

# The Economic Development of the Rhine River Basin in the Roman Period

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30 BC – AD 406

Tyler V. Franconi  
Christ Church

VOLUME II: FIGURES AND APPENDICES

Submitted for the degree of Doctor of Philosophy in Archaeology

University of Oxford

Trinity Term 2014



## **ABSTRACT**

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**ABSTRACT:** The economic development of frontier regions has been neglected in the study of the Roman economy. Traditional core/periphery models suggest that frontiers were marginal zones dependent on a wealthy Mediterranean core, and this view has dominated scholarship for more than thirty years. In light of recent work on the Roman economy, it is clear that many old models need to be reappraised; this thesis examines the economic development of frontiers through the case study of the Rhine River Basin. This region formed one of Rome's northern frontiers for more than 400 years and has a rich tradition of detailed archaeological and historical research. Using data from the Rhine frontier, this thesis re-examines the nature of frontier economies, arguing that they were dynamic, versatile, and complex rather than subaltern and undeveloped. A new model, based in the analytic framework of economic geography, is suggested as a replacement in order to appreciate the realities of frontier economies.



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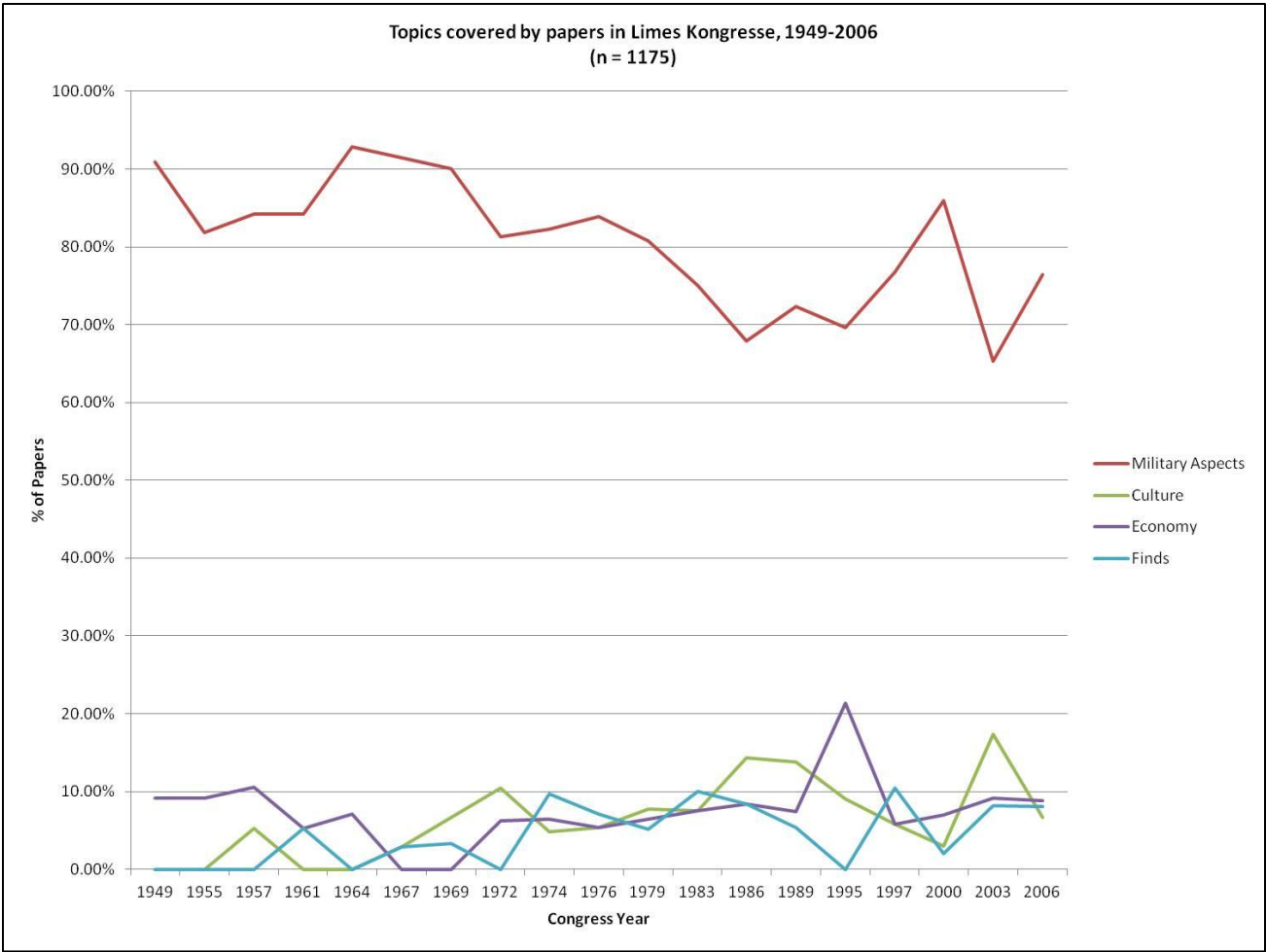


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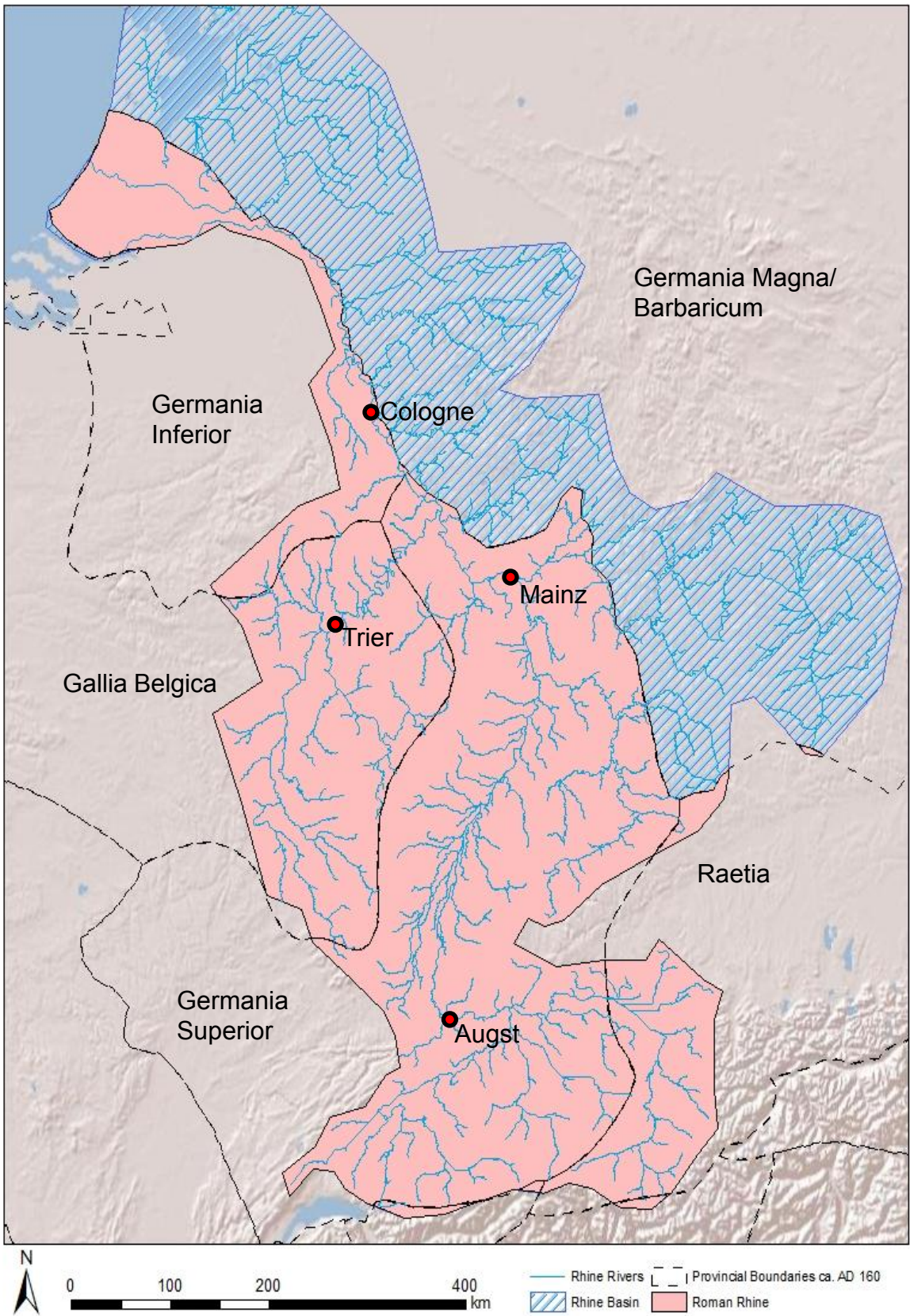


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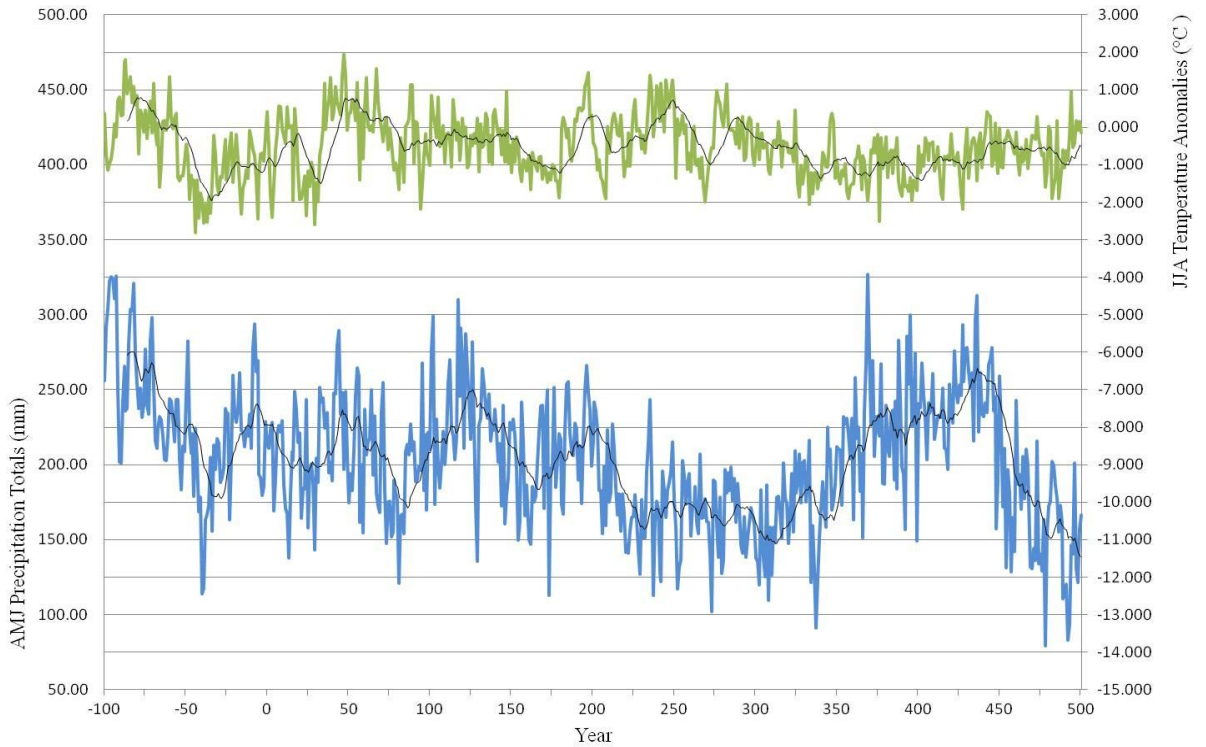


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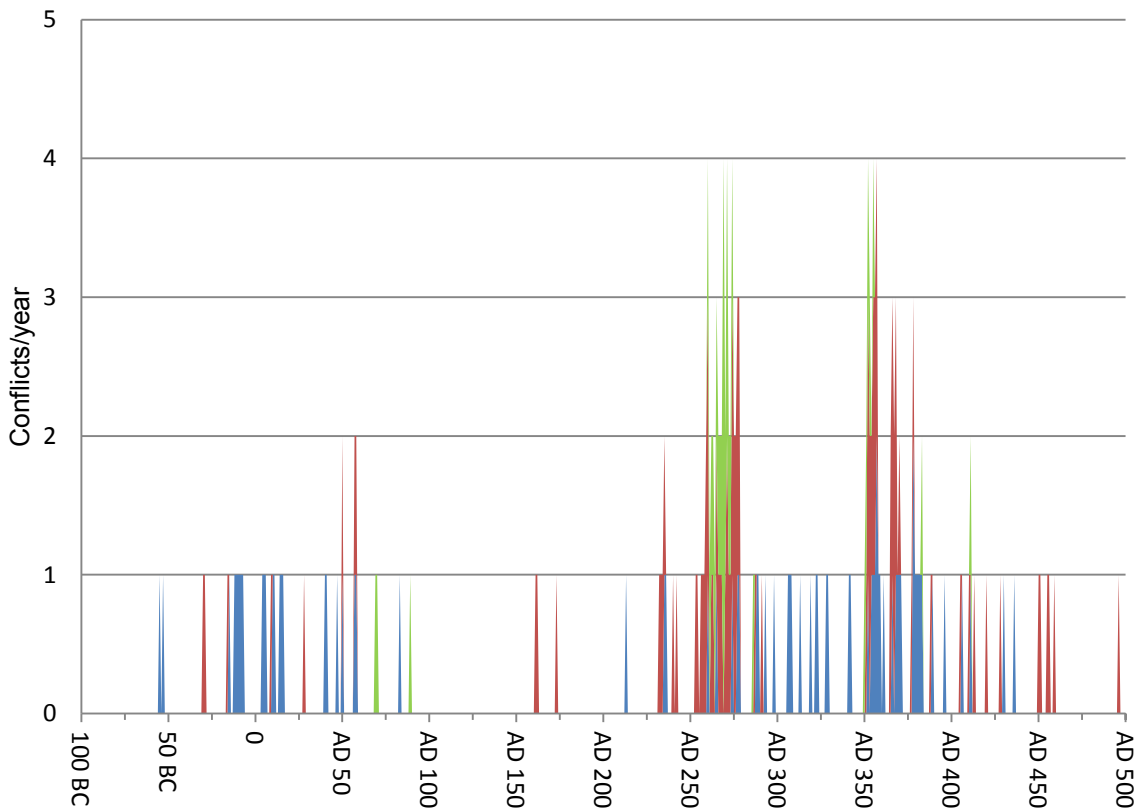


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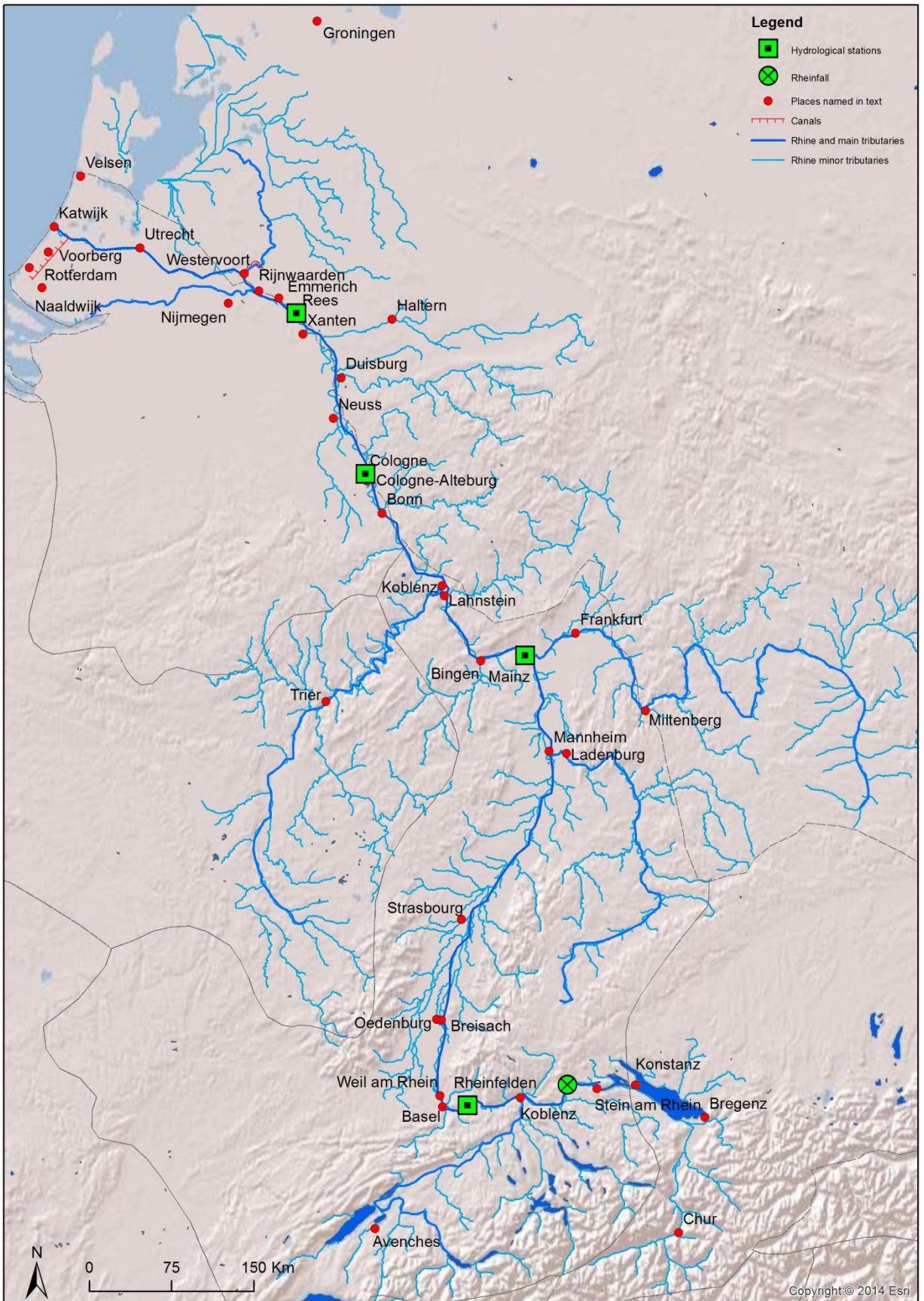


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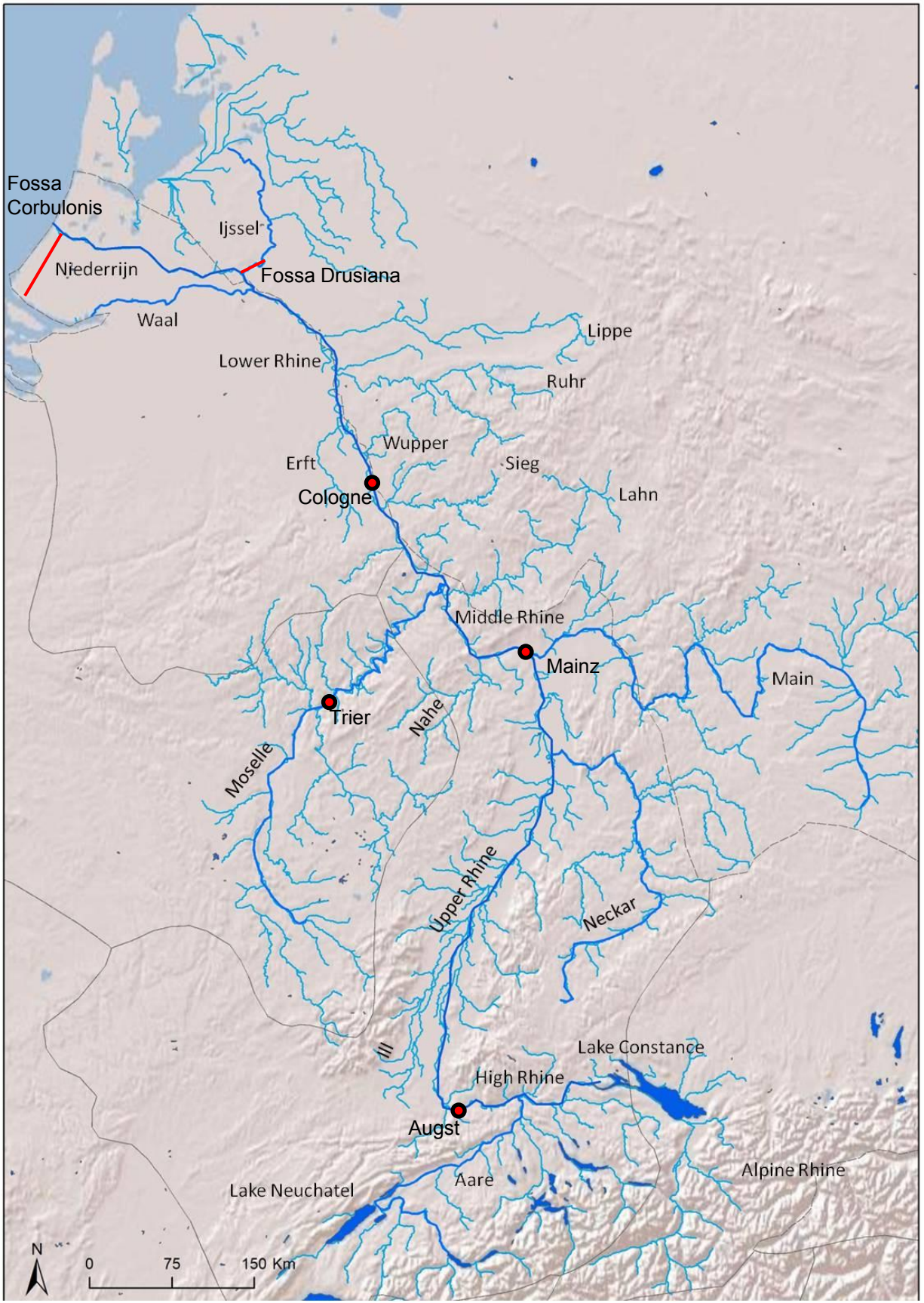


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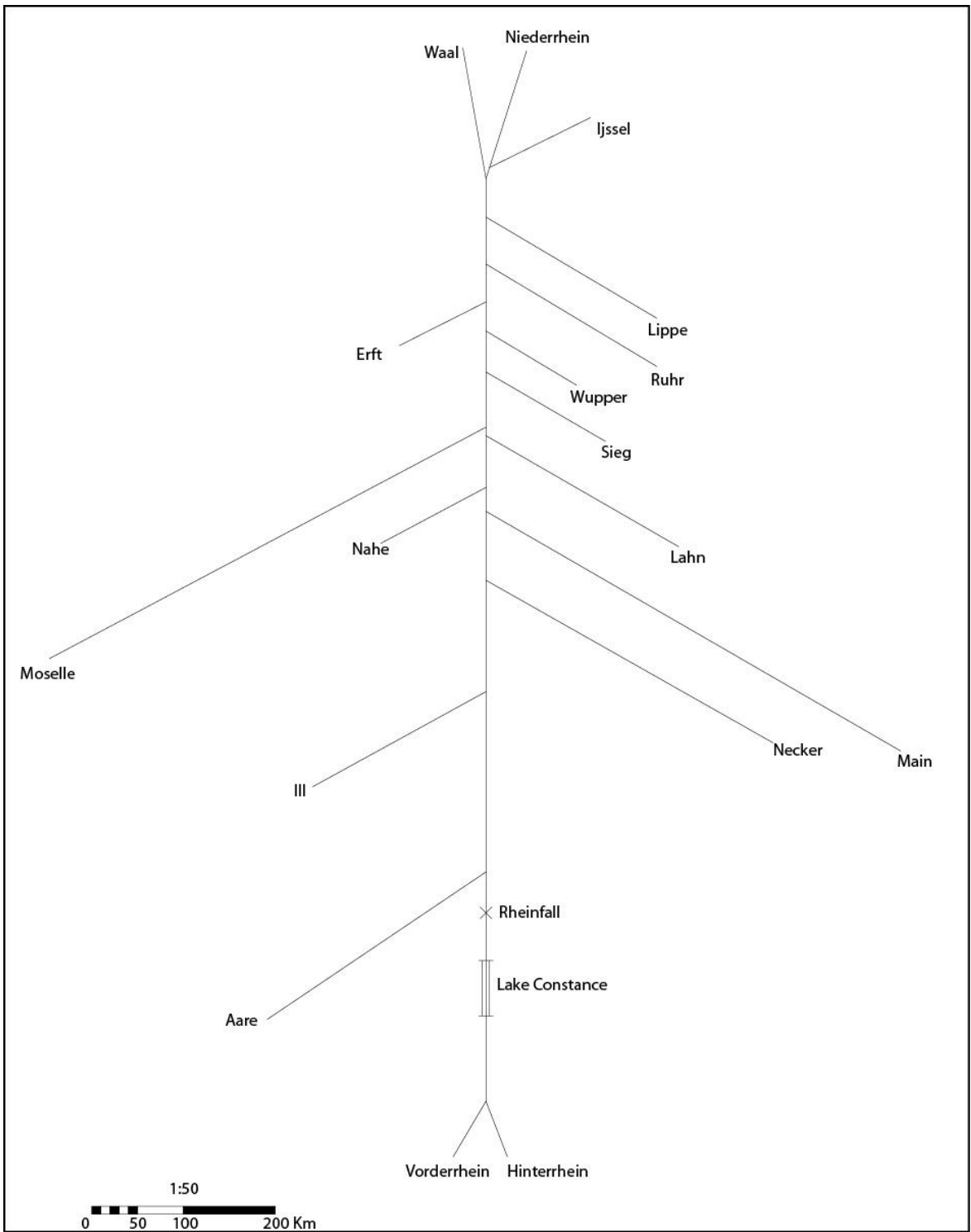


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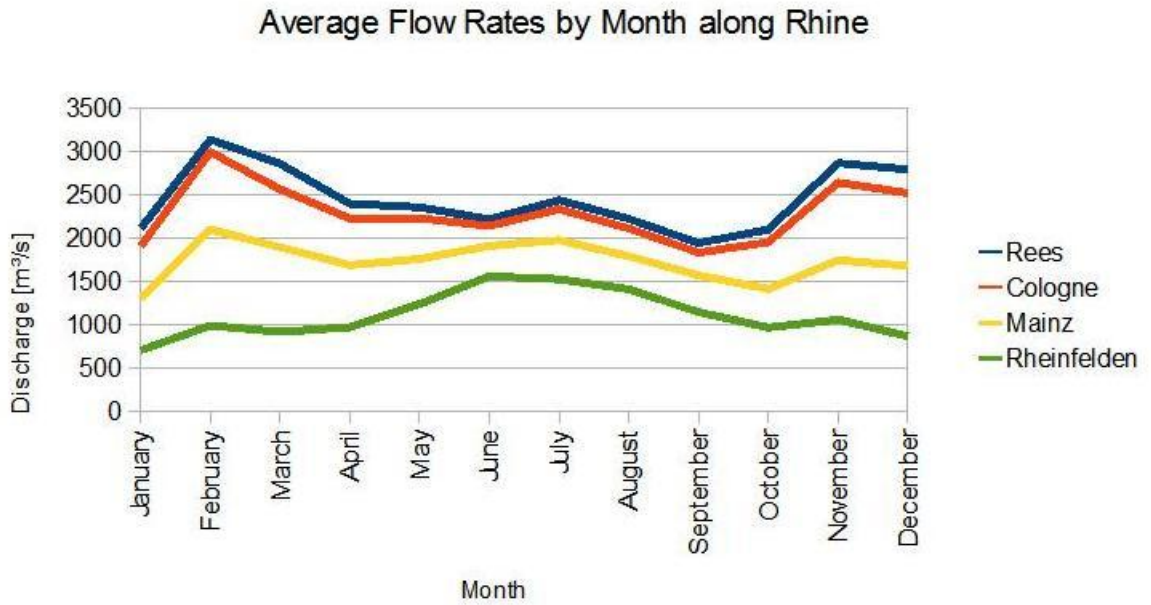


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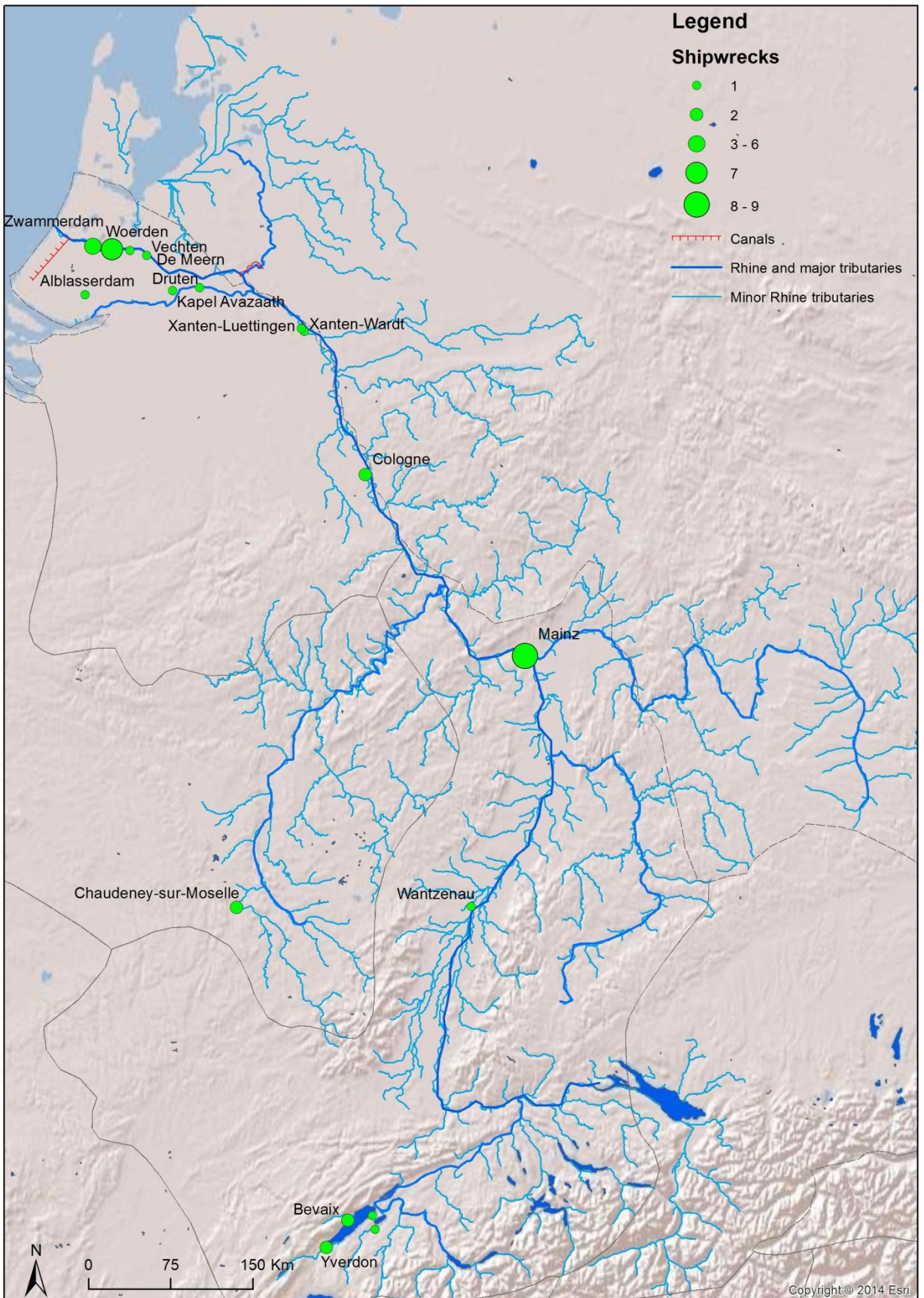


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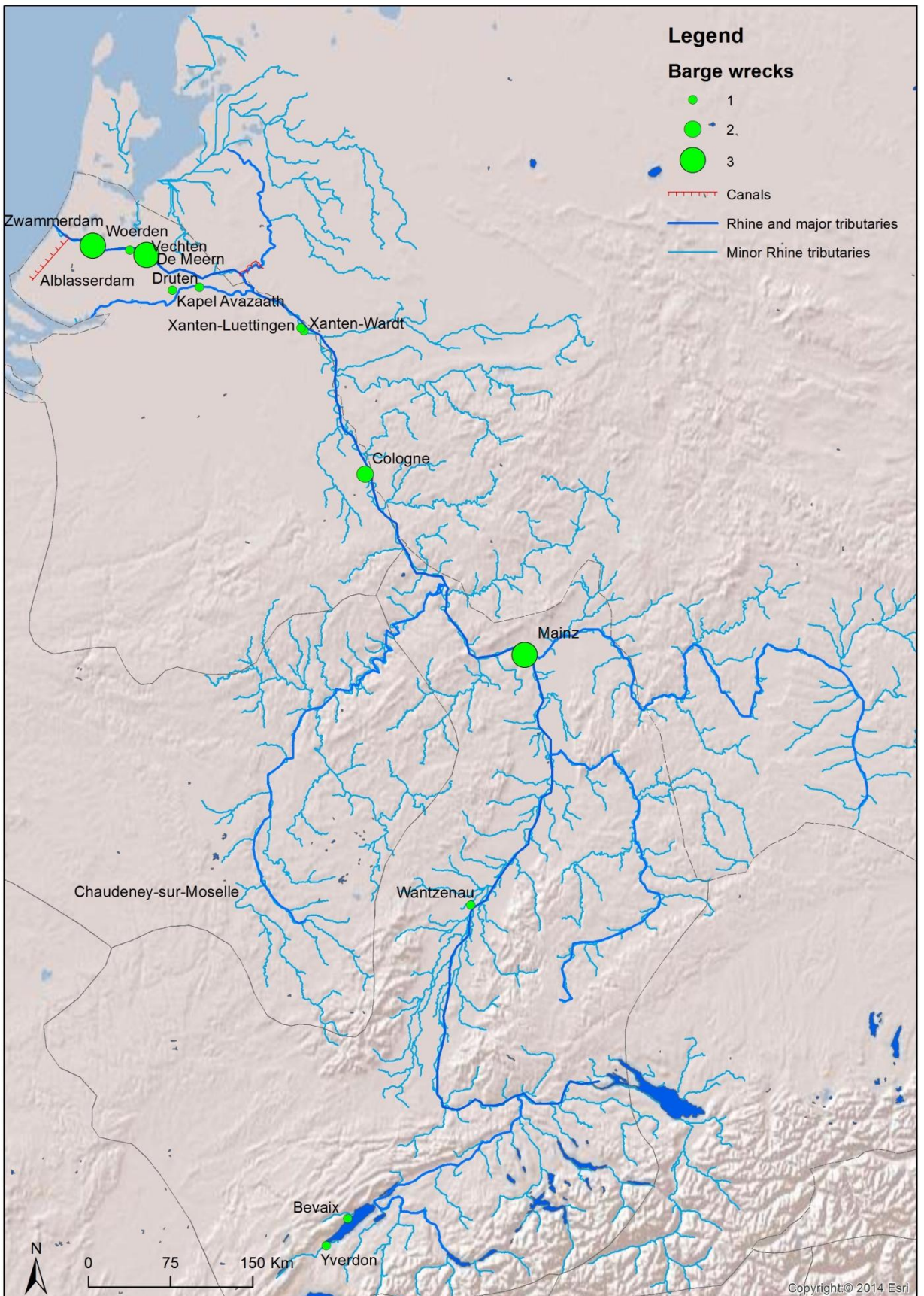


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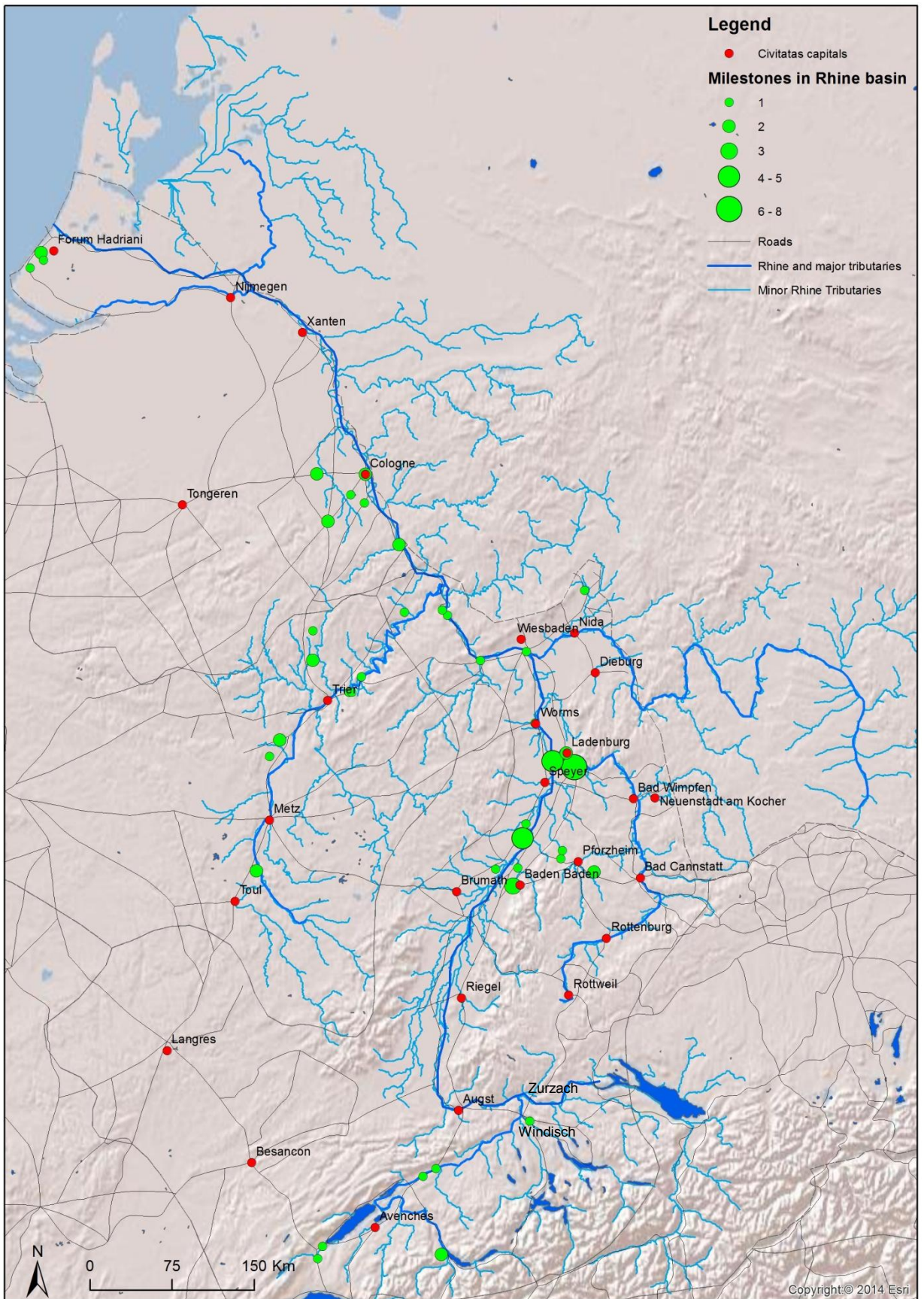


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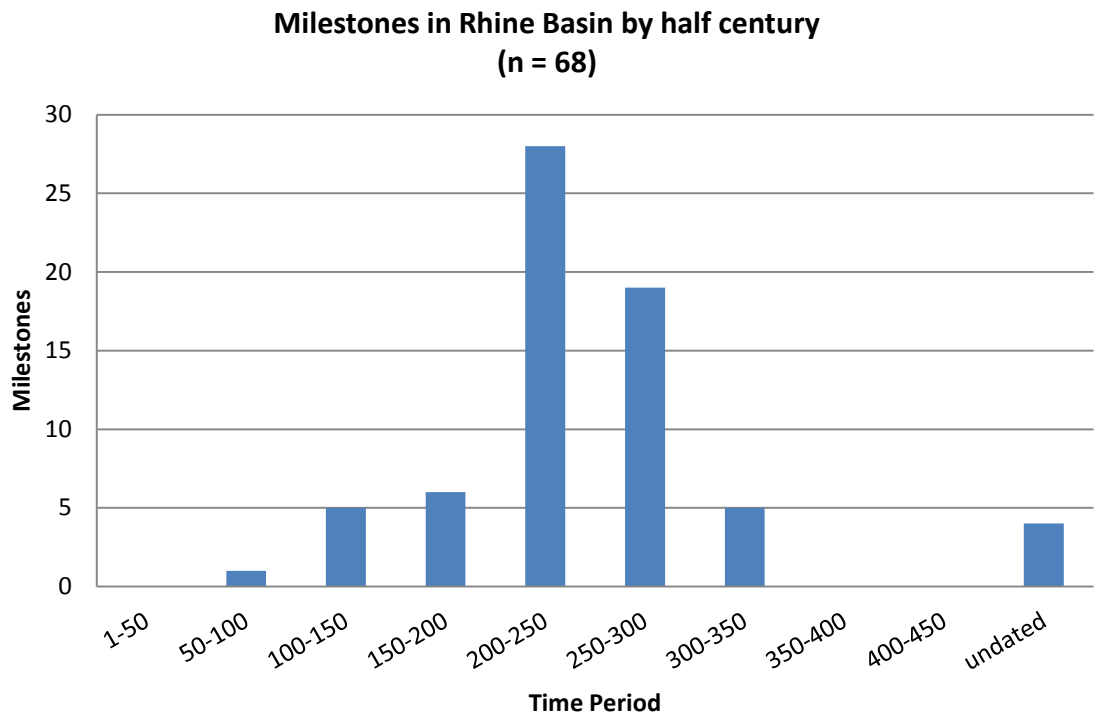


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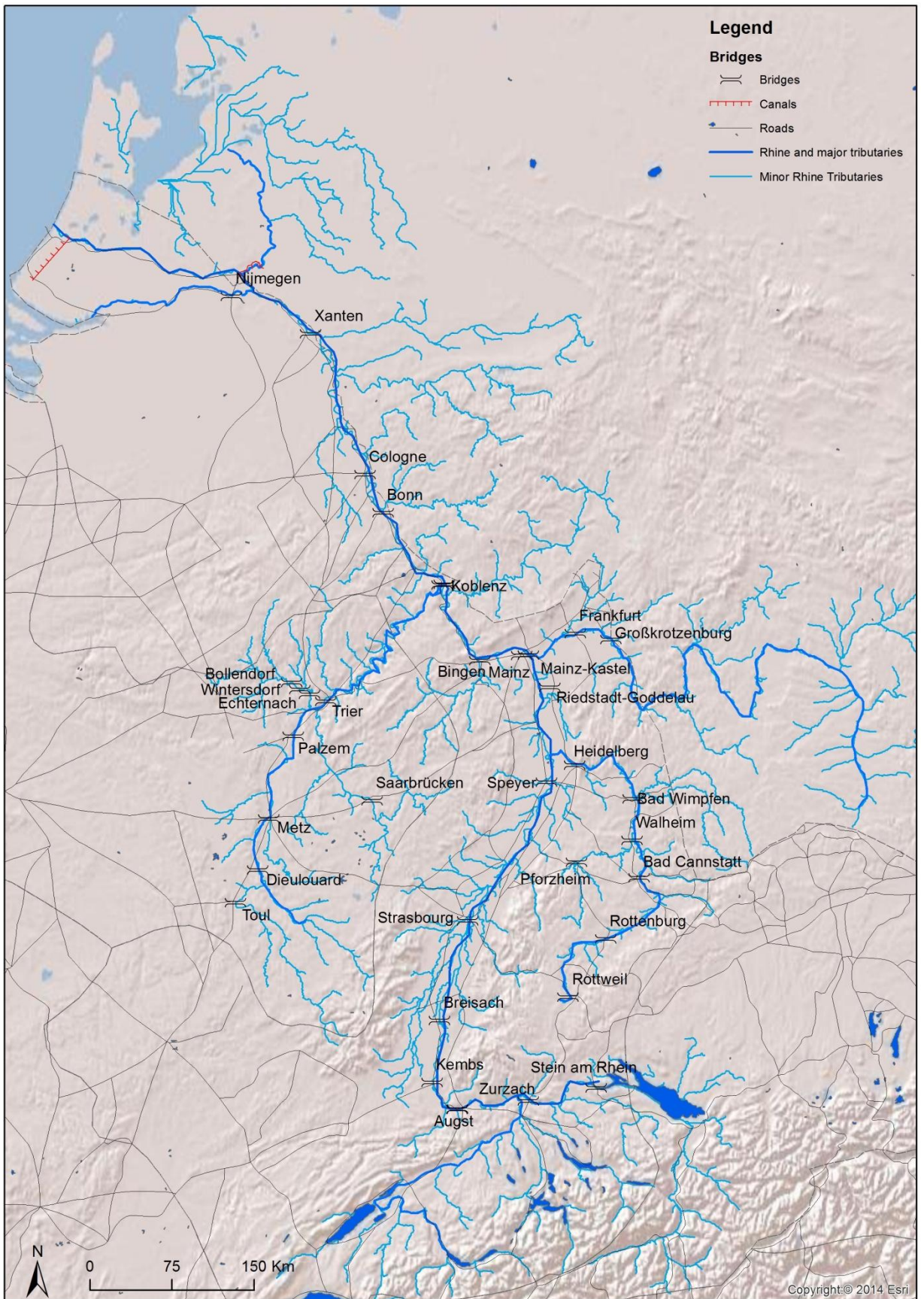


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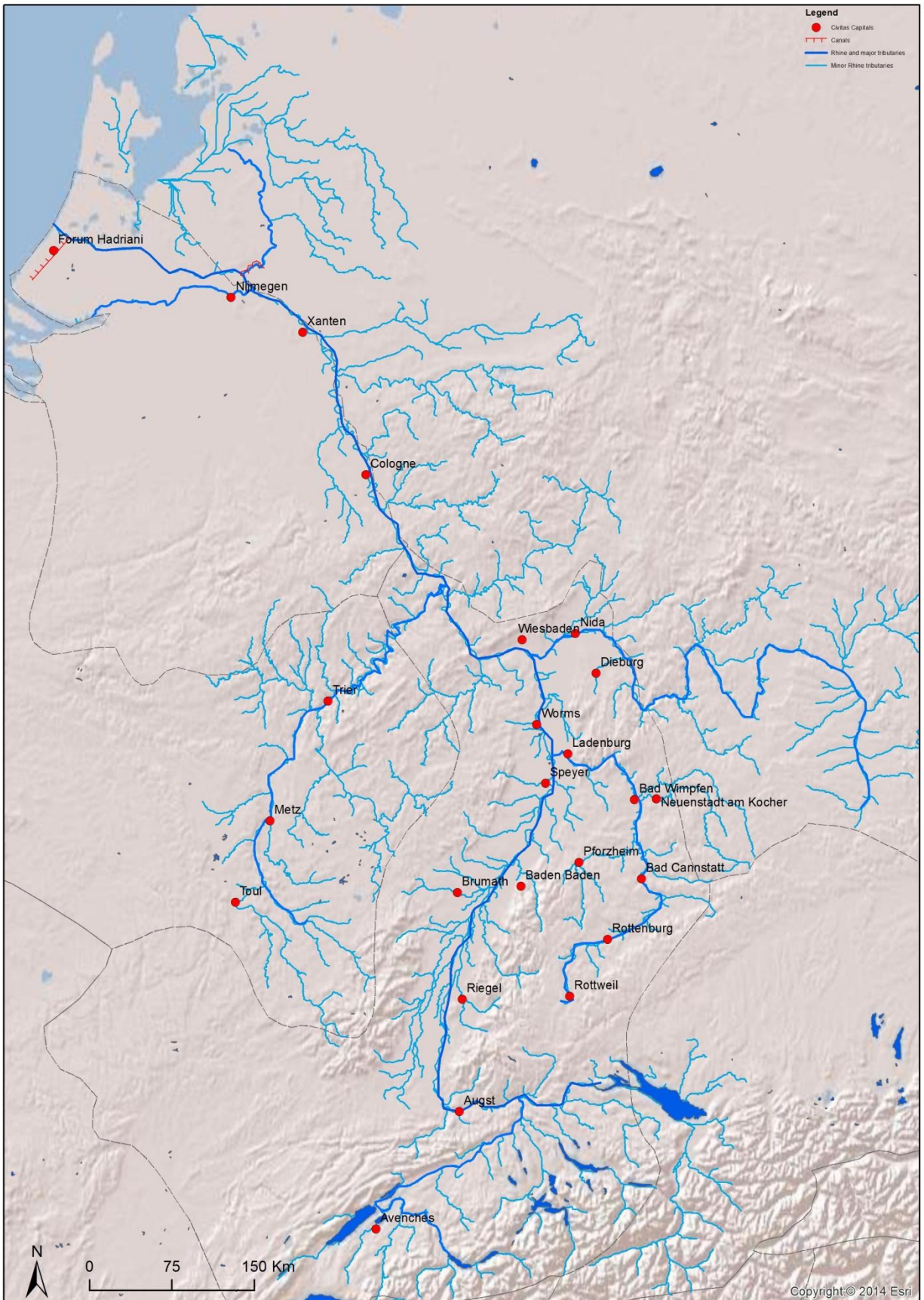


