FROM LIFE TO DEATH IN IRON AGE AND MEDIEVAL VINJEFJORD

Unveiling Burial Practices, Settlement and Landscape History

Raymond Sauvage (Ed.)

CAPPELEN DAMM FORSKNING

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PREFACE AND INTRODUCTION

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The E39 Betna–Stormyra project is the most extensive archaeological excavation of Late Iron Age cemeteries and settlement features conducted in Central Norway. The project focused particularly on Vinjefjord in the Hemne region, with sites dating from the Migration and Merovingian Periods, the Viking Age, and the Middle Ages (Table 1). This book emphasises two important themes: life in the form of settlements, buildings and agriculture; and death in the form of burial mound cemeteries with graves and structures for the dead. In past, premodern societies, these were not separate entities but were interwoven units and a natural part of daily life. Several of the chapters demonstrate this close relationship, and the book's title reflects these various perspectives.

Developer-funded excavations in Norway are limited to collecting and archiving data and finds in museum collections. Research on the same data is usually not a part of these projects. The E39 Betna–Stormyra project had the objective of collecting a wide range of archaeological evidence from prehistoric and historical settlements, buildings and agriculture, as well as a variety of mortuary evidence from prehistoric cemeteries. This resulted in a considerable record of grave goods, settlement assemblies, GIS data and reports. It was recognised early on that the results had considerable potential for providing insights into past lives and societies in the Vinjefjord area. To enhance and refine these findings through research and analysis, the Norwegian Public Roads Administration has generously funded this book. This was in recognition of the importance of integrating research and data collection in developer-funded archaeology, and the importance of sharing the results with both the scientific community and the public. As a number of the results have international significance, the chapters have been written in English, accompanied by individual chapter summaries in Norwegian.

THE VINJEFJORD LANDSCAPE

Vinjefjord is a long and narrow waterway that provides a safe and sheltered route from Vinjeøra in the Hemne region in Trøndelag to the Norwegian coastal sea route (the *Norvegr*) in Nordmøre. The area is also linked to mountain valleys between Hemne and Orkdal, and towards the Trondheimsfjord area through the valley of Orkdal (Figure 1). This topography offers easy access to resource-richinland areas and population centres in Trøndelag, as well as long-distance trade and communication networks through the coastal trade route. The fjord is also known for its rich fisheries, especially herring and salmon, while the side valleys provide arable land for agriculture. The excavations carried out in the Vinjefjord area provided insights into the Iron Age and medieval societies that thrived in the region due to its advantageous geography and resources.

Today, Vinjefjord derives its name from the farm Vinnan, or Vinje, which is located at the end of the fjord in present-day Vinjeøra. This important farm also contains the grounds of an earlier medieval church and an early Christian cemetery, recorded in medieval written sources. However, based on historical studies, it is believed that an earlier name for

Table 1. *Chronological table*

Early Iron age		**Eldre Jernalder**	
Pre-Roman Iron Age	500 BC–AD 1	Førromersk Jernalder	500 f. Kr–1 e. Kr
Roman Iron Age	AD 1–400	Romertid	1–400 e. Kr
Migration	AD 400–575	Folkevandringstid	400–575 e. Kr
Late Iron Age		**Yngre Jernalder**	
Merovingian period	AD 575–800	Mrovingertid	575–800 e. Kr
Viking Age	AD 800–1050	Vikingtid	800–1050 e. Kr
Middle Ages		**Middelalder**	
Early Middle Age	AD 1050–1130	Tidlig Middelalder	1050–1130 e. Kr
High Middle Age	AD 1130–1350	Høymiddelalder	1130–1350 e. Kr
Late Middle Age	AD 1350–1537	Seinmiddelalder	1350–1537 e. Kr

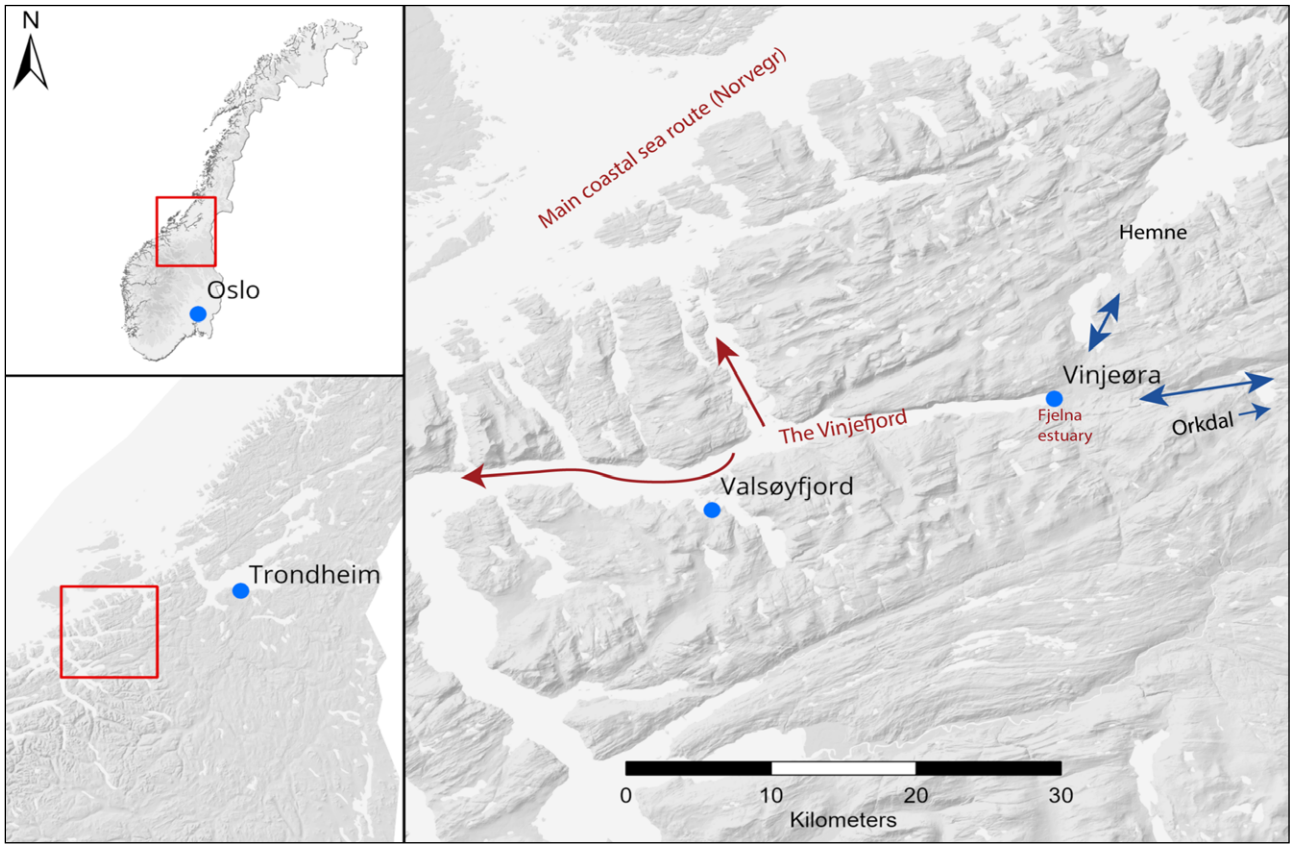

Figure 1. *Vinjefjord and the surrounding region with places of interest. Map by Kristoffer R. Rantala, NTNU University Museum. Vinjefjorden og omkringliggende områder med viktige steder avmerket.*

the fjord was *Fjolnir,* argued by the philologist Nils Hallan (1959). He suggested that the fjord originally received its name from the river Fjelna in Vinjeøra, emphasizing the importance of this river mouth and the fjord end to the communities in the area. The excavations seem to confirm this notion, as the location of a cooking pit field near the Fjelna estuary suggests that the location was used as a gathering site in the Early Iron Age (discussed in Sauvage Ch. 1).

Hallan studied the local settlement history in his historical study of the Hemne region. Using a traditional settlement historical approach using stray finds, toponyms and retrospective arguments from medieval written records, he emphasised the development of farm settlements and property rights. Since the study only found two stray finds from the Iron Age near Vinjefjord, the Iron Age settlements in this area are here considered limited compared to the wider areas in the Hemne region – particularly around the village of Kyrksæterøra. However, the toponyms and written indicators suggested that in the Late Iron Age, Vinjefjord was in an expansion phase, with several new farms being founded. The study also found that the area was heavily affected by the late medieval plague, suggesting that several major farms were deserted at this time. The evidence that emerged from the recent excavations suggests a thriving society with working agricultural communities and communal functions in the Early Iron Age. The characterisation of a limited settlement structure in the Iron Age can be said to be a bias due to a lack of reported finds at the time. However, several chapters in this book demonstrate that the Late Iron Age stands out as a particularly rich phase, with continuous settlements, trade indicators and cemeteries featuring rich grave goods and advanced ritual practices, which may correlate with Hallan's findings. The suggested downturn in the Late Middle Ages was also confirmed, via radiocarbon dates from the sites and vegetation history.

DISCOVERING IRON AGE AND MEDIEVAL SETTLEMENTS AND CEMETERIES NEAR VINJEFJORD

The European Route E39 is the primary coastal road connecting Western and Central Norway. For a long time, several subsections running along the southern shore of Vinjefjord have needed improvement and better traffic standards. As a result, the Norwegian Public Roads Administration has conducted numerous upgrades over the past 20 years. In accordance with the Norwegian Cultural Heritage Act (1978), these upgrades have instigated several archaeological excavations where the plans

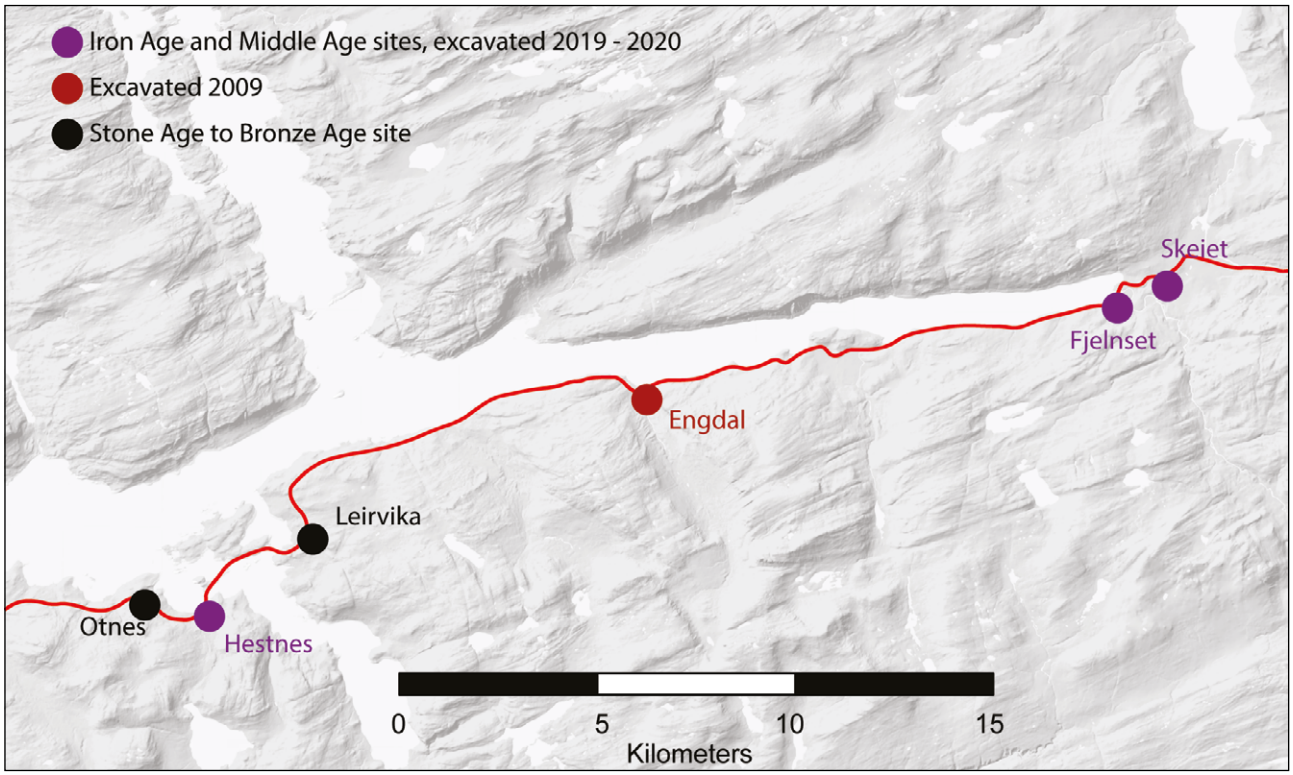

Figure 2. *The excavated sites along Vinjefjord. The E39 road is marked with a red line. The Stone Age to Bronze Age sites are not included in this volume. Documentation from these sites can be found in Østmoe et al. 2023a & 2023b. Utgravningsområder ved Vinjefjorden. Steinalder- og bronsealderlokaliteter er ikke med i denne boka, men dokumentasjonen finnes i rapportene (Østmoe et al. 2023a & 2023b).*

have involved protected sites. The first excavations were performed by the NTNU University Museum at the small hamlet of Engdal in 2009. This excavation uncovered the first evidence of prehistoric settlement along the fjord, in the form of building remains, postholes and cooking pits, which were dated to the Late Iron Age (Nygård 2010, discussed in Bryn Ch. 3). However, the major archaeological effort and focus of this book was carried out in 2019 and 2020 as a result of the development of the final sections of the road.

The excavations were conducted based on site surveys and evaluations performed during the regulatory phase of the road upgrades by the county administration in Møre og Romsdal and Trøndelag. To identify the archaeological remains within the planned construction areas, mechanical test trenching was performed on affected agricultural land. The surveys revealed several sites, including Stone Age and Bronze Age sites (Prestvold 1997, Engtrø 2013, Haugen 2014) (Figure 2). The Norwegian Public Roads Administration commissioned archaeological excavations of all affected sites in 2019 and 2020, as preparation for construction work in the following years.

The archaeological remains from the Iron Age and Middle Ages were discovered in three separate areas in Vinjeøra and Valsøyfjord. These areas were located on the farms Skeiet and Fjelnset in Vinjeøra and Hestnes in Valsøyfjord. The E39 Betna–Stormyra archaeological project aimed to investigate all the remains by using the strategy of large-scale top-soil stripping and mapping of all preserved features. The process revealed four concentrations at three sites, with Iron Age and medieval settlement and mortuary remains, by exposing a total area of approximately 35,000 m^2.

Skeiet – Vinjeøra

Two of the largest finds were discovered at Skeiet in Vinjeøra. This farm is located only 250 m west of Vinnan (Vinje), on the late-glacial terrace formations above the hamlet (Figure 3). The excavation involved the removal of the topsoil from two areas, totalling around 18,000 m^2. Site 1 (Skeiet 1) contained 11 (possibly 12) flattened burial mounds identified by their circular ring ditches. Excavations revealed 18 graves and three mortuary houses dated to the Late Iron Age, and the graves featured a large collection of grave goods. This provided an exceptional glimpse into Late Iron Age mortuary and funerary practices. The second site was situated 150 m south of the cemetery and contained Iron Age and medieval settlement features and remains with at least nine identifiable buildings (Skeiet 2). The Late Iron Age phase of the settlement

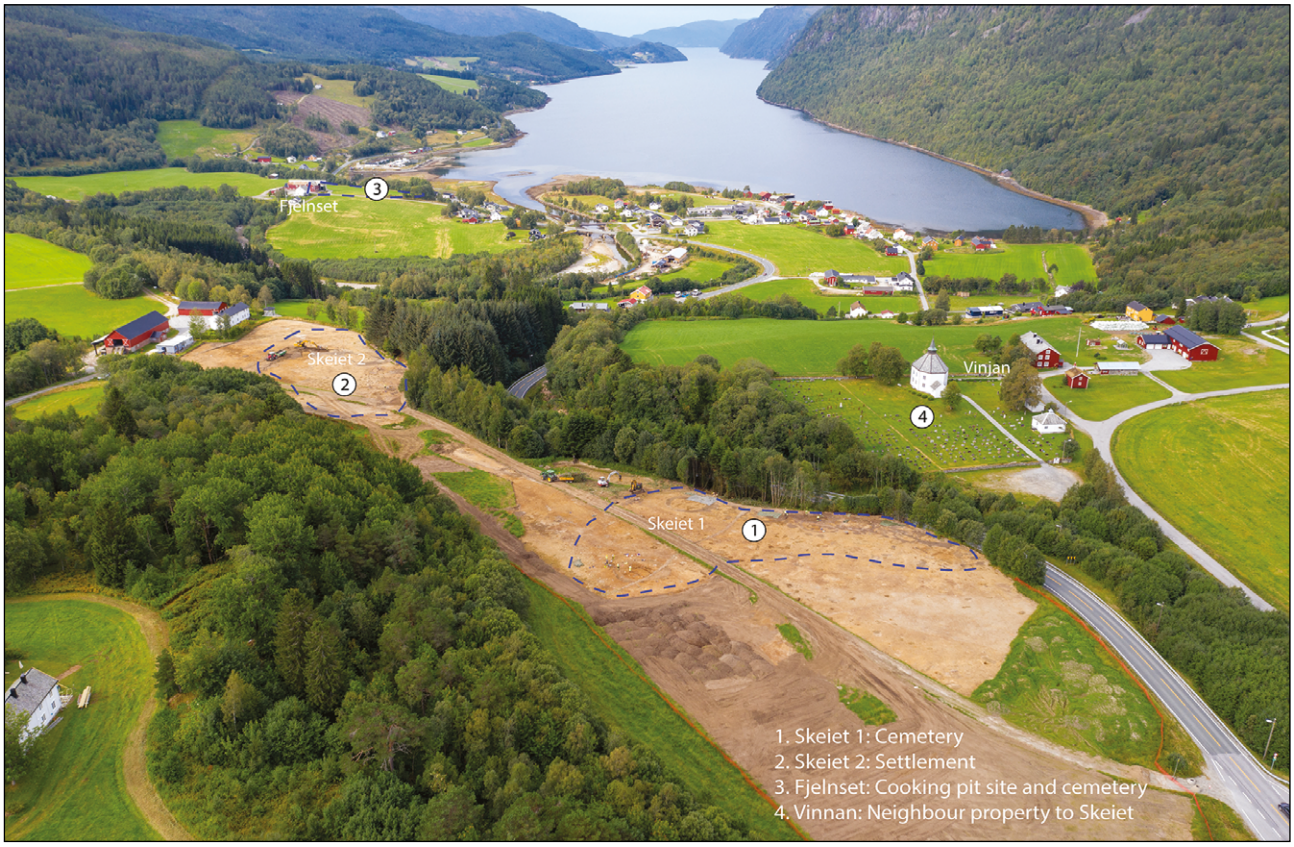

Figure 3. *Aerial photo of Vinjeøra with the excavation areas at Skeiet in the foreground and Fjelnset in the background. Photo: Raymond Sauvage, NTNU University Museum. Dronefoto over Vinjeøra med utgravingsfelt på Skeiet i forgrunn og Fjelnset i bakgrunnen.*

is believed to represent the users of the cemetery, due to its overlapping dates and proximity. This offered extensive data on the development of and changes to settlement and building traditions, as well as the relationship between settlements and cemeteries.

Fjelnset – Vinjeøra

The third investigated area was on the farm Fjelnset, located on a small glacial terrace above the estuary of the river Fjelna in Vinjeøra. The farm was named after its proximity to the river. It seems likely that during the Iron Age and medieval period, the estuary and the nearby river mouth provided a sheltered harbour, which made the site a strategic location. The excavation revealed two German fortifications from World War II, which were designed to prevent a landing of the Allied Forces from the sea (Figure 4), further highlighting the strategic landscape situation of the area. An area of approximately 6,900 m^2 was exposed, and the site featured a concentration of cooking pits as well as levelled burial mounds. Sixty-two cooking pits were preserved, and the ^{14}C dating evidence points to an intense utilisation phase during the Roman and Migration Periods. However, poor preservation, methodical robbing and erosion have inflicted extensive damage on all the graves, which meant less could be deduced about the mortuary practices. The excavations suggested that the site had been used as a cooking pit field or a communal gathering place, which was later replaced by burial mounds in the Late Iron Age.

Hestnes – Valsøyfjord

The fourth site was at Hestnes in the Valsøyfjord, which forms a side branch to the Vinjefjord, about 24 km west of Vinjeøra. After removing the topsoil, an area of roughly 11,500 m^2 was exposed. The site revealed a range of features related to Iron Age and medieval settlement and agriculture, including cooking pits. Remarkably, the site also yielded mortuary evidence in the form of a levelled burial mound that contained a decayed wooden Viking Age chamber grave, inside of which were items of jewellery, textile fragments, beads, tools and several fragments of clothing. Due to limited resources, this grave is not presented in detail in this book. A detailed analysis of the clothing fragments is, however, included. A full publication is planned at a later date.

CONTENT OF THIS BOOK

This publication is a compilation of ten studies based on the analysis of the archaeological finds, samples and documentation from these sites. It is important to

Figure 4. *Aerial photo of Skeiet at the estuary of the river Fjelna – Notice concrete constructions from WW2 German fortifications. Photo: Kristoffer R. Rantala, NTNU University Museum. Dronefoto over Fjelnset ved utløpet til Fjelna. Legg merke til betong-konstruksjonene etter bunkere fra 2. verdenskrig.*

Figure 5. *Aerial photo of the excavation areas at Hestnes. Photo: Kristoffer R. Rantala, NTNU University Museum. Dronefoto over utgravingsfeltet på Hestnes.*

note that the chapters represent the initial refinement of the data from the excavations. Due to the size and potential of the data, and the authors' capacity to write the chapters, a need arose to prioritise the studies included in the publication. Collaboration with scientific partners was essential during the analysis of the sites, and this has contributed to clearly enlightening and contextualising the findings. The volume contains several examples of multi-proxy approaches through this partnership, which have led to new insights into mortuary practices, settlement organisation and the development of agriculture and vegetation.

The book can be broadly divided into two sections. The first section (Chapters 1–4) looks at the development of settlements, building traditions, vegetation history and trade. In Chapter 1, Raymond Sauvage discusses trajectories in the settlement history based on ^{14}C dates, providing an overview of the dating results from the excavated sites. In Chapter 2, Anette Overland and Kari Loe Hjelle presents a palaeobotanical study which discusses models for the development of vegetation and the cultural landscape in Vinjeøra and the surrounding region, including an evaluation of pollen and macrofossils from settlement and burial features. Settlements from the Late Migration Period, Late Iron Age and the Middle Ages are rarely excavated in Central Norway. Therefore, the remains found in the settlement area at Skeiet are especially valuable, since they provide new insights into the development of building traditions and settlements during this long period. These findings are analysed by Hanne Bryn in Chapter 3. The cemetery at Skeiet revealed rich assemblies of imported finds from the Viking Age in the form of beads, jewellery and silver dirham coins. In Chapter 4, Birgit Maixner and Terje Hellan use beads and silver coins from the excavations and the surrounding area to study the impact of long-distance trade and trade routes in the Viking Age in the Hemnefjord and Vinjefjord areas.

Chapters 5 to 10 focus on the comprehensive mortuary remains from Skeiet. To excavate the nearly complete remains of a cemetery from the Late Iron Age is a rare occurrence in archaeology. The mapping of the entire mortuary site, including graves and grave goods, provided the rare chance to evaluate the entire development of the burial and mortuary practices at a cemetery from the start of the sixth century to the end of pre-Christian burials. This also included comprehensive evidence of secondary intrusions and the reuse of graves. Chapter 5, by Sauvage and Astrid B. Lorentzen, evaluates these findings in detail. The soil composition in the burial features provided additional clues to enhance further understanding of the use of the cemetery. In Chapter 6, Richard I. Macphail & Sauvage evaluate the geoarchaeological findings. The discovery of three mortuary houses at the cemetery is used as a starting point to discuss ritual practices and the relationship between the living and the dead in Late Iron Age cemeteries in Chapter 7, combining geoarchaeology, excavation results and radiocarbon dating. This study was first published in Medieval Archaeology in June 2024, but is reproduced as a chapter in this book to collect all the results in the same publication (Sauvage & Macphail 2024). During conservation work on grave goods from Skeiet and also from the wooden chamber grave at Hestnes, it was discovered that the remains of the textiles once worn by the buried persons were preserved as textile fragments near jewellery and tools in some of the graves. In Chapter 8, Ruth Iren Øien and Aina Heen-Pettersen evaluate how funerary clothing and bedding were presented during burial. Cremation was practised exclusively at Skeiet until the eighth century AD. Anna Kjellström et al. evaluate the execution of the cremation rituals by scrutinising cremated bones from Skeiet in Chapter 9. This study provides information about the cremated individuals and animal offerings, revealing that the pyres included the successful incineration of human bodies and entire larger mammals. Surprisingly, it is shown that anatomically selected parts of birds (wings) were central during one of the rituals. The cemetery also contained three boat graves. While the wooden hulls were completely decomposed, the layout of the boats could be deduced from the clinker nails. In Chapter 10, Rantala presents preliminary models for reconstructing the 3D shape of the boats, which may indicate what types of boats were used in graves.

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SUPPLEMENTARY MATERIAL

Descriptions of all finds and the results from radiocarbon dating can be accessed via Collections Online, hosted at the NTNU University Museum: https://collections.vm.ntnu.no/artefacts

Please refer to the museum number in Table 2 as the search criteria.

Table 2. *Reference table with museum number for finds that have been evaluated in the book*

Museum number	Type	Museum number	Type
Skeiet			
T28188	Grave 1: Simple dug inhumation	T28475	Grave 17: Cremation deposit
T28189	Grave 2: Oval pit grave	T28476	Grave 18: Mortuary house
T28190	Grave 3: Cremation deposit	T28476	Grave 19: Simple dug inhumation
T28191	Grave 4: Simple dug inhumation	T22216	Grave 20: Simple dug inhumation
T28473	Grave 5: Simple dug inhumation	T28479	Grave 21: Redeposited grave goods
T28192	Grave 6: Simple dug inhumation	T28156	Settlement finds
T28474	Grave 7: Simple dug inhumation	**Fjelnset**	
T28273	Grave 8: Boat grave	T28283	Cooking pits, settlement features
T28274	Grave 9: Mortuary house	T28284	Boat grave
T28275	Grave 10: Boat grave	T28285	Mound 1
T28276	Grave 11: Boat grave	T28286	Mound 2
T28277	Grave 12: Cremation deposit	T28287	Mound 3
T28278	Grave 13: Mortuary house	T28288	Mound 4
T28279	Grave 14: Cremation pit	**Hestnes**	
T28281	Grave 15: Simple dug inhumation	T28347	Settlement features
T28282	Grave 16: Stone lined dug inhumation	T28348	Chamber grave

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Sauvage, R. & R. I. Macphail 2024: Ritual Practise at Late Iron Age and Viking Age Cemeteries in Norway: The Mortuary Houses from Skeiet, Vinjeøra. *Medieval Archaeology,* Volume 68(1), 1–23.

Østmoe, E., K. Mikkelsen, K. R. Rantala & R. Sauvage 2023a: *NTNU Vitenskapsmuseet arkeologisk rapport 2023:21. E39 Betna – Stormyra: Bosetningsspor og dyrkingslag fra bronse- og eldre jernalder, samt kammergrav fra vikingtid på Hestnes og Otnes*. NTNU Vitenskapsmuseet.

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1. CHRONOLOGICAL TRAJECTORIES AT IRON AGE AND MEDIEVAL SETTLEMENTS IN VINJEFJORD BASED ON RECENT EXCAVATIONS

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ABSTRACT

This chapter explores chronological trends at archaeological sites recently excavated in Vinjefjord, Central Norway, focusing on the Iron Age and medieval periods. The Pre-Roman and Early Roman periods, in the Early Iron Age, show dispersed evidence, indicating a scattered settlement (c. 100 BC–AD 300). The Late Roman Iron Age and Migration Period (AD 350–550) witnessed increased activity, with concentrated cooking pits suggesting a communal gathering place and settlement evidence indicating more stable settlements. AD 500–600 exhibits a decline, potentially linked to the AD 536 event. The Late Iron Age (AD 550–1050) introduced burials in mounds, signalling a shift in landscape use, implied by a change from arable land and cooking pit field to cemeteries. Mounds served as territorial markers and memorials, possibly preceding stable settlements. The Viking Age (AD 800–1050) saw a rise in events, marked by increased activity, wealth and religious changes. Viking raids and trade contributed to local prosperity, while the transition to Christianity altered burial practices in the Early Middle Ages (c. AD 1050–1100). Later stages of the Middle Ages (c. AD 1250–1350) show a decline, possibly due to demographic challenges, with a significant decrease post-AD 1350. Historical records align with findings, suggesting desertion followed by reoccupation in the 17th century.

Keywords: Iron Age in Central Norway; Iron Age Assemblies; Cooking Pit sites; Odal burial mounds; Late medieval demographic crises; AD 536

INTRODUCTION

The E39 Betna–Stormyra archaeological investigations resulted in a sizeable record of the Iron Age and medieval settlements from the Vinjefjord area (Figure 1). Emphasising the development of settlement organisation and building construction, burial and mortuary practices, landscape use and vegetation history, it provides a considerable glimpse into Iron Age and medieval activity (Early Iron Age 500 BC–AD 550, Late Iron Age AD 550–1050 AD, medieval period AD 1050–1537). Because of a lack of excavations and reported finds at the time, the previous attempt to evaluate the area's settlement history in this period by Nils Hallan (1959) relied on very limited archaeological data and mainly used later historical records and place-name evidence. Therefore, the understanding of patterns in the development of settlement and human activity, particularly in the Iron Age, has not been well understood and evaluated based on archaeological data. The evidence that emerged from the recent excavations, however, may provide a foundation for an attempt to evaluate this based on archaeological data.

As a rescue archaeology operation, the excavations followed predetermined plans for road construction in two main areas beside the fjord. At Vinjeøra, at the end of the fjord, Iron Age and medieval settlement remains, including a Late Iron Age cemetery, were fully excavated on the farm Skeiet. On the farm Fjelnset, excavations near the local river estuary revealed remains of an Early Iron Age cooking pit field, later replaced by a burial mound cemetery in the Late Iron Age. At Hestnes in Valsøyfjord, at the opposite end of Vinjefjord, Early Iron Age settlement features and a solitary Viking Age chamber grave were discovered.

Reference: Sauvage, R. (2024). Chronological Trajectories at Iron Age and Medieval Settlements in Vinjefjord Based on Recent Excavations. I R. Sauvage (Ed.), *From Life to Death in Iron Age and Medieval Vinjefjord* (pp. 15–43). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.218.ch1
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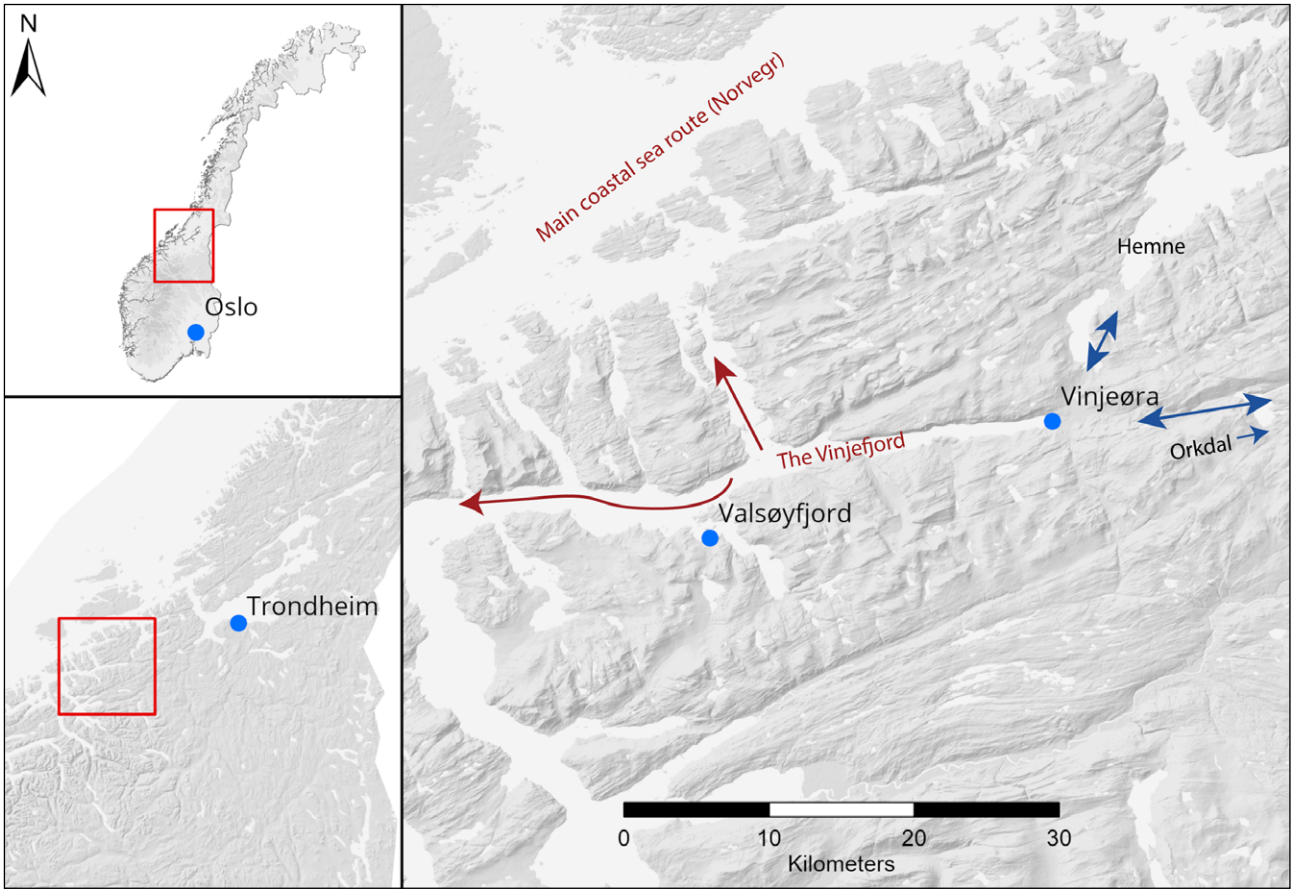

Figure 1. *The location of Vinjefjord and the surrounding area. By Kristoffer Rantala, NTNU University Museum. Vinjefjorden og omkringliggende områder med viktige steder avmerket.*

The investigations resulted in a considerable body of archaeological data in the form of finds, digital documentation and field reports, which may now provide a basis for studying Iron Age and medieval society in this region (Bryn et al. 2023, Østmoe et al. 2023).

To construct and study the chronological development of the excavated remains left at the sites, the project employed a strategy to sample a wide selection of archaeological features for AMS radiocarbon dating. These features can broadly be defined in five categories: cooking pits, settlement features, cultivation-related features, mortuary features and dates relating to site clearing/planning. Several recent studies demonstrate the potential to use statistical analysis of radiocarbon dates to study aspects of temporal variation and patterns in human activity and practices, and as proxies for palaeodemography (e.g. Jørgensen 2020, Capuzzo et al. 2020, Loftsgarden & Solheim 2022). While the dataset from the Vinjefjord area is modest (235 dates) compared to these studies, it opens up the possibility to demonstrate some overall chronological trends that may illustrate basic trajectories in the Iron Age and medieval settlements and activity in the Vinjefjord area.

The objective of this chapter is to discuss overall chronological trends and patterns in the Iron Age and medieval settlement history in the Vinjefjord area, based on an evaluation of the radiocarbon dates. The dates was analysed using kernel density models to illustrate distributions of temporal trends for events on the sites, focusing on cooking pits, agricultural layers, settlement features, mortuary features and evidence of planning/clearing of sites. Since the excavations focused on settlement along Vinjefjord, the surrounding region (Hemne) is not evaluated here. This also means that sites without Iron Age or medieval dates are excluded. For broader perspectives on the region, see Maixner and Helland's study on Viking Age trade and communication in the Hemne region (Ch. 4), and Overland & Hjelle's evaluation of vegetation history and development (Ch. 3) which also features sites from a broader temporal frame.

MATERIAL AND METHODS

Vinjefjord receives its name from Vinnan (Vinje), the largest farm at the fjord end in today's village of Vinjeøra. This farm also contains the site of an earlier medieval church and an early Christian cemetery from the 12th century. While it is mentioned in several medieval written records (Hallan 1959), no extensive archaeological investigations have been

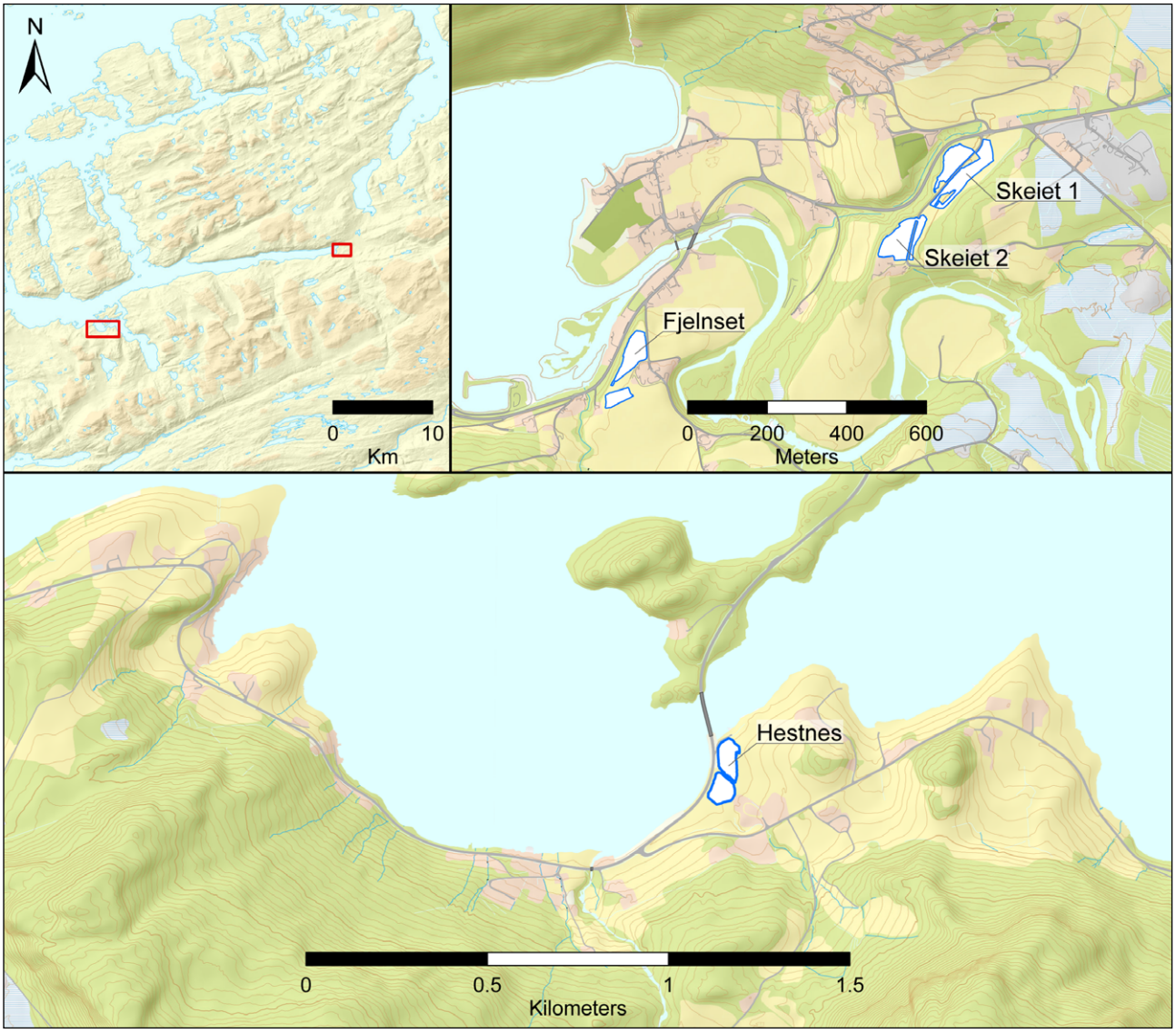

Figure 2. *Map of the Vinjefjord area showing investigated places. By Kristoffer Rantala, NTNU University Museum. Kart over undersøkte lokaliteter ved Vinjefjorden.*

conducted. It should be noticed that test pits dug in the farmyard at Vinnan indicated a medieval culture layer here, which suggests that the present farm dates back at least to the Middle Ages (Gjævran & Ingdahl 2020).The E39 Betna–Stormyra excavations, however, targeted three other farms based on the plans for the new European route E39 along Vinjefjord, set at opposite ends of the fjord (Figures 2 and 3). Prior test-trenching surveys had identified areas with potential Iron Age and medieval remains in ploughed fields on these sites: Skeiet and Fjelnset at Vinjeøra, and Hestnes at Valsøyfjord (Prestvold 1997, Engtrø 2013, Haugen 2014, Figure 3).

