (yet) in HERs. We would again advocate approaching HE to discuss your data requirements before putting in a bid for a project that might wish to make use of their datasets.

Portable Antiquities Scheme (PAS)

PAS data was obtained directly from the relevant staff at the British Museum. Data acquisition was simple and straightforward. The main issue came towards the end of the project in identifying those records which are not reported (yet) to the general public, in order to ensure that our outputs did not display material that should not be published.

Other

All other datasets were either obtained directly from the persons responsible or downloaded from online repositories.



Ask. 2016.
Image made from ten photographs of meetings in which the gathering of data was discussed and 'asked' for. As the copious amounts of data were gradually gathered, a simple and modest paper map (as seen in the centre of the picture) was coloured in with green felt tip pen and brought to each meeting, signifying progress. Artwork by Miranda Creswell.

Data processing

Chris Green

Main database

Data on sites/monuments and finds were collated in a database which was built in a way that mirrored the relevant structure of HBSMR, as the majority of our data was HER data and the majority of that was exported from HBSMR. All of the other datasets were restructured to match that system.

HER data was mostly received in XML formats, which were converted to tables for database import using various scripts. NRHE data was received as shapefiles and PDF reports. Again, scripts were written to extract data from those formats and convert them to tables for database import. Processing of PAS data was a fairly straightforward remapping of their structure onto our structure, but also had to be automated using a script due to the very large size of their raw data in CSV format: the file was too large to open in a standard spreadsheet package on the computer hardware available to us.

Other datasets required various levels of manual and automated processing, but were largely of much smaller size, so this was not problematic.

Achieving synthesis

The syntheses presented in this Atlas were created through the following process (for more detail, see Green 2013):
1. Each monument/find type in the original data was converted to a simplified code using a script;
2. Each record was plotted in GIS and assigned a membership of various grid systems (1x1km squares; 3km [corner to next nearest corner] hexagons; 5km hexagons) based on its location;
3. For the full set of records for each grid system, presence or absence of each monument/find code for each broad period (Uncertain; Prehistoric; Bronze Age; Iron Age; Roman; Early medieval) was calculated using a script.
4. The simplified presence/absence category data was attached to the relevant grid system layer in GIS.

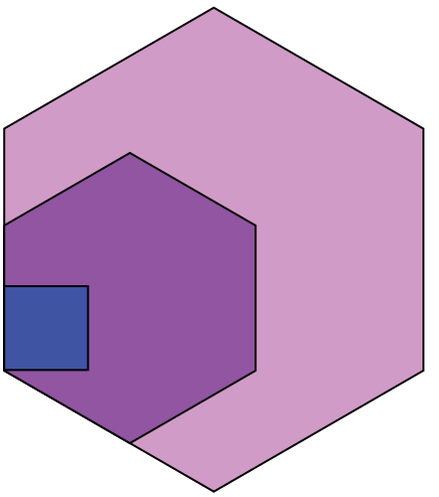
The end result of this process was a set of three GIS layers which could be used to map the presence/absence of any single category or combination of categories defined at Stage 1 for each broad time period. Three different layers were created to allow the production of maps that were legible at various spatial scales. All statistics were calculated using the highest resolution 1x1km grid square data.

National Mapping Programme data

NMP data was received in two formats: as rectified scanned images of hand drawn plans (for the older projects) or as CAD files tiled in 5x5km squares. The former were converted to vector shapefile format using an automated process to make them more visually scalable. The latter were tiled together and converted to shapefiles. We defined our own colour schemes for the CAD data, as the standard colour schemes used by the NMP are poor for readers with colour blindness (see p.106) and for printing. Data were tiled by HE's regions (based on EU Parliamentary constituencies) to reduce the time taken to draw on-screen or to filter/query.

Other

Other datasets were largely processed using methods similar to those above, using a mixture of Python scripts, manual editing, and GIS methods. Many spatial datasets were also summarised by 1x1km grid square to allow cross-comparison and statistical modelling.



Comparison of 1x1km squares, 3km hexagons, 5km hexagons, to scale.