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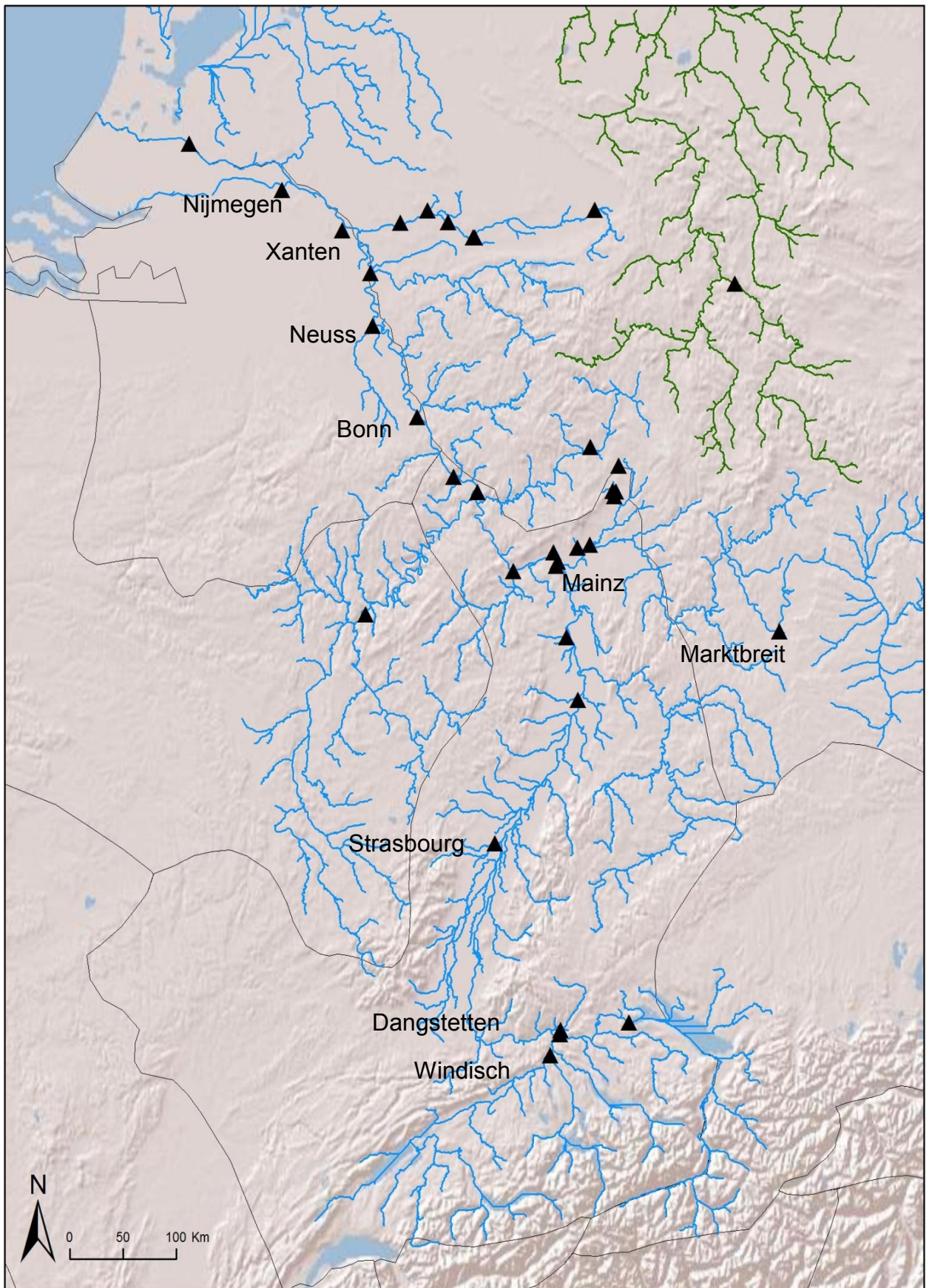


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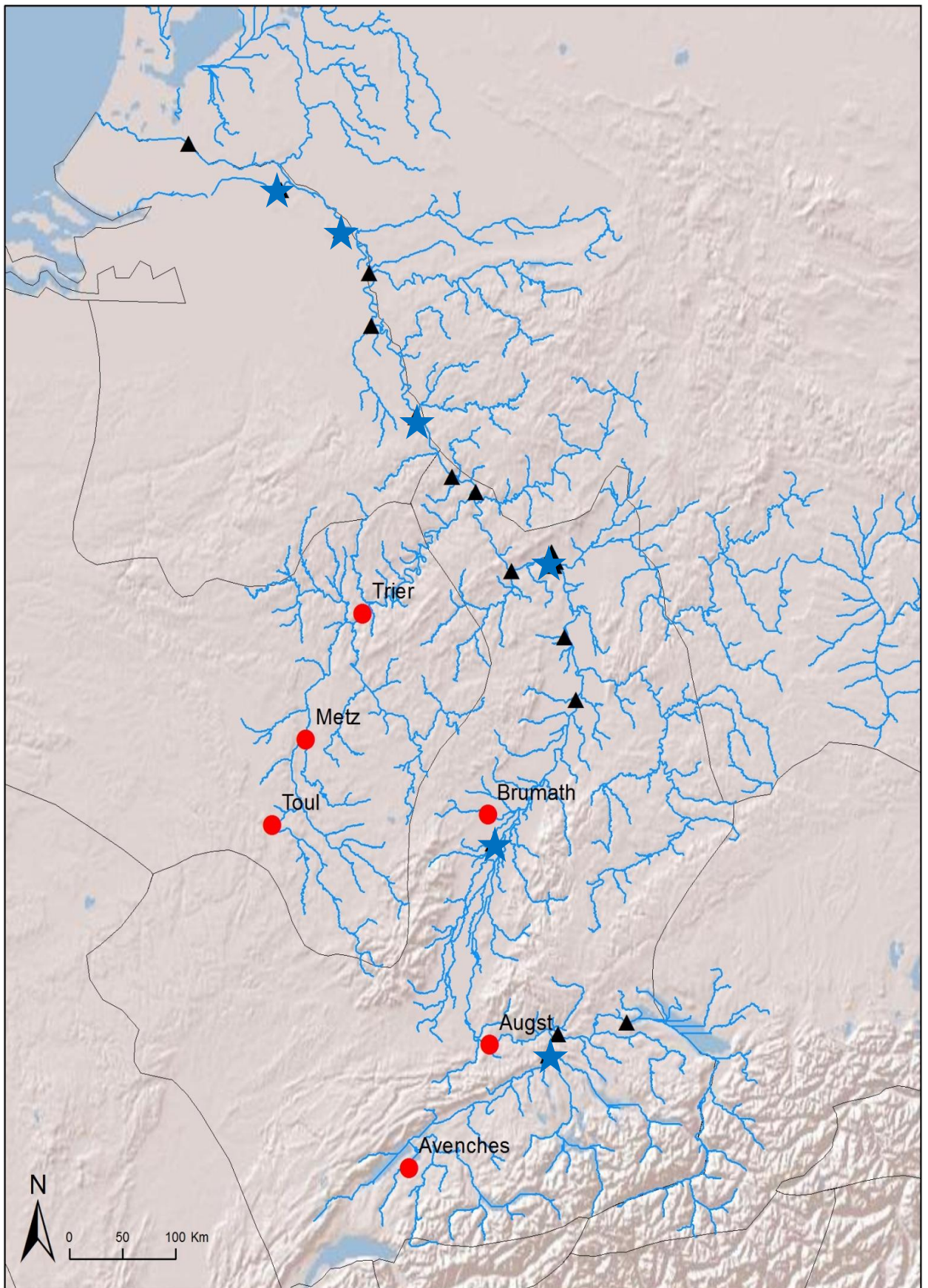


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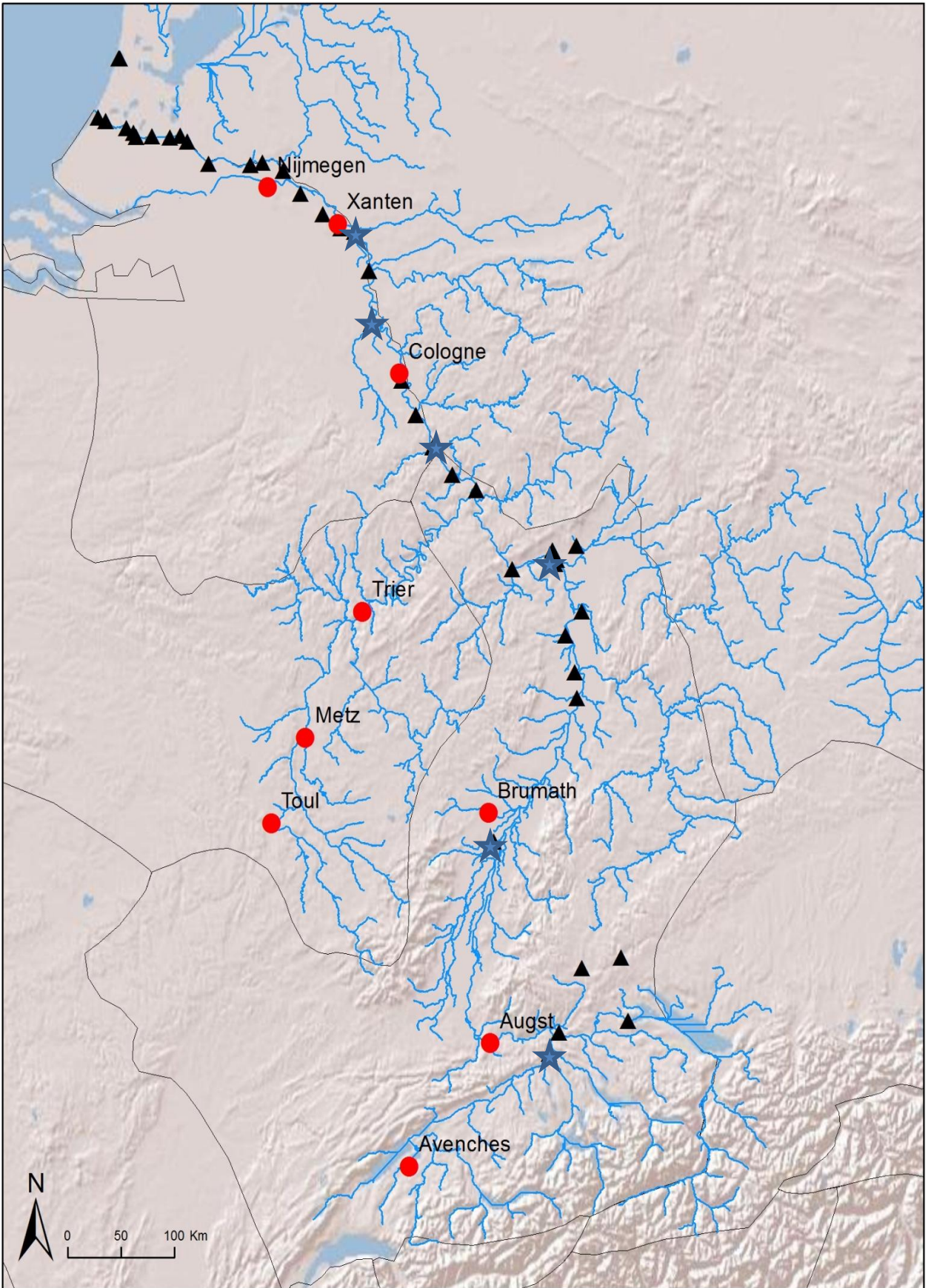


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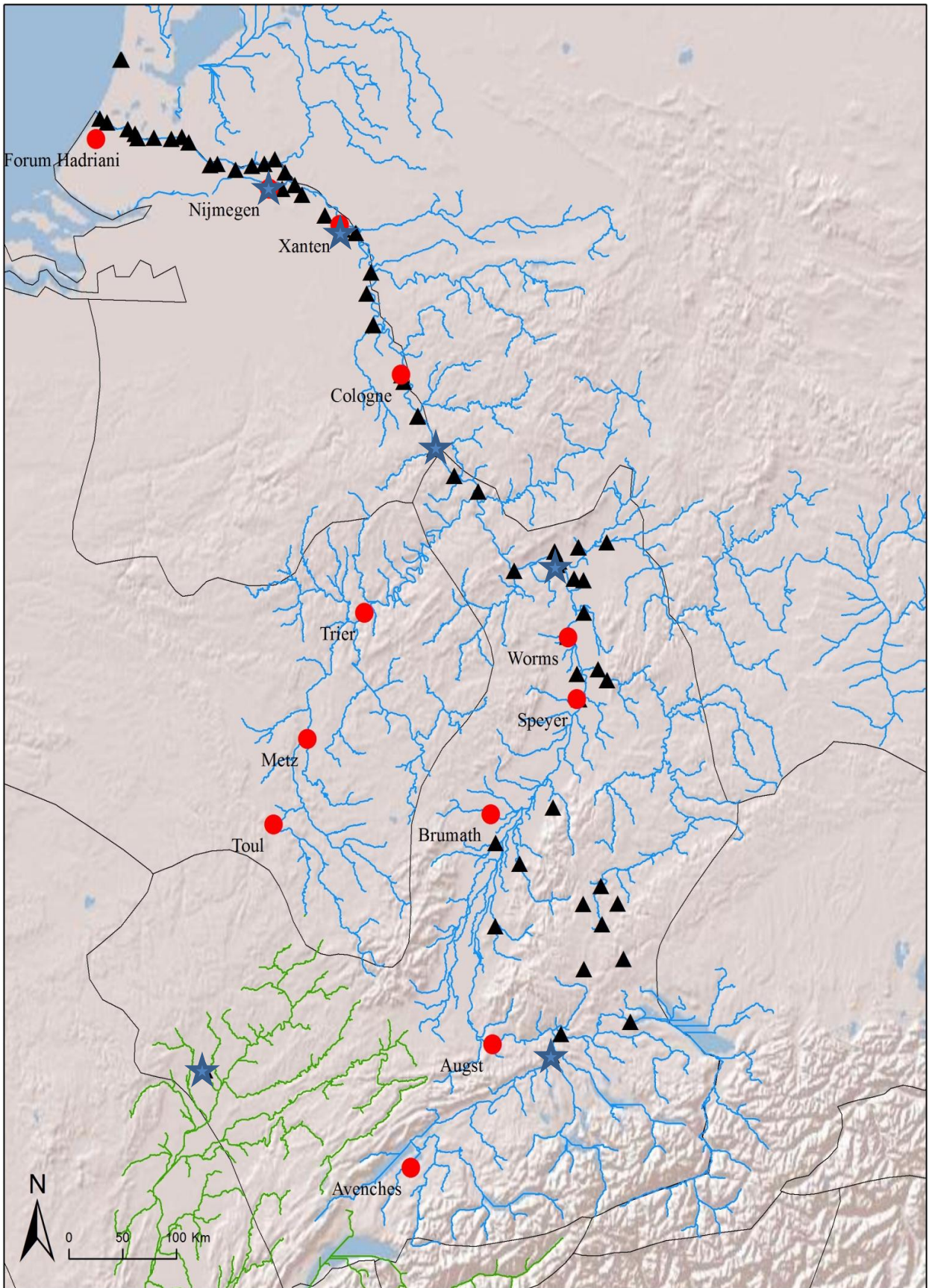


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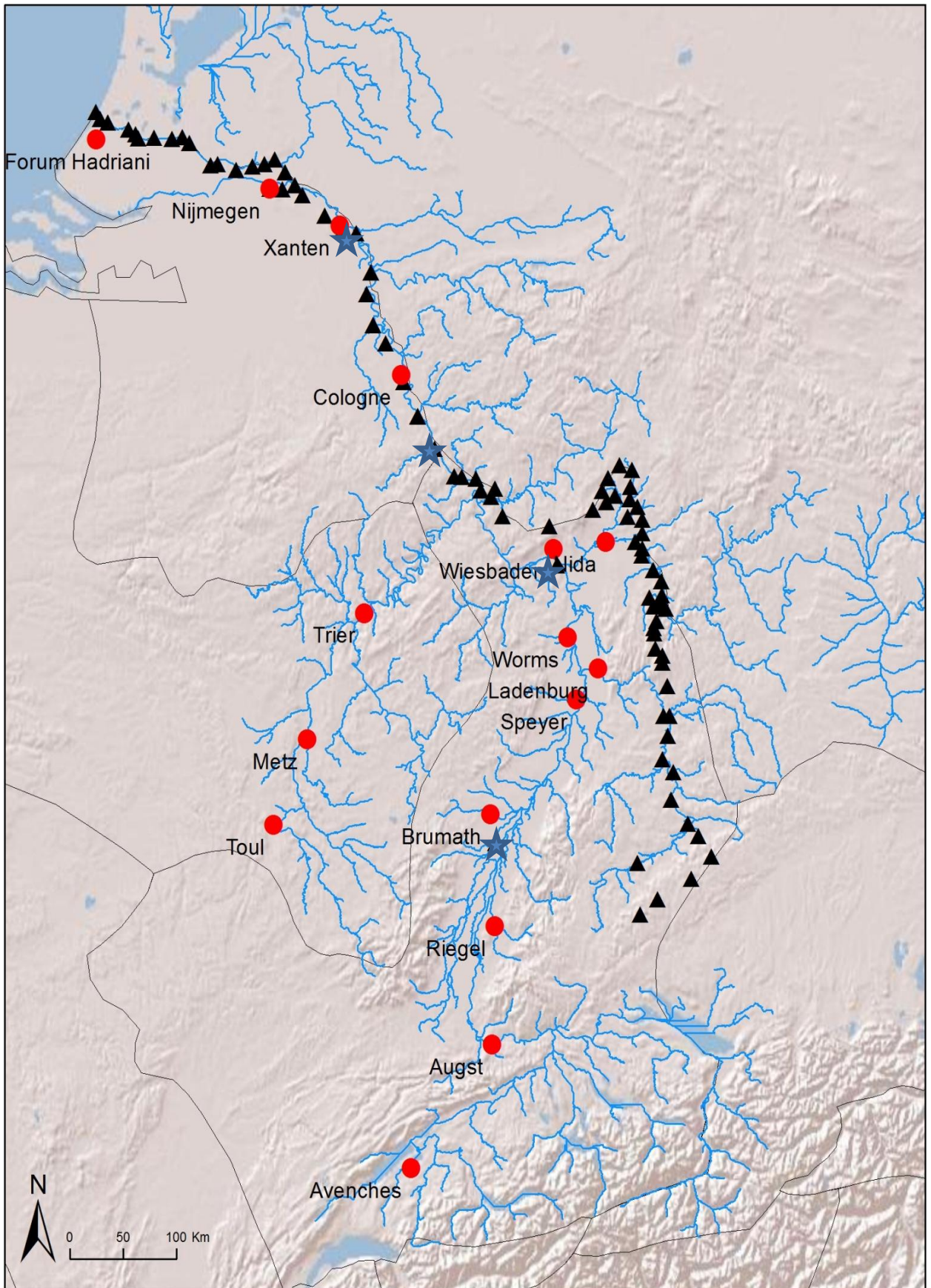


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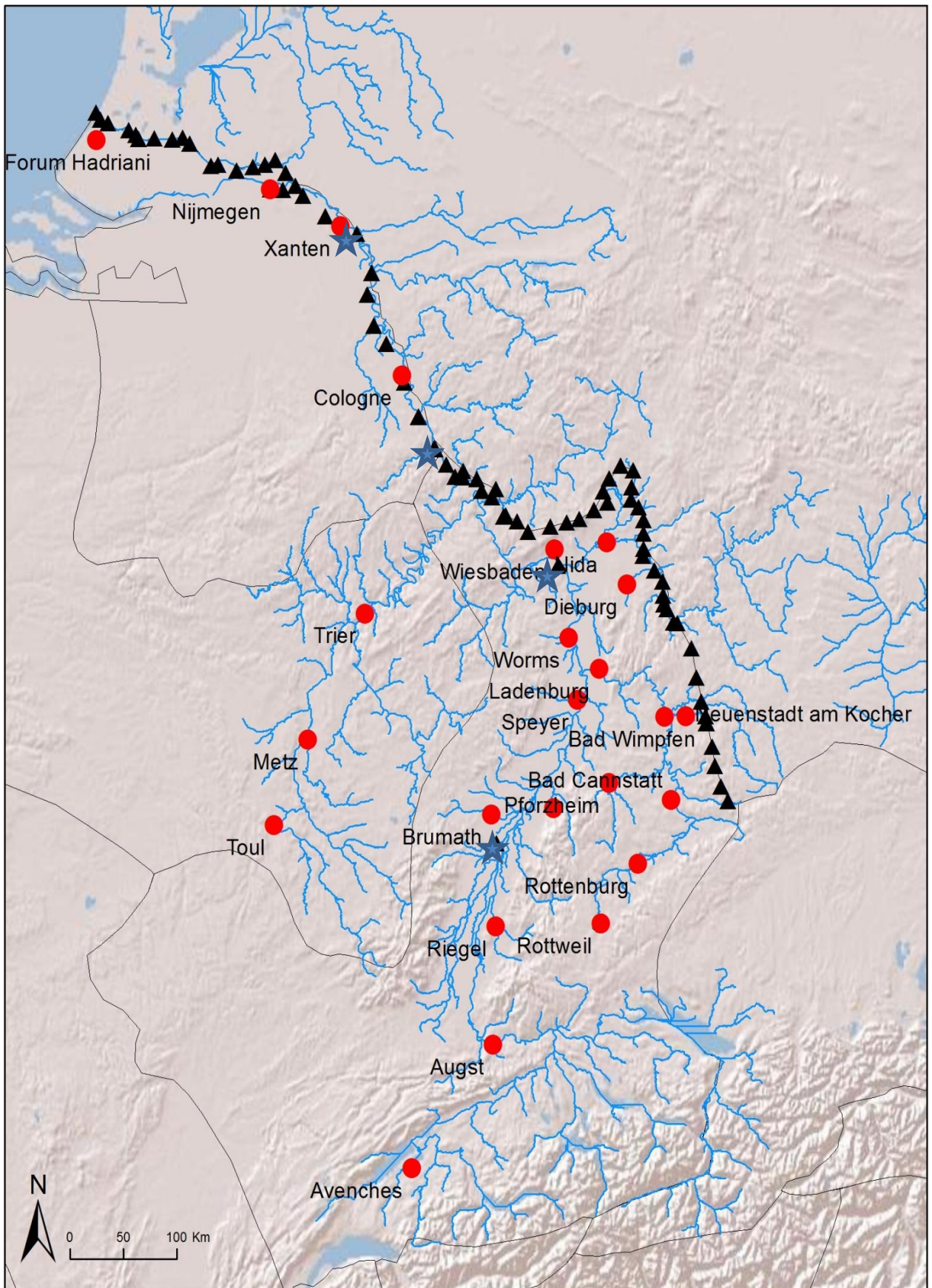


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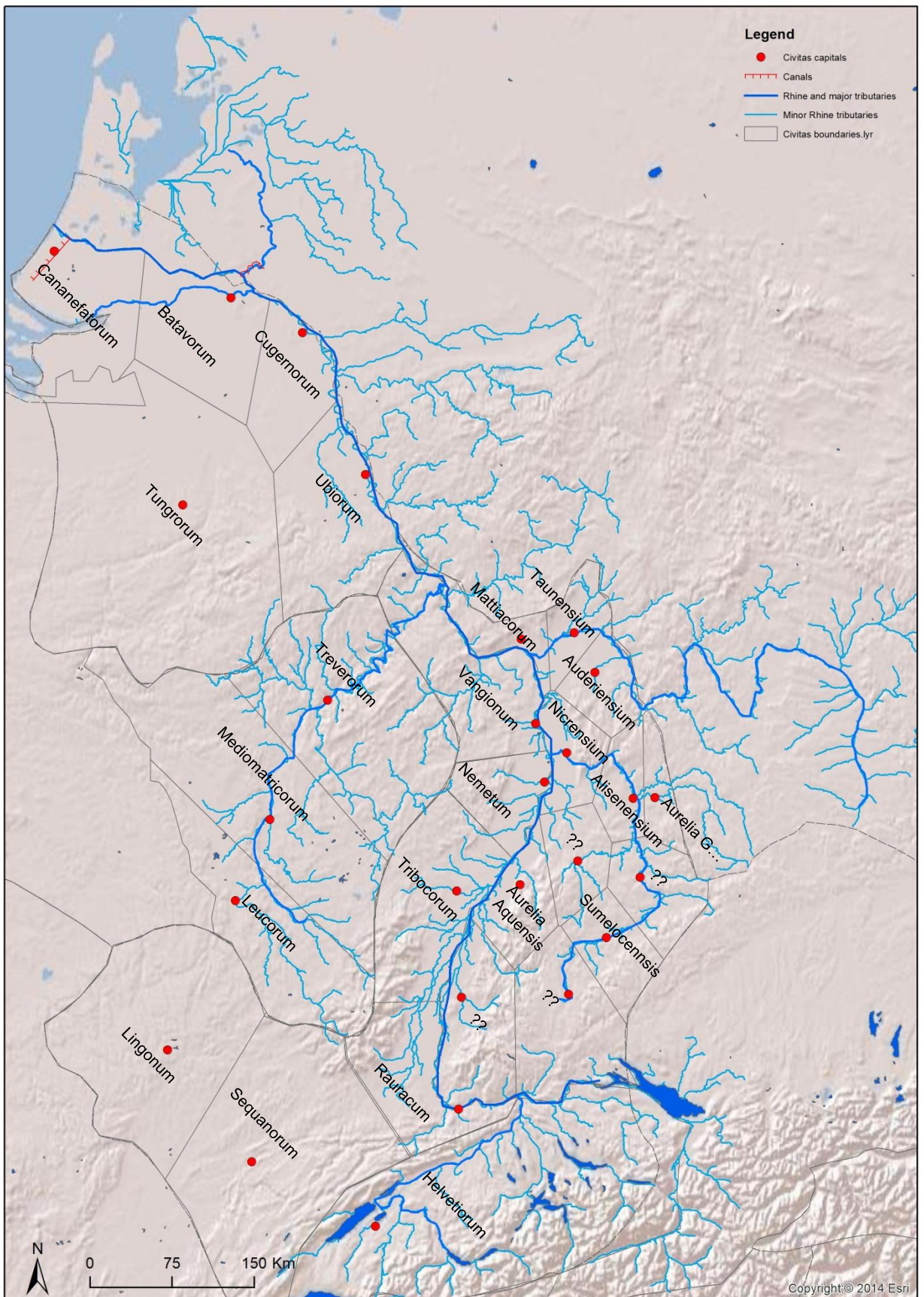


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## Establishment and Occupation of civitates in Rhine basin

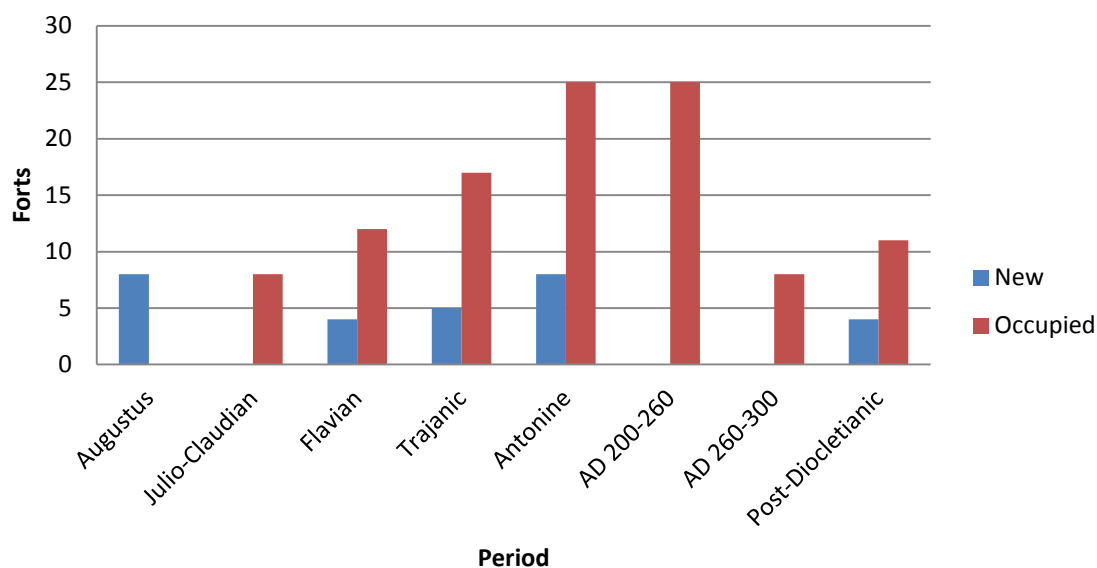


Fig. 3.9: Establishment of civitates by Emperor.

## Rhine basin urban area (ha) ca. AD 250

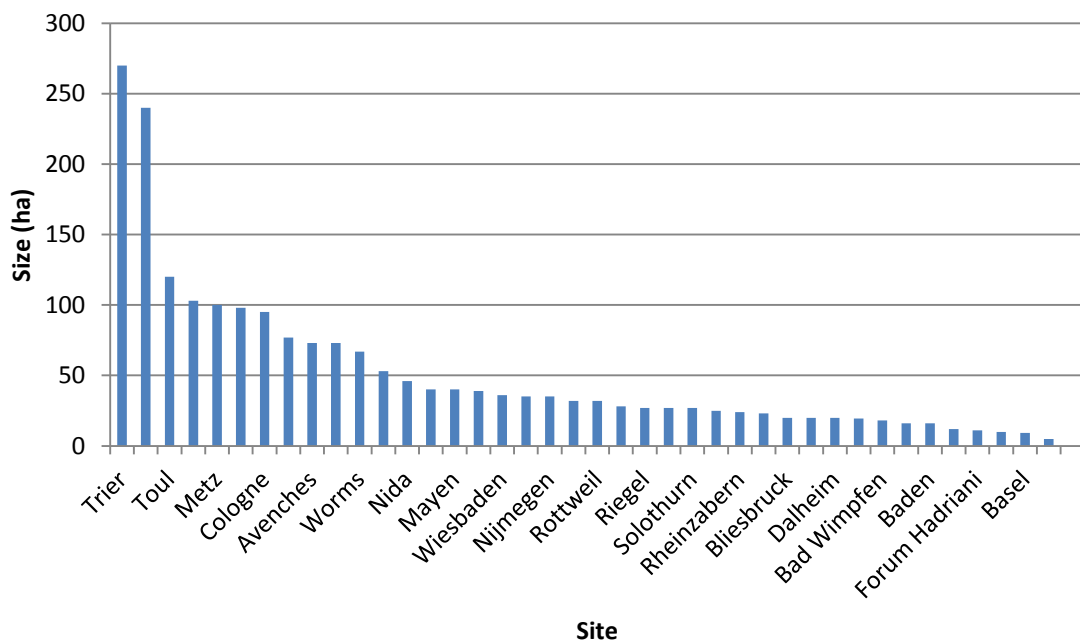


Fig. 3.10: Size of measurable cities in Rhine basin ca. AD 250.

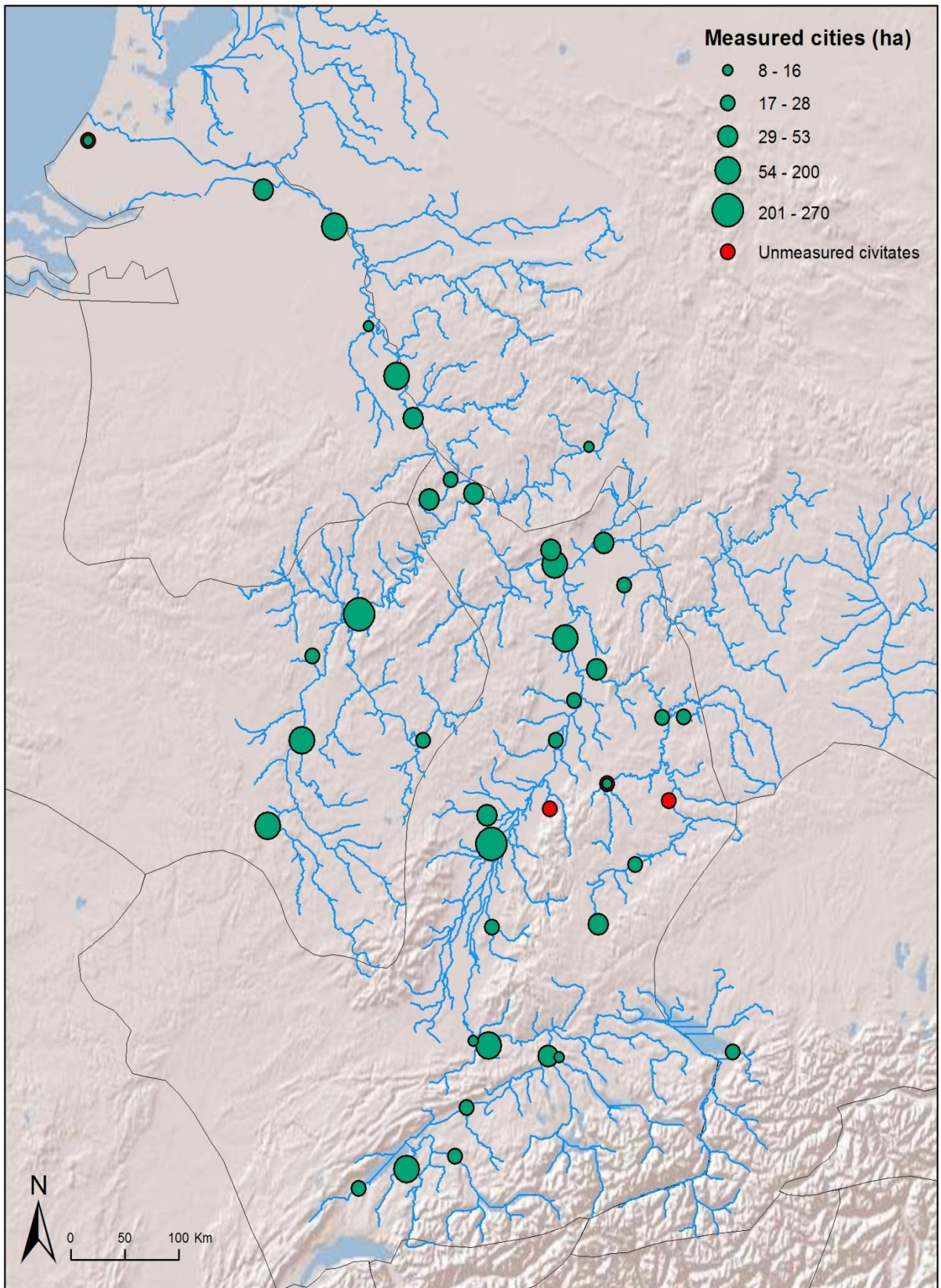


Fig. 3.11: Map of measurable city sizes ca. AD 200.

### Forts of Lower Germany by Size (n = 61)

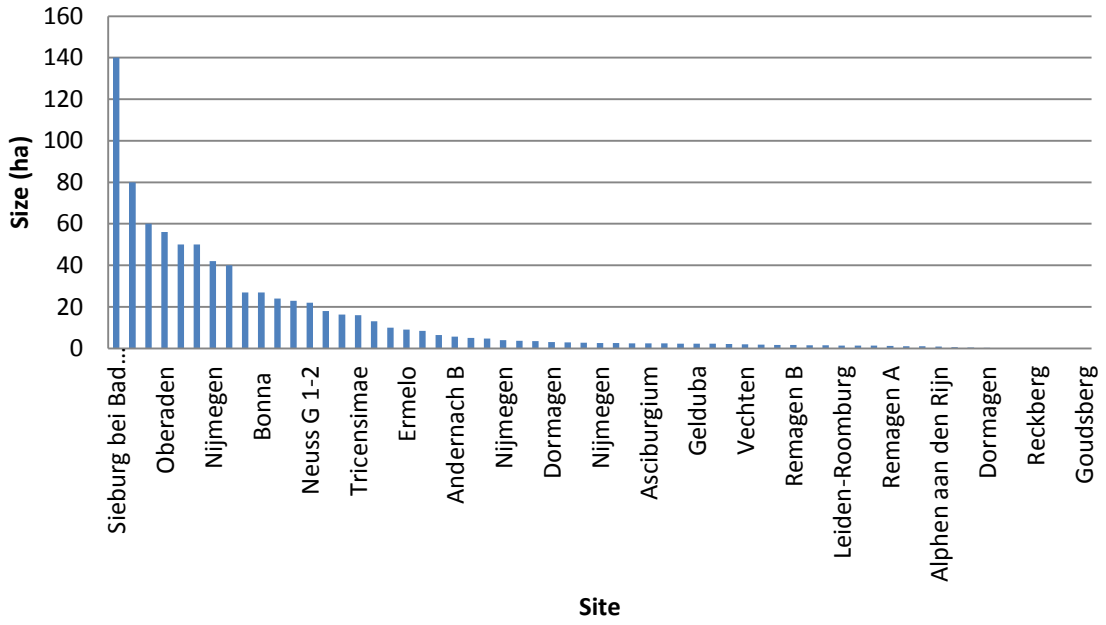


Fig. 3.12: Measurable forts in Lower Germany.

### Forts of Upper Germany by size (n = 115)

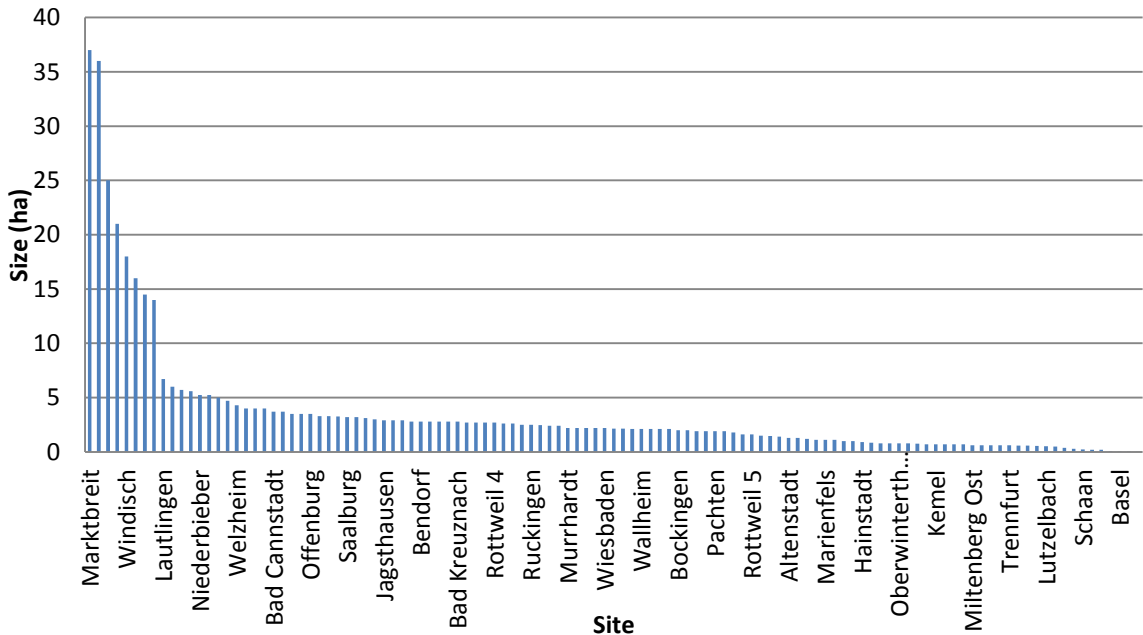


Fig. 3.13: Measurable forts in Upper Germany

## Lower Germany fort construction and occupation

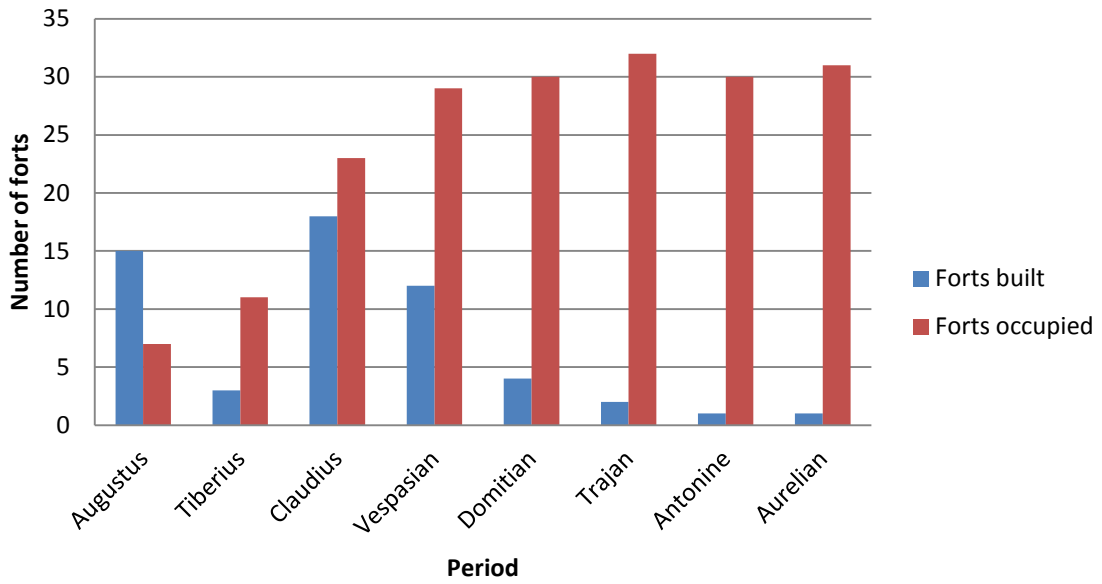


Fig. 3.14: Fort construction and occupation in Lower Germany

## Upper Germany fort construction and occupation

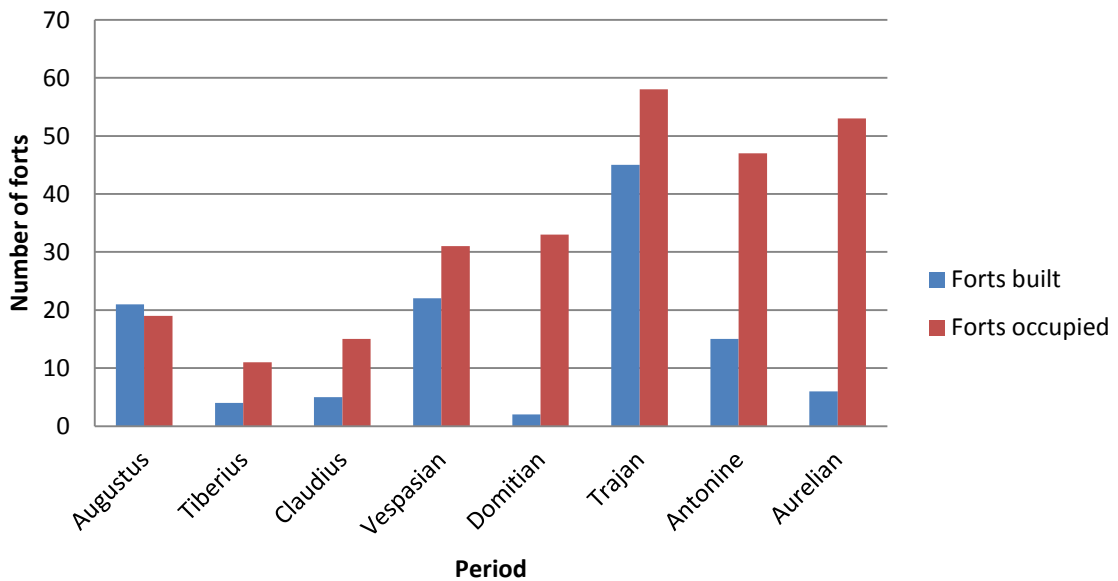


Fig. 3.15: Fort construction and occupation in Upper Germany

### Lower Germany garrison size based on forts

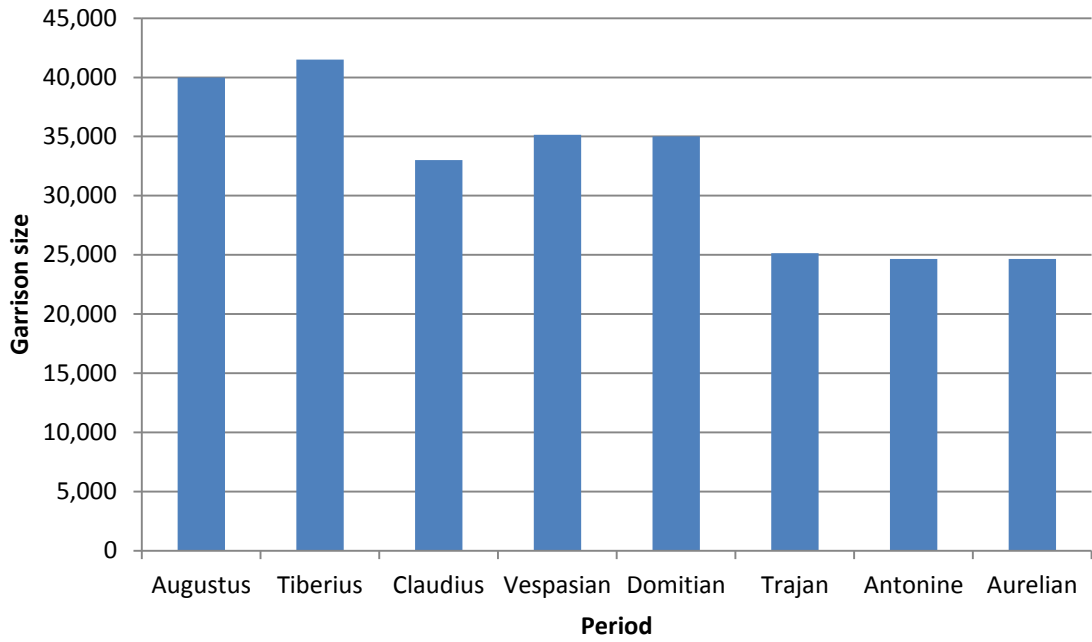


Fig. 3.16: Change in LG garrison size over time, by forts.