The sites were investigated in 2019 and 2020 employing a strategy to map the complete extent of preserved archaeological remains, using large-scale mechanical topsoil stripping exposing an area of approximately 35,000 m^2. This revealed four concentrations of Iron Age and medieval settlement and mortuary remains (Figure 4a–d): two on the farm Skeiet, one at Fjelnset, and one at Hestnes:

The finds at Skeiet (Figures 4a and b) were numerous and represent agricultural and cultivation activity from the Early Iron Age to the medieval period, a completely levelled burial mound cemetery with graves from the Late Iron Age and settlement features (including building remains) from the Migration Period (c. AD 400–575), Late Iron Age and the medieval period (for details, see Bryn Ch. 3, Sauvage & Lorentzen Ch. 5). Fjelnset (Figure 4c) revealed both similarities and differences, where finds of expected settlement features and agricultural features were more limited, but instead showed a distinct collection of cooking pits from the Early Iron Age. Remnants of a levelled mound cemetery were also seen. However, in contrast to Skeiet, all of the graves at Fjelnset were heavily damaged by later looting and a large percentage of the features were destroyed by

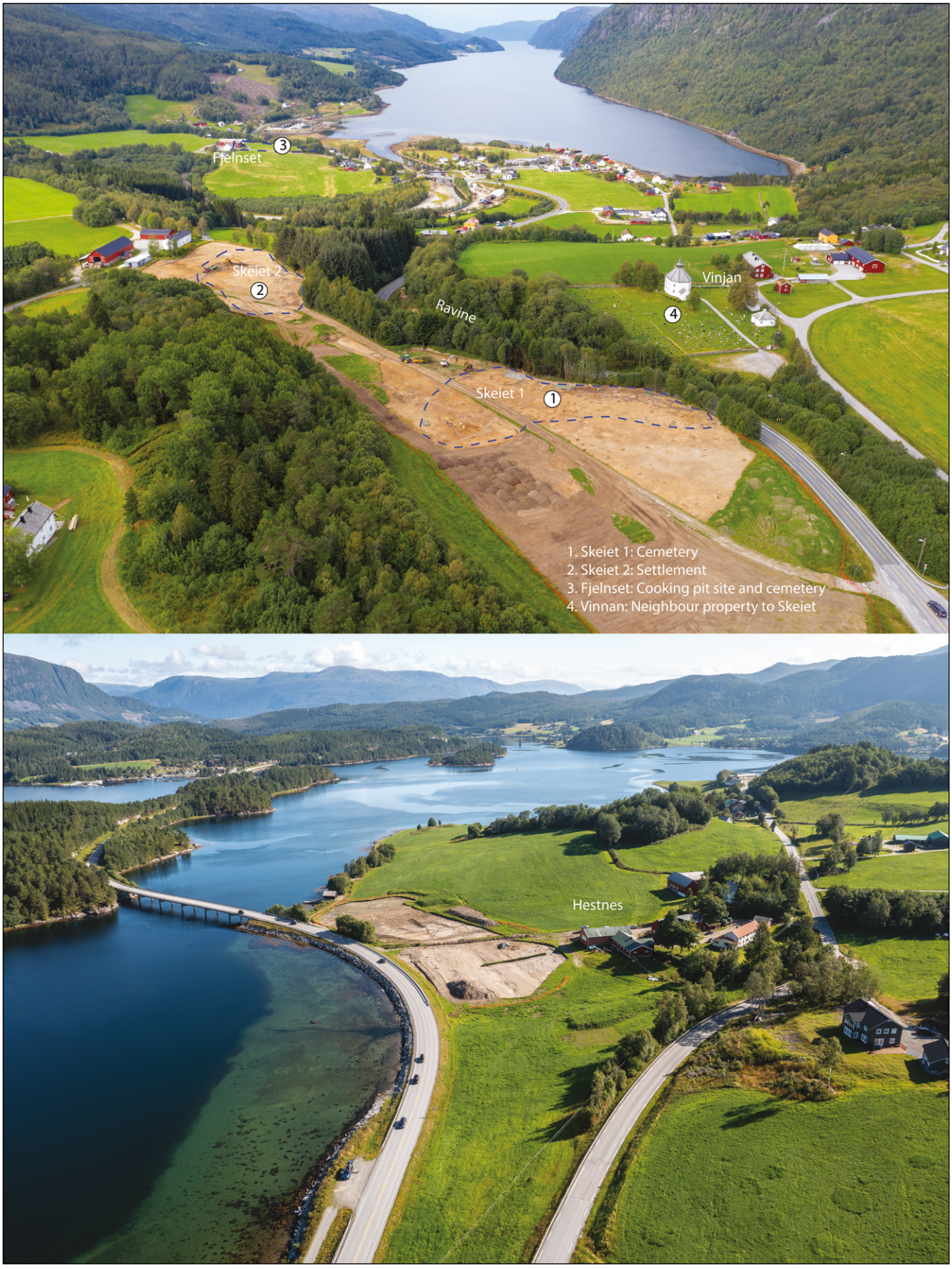

Figure 3. *Aerial photos of Vinjeøra (looking southwest) and Hestnes (looking East), with the excavation areas and position of Vinnan. Photo: Raymond Sauvage, NTNU University Museum. Dronefoto over Vinjeøra (mot sørvest) og Hestnes (mot øst).*

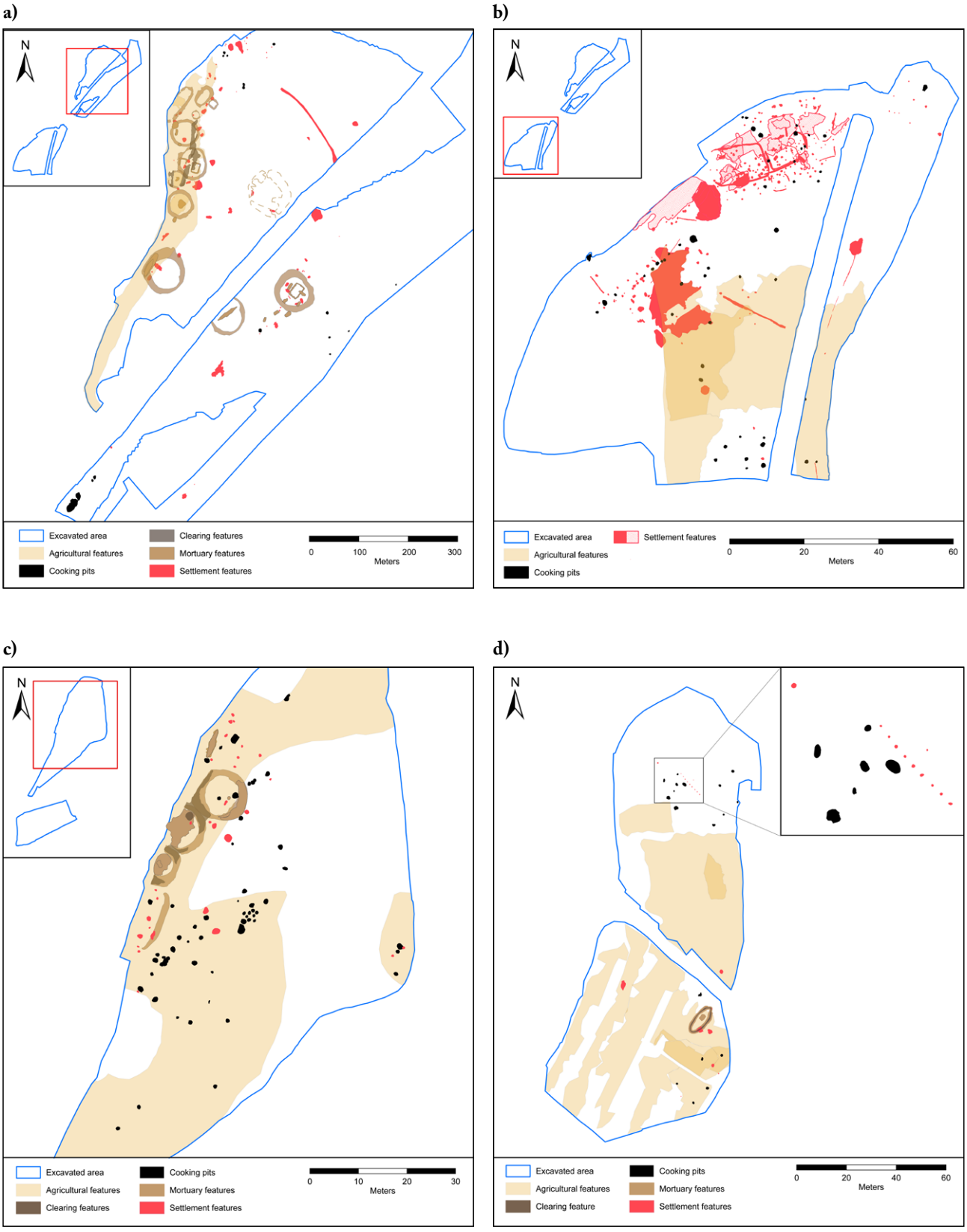

Figure 4a–d. *Recorded archaeological features at the sites: a) Skeiet 1 (cemetery); b) Skeiet 2 (settlement); c) Fjelsnet; and d) Hestnes. By Kristoffer Rantala, NTNU University Museum. Plan over dokumenterte spor på lokalitetene.*

Table 1. *Overview of archaeological features and dated context types at the excavated sites. Based on information in Bryn Ch. 3; Sauvage & Lorentzen Ch. 5; Sauvage & Macphail Ch. 7, Østmoe et al. 2023, Bryn et al. 2023.*

Category	Skeiet	Fjelnset	Hestnes
Short description	Settlement area represent the remains of at least nine buildings. Cultural layer deposits were present near the settlement. Cemetery located c. 150 north of settlement, containing 11 ring ditches. Agricultural layers and Ard Marks present at both areas, indicating cultivation of crops. 65 cooking pits scattered on both excavation areas, most in relation to the settlement area. Oblong layers containing charcoal superimposing several ring ditches and mound interior at the cemetery, interpreted as site clearing/planning.	Agricultural layer deposits found in part of the site. Settlement remains were limited. At least 62 cooking pits clustered at the site. Cemetery indicated by four fragmented ring ditches, damaged by lotting trenches and erosion. Grave goods recovered from looting ditches and stray finds imply Late Iron Age date. Only in situ grave were a fragmented boat grave (also looted). Porous charcoal layers with fired wooden remains and roots covered the ring ditches but preserved shape of mound interior.	Agricultural layers were recorded over large areas of at the site. 22 cooking pits was present. A small collection of cooking pits and a line of postholes, indicate a partially preserved walled construction (building?). Also present nearby, were a slag pit, and a charcoal production pit. An oval ring ditch from a flattened burial mound, contained the remains of a decomposed wooden burial chamber containing a rich furnished Viking age burial located within the ditch.
Cultivation layers and features	Cultivation layers, Ard Marks (7 dates)	Cultivation layers (2 dates)	Cultivation layers (3 dates)
Cooking pits	Cooking pits (21 dates)	Cooking pits (31 dates)	Cooking pits (13 dates)
Settlement features	Postholes, hearths, cultural layers and layers withing buildings, wall trenches, ditches, pits, forges, and slag layers (61 dates)	Hearths, pits (3 dates)	Postholes, pits, slag pit, charcoal production pit (10 dates)
Mortuary features	Pyre remains and cremated bone, Inhumation body stains, Grave goods (textile remains; wood (boat remains) faunal osteological remains), Layers and strata in ring ditches and mound construction material, Mortuary houses: wall trenches, trampled layer, charred plank remains, Charcoal stains and layers related to graves (57 dates)	Boat-grave backfill, Grave goods: possible decomposed wood from boat planking, Ring ditches and mound construction material (12 dates)	Wooden chamber: backfill and charcoal remains, ring ditche lower strata and mound construction material, grave goods: Woolen textile remains, wooden bark covering oval brooch, decomposed wood from small wooden chest (8 dates)
Clearing/planning features	Layers with charcoal covering ring ditches (4 dates)	Porous charcoal layers (2 dates)	Upper backfill/strata in ring-ditch (1 date)

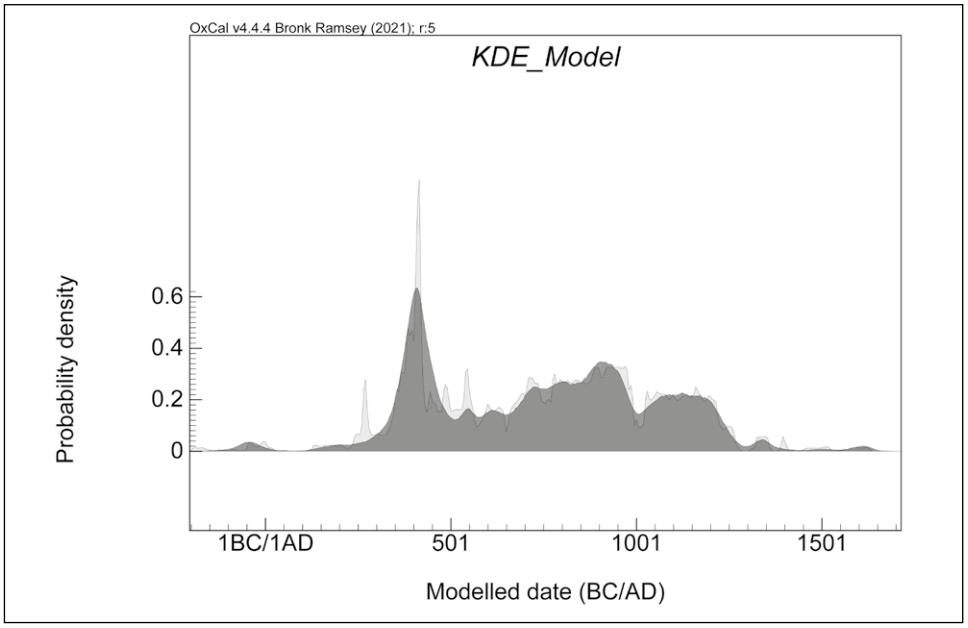

Figure 5. *KDE model of all included ^{14}C dates. Summed probability plot (SPD) in light grey. KDE-modell over alle ^{14}C-dateringer fra undersøkelsene.*

erosion. Thus, the site provides little mortuary evidence. This is reflected in the radiocarbon date results, which unfortunately means that no clear date for the construction and abandonment of the cemetery could be established (see discussion in results). Recovered finds that probably constitute scattered grave goods from the plundered graves point towards a Late Iron Age date for the cemetery (Bryn et al. 2023). The main site at Hestnes (Figure 4d) was placed between the modern farmyards and the shore, and contained the remains of a levelled burial mound with a richly furnished, decayed wooden chamber grave (see Øien & Heen-Pettersen Ch. 8). A limited amount of settlement and agricultural features were also recorded.

Accelerator Mass Spectrometry (AMS) radiocarbon dates are the main data for the chronological history of archaeological events at the sites. There are 235 radiocarbon dates included in the evaluation, which derive from a wide selection of different types of archaeological contexts (Table 1, Figure 5). This chapter presents the radiocarbon dates in five categories: cooking pits, settlement features, agricultural features, mortuary features and dates relating to site clearing/planning on the sites.

As discussed by Gustafson (2005), Herschend (2016) and Ystgaard et al. (2019), consideration should be taken when sampling mixed contexts like postholes, ditches and cultural layers to date houses, settlement and occupation phases. To compensate for these issues, we dated a series of postholes and features that belonged together, measured several samples from the same contexts and did control measurements. To study and illustrate the distributions of temporal trends in the datasets, we applied kernel density models using the KDE–Model function in OxCal. This method aims to compensate for some of the fluctuations and plateaus in the calibration curve which affect traditional summed probability radiocarbon plots (Bronk Ramsey 2017). We used OxCal version 4.4.4 and the IntCal20 curve (Reimer et al. 2020) for calibration and kernel density models in OxCal to illustrate temporal trends. Limited dates in certain categories hindered statistically significant KDE models, mainly in episodic features like layers from site clearing and agricultural layers. While not intended for rigorous statistical interpretations, these models approximate when activities occurred.

Included dates have been critically evaluated and several dates have been excluded from the results. These dates derive mostly from mixed contexts (such as charcoal in backfilled graves) and poorly preserved materials such as decomposed wood. These outliers had ranges that were clearly outside of other dates and typological dating from the same contexts. Dates prior to the start of the Scandinavian Iron Age (500 BC) have also been rejected. A list of dates is included at the end of the chapter.

RESULTS

Cultivation layers and agricultural features

Agricultural evidence in the form of cultivation layers and ard marks (from ploughing) were recorded at all sites. The evidence at Skeiet consisted of both cultivation layers and ard marks, which were located in both the settlement area and the cemetery (Figures 5a and b). However, ard marks were mainly revealed under the remnants of burial mounds at the cemetery, preserved from later ploughing by the mound remains. At Fjelnset and Hestnes, the findings were in the form of cultivation layers that covered parts of the sites (Figures 5c and d).

Twelve dates from cultivation layers and agricultural features indicate that the first Iron Age materialisations of agriculture in the Vinjefjord area happened during the first half of the first millennium AD (Figure 6). This period (c. AD 300–550) is represented at all three sites, indicating that growing crops and agricultural subsistence were extensively practised. Interestingly, the first part of the curve from Skeiet (Figure 6a) comes from the layers and ard marks under the flattened mounds at the cemetery (see also Sauvage & Lorentzen Ch. 5), indicating that it was placed upon cultivated land. The earliest date at Fjelnset, c. AD 250–400 (Figure 6b), may indicate the cultivation of crops in the same area or close to cooking pit-related activity (next section). However, it is important to consider that the intense use of cooking pits at this time could have produced a large amount of charcoal in the vicinity, which could be reflected in nearby soils (next section). Thus, it is reasonable to question the reliability of a single date. Similarly, a single date from Hestnes (Figure 6c) indicates agriculture-related features were made in c. AD 300–450, which may relate to settlement activity at the site (see *Settlement features* below).

From all three sites, there is a period without dates starting around AD 500. At Skeiet, the model implies a decrease from c. AD 500–600, from when there is a hiatus until c. 1050. The dates from Fjelnset and Hestnes (Figures 6b and c) indicate an earlier decline; however, the scarcity of dates means this may not be significant. A very limited number of dates from the sites indicate the reappearance of agricultural activity during the Late Iron Age and Early Middle Ages: c. AD 600–700 on Fjelnset, 700–1000 on Hestnes,

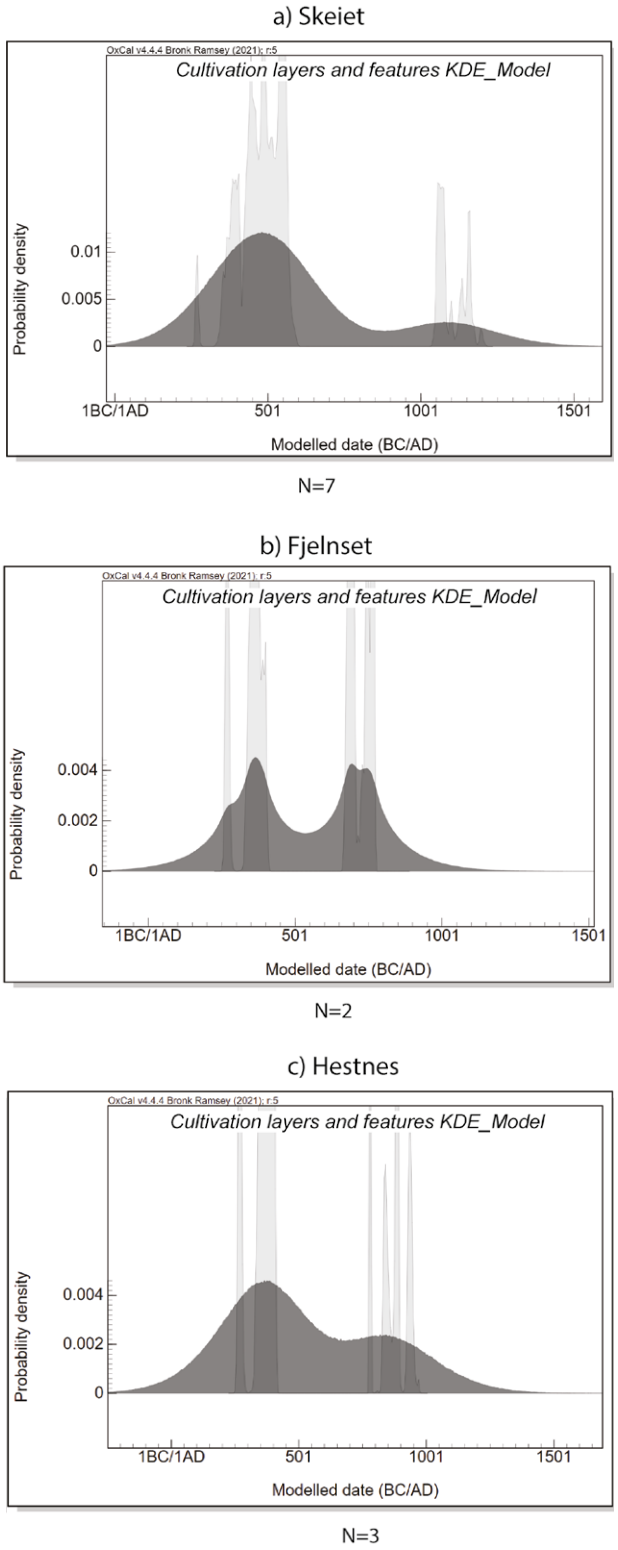

Figure 6. *KDE models of ^{14}C dates from cultivation layers and agricultural features: a) Skeiet; b) Fjelnset; and c) Hestnes. KDE-modell over ^{14}C-dateringer fra dyrkningslag og spor etter jordbruk.*

and 1050–1200 at Skeiet. Given the scarcity of data, the dates should only be interpreted to indicate the occurrence of agricultural activity and not as an indicator of when activity re-emerged.

Cooking pits

Cooking pits were common at the sites (149 finds). With a total of 65 dates, they form a good basis for estimating the chronology of the use of cooking pits in the Vinjefjord area during the Iron Age and medieval periods. Sixty-five dates entail they were made from c. first century BC to c. AD 1200–1300. However, the data indicates clear variations in intensity and continuity (Figures 7a–c). The earliest, apparently limited use is indicated by the first part of the curves from Fjelsnet and Hestnes, c. 100 BC–AD 100. From c. AD 250, the models indicate an all-over increase in the use of cooking pits. This is best seen at Fjelnset, where a considerable number of dates have ranges between AD 250–550, with a peak at c. 400–500 (Figure 7b). This indicates the intense use of cooking pits here in the Late Roman and Migration Periods. This distribution of dates is very dense, and no similar distributions are seen in the other models. The use of cooking pits in the same period is indicated at both Skeiet and Hestnes (Figures 7a and b). However, here they correspond to the first period with clear evidence of related buildings and settlements (next section).

There is a decrease in the dated cooking pits from c. AD 500–550 at all sites, indicated by a drop in the KDE curves at Skeiet and Hestnes in this period. Likewise, the curve for Fjelnset falls sharply in the fifth century, with the final dates of c. AD 440–550 indicating that the intense utilisation of cooking pits also stops here at this time. The dates from Skeiet indicate a hiatus in use between approximately AD 550–600/700. At Hestnes, the pause lasts until c. AD 1000. A similar trend is seen in the settlement features (next section). At Skeiet, cooking pits were again made from c. AD 650–700. From here, the data implies the continuous use of cooking pits during the Late Iron Age. However, the curve from Skeiet suggests a short break in c. AD 1000 (Figure 7a), which can imply a pause in the forming of cooking pits at the end of the Late Iron Age. A similar observation is made in the settlement data (below). The use of cooking pits seems to have stopped completely around AD 1200–1300, as implied at Skeiet and Hestnes (Figures 7a and c), which also aligns with trends in the settlement dates (below).

Settlement features

The most extensive settlement features were found at Skeiet, situated 150 m south of the cemetery, showcasing a wide range of features (refer to Table 1). This area was most likely a settlement during the Migration Period, featuring a longhouse, followed by various buildings and activity traces spanning from

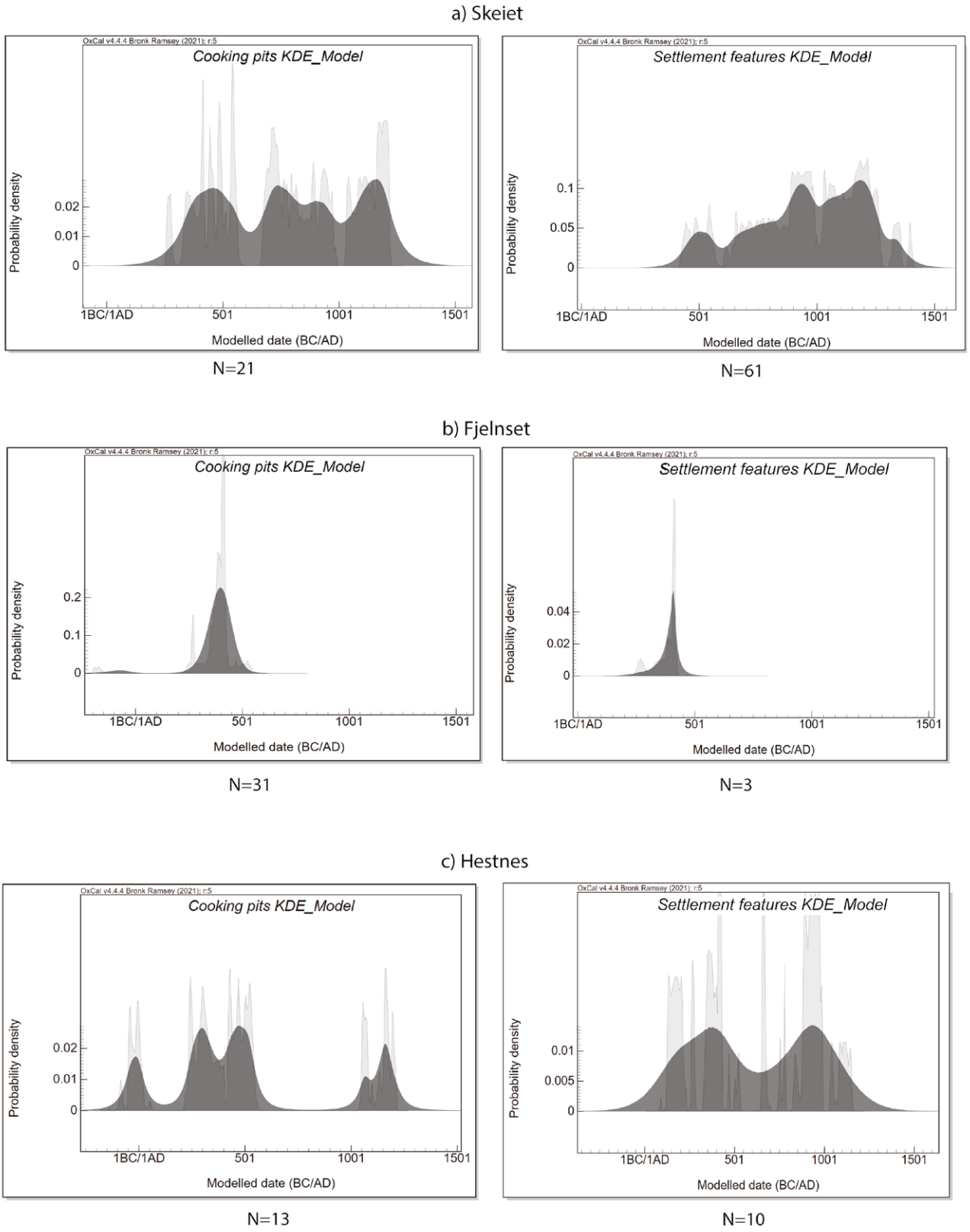

Figure 7. *KDE models of ^{14}C dates from cooking pits and settlement features: a) Skeiet; b) Fjelnset; and c) Hestnes. KDE-modell over alle ^{14}C-dateringer fra kokegroper.*

the Late Iron Age to the medieval period (Bryn Ch. 3). At Hestnes, the evidence constituted a concentration of postholes from a possible building and spread evidence of apparent settlement-related activity (blacksmithing and charcoal production) (Østmoe et al. 2023). Fjelnset provided only scant evidence (pits and possible hearths), entailing that no clear settlement was present here.

KDE models (Figure 7) suggest a timeline for settlement features spanning from the first centuries AD to approximately 1300–1400. Skeiet (Figure 7a), which has the most concise data, indicates a concentration of settlement features in the Migration Period, c. AD 400–550, which relates to the longhouse from this period (Bryn Ch. 3). Fjelnset (Figure 7b), indicates fewer features, with three dates hinting at limited forming of settlement-related features in the same period. This corresponds to the intense use of cooking pits at this site. Hestnes (Figure 7c) shows a similar peak in dates, corresponding to potential building remnants discovered there.

A noticeable decline in settlement-related activities emerged in the sixth century, evident in the KDE curves for Skeiet and Hestnes. This is visualised as a drop in the curve in c. AD 500–650 at Skeiet and 500–900 at Hestnes. Likewise, Fjelnset does not display any dates from settlement features after c. AD 500. A similar trend is seen in the cooking pit data (above). These observations also align with a local palaeobotanical study, which suggests changes in landscape use and vegetation in this period (Overland & Hjelle Ch. 2). This indicates several changes in settlement-related activity in Vinjefjord and aligns with societal shifts documented in the years around AD 536 in Scandinavia (to be discussed below).

The data (Figures 7a and b) suggest a resurgence in settlement activities from the seventh century at Skeiet and Hestnes. Building phase analyses at Skeiet (Bryn Ch. 3) indicate an initial phase with scattered postholes and vague features culminating in an identifiable building around AD 650–750. Subsequently, a continuous increase in dates is observed, peaking between AD 900–1000 and coinciding with the most extensive building phase (Bryn Ch. 3), indicating sustained growth and activity during the Late Iron Age. Therefore, steady growth and activity is suggested during this period. A similar peak may be suggested at Hestnes; however, the trend is not as clear here because of fewer dates.

From around AD 1000, ongoing settlement-related activity is observed at Skeiet and Hestnes. However, a slight decline around AD 1000–1100 at Skeiet hints at a minor hiatus in the early Middle Ages, a trend supported by evidence from the cooking pits. Though evidence exists for settlement-related activity at Hestnes during this period, it is comparatively less substantial, mainly comprised of layers containing slag as well as charcoal production pits. In contrast, Fjelnset does not display evidence of settlement-related activity during the Late Iron Age and the medieval period.

No clear form of late medieval or post-medieval settlement features was found. The data from Skeiet indicate a peak in settlement features around AD 1200 followed by a steep decline, and no samples were dated after approximately AD 1350. A similar situation is seen in the Hestnes dates, where they stop even earlier (c. 1150); however, this is based on very few dates. This also aligns with the end of dates from cooking pits (above). Also of relevance is the mentioned palaeobotanical study, which indicates a significant decrease in settlement and agricultural factors in the mid-1300s (Overland & Hjelle Ch. 2). This suggests a clear downturn in settlement dates by the last part of the 14th century and entails a profound reduction and/or absence of settlement activity. It seems very plausible to relate these observations to the European late medieval population and agricultural crisis (to be discussed below).

Mortuary features

All three sites featured mortuary elements in the form of levelled burial mounds containing graves and associated structures (see Table 1 for details). The Skeiet cemetery unveiled a rich array of findings, including at least 11 ring ditches surrounding sites of cremations, inhumations, mortuary houses and boat graves. These discoveries attest to a diverse and intensive range of burial practices and rituals (Sauvage & Lorentzen Ch. 5, Macphail & Sauvage Ch. 6, Sauvage & MacPhail Ch. 7, Øien & Heen-Pettersen Ch. 8, Kjellström et al. Ch. 9). Hestnes contained remnants of a single flattened burial mound with a wooden chamber grave. Additionally, burial mounds were identified at Fjelnset, indicated by four partially preserved ring ditches and a fragmented boat grave (Bryn et al. 2023). Unfortunately, these remains had suffered damage from looting trenches and erosion, resulting in less tangible evidence.

Data from Skeiet revealed concise KDE models reflecting the utilisation of burial mounds and graves spanning from approximately AD 500–600 to c. 950–1000 (Figure 8a), indicating that the mortuary features were made during the span of the Late Iron Age, a result which is similar to the evaluation of the overall chronology study of the site (Sauvage & Lorentzen

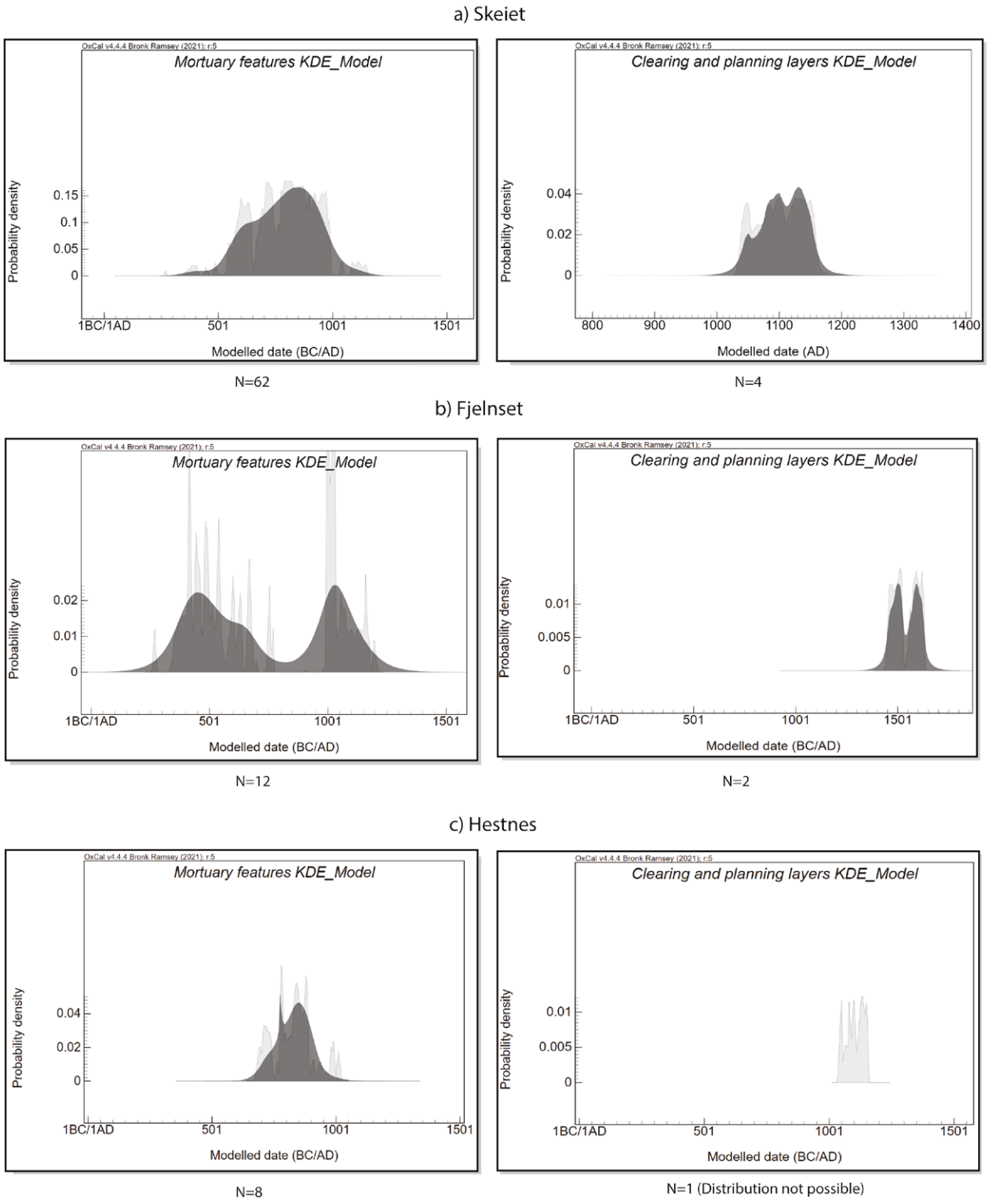

Figure 8. *KDE models of ^{14}C dates from mortuary features and features related to site clearing and planning: a) Skeiet; b) Fjelnset; and c) Hestnes. KDE-modell over alle ^{14}C-graver og spor etter planering.*

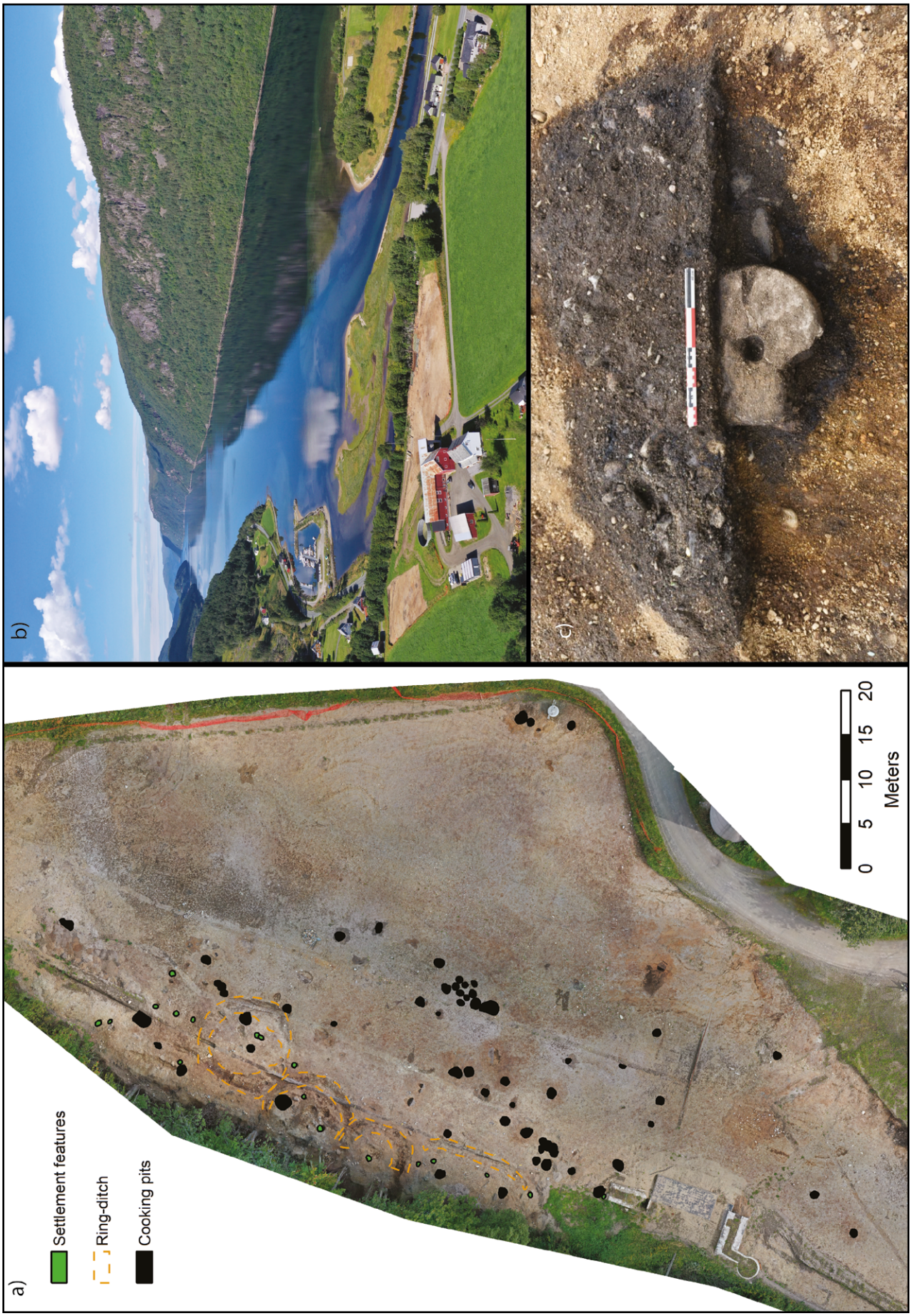

Figure 9. *Key observations on Fjelnset: a) cooking pits and later ring ditches; b) landscape situation; and c) rotary quern in situ. Photos: a–b Kristoffer R. Rantala; and c) Mari Raastad, NTNU University Museum. Nøkkelobservasjoner på Fjelnset med kokegroper og fotgrøfter (a), landskap (b), og dreiekvern funnet i en av kokegropene (c).*

Ch. 5). At Hestnes, the data indicated dates between approximately AD 700 and 950/1000 (Figure 8c). The later start at Hestnes is most likely due to the data originating from a single burial mound compared to the larger cemetery at Skeiet. The burial chamber itself is dated to c. 850–900 (Østmoe et al. 2023, Øien & Heen-Pettersen Ch. 8), and the broader range of dates aligns with a history of constructing the mound, the age of grave inventories and post-burial deposition.

In contrast, the dates from Fjelnset portrayed a substantially different scenario, deviating from the expected Late Iron Age range observed at the other sites. Instead, the data presented ranges spanning from approximately AD 300–750 and AD 950–1250. These samples were primarily retrieved from ring ditches and grave fillings, encompassing mixed contexts possibly associated with pre- and post-cemetery activities. Another significant factor contributing to this result is the substantial evidence of looting, evidenced by looting pits and trenches that penetrated central areas of the mounds and graves. Consequently, samples that could ascertain the actual burial dates were absent, resulting in a lack of dated evidence for the use of these graves. Notably, datable artefacts like glass beads and a spear, recovered in association with a looting trench within ring ditches during excavation (Bryn et al. 2023), were dated to the Viking Age, implying a Late Iron Age origin for the burial mounds.

Site clearance and planning

A final set of dates pertains to layers and deposits that potentially indicate clearing and flattening activities at these sites. At Skeiet, they derive from layers formed over the ring ditches and directly onto the subsoil inside of them. This suggests the removal or flattening of the mounds during the formation of these deposits. Similarly, at Hestnes, an upper stratum of the ring ditch revealed a backfill, potentially remnants of the levelled mound (Østmoe et al. 2023), implying a comparable scenario. At Fjelnset, distinct layers consisting of porous charcoal and burnt wooden roots covered segments of the ring ditches. However, these layers did not encompass the interior subsoil of the mounds, retaining a rounded shape that suggests the presence of the grave mounds during their formation. Their high charcoal content and porous nature imply a vegetation fire, potentially used to clear the area before establishing a field on the site (Bryn et al. 2023).