References:
• Green, C. 2013. 'Archaeology in broad strokes: collating data for England from 1500 BC to AD 1086.' In: A. Chrysanthi, D. Wheatley, I. Romanowska, C. Papadopoulos, P. Murrieta-Flores, T. Sly, G. Earl (eds.) Archaeology in the Digital Era: Papers from the 40th Annual Conference of Computer Applications and Quantitative Methods in Archaeology (CAA), Southampton, 26-29 March 2012. Amsterdam: Amsterdam University Press, 307-312.

Cartography

Chris Green

Principles

The principle purpose of scientific visualisation of data is to save time in coming to an understanding of what is being discussed (Chen et al. 2014). One could describe in text the content of any of the maps presented in this book, but that would be a very inefficient manner in which to convey information. Key to making our maps maximally and efficiently comprehensible is visual/aesthetic 'pleasantness' (Kent 2005) and, as such, that has been a key concern when creating the maps herein.

General guides exist that describe the principles of map design/cartography (e.g. MacEachren 1995), but I will describe briefly here the structure of the system used by myself in creating the maps in this Atlas (more detail on this can be found in Green 2019). Essentially, I liked to approach my cartography through a metaphorical understanding of Heisenberg's Uncertainty Principle. In its original form, this states that the more precisely one measures one trait of a particle (e.g. its velocity), the less precisely one is then able to measure other related traits (e.g. its position). This also works rather well as a metaphor for understanding good cartographic practice. For example, the spatial scale of chosen for a map (e.g. all of England) restricts the spatial resolution that can comprehensibly be used for objects drawn on the map (e.g. if mapping all of England on an A4 page, one cannot really see any differences in position of an object of less than 1-2 kilometres on the ground).

For archaeological cartography, this principle also applies to the attributes of the data being mapped, as it is impossible to comprehensibly convey on a single map the full gamut of temporal and typological information within (most) datasets. As such, we have to make decisions about the appropriate temporal precision/complexity to be mapped (e.g. a single period, several periods, or absolute dates) which then restricts the typological complexity that we can map (e.g. coarse site categories, or specific typological categories).

All mapping involves compromise on many levels from choices over map projection all the way down to size of symbols. The most important thing is to try to create maps that convey information comprehensibly, clearly, and quickly. Hopefully I have done so in this book.

Audience

Key to this process is thinking first about what the target audience for your maps might be. Generally speaking, people who are more familiar with the data being mapped can cope with far greater cartographic complexity than people who have little knowledge of the data. For this Atlas, we attempted to produce results that would be comprehensible to people undertaking an undergraduate archaeology degree, as it was felt that work targeted at such an audience would also be of interest to both those further into their archaeological careers and also the engaged amateur.

Colours

Another key point that bears brief discussion is colour choice. Specifically, the maps in this Atlas have been constructed in such a way that they ought to be comprehensible to people who are red/green colour blind (which is up to 10% of men, so a relatively small but significant portion of the populace). Variation in how different peoples' colour blindness works means that we will probably have failed in some cases, but all of the maps were tested using software called 'Color Oracle', so we hope that we have succeeded in creating maps that can be understood by most of our readers.

Map furniture

As a final point, when learning to make maps (or when figures are reviewed by a journal before publication), people are often told that all maps must have a north arrow and a scale bar. This is not true, as whether to include these items is entirely dependent on the map projection used. All too often, one sees maps on a continental scale produced using the Mercator projection on which the author has included a single scale bar: but distance varies from north to south on such a map, so that the scale bar will only be correct for one particular latitude. As such, you either need to include multiple scale bars or simply do not use one at all. The same applies to north arrows, which should only be used where the projection preserves north (from east to west across the map). All of the maps in this Atlas were produced using the Ordnance Survey's 1936 National Grid, so distances and directions are reasonably well preserved, but not perfectly.