### Upper Germany garrison size based on forts

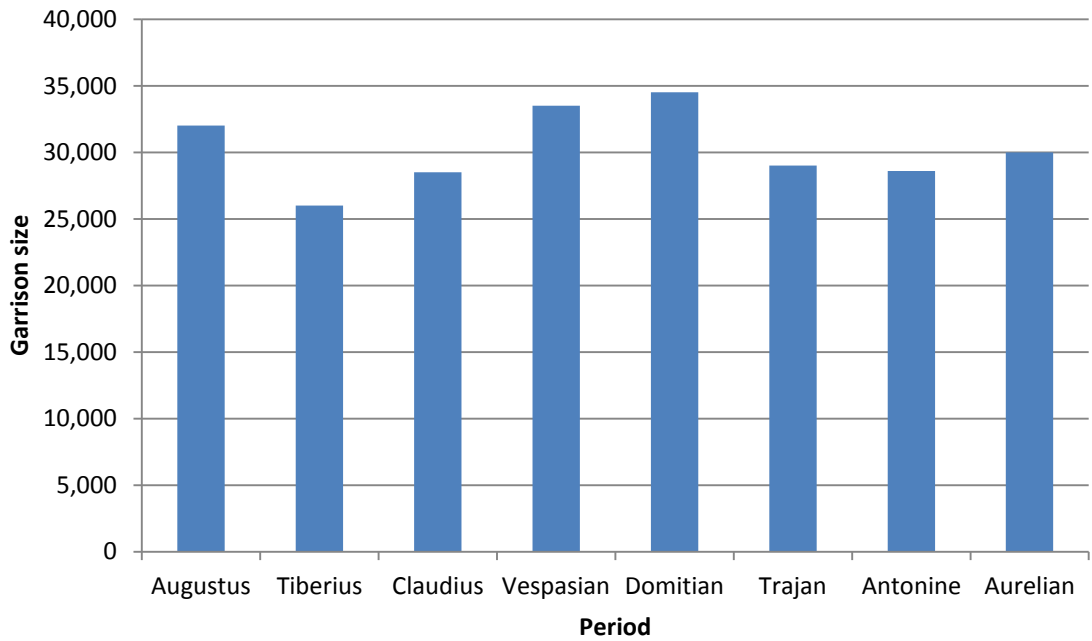


Fig. 3.17: Change in UG garrison size over time, by forts.

## Lower German garrison units based on fort types

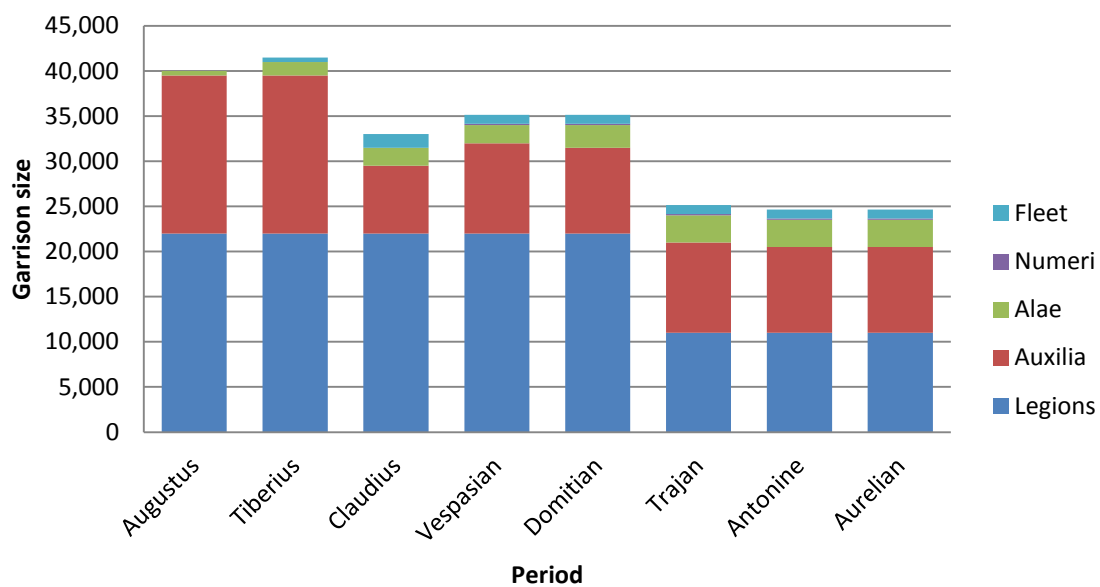


Fig. 3.18: Compositional change in LG garrison, by forts.

## Upper German garrison units based on fort types

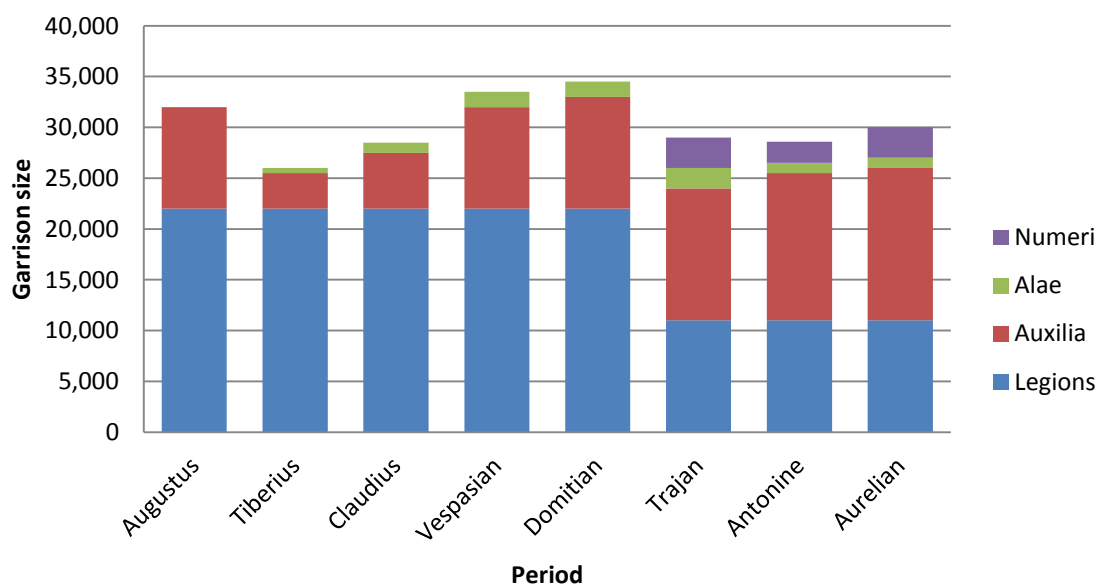


Fig. 3.19: Compositional change in UG garrison, by forts.

## Proportions of legions to auxilia in Germany based on forts

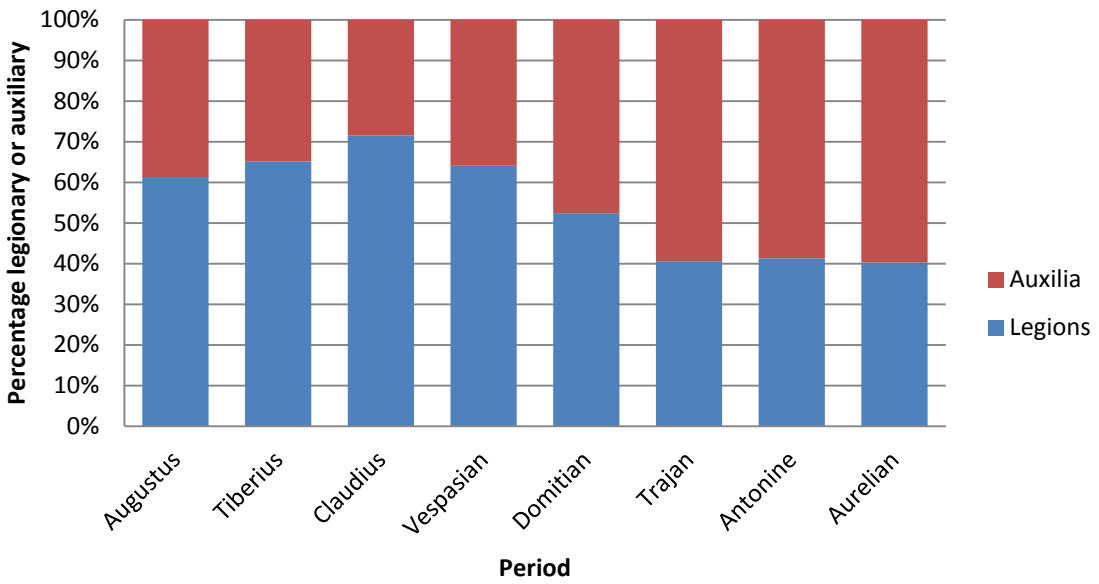


Fig. 3.20: Proportional Rhine garrison totals based on forts.

## Total German garrison based on forts

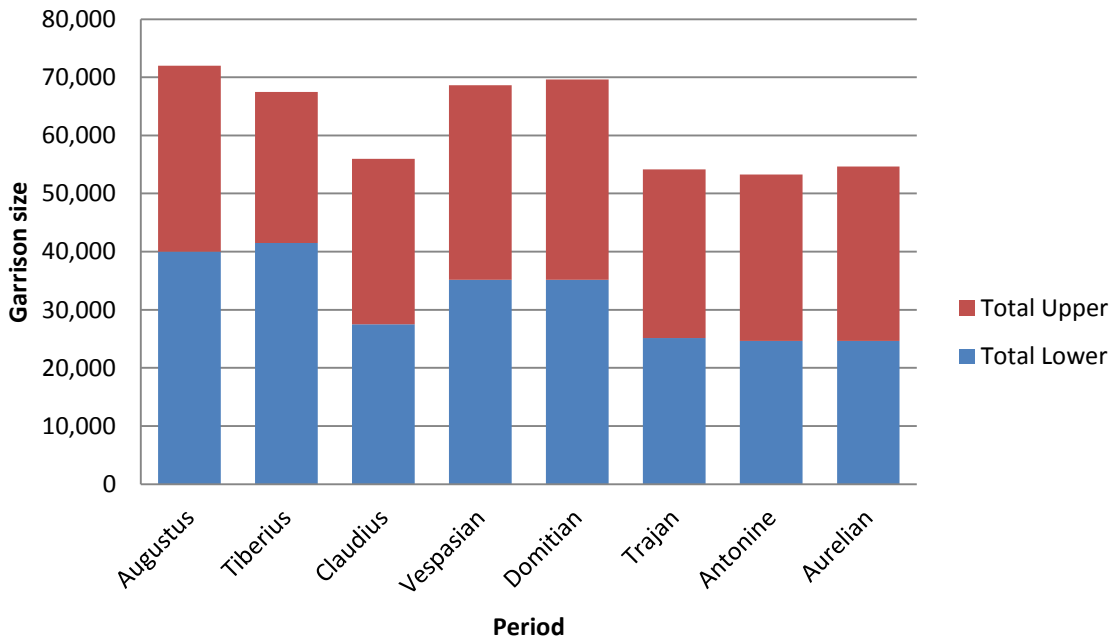


Fig. 3.21: Rhine garrison totals based on forts.

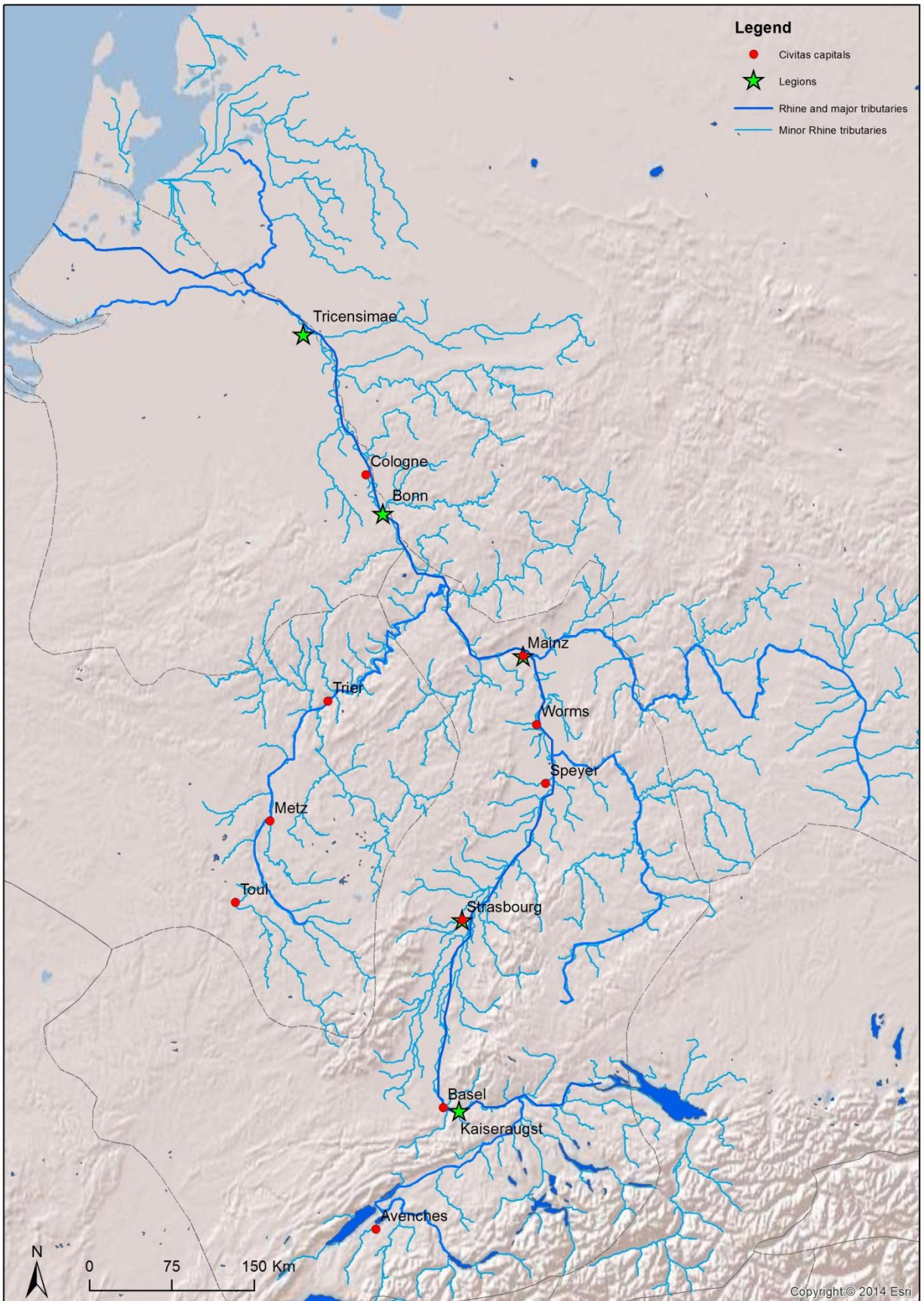


Fig. 3.22: Late antique civitas capitals and legionary fortresses.

## Forts built along Rhine by half century (n = 261)

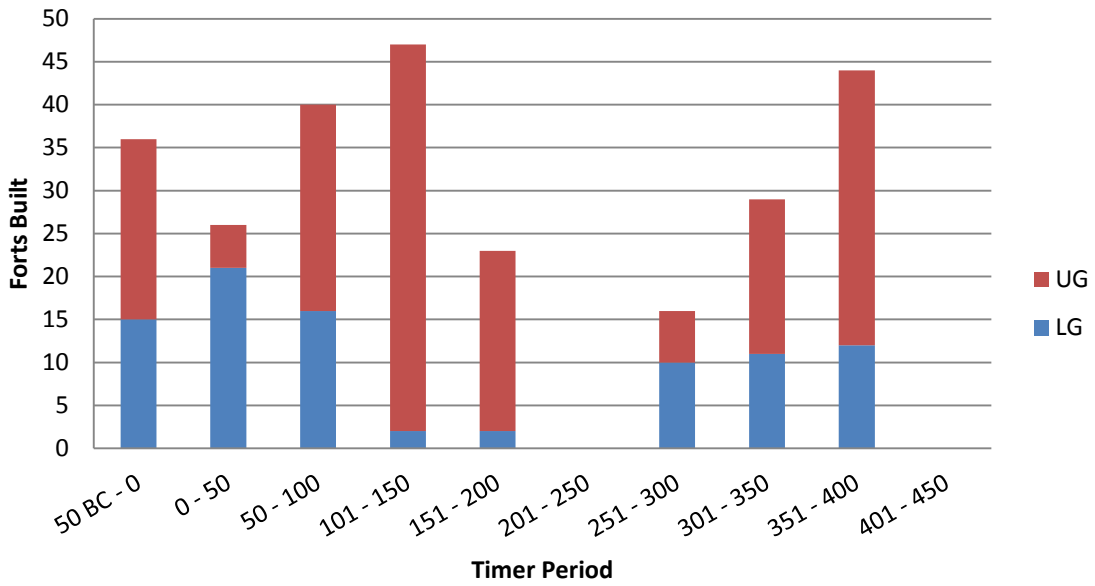


Fig. 3.23: Fort building along Rhine over Roman period, by half century.

## Late Antique fort sizes (ha)

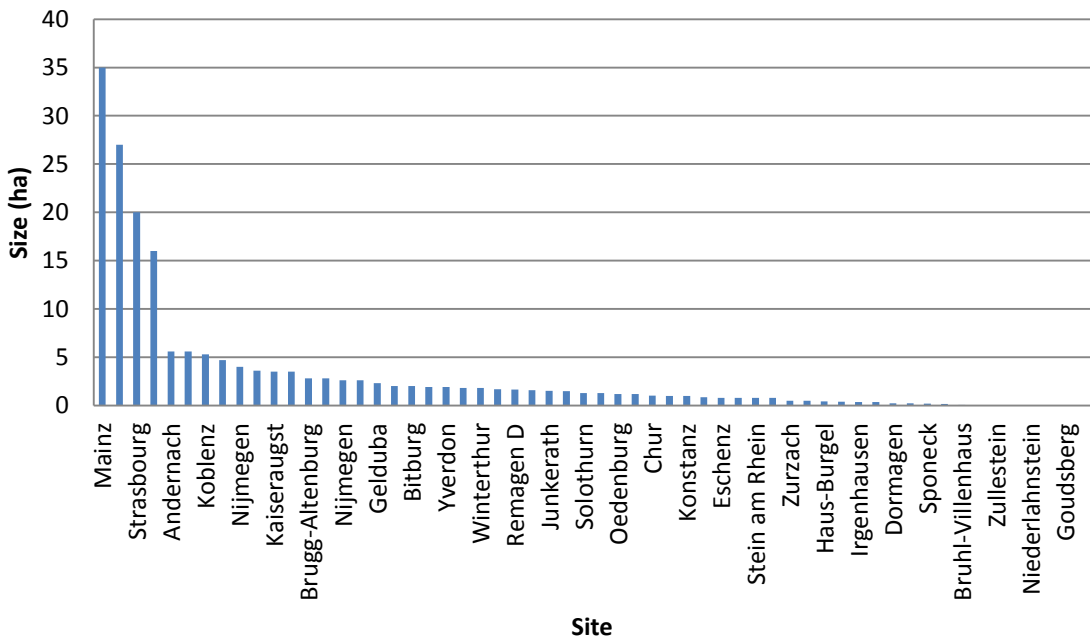


Fig. 3.24: Area of measurable forts and fortifications in Late Antiquity.

## Rhine basin urban area (ha) ca. AD 350

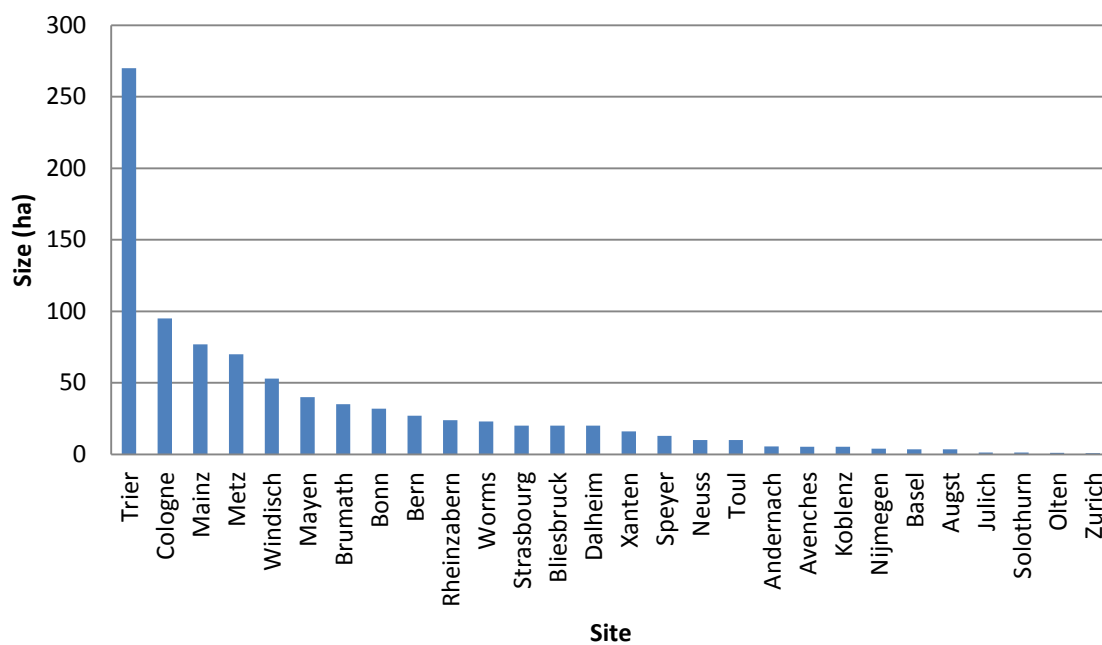


Fig. 3.25: Area of late antique urban centres along Rhine.

## Urban and military space in Rhine basin (ha)

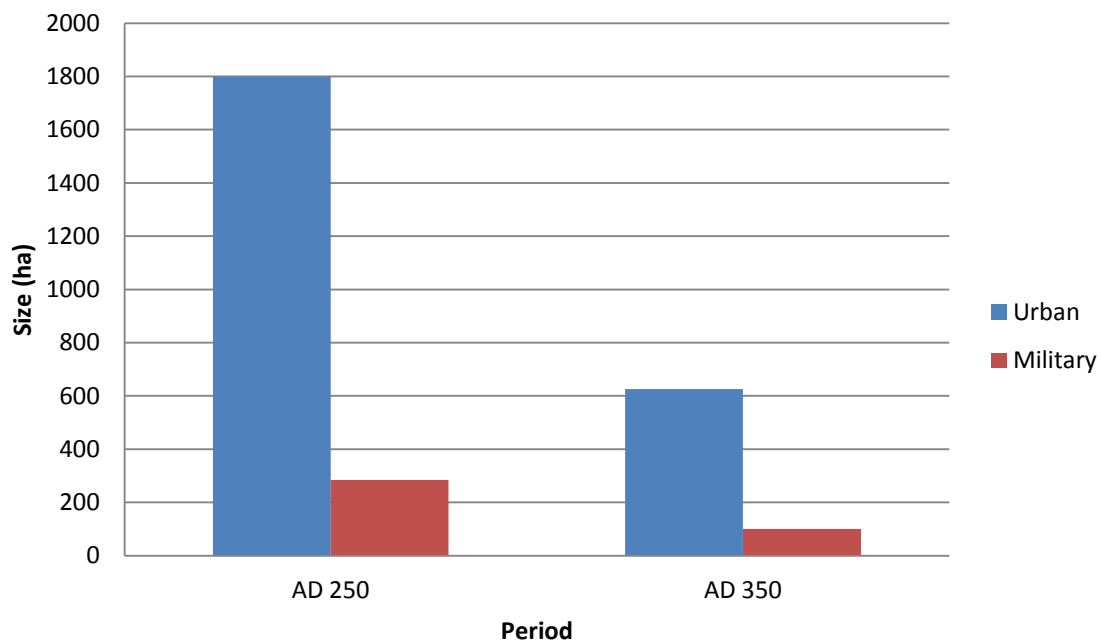


Fig. 3.26: Change in urban and military space AD 250-350.

Figure has been removed due to copyright restrictions.

Fig. 3.27: Change in rural occupation of southern Lower Germany in Roman period (Gechter and Kunow 1986, abb. 8).

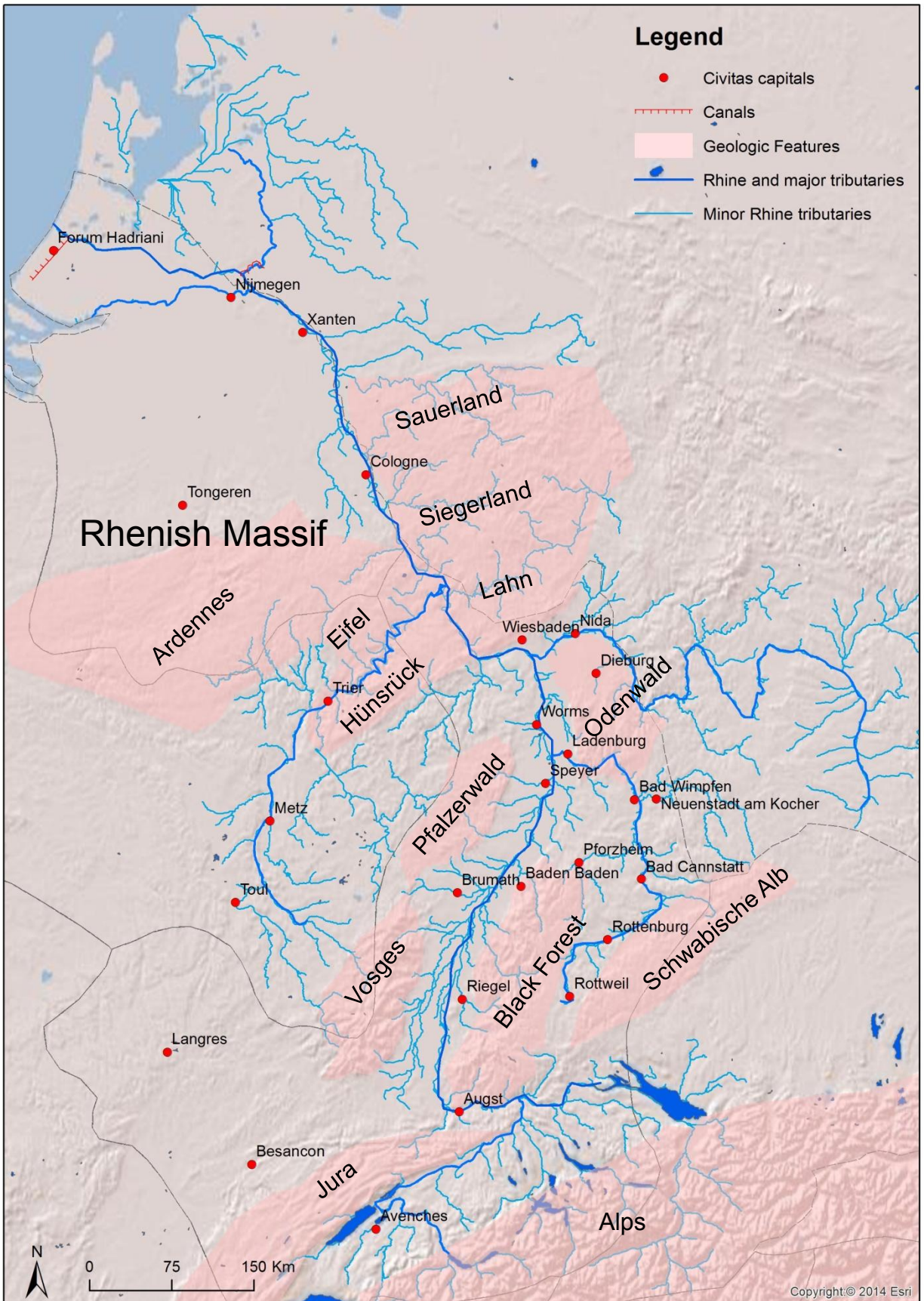


Fig. 4.1: Geological features of the Rhine Basin mentioned in text.

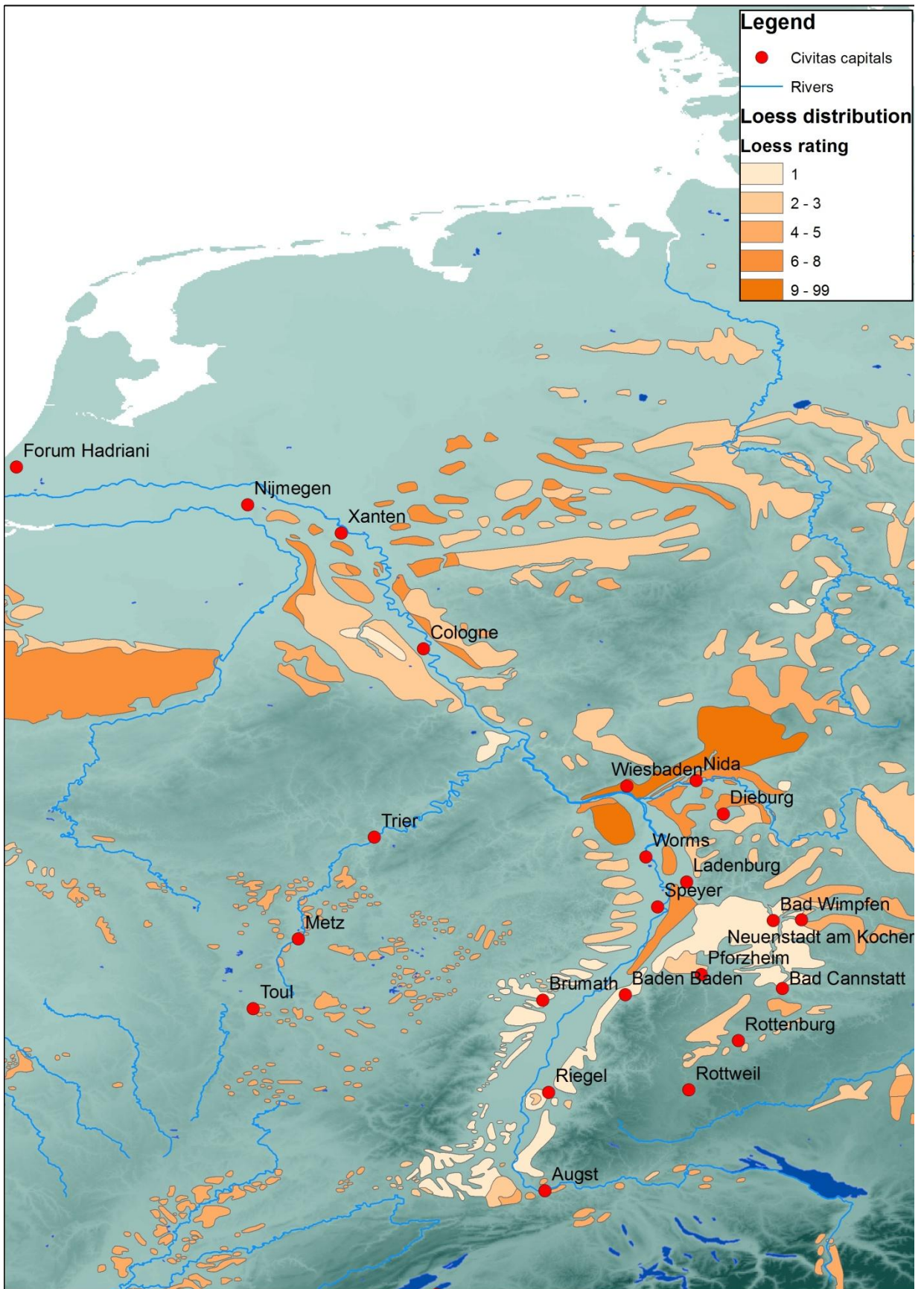


Fig. 4.2: Loess deposits in the Rhine region, with lightest colours being the deepest deposits. Loess , rivers, and European DEM files courtesy of D. Haase, see Haase *et al.* 2007.

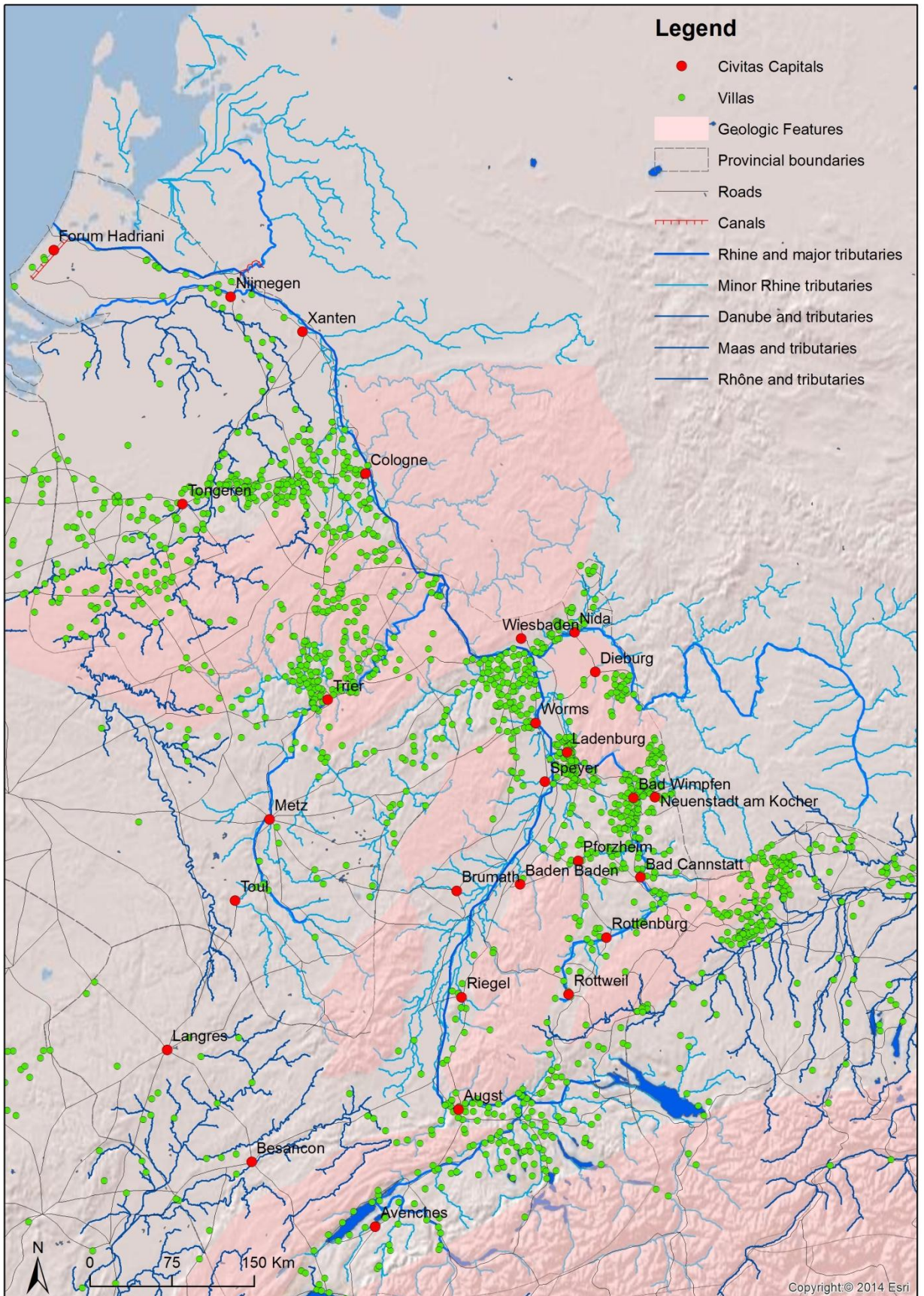


Fig. 4.3: Distribution of rural farms within Rhine basin and adjoining regions. Data courtesy of J. Åhlfeldt and the Digital Atlas of the Roman Empire (<http://imperium.ahlfeldt.se/>).

Figure has been removed due to copyright restrictions.

Fig. 4.4: Fliessem Villa and distribution of double-halled, axial villas in and near the Rhine basin (Wightmann 1971, fig. 15; Roymans and Habermehl 2011, fig. 2).

Figure has been removed due to copyright restrictions.

Fig. 4.5: Villa density in the areas of modern Germany and northern Switzerland (Wendt and Zimmermann 2008, abb. 8).

Figure has been removed due to copyright restrictions.

Fig. 4.6: Villa distribution in modern France, with Rhine basin highlighted ([http://www.villa.culture.fr/mediatheque/communs/images/grandFormat/1/80\\_2.jpg](http://www.villa.culture.fr/mediatheque/communs/images/grandFormat/1/80_2.jpg)).

Figure has been removed due to copyright restrictions.

Fig. 4.7: Distribution of wine-producing evidence in Rhine Basin, with Trier and Piesport noted and detail of the digital reconstruction of the villa at Bad Durkheim-Ungstein with excavation plan of pressing facility found on the site (reconstruction from <http://www.archaeopro.de/>, drawings from Brun and Gilles 2001, figs. 86, 87.)

Figure has been removed due to copyright restrictions.

Fig. 4.8: Plan of remains of pressing facilities at Piesport, with modern reconstruction of lever press and pressing-baskets (top image from Brun and Gilles 2001, fig. 88; lower <http://www.outdooractive.com/de/wanderung/mosel-saar/roemersteig/3076161/>)

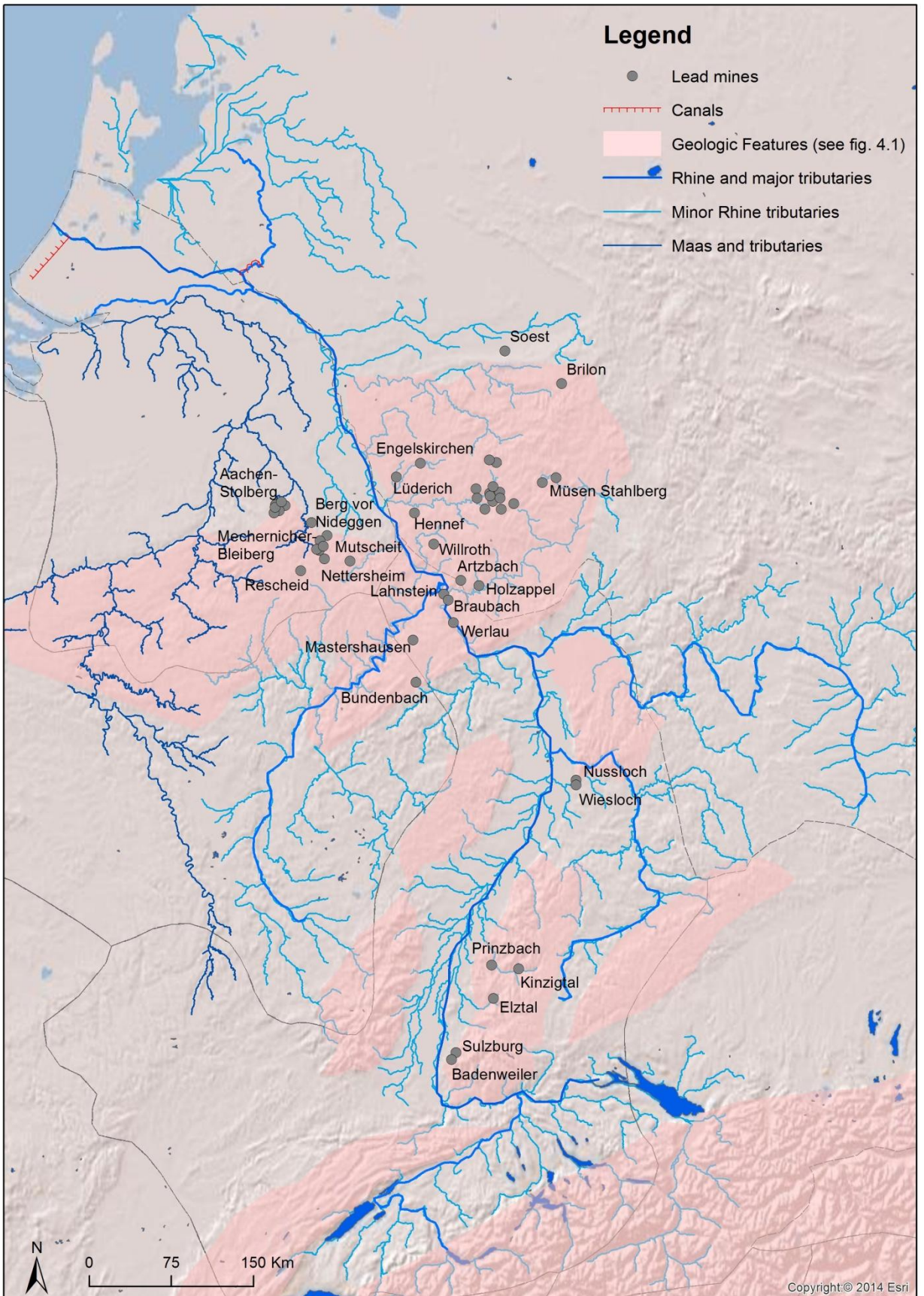


Fig. 4.9: Roman and Germanic lead-producing sites.

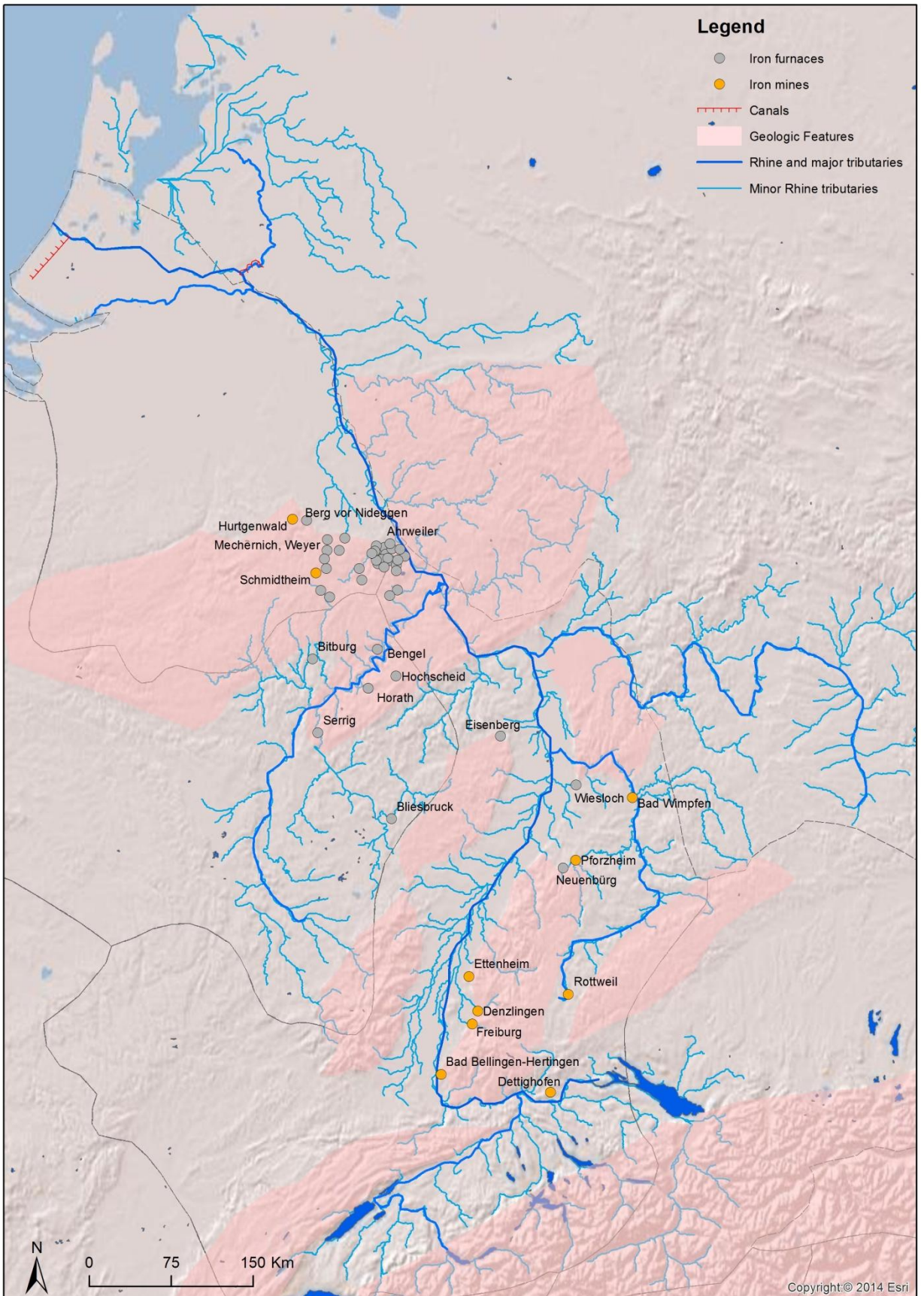


Fig. 4.10: Roman iron-producing sites.

Figure has been removed due to copyright restrictions.

Fig. 4.11: Different forest types in Europe, with approximate dimensions of Rhine Basin boxed (Metzger *et al.* 2005, fig. 5).

Figure has been removed due to copyright restrictions.

Fig. 4.12: Dendrochronological evidence for timber trade, orange = Dutch oak, red = central German oak, green = southern German oak (Dominguez-Delmas *et al.* 2014, fig. 7).

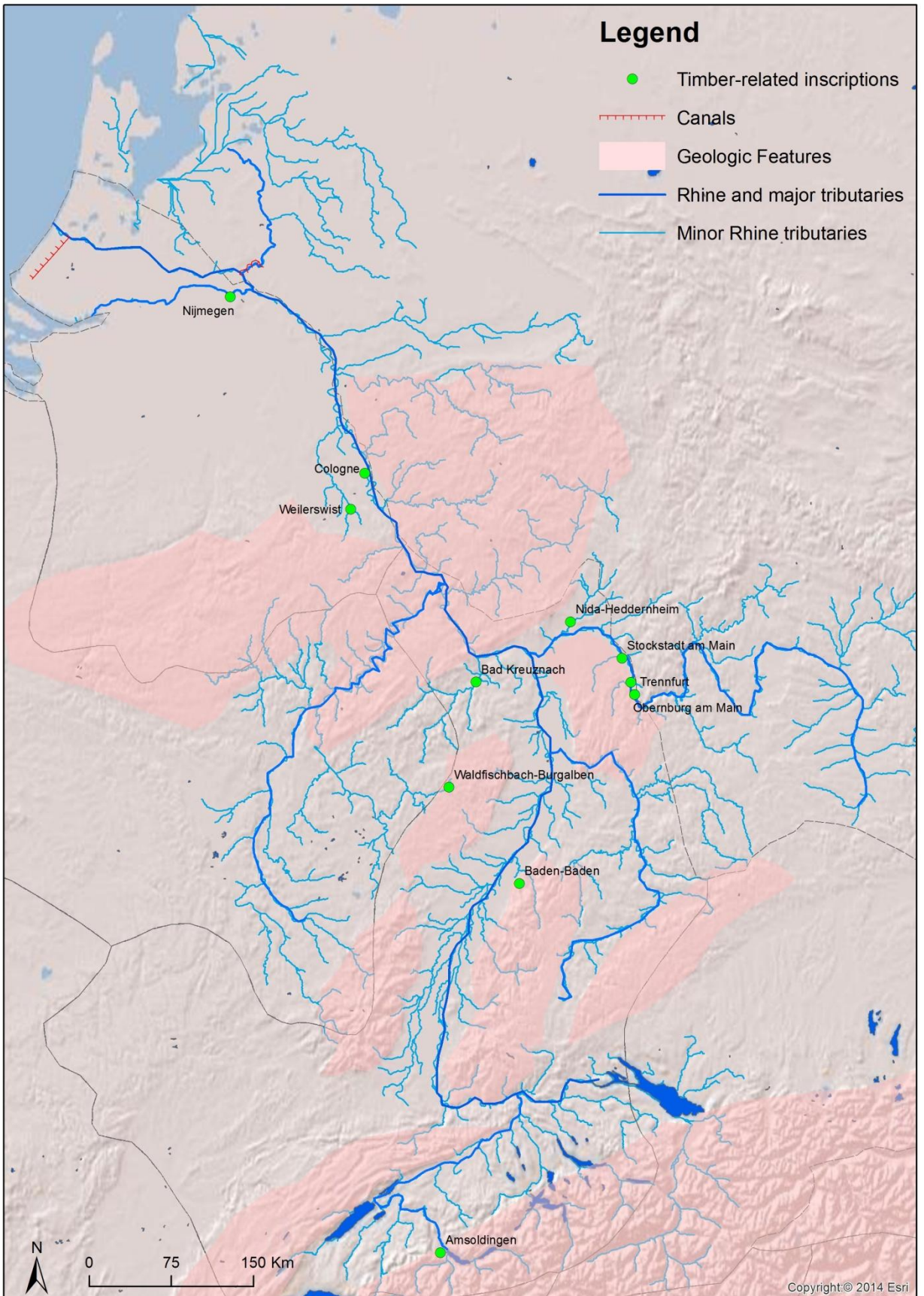


Fig. 4.13: Locations of inscriptions naming *saltuarii*, *dendrophoroi*, and others involved in timber production and trade in the Rhine basin.