The dates obtained from Skeiet (Figure 8a) indicate that these layers were formed roughly between AD 1040–1160. This establishes a terminus ante quem for the levelling of the mounds, indicating their destruction and levelling during the Early Middle Ages. A single date from the upper backfill within the ring ditch at Hestnes suggests a very similar time frame, approximately AD 1045–1155 (Figure 8c). This suggests that the mound was dismantled in the Early Middle Ages, similar to the situation at Skeiet but with less substantial evidence. In contrast, the date from the burnt vegetation layers at Fjelnset (Figure 8b) suggests a late medieval or Early Modern date.

DISCUSSION

Spread human activity in the Pre-Roman and Roman Iron Age (c. 100 BC–c. AD 300)

The first recorded Iron Age activity in Vinjefjord is based on scattered and spread evidence, mainly in the form of cooking pits and agricultural features dated to the period c. 100 BC–AD 300. This data implies that no clear buildings or settlements could be identified in Vinjefjord from this period. Considering the large number of known contemporary settlements and buildings in Norway, this diverges from the main picture (Fransson 2019, Henriksen & Bryn 2019, Løken 2020, Gjerpe 2023). This could indicate that in the early Iron Age, the population of Vinjefjord was more scattered compared to other areas.

However, since the excavation only pinpointed key sites along a planned construction path for roadworks, other areas well-suited to early Iron Age occupation in this landscape are not represented in the data. A possibility near Skeiet is Vinnan in Vinjeøra, which has a toponym that is traditionally dated to the Early Iron Age (Hallan 1959) and is situated on a terrace facing the fjord, well-suited for early settlement (see also aerial photo, Figure 3). Therefore, buildings and occupied places probably existed but were located outside of the excavated areas.

Scandinavian settlement patterns from this period are often described as moving around from place to place in the landscape, with buildings lasting for only one or two generations (Herschend 2009, Grønnesby 2019, Hennius 2020, Gjerpe 2023). This may have resulted in a more dispersed pattern of spread activity across the landscape, which could be what is seen in the scattered cooking pits and agricultural layers in Vinjefjord dating to this time.

Communal gathering and stable settlement in the Late Roman and Migration Period (c. AD 250–550)

After this period, the results suggested intensified activity, implied by increased usage of cooking pits and the forming of settlement traces from the Late Roman to the Migration Period. The intensely concentrated utilisation of cooking pits implied at

Fjelnset in this period deserves closer inspection. This site was placed at the end of Vinjefjord, with a clear orientation towards the fjord and the estuary of the local river (Figures 9a–b). This was the largest group of archaeological features on this site, and the dates represent a considerable temporal concentration of events, particularly in the Migration Period in approximately AD 400–500 (refer to Figure 9a). Like most cooking pits in Norway, they contained charcoal and fire-cracked rocks but very few objects. At Fjelnset, however, the upper part of a stone rotary quern was discovered in one of the pits (Figure 9c), which is a rare find in this type of context. Rotary querns were introduced into Scandinavia in the second century AD but seem to have become more common in the archaeological material from the fourth century (Hauken & Anderson 2019, Figures 10 and 11), aligning with the dates from Fjelnset.

The site displays several similarities to the Scandinavian cooking pit fields; concentrations of cooking pits without clear related settlement features, which are often interpreted as communal gathering sites. They relate to feasting and the preparation of food in pits, associated mainly with early (intertwined) religious, political, military and legal gatherings (Narmo 1996, Gustafson et al. 2005, Ødegaard 2019). Most fields contain more than 100 pits (Ødegaard 2021:332). Fjelnset contained only 62 pits. However, since the site was disturbed by erosion and ploughing, and had suffered damage caused by modern interventions (e.g. a WWII bunker), the original number may have been higher. Regional variations should also be expected, as seen in the cooking pit field in Leikvin, Sunndal with its 45 known pits (Narmo 1996). Important common factors are the lack of related settlement features and concentrations in dates that show repeated use. The general picture is that most cooking pits date to the Early Iron Age, especially the Late Roman and Migration Periods, and most go out of use at the end of the Migration Period (Ødegård 2021:231). This corresponds well with Fjelnset, where the dense distribution of the dates indicates intense, repeated use of the area during this period without clearly related settlement features.

Localisation to strategic, easily accessed, neutral and often liminal areas, frequently near water or wetlands, are important factors for the Scandinavian cooking pit fields (Ødegaard 2019). The landscape situation at Fjelnset (Figure 9b) indicates a strategic placement with an overview and control of the fjord and local landscape. The nearby estuary provided a water connection and may have been a well-suited landing place for boats and ships to access the site. In early written records, Vinjefjord is named *Fjolnir*. Nils Hallan (1959) argues that this was named after the river Fjelna at Vinjeøra (which gave rise to the name Fjelnset) and that this implies that the fjord end (and possibly the estuary) was an important destination for voyagers on the fjord. This may suggest that the proposed cooking pit field at Fjelnset was made at a place that was accessed frequently by people from different parts of the fjord, which would form a good basis for local gatherings.

Rotary querns from the Early Iron Age, like the one found in one of the cooking pits at Fjelnset, are usually found inside and related to houses in settlements (Hauken & Anderson 2019). However, another context where rotary querns are encountered is in Scandinavian Early Iron Age hillforts, where they may represent bread baking as part of the centralised functions, gatherings and meals on the hillforts (Ystgaard 2014:145–213, with references). This can perhaps be seen as a parallel to the functions of the cooking pit fields. However, a clear difference is that the cooking pit field provides a communal and collectivistic availability, compared to the more defensive and protected character of the hillforts.

During the same period that the cooking pit field at Fjelnset dates from, the KDE data imply an increased concentration of settlement and agricultural activity at Vinjefjord. Firstly, this is related to a longhouse with related features (cooking pits, hearths and agricultural layers) at Skeiet in Vinjeøra (Bryn Ch. 3). Secondly, a similar increase (though smaller) is also implied at Hestnes in Valsøyfjord, where a concentration of postholes and cooking pits may indicate settlement-related activity (refer to Figure 4d). Compared to south and east Norway, few clear Migration Period buildings and settlements are known in Central Norway (Ystgaard 2019) (for an overview of south Norway, see Løken 2020 and Gjerpe 2023). At nearby settlement areas in Ørland in Central Norway, the number of Migration Period buildings is low, and on-site activity had already declined heavily at the beginning of the period. Vinjefjord, on the contrary, seems to display stable activity and population during this phase. The use of a communal gathering site at Fjelnset suggests that the inhabitants collaborated on several issues, such as religion, politics and legal matters – using the fjord as the main artery for transport.

Crisis and decline in the transition from the Early to the Late Iron Age (c. AD 500–600)

Several of the variables express a decline in dated events in the period c. AD 500–600 in Vinjefjord.

This is seen in the lack of dated cooking pits and settlement features from approximately AD 500–650 at Skeiet (Figure 7a). The two KDE curves display a similar fall in this period, and the Migration Period longhouse was abandoned (Bryn Ch. 3). At Fjelnset, the forming of cooking pits came to a full stop around AD 500, indicating that the cooking pit field went into disuse around the same period (Figure 7b). A similar pattern (though based on fewer dates) is implied in the data from Hestnes, where no cooking pits were formed from c. AD 550 until after AD 1000 (Figure 7c). Similar patterns are seen across Scandinavia, and this is often referred to as the AD 536 event, based on a hypothesis that a proposed volcanic eruption, in this and following years, caused a major global climate deterioration event. Several reasons have been proposed for profound societal changes in this period, ranging from climate change (the Late Antique Ice Age), the outbreak of the plague (in the aftermath of climate deterioration), structural changes in society, and the organisation and often centralisation of settlements after the events (Löwenborg 2012, Iversen 2016, Stamnes 2016, Solheim & Iversen 2019, Gundersen 2021, Loftsgarden & Solheim 2023). It seems reasonable to suggest that the data from Vinjefjord follow the same general pattern.

In Central Norway, however, a reduction in dated settlement features may have started already at the beginning of the Migration Period. Extensive study of settlement history in nearby Ørland suggests a decline in settlement activity from c. AD 400. Based on correlations between minimal settlement evidence and palaeobotanical records, it is suggested that local settlements were finally abandoned in c. AD 550, followed by a 400-year hiatus (Overland & Hjelle 2019, Ystgaard 2019b). In comparison, the data from Vinjefjord suggests solid settlement evidence during the Migration Period, before a more abrupt recession in c. AD 500–600. The palaeobotanical study conducted near Skeiet provides local botanical data that may be compared to these trends (Overland & Hjelle Ch. 2). Here, the pollen data suggests several changes from c. AD 550–800, such as an increased use of fire and emphasis on outfield exploitation, later followed by a range of landscape changes indicated by woodland clearing and an increase in grazing. The first observations align with the decline in settlement features and cooking pits. However, the results above also entail that both cooking pits and settlement re-emerge in c. AD 650–700, which suggests faster recovery post 550 compared to Ørland, for example. This may align with the indicated woodland clearing and grazing, suggesting the swift recuperation of agriculture and settlement activity in the Late Iron Age at Vinjefjord. These observations might imply regional variations in Central Norway in mitigating and adapting to instability and a changing climate. A similar result seen in southern Norway indicates that mid-sixth-century climate changes affected agriculture and survival strategies differently in the varying geography of Norway (Gundersen 2021).

Building burial mounds and territoriality in the Late Iron Age (c. AD 550–1050)

Together with the re-emerged settlement factors, a large part of the archaeological evidence from Late Iron Age Vinjefjord derive from mortuary features. The KDE data from Skeiet (Figure 8a) suggest that burials and the construction of mounds commenced in c. AD 500–600 (see also Sauvage & Lorentzen Ch. 5). This places the start of burials in the earliest part of the Late Iron Age, at the same time as the nearby settlement data decreased. Dates from agricultural features (ard marks and cultivation layers) seen under the mound remains here (see *Cultivation layers and agricultural features* in the Results section) indicate that they were placed on an area formerly used as a field during the Migration Period settlement phase at Skeiet. Therefore, it is indicated that previously arable land was repurposed for burial mounds and cemeteries. While the cemetery at Fjelnset could not be reliably dated, the stray finds of grave goods imply a Late Iron Age date, which entails that the Early Iron Age cooking pit field was substituted by a cemetery. A change in landscape use from an infield (Skeiet) or cooking pit field (Fjelnset) to cemeteries after the c. AD 550 events may indicate the restructuring of landscape use in Vinjefjord and the dedication of previously cultivated land to burial mounds (similar trends are observed in Eastern Norway (Moen 2020). Some aspects of the changes in the landscape indicated by the palaeobotanical data mentioned above may be what we are seeing here. Since the first burials were cremations (Sauvage & Lorentzen Ch. 5), it may also (partially) explain the increase in charcoal in the nearby pollen records at this time.

Late Iron Age mounds can have many functions in addition to their role as burial sites. Studies show that mounds are often placed close to historical farmyards, and a link between settlement and grave mounds is often indicated (cf. Grønnesby 2019:280–283). One relevant discussion here is their role as the physical manifestation of a familial ancestral claim to a given territory (*odal*) (cf. Ødegaard 2010, Zachrisson 2017). Torunn Zachrisson (2017) claims that these property

rights were formalised in the society that emerged in the Late Iron Age (after the proposed AD 550 events), giving a person and their family the right to decide over and dispose of land, and burial mounds were seen as a physical manifestation of this right. Moen (2020) also underlines the social function and how Late Iron Age cemeteries operated as landmarks and monuments that helped create and embody the orally transmitted social memory of the family and its connection to the land. The dedication of arable land to burials (as we may see at Skeiet) can be a way to keep burials close and, as such, make them accessible to and integrated within everyday life. Also, cemeteries placed on previous cooking pit fields are examples that connect them to communal locations that were linked to repeated use and shared experiences.

According to these views, the Late Iron Age mounds in Vinjefjord may be seen as a mark of new territoriality and a physical manifestation of familial property rights in the area. This practice seems to have originated in the Late Iron Age. Their visibility was an important factor in communicating this to the general area and neighbours. It is also interesting to note that the cemetery at Skeiet was placed near the adjacent farm Vinnan and a proposed natural border (See the Material and methods section: note the ravine in the aerial photo, Figure 3), since mounds placed close to boundaries are a specific strong representation of physical and symbolic prehistoric territoriality (Ødegaard 2010). Considering Moen's view, it is also important to note that this connection formed parts of creating common histories that transmitted the memory of the family's relation to the land and that the dedication of arable land close to settlements and borders to this purpose shows the importance of these connections.

The cemetery at Fjelnset may be seen as a continuation and a mark of the importance of the previous communal cooking pit field. The practice of locating assemblies (*thing* sites) in cemeteries with a long history of use, for example, may underline the assembly's relation to communal identity and the commemorative practice of cemeteries. Perhaps Fjelnset could have functioned as a communal gathering place also in the Late Iron Age? However, it is also possible to view Fjelnset as a case of 'privatising' a formerly communal site from the previous period, moving it into the familial property rights and structures of the Late Iron Age.

The settlement dates from Skeiet entailed that settlement activity re-emerged in c. AD 650, while the dates from the cemetery indicated that the first burials started in c. AD 500–600. The settlement data is a bit elusive until the 700s, but the data indicate the continuous formation of settlement-related features fixed in the same area, near the burial mounds, throughout the Late Iron Age and into the early medieval period, spanning a variety of different building types (see Bryn Ch. 3). This indicates that the construction of mounds started before clear settlement evidence emerges and that a stable Late Iron Age settlement was established at Skeiet about a century after the first mounds. Considering the discussion above, it is, therefore, reasonable to question the association between the cemetery and settlement in the earliest part of the Late Iron Age and to consider whether this suggests that there is a time aspect in creating and maintaining property rights.

We do not know when the wandering scattered pattern often seen in Early Iron Age settlements (as noted in Vinjefjord, particularly in the Pre-Roman and Roman Iron Age) came to an end and when the fixed dwellings and farmhouses of the Late Iron Age property system came into being. Investigations at historical farmyards with cultural deposits in Trøndelag indicate that the process probably happened in the early part of the Late Iron Age (cf. Grønnesby & Heen-Pettersen 2015). The delay indicated at Skeiet entails that the settlement and the first mounds at the cemetery did not coexist at the start, which opens up the possibility that the restructuring of the landscape and the placement of burial mounds on former infields happened before an associated stable settlement was established. Perhaps this indicates that the process of territorialisation and establishment of ownership of land was gradual. This opens up the possibility that the cemeteries (at least at Skeiet) were the first element in building territoriality and identity related to ownership of land in early Late Iron Age Vinjefjord.

According to medieval legislation, it would take five generations, or approximately a century, to claim ownership of a particular piece of land through *odal*. The claimant had to trace their lineage back five generations to an individual buried in the burial mounds on the property (Zachrisson 2017). If we apply this concept to the Late Iron Age, it is possible that the individuals who built the first Late Iron Age building at Skeiet could trace their lineage back to the person buried under the original mound. This suggests that the burial mounds may have functioned as landmarks and monuments, used to establish ownership, build a social memory of the family and connect them to the land before constructing a permanent dwelling on the property.

Viking Age to early medieval Vinjefjord (AD 750–1150) – increased activity, wealth, religious change, and changing ownership

The KDE models from the investigated sites demonstrate an increase in dates from both settlement features, cooking pits and mortuary features, which indicates a broad range of activities and utilisation during the span of the Late Iron Age, particularly in the Viking Age (c. AD 750–1000). Among the observations are stable or increasing amounts of settlement data and cooking pits. Additional settlement evidence is also indicated by buildings discovered at Engdal, situated between Vinjeøra and Hestnes (see Bryn Ch. 3), which may imply expansion in settled areas along the fjord. This period stands out as a very expansive and rich period in Vinjefjord, as demonstrated by several of the studies in this book.

Observations include the continuing expansion of the cemeteries with extensive use for burials, together with increased complexity in ritual activity, changing mortuary practices, demonstrated at Skeiet by a change from cremations to inhumations, and the presence of mortuary houses, boat burials and the construction of a wooden chamber grave at Hestnes (Sauvage & Lorentzen Ch. 5, Kjellström et al. Ch. 9, Øien & Heen-Pettersen Ch. 8). Also, the increasing importance and impact on the area from long-distance trade is indicated by numerous grave goods, such as jewellery and coins from both the Eastern and Western worlds (Maixner & Hellan Ch. 4, Sauvage & Lorentzen Ch. 5). Current research suggests that trade via the Norwegian coastal sailing route towards the early emporia in today's Denmark started as early as the first half of the 700s (cf. Baug et al. 2019, Philippsen et al. 2022). Vinjefjord may have provided an easy connection to this trading route, which may be expressed in the presence of imports. Finds of early eighth century beads from South Scandinavia at Skeiet may align with these observations (Maixner & Hellan Ch. 4). This may also have encouraged participation in Viking raiding, which may have been a further important factor in building wealth in the Vinjefjord society (cf. Baug et al. 2019, Sauvage & Lorentzen Ch. 5).

Judging by the KDE data for the mortuary features in Vinjefjord, there is little evidence of burials in Late Iron Age cemeteries after c. AD 950. This observation is further supported by the detailed study of the chronology and development of burial practices at Skeiet (Sauvage & Lorentzen Ch. 5). Similar dates for the end of pre-Christian burial practices are typical for large parts of Norway, particularly western and central Norway, while less central inland areas in south and east Norway tend to demonstrate a later change. It is generally agreed that this reflects the Christianisation process and the prohibition against pagan cult practices in early Church law (Nordeide 2012). Thus, the Vinjefjord data seem to indicate that the area follows the same general trend.

The results propose that the burial mounds at Skeiet were flattened and destroyed in c. AD 1040–1160, and in 1045–1155 at Hestnes, shedding light on what happened to pre-Christian cemeteries in the Middle Ages. It is generally recognised that a considerable proportion of the Iron Age burial mounds in Norway have been destroyed. However, this is usually attributed to agricultural expansion and mechanisation in the Early Modern and Modern Periods (cf. Forseth 2007). The dates from Vinjefjord are, to the knowledge of this author, the only evidence that burial mounds were removed in the early Christian Middle Ages. This could imply the deliberate destruction of 'heathen' graves, perhaps a reflection of zealous early Christian behaviour. However, this does not make immediate sense if we consider that the burial mounds were seen as a physical manifestation of *odal* and property rights, as mentioned above, which is a legal principle that is recorded well into the Late Middle Ages (Zachrisson 2017). According to this view, it seems irrational to remove the local burial mounds by the inhabitants of the farm.

It is interesting to consider that data presented for Skeiet, above, also indicate a reduction in dated settlement features and cooking pits just before or at the same time as the clearing and levelling of the mounds. In relation to this time, the dates indicate stable continuity in both settlement and mortuary data. Detailed study of the building phases at the settlement (Bryn Ch. 3) indicates that long-term continuity during the Late Iron Age seems to come to an end at this point, and a new phase is documented in the late 11th century, where old buildings seem to be demolished to make space for a larger building. This could imply a profound change on some of the local farms in the Early Middle Ages, and the related destruction of the burial mounds thus may imply that this also involved a change in property rights and ownership, where the new owners did not have an ancestorial connection to the burial mounds.

Population decline and crisis in the Late Middle Ages (c. AD 1250–1500)

An important trend in most of the KDE models presented here is a general decline in dated events in the later part of the Middle Ages. This is particularly evident in the data for cooking pits and settlement

Figure 10. *Aerial photo showing the oblong features that superimpose the flattened mounds at Skeiet. Photo: Kristoffer R. Rantala, NTNU University Museum. Dronefoto med spor etter planeringslag over gravhaugene på Skeiet.*

features at Skeiet and Hestnes, where there is a profound decline starting in c. AD 1200–1300. Likewise, very few dates for any feature type are seen in the data after c. AD 1350. Hence, the radiocarbon dates and archaeological material from Vinjefjord show an almost total lack of late medieval activity. This observation can be aligned with results from the palaeobotanical study which indicate a significant decrease in settlement and agricultural factors in the mid-1300s, such as a reduction in charcoal values and an indication of reforestation (Overland & Hjelle Ch. 2), indicating an end to the nearby settlement and agricultural activity.

These observations most likely link to the well-known demographic decline and crises in the Late Middle Ages, which are well documented in European historical research. In recent years, much of the discussion has revolved around the questions of causality and the driving forces of climate change (the Little Ice Age), agrarian crises and particularly the plague (the Black Death in Norway from 1349). There is little controversy over the fact that these periods represented a major negative societal and demographic impact on Europe and Norway (Dybdal 2016, Schmid et al. 2015).

When estimating the impact of this crisis in the Hemne and Vinjefjord area using medieval tax records, Nils Hallan (1959) documents a severe decline in the number of working Late Medieval farms and postulates that the area was severely diminished by the crisis. The tendencies observed in the archaeological and vegetation data probably correlate to and support this study. Thus, the archaeological chronologies and the palaeobotanical record support that the area was highly affected by the late medieval agrarian and demographic crises. It is, however, important to note that the data presented here indicate a fall in activity already from the mid-1200s, which could entail that the impact of the Late Medieval crisis started before the onset of the Black Death in 1349. This could indicate that the decline in activity predates the mid-1300s. Similar trends are also recorded in both historical and archaeological evidence (e.g., Dybdal 2016, Rundberget 2017). Thus, it may indicate that the plague may have reinforced an already existing trend.

The almost complete lack of post-1350 dates for Vinjefjord indicates that several of the areas must have been left deserted for a considerable time. This indicates that local farms, such as Skeiet, did not seem to have survived the harsh times. This is supported by

the historical records, which suggest that it did not reappear as an independent farm until reoccupation in the 17th century, along with several other farms in the area (Hallan 1959). However, the KDE curve for clearing and planning layers for Fjelnset may be of interest here. These are the only two dates from Vinjefjord after AD 1350. The interpretation of these layers as evidence of clearing of the area by fire (see the Results section) could imply that vegetation was cleared as part of the reoccupation of the land. This would correspond with historical records (Halland 1959) which suggest a period of reoccupation and a more stable population in Vinjefjord after the medieval period.

CONCLUSION

Since previous studies had to rely on a very limited record of stray finds and placenames, the recent excavations provide a much better foundation for estimating patterns of human activity in the area. The discussion entails that the Vinjefjord area presents a rich cultural-historical development during this period and entails that the area experienced dynamic shifts in, for example, settlement patterns, activities, ritual patterns and property rights.

In the Early Iron Age (500 BC until c. AD 300), scattered evidence of cooking pits and agricultural features suggests a dispersed pattern of human activity. The absence of clear buildings or settlements in this period contrasts with the broader picture in Norway, indicating a more scattered population in Vinjefjord at this time. However, it must be considered that the bias caused by excavations that only followed a pre-established route for road construction could result in a more dispersed pattern than that seen elsewhere. The Late Roman and Migration Period (c. AD 350–550) seem to provide a period of stable human activity. The discovery of a concentration of cooking pits at Fjelnset suggests a communal gathering site at Vinjeøra, with possible religious, political, military and legal functions. The strategic location of the cooking pits near the estuary and the fjord indicates a site of importance for the local community. The presence of a rotary quern in one of the pits is a rare find, possibly indicating a connection to centralised functions like those seen in the hillforts.

The decline in dated events, particularly cooking pits and settlement features, around AD 500–600 aligns with broader trends in Scandinavia during the transition from the Early to the Late Iron Age. This probably relates to the AD 536 complex of events and the Late Antiquity Ice Age, such as climate change and societal instability. The relatively quick reappearance of both settlement features and cooking pits implies a faster recovery after this time in Vinjefjord than that seen elsewhere, which is an important result that underlines the importance of regional variations in response to such events. The period after AD 500–600 includes several observed changes, including a shift in landscape use, such as a change from cultivated fields to burial mound cemeteries. This may reflect changes in societal structures and property rights. Late Iron Age mounds may be regarded as manifestations of familial property rights and territoriality, contributing to the creation of social memory and identity.

The Late Iron Age, particularly the Viking Age (AD 800–1050), introduces an increase in settlement activity and presents a wide range of burial and ritual practices at the cemeteries. This reflects a dynamic and prosperous era in the area, which emphasises the importance of the fjord as an important point of access for sailing routes, which enabled participation in Viking raiding and trade that had a major influence in the area. The observed decline in pre-Christian burial practices post-AD 950 aligns with the Nordic Christianisation process and early Church prohibitions against pagan rituals, which show the area's connections to the Scandinavian Viking world. Of particular interest in Vinjefjord is the evidence for the destruction of burial mounds during the transition from the Viking Age to the Early Middle Ages (c. AD 1050–1150). This may reflect the deliberate destruction of pre-Christian ritual monuments. However, since this event seems to align with disruptions in building phases at some of the farms (seen at Skeiet), it may also reflect a change in ownership of farmland, if we consider that the notion of burial mounds as proof of familial property rights continues in the Christian Middle Ages.

The decline in dated events in Vinjefjord in the later parts of the Middle Ages (c. 1250–1350) reflects broader demographic and societal challenges. This correlates with local historical records and new archaeological evidence, and indicates a severe decline in the number of working farms in the region. However, since the decline in activity began in the mid-1200s, we may suggest that the impact of the late medieval crisis predates the Black Death in 1349. The almost complete lack of post-1350 dates suggests a period of considerable desertion and abandonment in Vinjefjord. Historical records and the KDE curve for clearing and planning layers at Fjelnset hint at reoccupation and more stable population in the area in the 17th century.

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SAMMENDRAG

Dette kapittelet utforsker kronologiske trender ved nylig utgravde lokaliteter i Vinjefjord-området i Midt-Norge, med fokus på jernalderen og middelalderen. I førromersk jernalder og romertid i eldre jernalder presenteres spredte funn som antyder en fragmentert bosetning (ca. år 500–300 e.Kr.). Senere, i sen romersk jernalder og folkevandringstid (ca. år 350–550 e.kr.), vitner et kokegropfelt og konsentrasjoner av bosetningsspor om økt aktivitet mer stabil bosetting, og bruk av et felles møtested i dagens Vinjeøra. I perioden rundt år 500–600 e.Kr. observeres en nedgang i bosettingsaktiviteten, muligens knyttet til hendelser rundt år 536. I påfølgende periode (ca. 600–800) ble gravhauger reist over tidligere dyrket mark og kokegropfelt, noe som antyder en overgang fra åker og kokegropfelt til gravfelt. Gravhaugene fungerte som territorielle markører og minnesmerker i årene før en ny stabil bosetting etableres litt senere i perioden. I vikingtiden (ca. 800–1050) ser vi en tydelig økning og intensivering av dannelse av bosetningsspor og bruk av gravfelt, og perioden vitner om økt rikdom, handel, bosetting, med vikingtokter og handel som viktige pådrivere. Religionsskiftet førte til at gravfeltene gikk ut av bruk, og gravene ble gradvis fjernet i tidlig middelalder – muligens som følge av endringer i eiendomsforhold (ca. 1050–1150). Fra omtrent 1250–1350 ser vi en betydelig nedgang, sannsynligvis som følge av agrare og demografiske utfordringer i seinmiddelalderen, med få indikasjoner på aktivitet på stedene før ca. 15–1600 e.kr. Dette harmoniserer med historiske studier som antyder en ødegårdstid fulgt av gjenbosetning på 1600-tallet.

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Appendix: Included dates

Site	Category	Context2	Dated material	Lab. ID	^{14}C-age	Calibrated age (62.2% probability)	Calibrated age (95.4% probability)
Fjelnset	Mortuary features	505821 Boatgrave filling in section	Charcoal, Pinus sp.	TRa-15509	1570 ± 15	437-546 AD	433-550 AD
Fjelnset	Mortuary features	506603 Boatgrave filling in section	Seeds/grains/plant remains.	TRa-16748	1325 ± 15	660-759 AD	655-774 AD
Fjelnset	Mortuary features	505821 Boatgrave- possible decomposed wood from boat planking	Charcoal, Pinus sp.	TRa-15511	1575 ± 15	436-542 AD	432-545 AD
Fjelnset	Mortuary features	505900 Mound 2 - charcoal layer under mound filling	Charcoal, Alnus sp.,	TRa-15503	1700 ± 15	268-404 AD	261-410 AD
Fjelnset	Mortuary features	505445 Mound 4 - mound filling	Seeds/grains/plant remains.	TRa-16747	1645 ± 10	409-425 AD	401-532 AD
Fjelnset	Mortuary features	506228 Mound 3 - ring ditch	Charcoal, Betula sp.,	TRa-15517	1560 ± 15	440-550 AD	435-563 AD
Fjelnset	Mortuary features	506742 Mound 3 - ring ditch	Seeds/grains/plant remains.	TRa-16750	1465 ± 15	587-639 AD	576-642 AD
Fjelnset	Mortuary features	505449 Mound 1 - ring ditch - charcoal layer in botom of section	Charcoal, Salix/Populus sp.,	TRa-15504	1050 ± 10	1004-1018 AD	991-1024 AD
Fjelnset	Mortuary features	506635 Mound 2 - ring ditch	Seeds/grains/plant remains.	TRa-16749	1015 ± 15	995-1031 AD	992-1035 AD
Fjelnset	Mortuary features	505065 Mound 2 - ring ditch	Charcoal, Pinus sp.,	TRa-15516	1005 ± 10	1021-1033 AD	992-1039 AD
Fjelnset	Mortuary features	505065 Mound 2 - ring ditch	Charcoal, Pinus sp.,	TRa-15515	945 ± 10	1042-1152 AD	1035-1158 AD
Fjelnset	Mortuary features	505449 Mound 1 - ring ditch - charcoal layer in botom of section	Charcoal. Seeds	TRa-15505	905 ± 10	1052-1175 AD	1047-1212 AD
Fjelnset	Agricultural layers and features	506650 Agricultuyral layer	Charcoal, Prunus/Sorbus sp.,	TRa-15513	1710 ± 15	263-382 AD	258-405 AD
Fjelnset	Agricultural layers and features	506651 Agricultuyral layer	Charcoal, Betula sp.,	TRa-15514	1290 ± 10	678-771 AD	669-774 AD
Fjelnset	Clearing/planning	25 Fire clearing layer	Charcoal	Beta-432768	390± 30	1451-1616 AD	1442-1631 AD
Fjelnset	Clearing/planning	504346 Fire clearing layer	Charcoal, Pinales	TRa-15498	340 ± 10	1503-1631 AD	1488-1635 AD
Fjelnset	Cooking pits	506036 Cooking pit	Charcoal. Seeds.	TRa-15508	2145 ± 15	-339--159 AD	-345--107 AD
Fjelnset	Cooking pits	501446 Cooking pit	Charcoal, betula	TRa-15543	1790 ± 20	238-320 AD	220-330 AD
Fjelnset	Cooking pits	501486 Cooking pit	Charcoal, Alnus sp.,	TRa-15542	1755 ± 15	250-337 AD	242-350 AD
Fjelnset	Cooking pits	502959 Cooking pit	Charcoal, Alnus sp.,	TRa-15538	1715 ± 15	260-380 AD	256-405 AD
Fjelnset	Cooking pits	503619 Cooking pit	Charcoal, Corylus sp.,	TRa-15545	1710 ± 15	264-401 AD	258-407 AD
Fjelnset	Cooking pits	502649 Cooking pit	Charcoal, Corylus sp.,	TRa-15551	1700 ± 15	268-402 AD	260-410 AD
Fjelnset	Cooking pits	504985 Cooking pit	Charcoal, Corylus sp.,	TRa-15501	1700 ± 15	267-404 AD	261-411 AD
Fjelnset	Cooking pits	502849 Cooking pit	Charcoal, Betula sp.,	TRa-15539	1695 ± 15	362-407 AD	261-413 AD
Fjelnset	Cooking pits	506493 Cooking pit	Charcoal, Prunus sp.,	TRa-15510	1685 ± 15	365-411 AD	262-416 AD
Fjelnset	Cooking pits	500517 Cooking pit	Charcoal, Alnus sp.,	TRa-15500	1685 ± 15	366-412 AD	264-415 AD
Fjelnset	Cooking pits	500782 Cooking pit	Charcoal, Betula sp.,	TRa-15547	1680 ± 15	365-413 AD	263-417 AD
Fjelnset	Cooking pits	500464 Cooking pit	Charcoal, Betula sp.,	TRa-15550	1680 ± 20	365-414 AD	262-419 AD
Fjelnset	Cooking pits	500732 Cooking pit	Charcoal, Betula/Alnus/Corylus sp.,	TRa-15559	1680 ± 10	381-413 AD	265-417 AD
Fjelnset	Cooking pits	500351 Cooking pit	Charcoal, Alnus/Betula/Corylus sp., twig	TRa-15540	1675 ± 15	376-416 AD	263-419 AD
Fjelnset	Cooking pits	500090 Cooking pit	Charcoal, Dicotyledon,	TRa-15552	1670 ± 25	365-419 AD	261-428 AD
Fjelnset	Cooking pits	500765 Cooking pit	Charcoal, Prunus/Sorbus sp.,	TRa-15554	1670 ± 15	380-417 AD	264-420 AD
Fjelnset	Cooking pits	500491 Cooking pit	Charcoal, Betula sp.,	TRa-15549	1670 ± 15	382-417 AD	265-420 AD
Fjelnset	Cooking pits	502687 Cooking pit	Charcoal, Betula sp.,	TRa-15557	1670 ± 10	384-418 AD	267-420 AD
Fjelnset	Cooking pits	502739 Cooking pit	Charcoal, Betula sp.,	TRa-15558	1670 ± 10	401-418 AD	365-420 AD
Fjelnset	Cooking pits	501391 Cooking pit	Charcoal, Dicotyledon,	TRa-15544	1665 ± 20	377-420 AD	262-428 AD

Site	Category	Context2	Dated material	Lab. ID	^{14}C-age	Calibrated age (62.2% probability)	Calibrated age (95.4% probability)
Fjelnset	Cooking pits	500946 Cooking pit	Charcoal, betula	TRa-15535	1665 ± 15	384-419 AD	265-424 AD
Fjelnset	Cooking pits	501511 Cooking pit	Charcoal, Betula sp.,	TRa-15541	1660 ± 15	384-420 AD	266-428 AD
Fjelnset	Cooking pits	500831 Cooking pit	Charcoal, Alnus/Betula/ Corylus sp., twig	TRa-15555	1660 ± 15	384-422 AD	264-431 AD
Fjelnset	Cooking pits	500232 Cooking pit	Charcoal, Salix/Populus sp.,	TRa-15548	1660 ± 15	401-423 AD	265-432 AD
Fjelnset	Cooking pits	501172 Cooking pit	Charcoal, Betula sp.,	TRa-15497	1655 ± 10	406-421 AD	379-430 AD
Fjelnset	Cooking pits	501194 Cooking pit	Charcoal, Alnus/Betula/ Corylus sp.,	TRa-15536	1650 ± 15	405-426 AD	376-532 AD
Fjelnset	Cooking pits	502596 Cooking pit	Charcoal, Betula sp.,	TRa-15556	1650 ± 10	410-421 AD	402-431 AD
Fjelnset	Cooking pits	500672 Cooking pit	Charcoal, Betula sp.,	TRa-15546	1645 ± 15	406-431 AD	383-533 AD
Fjelnset	Cooking pits	500863 Cooking pit	Charcoal, Betula sp.,	TRa-15537	1635 ± 15	409-433 AD	404-534 AD
Fjelnset	Cooking pits	170666-13 Cooking pit	Charcoal	Beta-432771	1610 ± 30	419-534 AD	413-542 AD
Fjelnset	Cooking pits	503364 Cooking pit	Charcoal, Salix/Populus sp.,	TRa-15553	1565 ± 15	437-550 AD	432-559 AD
Fjelnset	Settlement features	170666-37 Pit	Charcoal	Beta-432769	1730 ± 30	255-379 AD	248-406 AD
Fjelnset	Settlement features	503018 Hearth	Charcoal. Nutshell	TRa-15512	1660 ± 15	401-420 AD	365-427 AD
Fjelnset	Settlement features	502440 Hearth	Charcoal, Corylus sp.,	TRa-15499	1660 ± 15	402-421 AD	365-428 AD
Skeiet	Agricultural layers and features	205811 Agricultural layer	Charcoal. Betula sp., twig, Average	TRa-14464	1540 ± 15	485-572 AD	436-592 AD
Skeiet	Agricultural layers and features	113702 Agricultural layer cut by mortuary house G18	Charcoal, Betula sp.	TRa-15458	1685 ± 15	365-410 AD	262-415 AD
Skeiet	Agricultural layers and features	205682 Agricultuyral layer	Charcoal, Betula sp.,	TRa-15532	915 ± 15	1048-1164 AD	1044-1176 AD
Skeiet	Agricultural layers and features	111606 Ard marks under Mound IX	Charcoal, Alnus sp.,	TRa-15443	1555 ± 15	441-559 AD	435-569 AD
Skeiet	Agricultural layers and features	116627 Ard marks under Mound IX	Seeds/grains/plant remains.	TRa-17279	1580 ± 15	436-539 AD	432-543 AD
Skeiet	Agricultural layers and features	209167 Charcoal stain in agricultural layer	Charcoal. Betula sp. - twig. Alnus sp. - twig.	TRa-14639	1205 ± 15	785-877 AD	782-881 AD
Skeiet	Agricultural layers and features	115921 Mound IX - Agricultural layer under mound filling	Charcoal. Alnus sp. Betula sp.,	TRa-17275	1610 ± 15	422-531 AD	417-537 AD
Skeiet	Clearing/planning	108220 Clearing layer	Charcoal, kvist Alnus/ Betula sp.,	TRa-15439	920 ± 15	1048-1163 AD	1041-1171 AD
Skeiet	Clearing/planning	111733 Clearing layer	Charcoal, Betula sp.,	TRa-15448	950 ± 15	1040-1149 AD	1032-1157 AD
Skeiet	Clearing/planning	109568 Clearing layer	Charcoal. Alnus sp.,	TRa-17277	950 ± 10	1042-1151 AD	1034-1157 AD
Skeiet	Clearing/planning	106426 Mound III- layer superimposing ring ditch	Charcoal, Alnus sp.,	TRa-16386	940 ± 10	1044-1153 AD	1038-1158 AD
Skeiet	Cooking pit	202341 Cooking pit	Charcoal. Betula sp.	TRa-14603	945 ± 15	1044-1152 AD	1037-1158 AD
Skeiet	Cooking pit	202030 Cooking pit	Charcoal. Dicotyledon,	TRa-14604	870 ± 15	1176-1216 AD	1164-1219 AD
Skeiet	Cooking pit	202546 Cooking pit	Charcoal. Betula sp,	TRa-14605	865 ± 15	1176-1216 AD	1164-1219 AD
Skeiet	Cooking pit	205410 Cooking pit	Charcoal. Twig, Dicotyledon.	TRa-14609	1565 ± 15	440-546 AD	433-555 AD
Skeiet	Cooking pit	205293 Cooking pit	Charcoal. Salix/Populus sp.	TRa-14610	1275 ± 15	682-767 AD	675-773 AD
Skeiet	Cooking pit	207399 Cooking pit	Charcoal. seed. Sorbus/ Prunus sp. - twig.	TRa-14611	1295 ± 15	675-772 AD	666-775 AD
Skeiet	Cooking pit	211678 Cooking pit	Charcoal. Alnus sp - twig. Sorbus/Prunus sp - twig.	TRa-14612	1655 ± 15	405-422 AD	365-433 AD
Skeiet	Cooking pit	215633 Cooking pit	Charcoal. Betula sp.	TRa-14625	940 ± 15	1044-1155 AD	1038-1158 AD
Skeiet	Cooking pit	215633 Cooking pit	Charcoal. Betula sp.	TRa-14626	895 ± 15	1054-1206 AD	1051-1214 AD
Skeiet	Cooking pit	203667 Cooking pit	Charcoal. Betula sp. twig.	TRa-14628	1160 ± 15	776-946 AD	772-954 AD
Skeiet	Cooking pit	217277 Cooking pit	Charcoal. Betula/Alnus sp. - twigs.	TRa-14630	1135 ± 15	888-956 AD	881-979 AD
Skeiet	Cooking pit	217352 Cooking pit	Charcoal. Betula sp.	TRa-14632	1115 ± 10	894-977 AD	891-987 AD