References:

• Chen, M., L. Floridi, & R. Borgo. 2014. 'What is visualization really for?' In: The Philosophy of Information Quality. Springer Synthese Library Volume 358: 75-93
• Green, C. 2019. 'Cartography and Quantum Theory: in defence of distribution mapping.' In: P. Hacigüzeller, M. Gillings, G. Lock (eds.) Re-Mapping Archaeology: Critical Perspectives, Alternative Mappings. Abingdon: Taylor & Francis
• Kent, A.J. 2005. 'Aesthetics: a lost cause in cartographic theory?' Cartographic Journal 42(2): 182-188
• MacEachren, A.M. 1995. How Maps Work. Representation, Visualization, and Design. New York: Guildford Press

Non-cartographic visualisation

Chris Green

Visualisation

Many of the same principles that apply to cartography also apply to other scientific visualisations. Again, good general guides exist on how to present quantitative data visually (e.g. Tufte 2001). As with maps, consideration of audience is key and one should avoid colour combinations that cannot be differentiated by red/green colour blind people, so far as is practicable.

Workflow

The graphs presented in this Atlas have been mostly produced using the statistical software R. However, there is a workflow behind them that may prove useful to others:
1. Any spatial data processing needed was done first in ArcGIS, sometimes using Python scripts.
2. Any necessary iterative data processing was largely done using Python scripts.
3. Graphs were then created using R.
4. Finally, graphs were tidied up and finalised using Adobe Illustrator.

All of these processes could be undertaken using R or Python alone, but doing so is rather inefficient (in terms of time spent, at least initially) and would require installing many different libraries for the relevant package. For Stage 1, any GIS software could generally be used, but ArcGIS remains the most fully functional package with a full graphical user interface. It is expensive, however, so this stage might make sense to integrate with Stage 2. Stage 2 itself is best done using Python rather than R, as the iteration tools built into R are not particularly great and tend to be quite slow to run. Python is the least user friendly of the tools described, but is actually quite simple as programming languages go. R was favoured for Stage 3 due to the great degree of control one has over outputs, especially if writing directly to PDF (rather than drawing on screen first and then saving to PDF). For some of the graphs in this Atlas (particularly the field system orientation graphs), writing directly to PDF was necessary as that is the only way to get the lines to draw to the correct width and in the correct place. Stage 4 could be accomplished in any vector graphics package. Most graphs required little final processing, but some shading etc. has been added in this way. I find working in this way to be flexible and time efficient, with the package most suited to a task being used to achieve that task. It does perhaps make it slightly harder for others to reproduce results, but complexities over finding exactly the right library packages etc. also make single software package solutions less reproducible than they might appear on the surface.

Graphs

Choosing the right graph for the task of understanding a particular dataset is not always simple. Essentially, different graph styles have different strengths and weaknesses:

Boxplots (also known as box and whisker diagrams) are good for comparing the coarse numerical characteristics of different datasets. They show the minimum values, 1st quartile, median (i.e. the 2nd quartile), 3rd quartile and maximum value. Each quartile contains 25% of the data points. Often boxplots separate out 'outlier' values, but this is inconsistently applied between different software packages, so outliers have all been included within the overall distributions herein.

Histograms (which are not the same as bar charts) are good for showing the numerical characteristics of a single dataset in detail. The width of the bars can be varied to show greater or lesser detail.

Bar/column charts are good for showing the numerical characteristics of data which has been parcelled up into categories. They are not the same as histograms, which are purely numerical along both axes, whereas either the x or y-axis on a bar/column chart will always be categorical (even if those categories are derived from numerical data).

Scatter plots and line graphs are useful for comparing the precise the numerical values of one or more datasets, assuming the dataset has at least two numerical variables.

Many other graphs also exist that serve other specific purposes, such as the radial plots used for the field boundary orientations presented in this Atlas.

References:

• Tufte, E.R. 2001. The Visual Display of Quantitative Information. 2nd edition. Cheshire, Conn: Graphics Press

Art and archaeology (I)

Miranda Creswell

Richard Long on the use of photos, images and maps (Long & Tufnell 2007): 'They are the simplest way for me to distil the space and time of the world.'

'All art is unstable. Its meaning is not necessarily that implied by the author. There is no authoritative active voice. There are only multiple readings.' - David Bowie.