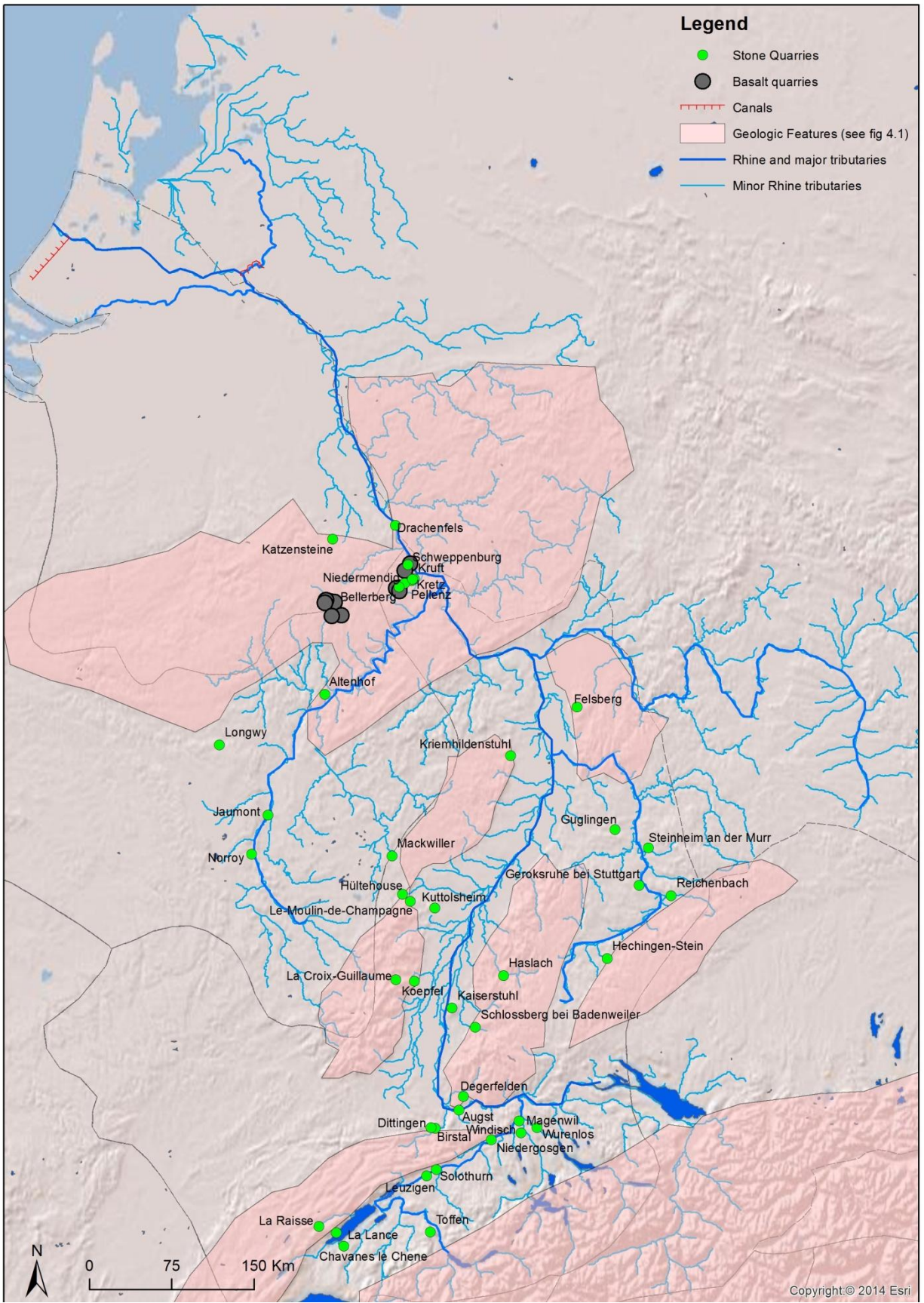


Fig. 4.14: Map of building-stone and basalt quarries (data after Gluhak & Hofmeister 2009; Russell 2013).

Figure has been removed due to copyright restrictions.

Fig. 4.15: Millstone quarries in relation to workshops and trade routes (Mangartz 2008, abb. 26).

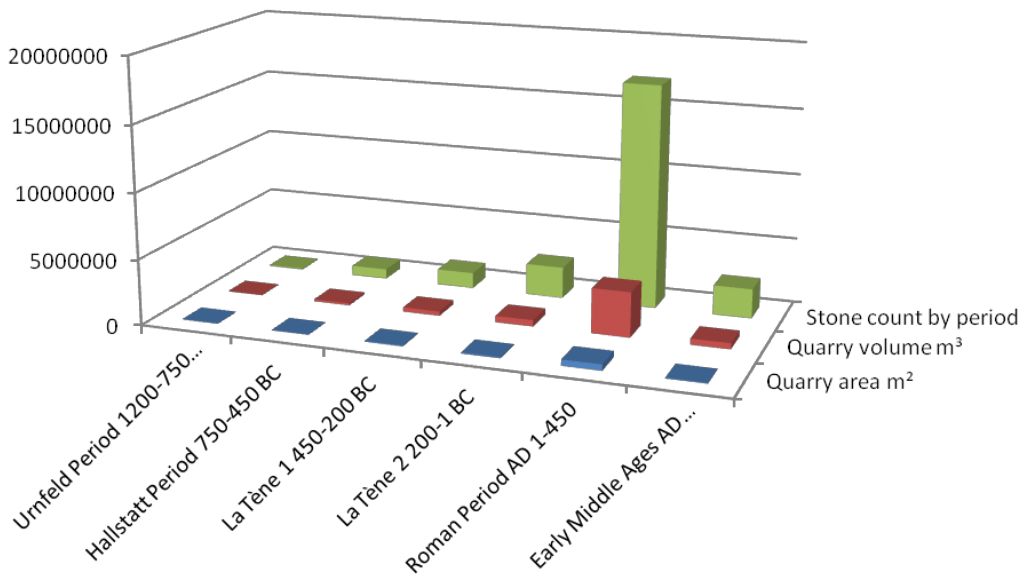


Fig. 4.16: Chronology of basalt millstone production at Mayen quarries(after Mangartz 2008, abb. 28).

Figure has been removed due to copyright restrictions.

Fig. 4.17: Zone of distribution of Eifel millstones in comparison to neighboring production centers (Gluhak and Hofmeister 2011, fig. 9).

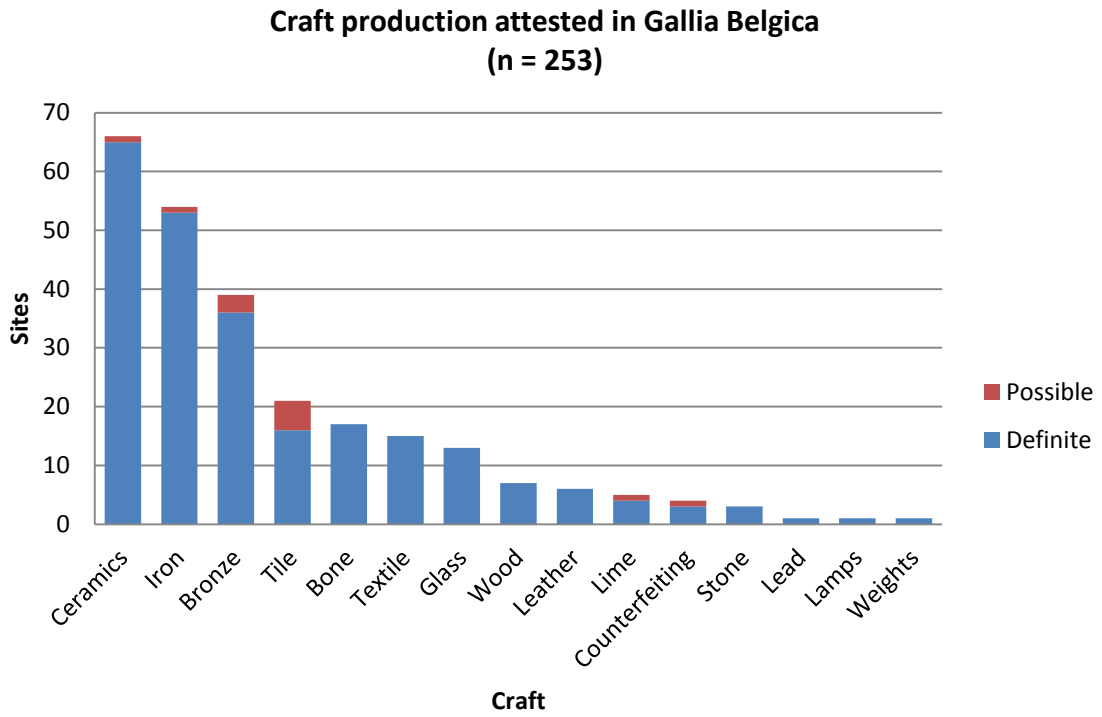


Fig. 5.1: Crafts attested in Gallia Belgica (data from Polfer 2005, tab. 4).

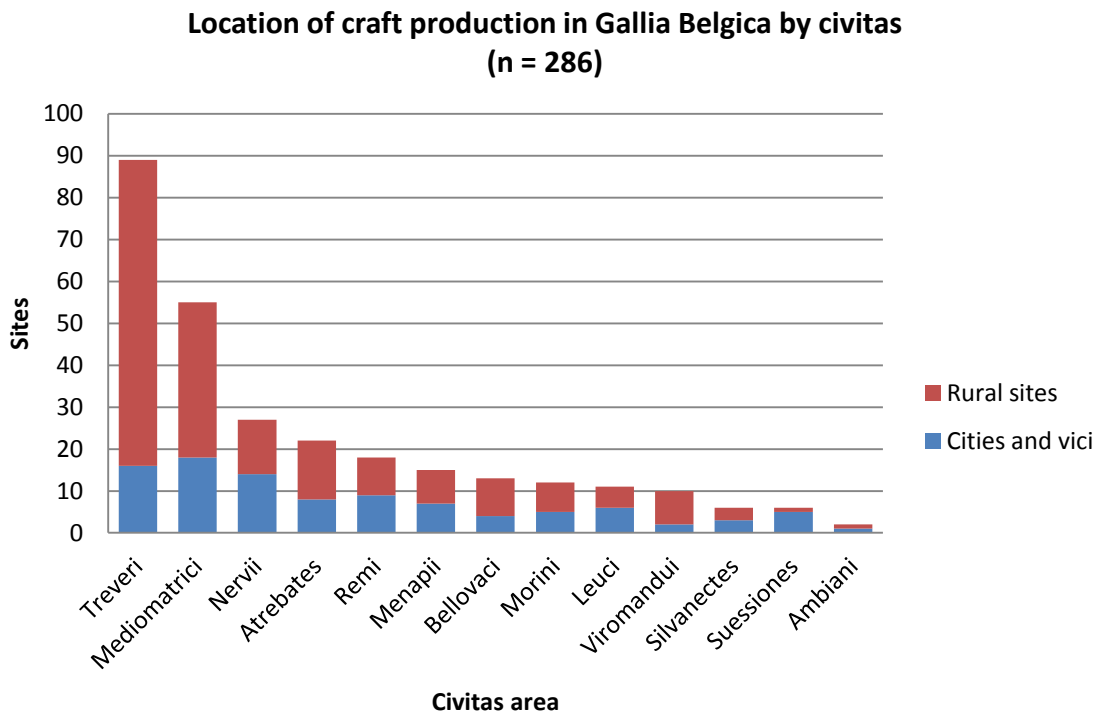


Fig. 5.2: Crafts attested in Gallia Belgica (data from Polfer 2005, tab. 2).

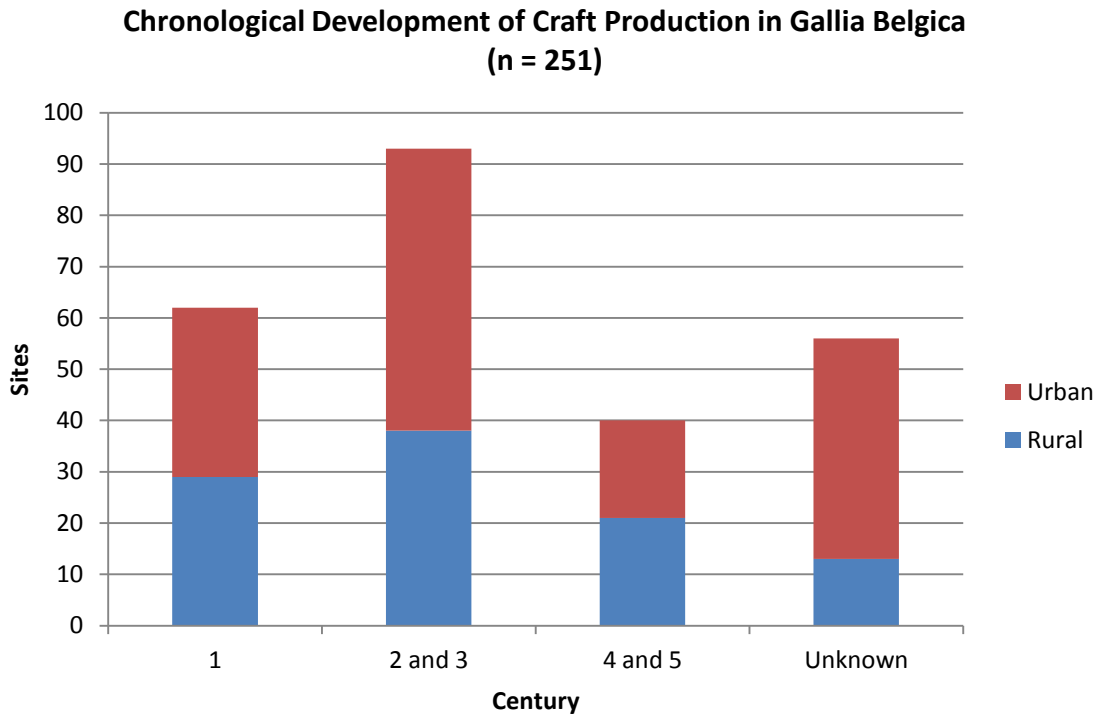


Fig. 5.3: Chronology of craftwork attested in Gallia Belgica (data from Polfer 2005, tab. 26).

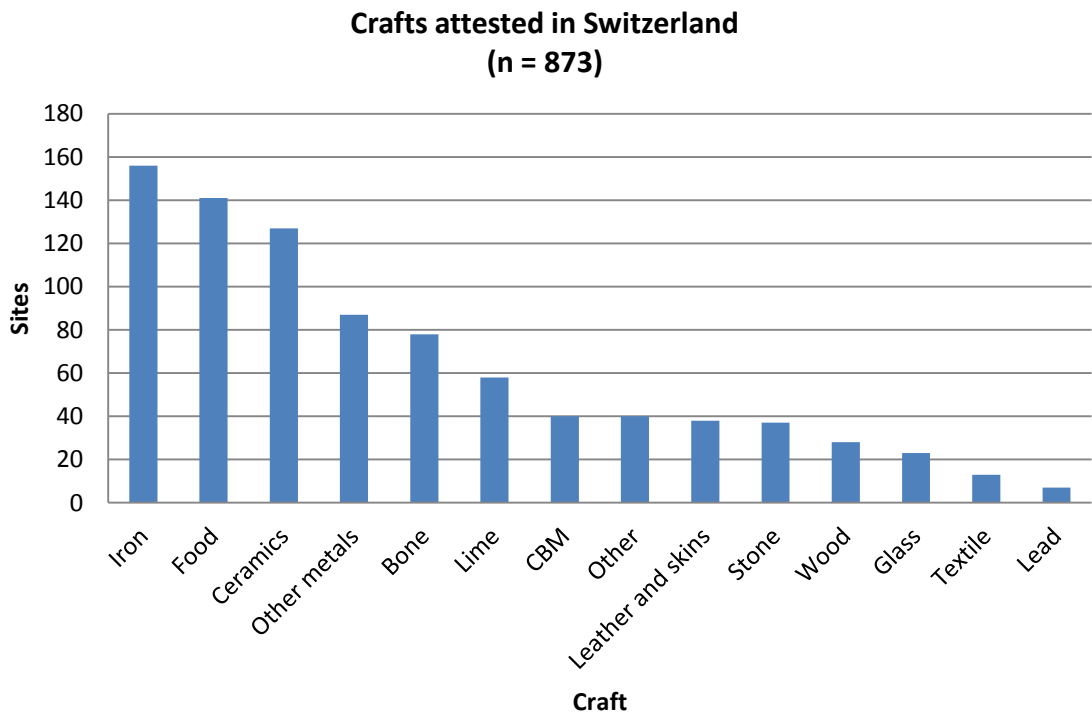


Fig. 5.4: Crafts attested in Roman Switzerland (data from Amrein *et al.* 2012).

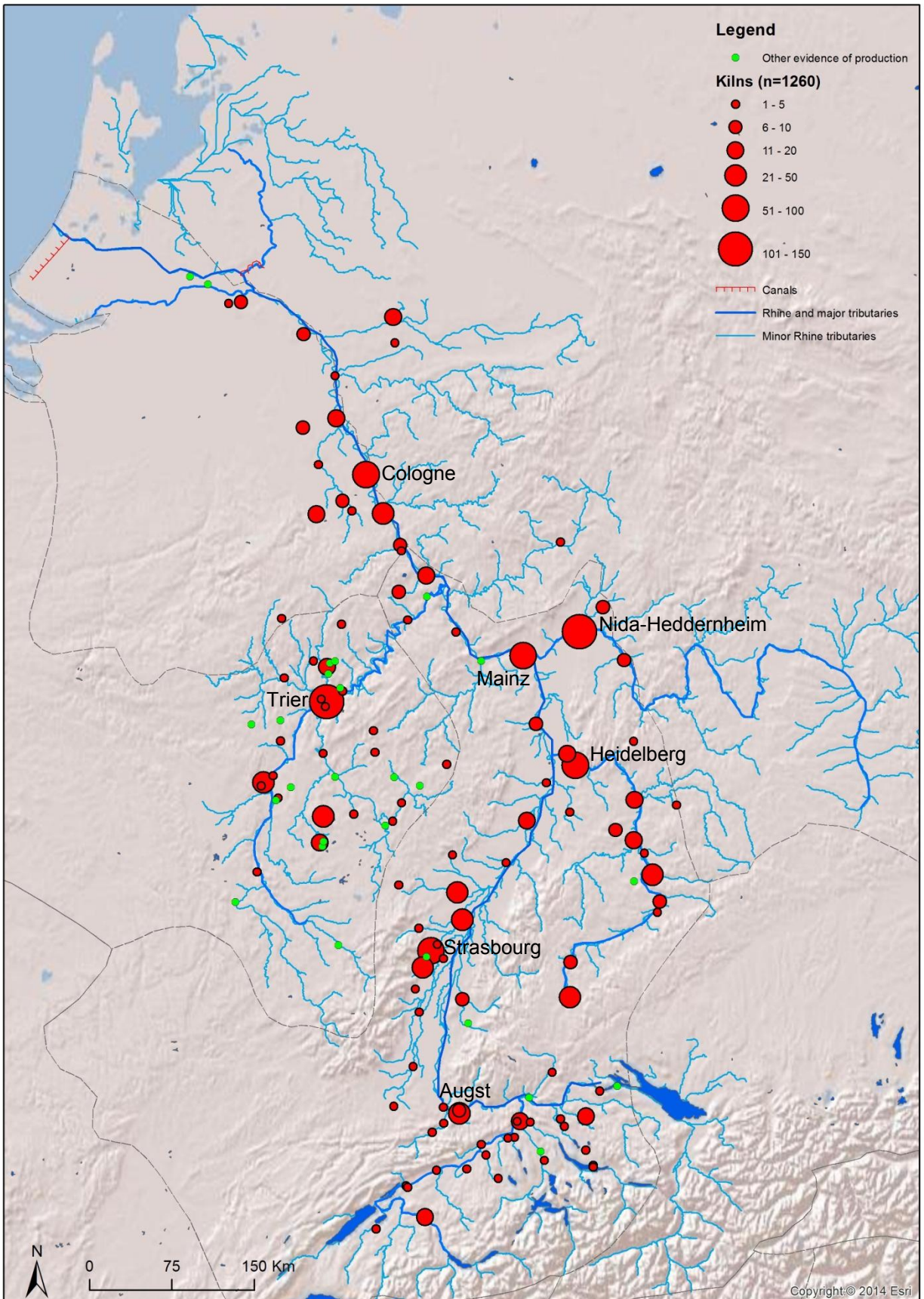


Fig. 5.5: Distribution and quantification of ceramic kilns and sites with other evidence for ceramic production within the Rhine Basin (see appendix 5.1 for data).

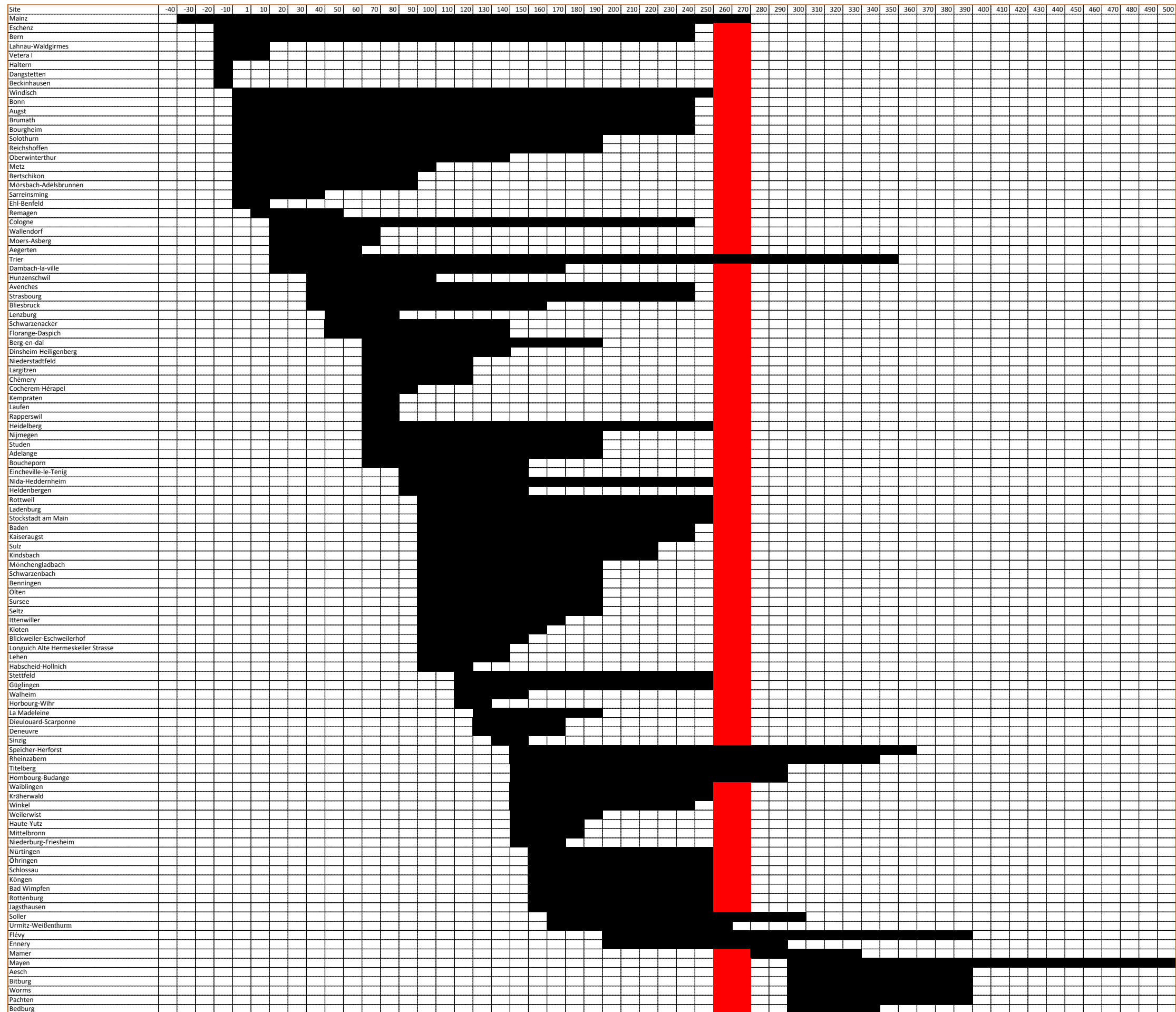


Fig. 5.6: Timeline of pottery producing sites in the Rhine basin with the period of the Gallic Empire shown in red (see Appendix 5.1).

**Pottery production sites in operation, 30 BC - AD 500**  
(n = 107)

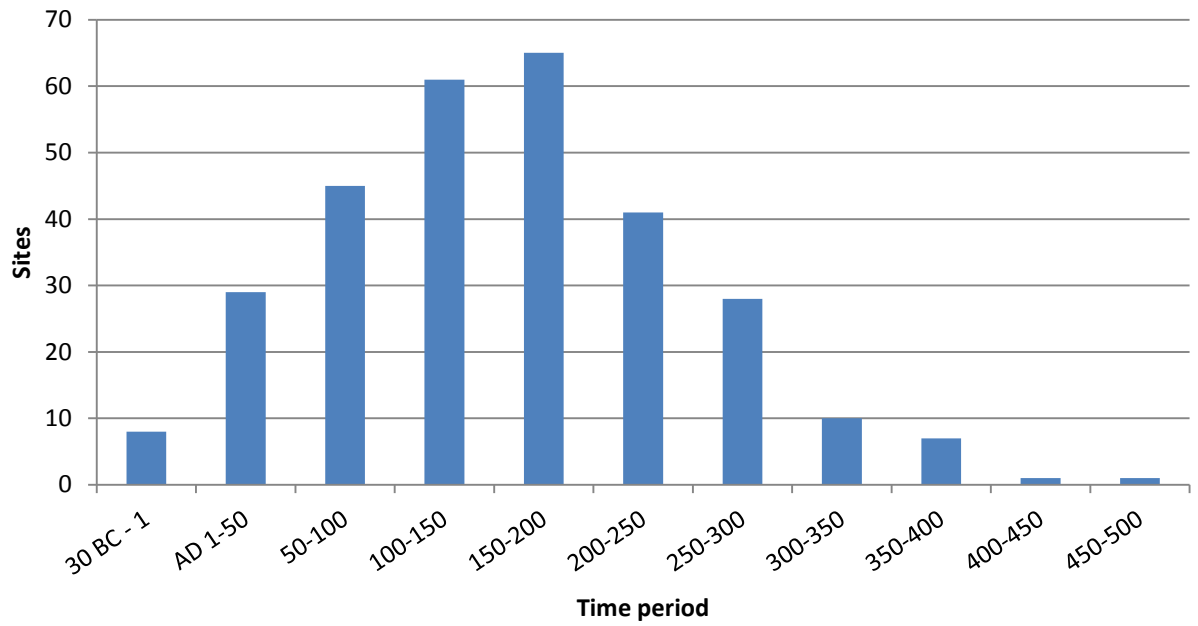


Fig. 5.7: Chronology of pottery producing sites in Rhine Basin, by half century (see appendix 5.1 for data).

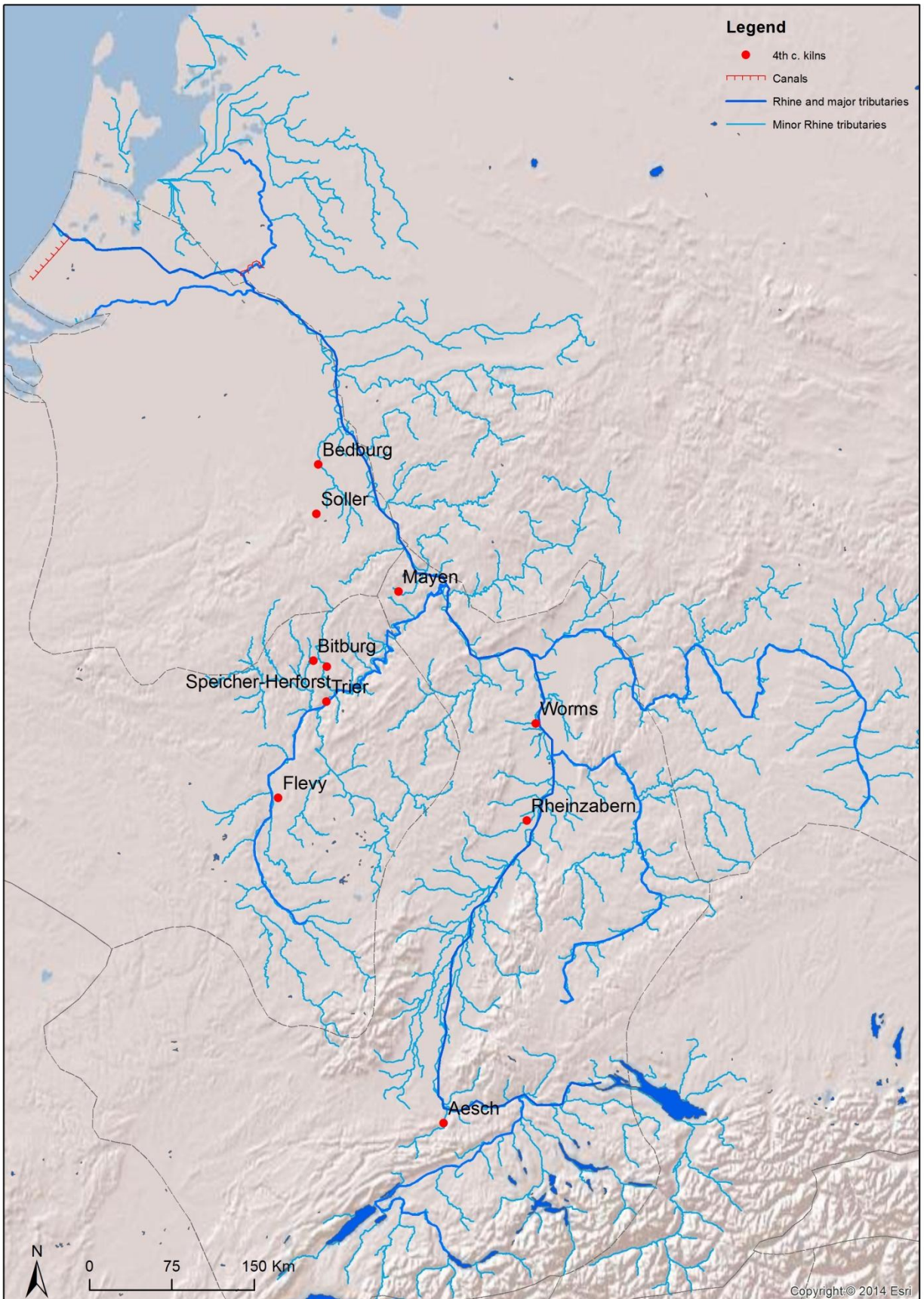


Fig. 5.8: Distribution of pottery-producing sites in the fourth century (see appendix 5.1 for data).

Figure has been removed due to copyright restrictions.

Fig. 5.9: Pottery production evidence in Roman Cologne (Höpken 2005, abb. 1).

Figure has been removed due to copyright restrictions.

Fig. 5.10: Pottery and glass production in Roman Trier (Luik 2002, abb. 1).

Figure has been removed due to copyright restrictions.

Fig. 5.11: Distribution of pottery kilns in Roman Mainz (Heising 2000, abb. 2).

Figure has been removed due to copyright restrictions.

Fig. 5.112 Terra sigillata kilns (1-13) in Rheinzabern and associated buildings (Reutti and Schulz 2010, abb. 1).

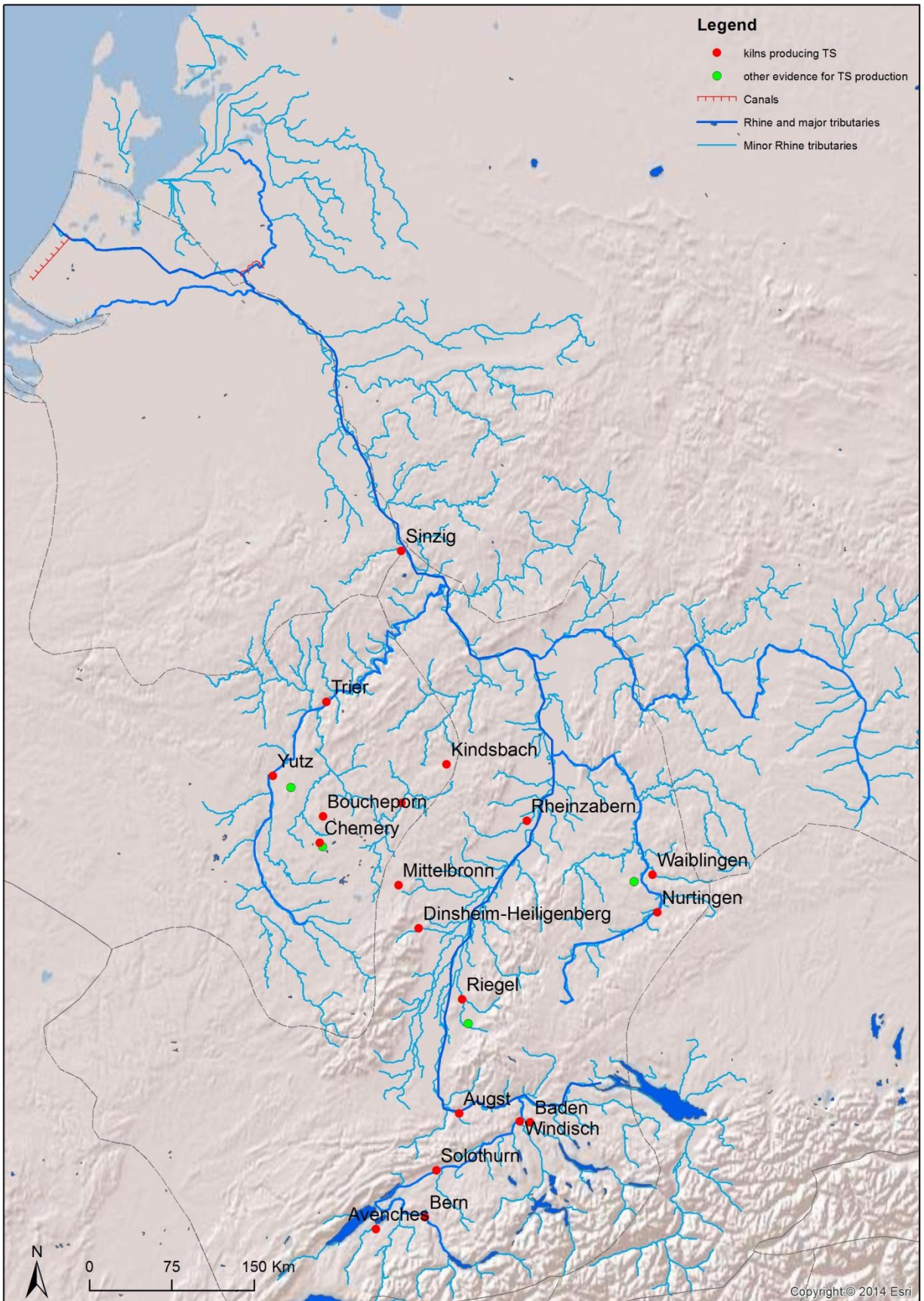


Fig. 5.13: Distribution of sigillata kilns in Rhine Basin (see appendix 5.1).

Figure has been removed due to copyright restrictions.

Fig. 5.14: Distribution of stamped Arretine sigillata in the Roman Empire (Mees 2011, abb.1).

Figure has been removed due to copyright restrictions.

Fig. 5.15: Distribution of stamped Pisa sigillata in the Roman Empire (Mees 2011, abb.2).

Figure has been removed due to copyright restrictions.

Fig. 5.16: Distribution of stamped La Graufesenque sigillata in the Roman Empire (Mees 2011, abb.4).

Figure has been removed due to copyright restrictions.

Fig. 5.17: Distribution of stamped Heiligenberg sigillata in the Roman Empire ([http://www2.rgzm.de/Transformation/Deutschland/KeramikProduktion/ToepfereienHeiligenbergVerbreitung\\_English.htm](http://www2.rgzm.de/Transformation/Deutschland/KeramikProduktion/ToepfereienHeiligenbergVerbreitung_English.htm)).

Figure has been removed due to copyright restrictions.

Fig. 5.18: Distribution of stamped Rheinzabern sigillata in the Roman Empire ([http://www2.rgzm.de/Transformation/Deutschland/KeramikProduktion/RheinzabernDistribution\\_English.htm](http://www2.rgzm.de/Transformation/Deutschland/KeramikProduktion/RheinzabernDistribution_English.htm)).

Figure has been removed due to copyright restrictions.

Fig. 5.19: Distribution of stamped Trier terra sigillata (A. Mees, M. Weber).

Figure has been removed due to copyright restrictions.

Fig. 5.20: Distribution of Trier Spruchbecherkeramik (Künzl 1997 abb. 44,45).

Figure has been removed due to copyright restrictions.

Fig. 5.21: Distribution of stamped Sinzig sigillata

(<http://www2.rgzm.de/transformation/home/FramesUK.cfm>).

Figure has been removed due to copyright restrictions.

Fig. 5.22: Distribution of stamped Schwäbische Sigillata

([http://www2.rgzm.de/Transformation/Deutschland/KeramikProduktion/ToepfereienWaiblingenVerbreitung\\_English.htm](http://www2.rgzm.de/Transformation/Deutschland/KeramikProduktion/ToepfereienWaiblingenVerbreitung_English.htm)).

Figure has been removed due to copyright restrictions.

Fig. 5.23: Distribution of stamped Helvetische sigillata  
([http://www2.rgzm.de/Transformation/Deutschland/KeramikProduktion/ToepfereienBern\\_EngeVerbreitung\\_English.htm](http://www2.rgzm.de/Transformation/Deutschland/KeramikProduktion/ToepfereienBern_EngeVerbreitung_English.htm)).

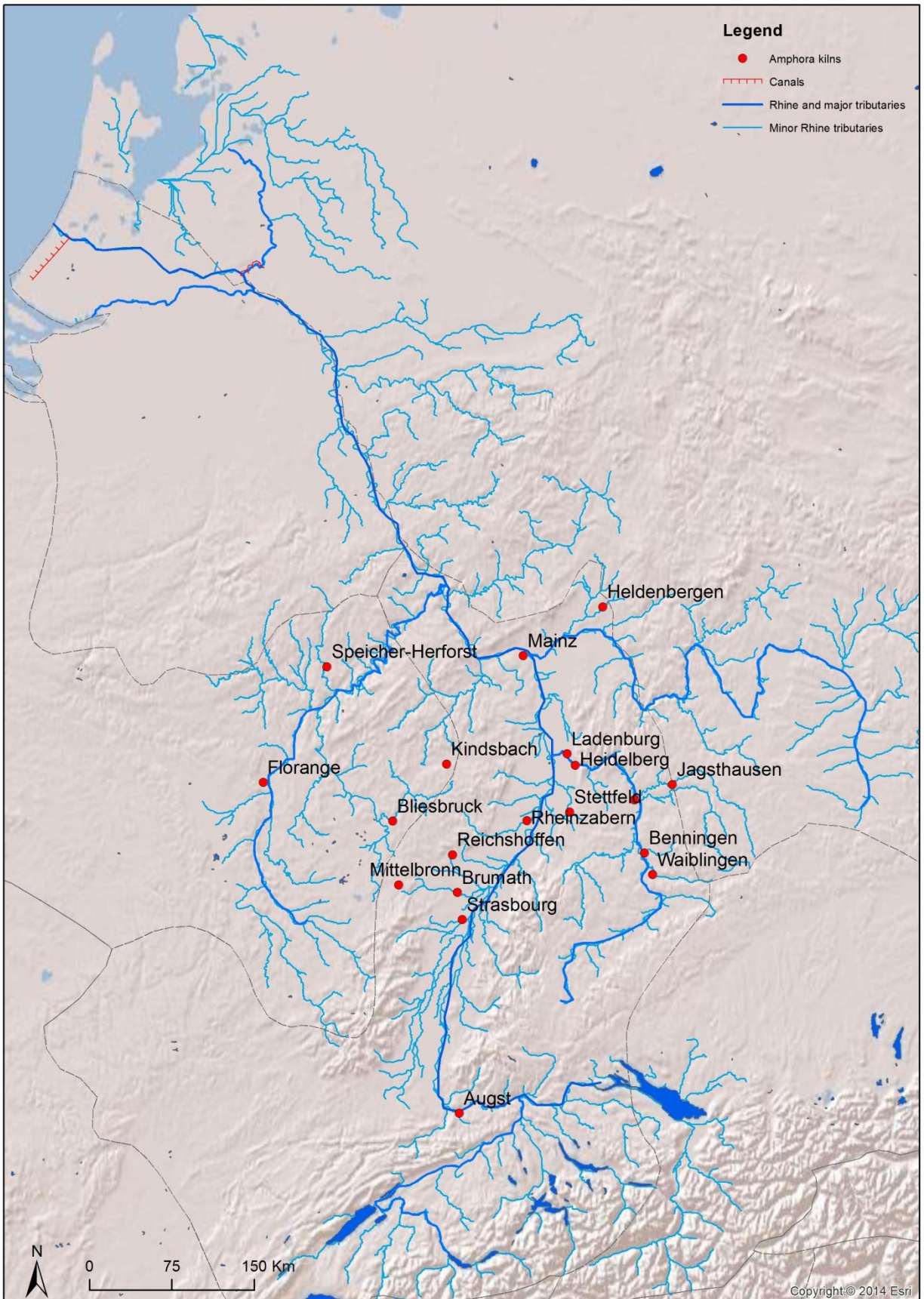


Fig. 5.24: Amphorae kilns in the Rhine Basin (see appendix 5.1).

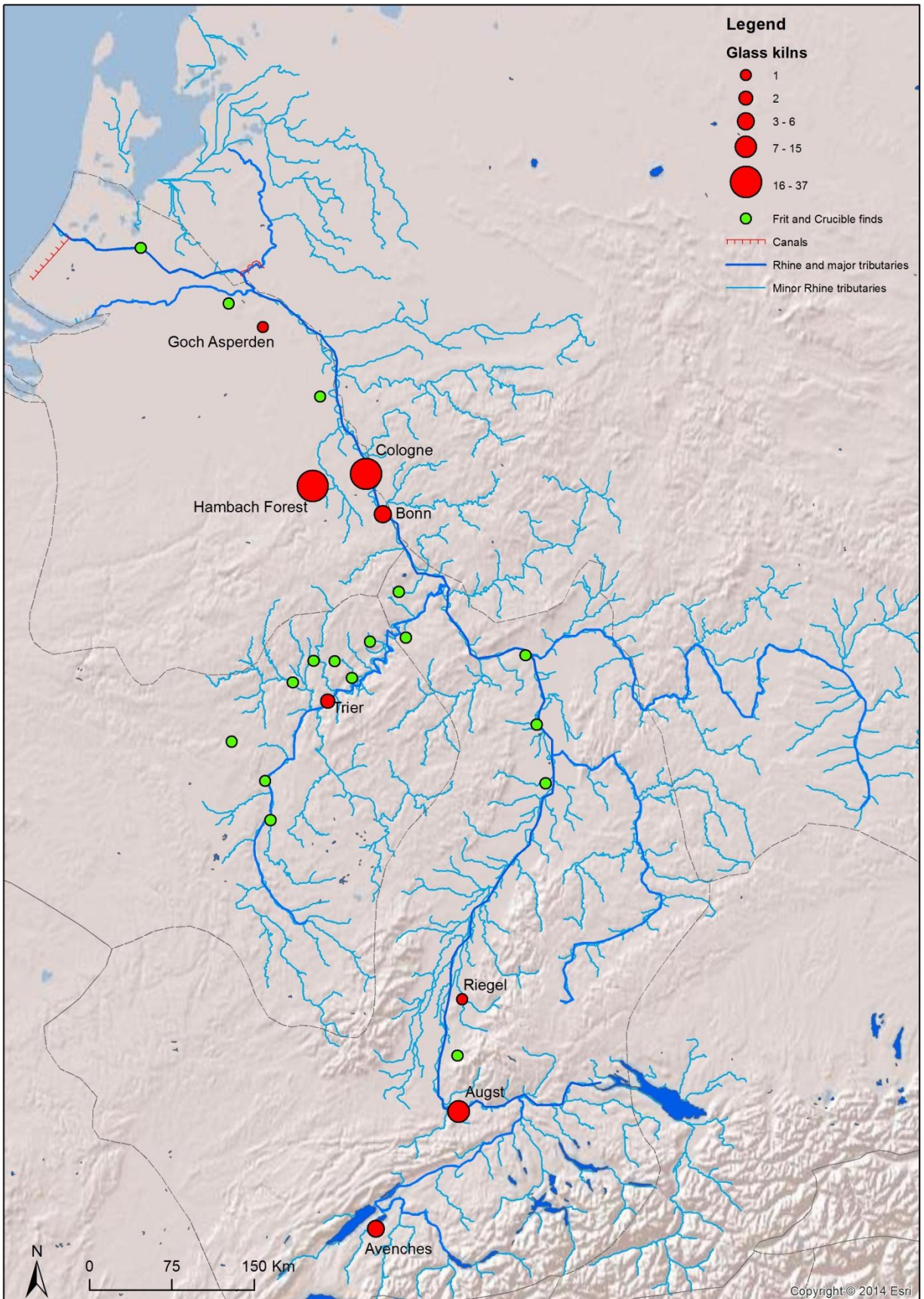


Fig. 5.25: Glass production in the Rhine Basin (see appendix 5.2).

Figure has been removed due to copyright restrictions.

Fig. 5.26: Distribution of glass furnaces (red triangles) in Cologne , relative to distribution of ceramic kilns (black dots) (adapted from Höpken 2005, abb. 1).