Site	Category	Context2	Dated material	Lab. ID	^{14}C-age	Calibrated age (62.2% probability)	Calibrated age (95.4% probability)
Skeiet	Cooking pit	202972 Cooking pit	Charcoal. Betula sp,	TRa-14633	970 ± 15	1030-1123 AD	1027-1152 AD
Skeiet	Cooking pit	201741 Cooking pit	Charcoal. Betula sp. Alnus sp.	TRa-14635	1210 ± 15	786-875 AD	783-880 AD
Skeiet	Cooking pit	102415 Cooking pit	Charcoal. Alnus sp.	TRa-14643	1555 ± 15	441-561 AD	435-569 AD
Skeiet	Cooking pit	100629 Cooking pit	Charcoal. Betula sp.	TRa-14644	1730 ± 15	257-362 AD	252-402 AD
Skeiet	Cooking pit	103477 Cooking pit	Charcoal: Alnus sp. og Prunus/Sorbus,	TRa-14652	1710 ± 15	263-383 AD	258-406 AD
Skeiet	Cooking pit	110592 Cooking pit	Charcoal. Betula sp,	TRa-14655	1245 ± 15	705-820 AD	685-867 AD
Skeiet	Cooking pit	110627 Cooking pit	Charcoal. Alnus sp,	TRa-14656	1250 ± 15	702-817 AD	680-827 AD
Skeiet	Cooking pit	114462 Cooking pit	Charcoal, Betula sp.,	TRa-15463	1550 ± 15	443-563 AD	436-571 AD
Skeiet	Cooking pit	214049 House 2	Charcoal. Alnus sp.	TRa-14638	1570 ± 15	436-545 AD	431-550 AD
Skeiet	Mortuary features	107114 Large charcoal stain	Charcoal.Alnus/Betula sp. - very young twig	TRa-14646	1115 ± 15	895-977 AD	891-988 AD
Skeiet	Mortuary features	104846 Layer cut by Grave 6	Charcoal. Betula sp.	TRa-17284	1110 ± 15	896-987 AD	892-992 AD
Skeiet	Mortuary features	150537 Grave 12 - cremated bone	Burned bone	TRa-15473	1465 ± 10	592-639 AD	581-642 AD
Skeiet	Mortuary features	111214 Grave 12 - cremation pyre remains	Charcoal, Betula sp., young twig	TRa-15442	1255 ± 15	702-741 AD	680-824 AD
Skeiet	Mortuary features	111882 Grave 14 - cremation pyre remains	Charcoal, Conifer., twig	TRa-15445	1255 ± 15	702-741 AD	679-822 AD
Skeiet	Mortuary features	111853 Grave 14 - cremation pyre remains	Charcoal, Pinus sp.	TRa-15444	1310 ± 15	668-772 AD	662-774 AD
Skeiet	Mortuary features	113034 Grave 17 - cremation pyre remains	Charcoal, Betula sp.	TRa-15452	1490 ± 10	573-597 AD	555-605 AD
Skeiet	Mortuary features	113064 Grave 17 - cremation pyre remains	Charcoal, Betula sp.	TRa-15453	1435 ± 15	606-643 AD	601-648 AD
Skeiet	Mortuary features	113016 Grave 17 - cremation pyre remains	Charcoal, Betula sp.	TRa-15454	1420 ± 15	607-649 AD	605-652 AD
Skeiet	Mortuary features	110990 Grave 3 - cremated bone	Burned bone	TRa-14465	1470 ± 10	587-636 AD	573-640 AD
Skeiet	Mortuary features	108054 Grave 1 - ash axe shaft (decayed)	Wood. Dicotyleon cf Fraxinus?	TRa-15896	1130 ± 15	892-973 AD	885-987 AD
Skeiet	Mortuary features	107685 Grave 1 - sword scabard decayed wood	Wood, decayed,, Pinus sp.	TRa-16391	1330 ± 15	658-756 AD	653-773 AD
Skeiet	Mortuary features	150742 Grave 10 - ash spear shaft (decayed)	Wood, Fraxinus sp	TRa-17768	1225 ± 15	787-871 AD	707-880 AD
Skeiet	Mortuary features	150745 Grave 10 - boat planking pierced by rivet	wood, Conifer	TRa-17771	1185 ± 15	778-884 AD	772-890 AD
Skeiet	Mortuary features	130787 Grave 10 - decayed boat planking pierced by rivet	Wood, Dicotyledon - twig	TRa-14661	1220 ± 25	786-876 AD	705-884 AD
Skeiet	Mortuary features	130237 Grave 11 - decayed boat planking pierced by rivet	Wood, Pinus sp.	TRa-14660	1205 ± 25	784-878 AD	710-889 AD
Skeiet	Mortuary features	110076 Grave 11 - tooth from cattle scull	Animal tooth	TRa-15471	1175 ± 15	776-890 AD	772-943 AD
Skeiet	Mortuary features	109959 Grave 11 - woolen textile remains	Wool	TRa-14662	1230 ± 25	708-875 AD	687-884 AD
Skeiet	Mortuary features	112744 Grave 15 - axe shaft (decayed)	Wood, Alnus/Betula/ Corylus sp.	TRa-15472	1270 ± 80	665-872 AD	642-975 AD
Skeiet	Mortuary features	116142 Grave 16 - charred wooden object	Charcoal, Betula sp.	TRa-16389	1135 ± 15	889-956 AD	885-978 AD
Skeiet	Mortuary features	116138 Grave 16 -chared wood on surface of axehead	Charcoal. Betula sp.	TRa-15895	1105 ± 15	898-988 AD	892-993 AD
Skeiet	Mortuary features	150741 Grave 2 - decayed wooden container with glass beads	Very degraded wood, dt. not possible.	TRa-17767	965 ± 15	1033-1147 AD	1029-1154 AD
Skeiet	Mortuary features	108389 Grave 2- woolen textile remains	Wool	TRa-16390	1095 ± 15	899-992 AD	892-995 AD
Skeiet	Mortuary features	150743 Grave 6 - decayed wood pierced by iron nail	Very degraded wood, dt. not possible.	TRa-17769	1115 ± 15	895-977 AD	891-989 AD

Site	Category	Context2	Dated material	Lab. ID	^{14}C-age	Calibrated age (62.2% probability)	Calibrated age (95.4% probability)
Skeiet	Mortuary features	106982 Grave 8 - decayed boat planking pierced by rivet	Mineralized wood, Average	TRa-14659	1265 ± 15	690-741 AD	676-777 AD
Skeiet	Mortuary features	106536 Grave 8 - decayed wooden planking	Charcoal, Alnus sp.	TRa-15469	1240 ± 25	703-826 AD	682-879 AD
Skeiet	Mortuary features	112524 Grave 15 - inhumation body stain	Charcoal, Dicotyledon., twig	TRa-15449	1090 ± 15	900-993 AD	894-995 AD
Skeiet	Mortuary features	110993 Grave 4 - inhumation body stain	Charcoal.Alnus/Betula sp. - very young twig	TRa-14645	1115 ± 15	895-978 AD	892-990 AD
Skeiet	Mortuary features	108450 Grave 5 - inhumation body stain	Charcoal. Salix/Populus	TRa-14649	1165 ± 15	776-942 AD	772-950 AD
Skeiet	Mortuary features	108983 Grave 6 - inhumation body stain	Decayed wood	TRa-14650	1140 ± 15	886-956 AD	776-977 AD
Skeiet	Mortuary features	108606 Grave 7 - inhumation body stain	Charcoal, Alnus sp.	TRa-15440	1270 ± 15	685-743 AD	675-775 AD
Skeiet	Mortuary features	150744 Mortuary house G13 - charred wooden wall plank	charcoal, Pinus sp,	TRa-17770	1265 ± 10	702-741 AD	679-768 AD
Skeiet	Mortuary features	150050 Mortuary house G13 - entrance layer	Charcoal. Betula sp.	TRa-17282	1690 ± 10	365-409 AD	264-413 AD
Skeiet	Mortuary features	112316 Mortuary house G13 - posthole	Charcoal, Betula sp.	TRa-15446	1425 ± 15	607-649 AD	605-650 AD
Skeiet	Mortuary features	112387 Mortuary house G13 - posthole	Charcoal, Betula sp.	TRa-15447	1280 ± 15	680-770 AD	672-774 AD
Skeiet	Mortuary features	113705 Mortuary house G18 - wall trench	Charcoal, Betula sp.	TRa-15461	1555 ± 10	443-561 AD	436-569 AD
Skeiet	Mortuary features	104932 Mortuary house G9 - wall trench	Charcoal. Betula sp.	TRa-14647	1235 ± 15	709-825 AD	705-877 AD
Skeiet	Mortuary features	104932 Mortuary house G9 - wall trench (average)	Charcoal. Betula sp.	TRa-14461	1115 ± 15	894-977 AD	891-990 AD
Skeiet	Mortuary features	104932 Mortuary house G9 - wall trench (average)	Charcoal. Betula sp.	TRa-14463	1140 ± 15	887-956 AD	776-979 AD
Skeiet	Mortuary features	104532 Mound 1 - ring ditch - growth horizon	Charcoal. Alnus sp,	TRa-14651	1295 ± 15	675-772 AD	666-775 AD
Skeiet	Mortuary features	104532 Mound 1 - ring ditch - section	Charcoal, Betula sp.,	TRa-16383	1230 ± 10	787-828 AD	706-878 AD
Skeiet	Mortuary features	104532 Mound 1 - ring ditch - section	Charcoal, betula	TRa-16384	1185 ± 10	778-885 AD	772-890 AD
Skeiet	Mortuary features	111475 Mound 10 - ring ditch	Charcoal, Alnus sp.,	TRa-15459	1130 ± 15	890-972 AD	886-978 AD
Skeiet	Mortuary features	106025 Mound 2 - ring ditch	Charcoal. Betula sp.,	TRa-17283	1475 ± 15	574-632 AD	565-640 AD
Skeiet	Mortuary features	109639 Mound 2 - ring ditch - burnt sand	Charcoal, Salix sp.,	TRa-16385	955 ± 10	1039-1148 AD	1034-1154 AD
Skeiet	Mortuary features	111312 Mound 4 - ring ditch	Charcoal, Betula sp.,	TRa-15450	1545 ± 15	538-567 AD	439-577 AD
Skeiet	Mortuary features	111312 Mound 4 - ring ditch	Charcoal, Corylus sp.,	TRa-15460	1210 ± 10	787-873 AD	784-878 AD
Skeiet	Mortuary features	116467 Mound 5 - ring ditch	Charcoal, Betula sp.,	TRa-16387	1205 ± 10	785-876 AD	783-880 AD
Skeiet	Mortuary features	111399 Mound 5 - ring ditch	Charcoal, Alnus/Corylus sp.,	TRa-15456	1185 ± 15	780-883 AD	773-889 AD
Skeiet	Mortuary features	112865 Mound 7 - ring ditch	Charcoal, Dicotyledon, Betula sp. Og Dicotyledon.,	TRa-15455	1250 ± 15	702-819 AD	682-828 AD
Skeiet	Mortuary features	115563 Mound 9 - ring ditch	Charcoal, Alnus sp.,	TRa-15464	1200 ± 10	784-878 AD	774-884 AD
Skeiet	Mortuary features	115563 Mound 9 - ring ditch	Charcoal, Corylus sp., twig	TRa-15465	1205 ± 15	785-876 AD	783-880 AD
Skeiet	Mortuary features	115563 Mound 9 - ring ditch	Charcoal. Alnus sp.,	TRa-17278	1170 ± 10	776-891 AD	772-945 AD

Site	Category	Context2	Dated material	Lab. ID	^{14}C-age	Calibrated age (62.2% probability)	Calibrated age (95.4% probability)
Skeiet	Mortuary features	107310 Mound IV - redeposited mound filling	Charcoal, Betula sp.,	TRa-15457	1510 ± 15	561-591 AD	549-599 AD
Skeiet	Mortuary features	114132 Mound IX - layer in ringditch backfill	Charcoal. Alnus sp.,	TRa-17276	1215 ± 10	787-873 AD	785-878 AD
Skeiet	Mortuary features	150529 Mound VI - ring ditch	Charcoal, Betula sp.,	TRa-15451	1470 ± 15	588-637 AD	575-641 AD
Skeiet	Settlement features	Cultural layer	Charcoal	Beta-432770	780 ± 30	1229-1274 AD	1219-1280 AD
Skeiet	Settlement features	210901 Cultural layer	Charcoal. Pinus sp., Average	TRa-14460	1115 ± 15	895-977 AD	892-989 AD
Skeiet	Settlement features	150438 Cultural layer	Charcoal, Corylus sp.,	TRa-15462	1290 ± 10	679-771 AD	670-774 AD
Skeiet	Settlement features	209608 House 1 - layer	Charcoal. Betula sp.	TRa-14629	900 ± 15	1053-1201 AD	1050-1213 AD
Skeiet	Settlement features	217340 House 1 - layer	Charcoal. Corylus sp.	TRa-14637	990 ± 15	1022-1116 AD	997-1150 AD
Skeiet	Settlement features	210174 House 1 - layer	Pinus sp.	TRa-14641	1030 ± 15	995-1023 AD	993-1026 AD
Skeiet	Settlement features	217340 House 1 - layer	Charcoal, Betula sp.	TRa-15476	945 ± 10	1042-1152 AD	1035-1158 AD
Skeiet	Settlement features	214386 Layer with slag	Charcoal. Pinus sp.	TRa-14640	1240 ± 15	707-822 AD	688-875 AD
Skeiet	Settlement features	216371 Metallworking forge	Charcoal. Betula sp - twig.	TRa-14615	915 ± 15	1048-1164 AD	1044-1176 AD
Skeiet	Settlement features	102317 Metallworking forge	Charcoal. Betula sp,	TRa-14657	1275 ± 15	682-767 AD	675-774 AD
Skeiet	Settlement features	216433 Metallworking forge	Pinus sp.	TRa-14642	920 ± 15	1048-1162 AD	1041-1168 AD
Skeiet	Settlement features	102317 Possible metallworking forge	CharcoalAlnus sp.	TRa-14658	1425 ± 15	607-648 AD	603-650 AD
Skeiet	Settlement features	203737 Hearth	Charcoal. Pinus sp.	TRa-14627	950 ± 10	1042-1151 AD	1034-1158 AD
Skeiet	Settlement features	219924 Hearth	Charcoal. Pinus sp.	TRa-14634	975 ± 10	1027-1121 AD	1025-1151 AD
Skeiet	Settlement features	219843 Hearth	Charcoal. Betula sp.	TRa-14636	1195 ± 15	783-880 AD	774-885 AD
Skeiet	Settlement features	102471 Hearth	Charcoal. Alnus sp. Betula sp,	TRa-14654	1255 ± 15	702-741 AD	679-822 AD
Skeiet	Settlement features	220194 Hearth	Charcoal, Prunus/Sorbus sp.,	TRa-15475	920 ± 10	1048-1161 AD	1043-1165 AD
Skeiet	Settlement features	203281 Hearth - House 101	Charcoal. Pinus sp.	TRa-14624	1205 ± 15	785-876 AD	782-881 AD
Skeiet	Settlement features	202214 Pit	Charcoal. Nutshell (Corylus)	TRa-14606	805 ± 15	1228-1261 AD	1222-1267 AD
Skeiet	Settlement features	213921 Pit	Charcoal. grain,	TRa-14620	870 ± 15	1175-1214 AD	1163-1218 AD
Skeiet	Settlement features	104335 Pit	Charcoal. Dicotyledon	TRa-14653	1305 ± 15	670-772 AD	664-774 AD
Skeiet	Settlement features	216195 Waste pit	Charcoal. Betula sp - twig.	TRa-14613	570 ± 15	1328-1405 AD	1323-1409 AD
Skeiet	Settlement features	215860 Waste pit	Charcoal. Betula sp - twigs.	TRa-14614	600 ± 15	1319-1396 AD	1306-1400 AD
Skeiet	Settlement features	212425 Waste pit	Charcoal. Salix/Populus sp.	TRa-14623	950 ± 20	1040-1150 AD	1032-1158 AD
Skeiet	Settlement features	215796 Fenced pathway ID 220200	charcoal, Betula	TRa-17234	1305 ± 10	670-772 AD	665-774 AD
Skeiet	Settlement features	218783 Fenced pathway ID 220200	charcoal,Alnus sp	TRa-17235	1155 ± 10	777-949 AD	772-959 AD
Skeiet	Settlement features	203050 Fenced pathway ID 220200	charcoal, piece Alnus sp	TRa-17236	1235 ± 10	708-822 AD	702-874 AD
Skeiet	Settlement features	220174 House 100 - post-hole	Charcoal. Betula sp.	TRa-14616	845 ± 15	1177-1226 AD	1166-1260 AD
Skeiet	Settlement features	213638 House 100 - post-hole	Charcoal. Betula sp.	TRa-14617	875 ± 15	1168-1210 AD	1160-1219 AD
Skeiet	Settlement features	213968 House 100 - post-hole	Charcoal. Betula sp.	TRa-14618	810 ± 15	1224-1260 AD	1220-1266 AD
Skeiet	Settlement features	213719 House 100 - post-hole	Charcoal. Betula sp.	TRa-14619	805 ± 15	1226-1260 AD	1221-1267 AD
Skeiet	Settlement features	213666 House 100 - post-hole	Charcoal. Betula sp.	TRa-14621	850 ± 15	1179-1222 AD	1164-1227 AD

Site	Category	Context2	Dated material	Lab. ID	^{14}C-age	Calibrated age (62.2% probability)	Calibrated age (95.4% probability)
Skeiet	Settlement features	213703 House 100 - post-hole	Charcoal. Betula sp.	TRa-14622	895 ± 15	1157-1208 AD	1052-1215 AD
Skeiet	Settlement features	House 100 - posthole	Seeds/grains/plant remains. Hordeum.	TRa-16751	845 ± 15	1178-1225 AD	1169-1258 AD
Skeiet	Settlement features	House 100 - posthole	Seeds/grains/plant remains.	TRa-16752	870 ± 15	1176-1216 AD	1161-1220 AD
Skeiet	Settlement features	House 100 - posthole	Seeds/grains/plant remains.	TRa-16753	1365 ± 15	652-664 AD	646-671 AD
Skeiet	Settlement features	203272 House 101 - post-hole	Charcoal, Betula sp.	TRa-15533	1595 ± 15	430-534 AD	424-538 AD
Skeiet	Settlement features	213229 House 101 - post-hole	Charcoal, Betula sp.	TRa-15534	1200 ± 15	783-880 AD	774-884 AD
Skeiet	Settlement features	200777 House 2 -posthole	Seeds/grains/plant remains.	TRa-15477	1555 ± 15	441-557 AD	435-568 AD
Skeiet	Settlement features	200623 House 2 -posthole	Seeds/grains/plant remains.	TRa-15478	1575 ± 15	436-544 AD	433-548 AD
Skeiet	Settlement features	202564 House 2 -posthole	Seeds/grains/plant remains.	TRa-15479	1540 ± 15	540-570 AD	440-590 AD
Skeiet	Settlement features	202688 House 2 -posthole	Seeds/grains/plant remains.	TRa-15480	1595 ± 15	432-534 AD	426-539 AD
Skeiet	Settlement features	202739 House 2 -posthole	Seeds/grains/plant remains.	TRa-15481	1555 ± 10	441-556 AD	436-566 AD
Skeiet	Settlement features	214137 House 2 -posthole	Seeds/grains/plant remains.	TRa-15482	1610 ± 15	422-531 AD	417-537 AD
Skeiet	Settlement features	201154 House 4 - posthole	Nutshells and seeds	TRa-15489	925 ± 15	1047-1160 AD	1041-1164 AD
Skeiet	Settlement features	203410 House 4 - posthole	Seeds	TRa-15490	1130 ± 10	891-972 AD	887-977 AD
Skeiet	Settlement features	213387 House 4 - posthole	Seeds	TRa-15491	1095 ± 10	900-993 AD	895-995 AD
Skeiet	Settlement features	201826 House 4 - posthole	Seeds	TRa-15492	1105 ± 10	899-990 AD	893-994 AD
Skeiet	Settlement features	201760 House 4 - posthole	Seeds	TRa-15493	1135 ± 10	889-956 AD	884-977 AD
Skeiet	Settlement features	217767 House 4 - posthole	Seeds	TRa-15494	985 ± 10	1025-1117 AD	1021-1150 AD
Skeiet	Settlement features	201398 House 4 - posthole	Seeds	TRa-15495	1155 ± 10	777-949 AD	772-959 AD
Skeiet	Settlement features	209751 House 4 - posthole	Seeds	TRa-15496	1125 ± 15	893-974 AD	889-979 AD
Skeiet	Settlement features	220192 House 6 - posthole	Seeds	TRa-15483	1095 ± 10	900-993 AD	895-995 AD
Skeiet	Settlement features	203157 House 6 - posthole	Seeds	TRa-15487	1115 ± 20	895-978 AD	891-991 AD
Skeiet	Settlement features	203091 House 6 - posthole	Seeds	TRa-15488	1115 ± 15	895-977 AD	891-988 AD
Skeiet	Settlement features	217253 Post hole	Charcoal, seed	TRa-15484	595 ± 10	1324-1396 AD	1316-1403 AD
Skeiet	Settlement features	210000 Post hole	Charcoal, nutshell	TRa-15485	890 ± 20	1159-1210 AD	1051-1219 AD
Skeiet	Settlement features	210829 Post hole	Charcoal, nutshell	TRa-15486	1135 ± 15	889-956 AD	885-977 AD
Skeiet	Settlement features	210572 Ditch	Charcoal. twigs, Dico-tyledon.	TRa-14608	955 ± 10	1039-1148 AD	1033-1155 AD
Skeiet	Settlement features	211826 House 1 - wall trench	Charcoal. Alnus sp.	TRa-15897	935 ± 15	1045-1157 AD	1040-1159 AD
Skeiet	Settlement features	217929 House 5 - wall trench	Charcoal.Grain	TRa-14631	1095 ± 15	900-992 AD	893-995 AD
Hestnes 5	Agricultural layers and features	403284 Agricultuyral layer	Charcoal. Betula sp.	TRa-15413	1715 ± 15	261-380 AD	258-403 AD
Hestnes 5	Agricultural layers and features	403285 Agricultural layers	Charcoal. Alnus/Betula sp.	TRa-15414	1160 ± 10	776-945 AD	772-952 AD
Hestnes 5	Agricultural layers and features	403286 Agricultuyral layer	Charcoal. Corylus sp.	TRa-15415	1690 ± 10	365-408 AD	263-413 AD
Hestnes 5	Clearing and planning	403819 Grave mound filling - backfill	Charcoal. Conifer.	TRa-15416	940 ± 10	1045-1155 AD	1040-1158 AD
Hestnes 5	Cooking pits	400047 Cooking pit	Charcoal, kvist Junipe-rus sp.,	TRa-15420	890 ± 10	1160-1206 AD	1053-1217 AD
Hestnes 5	Cooking pits	400047 Cooking pit	Charcoal, Pinus sp.,	TRa-15421	900 ± 10	1053-1175 AD	1049-1212 AD
Hestnes 5	Cooking pits	400224 Cooking pit	Charcoal, Betula sp.,	TRa-15422	1800 ± 15	232-311 AD	216-323 AD
Hestnes 5	Cooking pits	400244 Cooking pit	Charcoal, Betula sp.,	TRa-15423	1700 ± 10	268-402 AD	261-409 AD
Hestnes 5	Cooking pits	400286 Cooking pit	Charcoal, Betula sp.,	TRa-15424	1745 ± 15	253-347 AD	247-364 AD
Hestnes 5	Cooking pits	400981 Cooking pit	Charcoal, Betula sp.,	TRa-15425	1780 ± 15	245-320 AD	237-330 AD

Site	Category	Context2	Dated material	Lab. ID	^{14}C-age	Calibrated age (62.2% probability)	Calibrated age (95.4% probability)
Hestnes 5	Cooking pits	401915 Cooking pit	Charcoal, Betula sp.,	TRa-15426	1595 ± 15	430-534 AD	424-538 AD
Hestnes 5	Cooking pits	402948 Cooking pit	Charcoal, Alnus sp.,	TRa-15427	2045 ± 10	88 BC - 5 AD	-96-11 AD
Hestnes 5	Cooking pits	403009 Cooking pit	Charcoal, Alnus sp.,	TRa-15428	2015 ± 15	41 BC - 15 AD	-47-54 AD
Hestnes 5	Cooking pits	403024 Cooking pit	Charcoal, kvist, Alnus sp. Ca 5 årringer.,	TRa-15431	930 ± 10	1047-1159 AD	1043-1163 AD
Hestnes 5	Cooking pits	403061 Cooking pit	Charcoal, Alnus sp.,	TRa-15432	1565 ± 15	440-547 AD	433-559 AD
Hestnes 6	Cooking pits	410197 Cooking pit	Charcoal. Alnus/Corylus sp., twig	TRa-15523	1605 ± 10	425-530 AD	420-536 AD
Hestnes 6	Cooking pits	410326 Cooking pit	Charcoal. Alnus/Betula/Corylus sp., young twig	TRa-15524	1615 ± 10	418-530 AD	415-535 AD
Hestnes 5	Mortuarty features	403278 Chamber grave - backfill	Charcoal. Betula sp.,	TRa-15408	1240 ± 15	707-822 AD	688-873 AD
Hestnes 5	Mortuarty features	402841 Chamber grave	Charcoal. Alnus/Corylus sp.,	TRa-15409	1185 ± 10	778-884 AD	772-890 AD
Hestnes 5	Mortuarty features	403315 Chamber grave	Charcoal. Twig. Betula sp.,	TRa-15411	1175 ± 15	777-888 AD	771-943 AD
Hestnes 5	Mortuarty features	402841 Chamber grave	Charcoal. Alnus sp.,	TRa-15412	1270 ± 10	684-744 AD	677-772 AD
Hestnes 5	Mortuarty features	403821 Grave mound filling - top layer	Charcoal. Corylus sp.	TRa-15417	1185 ± 10	779-883 AD	772-889 AD
Hestnes 5	Mortuarty features	403724 Chamber grave - textile above thrifoil brooch	Wool	TRa-15888	1230 ± 25	706-872 AD	684-883 AD
Hestnes 5	Mortuarty features	403479 Chamber grave - decomposed wood from small wooden chest	Wood. Pinus sp.,	TRa-15890	1075 ± 20	904-1017 AD	897-1023 AD
Hestnes 5	Mortuarty features	403469 Chamber grave - bark covering oval brooch	Wood. Bark (Dicotyledon ?).	TRa-16110	1165 ± 15	776-941 AD	772-950 AD
Hestnes 5	Settlement features	401744 Charcoal production pit	Charcoal, Betula sp.,	TRa-15418	1100 ± 10	899-990 AD	894-994 AD
Hestnes 5	Settlement features	403267 Charcoal production pit	Charcoal, Corylus sp.,	TRa-15419	1130 ± 15	890-973 AD	886-978 AD
Hestnes 5	Settlement features	400142 Line of postholes	Charcoal, Betula sp.	TRa-15429	1865 ± 10	132-215 AD	127-225 AD
Hestnes 5	Settlement features	400156 Line of postholes	Charcoal, Corylus sp.	TRa-15430	1635 ± 10	410-433 AD	406-532 AD
Hestnes 5	Settlement features	402794 Pit	Charcoal, bark	TRa-15433	955 ± 15	1038-1149 AD	1030-1158 AD
Hestnes 5	Settlement features	402995 Pit	Charcoal, Alnus sp.	TRa-15434	1885 ± 10	127-203 AD	121-211 AD
Hestnes 5	Settlement features	400169 Line of postholes	Charcoal, Betula sp.	TRa-15435	1645 ± 10	409-423 AD	383-530 AD
Hestnes 5	Settlement features	400201 Line of postholes	Charcoal, Corylus sp.	TRa-15436	1705 ± 10	265-401 AD	261-408 AD
Hestnes 5	Settlement features	402984 Line of postholes	Charcoal, Pinus sp.	TRa-15437	1125 ± 15	893-974 AD	888-979 AD
Hestnes 5	Settlement features	403118 Slagg pit	Juniperus sp., twig	TRa-15438	1345 ± 20	653-674 AD	647-773 AD

Appendix: Rejected dates

Site	Context	Dated material / comment	Lab. ID	^{14}C-age	Calibrated age (62.2% probability)	Calibrated age (95.4% probability)
Fjelnset	504661 Boat rivets (decayed wood)	Wood	TRa-15560	985 ± 20	1022-1121 AD	997-1153 AD
Fjelnset	506704 Grave inventory (wooden parts and textiles)	Wood. Betula sp. ?,	TRa-15561	845 ± 15	1179-1224 AD	1167-1255 AD
Fjelnset	506228 Ring ditch	Charcoal, Prunus/Sorbus sp.,	TRa-15518	3495 ± 15	1879-1770 BC	1882-1751 BC
Fjelnset	500291 Cooking pit	Charcoal, Betula sp.,	TRa-15502	2930 ± 15	1199-1059 BC	1209-1053 BC
Fjelnset	506036 Cooking pit	Charcoal, Salix/Populus sp.,	TRa-15507	2730 ± 15	897-833 BC	908-825 BC
Fjelnset	505900 Ring ditch	Charcoal, Salix/Populus sp.,	TRa-15506	2675 ± 15	827-808 BC	894-803 BC
Hestnes 5	403315 Grave filling	Wood	TRa-15410	770 ± 15	1233-1278 AD	1227-1279 AD
Hestnes 5	403702 Grave inventory (wooden parts and textiles)	Partialy mineralized wood	TRa-15887	1565 ± 15	439-549 AD	433-561 AD

Site	Context	Dated material / comment	Lab. ID	^{14}C-age	Calibrated age (62.2% probability)	Calibrated age (95.4% probability)
Hestnes 5	403461 Grave inventory (human osteological material)	The sample did not yiels any collagen.	TRa-16109			
Hestnes 5	403315 Grave filling	Dating not possible because of degradation and seeds in the wood.	TRa-15891			
Hestnes 5	403469 Grave inventory (textile)	The sample was too small	TRa-15889			
Hestnes 6	411005 Agricultural layers	Charcoal, Prunus/Sorbus sp.,	TRa-15528	3785 ± 10	2279-2148 BC	2286-2143 BC
Hestnes 6	411007 Agricultural layers	Charcoal, Alnus/Corylus sp.,	TRa-15527	2870 ± 15	1106-1008 BC	1116-990 BC
Hestnes 6	410460 Agricultural layers	Charcoal, Betula sp.,	TRa-15526	2445 ± 10	726-478 BC	741-416 BC
Skeiet 1	107213 Grave inventory (wooden parts and textiles)	Wood, decayed. Betula sp.	TRa-16392	980 ± 15	1024-1121 AD	1021-1152 AD
Skeiet 1	108351 Grave 1 - charcoal stain	Charcoal, Dicotyledon, young twig	TRa-15470	955 ± 10	1038-1148 AD	1033-1154 AD
Skeiet 1	116383 Grave filling	Charcoal, Betula sp.	TRa-16388	7410 ± 20	6359-6235 BC	6375-6229 BC
Skeiet 1	111399 Ring ditch	Charcoal, Corylus sp.,	TRa-15467	7365 ± 20	6329-6096 BC	6356-6085 BC
Skeiet 1	112745 Grave filling - body stain	Charcoal. Betula sp.	TRa-17280	6630 ± 15	5617-5540 BC	5622-5484 BC
Skeiet 1	100864 Peat	Charcoal. Bark.	TRa-15894	6345 ± 25	5360-5230 BC	5373-5219 BC
Skeiet 1	107594 Grave filling - body stain	Charcoal. Dicotyledon	TRa-15893	6250 ± 20	5299-5211 BC	5306-5079 BC
Skeiet 1	150514 Pit	Charcoal, Alnus sp.,	TRa-16382	6205 ± 20	5213-5075 BC	5284-5056 BC
Skeiet 1	150600 Cremations	Burned bone	TRa-15474	3955 ± 15	2557-2458 BC	2567-2351 BC
Skeiet 1	107095 Grave filling - body stain	Charcoal. Pinus sp.	TRa-17281	2460 ± 15	747-539 BC	753-477 BC
Skeiet 1	108477 Grave filling - body stain	Charcoal. Betula sp.	TRa-14648	1710 ± 15	264-401 AD	258-408 AD
Skeiet 1	130669 Grave filling - body stain	Charcoal, Alnus/Betula/Corylus sp.	TRa-15441	1660 ± 15	401-421 AD	365-427 AD
Skeiet 1	130669 Grave filling - body stain	Charred seeds	TRa-15468	1570 ± 15	437-547 AD	432-551 AD
Skeiet 1	108477 Grave filling - body stain	Charcoal. Betula sp.	TRa-15892	1560 ± 15	440-550 AD	434-564 AD
Skeiet 1	107525 Cremation pyre remains	Double measurments	TRa-14462	1440 ± 15	605-642 AD	596-649 AD
Skeiet 1	107525 Cremation pyre remains	Double measurments	TRa-14462	1430 ± 15	607-646 AD	600-650 AD
Skeiet 1	106982 Boat rivets (decayed wood)	Double measurments	TRa-14659	1275 ± 15	682-767 AD	674-774 AD
Skeiet 1	106982 Boat rivets (decayed wood)	Double measurments	TRa-14659	1255 ± 10	703-740 AD	680-820 AD
Skeiet 1	108983 Grave 6 - body stain	Decayed wood	TRa-14650	1140 ± 15	886-956 AD	776-977 AD
Skeiet 1	115985 Grave 16 inhumation body stain	Wood, decayed, Dicotyledon - twig	TRa-15466	1295 ± 20	673-772 AD	664-775 AD
Skeiet 1	104932 Double measurments	Double measurments	TRa-14463	1140 ± 15	887-956 AD	776-979 AD
Skeiet 1	104932 Double measurments	Double measurments	TRa-14461	1115 ± 20	894-978 AD	891-991 AD
Skeiet 1	104932 Double measurments	Double measurments	TRa-14461	1115 ± 15	894-977 AD	891-990 AD
Skeiet 1	104932 Double measurments	Double measurments	TRa-14463	1080 ± 15	900-1012 AD	895-1020 AD
Skeiet 1	108983 Grave 6 - body stain	Decayed wood	TRa-14650	1060 ± 25	977-1023 AD	895-1029 AD
Skeiet 1	108476 Grave 2 - wooden container with glass beads	WD impossible because of sample conditions. Very degraded, alkali residue	TRa-17767		1032-1147 AD	1027-1154 AD
Skeiet 2	202214 Pit	Charcoal, Dicotyledon	TRa-14607	5690 ± 20	4543-4495 BC	4587-4454 BC
Skeiet 2	205811 Double measurments	Double measurments	TRa-14464	1550 ± 15	441-564 AD	435-573 AD
Skeiet 2	205811 Double measurments	Double measurments	TRa-14464	1530 ± 20	543-575 AD	441-599 AD
Skeiet 2	210901 Double measurments	Double measurments	TRa-14460	1130 ± 15	891-973 AD	885-980 AD
Skeiet 2	210901 Double measurments	Double measurments	TRa-14460	1100 ± 15	899-991 AD	893-994 AD

2. LATE HOLOCENE VEGETATION DEVELOPMENT IN VINJEØRA AND THE VALSØYFJORD REGION

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ABSTRACT

Palaeoenvironmental investigations through pollen and macrofossil analyses were undertaken during archaeological excavations in the Vinjefjord area on sites at Skeiet, Fjelnset, Hestnes and Otnes. Contexts from settlement sites, such as house postholes, plough marks, cultivation layers, a pathway and a range of mortuary features, were investigated. The palaeoenvironmental analyses from the archaeological contexts throw light on local settlement activity, farming practices, possible mortuary practices and local environmental conditions associated with the settlements during the Iron Age and Middle Ages. In addition, pollen analysis of three peat profiles, one reflecting vegetation development on a regional scale and two from local bogs on the outskirts of the excavation areas in Vinjeøra, provides an environmental record of the last c. 4000–5000 years and, in particular, human impact associated with the Iron Age and Middle Age settlements and cemeteries at Skeiet and Fjelnset. The global AD 536 event may be reflected in the local peat profiles through increased use of fire and emphasis on outfield exploitation, while the late medieval crisis and the Black Death, AD 1349, is reflected locally in the short-term woodland recovery of *Pinus*, which may be related to regional population decline at that time. Local and regional woodland development and outfield grazing activity throughout the prehistoric and historic periods are also reflected.

Keywords: Norse graves and settlements; infields and outfields; AD 536 event; vegetation dynamics

INTRODUCTION

To understand human impact on environments over time, palynological and archaeobotanical investigations are of major importance, and the combination of on-site and off-site records reveals a multiproxy dataset that optimises the information gained. Archaeological excavations at Skeiet and Fjelnset in Vinjeøra, and Hestnes and Otnes further southwest along Valsøyfjord (Figure 1a), carried out by the NTNU Science Museum in 2019–2020, revealed three Iron Age (500 BC–AD 1030) farm settlements with associated mortuary features, and the excavations at Otnes revealed Bronze Age (1800 BC–500 BC) clearance cairns associated with cultivation layers. Pollen and macrofossil samples from the settlements and mortuary contexts were collected during archaeological excavations to investigate aspects of human activity, economics, social organisation and mortuary rituals. The palaeobotanical investigation included pollen analysis of three peat profiles, Lubbehaugmyra, Leitmyra and Tjønnan (Figure 1b), which represent archives of long-term landscape and vegetation development and give an environmental framework for human activity in the area over the last c. 4000–5000 years. The peat profile from Lubbehaugmyra, located 200–300 m from Skeiet and c. 1 km from Fjelnset, gives a local record of vegetation change, most likely reflecting activity in these locations. Leitmyra, situated on a terrace above the village of Vinjeøra about 500 m from Skeiet, reflects outfield resource exploitation, and Tjønnan represents a larger basin that reflects regional vegetation and landscape development. This paper presents the main results from the palaeoenvironmental study, while a full outline is presented in Overland (2022).

Reference: Overland, A., Hjelle K.L. (2024). Late Holocene Vegetation Development in Vinjeøra and the Valsøyfjord Region. I R. Sauvage (Ed.), *From Life to Death in Iron Age and Medieval Vinjefjord* (pp. 45–81). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.218.ch2
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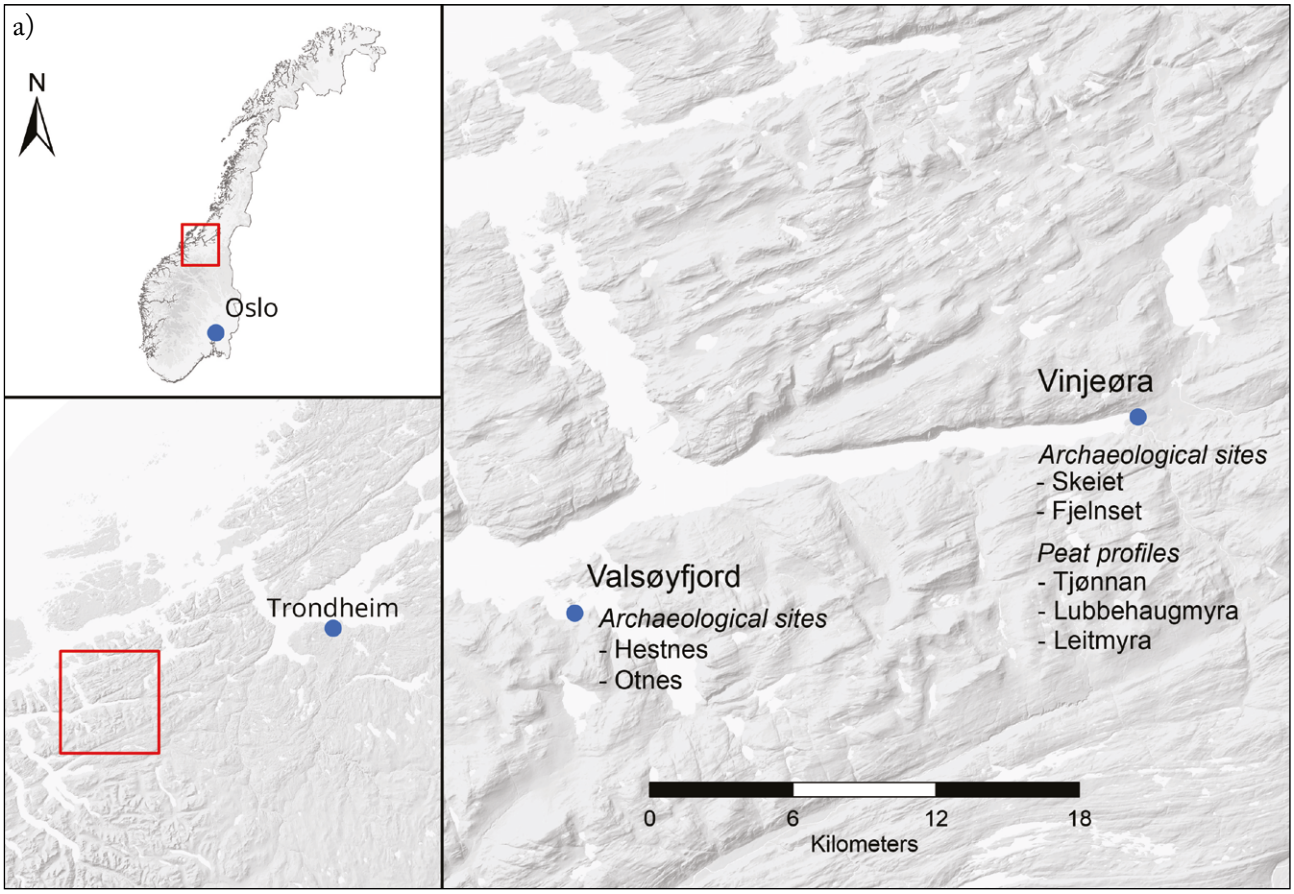


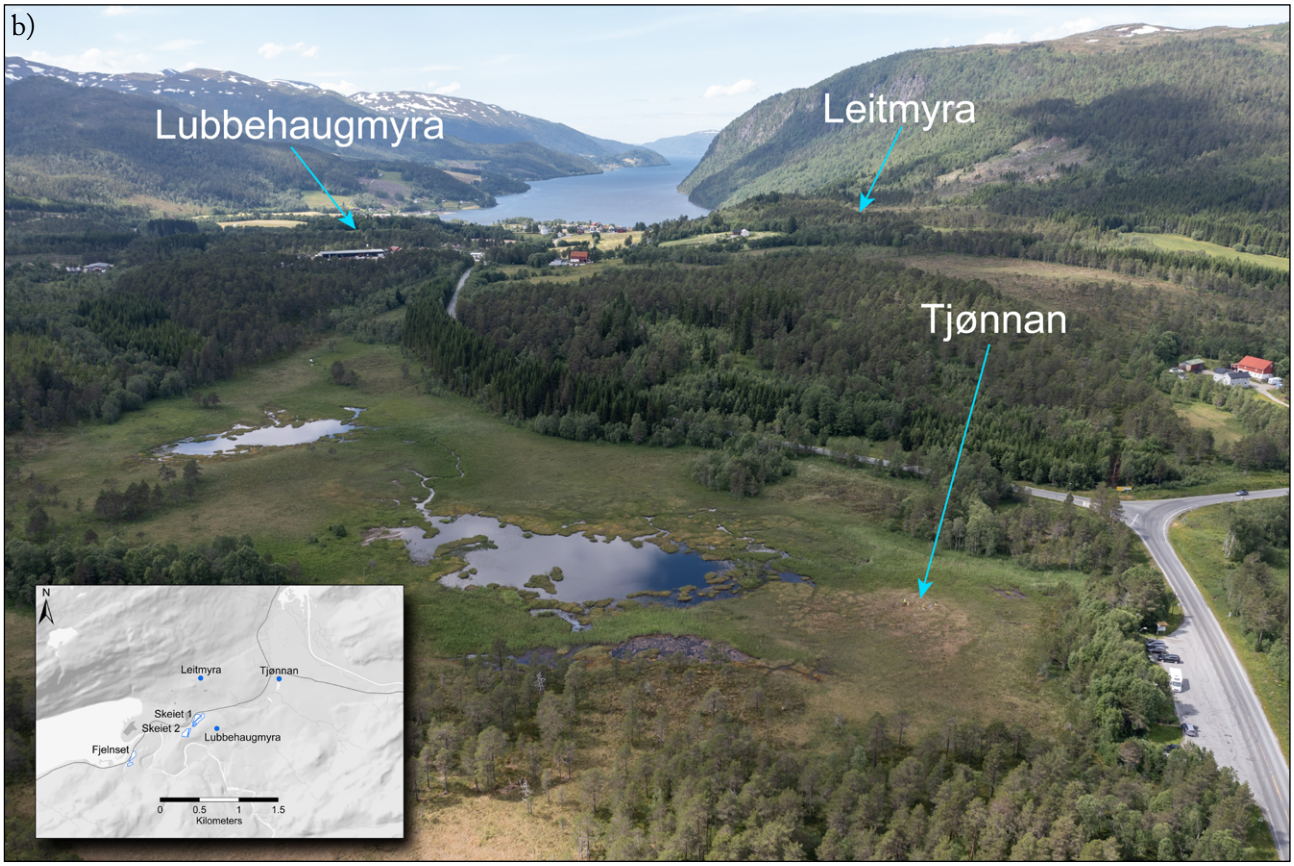


Figure 1. *Localities for pollen and macrofossil analysis. Skeiet (askeladden id 170657, id 170666), Fjelnset (id 177642) and peat profiles in Vinjeøra, and Hestnes (id 173431) and Otnes (id 173452) further south-west along Valsøyfjorden. b) Peat profiles from Lubbehaugmyra, Leitmyra and Tjønnan. Figure: Kristoffer Rantala, NTNU, University Museum. Lokalitetene hvor det ble utført pollen og makrofossilanalyse.*

MATERIAL AND METHODS

Study area

Vinjeøra is situated within the mid-boreal vegetation zone where coniferous forest and peatland dominate, but local pockets of boreonemoral deciduous woodland exist along the coast (Moen 1999). The area has an oceanic climate with weak continental traits due to low winter temperatures. The average winter temperature is –2°C (January), the average summer temperature is 14°C (July) and annual precipitation is 1500–2000 mm (Moen 1999, weather station Hemne – Lenes at Norwegian Centre for Climate Services).