Many artists have been aware of the past while producing and thinking about their work. More often than it is supposed, a 'discussion' is made with the work and concepts of earlier artists, but also with past communities, monuments and past landscapes, even if these are not directly depicted in their subsequent art pieces. There have been artists who have responded to ancient monuments directly, for instance Turner and Constable in paintings of Stonehenge, Paul Nash in paintings of archaeological sites in the English landscape or more recently Jeremy Deller who recreated Stonehenge as a bouncy castle (Sacrilege 2012). There are artists who look at objects in the way that archaeologists might: Cornelia Parker curated an exhibition looking at memory through objects with sixty artists on lost objects called Found (Foundling Museum 2016).

There are other artists whose output is less obviously influenced by the past, but continually refers to time through perception, through landscape, and in their creative research and writing: Bridget Ryley (1999), Cy Twombly (1928-2011), and Richard Long in his continued practise of making art works walking through landscape and making sculpture within the landscape. This rich heritage therefore continues to influence artists today, some of whom have more formally aligned themselves with the support of archaeologists as artists in residence within excavations (e.g. Helen Wickstead's art+archaeology research network). Many archaeologists in turn, have sought to look at landscape using more obviously creative methodologies: for instance, Mike Pearson and Michael Shanks (Three Landscapes project) or Chris Tilley; who have used drama, walks, encountering people working the land, mapping and documentation as research (Russell & Cochrane 2015: 208).

The work in this atlas continues the dialogue between archaeologist and artist and the past, but there is a fresh awareness in being able to present different realities of the world, using new tools and mediums. These are the combined use of GIS, LIDAR, Big Data, in combination with the simplicity of pencil and paper. The different researched realities are space, time, materiality, physical existence, substance. Although these two investigations are represented by different disciplines using different utensils, and work within different scales, they are looking at the same broader questions, and the exchanges between them have helped to further their respective work.

One of the practical issues surrounding the data being analysed for this research, for England in its entirety (c. 130,400 km^2) and from the period between 1500 BC and AD 1086 means that the research had to be digital and desk based, with an analytical scale that can only be described as broad brush. This is the first time anyone has collated data on this scale (temporally and spatially, in terms of data sets) for English archaeology since the explosion of data quantity post-PPG 16 (i.e. since 1990). This may also be the first time an artist has worked so closely alongside a group of archaeologists for a period of five years.

During the research, one of the surmounting questions was: how can scale in this project be traversed, so as not to lose sight of the different qualities of small ground based scale to mid-scale to the larger scale of maps; in other words would it be possible to have a Big Data project that is wide (c. 900,000 records) but also deep (looking at different scales)? Chris Green has acknowledged the importance of working at different scales by using hexagonal and square bins of different sizes with which to divide and analyse the landscape. The artist in the landscape became another scalar element, representing for this research the scale of one human physically placed in the land (the wandering human being), going to over thirteen different sites throughout England for periods of approximately five days at each site. Through these two methodologies, a link formed that was both direct and interactive; connecting land that was being analysed on site by the artist, to land that was being analysed by nine researchers at their desks in Oxford. This exchange took the form of continuous conversations, photographs, drawings, maps, articles, radial charts, blogs and reports.

While the artist was situated in the landscape, a new unforeseen element emerged, in encounters with people who inhabited and used the land, and resulted in numerous collaborative projects. They involved farmers, gardeners, dog walkers, school children, hospital patients, experts in biology, geology and people who simply had lived in and known these landscapes for a long time. As an example, a dog walker for one project had walked the land daily for a period of forty years; in another, a farmer talked about knowing the landscape for generations; a hospital patient had scrutinised the landscape out of the window for several months. This embedded knowledge is rich with continual observations of one place, an important perspective not often open to researchers (in this case who are looking at the whole of England) or to the roving artist.