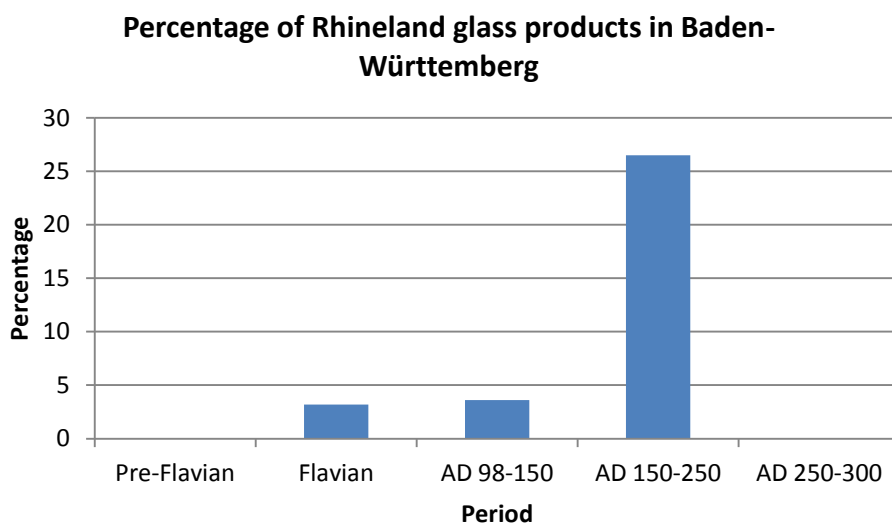


Fig. 5.27: Importation of Rhineland (Cologne) glass products in BW (after Hoffmann 2002, abb. 11).

Figure has been removed due to copyright restrictions.

Fig. 5.28: Location and plan of glass workshops in Augst (Fischer 2009, abb. 1, abb. 3).

Figure has been removed due to copyright restrictions.

Fig. 5.29: The glass-producing villas of the Hambach Forest (Gaitszch *et al.* 2000, abb. 1).

Figure has been removed due to copyright restrictions.

Fig. 5.30: ECVA stamp, bottles, and distribution map (Gaitzsch *et al.* 2000, abb. 25, 28).

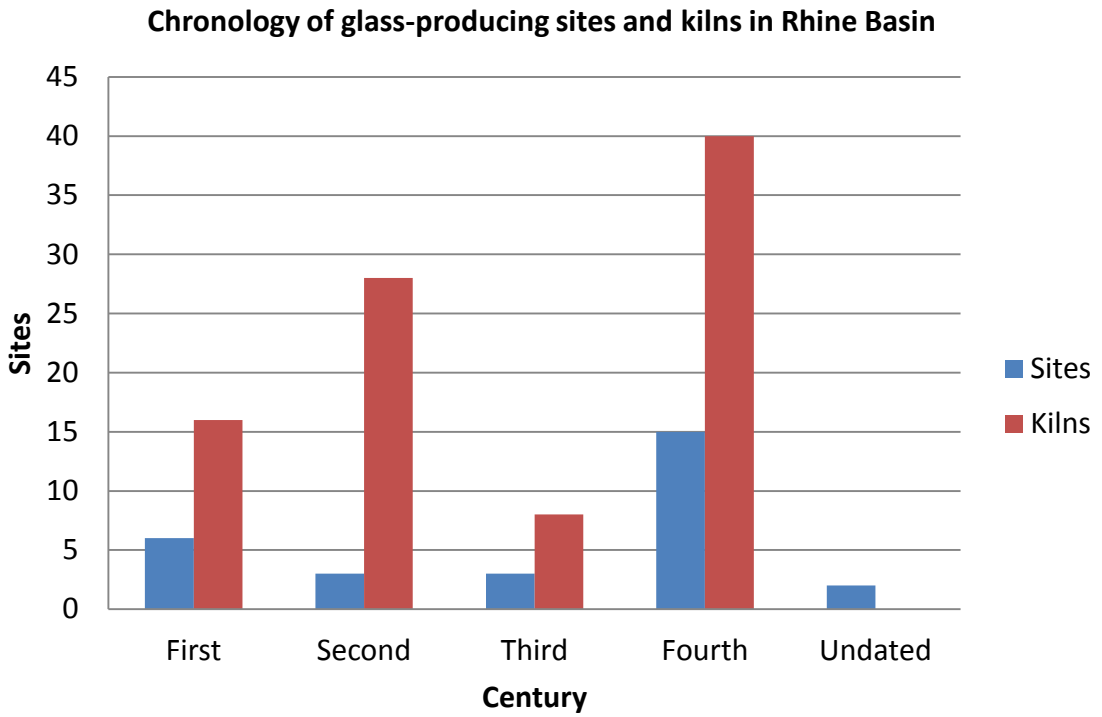


Fig. 5.31: Chronological development of glass producing sites and kilns (see appendix 5.2).

Figure has been removed due to copyright restrictions.

Fig. 5.32: Speyer Römerwein in Isings100a/Trier 140 bottle, with other examples from Hambach and Bonn, all fourth century (Historisches Museum der Pfalz; Gaitzsch *et al.* 2000, abb. 20; Follmann-Scholz 1988, abb. X).

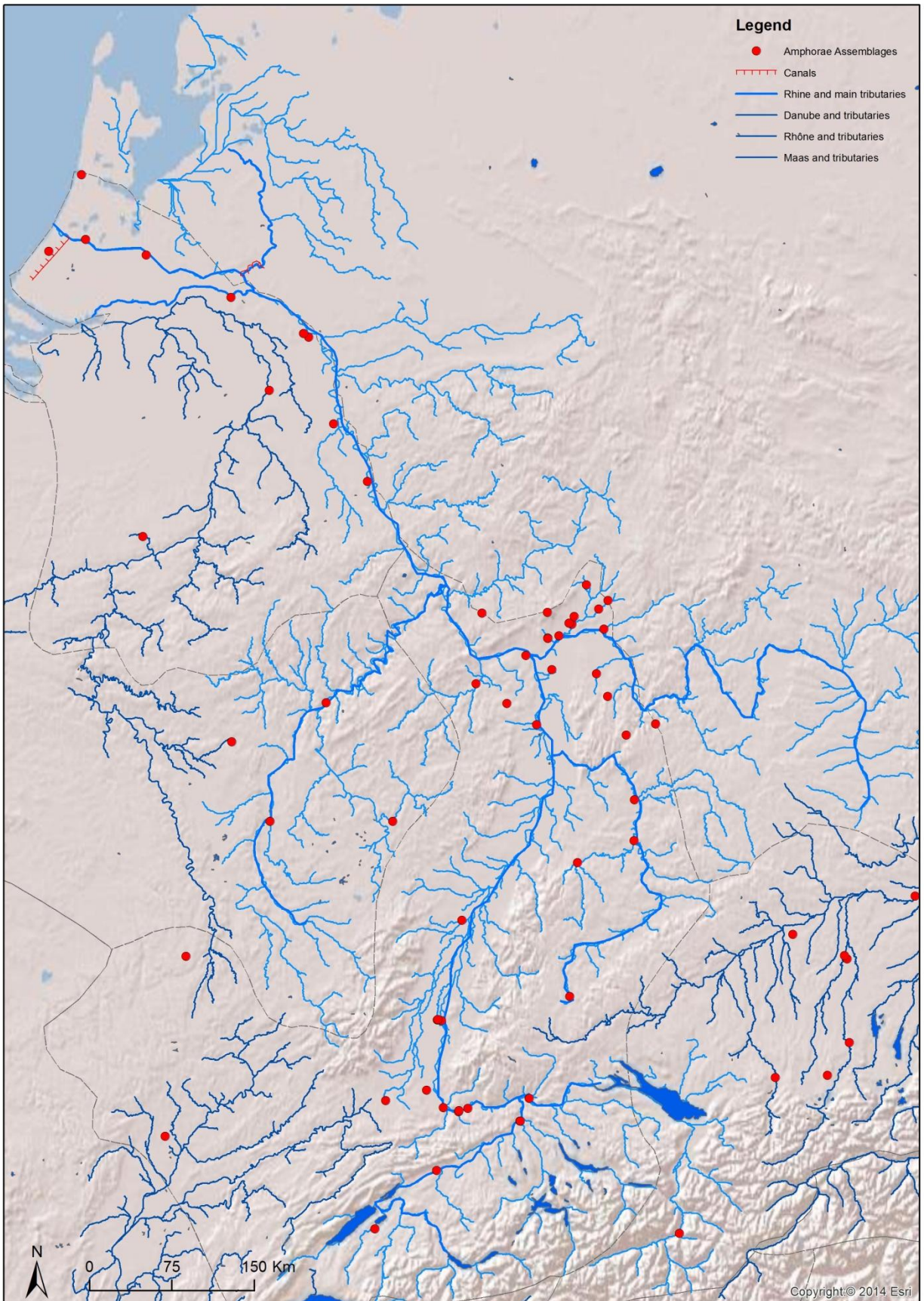


Fig. 6.1: Sites with quantified amphorae assemblages in database.

## Amphorae along Rhine by origin

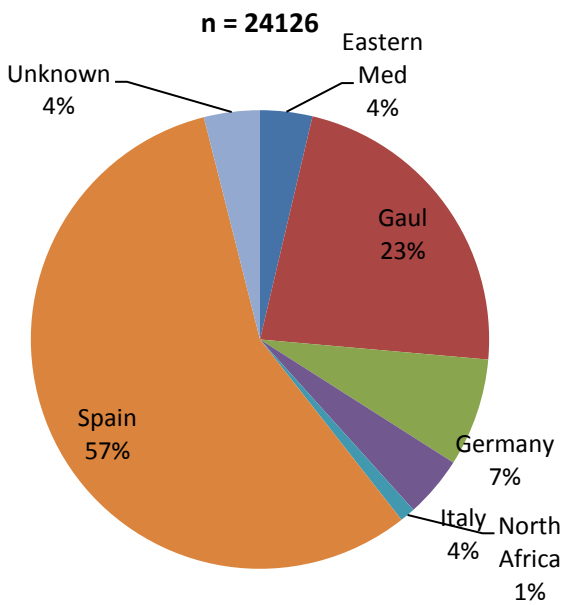


Fig. 6.2: Rhine amphorae assemblages by origin.

## Amphorae along Rhine by contents

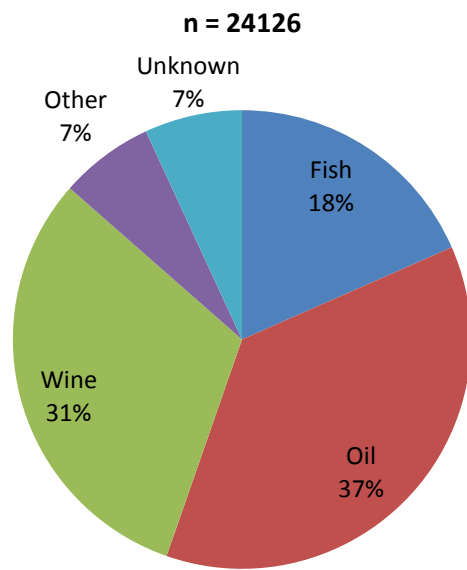


Fig. 6.3: Rhine amphorae assemblages by contents.

## Forms by combined quantification

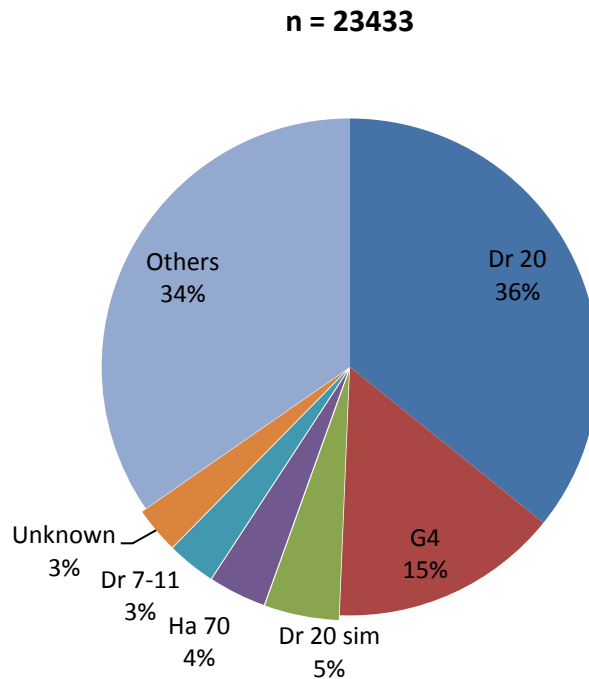


Fig. 6.4: Most common amphora forms in Rhine basin.

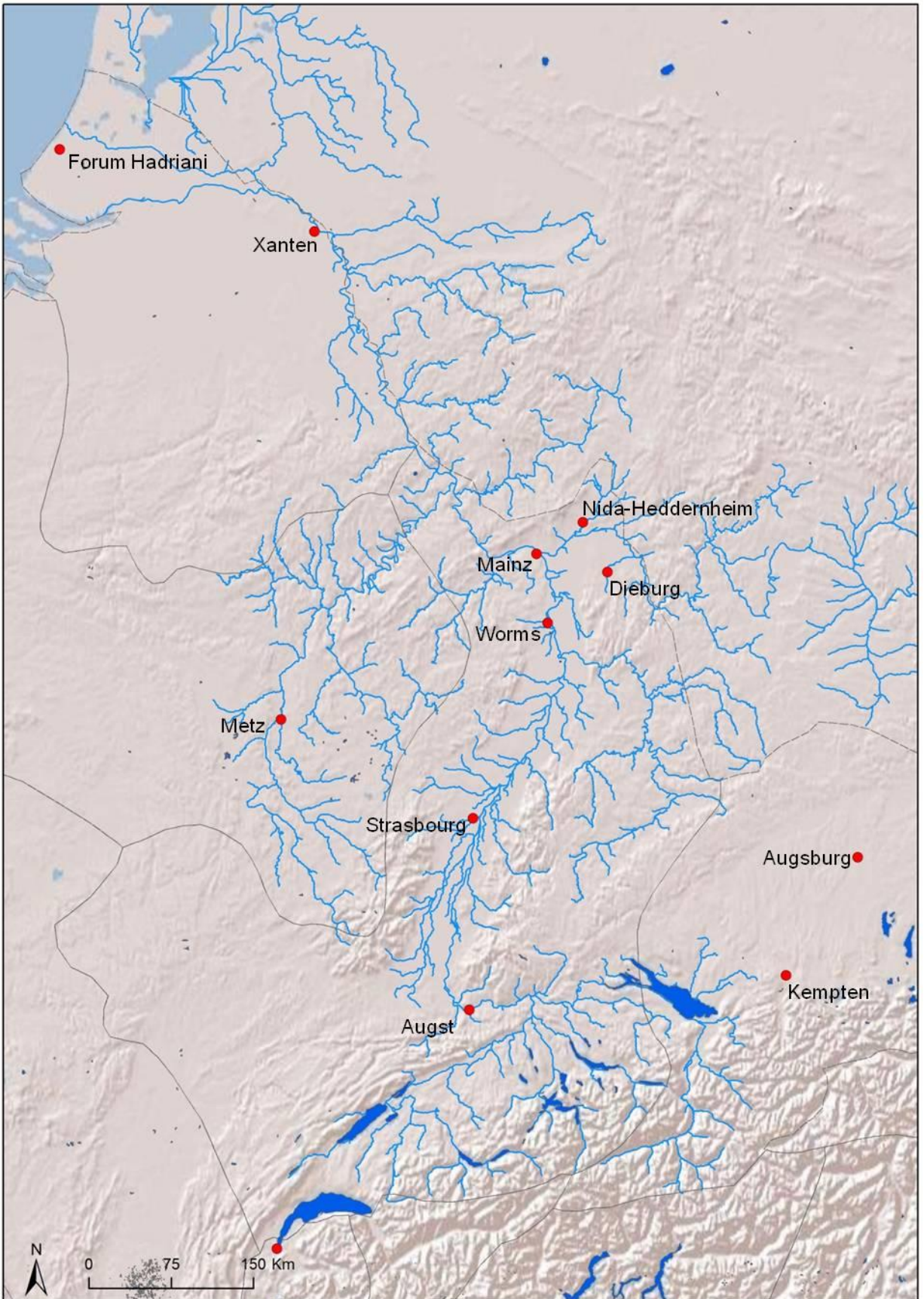


Fig. 6.5: Urban sites with quantified amphorae assemblages in database.

## Forms on Urban sites

n = 12403

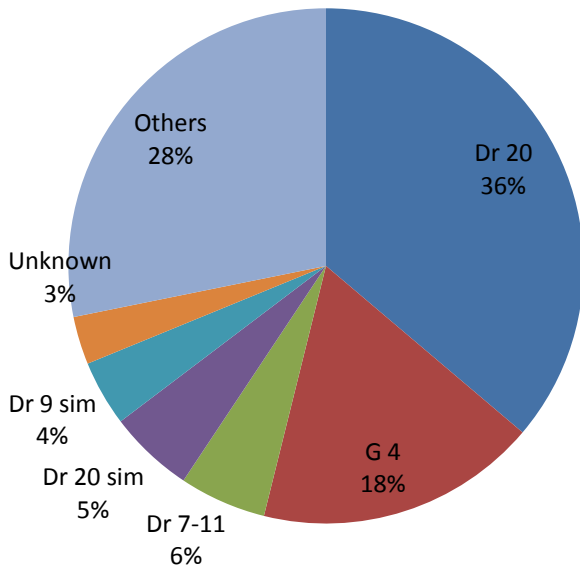


Fig. 6.6: Most common amphora forms on urban sites.

## Urban sites by origin

n = 12398

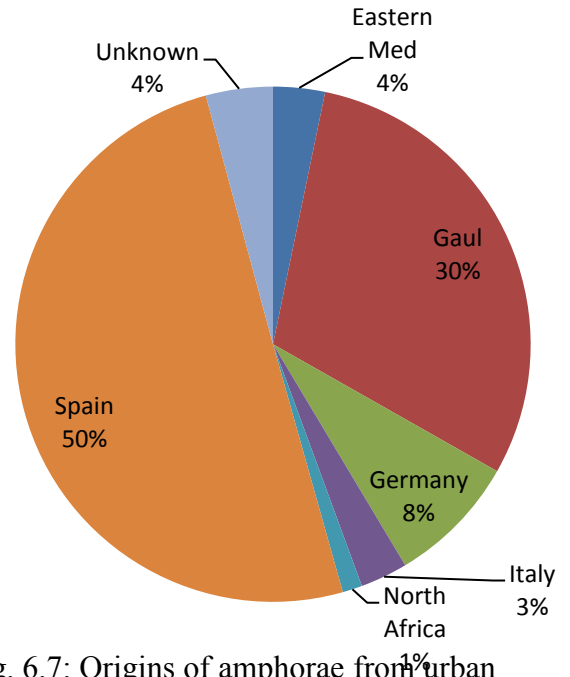


Fig. 6.7: Origins of amphorae from urban sites.

## Urban sites by contents

n = 12398

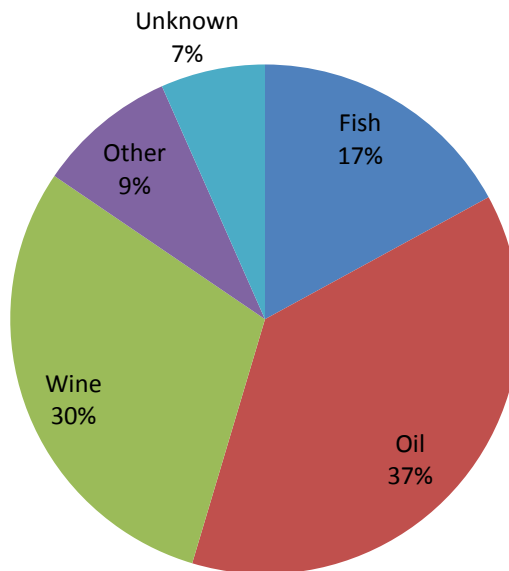


Fig. 6.8: Contents of amphorae from urban sites.

## Urban assemblages by origin

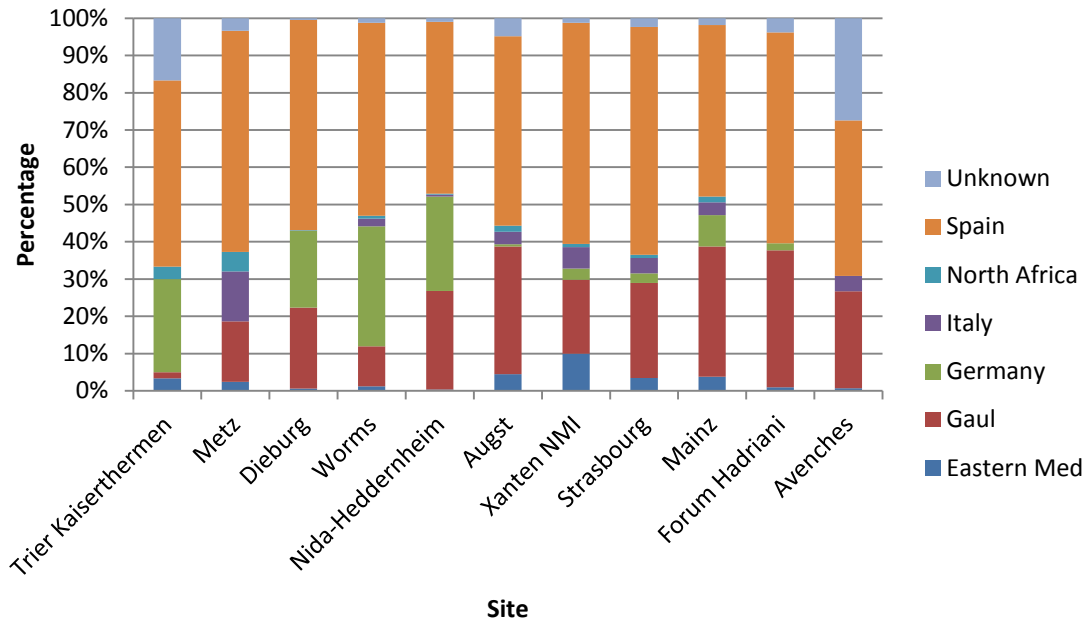


Fig. 6.9: Urban amphorae assemblages in stacked 100% bar charts showing product origin.

## Urban assemblages by contents

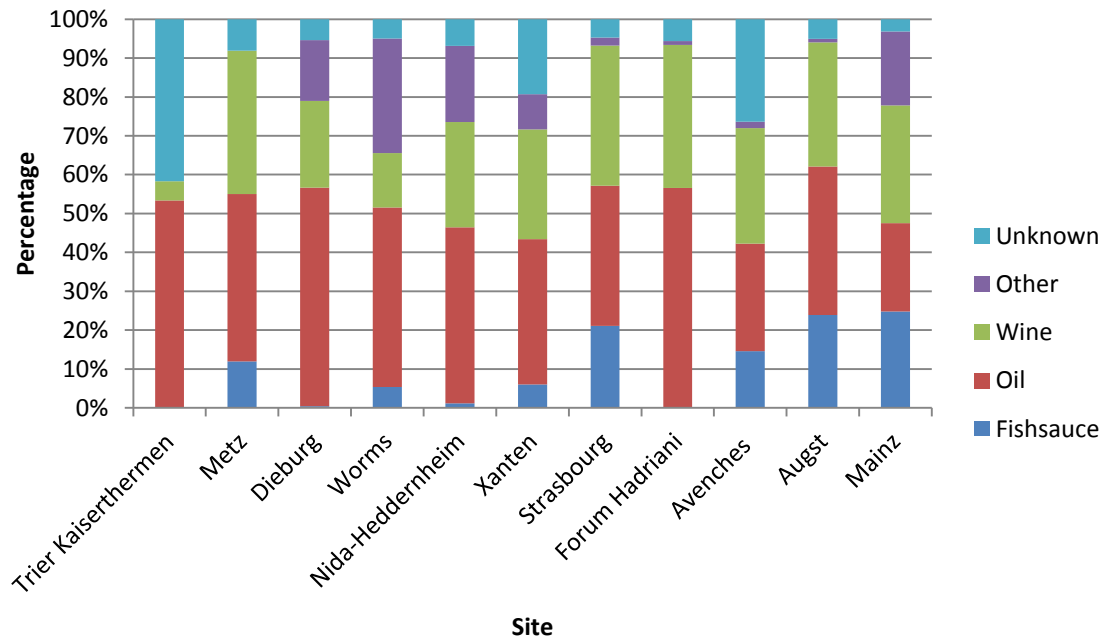


Fig. 6.10: Urban amphorae assemblages in stacked 100% bar charts showing contents.

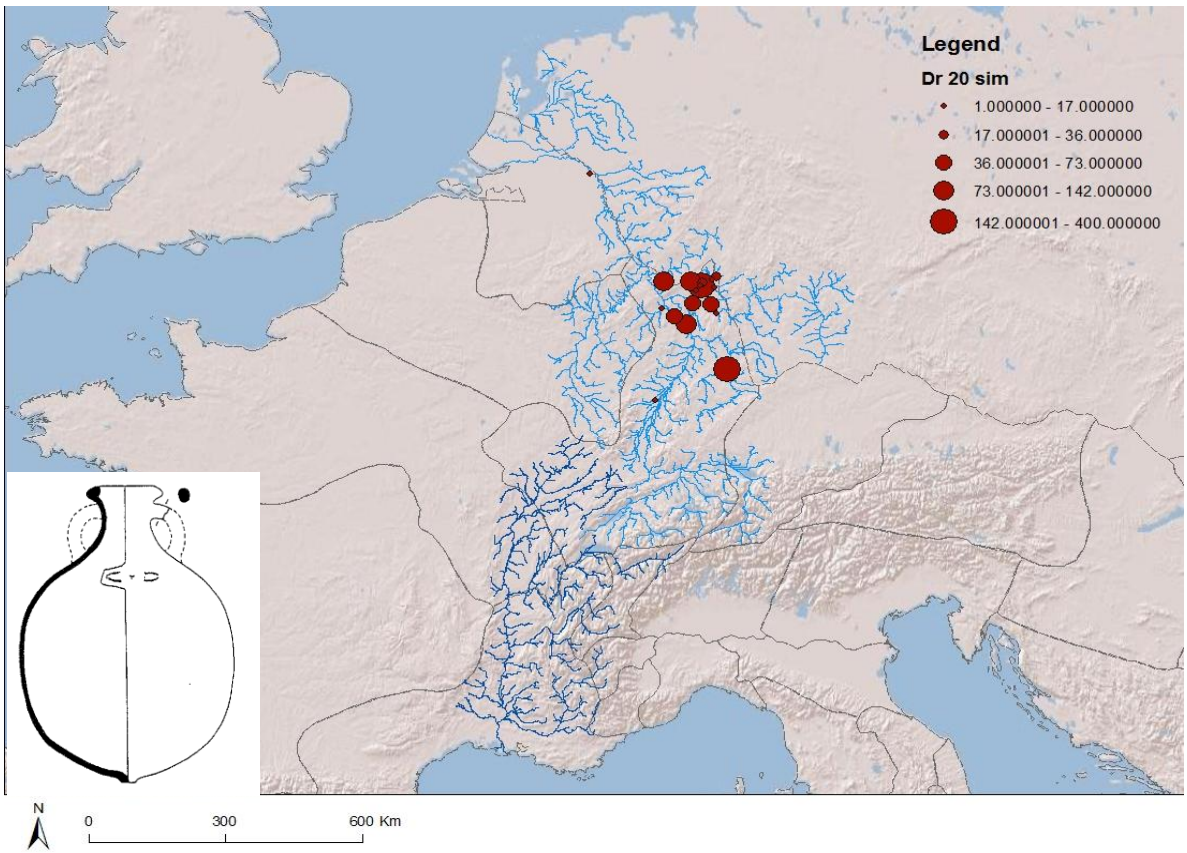


Fig. 6.11: Quantified distribution of Dressel 20 *similis*.

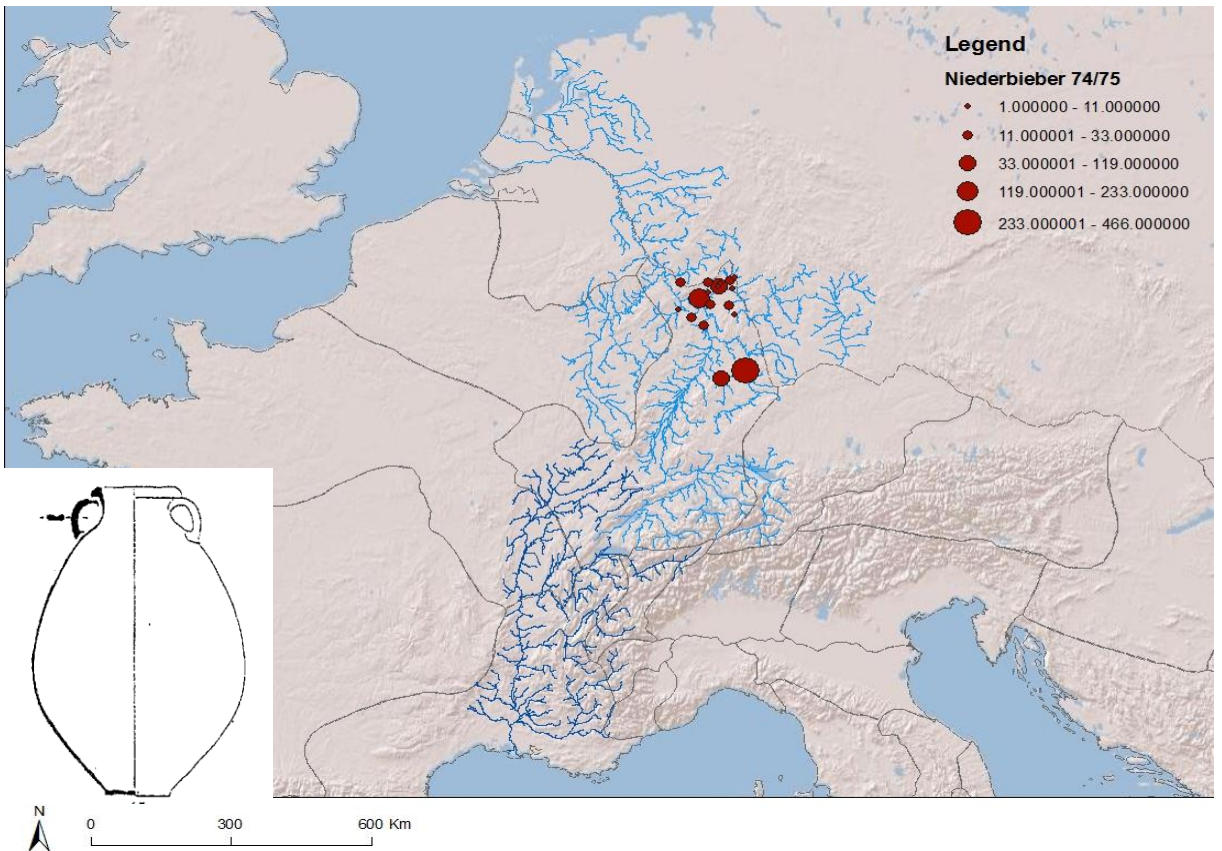


Fig. 6.12: Quantified distribution of Niederbieber 74/75.

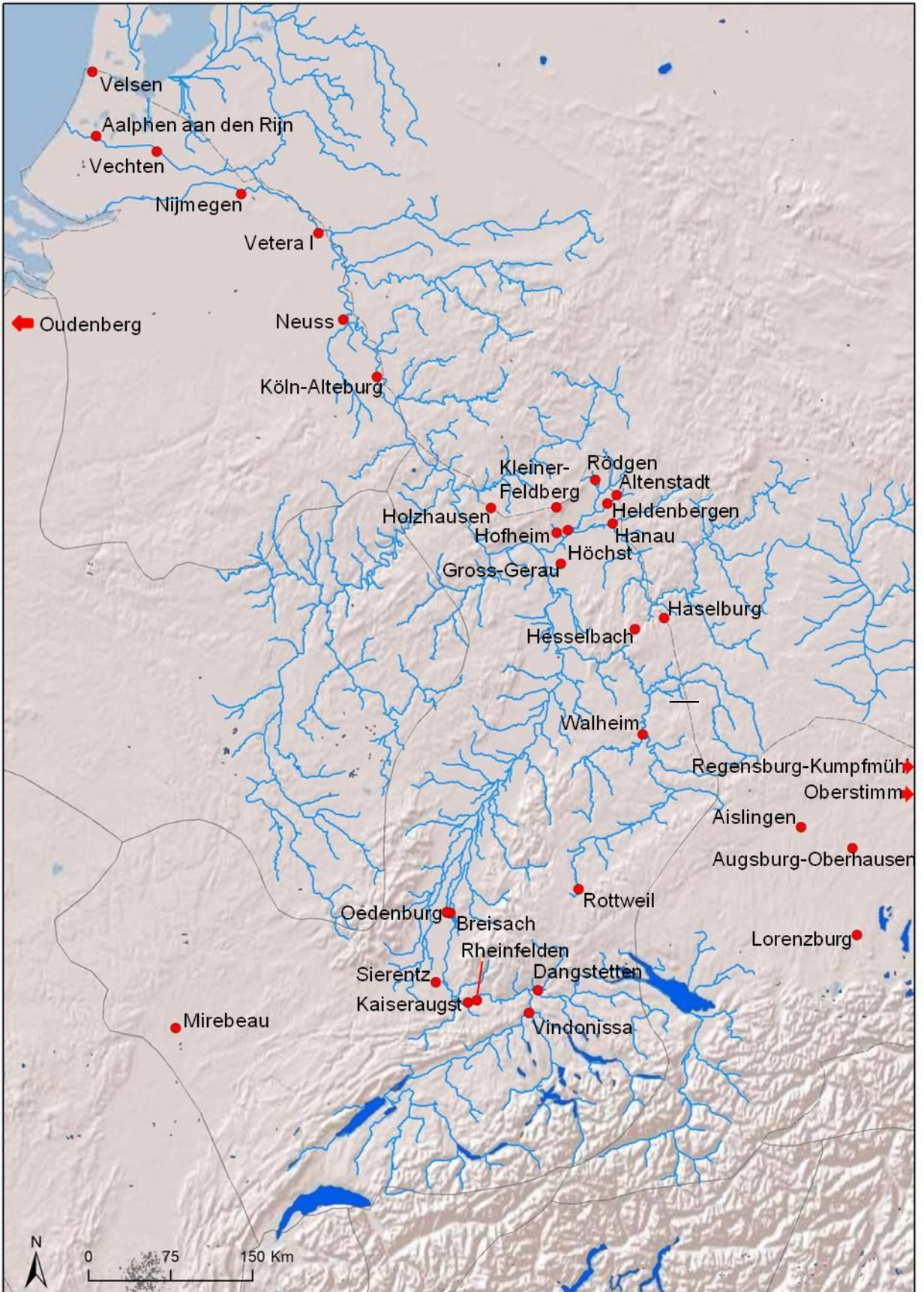


Fig. 6.13: Fort sites with quantified amphorae assemblages in database.

## Forms on military sites

n = 10081

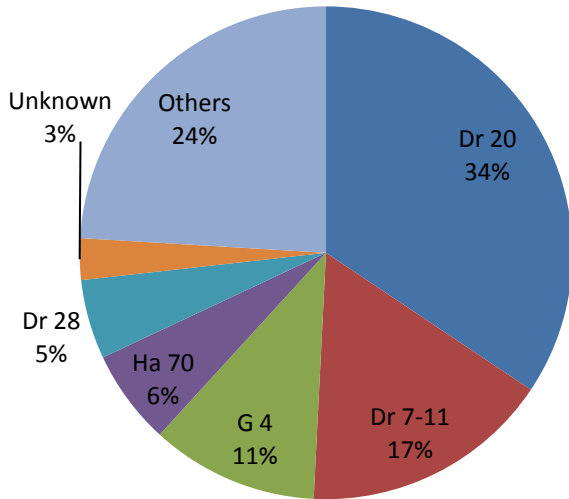


Fig. 6.14: Most common amphorae forms from forts.

## Military sites by origin

n = 10081

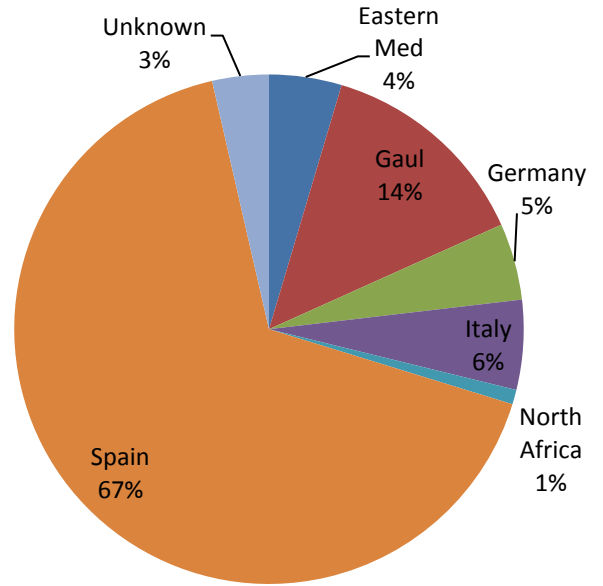


Fig. 6.15: Origins of amphorae from forts

## Military sites by contents

n = 10081

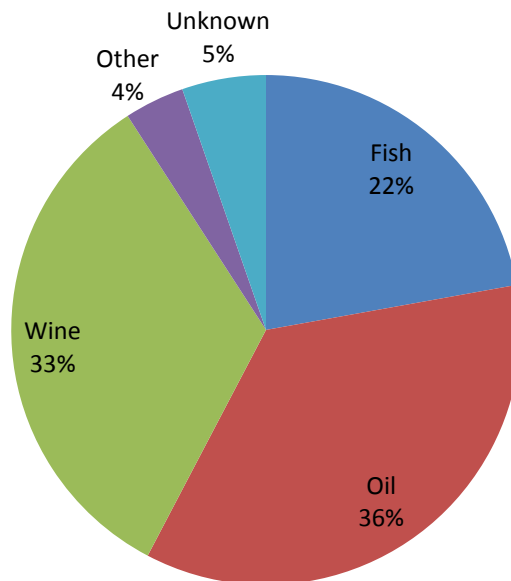


Fig. 16.6: Contents of amphorae from forts.

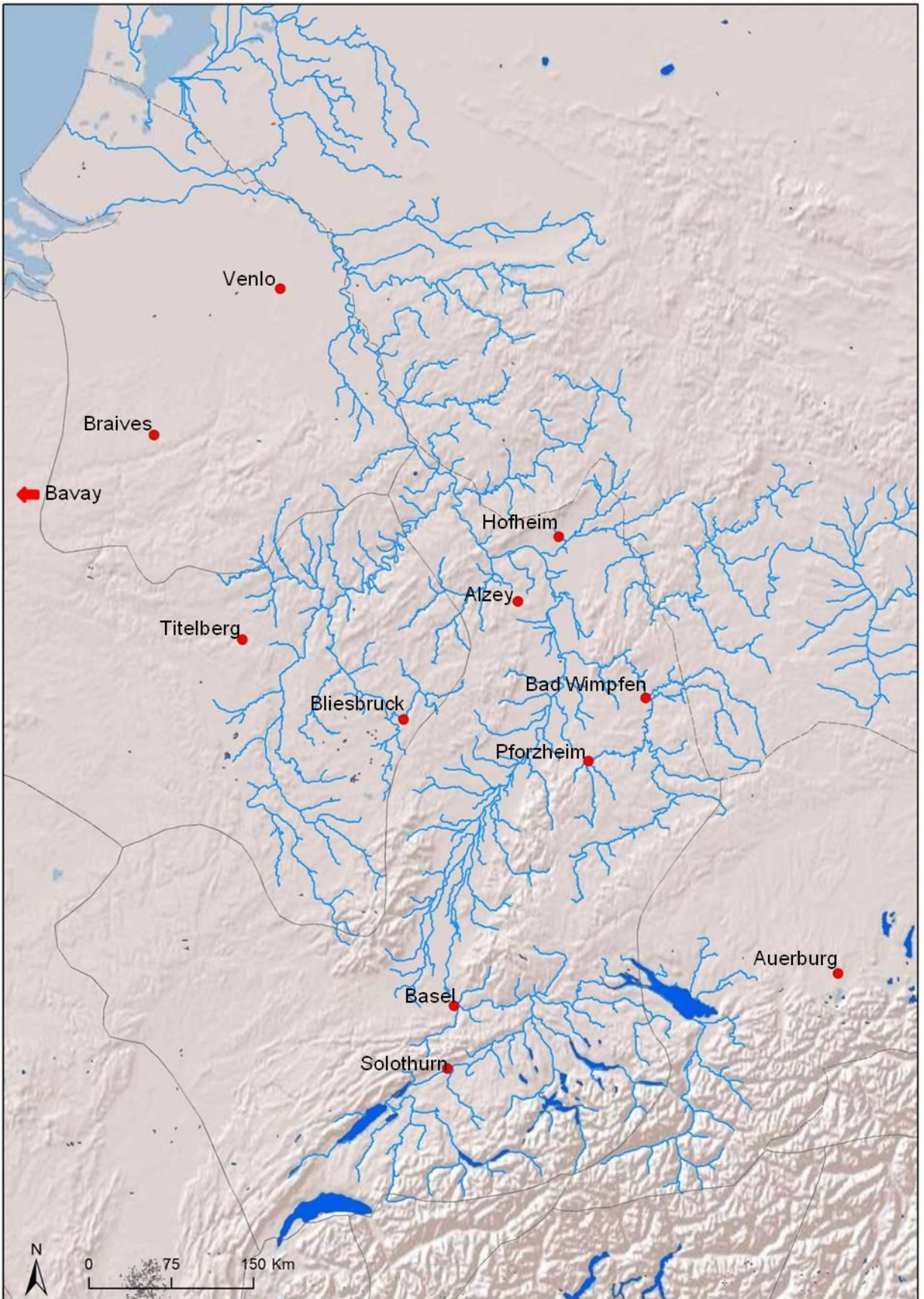


Fig.. 6.17: Vici sites with quantified amphorae assemblages in database.

### Forms on Vici sites

n = 1152

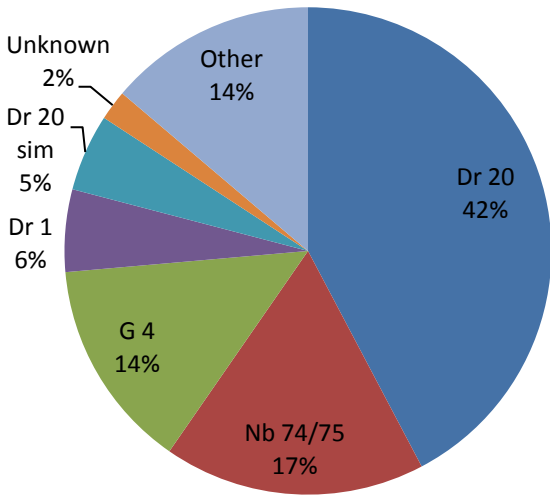


Fig. 6.18: Most common amphorae forms from vici.

### Vici by origin

n = 1152

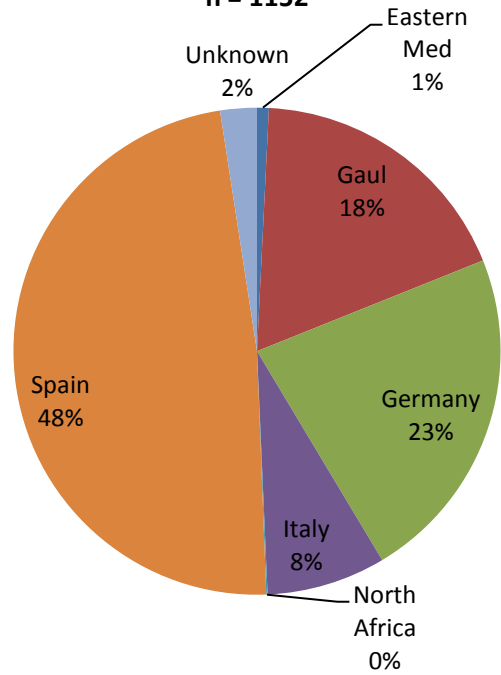


Fig. 6.19: Origins of amphorae from vici.

### Vici by contents

n = 1152

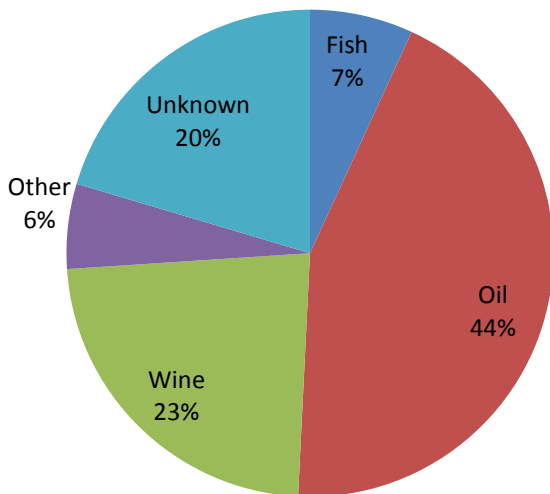


Fig. 6.20: Contents of amphorae from vici.

### Heimberg vici contents

n = 1119

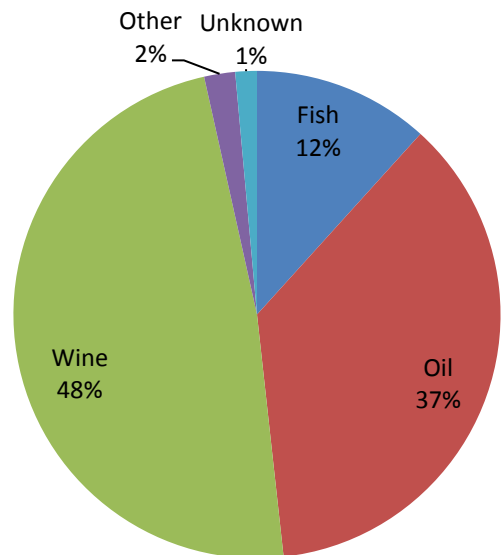


Fig. 6.21: Vici assemblages in Lower Germany based on Heimberg 1997.

## Vici assemblages by origin

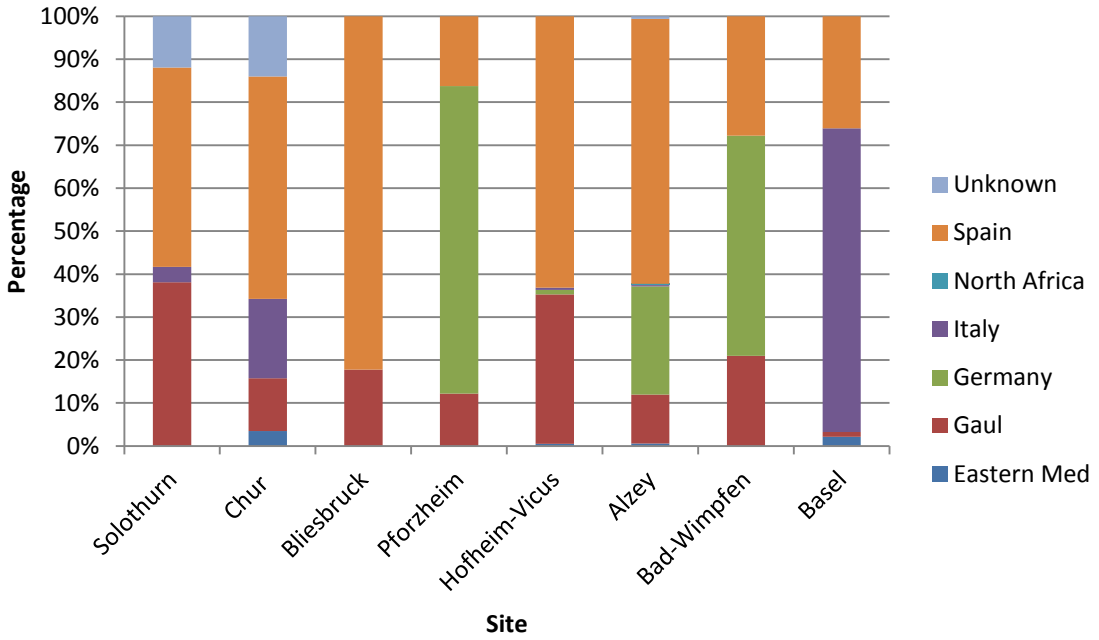


Fig. 6.22: Vici amphorae assemblages in stacked 100% bar charts showing product origin.