Samples and radiocarbon dates

Pollen and macrofossil samples were taken directly from archaeological contexts during excavation, and selected contexts were radiocarbon dated (Sauvage Ch.1, Overland 2022).

Selected intervals in the peat profiles from Lubbehaugmyra (N7022552.41, E198774.97, radius=40m), Leitmyra (N7023249.9, E198638.77, radius=125m) and Tjønnan (N7023132.88, E199614.6, radius=200m) were radiocarbon dated, and the stratigraphy described (Tables 1 and 2). The chronology (Figure 2) is based on age-depth models, using smooth spline in classic age-depth modelling (CLAM), R-code (Blaauw 2010) and the ^{14}C calibration curve IntCal20 (Bronk Ramsey 2020, Reimer et al. 2020).

Pollen and macrofossil analysis

All subsampling for pollen analysis (volume 1 cm^3) and loss-on-ignition (LOI) was done in the laboratory at the University of Bergen (UiB). Pollen samples were processed using the methods described by Fægri and Iversen (1989) with acetolysis and HF treatment, and samples for LOI were dried at 110°C for 24 hours and ignited at 550°C for 6 hours (Heiri et al. 2001). Pollen identification was carried out in line with Fægri and Iversen (1989), with the additional use of Beug (2004) and the pollen reference collection at UiB. For the identification of non-pollen palynomorphs (NPPs), several sources were consulted (Van Geel et al. 2003, Van Geel & Aptroot 2006, full overview in Overland 2022). Charcoal particles over 10 µm were counted. The pollen diagrams were plotted using Tilia version 2.6.1 (Grimm 2019), where black curves/histograms show percentage values and grey curves/histograms show this value ×20. All pollen data were calculated based on ∑P (total terrestrial pollen), while the percentages of spores, aquatics, NPPs and other microfossils were based on ∑P + X, where X is the group to which the taxa belong. The pollen diagrams were plotted alphabetically, except Cerealia, *Hordeum*-type and *Triticum/Avena*-type, which were plotted together and subsequently followed the grass family (Poaceae). Some pollen/spore-types were omitted, while complete pollen diagrams are presented in Overland (2022). The zonation of the pollen diagrams was based on constrained incremental sum of squares clustering (CONISS) (Grimm 1987).

Samples for macrofossil analyses were washed through 1 mm and 0.5 mm sieves. The analyses were carried out using a Zeiss Discovery V20 stereo microscope (80x), with the aid of the reference collection at the University of Bergen and Cappers et al. (2006). The nomenclature follows Lid and Lid (2005). In this paper, charred seeds/fruits are presented in subgroups relating to grassland (wetland/pasture/meadow), weed/ruderal, and household taxa (collected/cultivated), while a full record is presented in Overland (2022).

Data analysis

The overall pattern in the pollen and macrofossil data from archaeological contexts was investigated by gradient analysis using the program Canoco for Windows 5 (ter Braak & Smilauer 2002). The pollen data revealed a short gradient (< 2.2) using Detrended Correspondence Analysis (DCA), and Principal Component Analysis (PCA) was carried out. The pollen percentages were square-root transformed prior to analysis. For macrofossil data, DCA was carried out on presence/absence data. In the PCA and DCA plots, pollen types are abbreviated, while full names are given in Appendix 1.

Vegetation cover in the Vinjeøra region was estimated using the Landscape Reconstruction Algorithm (LRA) (Sugita 2007a, b). LRA accounts for differences in pollen production and dispersal among species, and a better representation of vegetation cover is obtained by using LRA than that given by pollen percentages alone (e.g., Hellman et al. 2008, Sugita et al. 2010, Poska et al. 2014, Hjelle et al. 2015). LRA consists of two models, one of which is REVEALS, which estimates the regional vegetation cover within a site radius of 50 to 100 km (Sugita 2007a). We applied this to the combined data from two sites: Tjønnan and Leitmyra. The estimated regional vegetation cover was input data in the program LOVE, together with pollen data from Lubbehaugmyra and the local vegetation cover (Sugita 2007b) estimated around Lubbehaugmyra.

Table 1. *Radiocarbon dates from peat profiles Lubbehaugmyra, Leitmyra and Tjønnan.*

Lab ID	Dated material; species names refer to seeds/fruits unless otherwise stated	Date before present (BP)	Calibrated age, 68,2 % probability	Calibrated age, 95,4 % probability	$d^{13}C$	Depth (cm)
Lubbehaugmyra						
TRa-15260	Charred twig, *Vaccinium vitis-idaea* leaf + twig, *Juniperus* needle	625±10	1305–1390 AD	1300–1395 AD	–28,4	31–32
TRa-16258	Charred heather twig, moss	1070±15	978–1017 AD	898–1022 AD	–28,4	49–50
TRa-15261	Moss, *Betula* (1)	1305±15	669–772 AD	663–774 AD	–25,0	69–70
TRa-16539	Moss, *Juniperus* needle (1), terrestrial leaf	1535±20	539–578 AD	438–598 AD	–32,8	79–79,5
TRa-16259	Moss, *Sphagnum*, terrestrial leaf, *Betula* (2)	1635±15	411–433 AD	407–532 AD	–27,2	86–87
TRa-16540	Charcoal, *Betula* (9), *Potentilla* (1), terrestrial leaf	2920±20	BC 1188–1054	BC 1209–1019	–24,1	99–100
TRa-15262	Charcoal (5) (diffuse porous)	4290±15	BC 2908–2893	BC 2916–2886	–25,6	106–107
Leitmyra						
TRa-15257	Moss	45±15	1712–1904 AD	1703–1909 AD	–26,9	18–19
TRa-16537	Charred heather leaf, charcoal, *Andromeda polyfolia* (*c.* 20)	1515±15	551–581 AD	545–595 AD	–21,1	31–31,5
TRa-16256	*Sphagnum*, moss	1750±15	252–343 AD	246–361 AD	–25,5	37–38
TRa-15258	*Sphagnum*	2245±15	BC 377–232	BC 386–208	–28,4	59–60
TRa-16538	Moss, charred heather leaf	3065±25	BC 1390–1286	BC 1411–1262	–26,4	72–73
TRa-16257	Moss, *Sphagnum*	3555±15	BC 1930–1885	BC 1949–1781	–24,2	90–91
TRa-15259	*Sphagnum*, moss	4130±15	BC 2854–2632	BC 2868–2585	–28,9	125–126
Tjønnan						
TRa-16541	Moss, *Carex* (1)	1160±15	776–950 AD	772–959 AD	–25,5	40–41
TRa-16542	*Sphagnum*	1580±15	436–542 AD	432–545 AD	–19,6	80–81
TRa-16543	*Sphagnum*, moss, terrestrial leaf, catkin bract, *Betula* (2)	1735±15	255–361 AD	250–383 AD	–24,8	120–121
TRa-16544	Moss, *Betula* (3) and catkin bract, terrestrial leaf	2445±15	BC 736–481	BC 748–416	–25,1	160–161
TRa-16260	Moss, *Sphagnum*, terrestrial leaf, *Betula* (4), *Carex* (5)	2480±15	BC 751–545	BC 759–540	–24,4	181–182
TRa-15263	*Sphagnum*, moss, terrestrial leaf, *Betula* (25) and catkin bract (8), *Carex* (3), *Alnus* (1), *Menyanthes* (2), *Potamogeton* (1)	3845±15	BC 2343–2211	BC 2451–2204	–28,9	260–261
TRa-17610	Moss, terrestrial leaf, *Betula* (7) and catkin bract (1), *Potamogeton* (4), woody fragments	4305±20	BC 2915–2896	BC 3003–2887	–23,5	319–320

The pollen samples were grouped into five-hundred-year periods based on estimates from the age-depth models. The following groups and taxa, with available pollen productivity estimates, were included in the analysis: pioneer trees and shrubs including *Alnus*, *Betula*, *Corylus*, *Juniperus* and *Salix*; warmth-demanding deciduous trees including *Fraxinus*, *Quercus*, *Tilia* and *Ulmus*; conifers including *Picea* and *Pinus*; grasslands and fields including *Artemisia*, Cerealia, *Plantago lanceolata*, *P. major*, and *Rumex*; other open-land including Cyperaceae, *Empetrum*, Ericaceae (excluding *Calluna*) and *Filipendula.* The pollen productivity estimates are based on data sets from Norway (Hjelle & Sugita 2012), Denmark (Nielsen 2004) and mean values from Europe (Mazier et al. 2012), taxa found to give a good approximation of the vegetation cover in western Norway (Hjelle et al. 2015). The programs REVEALS.C.v1.5.1.exe and

Table 2. *Stratigraphy, Lubbehaugmyra, Leitmyra and Tjønnan*

Layer	Depth (cm)	Description of layer	Troels Smith (1955) classification system
Lubbehaugmyra			
10	0–9	Dark decomposed *Sphagnum* peat	Sph(Tb)4, Th/Dh+
9	9–23	Light brown *Sphagnum* peat on top, with some *Eriophorum*. Darker and more decomposed below	Tb4-, Th/Dh+
8	23–31	Fibrous *Eriophorum* peat	Th/Dh3, Tb1
7	31–55	Fibrous *Eriophorum* peat with some moss	Th/Dh3, Tb+, Ld1
6	55–87	Fibrous *Eriophorum* peat with moss and twigs/woody roots	Th/Dh2, Ld2-, Tb+, Tl/Dl+
5	87–106	Dark decomposed peat with macroscopic remains of herbs, and some silt/sand	Th/Dh1, Ld3, Ag/Ga+
4	106–113	Dark decomposed peat with macroscopic remains of herbs, woody roots, silt/sand and charcoal	Th/Dh1, Ld3, Ag/Ga+, Tl/Dl+, charcoal+
3	113–115	Sand	Ld2+, Ag/Ga2-
2	115–122,5	Decomposed organic matter (possibly gyttja) with silt/sand and gravel	Ld3-, Ag/Ga+, Ggmin+
1	122,5–125	Light coloured sand with some gravel and decomposed organic matter	Ld1-, Ga3, Ggmin+
Leitmyra			
1	0–18	Yellow/bright *Sphagnum* peat (0–9 cm), somewhat more decomposed below (9–18 cm)	Ld+, Dg+, Th/Dh+, Tl/Dl+, Tb4
2	18–29	Light brown peat with macroscopic plant remains (herbs and wood)	Ld1, Dg1, Th/Dh1, Tl/Dl1, Tb+
3	29–59	Brown, decomposed *Sphagnum* peat	Ld+, Dg2, Th/Dh1, Tb1
4	59–89	Decomposed peat with twigs	Ld1, Dg2, Th/Dh1, Tb1, Dl+
5	89–100	*Sphagnum* peat, with changing levels of decomposition	Ld+, Dg2, Th/Dh1, Tb1
6	100–110	Fibrous *Eriophorum* peat, some woody twigs	Ld+, Dg+, Tl/Dl1, Th/Dh3, Tb1
7	110–133	Decomposed *Sphagnum* peat	Ld+, Dg+, Tl/Dl+, Th/Dh1, Tb3-
8	133–135	Charcoal layer	charcoal4, Ld+, Dg+
9	135–143	Fibrous peat (macroscopic remains of moss, herbs, and wood)	Ld2-, Dl+, Th/Dh1, Tb1
Tjønnan			
1	0–65	Fibrous, less decomposed, peat. Mostly moss, some macroscopic remains of herbs and wood	Th/Dh2+, Tb2+, Dg+, Ld+, Tl/Dl+
2	65–87	Fibrous, less decomposed, peat	Th/Dh2+, Tb2+, Dg+, Ld+, Tl/Dl+
3	87–150	Fibrous peat (mostly *Eriophorum,* some moss), also woody macroscopic remains	Th/Dh2+, Tb1+, Dg1, Ld+, Tl/Dl+
4	150–209	Fibrous peat (mostly moss, and some *Eriophorum*), and woody macroscopic remains	Tb2+, Th/Dh1, Tl/Dl+, Dg1-, Ld+
5	209–226	Fibrous, minerogenic peat (moss and *Eriophorum*), some woody macroscopic remains	Tb2+, Th/Dh1, Tl/Dl+, Dg1-, Ld+, Ag+
6	226–265,5	Transition to minerogenic peat (*Eriophorum*)	Tb2+, Dg1-, Th/Dh1, Tl/Dl+, Ld+, Ag+
7	265,5–294	Silty gyttja with macroscopic plant remains	Ld2, Dg1, Ag1-, Tb+, Th/Dh+, Tl/Dl+,
8	294–312	Silty gyttja with macroscopic plant remains	Ld3, Dg/Dl1, Tb+, Th/Tl/ Dh+, Ag+
9	312–370	Silty gyttja with macroscopic plant remains and sand	Ld3-, Ag1-, Dg/Dh/Dl+, Tb/Th/ Dh+, Gs+

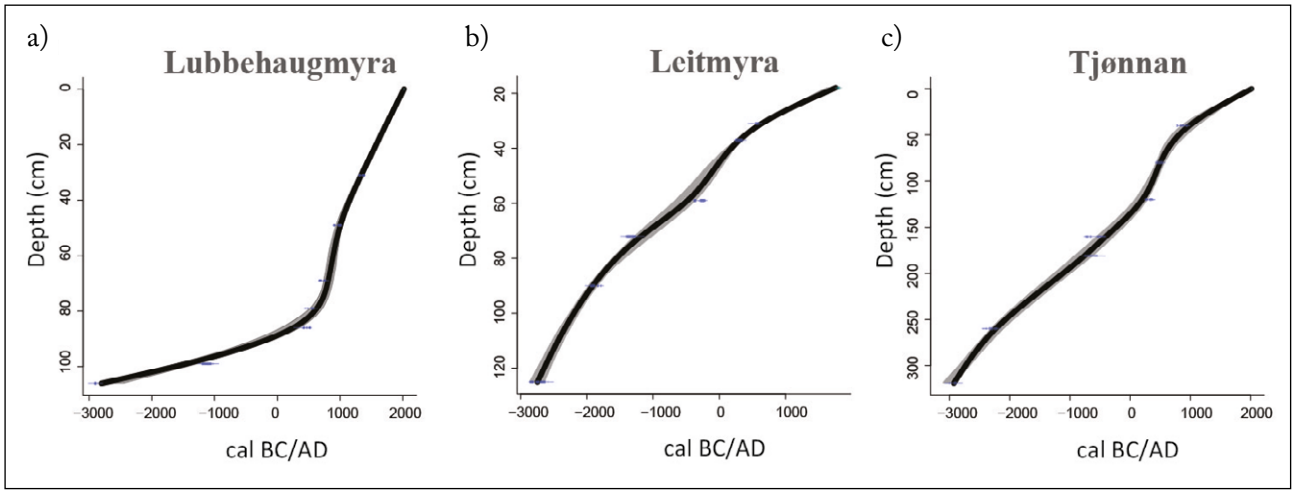


Figure 2. *Age models. Smooth spline in CLAM, R-code for classical age-depth modelling version 2.2 (Blaauw 2010). Calibrations by IntCal20 (Reimer et al. 2020), using 95% probability. a) Lubbehaugmyra. b) Leitmyra. c) Tjønnan. Kronologisk modell.*

LOVE.v5.1.win64.exe (both Sugita, unpublished) were applied. The wind speed was set to 3 m/s and the regional vegetation to 50 km. A fixed Relevant Source Area of pollen (RSAP) – the area in which the vegetation cover can be reconstructed using LOVE (cf. Sugita 1994, 2007b) – was set to 400 m.

RESULTS

Late Mesolithic natural riverside deposits at Skeiet (id 170657) – c. 5370–5220 BC

Organic layer, S1–S2

The pollen samples reflect pioneer deciduous woodland, dominated by *Betula* and *Alnus* (Figures 3a and 4a). Herbs present are Poaceae, *Filipendula*, forest herbs, light-demanding grassland herbs and ruderals. Charcoal values are low.

Cemetery, AD 550–1000

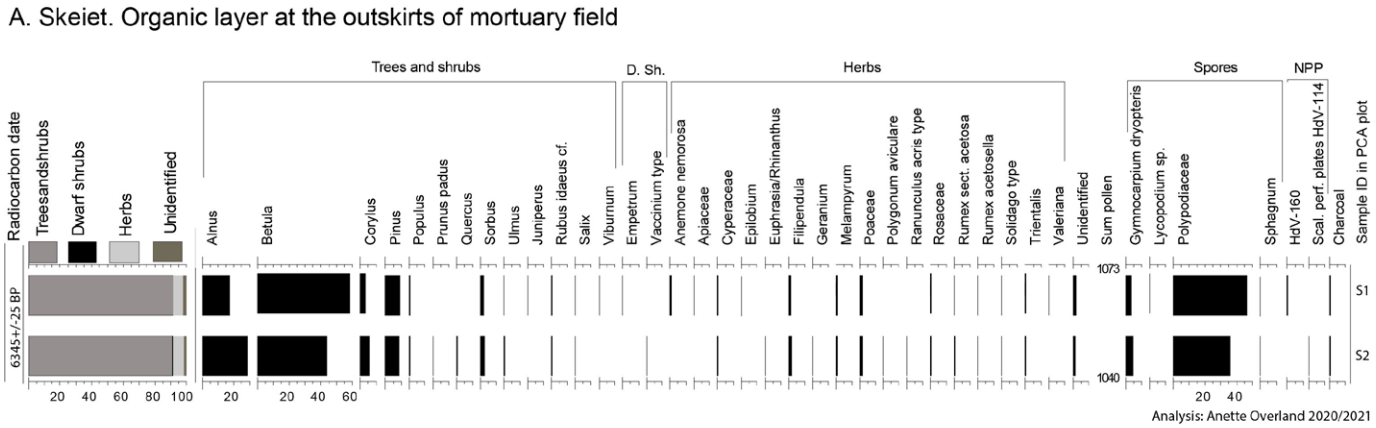
Plough marks, S19–S21 – Migration Period (AD 400–560/570)

The plough marks are associated with grassland taxa (Figures 3b, 4d and 5a) and low levels of arboreal pollen. *Hordeum*-type, *Triticum/Avena*-type and ruderals are recorded. Charcoal values are high and coprophilous fungi are present. The plough marks indicate an open landscape with fields and grasslands.

Mortuary contexts, S3–S18 – Merovingian (AD 560/570–800) and Viking Periods (AD 800–1030)

Samples were collected from mortuary features relating to Burial mounds I and II, and Graves 13–16 (Figures 3b, 4b–d and 5a and e). Both the ring ditches and Graves 10 and 14 relate to the Merovingian Period. Burial mound II is associated with low values of arboreal pollen and high values of grassland taxa and charcoal; ruderals, *Hordeum*-type and coprophilous fungi are recorded. In contrast, the ring ditch in Burial mound I has much higher values of arboreal pollen (*Betula, Salix*), lower values of grassland herbs and low charcoal values. These differences are interpreted in relation to the origin of the building material. Pollen samples associated with Burial mound II (ring ditch and Grave 11) bear resemblance to the plough marks (Figure 6a), and Burial mound II may have been constructed using older agricultural soils. In support of this is the *Hordeum* fruit, dated to the Migration Period, from Grave 11 (Overland 2022). Burial mound I may, on the other hand, represent a mix of both older and contemporary deposits. The top sample of the ring ditch in Burial mound I (S7) is interpreted as having been deposited after the mound was constructed (R. Sauvage, personal communication) and may represent the actual vegetation at the time. This sample shows an increase in *Betula* and fern spores, and has low charcoal value, suggesting that the mortuary site was a secluded area with little disturbance, in support of the micromorphology (Macphail 2021). The macrofossil samples from the ring ditch contained only a few charred grassland herbs (Figure 5a).

Figure 3. *Local context maps (Skeiet 1). a) Organic layer. b) Mortuary features at Skeiet. Figure: Kristoffer Rantala, NTNU, University Museum. Analyserte kontekster fra Skeiet 1.*



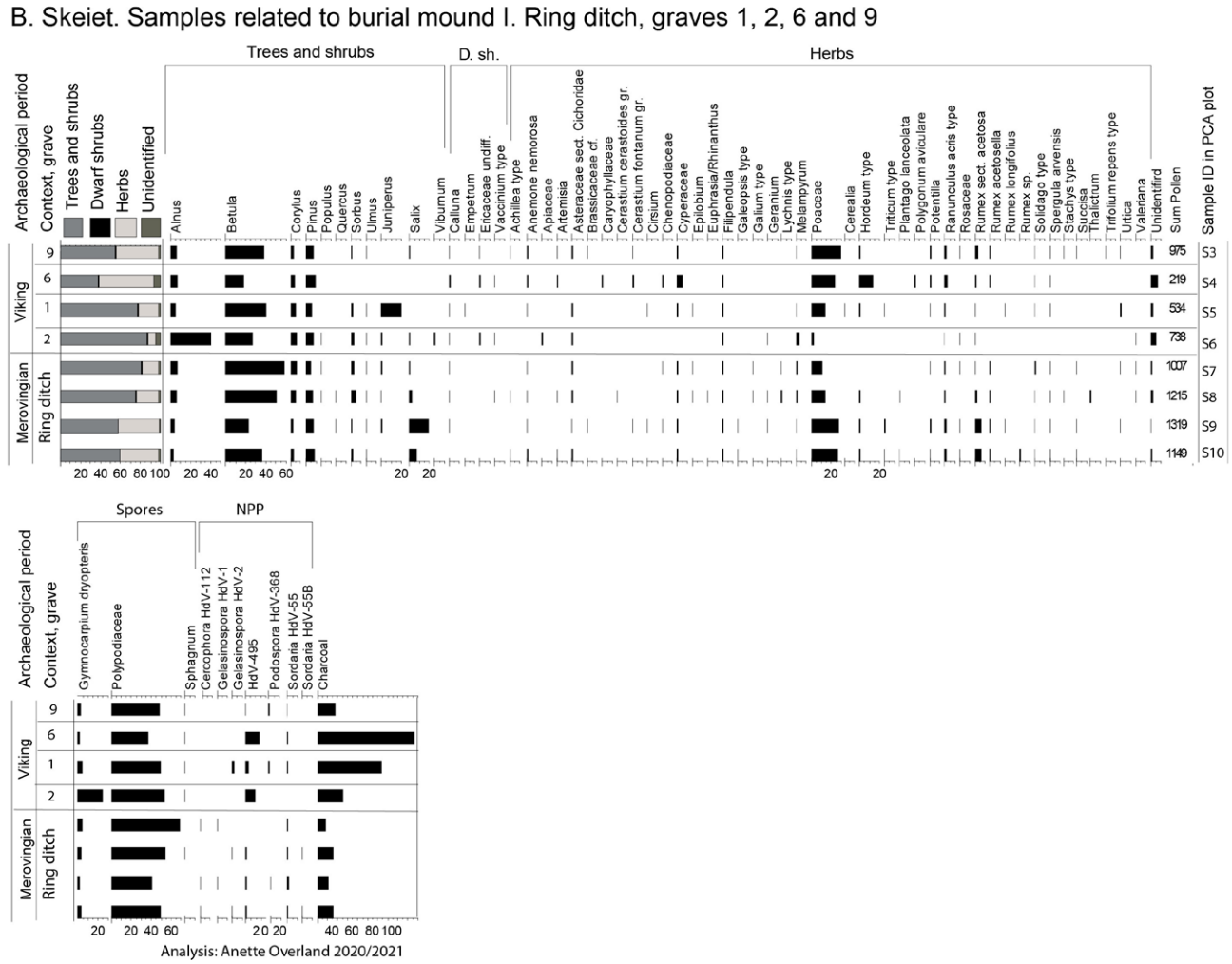
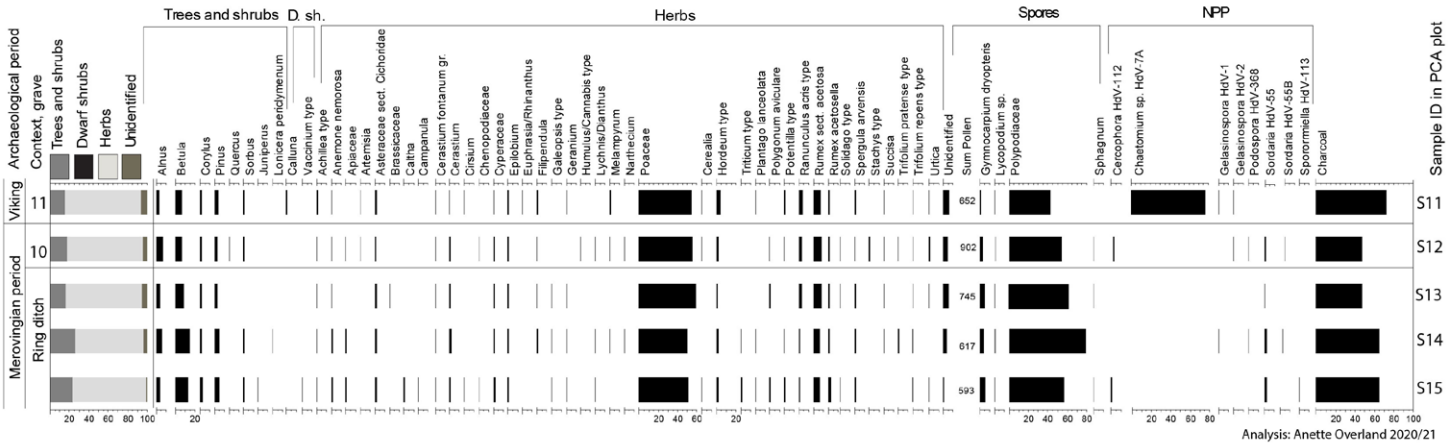
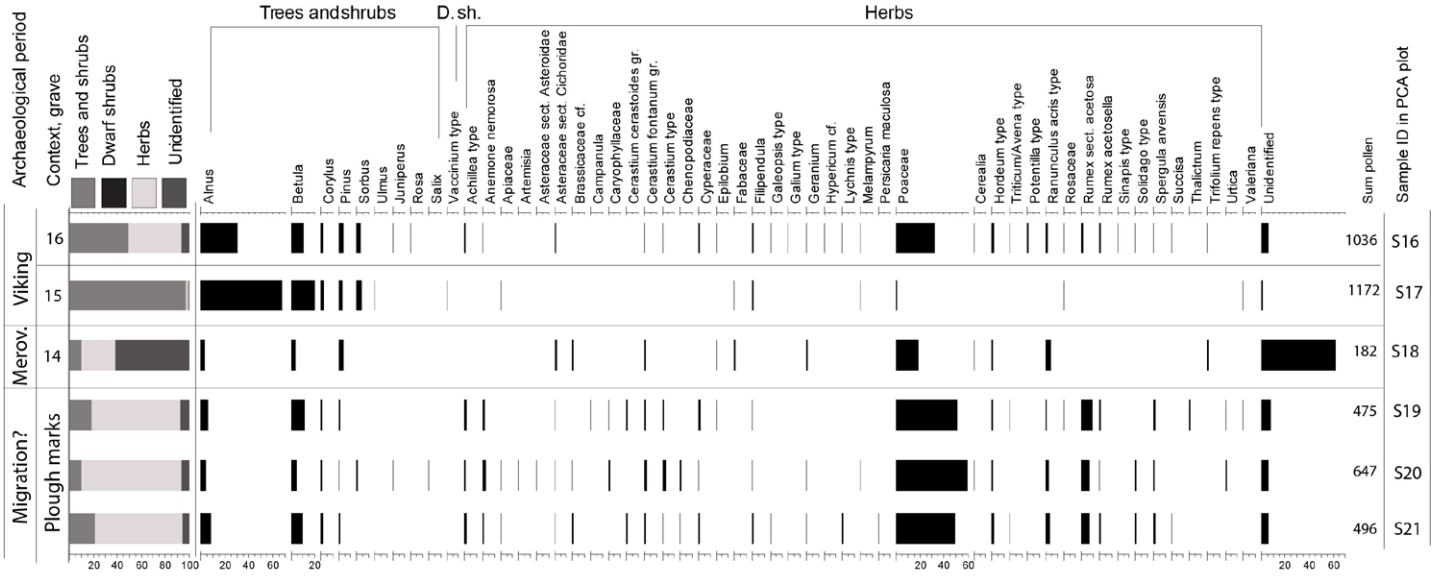


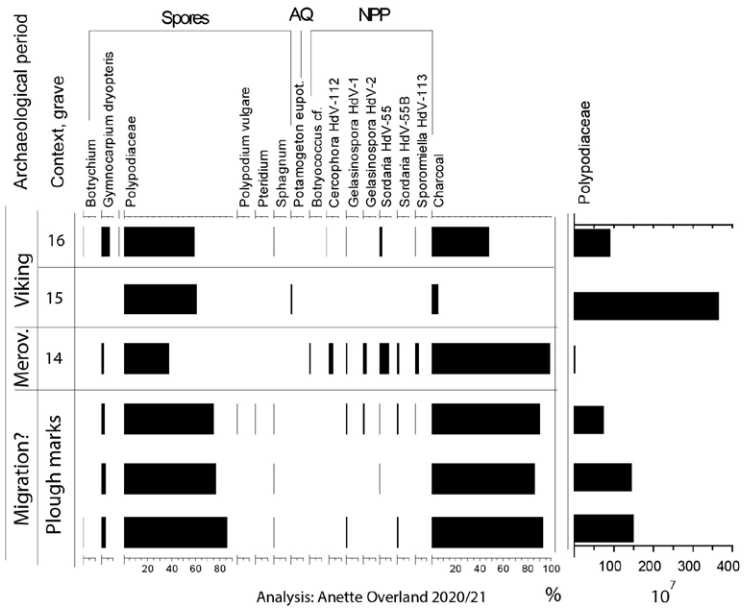
Figure 4. *Percentage pollen diagram from mortuary contexts and an older organic layer at Skeiet. A. Organic layer. B. Burial mound I. C. Burial mound II. D. Graves 14, 15 and 16, and plough marks. Concentration histogram for Polypodiaceae shown at the end of diagram. Pollendiagram fra undersøkte kontekster.*

C. Skeiet. Samples related to burial mound II. Ring ditch, graves 10 and 11



D. Skeiet. Samples related to graves 14, 15 and 16, and plough marks





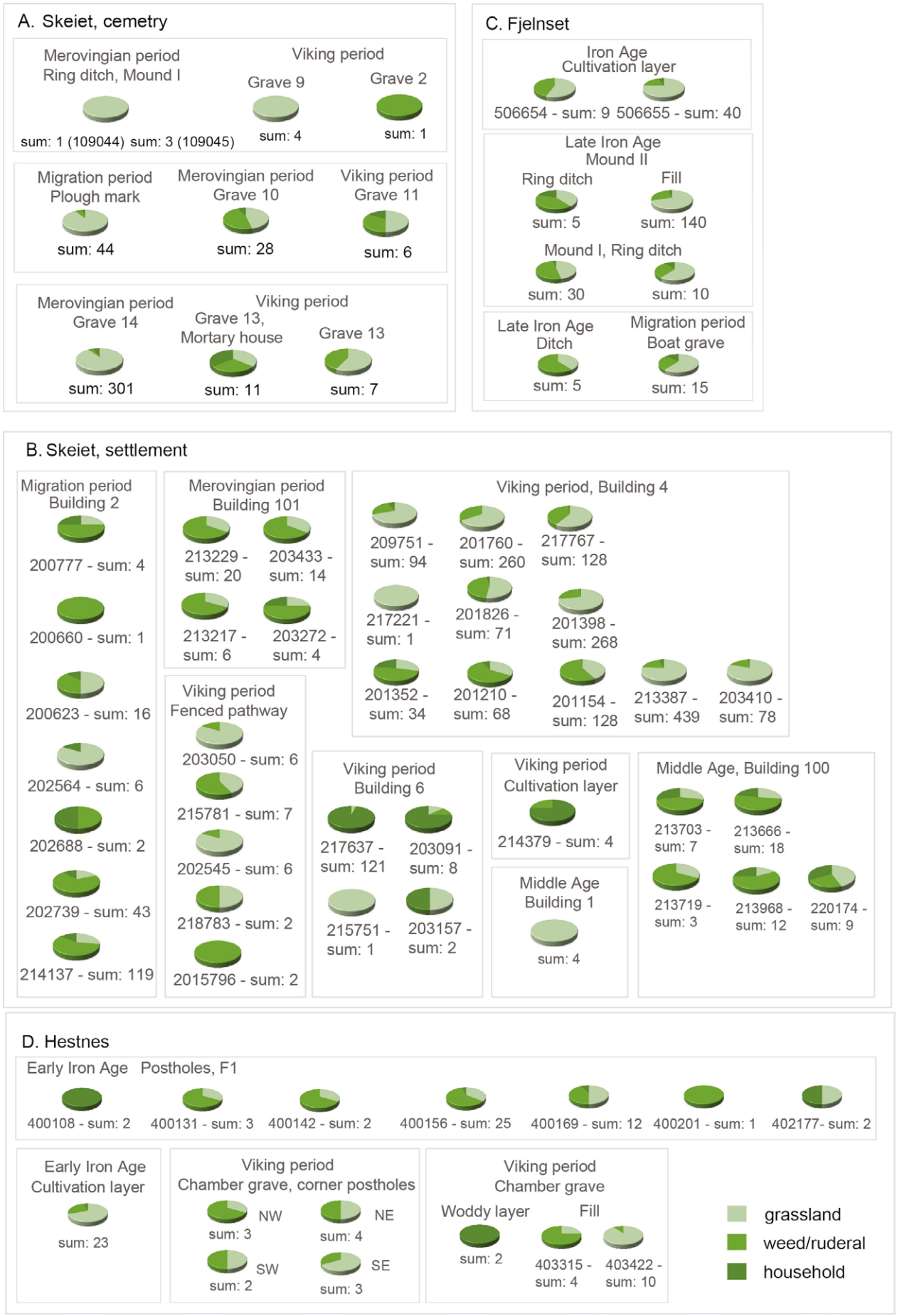


Figure 5. *Macrofossil data presented as sub-groups grassland, weed/ruderal and household taxa. A. and B. Skeiet. C. Fjelnset. D. Hestnes. Antall makrofossiler i kontekster fra Skeiet, Fjelnset og Hestnes.*

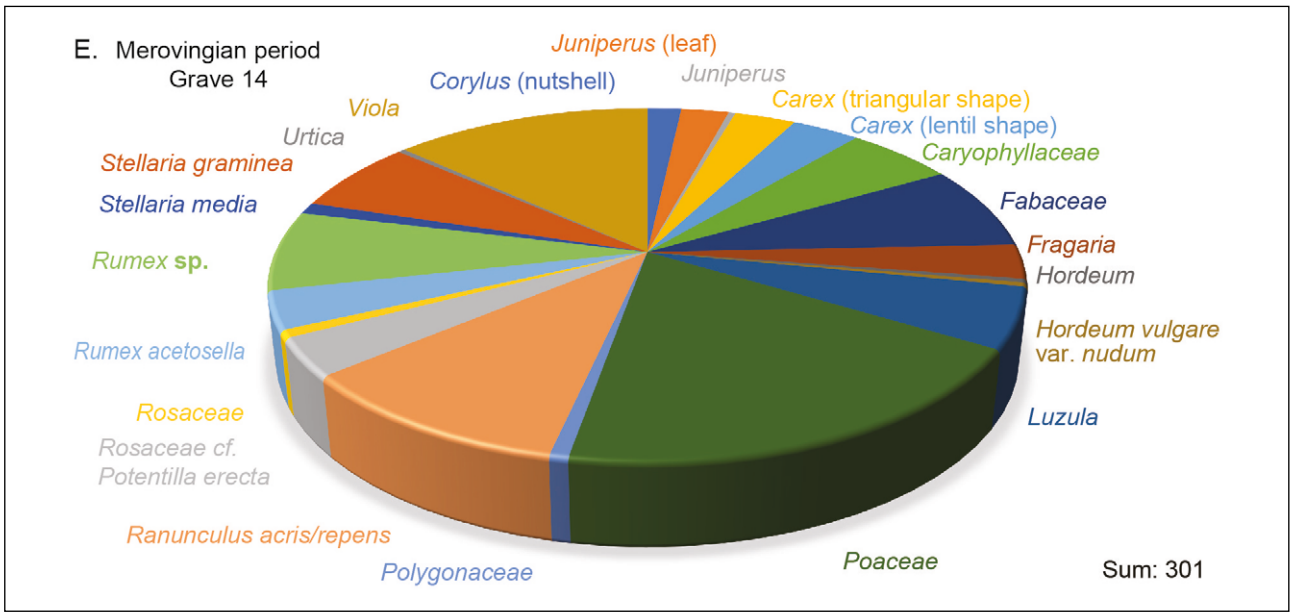


Figure 5 (continuing). *Macrofossil data in grave 14. Makrofossiler fra Grav 14.*

Grave 14 is a female cremation grave. The pollen sample is affected by fire (low pollen count, several burnt, unidentified pollen), and has a high charcoal value (Figure 4d). The macrofossil sample was particularly rich in charred macrofossils, most of which were grassland taxa (Figures 5a and e). The macrofossil sample from Grave 14 is interpreted in connection to mortuary rituals (see Discussion section).

Graves 11, 15 and 16, and graves associated with Burial mound I (Graves 1, 2, 6 and 9), relate to the Viking Period. The pollen sample from Grave 9 bears a resemblance to the ring ditch (Burial mound I), and Grave 11 can be compared to the ring ditch in Burial mound II (Figures 4b and c, and 6), suggesting that the pollen samples were affected by the subsoil. Macrofossil samples associated with Burial mound I contain only a few grassland taxa, while samples associated with Burial mound II also contain weeds/ruderals and household taxa (Figure 5a).

Samples from other graves also show distinctive characteristics. Grave 2, with a high percentage of arboreal pollen and low values of herbs, is comparable to the late Mesolithic organic layer to the north-east (Figure 6), supporting the interpretation that Burial mound I is associated with older deposits. Grave 1 is associated with a high percentage value of *Juniperus*, while Grave 6 has high values of *Hordeum*-type (13%) and charcoal (Figure 4b). Grave 15 contains unusually well-preserved and high concentrations (Figure 4d) of bracken spores (Polypodiaceae), which may represent gathered bracken for funeral rituals, while Grave 16, a weapon grave, shows the presence of crumbled pollen grains of herbs, possibly reflecting the deposition of floral tributes.

Cultivation and settlement AD 400–550 and AD 650–1350 at Skeiet (id 170666)

Cultivation S25–S31; Migration – Viking Periods

The pollen samples show a reduction in arboreal pollen and a steady increase in Poaceae, grassland taxa, *Hordeum*-type and ruderal species, suggesting the presence of fields, meadows and pastures (Figures 7a and 8). The bottom sample (S31) is associated with woodland cover in the PCA plot (Figure 6). The macrofossil sample from layer 1 contains grassland and ruderal taxa (Figure 5b).