The differences amongst individuals and their respective knowledge of land could be explained in terms of visibilities and invisibilities in the landscape (La Materialite de L'Invisible 2016). The small changes that cultivators notice in their crops (Berger 2016: 196-197) as in land moisture or in their animals are different and may be invisible to archaeologists who look at the land for traces of past human activities, and to an artist responding to a landscape, or to a historian working with maps and written information. These observations have different temporalities for each group: the cultivator is thinking of change in terms of the future, the archaeologists and historians are looking at the past in terms of the present, and the artist may be using a mixture of all of these. To make visible the invisible can only enhance archaeological research and also could bring new methodologies for all through which to think about landscape.

The sites that the artist visited were chosen by EnglaId researchers who had looked at them digitally. They were within the case study areas and the drawings became part of a series called Recording England. The drawings were not made as reconstructive drawings but as contemporary responses to a specific landscape. As a way of giving them equal status in order to analyse the thirteen sites with greater clarity (from an Iron Age fort or a field formation for instance) within the very complex set of identities and patterns in the English landscape, the same format and set of materials was applied to each drawing: the paper measured 50 by 35 cm with the same type of pencil and paper used for each drawing. For the artist, there appeared a tension or disconnect between what was being described archaeologically and what was in the landscape on site in the present (for example at Gonalston, Nottinghamshire, once the site of Roman and Iron Age occupation and field formations alongside the Trent, but which is now a deep lake made after gravel extraction). For the archaeologist there were added observations from the artist on the landscape and the archaeology as seen on site, on weather patterns, ecology, and at times information from current communities relevant to their research.

In each drawing, there has been an effort not to encircle 'objects' or features in the landscape with lines, but use fragmented lines and the white of the paper as part of an attempt to connect the complex features within each landscape. The result being that nothing in these drawings appears isolated: for instance, the artist has connected the tree to the river, to the rock, to the sky. For the same

Art and archaeology (II)

Miranda Creswell

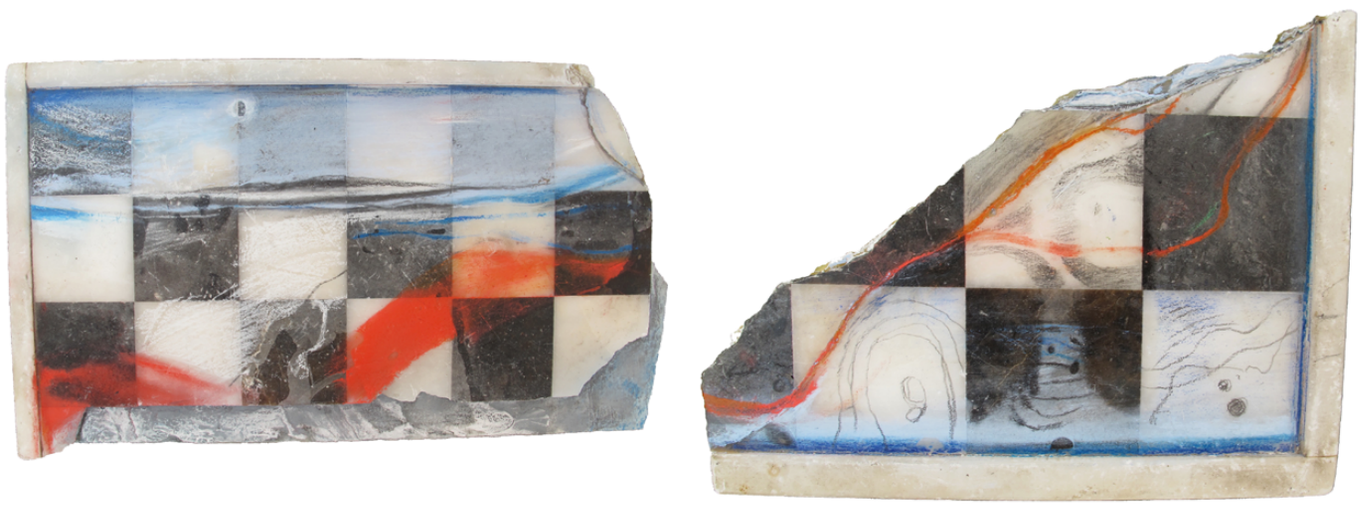
reason, the universal use of grey scale pencil work in the drawings was included so as not to separate landscape elements with colour. The drawings were made over long periods of days, not adhering to a specific moment in time or season: layers of pencil lines giving an impression of extended time. The last part of the methodology was to exclude human presence, partly due to the tendency of a viewer (i.e. anyone looking at the drawing) to imagine a figure in a landscape with a narrative and time period, which might take away from the overall observations of the landscape.