## Vici assemblages by contents

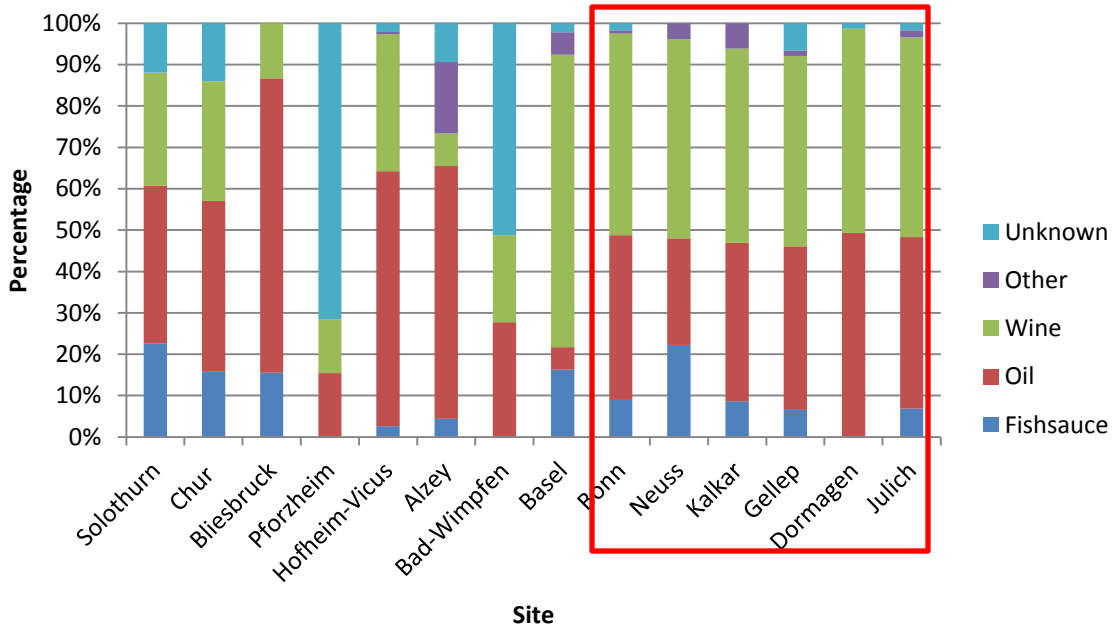


Fig. 6.23: Vici amphorae assemblages in stacked 100% bar charts showing contents, with Heimberg's data in red (from Heimberg 1997).

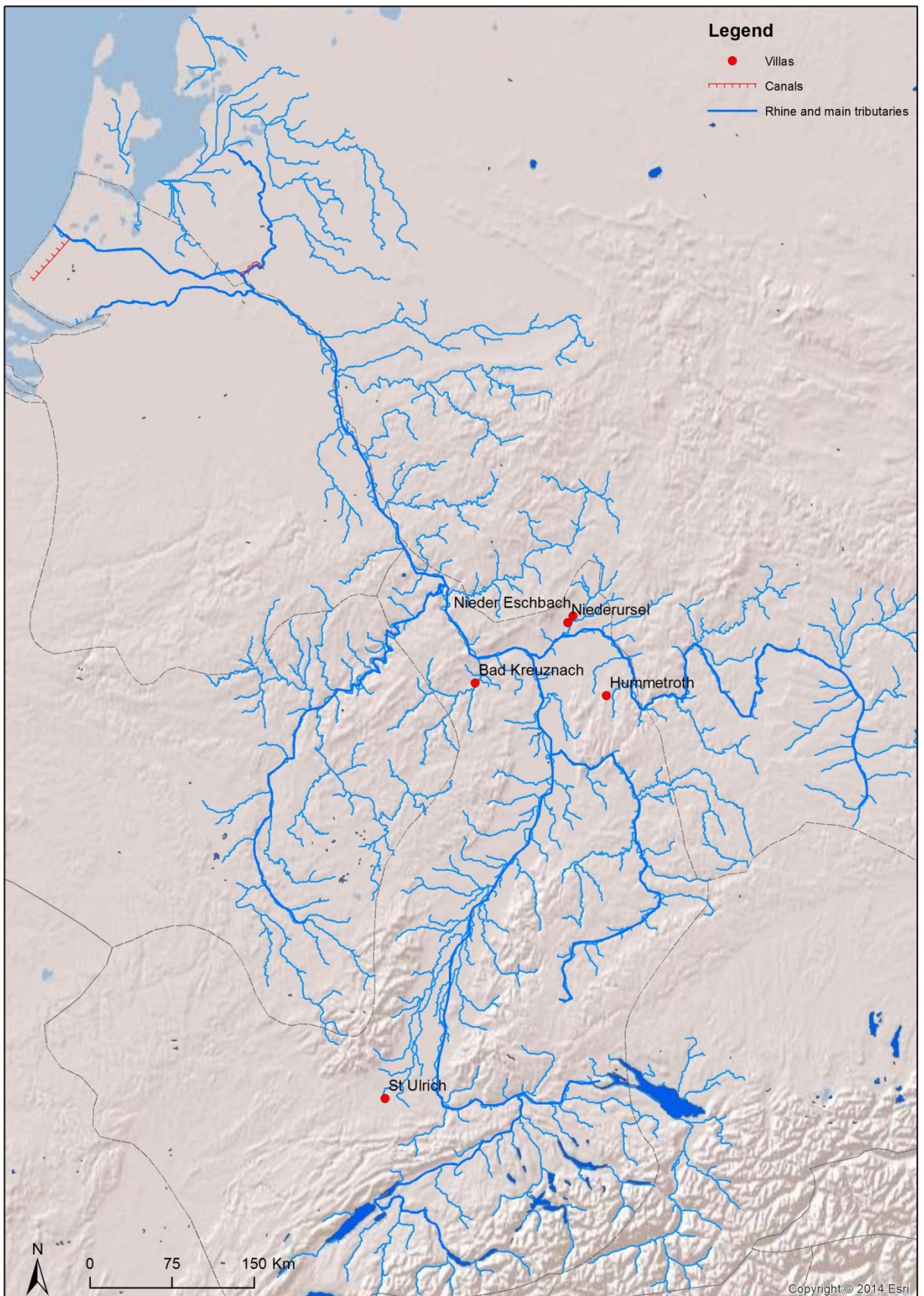


Fig. 6.24: Villa sites with quantified amphorae assemblages in database.

### Forms on Villa sites

n = 495

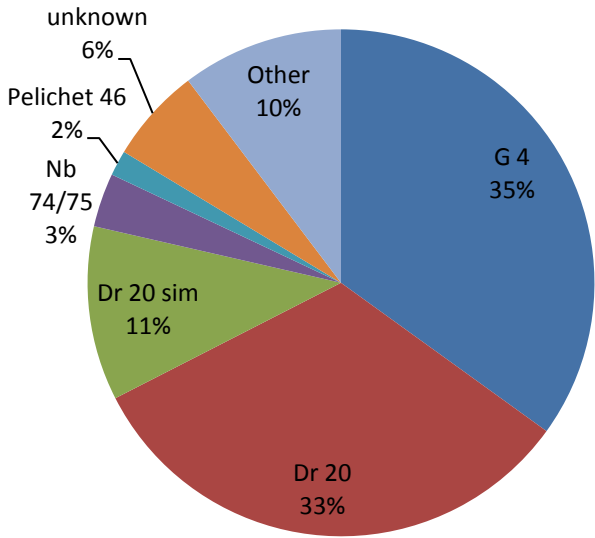


Fig. 6.25: Most common amphorae forms on villa sites.

### Villa sites by origin

n = 495

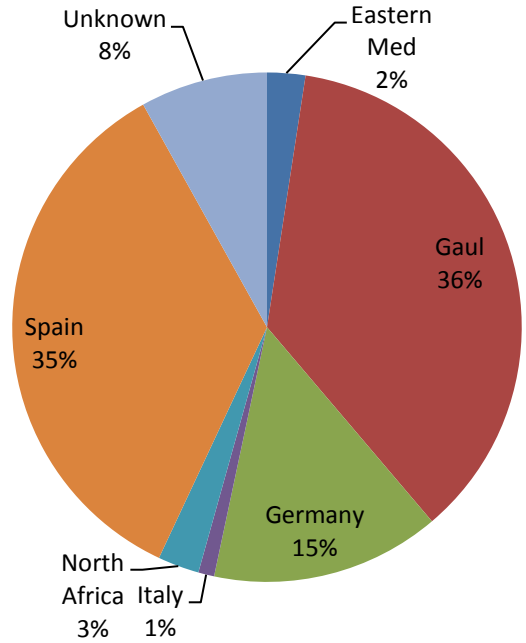


Fig. 6.26: Origins of amphorae from villas.

### Villas by contents

n = 495

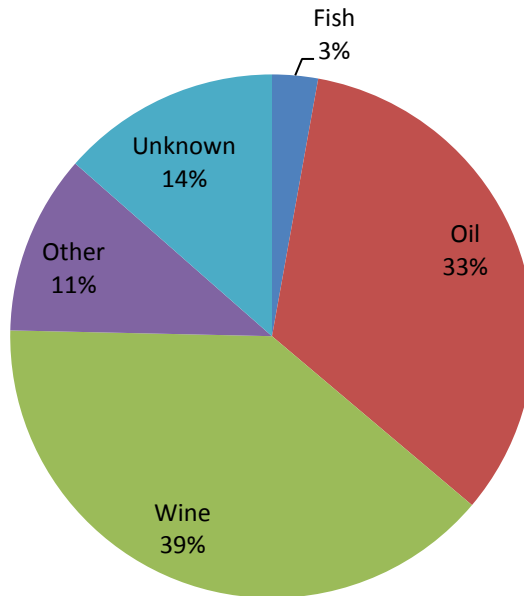


Fig. 6.27: Contents of amphorae from villas.

## Villa assemblages by origin

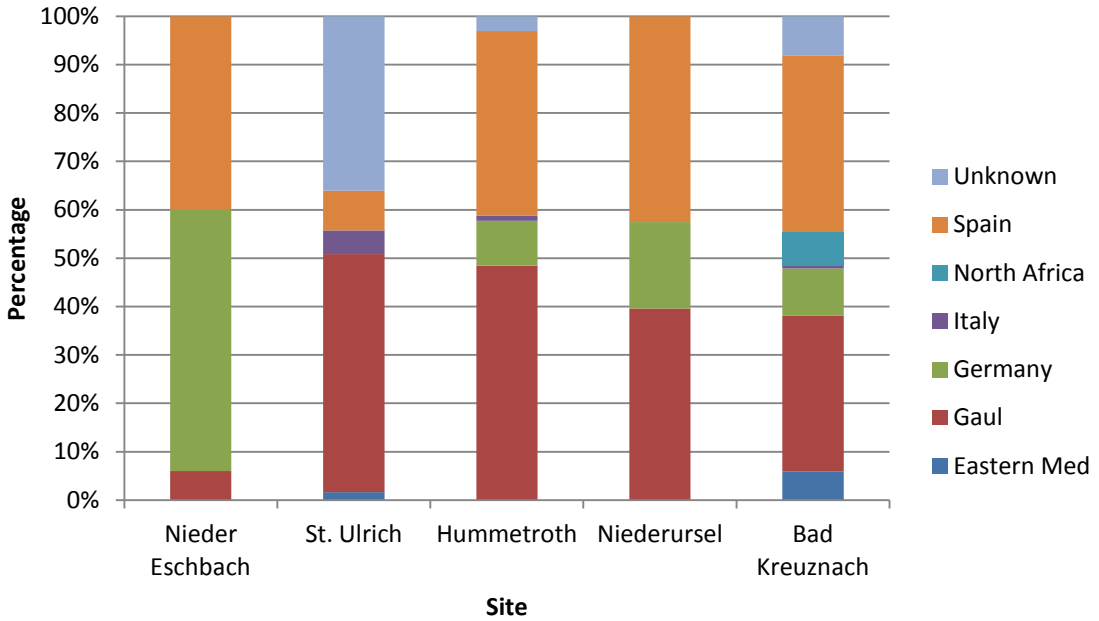


Fig. 6.28: Villa amphorae assemblages in stacked 100% bar charts showing product origin.

## Villa assemblages by contents

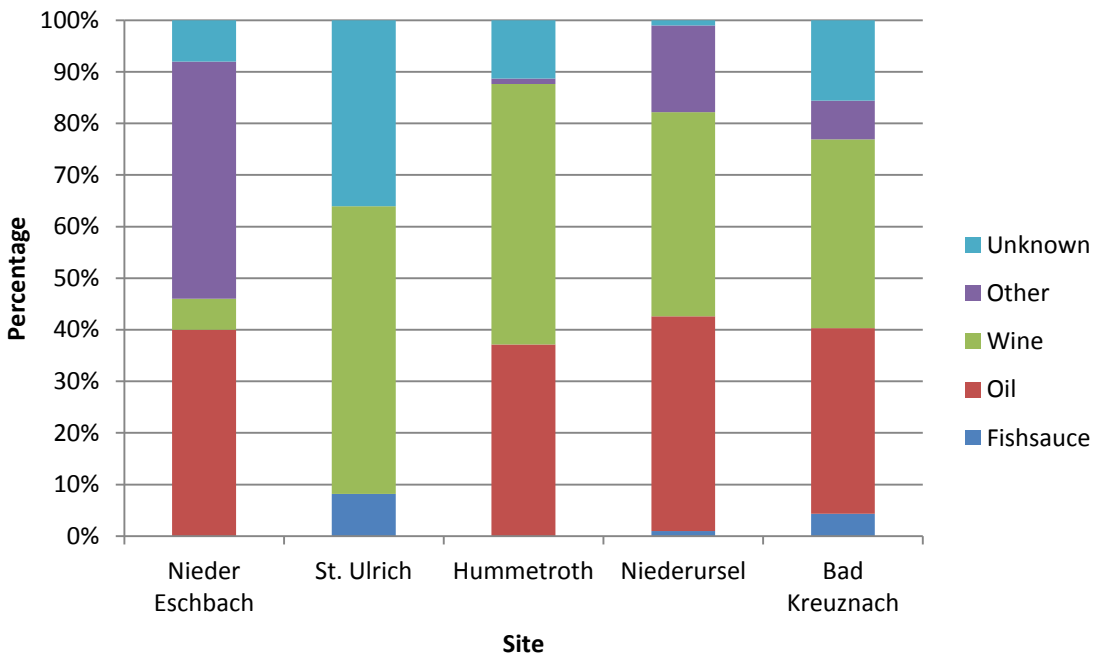


Fig 6.29: Villa amphorae assemblages in stacked 100% bar charts showing contents.

Fig. 6.30: Augst absolute import chronology by location part 1 (Martin-Kilcher 1992, abb. 108).



Figure has been removed due to copyright restrictions.

n=416; 100%=3488)

Fig. 6.31: Augst absolute import chronology by origin part 2 (Martin-Kilcher 1992, abb. 109).



Figure has been removed due to copyright restrictions.

rische Halbinsel (n=1793)

lien (n=1265)

tmittelmeerraum (n=249)

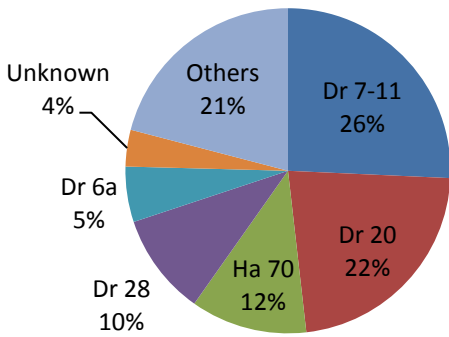
ien (n=104)

rdafrika (n=63)

Fig. 6.32: Augst stacked 100% bar chart chronology (Martin-Kilcher 1992, abb. 211).

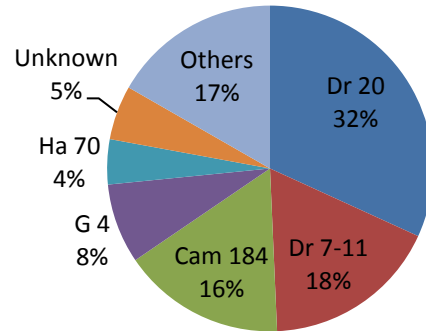
### Augustan

n = 4662



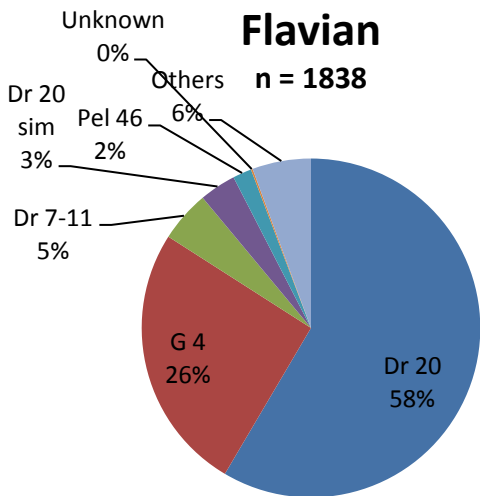
### Julio-Claudian

n = 1298



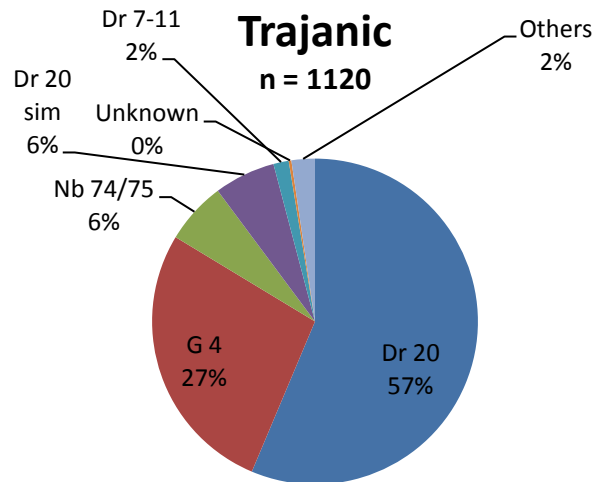
### Flavian

n = 1838



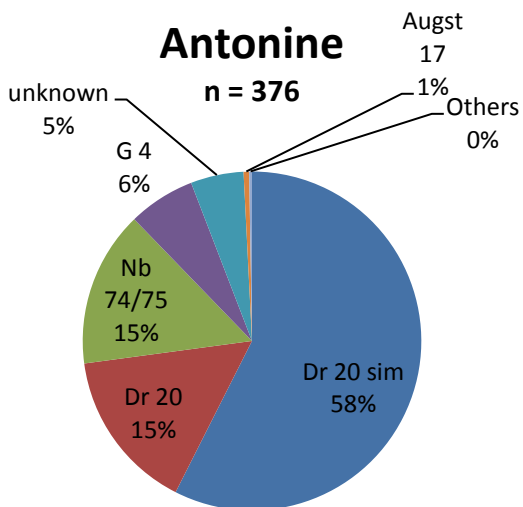
### Trajanic

n = 1120



### Antonine

n = 376



### 4<sup>th</sup> c. AD

n = 68

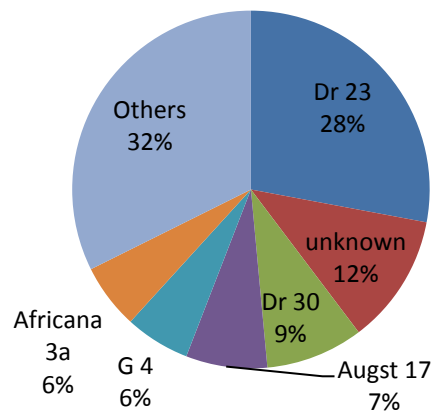


Fig. 6.33: Chronological change in common forms on forts.

## Amphorae origins over time in forts

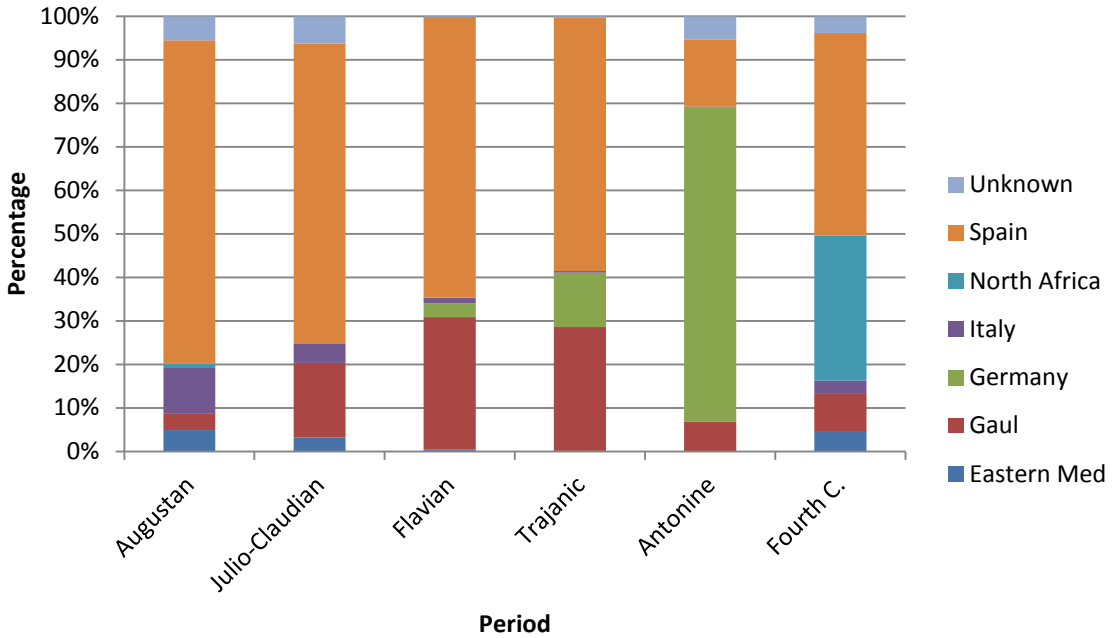


Fig. 6.34: Change of amphorae origins in forts by foundation date.

## Amphorae contents over time in forts

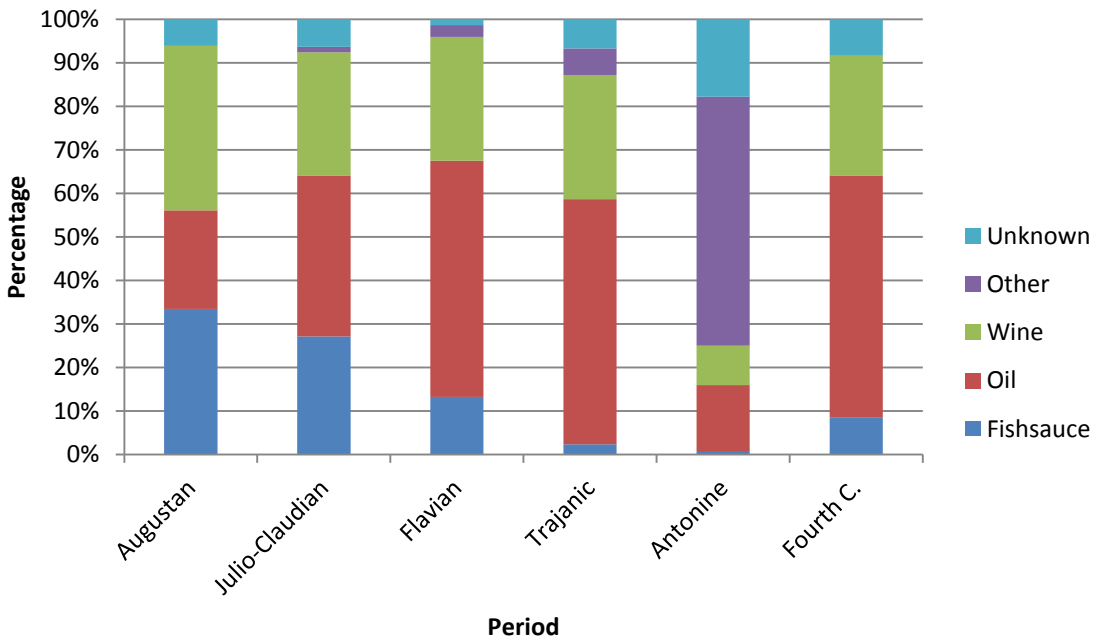


Fig. 6.35: Change of amphorae contents in forts by foundation date.

## Augustan fort assemblages by origin

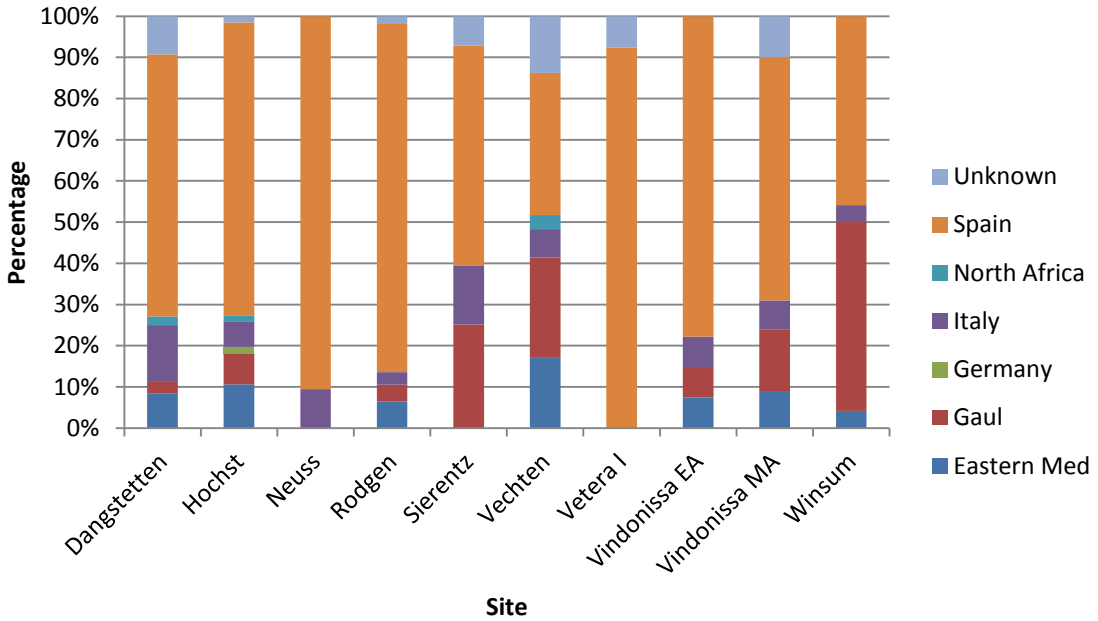


Fig. 6.36: Augustan fort amphorae assemblages in stacked 100% bar charts showing product origin.

## Augustan fort assemblages by contents

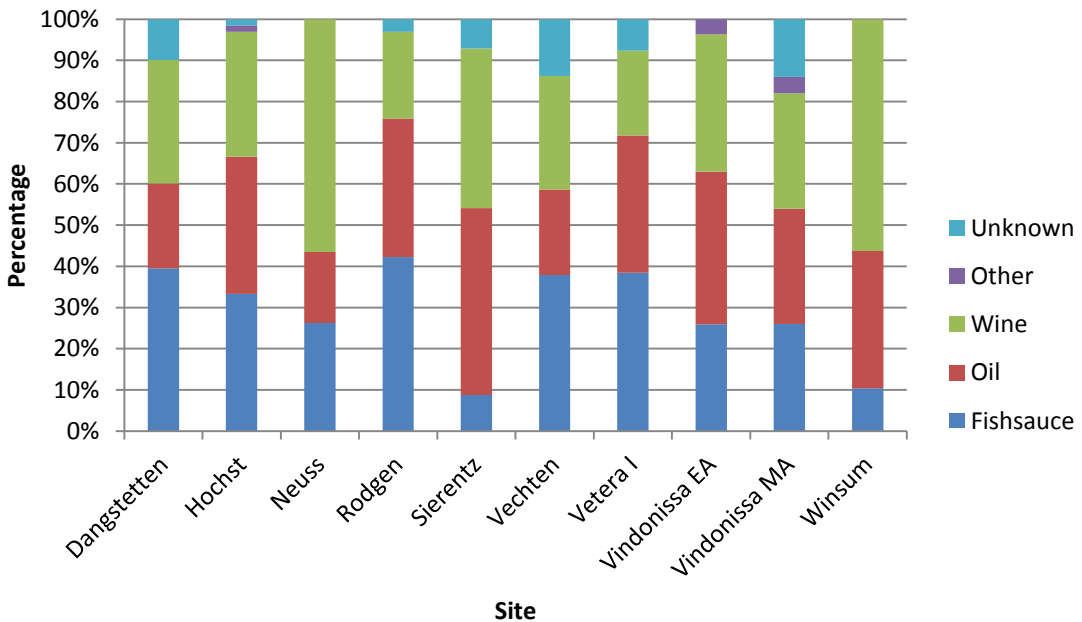


Fig. 6.37 Augustan fort amphorae assemblages in stacked 100% bar charts showing contents.

## Julio-Claudian fort assemblages by origin

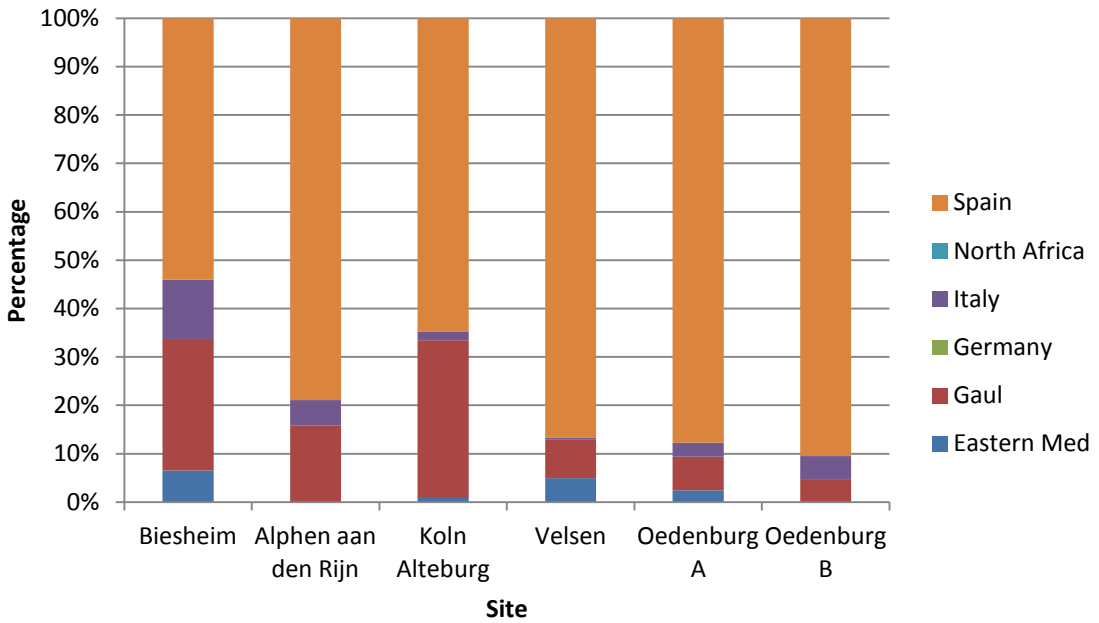


Fig. 6.38: Julio-Claudian fort amphorae assemblages in stacked 100% bar charts showing product origin.

## Julio-Claudian fort assemblages by contents

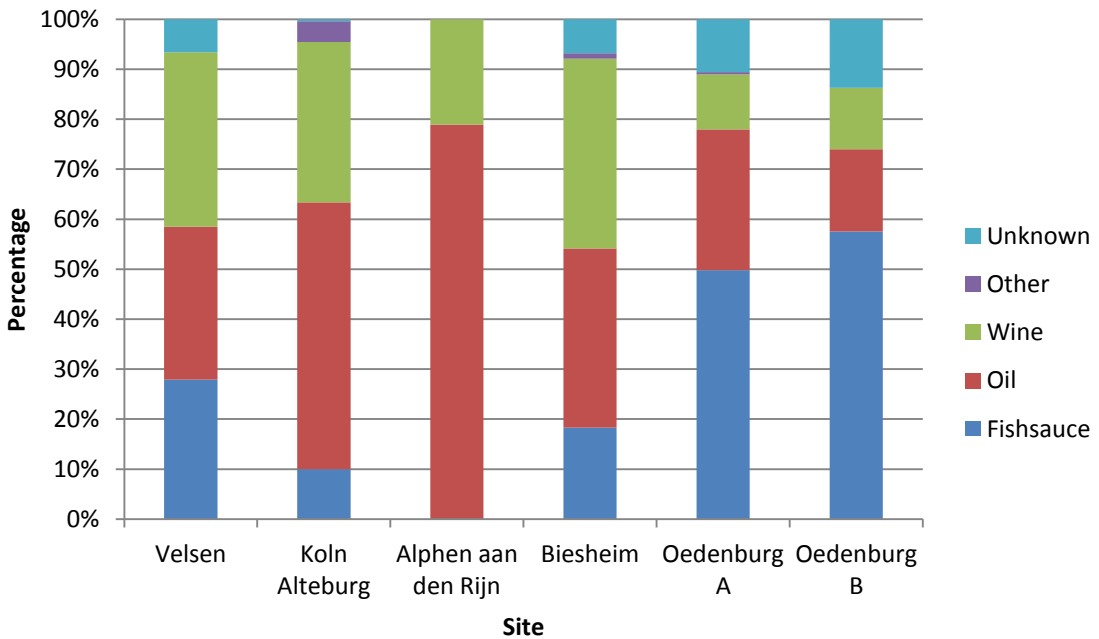


Fig. 6.39: Julio-Claudian fort amphorae assemblages in stacked 100% bar charts showing contents.

## Flavian fort assemblages by origin

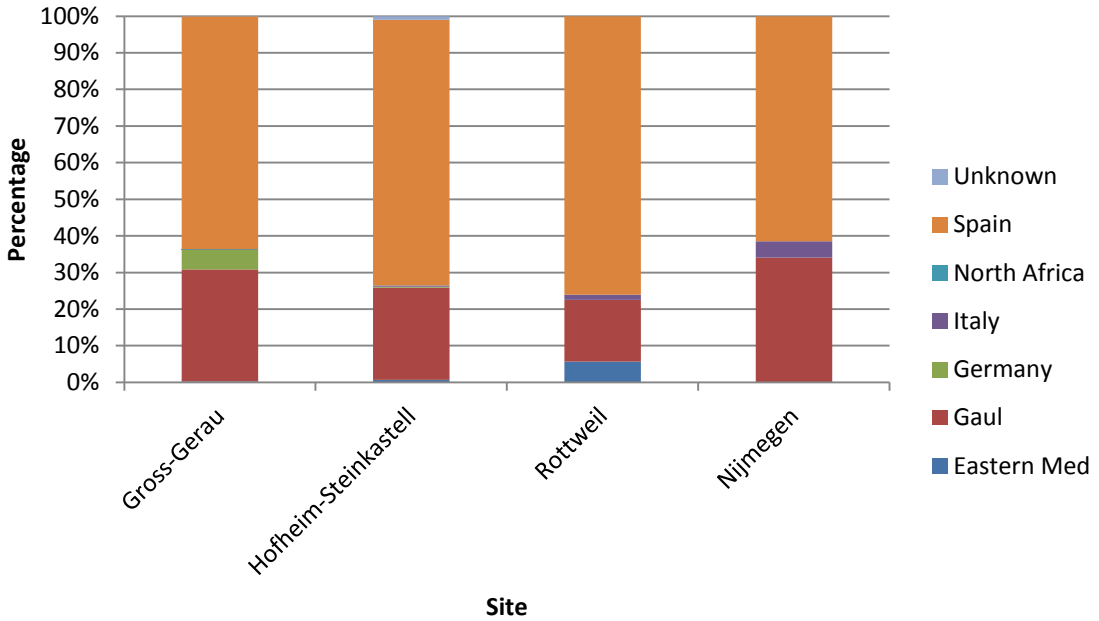


Fig. 6.40: Flavian forts amphorae assemblages in stacked 100% bar charts showing product origin.

## Flavian fort assemblages by contents

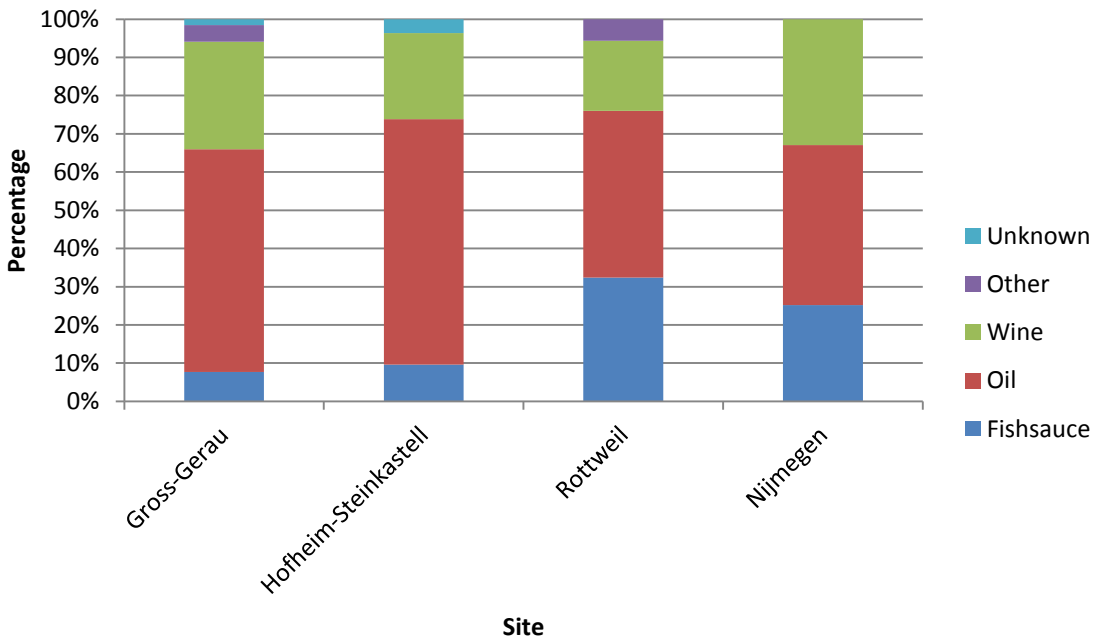


Fig. 6.41: Flavian fort amphorae assemblages in stacked 100% bar charts showing contents..

## Trajanic fort assemblages by origin

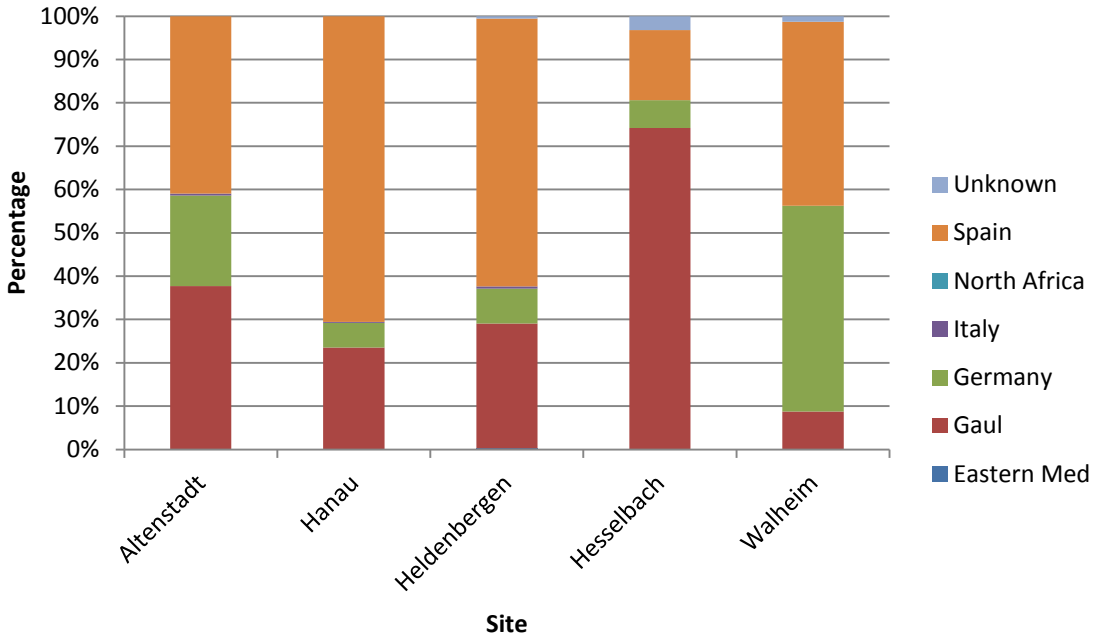


Fig. 6.42: Trajanic forts amphorae assemblages in stacked 100% bar charts showing product origin.

## Trajanic fort assemblages by contents

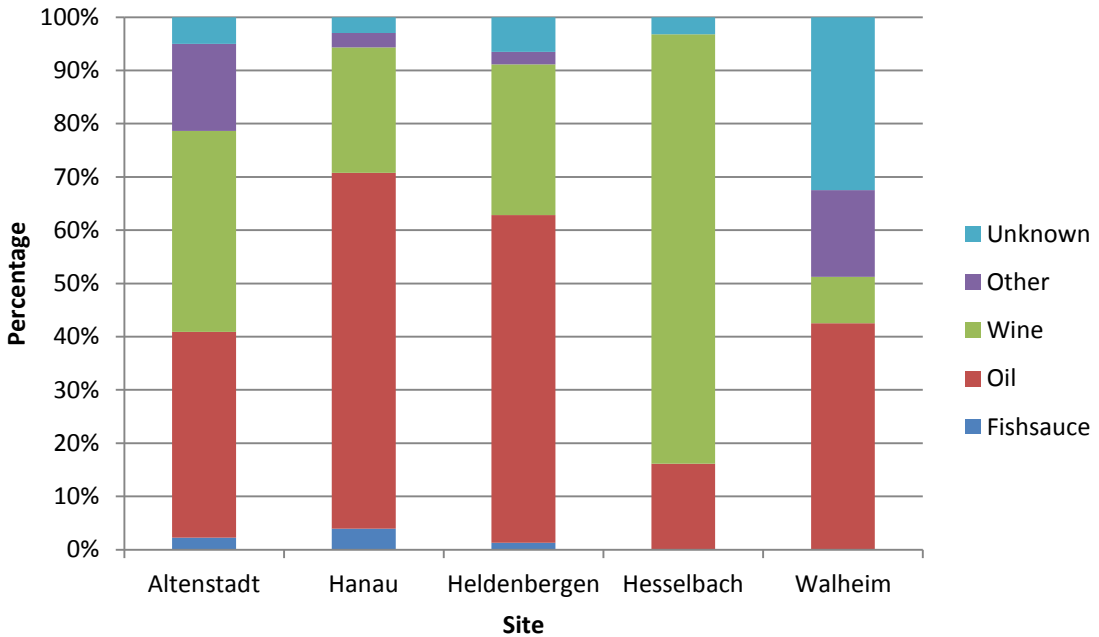


Fig. 6.43: Trajanic fort amphorae assemblages in stacked 100% bar charts showing contents.

## Antonine fort assemblages by origin

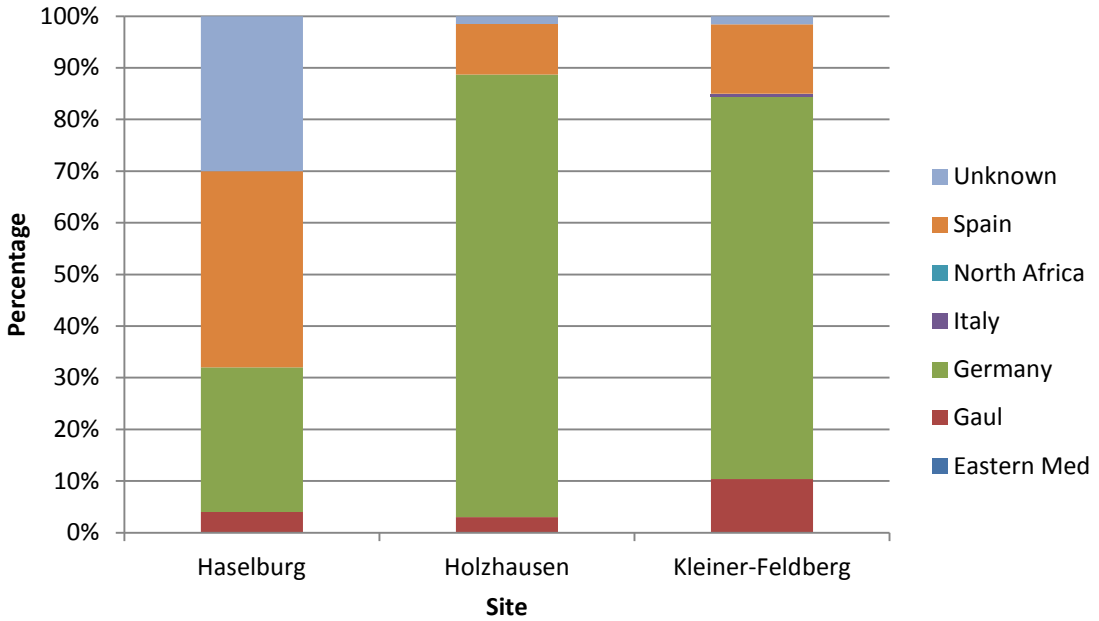


Fig. 6.44: Antonine fort assemblages in stacked 100% bar charts showing product origin.

## Antonine fort assemblages by contents

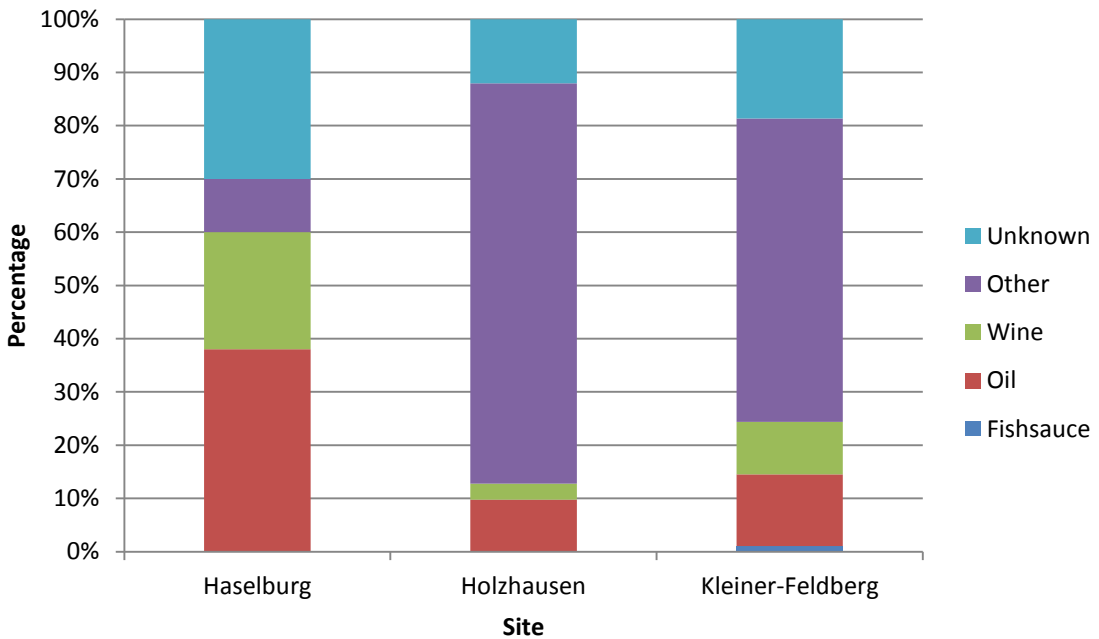


Fig. 6.45: Antonine fort amphorae assemblages in stacked 100% bar charts showing contents.