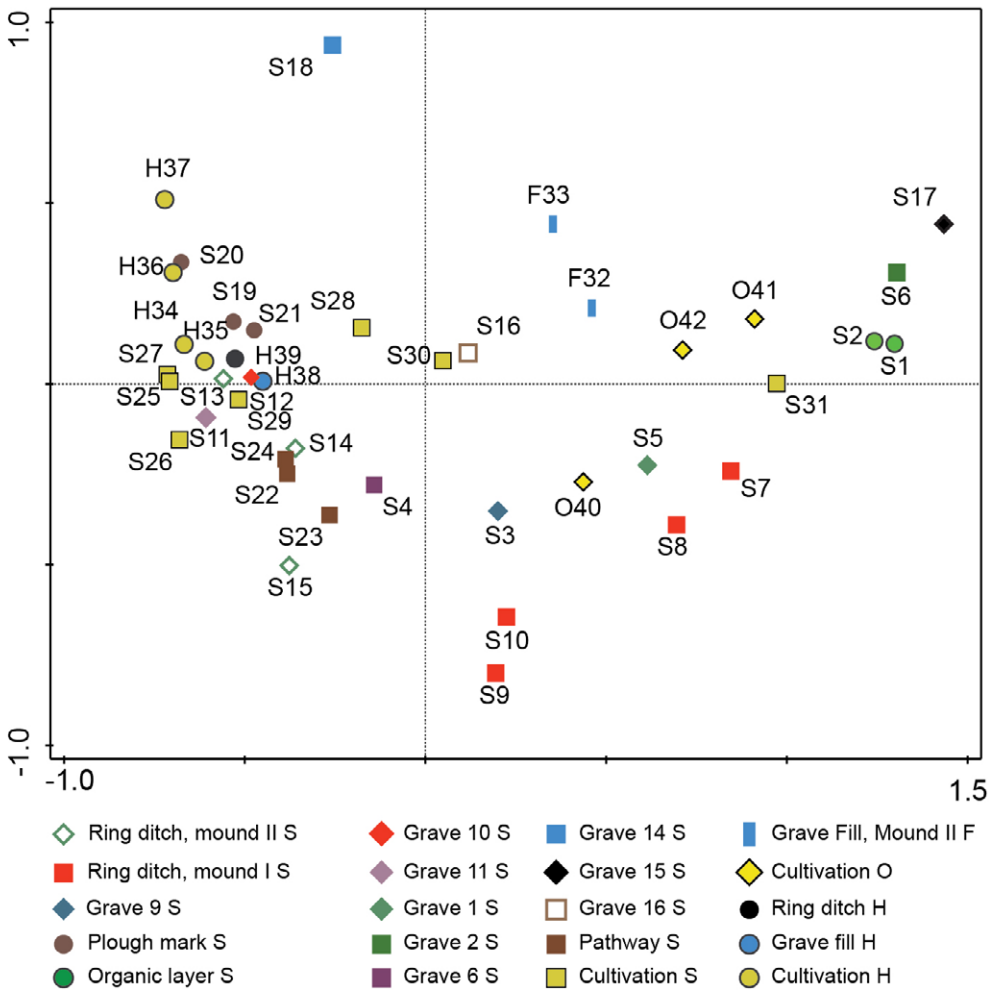
Fenced pathway S22–S24; Viking Period

The pollen samples reflect an open landscape, mostly herbs representing grasslands and ruderals (Figures 7b, 5b and 8). Grazing indicator *Plantago lanceolata* and *Urtica,* which suggest nitrogen-rich environments, and coprophilous fungi may suggest that the pathway was used by animals.

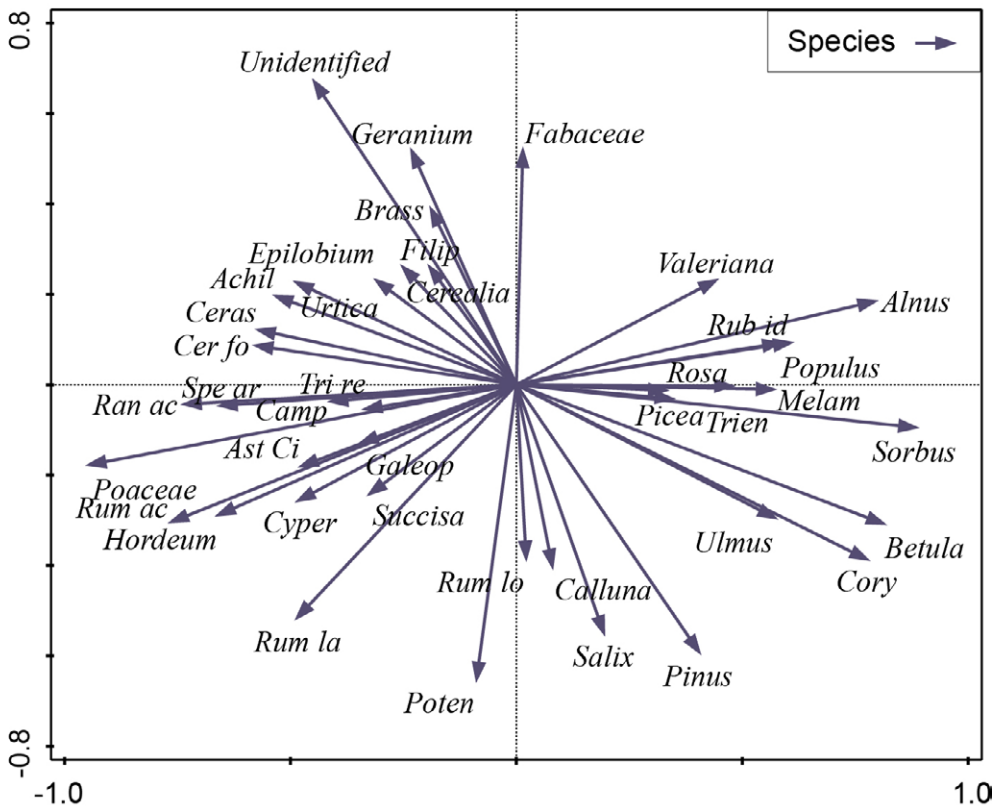
Building 2; Migration Period

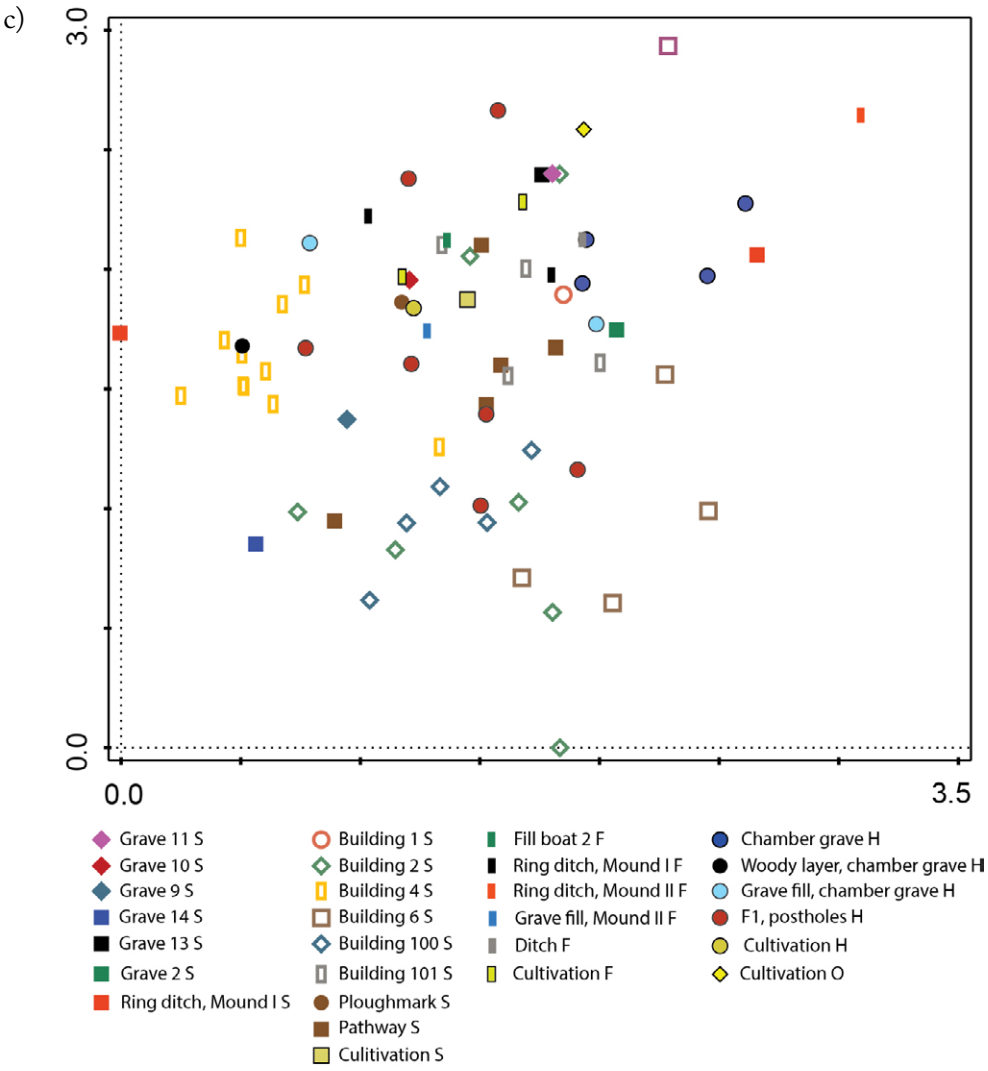
The macrofossil samples from one row of roof-bearing posts show a differentiation in the number of charred macrofossils (Figure 5b). One end of the building has the highest number (Sums: 43 and 119), most of which relate to ruderals (*Rumex acetosella, Stellaria media*). Grassland taxa are best represented by Poaceae and household taxa include Cerealia and *Hordeum*, wild strawberry (*Fragaria vesca*), raspberry (*Rubus idaeus*) and hazelnut (*Corylus*). The remaining samples have lower numbers of macrofossils, where a few samples are dominated by grassland taxa. The DCA plot shows a scattered distribution of samples

a)


1.0
-1.0
-1.0
1.5
S18
H37
F33
S17
H36
S20
F32
O41
S6
S19
H34
S21
S28
S16
O42
S2
S1
H35
S27
H39
S30
H38
S25
S13
S12
S31
S29
S11
S24
S14
S5
S26
S22
S4
O40
S7
S23
S3
S8
S15
S10
S9
Ring ditch, mound II S
Grave 10 S
Grave 14 S
Grave Fill, Mound II F
Ring ditch, mound I S
Grave 11 S
Grave 15 S
Cultivation O
Grave 9 S
Grave 1 S
Grave 16 S
Ring ditch H
Plough mark S
Grave 2 S
Pathway S
Grave fill H
Organic layer S
Grave 6 S
Cultivation S
Cultivation H

b)


0.8
-0.8
-1.0
1.0
Species
Unidentified
Geranium
Fabaceae
Brass
Epilobium
Filip
Achil
Cerealia
Valeriana
Alnus
Ceras
Urtica
Rub id
Cer fo
Rosa
Populus
Spe ar
Tri re
Ran ac
Camp
Melam
Picea
Trien
Sorbus
Ast Ci
Galeop
Poaceae
Rum ac
Cyper
Succisa
Ulmus
Betula
Hordeum
Cory
Rum lo
Calluna
Rum la
Salix
Pinus
Poten



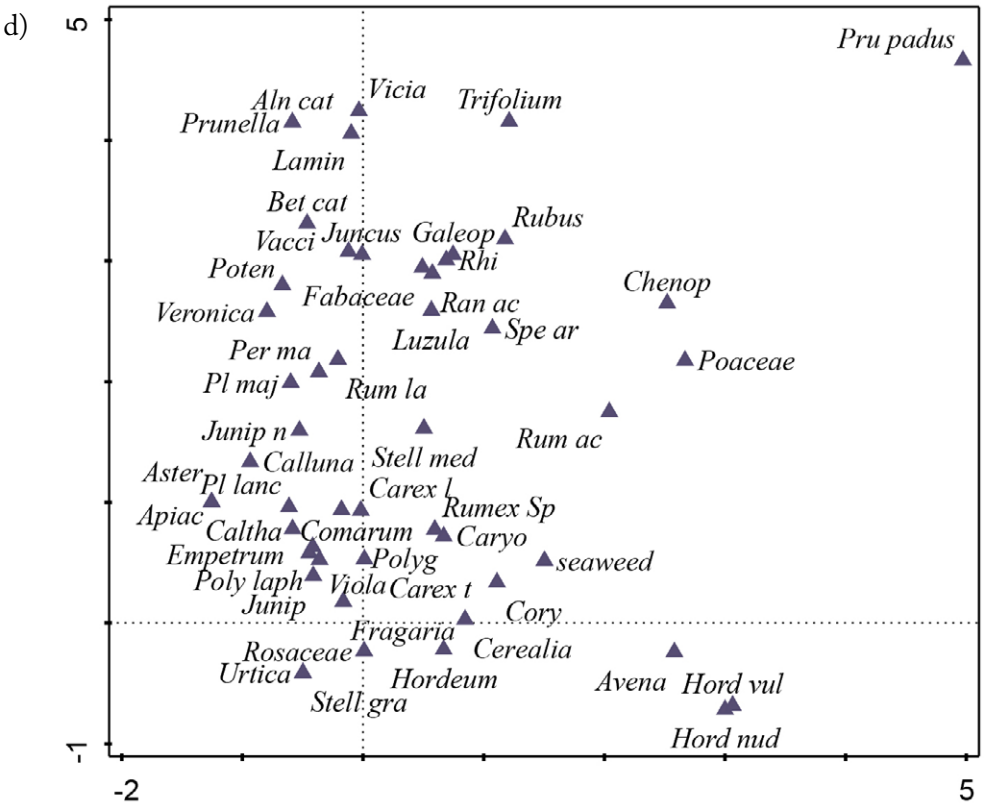


Figure 6. *Principal Component Analysis (PCA) of pollen samples showing main gradients in a with main species in b. Detrended correspondence analysis (DCA) of macrofossil samples in c with main species in d. Samples from Skeiet (S), Fjelnset (F), Hestnes (H) and Otnes (O). PCA-analyse av pollendata og DCA-analyse av makrofossildata.*

(Figure 6c). The building is interpreted as relating to household functions, based on the content of macrofossils (Viklund 1998).

Building 101; Late Merovingian – Viking Periods

Four macrofossil samples were analysed from roof-bearing posts (Figure 5b), dominated by ruderals (*Rumex acetosella, Spergula arvensis*, *Stellaria media*), some grassland taxa (*Ranunculus acris/repens*) and, in one posthole (203272), unspecified Cerealia was recorded. The function is interpreted to relate to household activities.

Building 6; Viking Period

Three out of four postholes contained household macrofossils (Figure 5b), mainly Cerealia (Figures 6c and d). Building 6 may represent a cereal storeroom (Viklund 1998, Jensen et al. 2020).

Building 4; Viking Period

Samples from 11 postholes were analysed, and ruderals (*Rumex acetosella*) were most prominent to the south-west, while grassland taxa (Poaceae) dominated the remaining postholes. Most of the postholes had a small representation of household taxa (Figure 5b). Despite the large number of grassland taxa, and the DCA plot showing association with outfield taxa (Figures 6c and d), this building may represent household functions (Bryn et al. 2023).

Waste deposit (building 100); Early – High Middle Ages

Five macrofossil samples were analysed (Figure 5b), and the material was interpreted as representing a waste deposit from the Middle Ages. Ruderals are dominant, but household waste is represented. The DCA plot suggests association with Cerealia (Figures 6c and d).

Building 1; Middle Ages

One sample from the wall ditch was analysed which contained grassland herbs. The function of the building is not clear.

In general, Cerealia is found in all the buildings, except building 1. Buildings are generally associated with household taxa (Figure 6). *Avena* is associated with buildings/contexts from the Middle Ages (buildings 100 and 6).

Cultivation and cemetery AD 550–1000 at Fjelnset (id 170642)

Cultivation layer F32–F33 – Late Iron Age

The macrofossil samples from the cultivation layer had predominantly grassland taxa (Figures 9, 5c and 10). Ruderals (*Galeopsis*, *Rumex acetosella*, *Stellaria media*, *Spergula arvensis*) and species relating to household were present (*Rubus idaeus*, *Corylus* nutshell).

Burial mounds and boat grave – Late Iron Age and Migration Period

In the burial mounds and the boat grave, macrofossil samples represent mostly ruderals and grassland taxa (Figure 5c). The ring ditch in Burial mound II had low numbers of macrofossils, while the fill was rich (sum: 140) in mostly grassland taxa. Ruderals (*Rumex acetosella*, *Stellaria media*, *Chenopodium album*) and household taxa (cf. *Avena*, *Corylus* nutshell) were also present. Two pollen samples from the fill in mound II were analysed, where arboreal pollen (mostly *Betula* and *Alnus*) had 60–70% representation, and herbs (mostly Poaceae) represented c. 25% (Figure 10). Grassland herbs, ruderals (*Artemisia*, Chenopodiaceae), *Hordeum*-type and coprophilous fungi were present, and charcoal values were high.

The analysed contexts from Fjelnset suggest cultivated areas and grasslands. The pollen samples also had a good representation of light-demanding tree species (birch and alder), which may reflect shrubs in the surrounding area, but the pollen content in the mound fill may also have been influenced by mortuary rituals (see Discussion section).

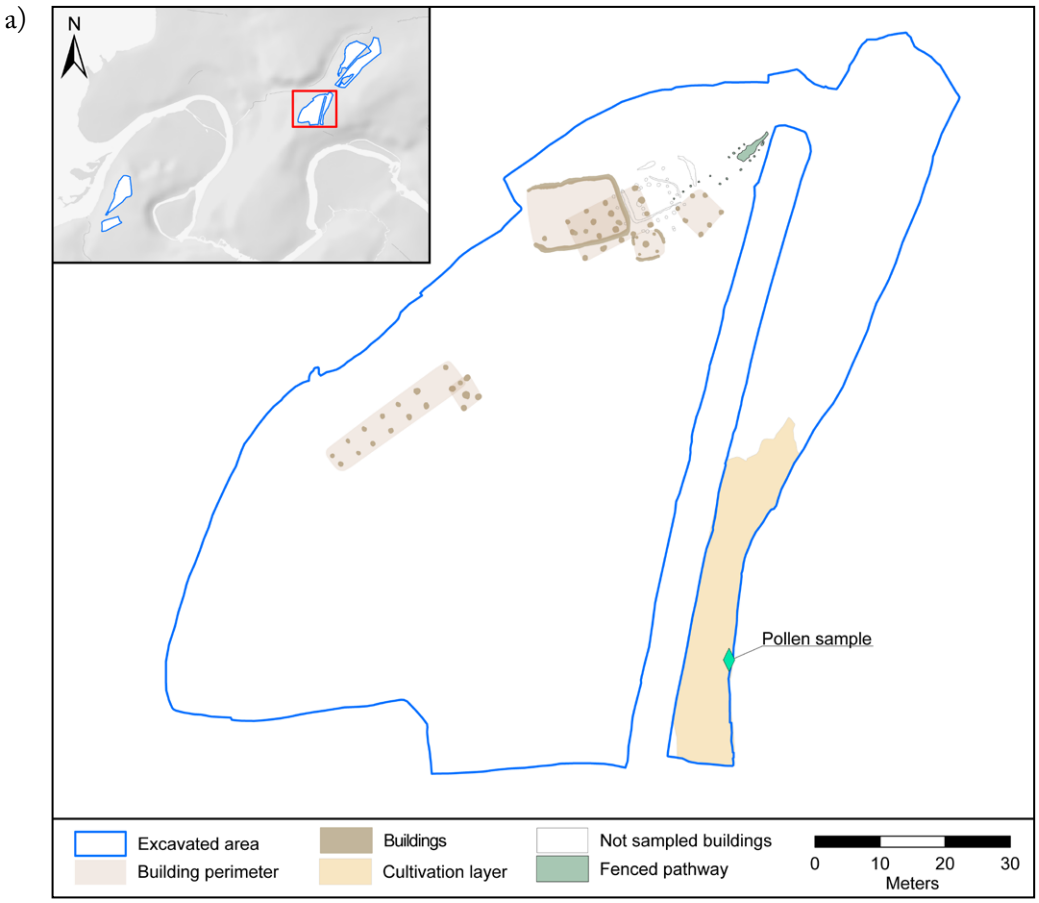
Cultivation and settlement 100 BC–AD 550 and mortuary features AD 850–1150 at Hestnes (id 173431)

Cultivation layer H34–H37 – Roman Iron Age – Viking Period

The pollen samples reflect open landscape dominated by grassland and ruderal herbs (Figures 11, 12, and 6a and b). *Hordeum*-type increase throughout the profile suggests local cereal cultivation, and coprophilous fungi suggests the use of manure.

Possible building F1 – Roman/Migration Period

Postholes (F1) in the northern part of the site may reflect a building (Østmoe et al. 2023). The macrofossil samples are dominated by ruderals (Figure 5d), and household taxa (*Corylus* nutshells) are present in four postholes. The DCA plot shows a dispersed



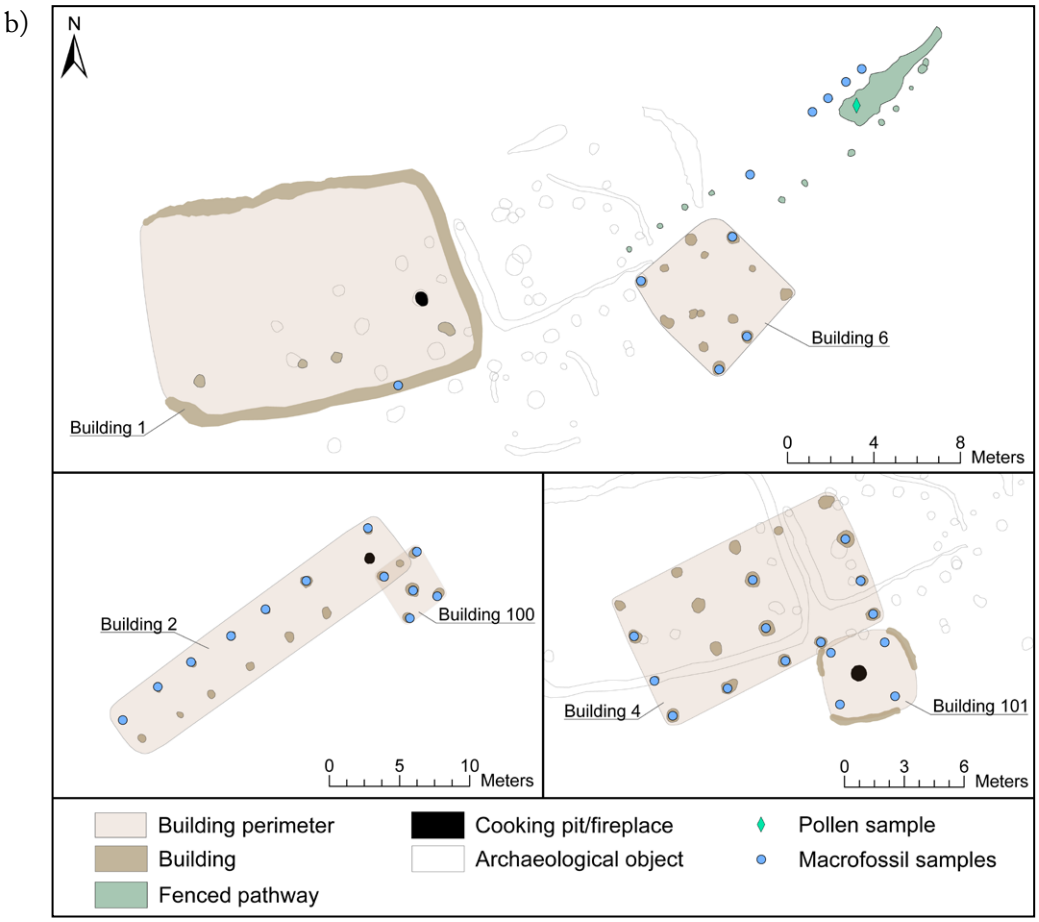


Figure 7. *Local context maps. a) Overview of settlement at Skeiet, including buildings, fenced pathway and cultivation layer. b) Detail of buildings at Skeiet with associated pollen and macrofossil samples. Figure: Kristoffer Rantala, NTNU, University Museum. Analyserte kontekster fra Skeiet 2.*

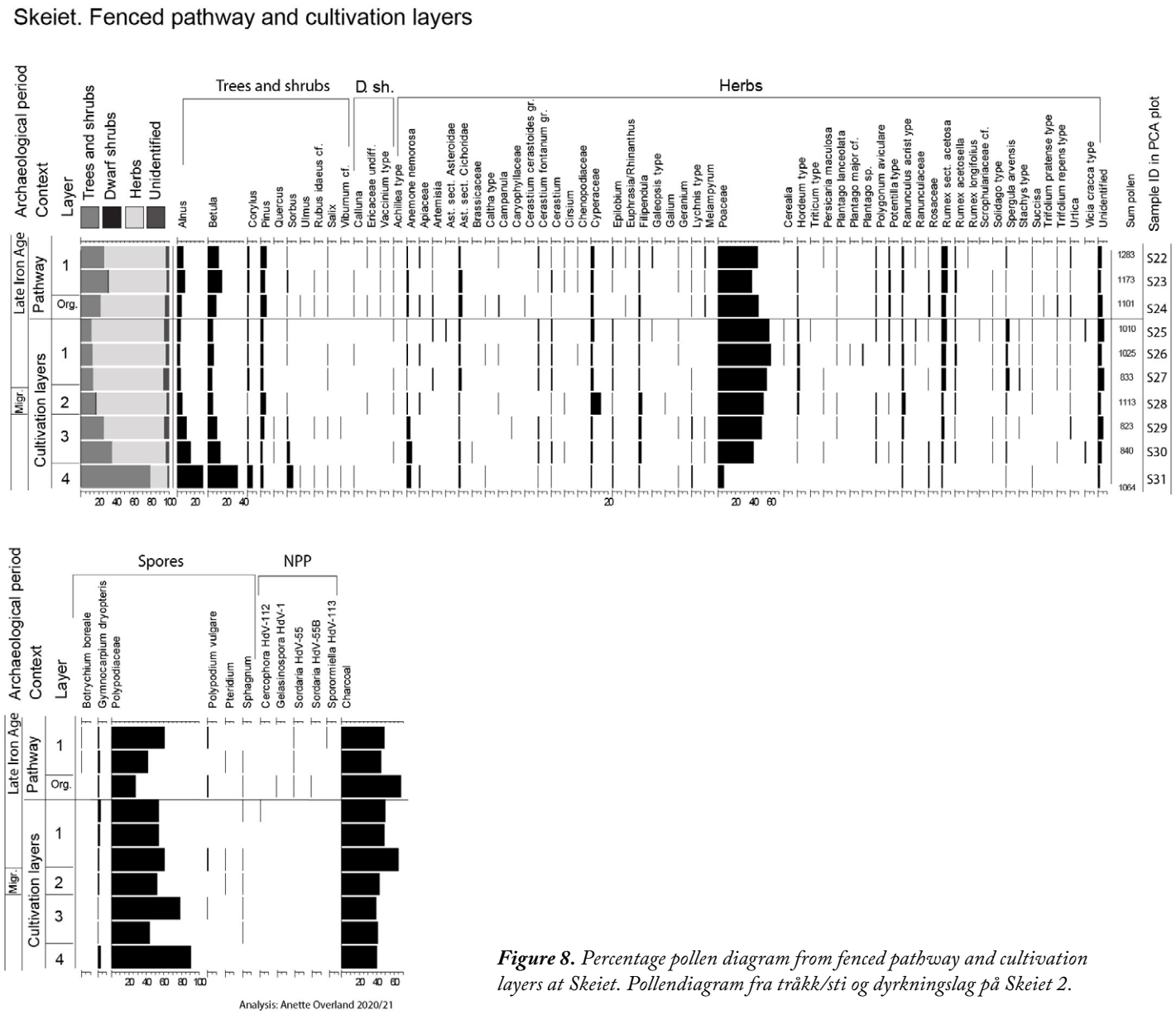


Figure 8. *Percentage pollen diagram from fenced pathway and cultivation layers at Skeiet. Pollendiagram fra trakk/sti og dyrkningslag på Skeiet 2.*

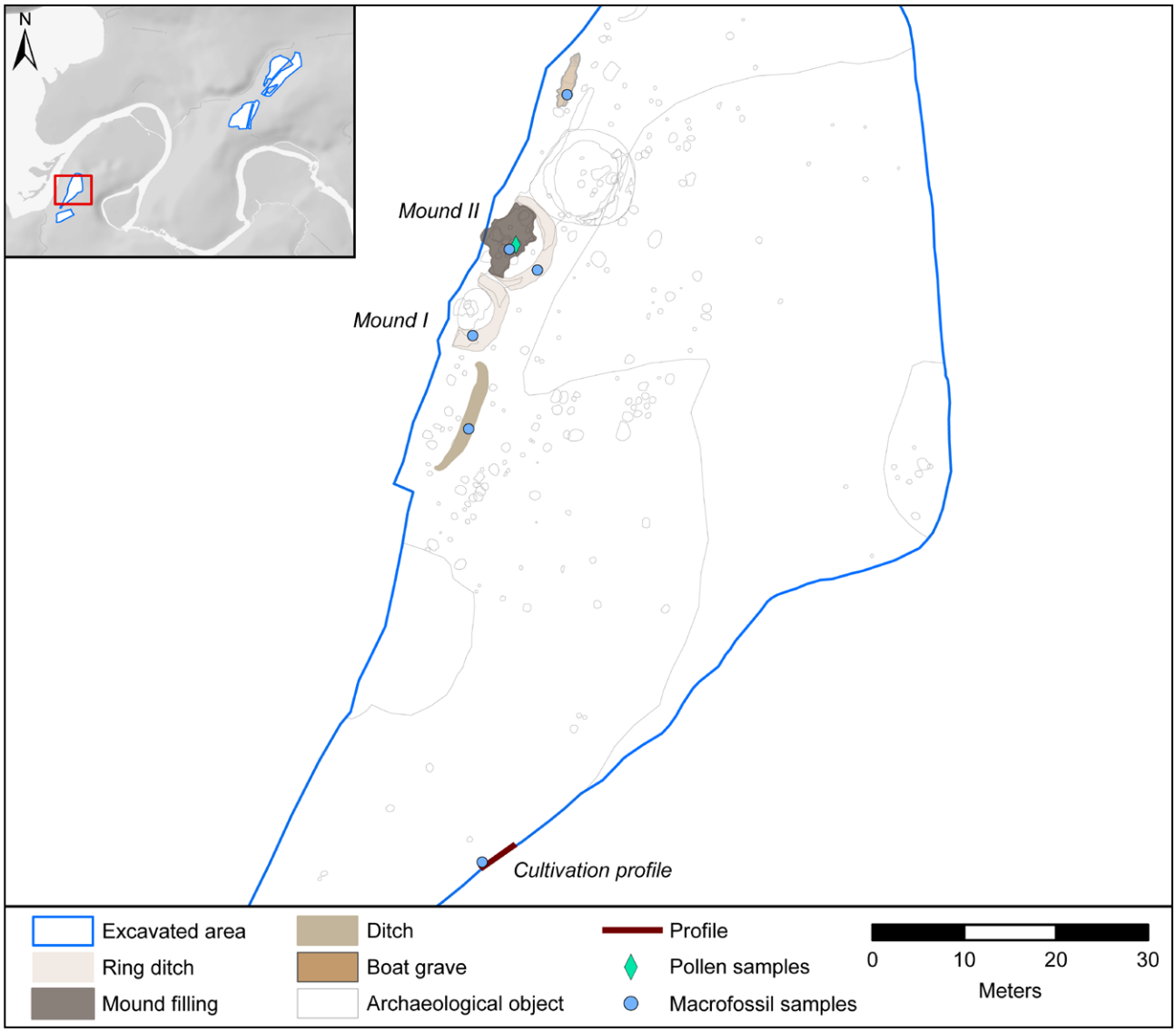


Figure 9. *Local context map for Fjelnset. Figure: Kristoffer Rantala, NTNU, University Museum. Analyserte kontekster fra Fjelnset.*

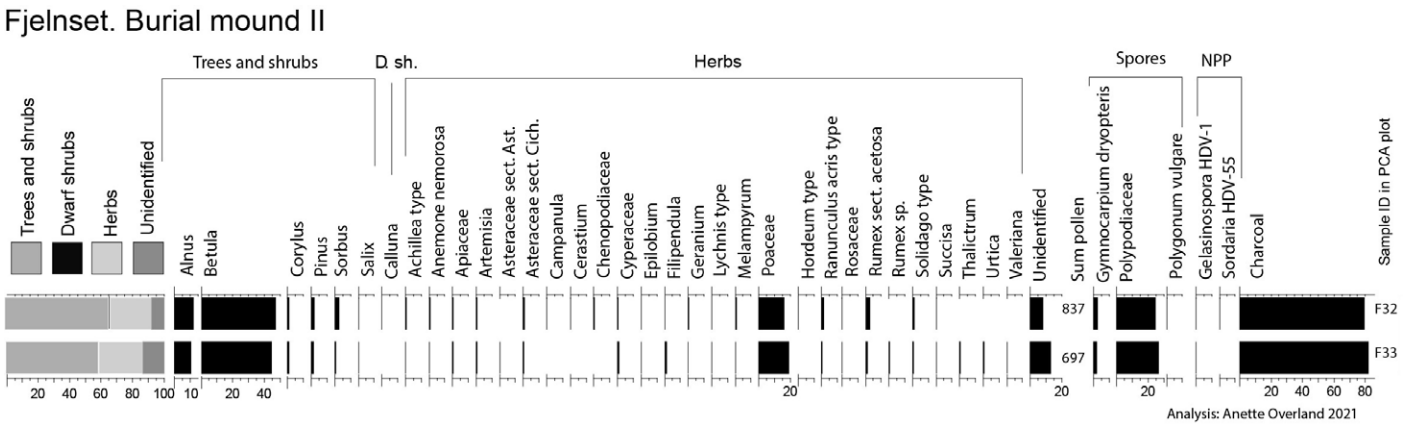


Figure 10. *Percentage pollen diagram from Burial mound II at Fjelnset. Pollendiagram fra Haug 2 på Fjelnset.*

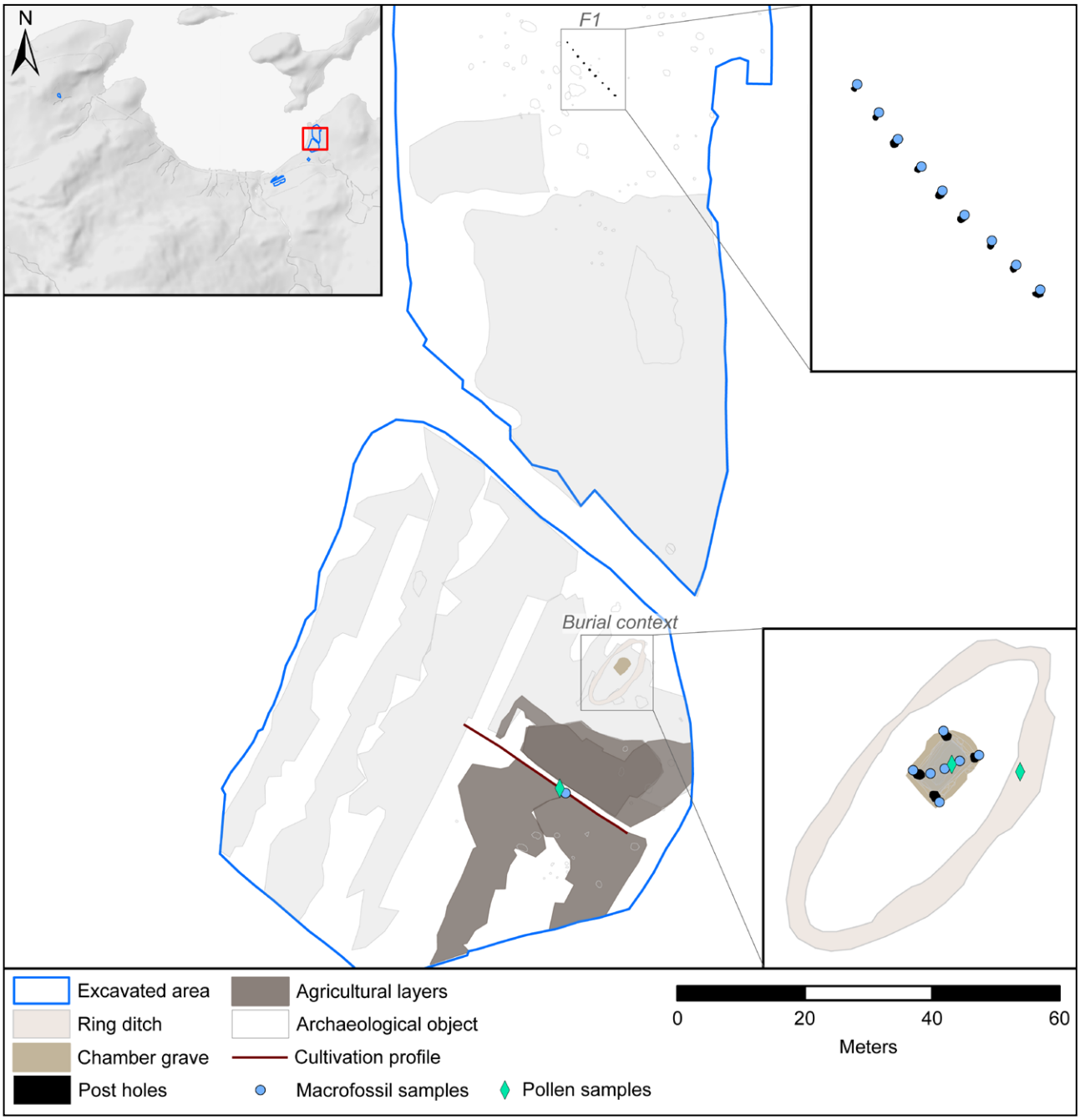


Figure 11. *Local context map for Hestnes. Figure: Kristoffer Rantala, NTNU, University Museum. Analyserte kontekster fra Hestnes.*

pattern, reflecting differences between the samples (Figures 6c and d).

Chamber grave H38–H39 – Viking Period

The pollen samples (fill and ring ditch) show a resemblance to the cultivation layer (Figures 12, and 6a and b). This may suggest that the chamber grave was erected within the infields. The chamber postholes and grave fill had macrofossils representing grasslands and ruderals (Figure 5d), while the woody layer contained household taxa (*Rubus idaeus*, *Fragaria vesca*).

In general, the landscape at Hestnes was open throughout the Iron Age, dominated by fields and grasslands. In the PCA plot, pollen samples are grouped on the left-hand side, showing similarities to cultivation layers and plough marks at Skeiet.

Clearance cairns (Early Bronze Age and Migration Period) at Otnes (id 173452)

Pollen and macrofossil samples were analysed from two clearance cairns (Figure 13). The Bronze Age layer (O42) reflected a partly open landscape (Figures 14, and 6a and b), with a presence of *Hordeum*-type and

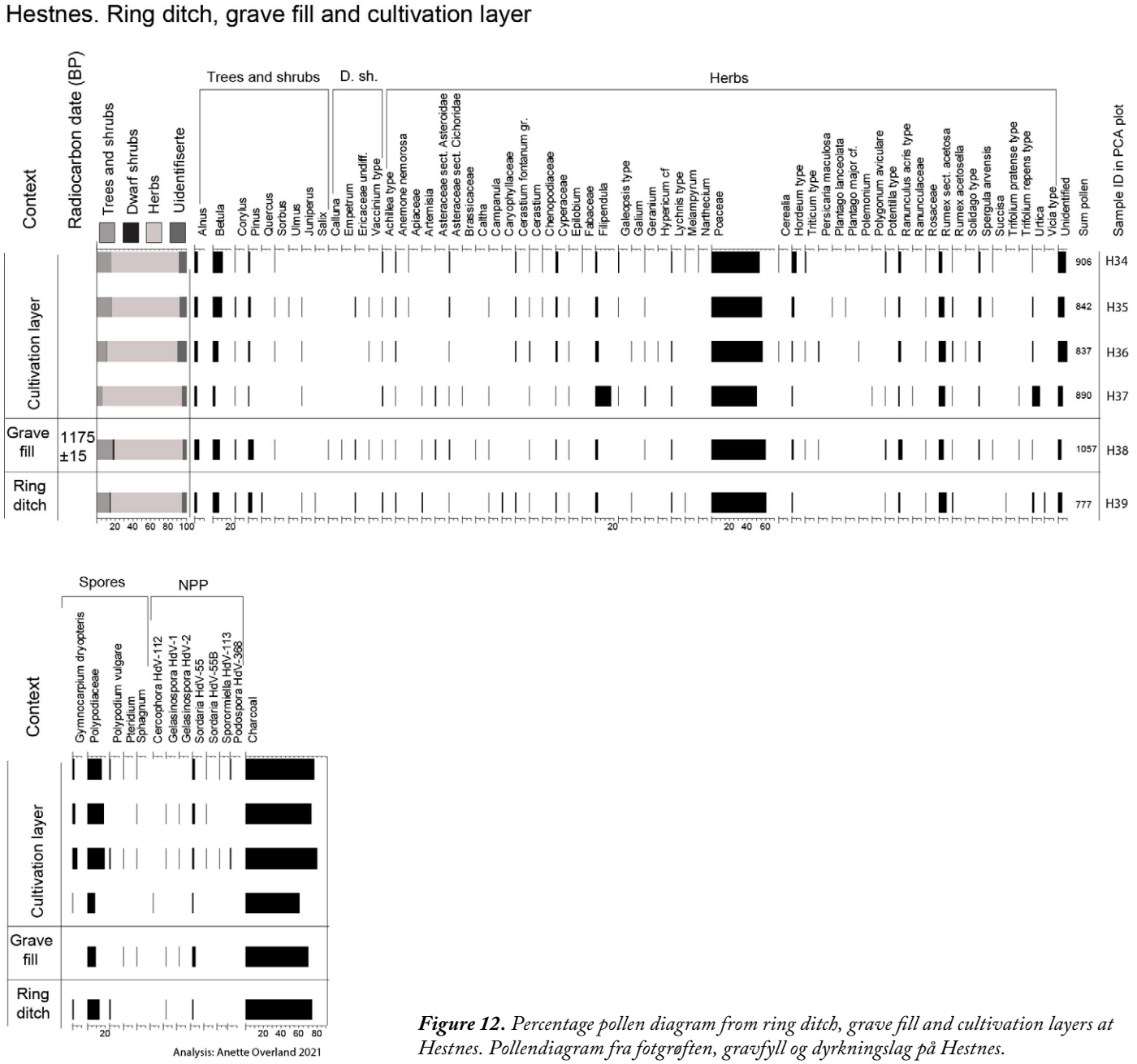


Figure 12. *Percentage pollen diagram from ring ditch, grave fill and cultivation layers at Hestnes. Pollendiagram fra fotgrøften, gravfyll og dyrkningslag på Hestnes.*

high charcoal values, while the macrofossil sample contained *Rubus idaeus,* which may reflect household waste. The top layer from the Migration Period (O40) reflects a more open landscape, grazed and cultivated. The PCA plots of the Otnes samples, O40–O42, towards the right-hand side, reflect some woodland cover.