The idea that landscapes are somehow timeless and imbued with identities of common ancestry has been referred to by Hoskins and Wordsworth (Johnson 2007). There is a sense when looking at a landscape that due to its presumed timeless solidity, it lasts longer than a human life and supports memories from the past. Part of this perceived solidity perhaps may come also from the 'depth from relative motion' (from J.J. Thompson, Livingstone 2002): as we observe or walk through a landscape, the objects near us such as plant forms, trees, etc. appear to move in the wind at a faster rate than the same objects with the same conditions, faraway, giving the illusion of stillness at a distance. The art works and the series of maps in the atlas, have attempted to show that elements within the landscape are anything but still: they are on the move, continually changing ecologically, historically and aesthetically.

The artist observed that elements in the landscape move at a different rate from each other: down to numerous different rates of movement within a single bush, with older branches moving at different rates to younger leaves. She observed all these landscape details together from the point of view of a human within it (who was also moving simply by breathing or tilting the head). The complexity of this observed landscape was somewhat lifted however, when land was viewed from an elevated position: the land divisions became simpler perceptively, patterns emerged and there was less movement and eventual stillness the further away from the artist observer.

The work of an artist and that of an archaeologist could be said to be, in part, to push boundaries, within the times in which they inhabit, and to use inventiveness to try and attain new dynamic realities. In this Atlas, the English landscape has been researched from many view points and with new and old devices. The complexity, however, does not stop there, as the landscape itself cannot be viewed as a single entity or as a solid, or timeless form. Publications, writing, maps and graphs, and artworks go some way to digest the complex information and produce a structure from which the reader has the freedom to use and translate into future inspirations and future research.

'Recognizing and appreciating the impermanent, evanescent aspects of nature would gently assure us that nothing that exists can escape this condition of transience.' (Saito 2005: 170)



Imagined landscape, geology and maps. 2017.
Coloured pencil, pastel, graphite and chalk on fragmented marble chess set. Artworks by Miranda Creswell.

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Art and archaeology (III)

Miranda Creswell

Since the end of the EngLaId project, Miranda has continued to engage with archaeology and archaeologists. She has been appointed as Artist in Residence at the School of Archaeology in Oxford and has worked with other projects on English archaeological topics. We present here a series of works inspired by her engagement with archaeological thinking.

The departure of her work here is the pencil line has been transformed into paint, the subject matter is not only directly observed but imagined, referring broadly to the timelessness of human interaction with landscape.

She has focussed on certain universal constants that link humans to landscape, that have been the focus of archaeological research.

Pictured here are the interest of humans on rising suns, on seasonal weather, on tides, river flow, on vegetation and deposited objects.

'Abstract Land no.1a'
A find spot on a map or an event in time imagined. Each event could be imagined to be surrounded, enveloped by seasonal vegetation and weather.



'Abstract Land no.2'
A section of imagined land shaped by sea, wind and sun.



‘Blurring a line’
Lines on top of lines, the notion of past activity, over which more activity occurs, then blurs.
Pathways, tracks, boundaries.



'Land coastal'
A painting made by the coast in a storm, in which part of the paint was washed away and blasted by sand.
The notion of presence and absence in archaeology and other disciplines.



‘Land, Water, Wind’
A painting and drawing of tidal land made on site and in the studio over three years,
The memory of repeated weather patterns and returning vegetation and water.



‘Layers Blue’
Imagined sedimentary layers and superposition dating.
Two blue objects within the layers.



'Two people, river at dawn'
A painting on human interest in the orientation of the sun, midwinter equinox, orientation of field systems, river depositions.