## Fourth-century fort assemblages by origin

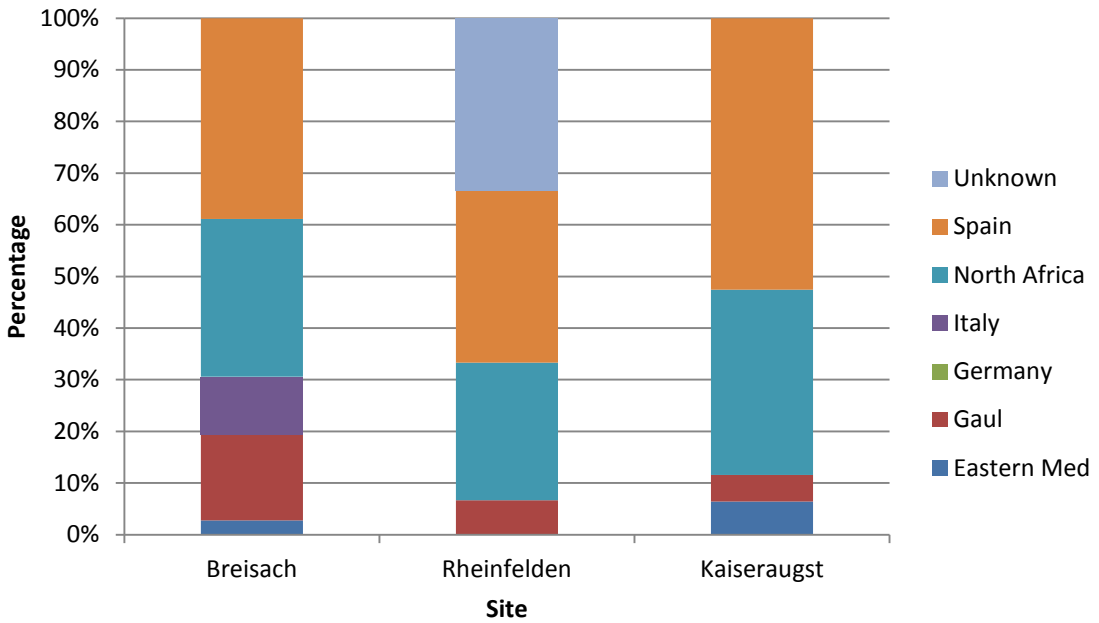


Fig. 6.46: Fourth-century forts amphorae assemblages in stacked 100% bar charts showing product origin.

## Fourth-century fort assemblages by contents

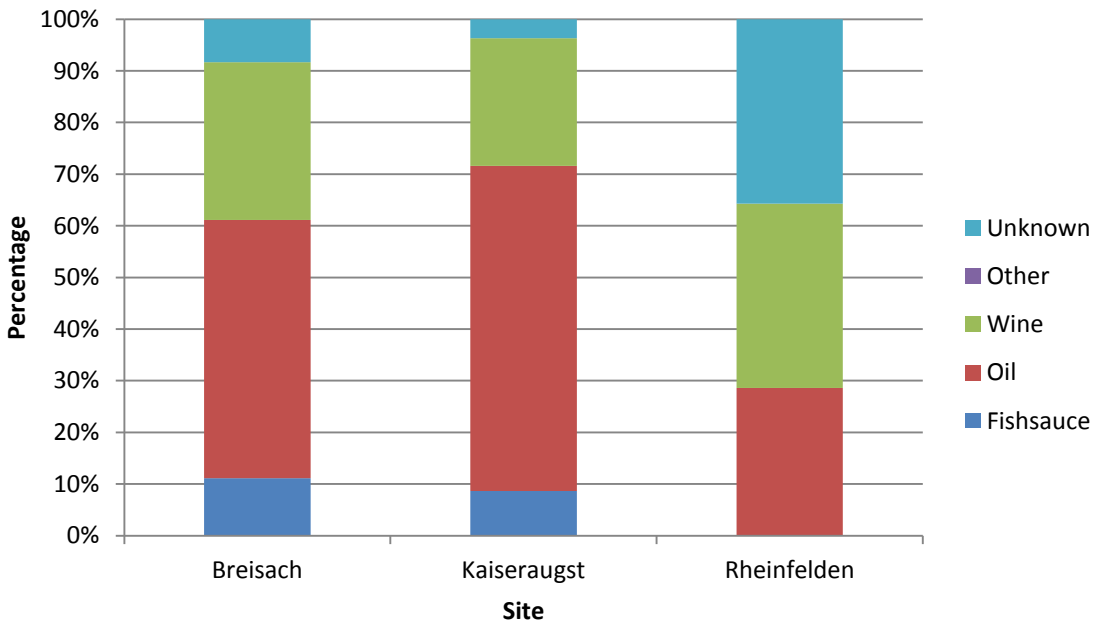


Fig. 6.47: Fourth-century fort amphorae assemblages in stacked 100% bar charts showing contents.

Fig. 6.48: Dressel 20 rim forms from Kempten, Augst, and Mainz (Schimmer 2009, abb. 8).

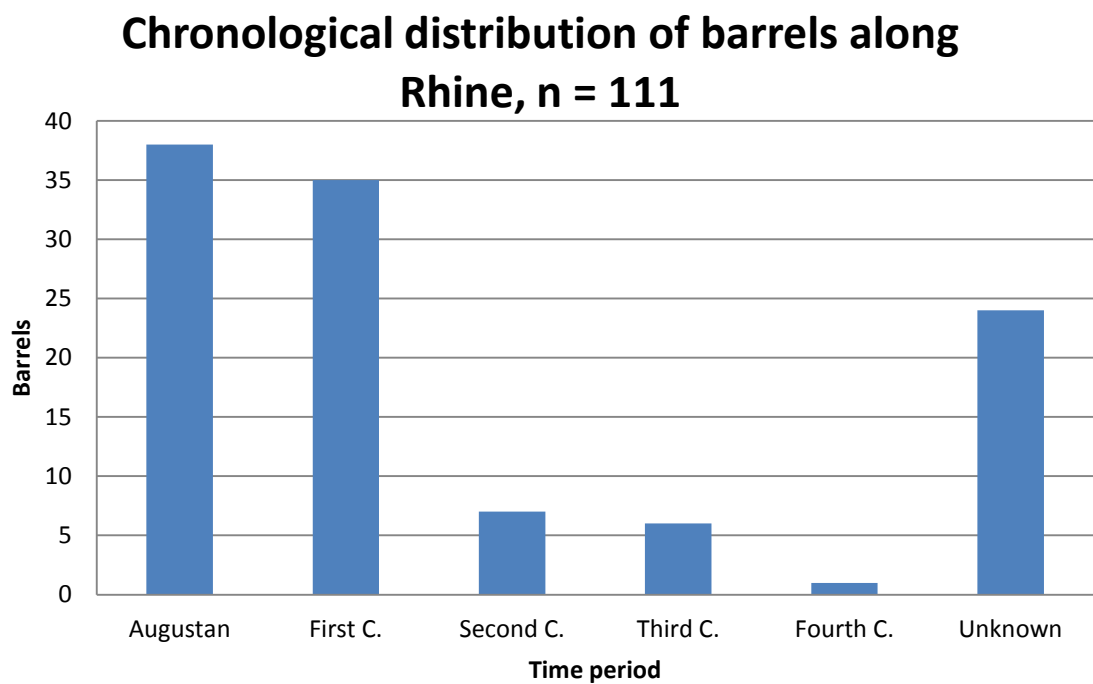


Fig. 6.49: Temporal distribution of barrels in the Rhine basin (data from Marlière 2002.)



Fig. 6.50: Neumagen Weinschiff (author).



Fig. 6.51: Neumagen Traidelschiff (author).

### Gallic sites by Origins

n = 2215

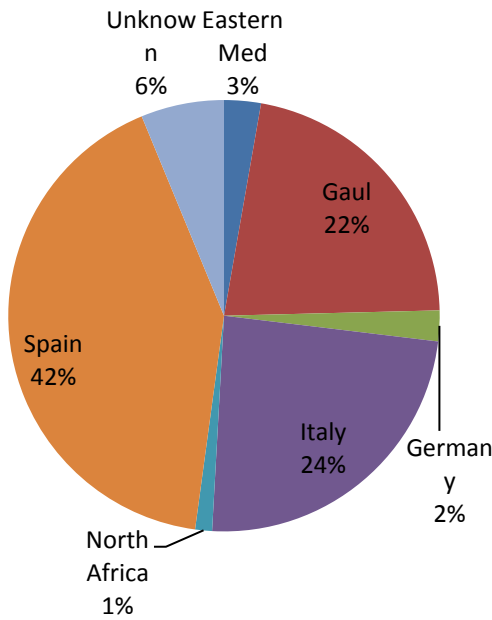


Fig. 6.52: Amphorae from Gallic sites by origin.

### Gallic sites by Contents

n = 2215

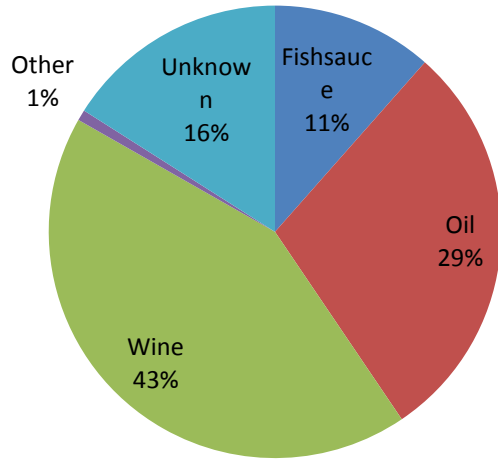


Fig. 6.53: Amphorae from Gallic sites by contents.

### Upper Rhône Basin by Origin

n = 613

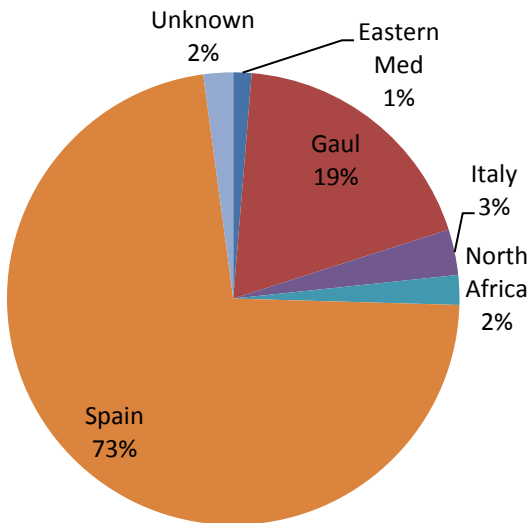


Fig. 6.54: Amphorae from Upper Rhône sites by origin.

### Upper Rhône Basin by Contents

n = 613

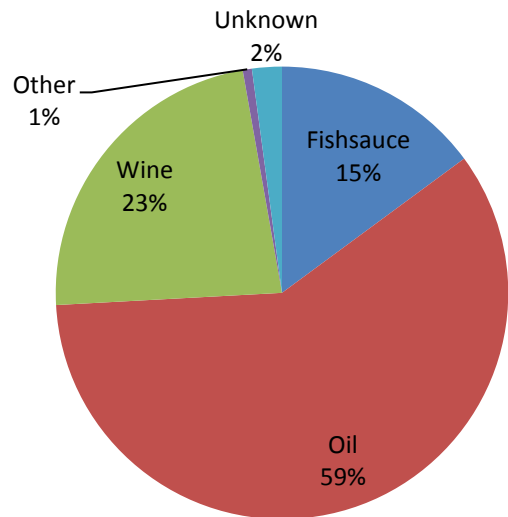


Fig. 6.55: Amphorae from Upper Rhône sites by contents.

## Gallic assemblages by origin

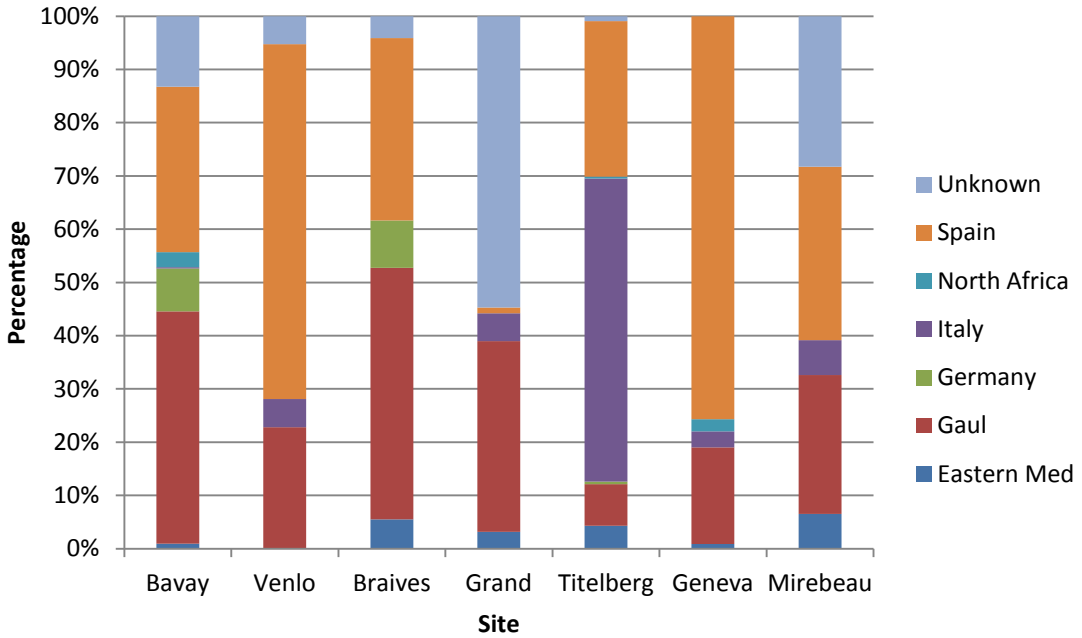


Fig. 6.56: Gallic and Upper Rhône amphorae assemblages in stacked 100% bar charts showing product origin.

## Gallic assemblages by contents

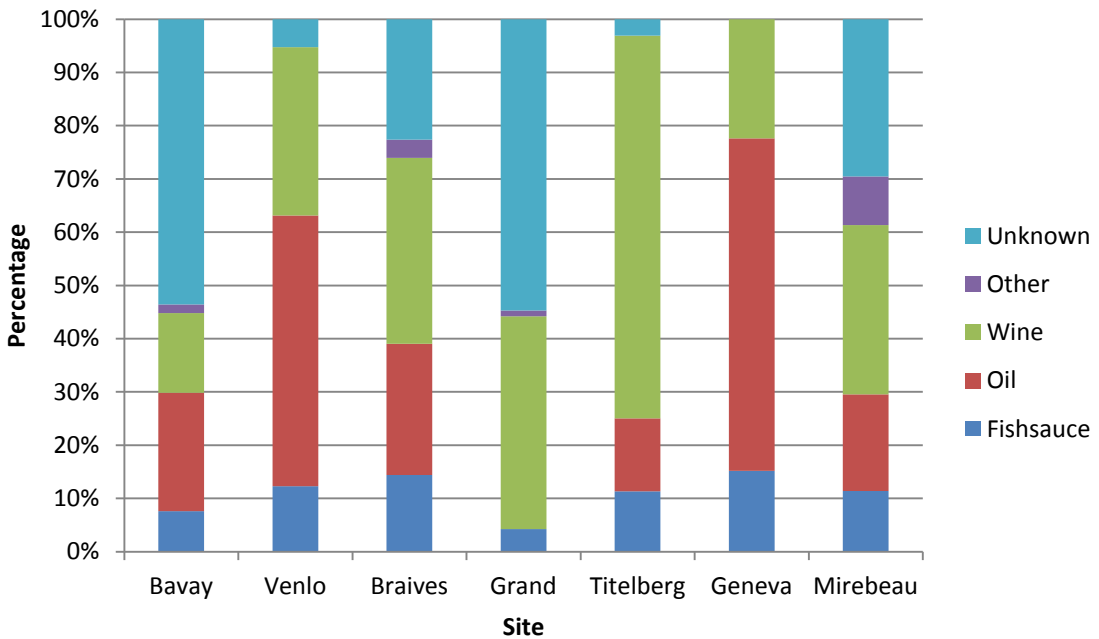


Fig. 56: 6. Gallic and Upper Rhône amphorae assemblages in stacked 100% bar charts showing contents.

### Raetian sites by Origin n = 2322

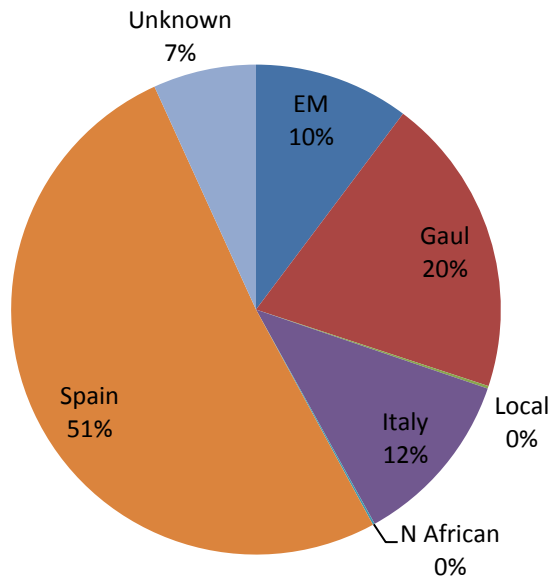


Fig. 6.58: Amphorae from Raetian sites by origin.

### Raetian sites by Contents n = 2322

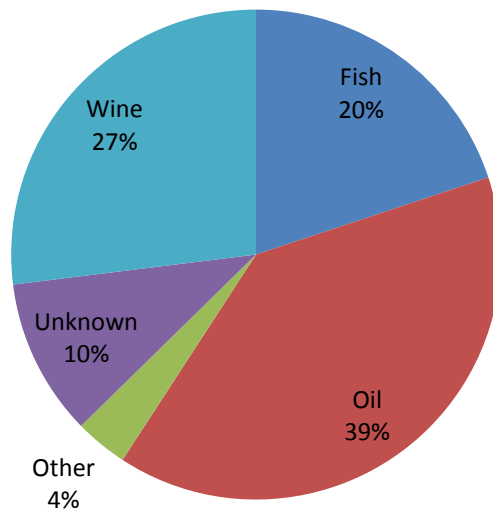


Fig. 6.59: Amphorae from Raetian sites by contents.

## Raetian assemblages by origin

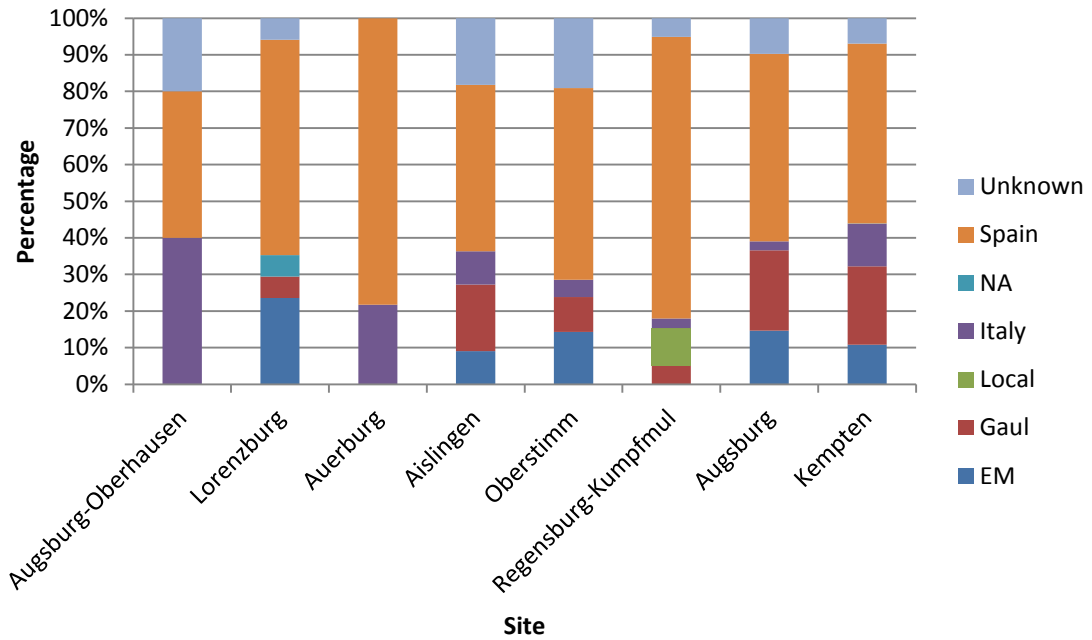


Fig. 6.60: Raetian amphorae assemblages in stacked 100% bar charts showing product origin.

## Raetian assemblages by contents

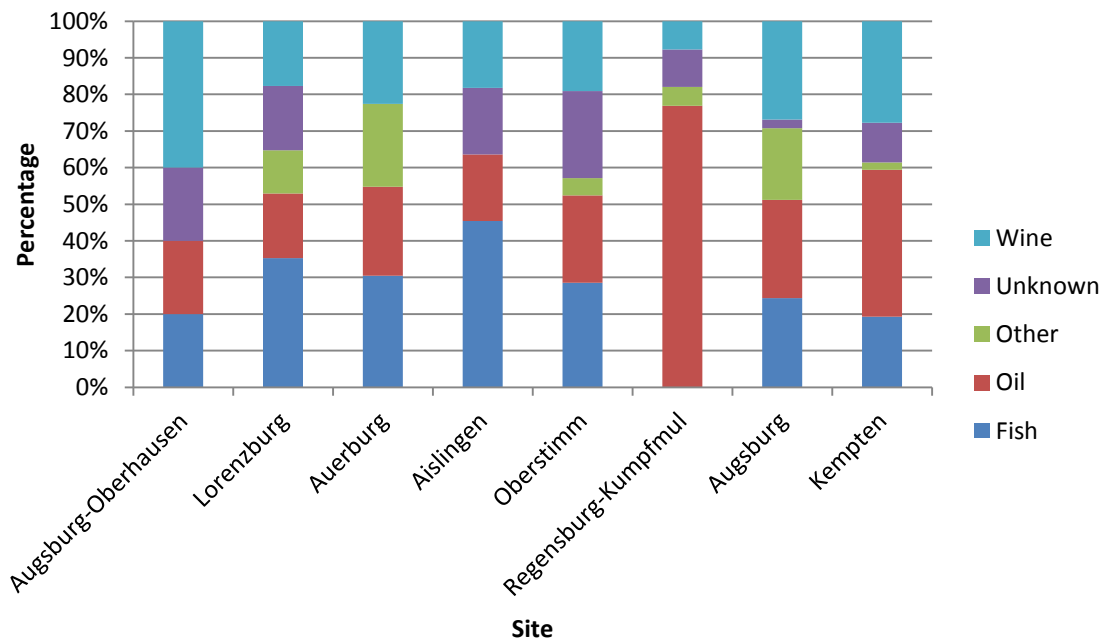


Fig. 6.61: Raetian amphorae assemblages in stacked 100% bar charts showing product origin.

## Regional comparison by origin

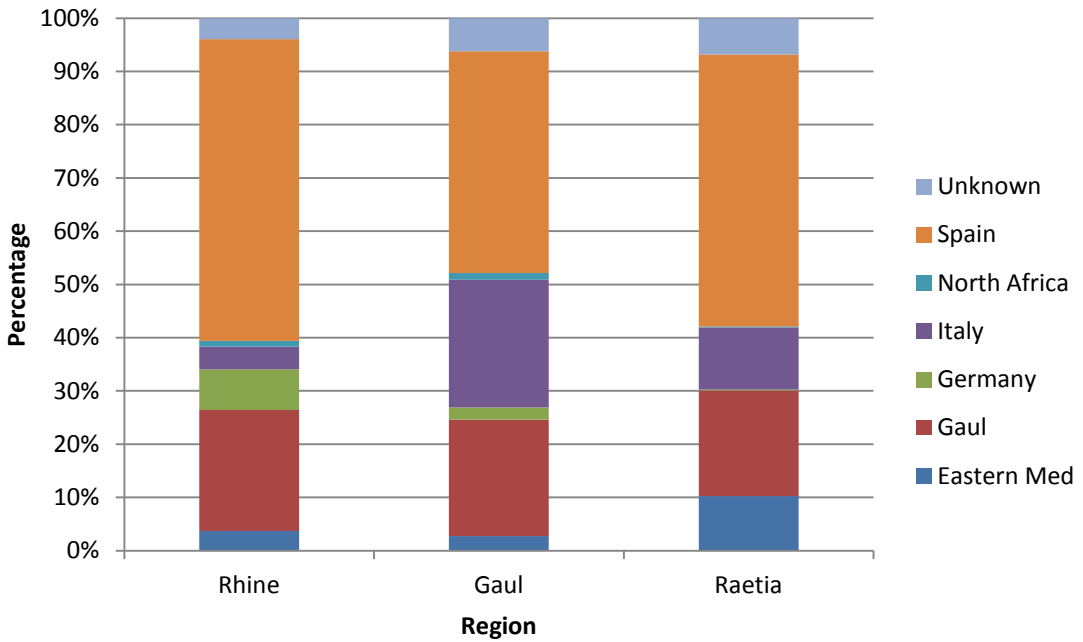


Fig. 6.62: Amphorae assemblages from all regions in stacked 100% bar charts showing product origin.

## Regional comparison by contents

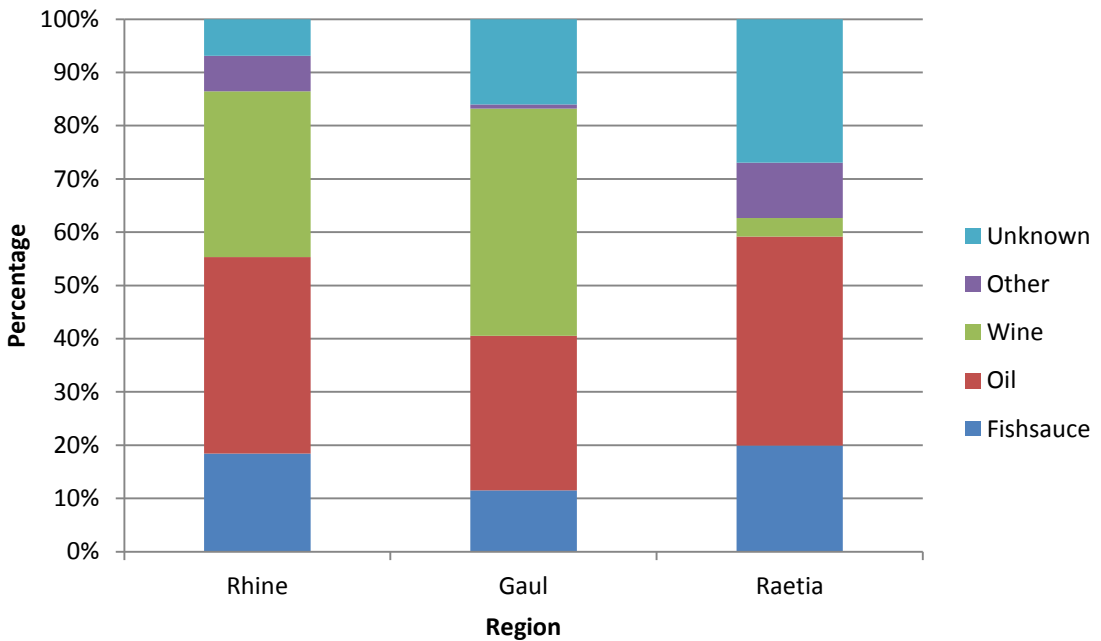


Fig. 6.63: Amphorae assemblages from all regions in stacked 100% bar charts showing contents.

Ship	Find Spot	Country	Date	Type	Length (m)	Width (m)	Height (m)	Tonnage
Bevaix	Bevaix	Switzerland	AD 182-190	barge	19.4	2.9	0.9	7 - 10
Cologne	Cologne	Germany	AD 50-100	barge	23	3.5		
Cologne	Cologne	Germany		barge				
De Meern 1	De Meern	Netherlands	AD 150-200	barge	24.6	2.6		
Druten	Druten	Netherlands	AD 200	barge	27	2.8		
Kapel Avazaath	Kapel Avazaath	Netherlands	AD 100-160	barge	35-40	3.2		
Mainz 6	Mainz-Lohrstrasse	Germany	late 1st - early 2nd c. AD	barge	11	3.7	1	
Mainz K1	Mainz-Kappelhof	Germany		barge	30-40	3.5-3.7		
Mainz K2	Mainz-Kappelhof	Germany		barge				
Wantzenau	Wantzenau	France	late 3rd c. AD	barge	6.5	2.3	1.5	3.5
Woerden 1	Woerden	Netherlands	AD 170-175	barge	29.6	3.6		
Woerden 2/6	Woerden	Netherlands		barge	14	3.1	1.2	
Woerden 7	Woerden	Netherlands	AD 150-160	barge	29.6	4.7	1	
Xanten-Luettingen	Xanten	Germany	3rd c. AD	barge	35	4.9	1.3	
Xanten-Wardt	Xanten	Germany	1st c. AD	barge	15	2.6	0.7	
Yverdon A	Yverdon	Switzerland	late 1st c. AD	barge	20 - 24			
Zwammerdam 2	Zwammerdam	Netherlands	AD 150-226	barge	22.75	2.8	0.95	35
Zwammerdam 4	Zwammerdam	Netherlands	AD 150-228	barge	34	4.4	1.2	105-110
Zwammerdam 6	Zwammerdam	Netherlands	AD 150-230	barge	20.25	3.4	0.9	35

## Appendix 3.1 Augustan forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Asciburgium	Augustus	cohort	1.5	500	Lower	Rhine
Hedemunden	Augustus	marching camp	4.8	n/a	Lower	Weser
Neuss B	Augustus	legion	50	11000	Lower	Rhine
Nijmegen	Augustus	legion	42	11000	Lower	Waal
Olfen	Augustus	marching camp	5	1000	Lower	Lippe
Sieburg bei Bad Karlshafen	Augustus	marching camp	140	n/a	Lower	Weser
Anreppen	Augustus	Legion	23	5500	Lower	Lippe
Bonna	Augustus	cohort	n/a	500	Lower	Rhine
Bonna	Augustus	legion	n/a	5500	Lower	Rhine
Haltern	Augustus	Legion	16.3	5500	Lower	Lippe
Holsterhausen	Augustus	Legion	50	11000	Lower	Lippe
Kneblinghausen	Augustus	Legion	10	5500	Lower	Lippe
Oberaden	Augustus	Legion	56	11000	Lower	Lippe
Vechten	Augustus	cohort/ala	1.9	500	Lower	Rhine
Vetera I	Augustus	legion	60	11000	Lower	Rhine
Andernach	Augustus	cohort	n/a	500	Upper	Rhine
Bingen	Augustus	cohort	n/a	500	Upper	Rhine
Dorlar	Augustus	marching camp	21	n/a	Upper	Wetterau
Eschenz	Augustus	cohort	n/a	500	Upper	Rhine
Friedberg	Augustus	cohort	n/a	500	Upper	Wetterau
Höchst	Augustus	cohort	n/a	500	Upper	Wetterau
Hofheim	Augustus	cohort	n/a	500	Upper	Wetterau
Kastel	Augustus	cohort	n/a	500	Upper	Rhine
Koblenz	Augustus	cohort	6	500	Upper	Rhine
Rödgen	Augustus	supply base	3.3	500	Upper	Wetterau
Speyer	Augustus	cohort	2.7	500	Upper	Rhine
Wiesbaden	Augustus	cohort	n/a	500	Upper	Wetterau
Worms	Augustus	cohort/alae	n/a	500	Upper	Rhine
Zurzach	Augustus	cohort	n/a	500	Upper	Rhine
Bad Nauheim	Augustus	vexillation	n/a	2500	Upper	Wetterau
Dangstetten	Augustus	Legion	14.5	5500	Upper	Rhine
Mainz	Augustus	Legion	36	11000	Upper	Rhine
Marktbreit	Augustus	Legion	37	11000	Upper	Main
Trier Petrisberg	Augustus	ala?	n/a	500	Upper	Moselle
Windisch	Augustus	Legion	18	5500	Upper	Rhine

Appendix 3.2 Tiberian forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Asciburgium	Augustus	cohort	1.5	500	Lower	Rhine
Bonn	Augustus	legion	n/a	5500	Lower	Rhine
Vechten	Augustus	cohort/ala	1.9	500	Lower	Rhine
Vetera I	Augustus	legion	60	11000	Lower	Rhine
Velsen I	Tiberius	fleet	1.3	n/a	Lower	North Sea coast
Andernach A	Tiberius	cohort/vexillation	n/a	500	Lower	Rhine
Burginatum	Tiberius	ala	2.7	500	Lower	Rhine
Cologne	Tiberius	legion	n/a	11000	Lower	Rhine
Driel	Tiberius	ala	8.5	1000	Lower	Rhine
Neuss E-F	Tiberius	legion	40	11000	Lower	Rhine
Andernach	Augustus	cohort	n/a	500	Upper	Rhine
Bingen	Augustus	cohort	n/a	500	Upper	Rhine
Eschenz	Augustus	cohort	n/a	500	Upper	Rhine
Kastel	Augustus	cohort	n/a	500	Upper	Rhine
Koblenz	Augustus	cohort	6	500	Upper	Rhine
Speyer	Augustus	cohort	2.7	500	Upper	Rhine
Worms	Augustus	cohort/ala	n/a	500	Upper	Rhine
Zurzach	Augustus	cohort	n/a	500	Upper	Rhine
Mainz	Augustus	Legion	36	11000	Upper	Rhine
Windisch	Augustus	Legion	18	5500	Upper	Rhine
Konstanz	Tiberius	cohort	n/a	500	Upper	Rhine
Oedenburg A	Tiberius	cohort	n/a	500	Upper	Rhine
Oedenburg B	Tiberius	cohort	3.5	500	Upper	Rhine
Strasbourg	Tiberius	Legion	25	5500	Upper	Rhine

## Appendix 3.3 Claudian forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone	
Vechten	Augustus	cohort/ala	1.9	500	Lower	Rhine	
Vetera I	Augustus	legion	60	11000	Lower	Rhine	
Burginatum	Tiberius	ala	2.7	500	Lower	Rhine	
Driel	Tiberius	ala	8.5	1000	Lower	Rhine	
Kleve-Rindern	Claudius	cohort	n/a	500	Lower	Rhine	
Remagen A	Claudius	cohort	1.2	500	Lower	Rhine	
Velsen II	Claudius	fleet	2.6	500	Lower	North Sea coast	
Alphen aan den Rijn	Claudius	cohort	0.95	500	Lower	Rhine	
Alteburg	Claudius	fleet	6.5	1000	Lower	Rhine	
Asciburgium	Claudius	cohort	2.36	500	Lower	Rhine	
Bodegraven	Claudius	cohort/ala?	n/a	500	Lower	Rhine	
Bonn	Claudius	legion	27	5500	Lower	Rhine	
Leiden-Roomburg	Claudius	cohort	1.4	500	Lower	Rhine	
Levefanum	Claudius	cohort	n/a	500	Lower	Rhine	
Looward	Claudius	cohort/ala?	n/a	500	Lower	Rhine	
Neuss G 1-2	Claudius	legion	22	5500	Lower	Rhine	
Utrecht	Claudius	cohort	1.3	500	Lower	Rhine	
Valkenburg	Claudius	ala	1.43	500	Lower	Rhine	
Vleuten de Meern	Claudius	cohort	n/a	500	Lower	Rhine	
Wesel Buderich	Claudius	cohort	n/a	500	Lower	Rhine	
Woerden	Claudius	cohort	n/a	500	Lower	Rhine	
Zwammerdam	Claudius	cohort	1.03	500	Lower	Rhine	
Andernach	Augustus	cohort	n/a	500	Upper	Rhine	
Bingen	Augustus	cohort	n/a	500	Upper	Rhine	
Eschenz	Augustus	cohort	n/a	500	Upper	Rhine	
Kastel	Augustus	cohort	n/a	500	Upper	Rhine	
Koblenz	Augustus	cohort	6	500	Upper	Rhine	
Speyer	Augustus	cohort	2.7	500	Upper	Rhine	
Worms	Augustus	cohort/ala	n/a	500	Upper	Rhine	
Zurzach	Augustus	cohort	n/a	500	Upper	Rhine	
Mainz	Augustus	Legion	36	11000	Upper	Rhine	
Vetera I	Augustus	legion	60	11000	Upper	Rhine	
Windisch	Augustus	Legion	18	5500	Upper	Rhine	
Andernach A	Tiberius	cohort/vexillation	n/a	500	Upper	Rhine	
Strasbourg	Tiberius	Legion	25	5500	Upper	Rhine	
Konstanz	Tiberius	cohort	n/a	500	Upper	Rhine	
Gernsheim	Claudius	fleet?	n/a	500	Upper	Rhine	
Hofheim	Claudius	cohort	1.9	500	Upper	Main	
Hufingen	Claudius	ala	2.4	500	Upper	Danube	
Rheingonheim	Claudius	cohort	1.8	500	Upper	Rhine	
Tuttlingen	Claudius	cohort	n/a	500	Upper	Danube	

## Appendix 3.4 Vespasianic forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Vechten	Augustus	cohort/ala	1.9	500	Lower	Rhine
Burginatum	Tiberius	ala	2.7	500	Lower	Rhine
Driel	Tiberius	ala	8.5	1000	Lower	Rhine
Kleve-Rindern	Claudius	cohort	n/a	500	Lower	Rhine
Alphen aan den Rijn	Claudius	cohort	0.95	500	Lower	Rhine
Asciburgium	Claudius	cohort	2.36	500	Lower	Rhine
Bodegraven	Claudius	??	n/a	500	Lower	Rhine
Leiden-Roomburg	Claudius	cohort	1.4	500	Lower	Rhine
Levefanum	Claudius	cohort	n/a	500	Lower	Rhine
Looward	Claudius	??	n/a	500	Lower	Rhine
Utrecht	Claudius	cohort	1.3	500	Lower	Rhine
Valkenburg	Claudius	ala	1.43	500	Lower	Rhine
Vleuten de Meern	Claudius	cohort	n/a	500	Lower	Rhine
Wesel Buderich	Claudius	cohort	n/a	500	Lower	Rhine
Woerden	Claudius	cohort	n/a	500	Lower	Rhine
Zwammerdam	Claudius	cohort	1.03	500	Lower	Rhine
Arnhem-Meinderswijk	Vespasian	cohort	2.2	500	Lower	Rhine
Bonn	Vespasian	legion	27	5500	Lower	Rhine
Carvo-Kesteren	Vespasian	cohort	n/a	500	Lower	Rhine
Gelduba	Vespasian	cohort or ala	2.3	500	Lower	Rhine
Mannaricium	Vespasian	cohort	n/a	500	Lower	Rhine
Nijmegen	Vespasian	legion	18	5500	Lower	Waal
Remagen B	Vespasian	cohort	1.6	500	Lower	Rhine
Steincheshof	Vespasian	cohort	3.6	500	Lower	Rhine
Vetera II	Vespasian	legion	n/a	5500	Lower	Rhine
Kastel	Augustus	cohort	n/a	500	Upper	Rhine
Koblenz	Augustus	cohort	6	500	Upper	Rhine
Mainz	Augustus	Legion	36	11000	Upper	Rhine
Windisch	Augustus	Legion	18	5500	Upper	Rhine
Andernach A	Tiberius	cohort/vexillation	n/a	500	Upper	Rhine
Gernsheim	Claudius	fleet?	n/a	n/a	Upper	Rhine
Hufingen	Claudius	ala	2.4	500	Upper	Danube
Rheingonheim	Claudius	cohort	1.8	500	Upper	Rhine
Tuttlingen	Claudius	cohort	n/a	500	Upper	Danube
Alteburg	Claudius	fleet	6.5	1000	Upper	Rhine
Baden Baden	Vespasian	cohort	n/a	500	Upper	Rhine
Bingen	Vespasian	cohort	n/a	500	Upper	Rhine
Geislingen	Vespasian	cohort	2.7	500	Upper	Neckar
Gross Gerau	Vespasian	cohort	1.9	500	Upper	Wetterau
Heidelberg	Vespasian	cohort	3.1	500	Upper	Neckar
Hofheim	Vespasian	cohort	2.15	500	Upper	Wetterau
Ladenburg	Vespasian	ala	3.7	500	Upper	Neckar
Mirebeau	Vespasian	Legion	22	5500	Upper	Burgundy
Neuss G3	Vespasian	legion	24	5500	Upper	Rhine
Nida	Vespasian	ala	5	500	Upper	Wetterau
Offenburg	Vespasian	cohort	3.5	500	Upper	Neckar

### Appendix 3.4 Vespasianic forts

<b>Fort</b>	<b>Date</b>	<b>Fort Type</b>	<b>Size (ha)</b>	<b>Unit Size</b>	<b>Territory</b>	<b>Zone</b>
Quadriburgium	Vespasian	numerus	n/a	150	Upper	Rhine
Riegel	Vespasian	cohort	n/a	500	Upper	Rhine
Rottweil 1	Vespasian	vexillation	16	n/a	Upper	Neckar
Rottweil 2	Vespasian	cohort	5.7	500	Upper	Neckar
Rottweil 3	Vespasian	cohort	4	500	Upper	Neckar
Rottweil 4	Vespasian	cohort	2.7	500	Upper	Neckar
Rottweil 5	Vespasian	cohort	1.6	500	Upper	Neckar
Sulz	Vespasian	cohort	1.45	500	Upper	Alb
Trebur	Vespasian	cohort	n/a	500	Upper	Rhine
Waldmossingen	Vespasian	cohort	2	500	Upper	Alb
Wiesbaden	Vespasian	cohort	2.2	500	Upper	Wetterau

Appendix 3.5 Domitianic forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Vechten	Augustus	cohort/ala	1.9	500	Lower	Rhine
Burginatum	Tiberius	ala	2.7	500	Lower	Rhine
Driel	Tiberius	ala	8.5	1000	Lower	Rhine
Kleve-Rindern	Claudius	cohort	n/a	500	Lower	Rhine
Alphen aan den Rijn	Claudius	cohort	0.95	500	Lower	Rhine
Bodegraven	Claudius	??	n/a	500	Lower	Rhine
Leiden-Roomburg	Claudius	cohort	1.4	500	Lower	Rhine
Levefanum	Claudius	cohort	n/a	500	Lower	Rhine
Looward	Claudius	??	n/a	500	Lower	Rhine
Utrecht	Claudius	cohort	1.3	500	Lower	Rhine
Valkenburg	Claudius	ala	1.43	500	Lower	Rhine
Vleuten de Meern	Claudius	cohort	n/a	500	Lower	Rhine
Wesel Buderich	Claudius	cohort	n/a	500	Lower	Rhine
Woerden	Claudius	cohort	n/a	500	Lower	Rhine
Zwammerdam	Claudius	cohort	1.03	500	Lower	Rhine
Arnhem-Meinderswijk	Vespasian	cohort	2.2	500	Lower	Rhine
Bonn	Vespasian	legion	27	5500	Lower	Rhine
Carvo-Kesteren	Vespasian	cohort	n/a	500	Lower	Rhine
Mannaricium	Vespasian	cohort	n/a	500	Lower	Rhine
Nijmegen	Vespasian	legion	18	5500	Lower	Waal
Remagen B	Vespasian	cohort	1.6	500	Lower	Rhine
Steincheshof	Vespasian	cohort	3.6	500	Lower	Rhine
Vetera II	Vespasian	legion	n/a	5500	Lower	Rhine
Asciburgium	Domitian	beneficarii station	2.36		Lower	Rhine
Dormagen	Domitian	ala	3	500	Lower	Rhine
Gelduba	Domitian	cohort	2.3	500	Lower	Rhine
Kastel	Augustus	cohort	n/a	500	Upper	Rhine
Mainz	Augustus	Legion	36	5500	Upper	Rhine
Windisch	Augustus	Legion	18	5500	Upper	Rhine
Andernach A	Tiberius	cohort/vexillation	n/a	500	Upper	Rhine
Gernsheim	Claudius	fleet?	n/a	??	Upper	Rhine
Hufingen	Claudius	ala	2.4	500	Upper	Danube
Rheingonheim	Claudius	cohort	1.8	500	Upper	Rhine
Tuttlingen	Claudius	cohort	n/a	500	Upper	Danube
Alteburg	Claudius	fleet	6.5	1000	Upper	Rhine
Baden Baden	Vespasian	cohort	n/a	500	Upper	Rhine
Bingen	Vespasian	cohort	n/a	500	Upper	Rhine
Geislingen	Vespasian	cohort	2.7	500	Upper	Neckar
Gross Gerau	Vespasian	cohort	1.9	500	Upper	Wetterau
Heidelberg	Vespasian	cohort	3.1	500	Upper	Neckar
Hofheim	Vespasian	cohort	2.15	500	Upper	Wetterau
Ladenburg	Vespasian	ala	3.7	500	Upper	Neckar
Neuss G3	Vespasian	legion	24	5500	Upper	Rhine
Nida	Vespasian	ala	5	500	Upper	Wetterau
Offenburg	Vespasian	cohort	3.5	500	Upper	Neckar
Quadriburgium	Vespasian	numerus	n/a	150	Upper	Rhine

Appendix 3.5 Domitianic forts

<b>Fort</b>	<b>Date</b>	<b>Fort Type</b>	<b>Size (ha)</b>	<b>Unit Size</b>	<b>Territory</b>	<b>Zone</b>
Riegel	Vespasian	cohort	n/a	500	Upper	Rhine
Rottweil 5	Vespasian	cohort	1.6	500	Upper	Neckar
Sulz	Vespasian	cohort	1.45	500	Upper	Alb
Trebur	Vespasian	cohort	n/a	500	Upper	Rhine
Waldmossingen	Vespasian	cohort	2	500	Upper	Alb
Wiesbaden	Vespasian	cohort	2.2	500	Upper	Wetterau
Strasbourg	Domitian	legion	25	5500	Upper	Rhine