Peat profiles: Lubbehaugmyra, Leitmyra and Tjønnan

Middle Neolithic – Late Bronze Age

Results and interpretations of environments based on the three pollen diagrams are presented in Overland (2022). Summed up, these peat profiles suggest *Alnus* carr on mineral wet soils in lowland areas during the Middle Neolithic (Tjønnan and Lubbehaugmyra), and *Pinus* and *Betula* at a higher elevation (Leitmyra) (Figures 15a–c). Both locally and regionally, *Corylus* has better representation in the Middle Neolithic than in later periods. From the Late Neolithic/Bronze Age transition, peat development was initiated in Tjønnan, when local *Alnus* carr developed into Cyperaceae-dominated wetland.

At the end of the Middle Neolithic in Tjønnan and Lubbehaugmyra, and Late Neolithic in Leitmyra, there are increased levels of charcoal. This may

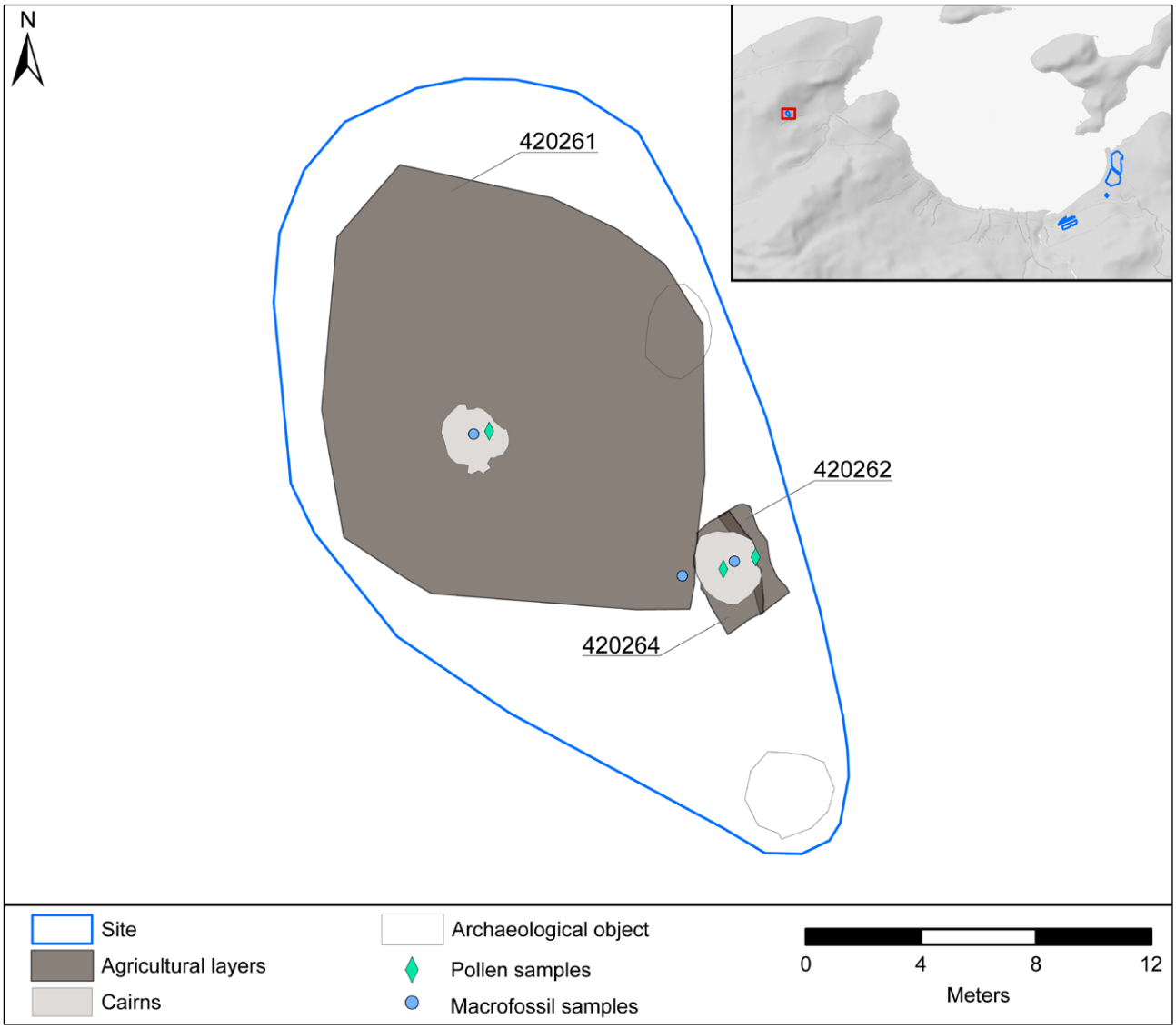


Figure 13. *Local context map for Otnes. Figure: Kristoffer Rantala, NTNU, University Museum. Analyserte kontekster på Otnes.*

reflect natural forest fires in *Pinus* woodlands but may also reflect human impact (see Discussion section). When combining pollen data from Tjønnan and Lubbehaugmyra into time intervals, a decrease in trees and shrubs is evident in the Late Neolithic (2250 BC–1750 BC) and the Early Bronze Age (1750 BC–1250 BC) (Figure 16). A more detailed picture is given by the estimated vegetation cover, accounting for differences in pollen production and dispersal among species. The REVEALS estimated cover of trees and shrubs fluctuates around 60% until 1750 BC. During the Early Bronze Age, the cover of trees and shrubs was reduced to less than 40% (Figure 16). In Lubbehaugmyra, the estimated cover indicates a change from nearly 90% pioneer trees and shrubs in the Late Neolithic to less than 30% in the Bronze Age.

Early Iron Age

In Lubbehaugmyra, the Early Iron Age is associated with a reduction in woodlands and an increase in *Juniperus*, dwarf shrubs (*Calluna*) and Cyperaceae. *Hordeum*-type and a range of ruderal weeds and grassland taxa are present and there is an increase in charcoal and coprophilous fungi. These changes in local vegetation and environment are interpreted as a direct consequence of activity at Skeiet and Fjelnset. The landscape surrounding Lubbehaugmyra is more open (Figure 15a) and probably influenced by grazing. *Hordeum* and ruderal weeds may have been dispersed from surrounding infields.

Leitmyra forms part of the outfield grazing areas and shows undulating low levels of charcoal, which may reflect settlement activity on a regional scale. In Tjønnan, charcoal values were high in the Pre-Roman Iron Age. Both pollen diagrams show woodland

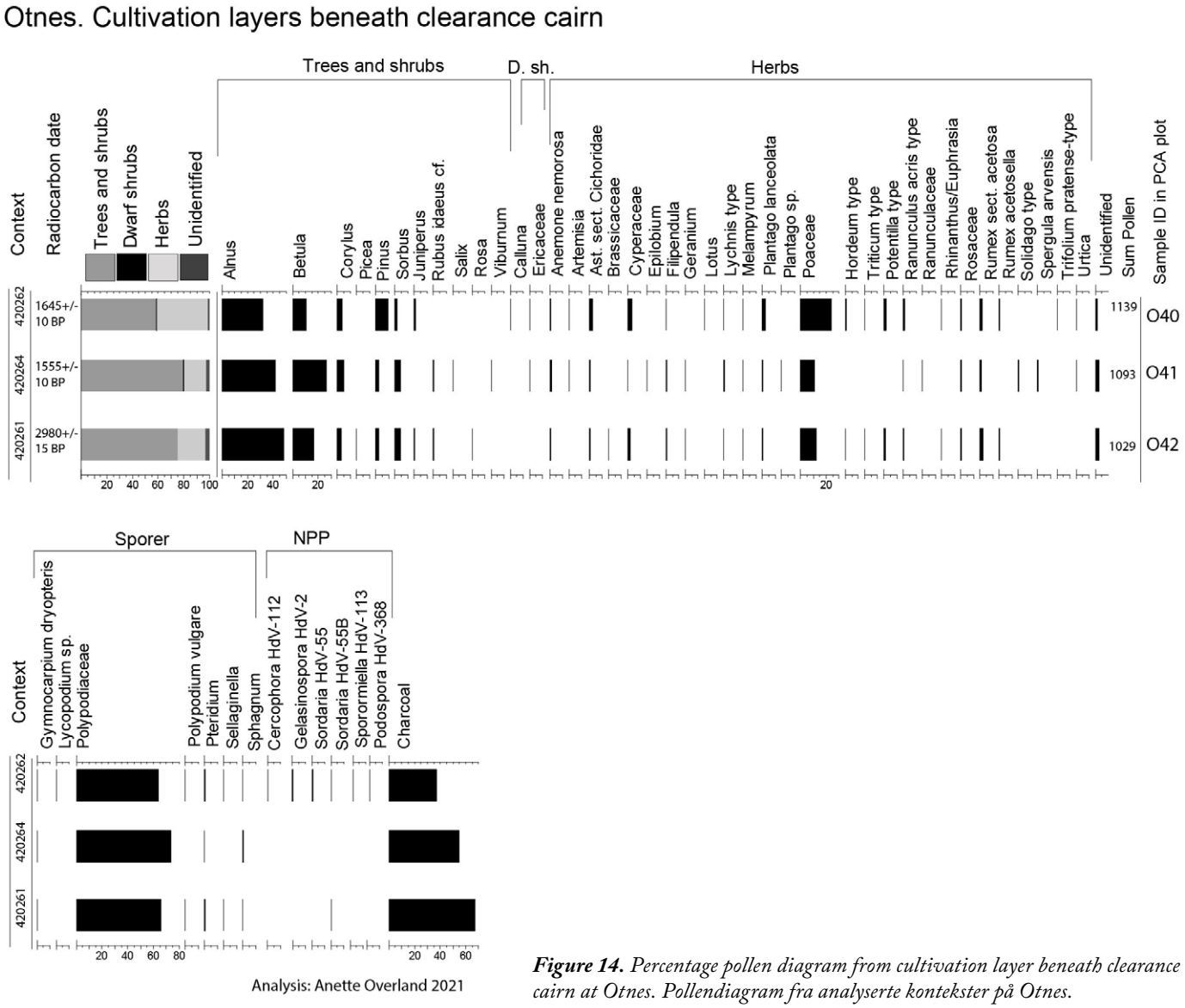


Figure 14. *Percentage pollen diagram from cultivation layer beneath clearance cairn at Otnes. Pollendiagram fra analyserte kontekster på Otnes.*

clearances. The combined pollen percentages of open-land taxa in these two diagrams increased to more than 20% in the Iron Age, AD 250–750, and the estimated vegetation cover shows relatively high levels of grasslands and *Calluna*. However, it is sedges, *Empetrum* and *Vaccinium,* that dominate the open-land vegetation cover, reflecting wetlands and outfield pastures on both a regional and local scale (Figure 16).

Late Iron Age

Intensification in outfield grazing is seen in the Vinjefjord area in the Merovingian Period (AD 560–800), with a reduction in pioneer deciduous trees (*Alnus, Betula*) and *Pinus*, and an increase in *Juniperius* and *Calluna*. Generally, there is also an increase in ruderal taxa and Cerealia recorded in the peat profiles. On a local level (Lubbehaugmyra), there are elevated values of charcoal at the time of the cemetery activity at both Skeiet and Fjelnset. In the Viking Period there is less burning activity close to Lubbehaugmyra and some local *Pinus* woodland recovery. The initiation of a *Picea* curve in the pollen diagrams during the Late Iron Age may reflect changes in outfield utilisation, possibly in the aftermath of AD 536 (see Discussion section).

Middle Ages

Reduced woodland cover at Vinjeøra in the Middle Ages is visible in all three peat profiles. Associated with *Pinus* clearance are relatively high charcoal values. The maximum value of charcoal is interpolated to AD 1315 in Lubbehaugmyra, most likely reflecting activity at Skeiet. From AD 1350, the settlement at Skeiet was abandoned (Bryn Ch. 3), which is visible in the local peat profiles through *Pinus* recovery and

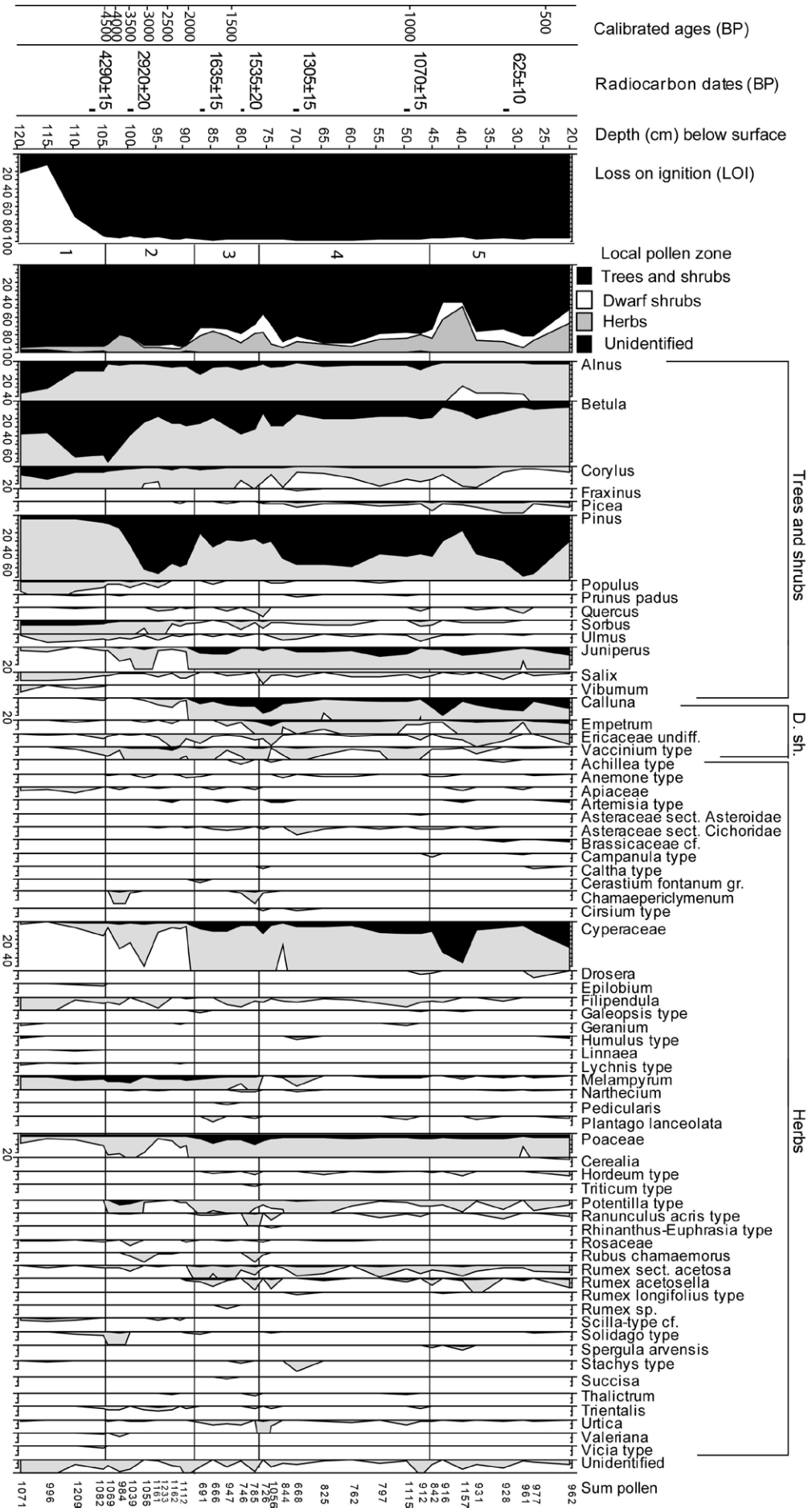
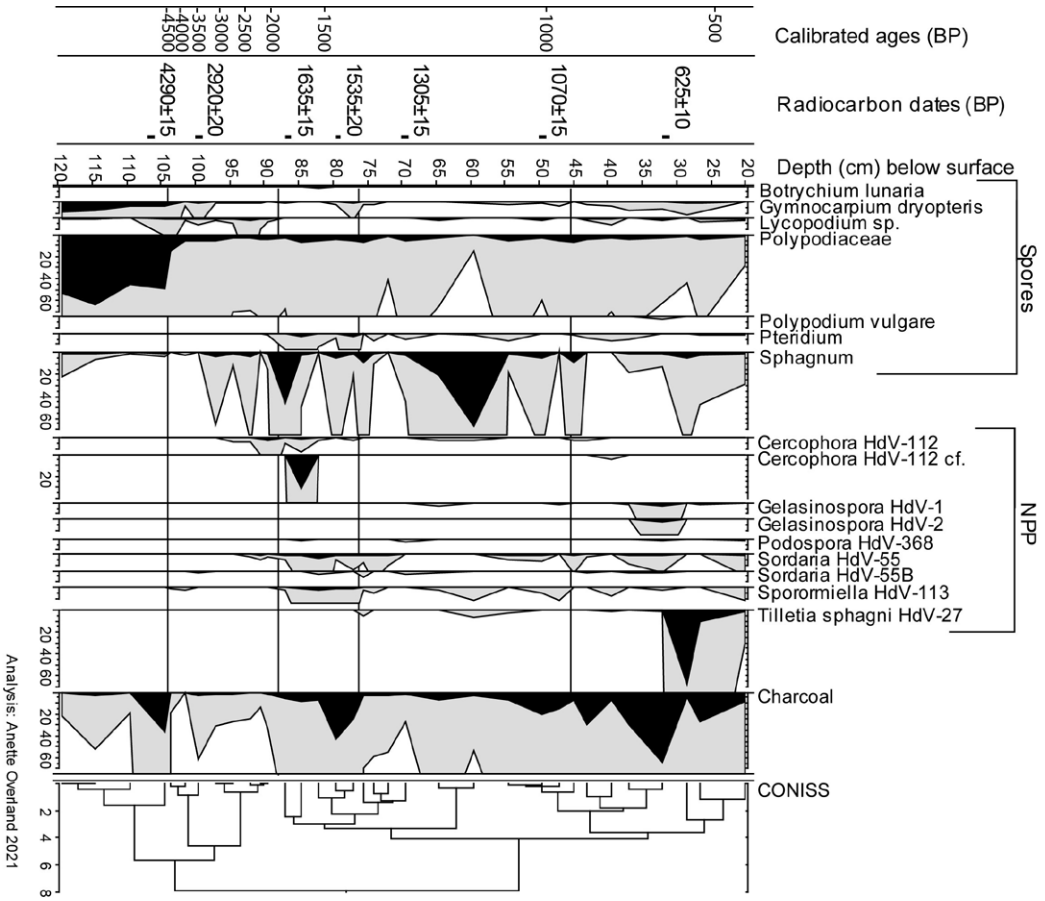


Figure 15. *Percentage pollen diagrams from peat profiles. A. Lubbehaugmyra. B. Leitmyra. C. Tjønnan. Pollendiagram fra torvsøylene på Lubbhaugmyra, Leitmyra og Tjønnan.*


Calibrated ages (BP)
Radiocarbon dates (BP)
4290±15
2920±20
1635±15
1535±20
1305±15
1070±15
625±10
Depth (cm) below surface
Botrychium lunaria
Gymnocarpium dryopteris
Lycopodium sp.
Polypodiaceae
Polypodium vulgare
Pteridium
Sphagnum
Spores
Cercophora HdV-112
Cercophora HdV-112 cf.
Gelasinospora HdV-1
Gelasinospora HdV-2
Podospora HdV-368
Sordaria HdV-55
Sordaria HdV-55B
Sporormiella HdV-113
Tilletia sphagni HdV-27
NPP
Charcoal
CONISS
Analysis: Anette Overland 2021

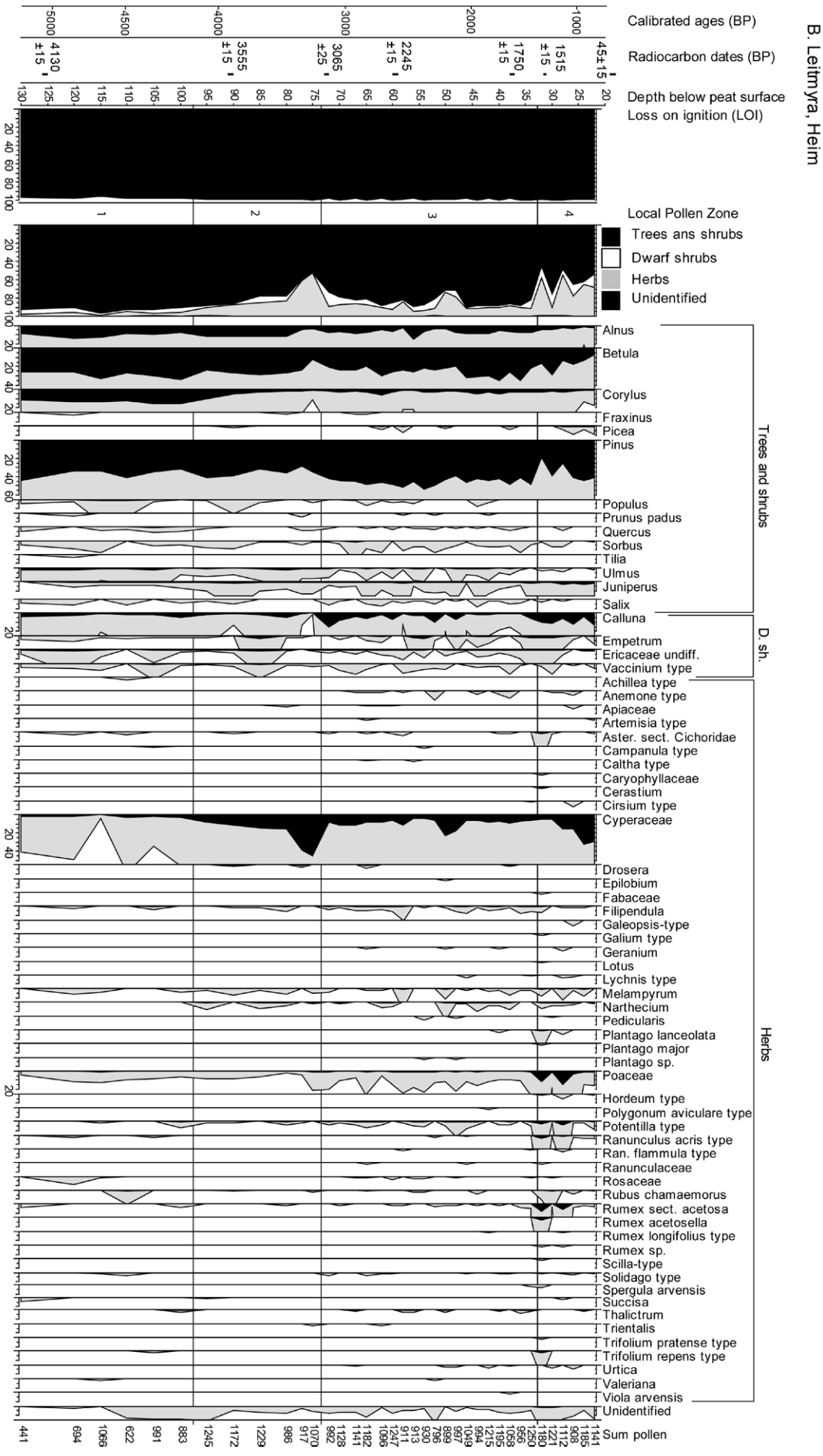
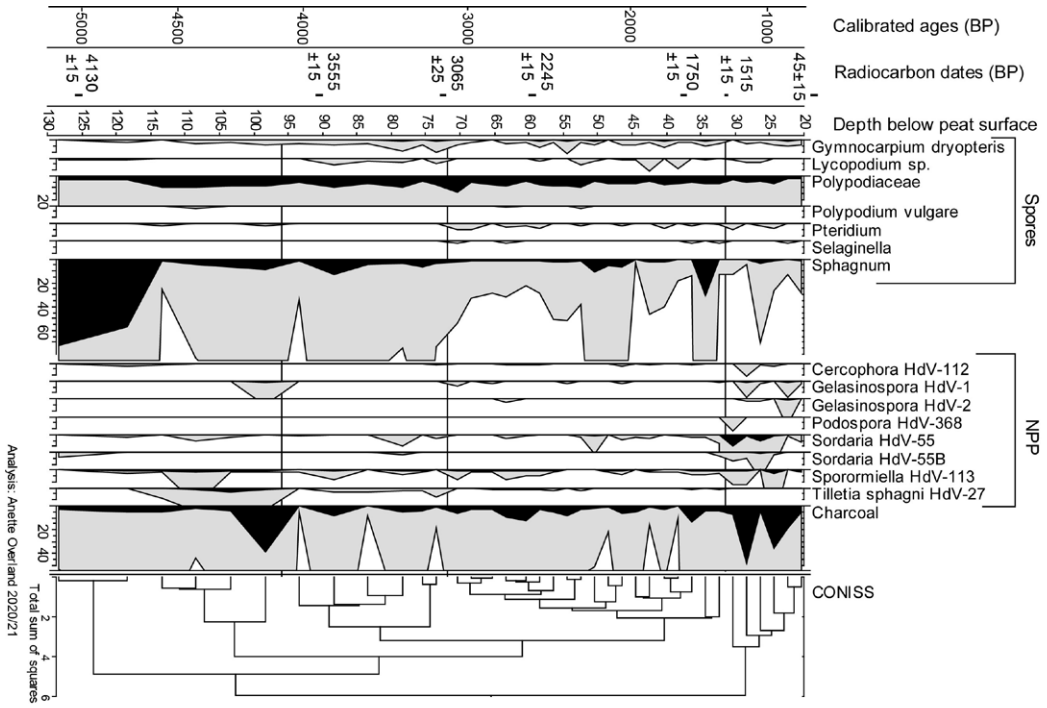


Figure 15. (cont.)


Calibrated ages (BP)
Radiocarbon dates (BP)
4130 ±15
3555 ±15
3065 ±25
2245 ±15
1750 ±15
1515 ±15
45±15
Depth below peat surface
Gymnocarpium dryopteris
Lycopodium sp.
Polypodiaceae
Polypodium vulgare
Pteridium
Selaginella
Sphagnum
Spores
Cercophora HdV-112
Gelasinospora HdV-1
Gelasinospora HdV-2
Podospora HdV-368
Sordaria HdV-55
Sordaria HdV-55B
Sporormiella HdV-113
Tilletia sphagni HdV-27
NPP
Charcoal
CONISS
Total sum of squares
Analysis: Anette Overland 2020/21

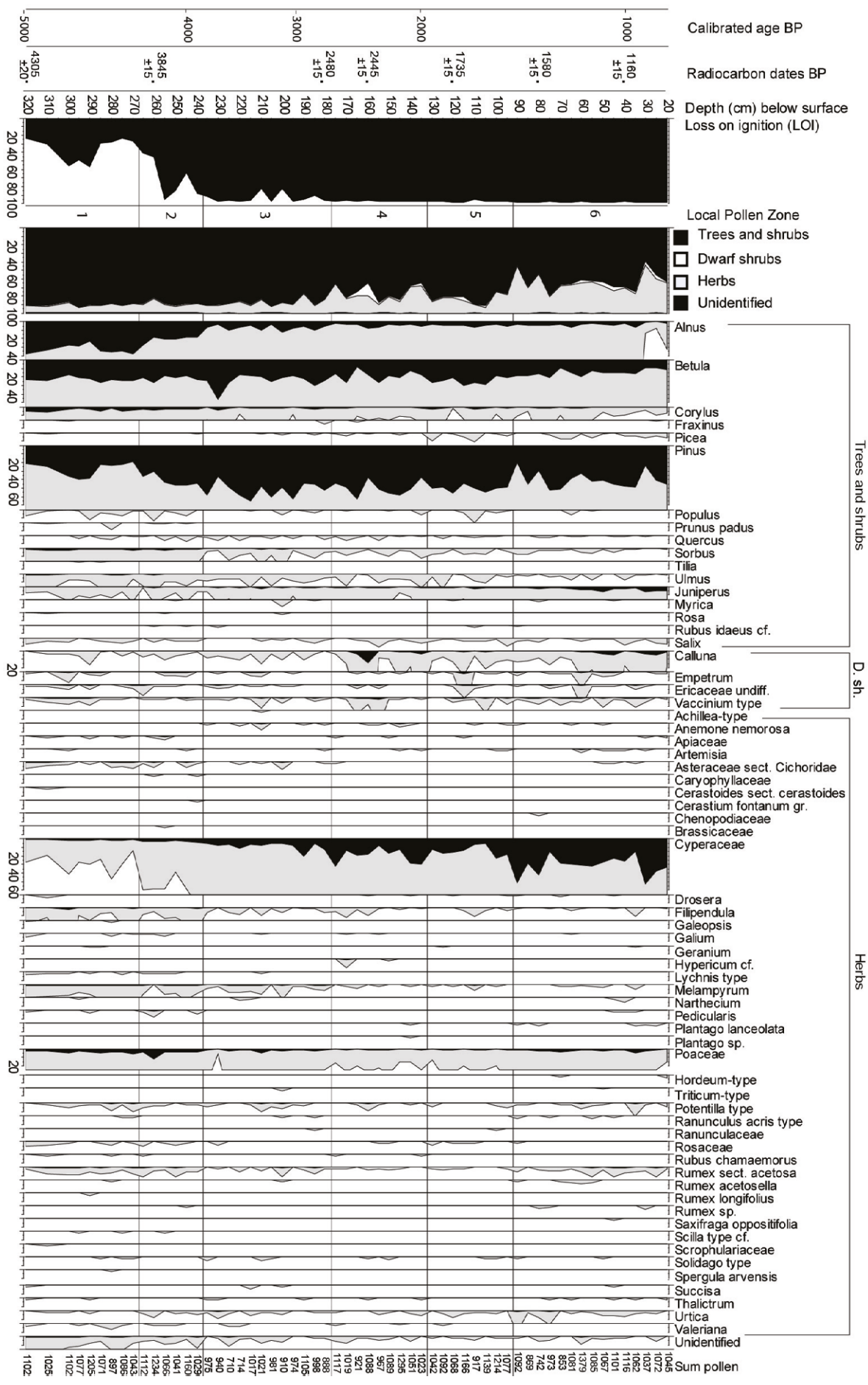
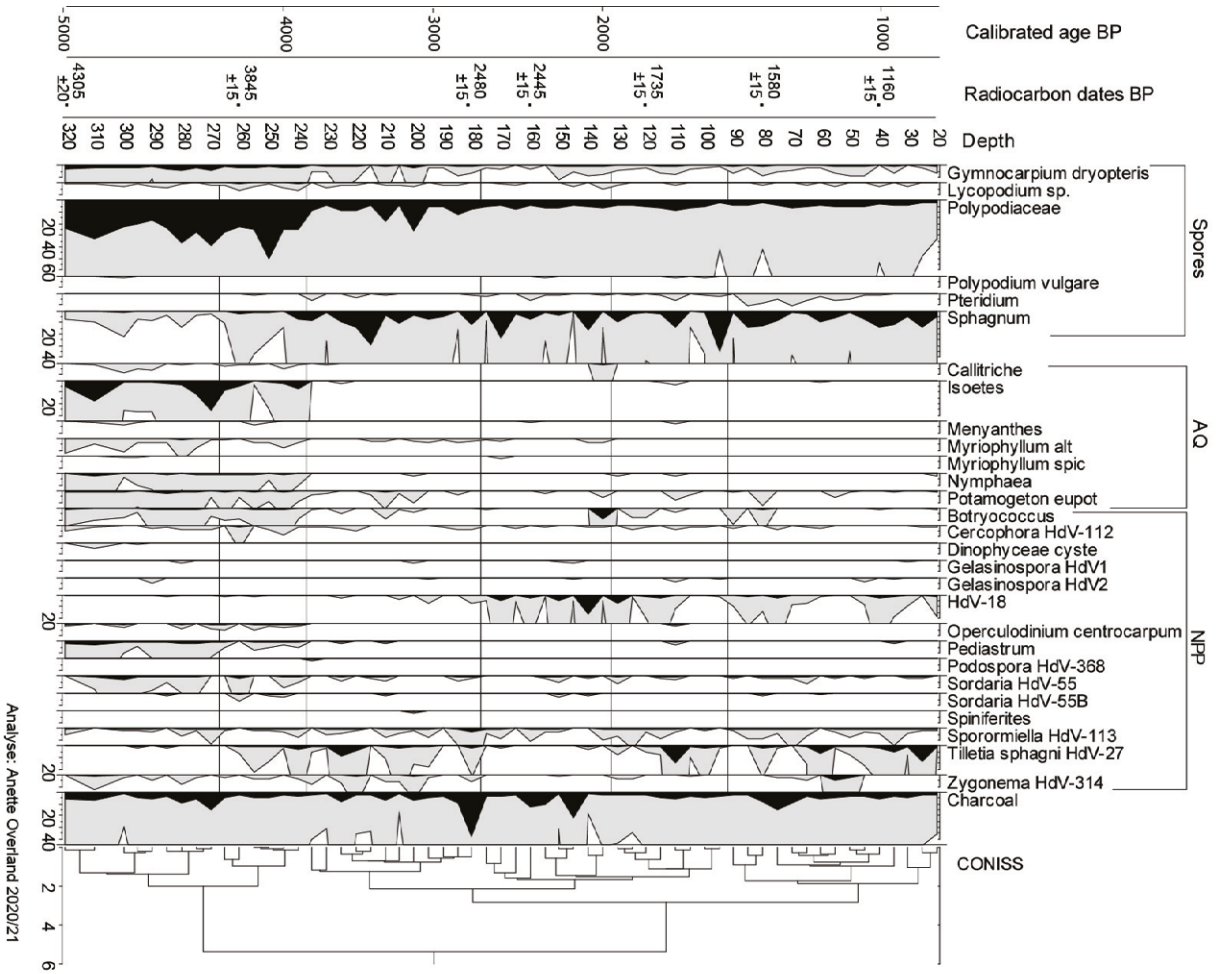


Figure 15. *(cont.)*


Calibrated age BP
Radiocarbon dates BP
Depth
Gymnocarpium dryopteris
Lycopodium sp.
Polypodiaceae
Polypodium vulgare
Pteridium
Sphagnum
Callitriche
Isoetes
Menyanthes
Myriophyllum alt
Myriophyllum spic
Nymphaea
Potamogeton eupot
Botryococcus
Cercophora HdV-112
Dinophyceae cyste
Gelasinospora HdV1
Gelasinospora HdV2
HdV-18
Operculodinium centrocarpum
Pediastrum
Podospora HdV-368
Sordaria HdV-55
Sordaria HdV-55B
Spiniferites
Sporormiella HdV-113
Tilletia sphagni HdV-27
Zygonema HdV-314
Charcoal
CONISS
Spores
AQ
NPP
Analyse: Anette Overland 2020/21

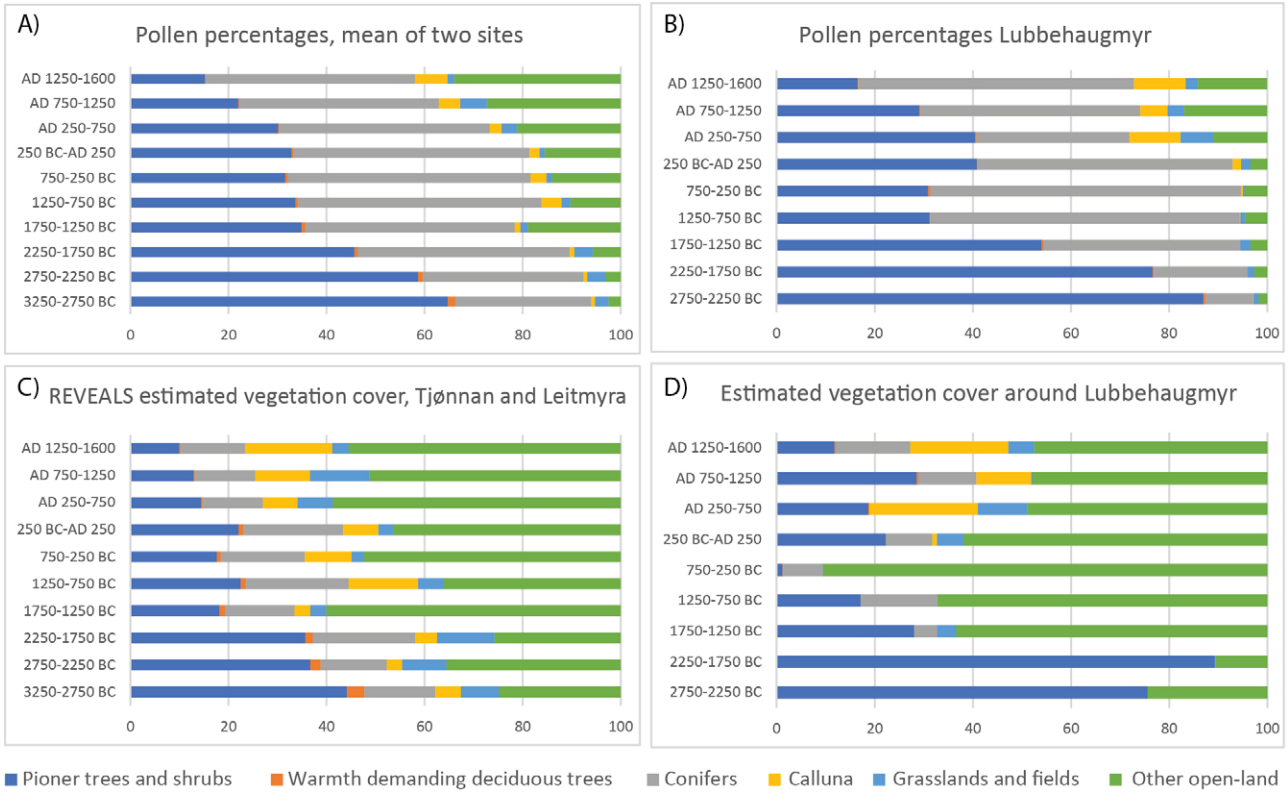


Figure 16. *Pollen data from Leitmyra, Lubbehaugmyra and Tjønnan in 500-year (350-year) time periods and estimates using the Landscape Reconstruction Algorithm (Sugita 2007a, b). a) Pollen percentages for Leitmyra and Tjønnan combined. b) Pollen percentages for Lubbehaugmyra. c) Regional estimated vegetation cover based on Leitmyra and Tjønnan. d) Estimated local vegetation cover based on Lubbehaugmyra. Statistiske modeller for vegetasjons- og landskapsutvikling de siste 4000–5000 år.*

a reduction in charcoal interpolated to AD 1389 in Lubbehaugmyra and AD 1382 in Leitmyra. This may suggest that the Black Death (AD 1349) had an impact on settlements in the Vinjeøra area.

DISCUSSION

Vinjeøra before the Iron Age settlement phase

Vinjeøra, where relatively well-preserved remains of pre-Christian cemeteries and settlements from the Late Iron Age and Middle Ages were archaeologically investigated at Skeiet and Fjelnset, represents the focal point of the present palaeobotanical investigation. The organic riverside deposit at Skeiet reveals the natural conditions in Vinjeøra in the Late Mesolithic, when pioneer deciduous shrublands, light-demanding grassland herbs and ruderals were predominant on sandy deposits and minerogenic soils. These sandy deposits were most likely suitable for tilling and cultivation advances in the Iron Age.

Vinjeøra is strategically situated at the end of Vinjefjord, only separated from the Hemnefjord area by the isthmus Eide, of which the peat/sediment profile Tjønnan forms a part. The profile from Tjønnan reveals regional woodland development but may also represent an environmental record of the communication route between Vinjefjord and Hemnefjord, and towards Orkdal and the Trondheimfjord area (Sauvage Ch. 1). The charcoal curve in the Tjønnan profile is particularly prominent at the end of the Middle Neolithic, from the end of the Late Bronze Age to the end of the Pre-Roman Iron Age and at the end of the Migration Period. Not forgetting the possibility of natural forest fires (Ohlson et al. 2006), the infilled lake Tjønnan may have been an attractive natural resource during several periods in prehistory. There are Stone Age sites associated with the area and deer trapping pits (id. 64000) of unknown age located 200 m from the coring point in Tjønnan (Norwegian Directorate of Cultural Heritage). The record of coprophilous fungi (Van Geel et al. 2003, Mazier et al. 2009, Cugny et al. 2010, Davies 2019) in Tjønnan clearly suggests the wetland as a favourable location for deer browsing throughout prehistory.

During the Bronze Age there were probably farming settlements along the coastal route, including Otnes (this project) and further afield (Norwegian Directorate of Cultural Heritage), and cooking pits at Fjelnset indicate human presence during the

Pre-Roman Iron Age (Sauvage Ch. 1). It is therefore possible that the isthmus Eide, which includes Tjønnan, was used as a transport route also prior to the Late Iron Age (Maixner & Hellan Ch. 4).