Appendix 3.6 Trajanic forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Vechten	Augustus	cohort/ala	1.9	500	Lower	Rhine
Burginatum	Tiberius	ala	2.7	500	Lower	Rhine
Driel	Tiberius	ala	8.5	1000	Lower	Rhine
Kleve-Rindern	Claudius	cohort	n/a	500	Lower	Rhine
Alphen aan den Rijn	Claudius	cohort	0.95	500	Lower	Rhine
Bodegraven	Claudius	??	n/a	500	Lower	Rhine
Leiden-Roomburg	Claudius	cohort	1.4	500	Lower	Rhine
Levefanum	Claudius	cohort	n/a	500	Lower	Rhine
Looward	Claudius	??	n/a	500	Lower	Rhine
Utrecht	Claudius	cohort	1.3	500	Lower	Rhine
Valkenburg	Claudius	ala	1.43	500	Lower	Rhine
Vleuten de Meern	Claudius	cohort	n/a	500	Lower	Rhine
Wesel Buderich	Claudius	cohort	n/a	500	Lower	Rhine
Woerden	Claudius	cohort	n/a	500	Lower	Rhine
Zwammerdam	Claudius	cohort	1.03	500	Lower	Rhine
Arnhem-Meinderswijk	Vespasian	cohort	2.2	500	Lower	Rhine
Bonn	Vespasian	legion	27	5500	Lower	Rhine
Carvo-Kesteren	Vespasian	cohort	n/a	500	Lower	Rhine
Mannaricium	Vespasian	cohort	n/a	500	Lower	Rhine
Quadriburgium	Vespasian	numerus	n/a	150	Lower	Rhine
Remagen B	Vespasian	cohort	1.6	500	Lower	Rhine
Steincheshof	Vespasian	cohort	3.6	500	Lower	Rhine
Vetera II	Vespasian	legion	n/a	5500	Lower	Rhine
Asciburgium	Domitian	beneficarii station	2.36		Lower	Rhine
Dormagen	Domitian	ala	3	500	Lower	Rhine
Gelduba	Domitian	cohort	2.3	500	Lower	Rhine
Katwijk	Trajan	cohort	0.56	500	Lower	Rhine
Neuss H	Trajan	ala	2.9	500	Lower	Rhine
Kastel	Augustus	cohort	n/a	500	Upper	Rhine
Mainz	Augustus	Legion	36	5500	Upper	Rhine
Andernach A	Tiberius	cohort/vexillation	n/a	500	Upper	Rhine
Alteburg	Claudius	fleet	6.5	1000	Upper	Rhine
Strasbourg	Domitian	legion	25	5500	Upper	Rhine
Altenstadt	Trajan	numerus	1.3	150	Upper	Wetterau
Arnsburg	Trajan	cohort	2.9	500	Upper	Wetterau
Bad Cannstadt	Trajan	ala	3.7	500	Upper	Neckar
Bad Wimpfen	Trajan	cohort	2.6	500	Upper	Neckar
Bendorf	Trajan	cohort	2.8	500	Upper	Taunus
Benningen	Trajan	cohort	2.2	500	Upper	Neckar
Bockingen	Trajan	cohort	2	500	Upper	Neckar
Burdaligen	Trajan	cohort	1.9	500	Upper	Alb
Butzbach	Trajan	cohort	4	500	Upper	Wetterau
Dettingen	Trajan	numerus	0.36	150	Upper	Alb
Donnstetten	Trajan	numerus	0.3	150	Upper	Alb
Echzell	Trajan	ala	5.24	500	Upper	Wetterau
Friedberg	Trajan	cohort milliaria	4	1000	Upper	Main

Appendix 3.6 Trajanic forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Hanau Kesselstadt	Trajan	vexillation	14		Upper	Main
Heddesdorf	Trajan	cohort	2.8	500	Upper	Taunus
Heldenbergen	Trajan	cohort	n/a	500	Upper	Main
Koblenz Niederberg	Trajan	cohort	2.8	500	Upper	Taunus
Kochendorf	Trajan	vexillation	0.2		Upper	Neckar
Kongen	Trajan	cohort	2.4	500	Upper	Neckar
Lautlingen	Trajan	ala milliaria	6.7	1000	Upper	Alb
Markobel	Trajan	cohort	3.3	500	Upper	Wetterau
Oberflorstadt	Trajan	cohort	2.8	500	Upper	Wetterau
Obernburg	Trajan	cohort	2.9	500	Upper	Main
Rottenburg	Trajan	cohort?	n/a	500	Upper	Neckar
Saalburg	Trajan	numerous	0.7	150	Upper	Taunus
Stockstadt	Trajan	cohort	3.25	500	Upper	Main
Wallheim	Trajan	cohort	2.1	500	Upper	Neckar
Zugmantel	Trajan	numerous	1.1	150	Upper	Taunus
Arzbach	Trajan	numerous	0.7	150	Upper	Taunus
Ems	Trajan	numerous	1.3	150	Upper	Taunus
Eulbach	Trajan	numerous	0.55	150	Upper	Odenwald
Grosskrotzenburg	Trajan	cohort	2.1	500	Upper	Wetterau
Hainstadt	Trajan	numerous?	0.9	150	Upper	Main
Hesselbach	Trajan	numerous	0.6	150	Upper	Odenwald
Inheiden	Trajan	numerous	1.1	150	Upper	Wetterau
Kapersburg	Trajan	numerous	1.6	150	Upper	Wetterau
Langenhain	Trajan	cohort	3.2	500	Upper	Wetterau
Lutzelbach	Trajan	numerous	0.53	150	Upper	Odenwald
Marienfels	Trajan	numerous	1.1	150	Upper	Taunus
Neckarburken	Trajan	cohort	2.1	500	Upper	Odenwald
Niedernberg	Trajan	cohort	2.2	500	Upper	Main
Oberscheidenthal	Trajan	cohort	2.1	500	Upper	Odenwald
Ruckingen	Trajan	cohort	2.5	500	Upper	Wetterau
Schlossau	Trajan	numerous	0.58	150	Upper	Odenwald
Seckmauern	Trajan	numerous	0.6	150	Upper	Odenwald
Seligenstadt	Trajan	cohort	3	500	Upper	Main
Trennfurt	Trajan	numerous	0.6	150	Upper	Outer
Vielbrunn (Hainhaus)	Trajan	numerous	0.57	150	Upper	Odenwald
Worth	Trajan	numerous	0.78	150	Upper	Main
Wurzberg	Trajan	numerous	0.6	150	Upper	Odenwald

## Appendix 3.7 Antonine forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Vechten	Augustus	cohort/ala	1.9	500	Lower	Rhine
Burginatum	Tiberius	ala	2.7	500	Lower	Rhine
Driel	Tiberius	ala	8.5	1000	Lower	Rhine
Kleve-Rindern	Claudius	cohort	n/a	500	Lower	Rhine
Alphen aan den Rijn	Claudius	cohort	0.95	500	Lower	Rhine
Bodegraven	Claudius	??	n/a	500	Lower	Rhine
Leiden-Roomburg	Claudius	cohort	1.4	500	Lower	Rhine
Levefanum	Claudius	cohort	n/a	500	Lower	Rhine
Looward	Claudius	??	n/a	500	Lower	Rhine
Utrecht	Claudius	cohort	1.3	500	Lower	Rhine
Valkenburg	Claudius	ala	1.43	500	Lower	Rhine
Vleuten de Meern	Claudius	cohort	n/a	500	Lower	Rhine
Wesel Buderich	Claudius	cohort	n/a	500	Lower	Rhine
Woerden	Claudius	cohort	n/a	500	Lower	Rhine
Zwammerdam	Claudius	cohort	1.03	500	Lower	Rhine
Arnhem-Meinderswijk	Vespasian	cohort	2.2	500	Lower	Rhine
Bonn	Vespasian	legion	27	5500	Lower	Rhine
Carvo-Kesteren	Vespasian	cohort	n/a	500	Lower	Rhine
Mannaricium	Vespasian	cohort	n/a	500	Lower	Rhine
Quadriburgium	Vespasian	numerus	n/a	150	Lower	Rhine
Steincheshof	Vespasian	cohort	3.6	500	Lower	Rhine
Vetera II	Vespasian	legion	n/a	5500	Lower	Rhine
Asciburgium	Domitian	beneficarii station	2.36		Lower	Rhine
Dormagen	Domitian	ala	3	500	Lower	Rhine
Gelduba	Domitian	cohort	2.3	500	Lower	Rhine
Katwijk	Trajan	cohort	0.56	500	Lower	Rhine
Neuss H	Trajan	ala	2.9	500	Lower	Rhine
Remagen C	Antonines	beneficarii station	n/a		Lower	Rhine
Kastel	Augustus	cohort	n/a	500	Upper	Rhine
Mainz	Augustus	Legion	36	5500	Upper	Rhine
Andernach A	Tiberius	cohort/vexillation	n/a	500	Upper	Rhine
Alteburg	Claudius	fleet	6.5	1000	Upper	Rhine
Strasbourg	Domitian	legion	25	5500	Upper	Rhine
Hanau Kesselstadt	Trajan	vexillation	14		Upper	Main
Altenstadt	Trajan	numerus	1.3	150	Upper	Wetterau
Arnsburg	Trajan	cohort	2.9	500	Upper	Wetterau
Bendorf	Trajan	cohort	2.8	500	Upper	Taunus
Butzbach	Trajan	cohort	4	500	Upper	Wetterau
Echzell	Trajan	ala	5.24	500	Upper	Wetterau
Friedberg	Trajan	cohort milliaria	4	1000	Upper	Main
Heddesdorf	Trajan	cohort	2.8	500	Upper	Taunus
Heldenbergen	Trajan	cohort	n/a	500	Upper	Main
Koblenz Niederberg	Trajan	cohort	2.8	500	Upper	Taunus
Markobel	Trajan	cohort	3.3	500	Upper	Wetterau
Oberflorstadt	Trajan	cohort	2.8	500	Upper	Wetterau
Obernburg	Trajan	cohort	2.9	500	Upper	Main

Appendix 3.7 Antonine forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Saalburg	Trajan	numerus	0.7	150	Upper	Taunus
Stockstadt	Trajan	cohort	3.25	500	Upper	Main
Zugmantel	Trajan	numerus	1.1	150	Upper	Taunus
Arzbach	Trajan	numerus	0.7	150	Upper	Taunus
Ems	Trajan	numerus	1.3	150	Upper	Taunus
Grosskrotzenburg	Trajan	cohort	2.1	500	Upper	Wetterau
Hainstadt	Trajan	numerus?	0.9	150	Upper	Main
Inheiden	Trajan	numerus	1.1	150	Upper	Wetterau
Kapersburg	Trajan	numerus	1.6	150	Upper	Wetterau
Langenhain	Trajan	cohort	3.2	500	Upper	Wetterau
Marienfels	Trajan	numerus	1.1	150	Upper	Taunus
Niedernberg	Trajan	cohort	2.2	500	Upper	Main
Ruckingen	Trajan	cohort	2.5	500	Upper	Wetterau
Seligenstadt	Trajan	cohort	3	500	Upper	Main
Trennfurt	Trajan	numerus	0.6	150	Upper	Outer
Worth	Trajan	numerus	0.78	150	Upper	Main
Hunzel	Antonines	numerus	0.75	150	Upper	Taunus
Jagsthausen	Antonines	cohort	2.9	500	Upper	Outer
Lorch	Antonines	cohort	2.47	500	Upper	Outer
Mainhardt	Antonines	cohort	2.5	500	Upper	Outer
Marienfels	Antonines	cohort	2.8	500	Upper	Taunus
Miltenberg altstadt	Antonines	cohort	2.7	500	Upper	Outer
Miltenberg Ost	Antonines	numerus	0.6	150	Upper	Outer
Murrhardt	Antonines	cohort	2.2	500	Upper	Outer
Ohringen ost	Antonines	cohort	2.2	500	Upper	Outer
Ohringen west	Antonines	cohort	2.1	500	Upper	Outer
Osterburken	Antonines	cohort	2.14	500	Upper	Outer
Saalburg	Antonines	cohort	3.2	500	Upper	Taunus
Walldurn	Antonines	numerus	0.8	150	Upper	Outer
Welzheim	Antonines	ala	4.3	500	Upper	Outer
Westernbach	Antonines	cohort	1	500	Upper	Outer

## Appendix 3.8 Aurelian forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Vechten	Augustus	cohort/ala	1.9	500	Lower	Rhine
Burginatum	Tiberius	ala	2.7	500	Lower	Rhine
Driel	Tiberius	ala	8.5	1000	Lower	Rhine
Kleve-Rindern	Claudius	cohort	n/a	500	Lower	Rhine
Alphen aan den Rijn	Claudius	cohort	0.95	500	Lower	Rhine
Alteburg	Claudius	fleet	6.5	1000	Lower	Rhine
Bodegraven	Claudius	??	n/a	500	Lower	Rhine
Leiden-Roomburg	Claudius	cohort	1.4	500	Lower	Rhine
Levefanum	Claudius	cohort	n/a	500	Lower	Rhine
Looward	Claudius	??	n/a	500	Lower	Rhine
Utrecht	Claudius	cohort	1.3	500	Lower	Rhine
Valkenburg	Claudius	ala	1.43	500	Lower	Rhine
Vleuten de Meern	Claudius	cohort	n/a	500	Lower	Rhine
Wesel Buderich	Claudius	cohort	n/a	500	Lower	Rhine
Woerden	Claudius	cohort	n/a	500	Lower	Rhine
Zwammerdam	Claudius	cohort	1.03	500	Lower	Rhine
Arnhem-Meinderswijk	Vespasian	cohort	2.2	500	Lower	Rhine
Bonn	Vespasian	legion	27	5500	Lower	Rhine
Carvo-Kesteren	Vespasian	cohort	n/a	500	Lower	Rhine
Mannaricium	Vespasian	cohort	n/a	500	Lower	Rhine
Quadriburgium	Vespasian	numerus	n/a	150	Lower	Rhine
Steincheshof	Vespasian	cohort	3.6	500	Lower	Rhine
Vetera II	Vespasian	legion	n/a	5500	Lower	Rhine
Asciburgium	Domitian	beneficarii station	2.36	120	Lower	Rhine
Dormagen	Domitian	ala	3	500	Lower	Rhine
Gelduba	Domitian	cohort	2.3	500	Lower	Rhine
Neuss H	Trajan	ala	2.9	500	Lower	Rhine
Remagen C	Antonines	beneficarii station	n/a	120	Lower	Rhine
Ermelo	Aurelians	marching camp	9.1		Lower	Netherlands
Kastel	Augustus	cohort	n/a	500	Upper	Rhine
Mainz	Augustus	Legion	36	5500	Upper	Rhine
Andernach A	Tiberius	cohort/vexillation	n/a	500	Upper	Rhine
Altenstadt	Domitian	numerus	1.3	150	Upper	Wetterau
Arnsburg	Domitian	cohort	2.9	500	Upper	Wetterau
Bendorf	Domitian	cohort	2.8	500	Upper	Taunus
Butzbach	Domitian	cohort	4	500	Upper	Wetterau
Echzell	Domitian	ala	5.24	500	Upper	Wetterau
Friedberg	Domitian	cohort milliaria	4	1000	Upper	Main
Heddesdorf	Domitian	cohort	2.8	500	Upper	Taunus
Heldenbergen	Domitian	cohort	n/a	500	Upper	Main
Koblenz Niederberg	Domitian	cohort	2.8	500	Upper	Taunus
Markobel	Domitian	cohort	3.3	500	Upper	Wetterau
Ober-Florstadt	Domitian	cohort	2.8	500	Upper	Wetterau
Obernburg	Domitian	cohort	2.9	500	Upper	Main
Saalburg	Domitian	numerus	0.7	150	Upper	Taunus
Stockstadt am Main	Domitian	cohort	3.25	500	Upper	Main

## Appendix 3.8 Aurelian forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Strasbourg	Domitian	legion	25	5500	Upper	Rhine
Zugmantel	Domitian	numerous	1.1	150	Upper	Taunus
Katwijk	Trajan	cohort	0.56	500	Upper	Rhine
Arzbach	Trajan	numerous	0.7	150	Upper	Taunus
Bad Ems	Trajan	numerous	1.3	150	Upper	Taunus
Grosskotzenburg	Trajan	cohort	2.1	500	Upper	Wetterau
Hainstadt	Trajan	numerous?	0.9	150	Upper	Main
Inheiden	Trajan	numerous	1.1	150	Upper	Wetterau
Kapersburg	Trajan	numerous	1.6	150	Upper	Wetterau
Langenhain	Trajan	cohort	3.2	500	Upper	Wetterau
Marienfels	Trajan	numerous	1.1	150	Upper	Taunus
Niedernbern	Trajan	cohort	2.2	500	Upper	Main
Ruckingen	Trajan	cohort	2.5	500	Upper	Wetterau
Seligenstadt	Trajan	cohort	3	500	Upper	Main
Trennfurt	Trajan	numerous	0.6	150	Upper	Outer
Worth	Trajan	numerous	0.78	150	Upper	Main
Hunzel	Antonines	numerous	0.75	150	Upper	Taunus
Jagsthausen	Antonines	cohort	2.9	500	Upper	Outer
Lorch	Antonines	cohort	2.47	500	Upper	Outer
Mainhardt	Antonines	cohort	2.5	500	Upper	Outer
Marienfels	Antonines	cohort	2.8	500	Upper	Taunus
Miltenberg	Antonines	numerous	0.6	150	Upper	Outer
Miltenberg Altstadt	Antonines	cohort	2.7	500	Upper	Outer
Murrhardt	Antonines	cohort	2.2	500	Upper	Outer
Ohringen Ost	Antonines	cohort	2.2	500	Upper	Outer
Ohringen West	Antonines	cohort	2.1	500	Upper	Outer
Osterburken	Antonines	cohort	2.14	500	Upper	Outer
Saalburg	Antonines	cohort	3.2	500	Upper	Taunus
Walldurn	Antonines	numerous	0.8	150	Upper	Outer
Welzheim	Antonines	ala	4.3	500	Upper	Outer
Westernbach	Antonines	cohort	1	500	Upper	Outer
Altenburg	Aurelians	numerous	0.7	150	Upper	Taunus
Holzhausen	Aurelians	cohort	1.4	500	Upper	Taunus
Kemel	Aurelians	numerous	0.7	150	Upper	Taunus
Kleiner Feldberg	Aurelians	numerous	0.7	150	Upper	Taunus
Niederbieber	Aurelians	numerous (2)	5.25	300	Upper	Taunus
Rheinbrohl	Aurelians	fortlet	0.07	150	Upper	Taunus

## Appendix 3.9 Late-Roman forts

Fort	Date	Fort Type	Size (ha)	Unit Size	Territory	Zone
Bonn	Vespasian	legion	27	1000?	Lower	Rhine
Bruhl-Villenhaus	Late Third	burgus	0.07		Lower	Rhine
Gelduba	Late Third	burgus	??		Lower	Rhine
Gelduba	Late Third	ala	2.3	500	Lower	Rhine
Goudsberg	Late Third	burgus	0.01		Lower	Rhine
Andernach	Diocletian	burgus	5.6		Lower	Rhine
Remagen D	Diocletian	burgus	1.65		Lower	Rhine
Bitburg	Constantine	urban	2		Lower	Eifel
Cologne Deutz	Constantine	legion	1.8	1000?	Lower	Rhine
Cuijk	Constantine	burgus	1.7		Lower	Maas
Dormagen	Constantine	burgus	0.24		Lower	Rhine
Haus-Burgel	Constantine	burgus	0.41		Lower	Rhine
Junkerath	Constantine	urban	1.52		Lower	Eifel
Maastricht	Constantine	urban	1.5		Lower	Maas
Nijmegen	Constantine	burgus	2.6		Lower	Waal
Tricensimae	Constantine	legion	16	1000?	Lower	Rhine
Andernach B	Julian	burgus	5.6		Lower	Rhine
Nijmegen	Julian	burgus	4		Lower	Waal
Asciburgium	Valentinian	burgus	0.03		Lower	Rhine
Asperden	Valentinian	burgus	0.16		Lower	Rhine
Boppard	Valentinian	burgus	4.7		Lower	Rhine
Gelduba	Valentinian	burgus	1		Lower	Rhine
Haus-Burgel	Valentinian	burgus	0.4		Lower	Rhine
Niederlahnstein	Valentinian	burgus	0.02		Lower	Rhine
Mainz	Augustus	legion	35		Upper	Rhine
Strasbourg	Domitian	legion	20		Upper	Rhine
Basel	Diocletian	burgus	3.6		Upper	Donau-Ilker-Rhein
Brugg-Altenburg	Diocletian	burgus	2.8		Upper	Swiss
Eschenz	Diocletian	burgus	0.8		Upper	Donau-Ilker-Rhein
Irgenhausen	Diocletian	burgus	0.37		Upper	Donau-Ilker-Rhein
Kloten	Diocletian	burgus	??		Upper	Donau-Ilker-Rhein
Konstanz	Diocletian	burgus	1		Upper	Donau-Ilker-Rhein
Oberwinterthur	Diocletian	burgus	0.78		Upper	Donau-Ilker-Rhein
Pfyn	Diocletian	burgus	1.6		Upper	Donau-Ilker-Rhein
Stein am Rhein	Diocletian	burgus	0.79		Upper	Donau-Ilker-Rhein
Winterthur	Diocletian	burgus	1.8		Upper	Swiss
Zurzach	Diocletian	burgus	0.5		Upper	Rhine
Arbon	Constantine	burgus	0.85		Upper	Donau-Ilker-Rhein
Kaiseraugst	Constantine	legion	3.5	1000?	Upper	Donau-Ilker-Rhein
Koblenz	Constantine	urban	5.3		Upper	Rhine
Neumagen	Constantine	urban	1.28		Upper	Mosel
Pachten	Constantine	urban	1.9		Upper	Saar
Solothurn	Constantine	urban	1.3		Upper	Swiss
Yverdon	Constantine	urban	1.9		Upper	Swiss
Altrip	Valentinian	burgus	0.5		Upper	Rhine
Alzey	Valentinian	burgus	2.6		Upper	Rhine

Appendix 3.9 Late-Roman forts

<b>Fort</b>	<b>Date</b>	<b>Fort Type</b>	<b>Size (ha)</b>	<b>Unit Size</b>	<b>Territory</b>	<b>Zone</b>
Avenches	Valentinian	burgus	2.03		Upper	Swiss
Bad Kreuznach	Valentinian	burgus	2.8		Upper	Rhine
Basel	Valentinian	burgus	0.04		Upper	Rhine
Breisach	Valentinian	burgus	3.5		Upper	Rhine
Chur	Valentinian	urban	1.02		Upper	Swiss
Ladenburg	Valentinian	burgus	0.02		Upper	Neckar
Mainz	Valentinian	burgus			Upper	Rhine
Neuwied-Engers	Valentinian	burgus	0.01		Upper	Rhine
Oedenburg	Valentinian	burgus	1.2		Upper	Rhine
Olten	Valentinian	burgus	1.2		Upper	Swiss
Schaan	Valentinian	burgus	0.23		Upper	Swiss
Sponeck	Valentinian	burgus	0.2		Upper	Donau-Iller-Rhein
Wilten	Valentinian	burgus	0.37		Upper	Swiss
Zullestein	Valentinian	burgus	0.04		Upper	Neckar
Zurich	Valentinian	burgus	0.8		Upper	Swiss

Site	Country	Kilns	Sigillata	Amphorae	Date Range	Reference
Adelange	France	?			70-200	Pastor 2010
Aegerten	Switzerland	2			20-70	Amrein <i>et al.</i> 2012
Aesch	Switzerland	1			300-400	Amrein <i>et al.</i> 2012
Altenburg bei Brugg	Switzerland	1			Undated	Amrein <i>et al.</i> 2012
Augst	Switzerland	42	x	x	AD 1-250	Amrein <i>et al.</i> 2012
Avenches	Switzerland	4	x		40-250	Amrein <i>et al.</i> 2012
Bad Cannstatt	Germany	80	x		160-260	Kaiser 2005
Bad Wimpfen	Germany	15		x	160-260	Kaiser 2005; Kortüm 2005, 158
Baden	Switzerland	1	x		100-250	Amrein <i>et al.</i> 2012
Basel	Switzerland	1			Undated	Amrein <i>et al.</i> 2012
Beckinghausen	Germany	2			11BC-8BC	Clerbaut 2010
Bedburg	Germany	2			300-350	Wirtz 1998; Clerbaut 2010
Beilingen-Kuhsteig	Germany	?			Undated	Polfer 2005
Benningen	Germany	4		x	100-200	Wirtz 1998; Clerbaut 2010
Berg en Dal	Netherlands	8			70-200	Wirtz 1998; Clerbaut 2010
Bergheim	France	1			Undated	Pastor 2010
Berlingen	Switzerland	?			Undated	Amrein <i>et al.</i> 2012
Bern	Switzerland	15	x		15 BC - 250	Amrein <i>et al.</i> 2012
Bertschikon	Switzerland	1			AD 1-100	Amrein <i>et al.</i> 2012
Besseringen	Germany	1			Undated	Polfer 2005
Bingen	Germany	?			n/a	Clerbaut 2010
Binsfeld	Germany	?			Undated	Polfer 2005
Bitburg	Germany	1			300-400	Polfer 2005
Blickweiler-Eschweilerhof	Germany	3	x		100-160	Polfer 2005
Bliesbruck	France	3		x	40-170	Clerbaut 2010, Polfer 2001, Pastor 2010
Bonn	Germany	29			AD 1-250	Wirtz 1998; Clerbaut 2010, Rothenhöfer 2005
Boucheporn	France	29	x		70-160	Pastor 2010
Bourgheim	France	74			1-250	Pastor 2010
Brumath	France	23		x	1-250	Pastor 2010, 53
Chémery	France	11	x		75-125	Pastor 2010
Cocherem-Hérapel	France	1			75-100	Pastor 2010
Cologne	Germany	100			25-250	Höpken 2005
Dalheim	Luxembourg	1			Undated	Polfer 2005

Site	Country	Kilns	Sigillata	Amphorae	Date Range	Reference
Dambach-la-ville	France	40			20-180	Pastor 2010
Dangstetten	Germany	?			12BC-8BC	Clerbaut 2010
Deneuvre	France	?			125-175	Polfer 2005, Pastor 2010
Dieulouard-Scarponne	France	1			125-175	Pastor 2010
Dinsheim-Heiligenberg	France	5	x		75-150	Pastor 2010
Ehl-Benfeld	France	1			AD 1 to 20	Pastor 2010
Eincheville-le-Tenig	France	?	x		90-160	Pastor 2010
Ennery	France	?			200-300	Pastor 2010
Erfstadt-Friesheim/Niederberg	Germany	7			n/a	Rothenhöfer 2005
Eschenz	Switzerland	5			15 BC - 250	Amrein <i>et al.</i> 2012
Fameck	France	1			Undated	Pastor 2010
Feyen	Germany	1			Undated	Polfer 2005
Flévy	France	1			200-400	Pastor 2010
Florange-Daspich	France	25		x	50-150	Pastor 2010
Güglingen	Germany	10			125-260	Kortüm 2005, 163
Habscheid-Hollnich	Germany	1			100-125	Polfer 2005
Haltern	Germany	13			12BC-8BC	Wirtz 1998; Clerbaut 2010
Haute-Yutz	France	3	x		150-180	Pastor 2010
Heidelberg	Germany	60		x	70-260	Planck 2005, 114
Heitersheim	Germany	3 to 11			TBD	Kaiser 2005
Heldenbergen	Germany	6		x	90-150	Baatz and Herrmann 2002, 453
Hien	Netherlands	?			n/a	Clerbaut 2010
Hombourg-Budange	France	?	x		150-300	Pastor 2010
Horboung-Wihr	France	2			120-140	Pastor 2010
Hunzenschwil	Switzerland	1			43-101	Amrein <i>et al.</i> 2012
Illzach	France	1			Undated	Pastor 2010
Ittenwiller	France	?	x		100-175	Pastor 2010
Jagsthausen	Germany	5		x	160-260	Kaiser 2005
Kaiseraugst	Switzerland	8			100-250	Amrein <i>et al.</i> 2012
Karden	Germany	5			n/a	Cüppers 2005, 576
Kempraten	Switzerland	1			70-90	Amrein <i>et al.</i> 2012
Kindsbach	Germany	1	x	x	2nd-3rd c.	Cüppers 2005, 413
Kloten	Switzerland	1			100-170	Amrein <i>et al.</i> 2012

Site	Country	Kilns	Sigillata	Amphorae	Date Range	Reference
Kobern	Germany	?			n/a	Clerbaut 2010
Köngen	Germany	8			160-260	Luik 2004, 128
Kottwil	Switzerland	1			Undated	Amrein <i>et al.</i> 2012
Kräherwald	Germany	?	x		150-260	RGZM
Krozingen	Germany	21			70-150	Fingerlin 1982; Kaiser 2005; Tränkle 2009
La Madeleine	France	1	x		125-200	Pastor 2010
Ladenburg	Germany	19		x	100-260	Kaiser 2005; Kortüm 2005, 157
Lahnau-Waldgirmes	Germany	2			7BC-9/15	Becker 2003, 342
Langenthal	Switzerland	2			Undated	Amrein <i>et al.</i> 2012
Largitzen	France	4			75-125	Pastor 2010
Laufen	Switzerland	1			70-90	Amrein <i>et al.</i> 2012
Lehen	Germany	?	x		100-150	RGZM
Lenzburg	Switzerland	2			50-90	Amrein <i>et al.</i> 2012
Lienden	Netherlands	?			n/a	Clerbaut 2010
Longuich	Germany	1			100-150	Polfer 2005
Mainz	Germany	90		x	30 BC - 280	Heising 2000
Mamer	Luxembourg	?			275-325	Polfer 2005
Mayen	Germany	7			350-500	Mangartz 2008
Meistratzheim	France	1			Undated	Pastor 2010
Metz	France	6	x		1-100	Pastor 2010
Mittelbronn	France	1	x	x	150-175	Pastor 2010
Moers-Asberg	Germany	2			25-75	Wirtz 1998; Clerbaut 2010
Mönchengladbach	Germany	6			100-200	Wirtz 1998; Clerbaut 2010
Mörsbach-Adelsbrunnen	Germany	?			AD 1 - 100	Polfer 2005
Neunkirchen	Germany	?			Undated	Polfer 2005
Neuss	Germany	14			n/a	Clerbaut 2010
Nida-Heddernheim	Germany	150			85-260	Baatz and Herrmann 2002, 285
Niederanven	Luxembourg	?			Undated	Polfer 2005
Niederburg-Friesheim	Germany	4			150-175	Wirtz 1998; Clerbaut 2010
Niederstadtfeld	Germany	2			75-125	Polfer 2005
Nijmegen	Netherlands	4			70-200	Wirtz 1998; Clerbaut 2010
Nürtingen	Germany	1	x		160-260	Planck 2005, 237
Oberkirchen	Germany	1			n/a	Clerbaut 2010, Polfer 2005

Site	Country	Kilns	Sigillata	Amphorae	Date Range	Reference
Oberlunkhofen	Switzerland	?			Undated	Amrein <i>et al.</i> 2012
Oberwinterthur	Switzerland	15			AD1-150	Amrein <i>et al.</i> 2012
Obfelden	Switzerland	2			Undated	Amrein <i>et al.</i> 2012
Öhringen	Germany	2			160-260	Planck 2005, 238
Olten	Switzerland	1			100-200	Amrein <i>et al.</i> 2012
Orenhofen-Distelmaar	Germany	?			Undated	Polfer 2005
Pachten	Germany	?			300-400	Polfer 2005
Rapperswil	Switzerland	1			70-90	Amrein <i>et al.</i> 2012
Reichshoffen	France	5		x	1-200	Pastor 2010
Remagen	Germany	6			14-50	Wirtz 1998; Clerbaut 2010
Rheinzabern	Germany	13	x	x	150-350	Reutti and Schulz 2010
Riegel	Germany	10	x		n/a	Kaiser 2005; Brauning 2004 (RGZM plan)
Rottenburg	Germany	22			160-260	Kaiser 2005; Gaubatz-Sattler 1999, 280-301
Rottweil	Germany	27			100-260	Kaiser 2005; Kortüm 2005, 156
Sarreinsming	France	?			1 AD - 50	Pastor 2010
Schleitheim	Switzerland	1			Undated	Amrein <i>et al.</i> 2012
Schlossau	Germany	4			160-260	Planck 2005, 214
Schwarzenacker	Germany	2			50-150	Clerbaut 2010, Polfer 2005
Schwarzenbach	Germany	3			100-200	Wirtz 1998; Clerbaut 2010
Schweich-Krieg Heck	Germany	?			Undated	Polfer 2005
Seltz	France	2			100-200	Pastor 2010
Sinzig	Germany	4	x		140-160	Rothenhöfer 2005; Cüppers 2005, 554
Sirzenich-bei der Hambuch	Germany	1			Undated	Polfer 2005
Soller	Germany	12			175-300	Wirtz 1998; Clerbaut 2010
Solothurn	Switzerland	4	x		AD1-200	Amrein et al 2012
Speicher-Herforst	Germany	12			150-375	Wirtz 1998; Clerbaut 2010
Speyer	Germany	1			n/a	Clerbaut 2010
Stettfeld	Germany	5		x	120-260	Schallmeyer 1982; Planck 2005, 340
Stockstadt	Germany	7			100-260	Greiner 2005, 167
Strasbourg	France	21		x	40-250	Pastor 2010
Studen	Switzerland	1			70-200	Amrein <i>et al.</i> 2012
Sulz	Germany	9			100-230	Planck 2005, 333
Sursee	Switzerland	1			100-200	Amrein <i>et al.</i> 2012

Site	Country	Kilns	Sigillata	Amphorae	Date Range	Reference
Tholey	Germany	1			Undated	Polfer 2005
Titelberg	Luxembourg	2			150-300	Polfer 2005
Toul	France	?			Undated	Polfer 2005
Trier	Germany	108	x		20-360	Polfer 2005
Urmitz-Weißenthurm	Germany	12			175-260	Wirtz 1998; Cüppers 2005, 662
Vetera I	Germany	1			15BC-14	Wirtz 1998
Waiblingen	Germany	31	x	x	150-260	Planck 2005, 349
Walheim	Germany	13			125-150	Kaiser 2005; Kortüm 2005, 161; Planck 2005, 355
Wallendorf	Germany	1			25-75	Polfer 2005
Wielerwist	Germany	1			150-200	Wirtz 1998; Clerbaut 2010
Windisch	Switzerland	11	x		AD1-260	Amrein <i>et al.</i> 2012
Winkel	Switzerland	1			150-250	Amrein <i>et al.</i> 2012
Worms	Germany	6			4th c.	Cüppers 2005, 674
Xanten	Germany	7			125-225	Wirtz 1998; Clerbaut 2010
Zofingen	Switzerland	1			Undated	Amrein <i>et al.</i> 2012

Site	Tank	Crucible	Annealing	Crucibles	Glass frit	Date	Reference
Cologne		18	6	x	x	1st-4th c.	Höpken and Schäfer 2005
Augst	3	9	3	x	x	1st-3rd c.	Fischer 2009
Hambach	3	27	7	x	x	4th-5th c.	Gaitzsch <i>et al.</i> 2000
Mainz				x	x	Late Antique	Harter 1999, 138
Trier		2		x	x	2nd - 4th c.	Polfer 2005, 105-7
Bonn		6		x	x	1st c.	Follmann-Scholz 1991
Sulzburg					x	Undated	Hoffmann 2002, 20
Riegel		1			x	1st c.	Hoffmann 2002, 21
Goch-Asperden		1		x	x	4th c.	Follmann-Scholz 1991
Honthheim				x		Late Antique	Polfer 2005, 131
Worms						Late Antique	Grünwald and Vogt 2001, 18-20
Speyer						Late Antique	Grünwald 1989, 42
Mayen						Late Antique	Wightmann 1970, 204; Hartmann and Grünwald 2010
Avenches		5			x	1st c.	Amrein <i>et al.</i> 2012, 52-55.
Metz					x	Late Antique	Polfer 2005, 110-12
Bitburg				x		4th c.	Polfer 2005, 114
Titelberg				x	x	3rd c.	Polfer 2005, 129
Bollendorf				x	x	4th c.	Polfer 2005, 131
Rivenich					x	Late Antique	Polfer 2005, 133
Spangdahlem					x	Undated	Polfer 2005, 134
Florange-Daspich				x		Late Antique	Polfer 2005, 33-34
Nijmegen					x	1st c.	Bloemers in Isings 1980, 341-44.
Krefeld				x		Late Antique	Gaitzsch <i>et al.</i> 2000, 109
Utrecht				x		Undated	Isings 1957, 12
Mittelstrimmig				x		4th c.	Van Geesbergen 1999, 121

Site	Reference	Type	Date	Region	Quant.	Total	Fish	Oil	CONTENTS				EM	Gaul	Germ	ORIGINS			
									Wine	Other	Unk	Italy				NA	Spain	Unk	
Aislingen	Schimmer 2009	M	JC	Raetia	MNI	11	45%	18%	18%	0%	18%	9%	18%	9%	0%	0%	45%	18%	
Alphen aan den Rijn	van der Werff 2003	M	AUG	Rhine	MNI	38	0%	79%	21%	0%	0%	0%	16%	0%	5%	0%	79%	0%	
Altenstadt	Ehmig 2007	M	TRAJ	Rhine	MNI	220	2%	39%	38%	16%	5%	0%	38%	21%	0%	0%	41%	0%	
Alzey	Ehmig 2007	V		Rhine	MNI	342	4%	61%	8%	17%	9%	1%	11%	25%	0%	0%	62%	1%	
Auerburg	Schimmer 2009	V	JC	Raetia	MNI	115	30%	24%	23%	23%	0%	0%	0%	22%	0%	0%	78%	0%	
Augsburg	Schimmer 2009	U		Raetia	MNI	41	24%	27%	27%	20%	2%	15%	22%	2%	0%	0%	51%	10%	
Augsburg-Oberhausen	Schimmer 2009	M	AUG	Raetia	MNI	5	20%	20%	40%	0%	20%	0%	0%	40%	0%	0%	40%	20%	
Augst	Martin-Kilcher 1994	U		Rhine	RBH	5354	24%	38%	32%	1%	5%	4%	34%	1%	3%	2%	51%	5%	
Avenches	Meylen-Krause 1995	U		Rhine	MNI	561	15%	28%	30%	2%	26%	1%	26%	0%	4%	0%	42%	27%	
Bad Kreuznach	Ehmig 2007	villa		Rhine	MNI	186	4%	36%	37%	8%	16%	6%	32%	10%	1%	7%	37%	8%	
Bad Wimpfen	Czys et al. 1981	V	ANT	Rhine	MNI	162	0%	28%	21%	0%	51%	0%	21%	51%	0%	0%	28%	0%	
Basel	Deschler-Erb 2008	O/V	IA/AUG	Rhine	MNI	194	16%	5%	71%	5%	2%	2%	1%	0%	71%	0%	26%	0%	
Bavay	Marlière 1998	V		Gaul	RBH	847	8%	14%	39%	0%	39%	1%	44%	8%	0%	3%	31%	13%	
Biesheim	Baudoux 1996	V	JC	Rhine	MNI	279	18%	36%	38%	1%	7%	6%	25%	0%	11%	0%	51%	6%	
Bliesbruck	Baudoux 1996	V		Rhine	MNI	45	16%	71%	13%	0%	0%	0%	18%	0%	0%	0%	82%	0%	
Braives	Brulet et al 1992	V		Gaul	RBH	366	13%	27%	39%	2%	19%	5%	47%	9%	0%	0%	34%	4%	
Breisach	Zagermann 2010	M	4th c.	Rhine	RBH	36	11%	50%	31%	0%	8%	3%	17%	0%	11%	31%	39%	0%	
Chur	Martin-Kilcher 1991	V		Rhine	MNI	114	16%	41%	29%	0%	14%	4%	12%	0%	18%	0%	52%	14%	
Dangstetten	Ehmig 2010	M	AUG	Rhine	MNI	2208	39%	21%	30%	0%	10%	8%	3%	0%	14%	2%	64%	9%	
Dieburg	Ehmig 2007	U	TRAJ	Rhine	MNI	466	0%	56%	22%	16%	5%	1%	22%	21%	0%	0%	56%	0%	
Forum Hadriani	Van Kerckhove in press	U	ANT	Rhine	MNI	113	0%	57%	37%	1%	6%	1%	37%	2%	0%	0%	57%	4%	
Geneva	Paunier 1981	U		Gaul	RBH	567	15%	62%	22%	0%	0%	1%	18%	0%	3%	2%	76%	0%	
Grand	Baudoux 1996	villa		Gaul	MNI	95	4%	0%	40%	1%	55%	3%	36%	0%	5%	0%	1%	55%	
Gross-Gerau	Ehmig 2007	M	FLAV	Rhine	MNI	1465	8%	58%	28%	4%	2%	3%	36%	0%	5%	0%	1%	55%	
Hanau	Ehmig 2007	M	TRAJ	Rhine	MNI	404	4%	67%	24%	3%	3%	0%	31%	5%	0%	0%	64%	0%	
Haselburg	Fleer 2011	M	ANT	Rhine	MNI	50	0%	38%	22%	10%	30%	0%	24%	6%	0%	0%	71%	0%	
Heldenbergen	Ehmig 2007	M	TRAJ	Rhine	MNI	385	1%	62%	28%	2%	6%	0%	4%	28%	0%	0%	38%	30%	
Hesselbach	Baatz 1973	M	TRAJ	Rhine	MNI	31	0%	16%	81%	0%	3%	0%	29%	8%	1%	0%	62%	1%	
Höchst	Ehmig 2007	M	AUG	Rhine	MNI	66	33%	33%	30%	2%	2%	0%	74%	6%	0%	0%	16%	3%	
Hofheim Steinkastell	Ehmig 2007	M	FLAV	Rhine	MNI	302	10%	64%	23%	0%	4%	11%	8%	2%	6%	2%	71%	2%	
Hofheim Vicus	Ehmig 2007	V	TRAJ	Rhine	MNI	190	3%	62%	33%	1%	2%	1%	25%	0%	0%	0%	73%	1%	
Holzhausen	Ehmig 2007	M	ANT	Rhine	MNI	133	0%	10%	3%	75%	12%	1%	35%	1%	1%	0%	63%	0%	
Hummetroth	Ehmig 2007	villa		Rhine	MNI	97	0%	37%	51%	1%	11%	0%	3%	86%	0%	0%	10%	2%	
Kaiseraugst	Martin-Kilcher 1994	M	4th c.	Rhine	RBH	78	9%	63%	24%	0%	4%	0%	48%	9%	1%	0%	38%	3%	
Kempten	Schimmer 2009	U		Raetia	RBH	2073	19%	40%	28%	2%	11%	6%	5%	0%	0%	36%	53%	0%	
Kleiner Feldberg	Ehmig 2007	M	ANT	Rhine	MNI	193	1%	13%	10%	57%	19%	11%	21%	12%	0%	0%	49%	7%	
Köln Alteburg	Hanel 2003	M	JC	Rhine	MNI	422	10%	53%	32%	4%	1%	1%	32%	0%	2%	0%	65%	0%	

Site	Reference	Type	Date	Region	Quant.	Total	CONTENTS							ORIGINS				
							Fish	Oil	Wine	Other	Unk	EM	Gaul	Germ	Italy	NA	Spain	Unk
Lorenzburg bei Epfach	Schimmer 2009	M	JC	Raetia	MNI	17	35%	18%	18%	12%	18%	44%	7%	0%	1%	0%	48%	0%
Mainz	Ehmig 2003	U		Rhine	RBH	1987	19%	39%	16%	1%	26%	3%	35%	8%	3%	2%	46%	2%
Metz	Baudoux 1996	U		Rhine	MNI	209	12%	43%	37%	0%	8%	5%	26%	6%	3%	0%	58%	2%
Mirebeau	Goguy et al 1995	M	FLAV	Gaul	MNI	44	11%	17%	30%	9%	28%	2%	16%	0%	13%	5%	59%	3%
Neuss	Filtzinger 1972	M	AUG	Rhine	RBH	1460	26%	17%	57%	0%	0%	7%	26%	0%	7%	0%	33%	28%
Nida-Hedderheim	Ehmig 2007	U	TRAJ	Rhine	MNI	2061	1%	45%	27%	20%	7%	0%	0%	0%	9%	0%	91%	0%
Nieder Eschbach	Ehmig 2007	villa		Rhine	MNI	50	0%	40%	6%	46%	8%	0%	26%	25%	0%	0%	46%	1%
Niederursel	Ehmig 2007	villa		Rhine	MNI	101	1%	42%	40%	17%	1%	0%	6%	54%	0%	0%	40%	0%
Nijmegen	van der Werff 1984	M	FLAV	Rhine	MNI	659	25%	42%	33%	0%	0%	0%	40%	18%	0%	0%	43%	0%
Oberstimm	Schimmer 2009	M	FLAV	Raetia	MNI	21	29%	24%	19%	5%	24%	0%	34%	0%	4%	0%	62%	0%
Oedenburg A	Viroulet & Baudoux 2009	M	JC	Rhine	MNI	227	50%	28%	11%	0%	11%	2%	6%	0%	3%	0%	78%	11%
Oedenburg B	Viroulet & Baudoux 2009	M	JC	Rhine	MNI	74	58%	16%	12%	0%	14%	0%	4%	0%	4%	0%	78%	14%
Oudenburg	Vanhoutte et al 2009	M	3rd c.	Gaul	MNI	10	0%	60%	40%	0%	0%	0%	40%	0%	0%	0%	60%	0%
Pforzheim	Kortüm 1995	V	TRAJ	Rhine	MNI	123	0%	15%	13%	0%	72%	0%	12%	72%	0%	0%	16%	0%
Regensburg-Kumpfmühl	Schimmer 2009	M	FLAV	Raetia	MNI	39	0%	77%	8%	5%	10%	0%	5%	3%	10%	0%	77%	5%
Rheinfelden	Asal 2005	M	4th c.	Rhine	MNI	15	0%	29%	36%	0%	36%	0%	7%	0%	0%	27%	33%	33%
Rödgen	Ehmig 2007	M	AUG	Rhine	MNI	265	42%	34%	21%	0%	3%	6%	4%	0%	3%	0%	85%	2%
Rottweil	Franke 2003	M	FLAV	Rhine	MNI	71	32%	44%	18%	6%	0%	6%	17%	0%	1%	0%	76%	0%
Sierentz	Baudoux 1996	M	AUG	Rhine	MNI	183	9%	45%	39%	0%	7%	0%	25%	0%	14%	0%	54%	7%
Solothurn	Roth-Rubi 1975	V	FLAV	Rhine	RBH	84	23%	38%	27%	0%	12%	0%	38%	0%	4%	0%	46%	12%
St. Ulrich	Baudoux 1996	villa		Rhine	MNI	61	8%	0%	56%	0%	36%	2%	49%	0%	5%	0%	8%	36%
Strasbourg	Baudoux 1996; 1998	U		Rhine	MNI	777	21%	36%	36%	2%	5%	3%	25%	3%	4%	1%	61%	2%
Titelberg	Laubenheimer 1998	O/V	IA/AUG	Gaul	MNI	882	11%	14%	72%	0%	3%	4%	8%	0%	57%	0%	29%	1%
Trier Kaiserthermen	Husson-Cüppers 1972	U	4th c.	Rhine	MNI	60	0%	53%	5%	0%	42%	3%	2%	25%	0%	3%	50%	17%
Vechten	van der Werff 2004	M	AUG	Rhine	RBH	29	38%	21%	28%	0%	14%	17%	24%	0%	7%	3%	34%	14%
Velsen	Goudswaard 1990	M	JC	Rhine	MNI	258	28%	31%	35%	0%	7%	5%	7%	0%	0%	0%	81%	7%
Venlo	Hupperetz 1998	V		Gaul	RBH	57	12%	51%	32%	0%	5%	0%	23%	0%	5%	0%	67%	5%
Vetera I	Hanel 1995	M	AUG	Rhine	MNI	276	38%	33%	21%	0%	8%	0%	0%	0%	0%	0%	92%	8%
Vindonissa EA	Martin-Kilcher 2003	M	AUG	Rhine	MNI	27	26%	37%	33%	4%	0%	7%	7%	0%	7%	0%	78%	0%
Vindonissa MA	Martin-Kilcher 2003	M	AUG	Rhine	MNI	100	26%	28%	28%	4%	14%	9%	15%	0%	7%	0%	59%	10%
Walheim	Monfort 2004	M	TRAJ	Rhine	MNI	80	0%	43%	9%	16%	33%	0%	9%	48%	0%	0%	43%	1%
Winsum	Galestin 2001/2002	M	JC	Rhine	RBH	48	10%	33%	56%	0%	0%	4%	46%	0%	4%	0%	46%	0%
Worms	Ehmig 2007	U	FLAV	Rhine	MNI	485	5%	46%	14%	29%	5%	1%	11%	32%	2%	1%	52%	1%
Xanten	Monfort 2006	U		Rhine	MNI	332	6%	37%	28%	9%	19%	10%	20%	3%	6%	1%	59%	1%
M - military, U - urban, IA - Iron Age, V - vicus																		
AUG - Augustan, JC - Julio-Claudian, FLAV - Flavian, TRAJ - Trajanic, ANT - Antonine																		
Quant. - Quantification, MNI - Minimum number of individuals, RBH - Rims, bases, handles																		
Unk - Unknown, EM - Eastern Mediterranean, Germ - Germany, NA - North Africa																		