Cultivation expansion in the Vinjefjord area during the Iron Age

The Roman Iron Age and the Migration Period are periods of expansion in the Vinjefjord area. The peat profiles reflect well-established cultural landscapes with infields from the Early Iron Age. The pollen samples from archaeological contexts confirm cereal cultivation on sandy soils and outfield grazing in more wooded areas. *Hordeum* was the dominant cereal crop, and both hulled barley (*Hordeum vulgare* var. *vulgare*) and naked barley (*Hordeum vulgare* var. *nudum*) are recorded. In the Late Iron Age, *Avena* is also recorded.

There are suggestions that mowing could have been practised at Skeiet and Hestnes as early as the Migration and Roman Periods through the increase in Poaceae, *Rumex* sect. *acetosa* and Asteraceae in the pollen record (cf. Hjelle 1999, 2005). The evidence of mowed meadows exists in Europe from the Pre-Roman Iron Age (Myhre 2004) and, in Norway, use of the scythe is recorded from the Merovingian Period (Solberg 2003). Most likely meadows were an integrated part of the cultural landscape in the Vinjefjord area from the Late Iron Age at least (cf. Hjelle 1999, 2005, Myhre 2004).

Coprophilous fungi are recorded in Lubbehaugmyra from the Pre-Roman Iron Age and are well-represented in the Early Iron Age, associated with deforestation, an increase in nearby grasslands and fields, and a rise in charcoal values. In Leitmyra, coprophilous fungi increased after AD 536, associated with an increase in grasslands and infields nearby. Both Lubbehaugmyra and Leitmyra may have represented outfield grazing areas.

The AD 536 event in Vinjeøra

In Vinjeøra, there was a disruption in settlement and the use of the cemetery in the period AD 550–650 (Sauvage Ch. 1) which may have been a response to global climatic and societal events (Büntgen et al. 2016), but also regional sea level changes clearly affected local farming sustainability and existence strategies (Hjelle et al. 2022). In nearby areas, the increased use of outfield resources was triggered by the AD 536 event, which may be comparable to this study (Overland & Hjelle 2019, Hjelle et al. 2022). Lubbehaugmyra reflects the increased use of fire, where charcoal values increased from 7% in AD 505 to 44% in AD 610 (interpolated). In the aftermath of the AD 536 event, both *Betula* and *Calluna* had short-term increases in Lubbehaugmyra, interpolated to AD 536–777 and 537–748 respectively. This may be directly linked to the changes at Skeiet, where the period AD 550–650 saw the abandonment of the farming settlement at the time of the first cremation burial (Sauvage Ch. 1). The latter part of the Merovingian Period reflects much lower charcoal values and reforestation (*Pinus*), continuing into the Viking Period when woodland clearing starts again.

In Leitmyra, the local landscape in the period after AD 536 totally changed, reflected by deforestation, increased *Calluna*, the establishment of herb-rich grasslands, nearby *Hordeum* cultivation and an increase in charcoal values. Finally, in Tjønnan, a charcoal peak is interpolated to AD 537, which marks the beginning of a deforestation period, possibly linked to an increase in grazing activity. This all suggests the disruption of established settlements and possibly an emphasis on outfield grazing in the immediate aftermath of AD 536.

Another aspect of the AD 536 event is the possible establishment of *Picea* on a regional level, visible in Leitmyra and Lubbehaugmyra. *Picea* expanded in the Trøndelag area during the Merovingian and Viking Periods (Hafsten 1992), and this rapid expansion is usually referred to as relating to climatic changes (Bradshaw & Lindbladh 2005, Ohlson et al. 2006), but a possible additional factor may be the availability of deserted cultivation land after AD 536 (Björkman & Bradshaw 1996).

Late Iron Age and Middle Age settlement

Building 4 at Skeiet, dating from the Viking Period and extended in the Middle Ages (buildings 4 and 5), is interpreted as a dwelling, while the remaining buildings (1, 6, 100 and 101) probably represent farm outhouses/storage/economy buildings (Bryn et al. 2023). Building 4, in relation to macrofossil assemblage, is different from the rest of the buildings in that it is very rich in charred macrofossils, of which the samples also have the highest volume of charcoal. They are dominated by grassland and out-field taxa in general, but also household taxa and weeds. As a dwelling, the macrofossils may have been charred through food preparation and other activities around the fireplace. The macrofossil samples from building 4 suggest that plant material other than food products was in common use indoors.

Farming activity and use of the landscape from the Late Iron Age into the Middle Ages may be

reflected in the macrofossil data from building postholes, in addition to pollen data. Weeds, unintentionally brought in with crops (*Hordeum* and *Avena*), or brought in through the use of specific plant material, suggest cultivation on sandy, nutrient-poor soils (*Spergula arvensis*, *Rumex acetosella, Stellaria media*), the presence of mowed meadows (Poaceae, *Rumex* sect. *acetosa*, *Achillea*-type, Asteraceae sect. Cich.) and possibly grazed outfields in more wooded areas. Shrubby vegetation has been used and gathered (*Alnus, Juniperus*), as well as berries and nuts (*Corylus, Prunus padus, Rubus idaeus, Fragaria vesca, Empetrum nigrum*).

Mortuary practice in the Skeiet cemetery

The differences between pollen samples related to Burial mounds I and II may be associated with the origin of the deposits used in the construction of the earthen mounds. As seen above, Burial mound I is interpreted to have been constructed using old riverside deposits, while Burial mound II may have been constructed using older agricultural soils, possibly related to the Early Iron Age settlement. The pollen samples from the ring ditches are possibly composed of material eroded from the top of the mounds (building material), as well as contemporary pollen rain. According to micromorphology from Burial mound I (Macphail 2021), the ring ditch was left open without disturbance. The topmost pollen sample in the ring ditch (mound I) is interpreted to represent the local vegetation after construction, and the pollen sample has high values of *Betula*, low charcoal levels and a lack of Cerealia, suggesting low-level cultural activity at a very local scale.

As reflected in the DCA and PCA plots, the samples from the graves have a wide distribution, reflecting their differences. This may indicate the different use of plants in relation to mortuary practices. Both macrofossil and pollen assemblages from the graves may be interpreted as representing gifts or related to other funeral practices (Lageråas 2000, Viklund et al. 2013, Lempiäinen-Avci et al. 2017). The pollen samples from Graves 11 and 6 show relatively high values of *Hordeum*-type (3.4% and 13% respectively), which may represent gifts or stomach contents (cf. Bunting & Tipping 2001). The cremation grave, Grave 14, had a particularly high number of macrofossils from grassland taxa (sum: 301), which may be interpreted as representing hay used in funeral practices (Tranberg et al. 2020). Grave 1 shows high pollen values of *Juniperus* (c. 20%). *Juniperus* is also found as charred needles in the Hestnes chamber grave and in Grave 14 at Skeiet, but is also found in building contexts on the latter site, reflecting common use of this aromatic, oily shrub. Grave 15 was particularly rich in well-preserved bracken spores, together with abundant pollen from *Alnus* and *Betula*, suggesting the use of bracken collected in a wooded area, while Grave 16 may suggest floral tributes. The use of bracken and floral tributes in graves is known from Scotland and Denmark in the Bronze Age (Tipping 1994, Proudfoot 1997, Clarke 1999) and Finland in the Middle Ages (Tranberg et al. 2020).

Woodland clearance in the Early Middle Ages and the local effects of the Black Death, AD 1349

In the Middle Ages, there was a settlement site at Skeiet, and local and regional *Pinus* clearance is visible in all three peat profiles. Associated with *Pinus* clearance are relatively high charcoal values, suggesting high human impact. From AD 1350, the settlement here was abandoned (Sauvage Ch. 1), which is most likely associated with a *Pinus* recovery and drop in charcoal values in Lubbehaugmyra interpolated to AD 1389, and reduced charcoal values in the top sample from Leitmyra interpolated to AD 1382. This clearly suggests that the Black Death, AD 1349, (Lunden 2004) had an impact on settlements in the Vinjeøra area. An increase in *Pinus* woodland associated with the Black Death is also recorded regionally (Overland & Hjelle 2019, Hjelle et al. 2022).

CONCLUSION

The palaeoenvironmental sampling of archaeological contexts gives invaluable data regarding local environments, settlement activity, farming practices and mortuary practices. The AD 536 event and the Black Death (AD 1349) had a significant impact on local settlements in Vinjeøra, in which the AD 536 event seems to have been followed by the increased use of outfield resources, while the Black Death was followed by woodland recovery. In combination with local and regional peat profiles, which represent less directly disturbed archives of vegetation and environmental records, the palaeoenvironmental investigations have provided an important tool in the reconstruction of the local environmental setting for the archaeological investigations, in particular at Skeiet and Fjelnset. The Hestnes investigation, on the other hand, lacked the possibility for studying an undisturbed sequence of local peat that would otherwise allow an environmental framework from this excavation as well. This pinpoints the potential of palaeoenvironmental studies in connection with archaeological excavations.

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SAMMENDRAG

Pollen- og makrofossilanalyser ble gjennomført fra bosetningsspor og gravminner i forbindelse med arkeologiske utgravninger i 2019–2020 på Vinjeøra og Valsøyfjord i Heim kommune, Trøndelag. Stolpehull fra bygninger, veifar, dyrkingslag, ardspor og gravstedskontekster, hovedsakelig fra jernalder og middelalder, ble undersøkt på Skeiet, Fjelnset og Hestnes, og rydningsrøyser fra bronsealder og eldre jernalder på Otnes. Disse undersøkelsene kaster lys over lokale miljø- og bosetningsforhold, jordbruks-praksis og mulige begravelsesritualer tilknyttet de arkeologiske funnene. I tillegg ble det gjennomført pollenanalyser fra tre myrer i Vinjeøra-området som gir detaljert informasjon om vegetasjons- og landskapsutvikling de siste 4000–5000 år.

Landskapet rundt Vinjeøra var preget av løvskog, der or (*Alnus incana/glutinosa*) dominerte frem til slutten av yngre steinalder. I denne perioden var regionen preget av skogsvegetasjon med svak kulturpåvirkning, tydelig gjennom trekullkurven fra myrene. Furu (*Pinus sylvestris*) og bjørk (*Betula pubescens*) ble dominerende, med en begynnende åpning av skogsvegetasjonen i løpet av yngre steinalder og bronsealder. Rundt Skeiet og Fjelnset etableres åpne landskap med beitearealer i bronsealder, og særlig i overgangen mot jernalder og videre i yngre jernalder, da både beite- og slåttearealer trolig ble etablert i tilknytning til bosetningene. De dominerende kornslagene var nakenbygg (*Hordeum vulgare* var. *nudum*) og agnkledt bygg (*Hordeum vulgare* var. *vulgare*), og i middelalder ble også havre (*Avena sativa*) brukt. Analysene fra gravminnene indikerer bruk av plantemateriale i forbindelse med begravelsesritualer.

Den globale klimakrisen rundt 536 e.Kr. gjenspeiles trolig i de lokale myrene gjennom økt bruk av ild og økt utnyttelse av utmarksressurser, mens krisen i senmiddelalder (Svartedauden) 1349 e.Kr., reflekteres gjennom en kortvarig gjenskogning av furu. De paleobotaniske analysene har gitt verdifull kunnskap om landskapsutvikling og ressursutnyttelse i forbindelse med de undersøkte bosetningene og gravminnene, og synliggjør også betydningen av naturlige myravsetninger som arkiv for vegetasjonsutvikling og kulturpåvirkning som ikke fanges opp i arkeologiske kontekster.

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APPENDIX 1:
Pollen-types, Norwegian names from Lid & Lid (2005) and common English names.

Pollen type (abbreviations in Fig. 6)	Norwegian	Common English
Achillea type (*Achil*)	prestekrage/ryllik	oxeye daisy/yarrow
Aconitum	storhjelm	monkshood
Alchemilla	marikåpe	lady's mantel
Alnus, catkin (*Aln* cat)	or	alder
Anemone nemorosa	hvitveis	wood anemone
Apiaceae (Apiac)	skjermplanter	umbellifer family
Artemisia	burot	mugworth
Asteraceae sect. Aster	kurvplanter	composite family
Asteraceae (Aster)	kurvplanter	composite family
Asteraceae sect. Cich (*Ast Ci*)	svæve type	composite family (dandelion type)
Avena	havre	oats
Betula, catkin (*Bet* cat)	bjørk	birch
Betula nana	dvergbjørk	dwarf birch
Botrychium boreale	fjellmarinøkkel	northern moonwort
Botrychium lunaria	marinøkkel	moonwort
Brassicaceae (Brass)	korsblomster	crucifer family
Callitriche	vasshår	water starwort
Calluna	røsslyng	heather
Caltha type	bekkeblom	marsh-marigold
Campanula (*Camp*)	blåklokke	bluebell
Carex (*Carex* l, *Carex* t)	starr	sedges
Caryophyllaceae (Caryo)	nellikfamilien	carnation family
Cerastium cerastoides gr.	arve	mountain mouse-ear
Cerastium fontanum gr. (*Cer fo*)	arve	common mouse-ear
Cerastium type (*Ceras*)	storarveslekten	mouse-ear
Cerealia	korn	cereals
Chamaepericlymenum suecicum	skrubbær	dwarf cornel
Chenopodiaceae (Chenop)	melder	amaranth family
Cirsium	tistel	thistle
Comarum	myrhatt	marsh cinquefoil
Corylus (*Cory*)	hassel	hazel
Cryptogramma	hestespreng	parsley fern
Cyperaceae (Cyper)	halvgress/starr	sedge family
Drosera	soldogg	sundew
Empetrum	krekling	crowberry
Epilobium	Mjølke/geitrams	willowherbs
Euphrasia/Rhinanthus (*Rhi*)	øyentrøst/engkall	eyebright/yellow-rattle
Ericaceae	lyngfamilien	heather
Fabaceae	ertefamilien	pea family
Fagus	bøk	beech
Filipendula (Filip)	mjødurt	meadowsweet

Pollen type (abbreviations in Fig. 6)	Norwegian	Common English
Fragaria	markjordbær	wild strawberry
Frangula alnus	trollhegg	alder buckthorn
Fraxinus	ask	European ash
Galeopsis type *(Galeop)*	då	hemp-nettle
Galium	maure	bedstraw
Geranium	storknebb	crane's-bill
Gymnocarpium dryopteris	fugletelg	oak-fern
Hordeum type (*Hord nud, Hord vul*)	bygg	barley
Humulus/Cannabis type	Humle/hamp	hops/hemp
Huperzia selago	lusegras	fir clubmoss
Hypericum	perikum	St. john's-wort
Isoetes	brasmegras	quillwort
Juniperus (Junip, Junip n*)*	einer	juniper
Laminaceae (Lamin)	leppeblomstfamilien	sage family
Linnea	linnea	twinflower
Lonicera periclymenum	vivendel	common honneysuckle
Lotus type	tiriltunge	common bird's-foot trefoil
Luzula	frytle	wood-rush
Lychnis type	hanekam/tjæreblom	ragged-robin/sticky catchfly
Lycopodium	kråkefot	clubmoss
Lycopodium annotinum	stri kråkefot	interrupted clubmoss
Melampyrum (*Melam*)	marimjelle	cow-wheat
Menyanthes	bukkeblad	bog bean
Myrica	pors	bog myrtle
Myriophyllum alterniflorum	tusenblad	alternate water-milfoil
Myriophyllum spicatum	akstusenblad	spiked water-milfoil
Narthecium	rome	bog asphodel
Nymphaea	nøkkerose	white water-lily
Onagraceae/Epilobium	mjølke	willowherb
Ophioglossum	ormetunge	adders-tongue
Pedicularis	myrklegg	lousewort
Persicaria maculosa (*Per ma*)	hønsegress	redshank
Picea	gran	spruce
Pinus	furu	pine
Plantago lanceolata (*Pl lanc*)	smalkjempe	ribworth plantain
Plantago major (*Pl maj*)	groblad	broadleaf plantain
Plantago sp.	kjempe	plantain
Poaceae	gress	grasses
Polemonium	fjellflokk	Jacob's ladder
Polygonum aviculare	tungress	knotgrass
Polygonaceae (Polyg)	slireknefamilien	knotweed family
Polygonum laphatifolium (*Poly laph*)	rødt hønsegress	pale persicaria
Polypodiaceae	sisselrotfamilien	ferns

Pollen type (abbreviations in Fig. 6)	Norwegian	Common English
Polypodium vulgare	sisselrot	polypod
Populus	osp	poplar/aspen
Potamogeton eupot.	tjønnaks	pondweed
Potentilla type (*Poten*)	tepperot/myrhatt	tormentil/marsh cinquefoil
Prunella type	blåkoll	selfheal
Prunus padus (*Pru padus*)	hegg	bird cherry
Pteridium	einstape	bracken
Quercus	eik	oak
Ranunculus acris type (*Ran ac*)	engsoleie	meadow buttercup
Ranunculus flammula type	grøftesoleie	lesser spearwort
Ranunculaceae	soleiefamilien	buttercup family
Rosa	nyperose	rose
Rosaceae	rosefamilien	rose family
Rubus chamaemorus	molte	cloudberry
Rubus idaeus (*Rub id*)	bringebær	rasberry
Rumex acetosella (*Rum la*)	småsyre	sheep's sorrel
Rumex longifolius type (*Rum lo*)	høymol	northern dock
Rumex sect. acetosa (*Rum ac*)	engsyre	common sorrel
Rumex sp. (*Rumex* sp)	syre	dock
Ruppia	havgras	tasselweed
Salix	selje/vier	willow
Saxifraga oppositifolia type	sildre	purple saxifrage
Schrophulariaceae	maskeblomsterfamilien	figwort family
Scilla type	blåstjerne	squill
Secale	rug	rye
Sedum	bergknapp	stonecrop
Selaginella	dvergjamne	lesser clubmoss
Silene dioica type	jonsokblom	campion
Sinapis type	sennepslekten	charlock, mustard
Solidago type	gullris	goldenrod
Sorbus	rogn	rowan/mountain-ash
Spergula arvensis (*Spe ar*)	linbendel	corn spurrey
Sphagnum	torvmoser	peat moss
Stachys type	svinerot	woundwort
Stellaria media (*Stell med*)	vassarve	common chickweed
Stellaria gramineae (*Stell gra*)	grasstjerneblom	starwort
Succisa	blåknapp	devil's-bit
Thalictrum	frøstjerne	meadow-rue
Tilia	lind	lime
Trientalis (*Trien*)	skogstjerne	chickweed-wintergreen
Trifolium pratense type	rødkløver	red clover
Trifolium repens type (*Tri re*)	hvitkløver	white clover
Triticum type	hvete	bread wheat

Pollen type (abbreviations in Fig. 6)	Norwegian	Common English
Ulmus	alm	elm
Urtica	nesle	nettle
Vaccinium type (*Vacci*)	bærlyng	blueberry/lingonberry
Valeriana	valeriana	valerian
Verbascum	kongslys	mullein
Veronica	veronika	speedwell
Viburnum	krossved	guelder-rose
Vicia cracca type	fuglevikke	vetch
Vicia type	vikke	vetch
Viola arvensis	åkerstemorsblomst	field pansy

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3. BUILDING TRADITIONS AND SETTLEMENT ORGANISATION AT SKEIET FROM THE MIGRATION PERIOD TO THE BLACK DEATH

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ABSTRACT

The excavation at the farm Skeiet in Vinjeøra, Central Norway resulted in significant finds of occupation evidence from the Iron Age and medieval period. The high number of buildings recorded as well as extensive time intervals added new knowledge to the research on building traditions and settlement organisation in rural areas in Central Norway. This paper discusses changes in building traditions and settlement organisation between AD 400–1350, presenting a detailed chronology and settlement development in the area over the centuries by employing a detailed on-site ^{14}C sampling strategy and Bayesian modelling. The results indicated a shift in building traditions that followed the Early to Late Iron Age transition in the late 6th century, featuring the introduction of single-aisled constructions. Furthermore, the excavations revealed that post-constructed buildings were still in use during the High Middle Ages. The downfall of the settlement started in the mid-1200s before coming to a definitive end in the mid-1300s, an event that coincided with the Black Death.

Keywords: Bayesian statistics; ; Single-aisled buildings; Medieval post-constructed buildings; Continuous occupation; Late Iron Age in Norway; Settlement archaeology

INTRODUCTION

Following the Early to Late Iron Age transition around c. AD 550, significant developments occurred within the building traditions in rural areas in Norway. The widespread theory amongst researchers is that these changes started during the last part of the Viking Age (AD 800–1050) and continued into the Early and High Middle Ages (AD 1050–1150, AD 1150–1350) (Skre 1996, Myhre 2002, Weber 2002, Grindkåsa 2007, Eriksen 2015, Sørheim 2005, 2015). The transition was characterised by the demise of the three-aisled multifunctional longhouse that had been a favoured construction type for centuries and the introduction of single-function one-aisled buildings, where the outer walls carried the main load of the roof construction. These buildings were later developed by lifting the posts out of the ground and placing them on sills. During the medieval period, the cross-timber technique gradually replaced post-constructed buildings and became the preferred building tradition, widely documented by excavations of medieval cities in Norway (e.g., Schia 1979, Christophersen & Nordeide 1994). Excavations of Late Iron Age (AD 550–1050) and medieval period (AD 1050–1537) building remains in rural Norway are, on the other hand, scarce. Therefore, the current data about changes in non-urban building traditions during this dynamic period need to be synthesised from geographically and temporally dispersed, often poorly-preserved evidence. As Jes Martens points out (2009:7 with references), less than 10% of the Norwegian population lived in cities. Therefore, the introduction and implementation of changes in the building and settlement traditions in the communities where most people lived and worked can be difficult to study and often relies on comparison with the urban remains.

In the last two decades, archaeological excavations in Central Norway have started uncovering sites with building remains from the Late Iron Age and medieval period in rural areas. In an overview of the known Late Iron Age and medieval period buildings excavated in Central Norway, Sauvage & Mokkelbost (2016) presented 23 buildings. Since then, buildings have been investigated in Byneset in Trondheim in

Reference: Bryn, H. (2024). Building Traditions and Settlement Organisation at Skeiet from the Migration Period to the Black Death. I R. Sauvage (Ed.), *From Life to Death in Iron Age and Medieval Vinjefjord* (pp. 83–111). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.218.ch3
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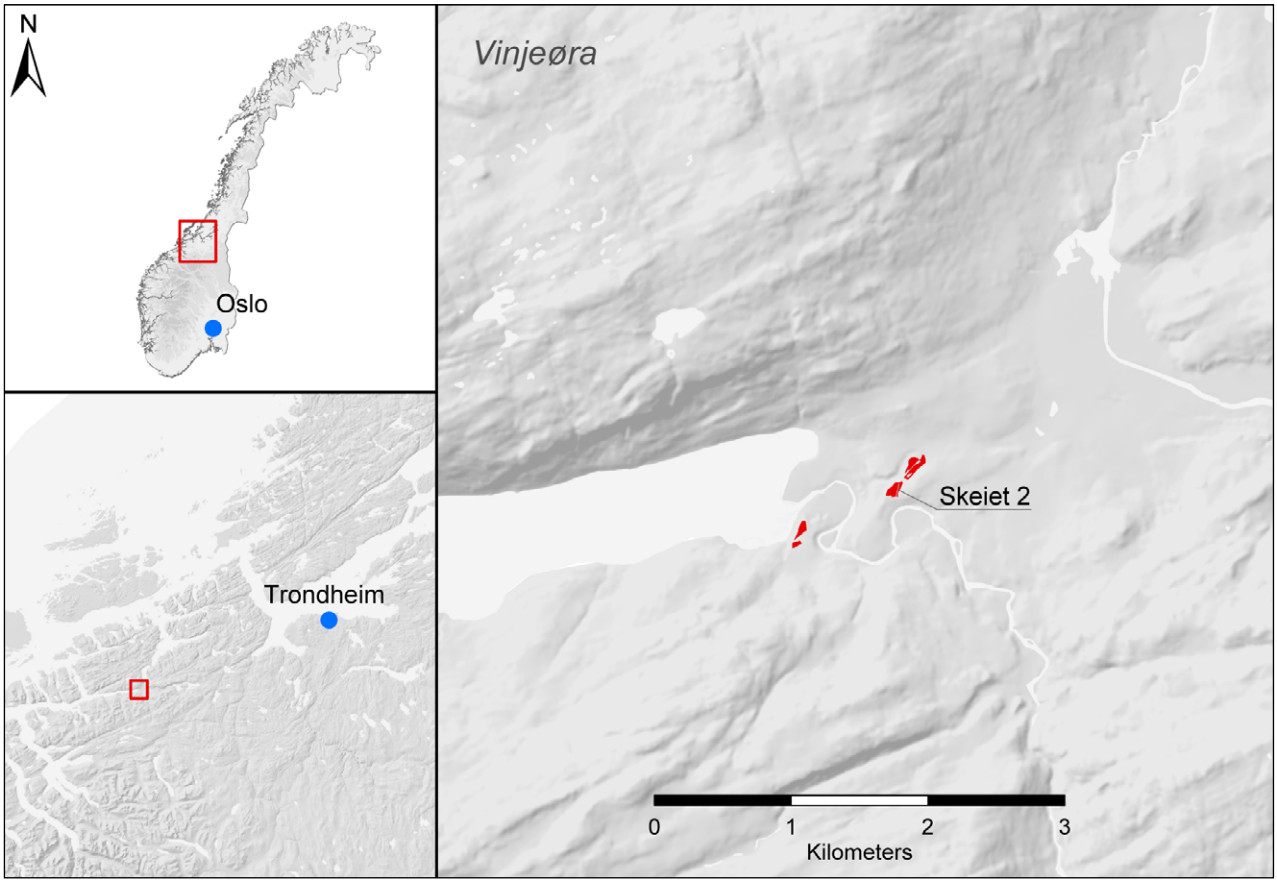


Figure 1. *Location of Vinjeøra and Skeiet in Central Norway. Illustration: Kristoffer R. Rantala, NTNU University Museum. Lokasjonskart.*

2016, Foss Lian in 2018 and Kvenild Søndre in 2021 (Eidshaug & Sauvage 2018, Fretheim & Henriksen 2021, Wood & Grønnesby 2023). While this has contributed to a significantly better understanding of changes in building traditions in the Late Iron Age and medieval period, most sites only represent few buildings and only cover parts of the chronological timespan. The material is also sparse compared to the abundance of buildings excavated from the Early Iron Age (500 BC–AD 550). As an example, excavations at Torgårdsletta in Trondheim and in Melhus have uncovered more than 80 buildings alone (Rønne 2005, Henriksen & Bryn 2019, Grønnesby 2019). This means that we have a much better understanding of long-term local development of three-aisled longhouse traditions at sites from the Early Iron Age than long-term shifts in chronology and application in building practices and organisation at the sites from the dynamic Late Iron Age and medieval period.

The excavation on the farm Skeiet in Vinjeøra, Central Norway, resulted in significant finds of long-term occupation evidence spanning over the period AD 400–1350. The radiocarbon dating showed that the occupation was continuous except for a brief decline in activity after the Early to Late Iron Age transition around AD 550–650. With several dated buildings and the extensive time interval deduced by the dates, the occupation and building evidence can be studied here within a specific local area, from the longhouse tradition in the Migration Period (AD 400–550) via single-aisled post-constructed buildings in the Late Iron Age and well into the medieval period, to a decline in dated evidence by the end of the High Middle Ages (AD 1350). This represents a significant addition to the small number of excavated settlements in rural areas and offers valuable insights that may enhance our understanding of changes and implementation of building traditions and settlement organisation in local communities.

This paper aims to discuss changes in building traditions and settlement organisation from the Migration Period (AD 350–550) to the end of the High Middle Ages (AD 1350) at Skeiet. Furthermore, I will discuss the introduction of single-aisled post-constructed buildings following the Early to Late Iron Age transition and the possibility that this building technique may have been introduced already in the Merovingian Period (AD 550–800), and the longevity of the post-in-ground construction method in this geographic area. Additionally, I will discuss the settlement activity and organisation at Skeiet in the Middle Ages and its downfall in the mid-1300s.

Figure 2. *Views of the Vinjefjord with the excavated settlement area at Skeiet in the foreground. Aerial photograph by Kristoffer R. Rantala, NTNU University Museum. Utgravingsfeltet med utsikt mot Vinjefjorden.*

MATERIAL AND METHODS

The Iron Age and medieval period settlement area at Skeiet was first discovered in 1996. As part of a large road development project which included the relocation of the E39 through Vinjeøra, the area underwent site evaluations that uncovered postholes, cooking pits and cultural layer deposits (Prestvold 1997, Haugen 2014). The presence of fire-cracked stones in the cultural layer deposits suggested activity in the Late Iron Age or medieval period (Grønnesby 2016).

In 2019, the NTNU University Museum conducted a large excavation project commissioned by the Norwegian Public Roads Administration. To reveal the spatial layout of the settlement site, the entire area of 7,200 m^2 underwent mechanical topsoil stripping. A total of 700 features were uncovered, mostly postholes and cooking pits/fireplaces, but also miscellaneous pits, a forge, as well as agricultural layers and a cultural layer deposit. The archaeological features formed clear concentrations in the central and northern parts of the site, forming two main settlement clusters (Figure 3). Among the 242 postholes investigated, 122 were recognised as parts of nine identified buildings. One was three-aisled, six were interpreted as single-aisled and the remaining two were small four and five-post buildings. The remainder of the postholes could not be linked to recognisable constructions, but their high number suggests several undetected buildings may have stood on the site (Bryn et al. 2023). Most of the postholes were recorded in the settlement clusters, in areas that were occupied by buildings for most of the active settlement period allowing no room for additional buildings to co-exist. The site lay just south of the pre-Christian cemetery from the Late Iron Age discussed by Sauvage & Lorentzen (Ch. 5), which is seen as the burial ground for the settlement because of its proximity, landscape situation and contemporary dates.

^{14}C dating and chronology

A total of 81 ^{14}C samples from the site were analysed by the National Laboratory of Age Determination at the NTNU University Museum. Of these, a total of 75 samples were included in the ^{14}C model discussed below. In addition, two samples analysed as part of the test trenching in 2014 (Haugen 2014) were also included in the ^{14}C model. These samples are identified by the Beta laboratory number. The remainder of the samples were treated as outliers and rejected due to insufficient statistical results or results that

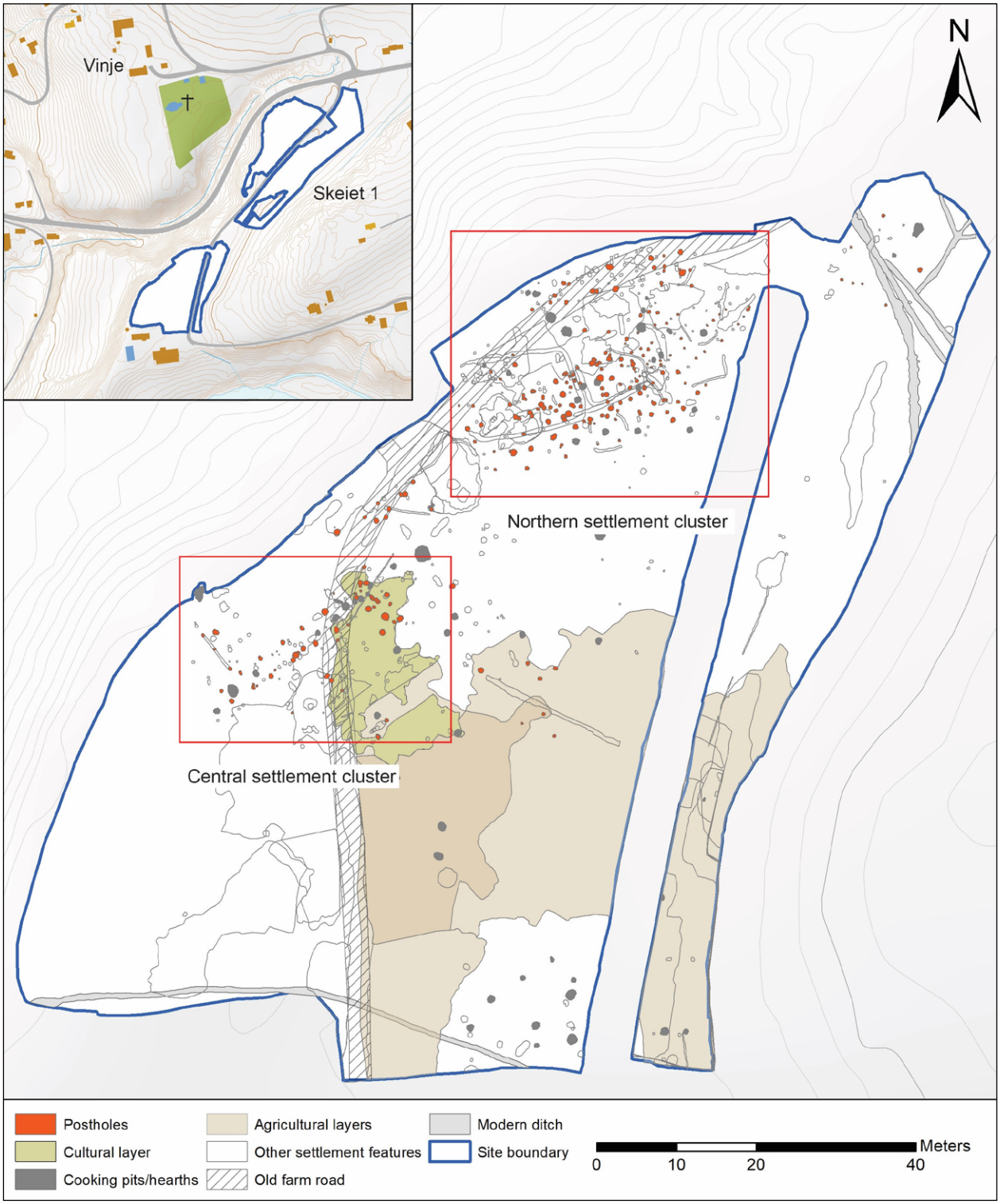


Figure 3. *The settlement area at Skeiet with the two main settlement clusters highlighted. The main settlement features are identified, such as postholes, cooking pits, agricultural layers and the cultural layer deposit. Illustration: Hanne Bryn, NTNU University Museum. Spredning og inndeling av bosetningsspor på lokaliteten.*

were clearly out of range, such as samples dated to the Late Mesolithic (6500–4000 BC). A few of the samples did not add any additional information to the ^{14}C model and were therefore left out. A full overview of all of the samples analysed can be found in Appendix 1.

Due to the lack of continuous stratigraphic sequences at ploughed sites, ^{14}C dating was important to reconstruct the occupation chronology and building phases. The ^{14}C strategy relied heavily on sampling postholes from post-in-ground constructions, and care was taken as the soil within the features

Figure 4. *T28156. Selection of finds from Skeiet 2. A) Set of keys found east of building 1; B) Whetstones found respectively in the cultural layer deposit and the ditch surrounding building 1; C) Knife found in the cultural layer deposit; D) Fragment of a soapstone vessel found in the cultural layer deposit; R) Spindle whirl found in a waste pit in the central settlement cluster; F) Hammer with a part of the wooden handle preserved found within the perimeter of building 1. Photo: Hanne Bryn, NTNU University Museum. Utvalgt funn fra boplassen: A) Nøkler; B) Brynestein; C) Kniv; D) Skår fra kleberkar; E; Spinnehjul. F) Hammer.*

may have contained organic components from the time of occupation (Gjerpe 2008:85–94, Diinhoff & Slinning 2013:65–68). Macrofossils such as grains and seeds were the desired dating material and prioritised for ^{14}C dating. Charcoal was primarily sampled from cooking pits and fireplaces, as well as other features where charcoal was regarded as a reliable material to date the actual activity. Charcoal was used for dating postholes when no macrofossil was found within the specific samples. All dated materials were subjected to species identification before running the ^{14}C sample. The overall goal of the ^{14}C dating strategy was to avoid the large temporal spread of dating results that can occur when using charcoal as dating material. The sampling was done primarily on the soil from the construction cut of the postholes. Many of the excavated postholes

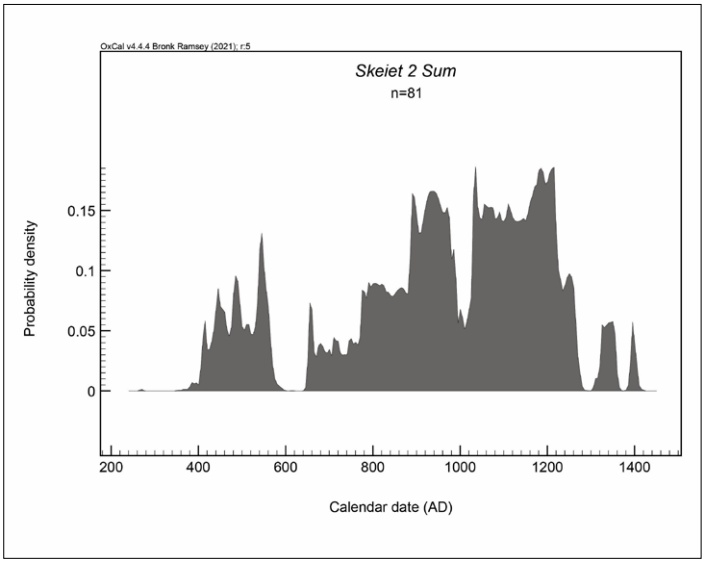
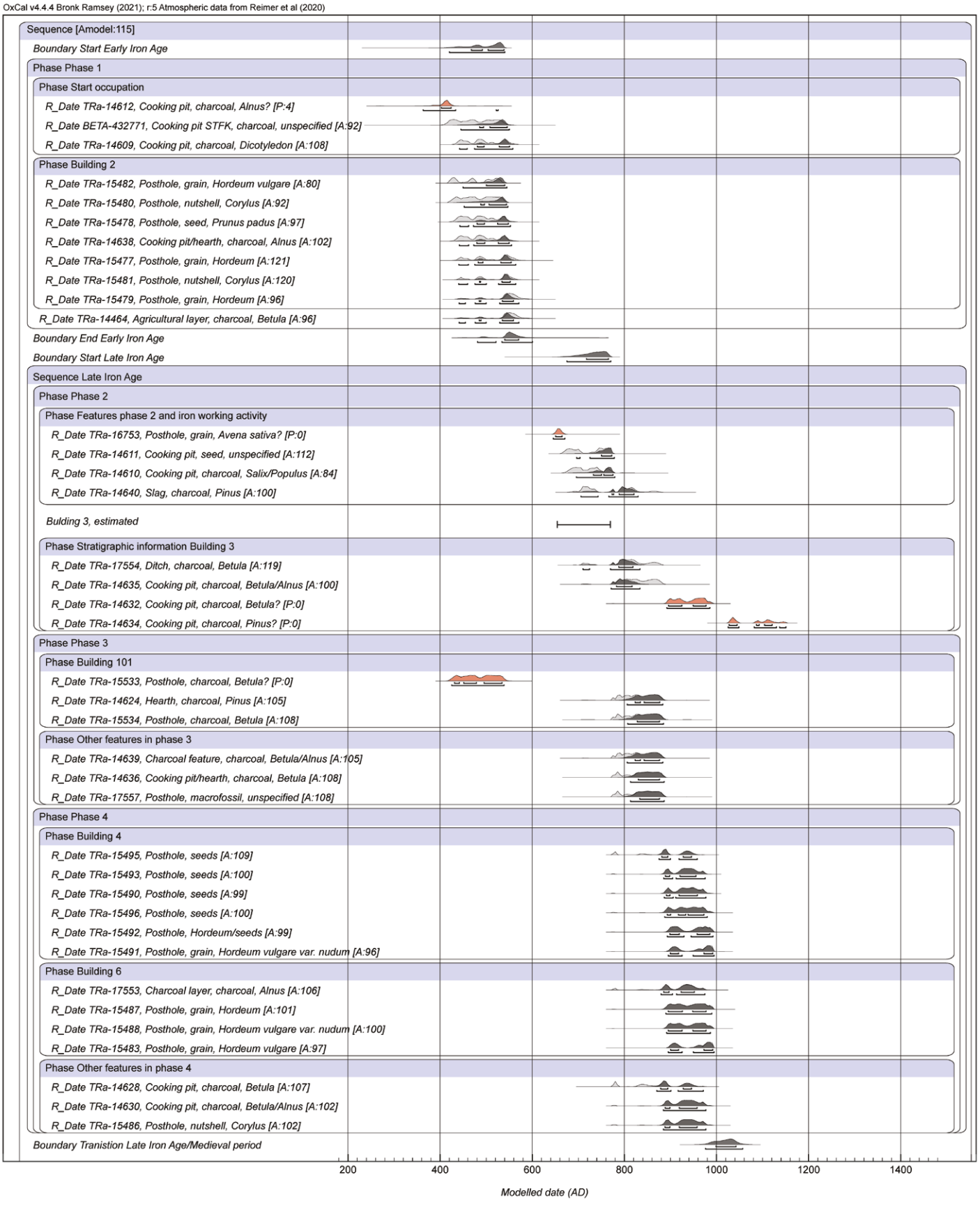


Figure 5. *Summed probability of all ^{14}C dates. Summering av alle ^{14}C-dateringer fra boplassen.*


OxCal v4.4.4 Bronk Ramsey (2021); r:5 Atmospheric data from Reimer et al (2020)
Sequence [Amodel:115]
Boundary Start Early Iron Age
Phase Phase 1
Phase Start occupation
R_Date TRa-14612, Cooking pit, charcoal, Alnus? [P:4]
R_Date BETA-432771, Cooking pit STFK, charcoal, unspecified [A:92]
R_Date TRa-14609, Cooking pit, charcoal, Dicotyledon [A:108]
Phase Building 2
R_Date TRa-15482, Posthole, grain, Hordeum vulgare [A:80]
R_Date TRa-15480, Posthole, nutshell, Corylus [A:92]
R_Date TRa-15478, Posthole, seed, Prunus padus [A:97]
R_Date TRa-14638, Cooking pit/hearth, charcoal, Alnus [A:102]
R_Date TRa-15477, Posthole, grain, Hordeum [A:121]
R_Date TRa-15481, Posthole, nutshell, Corylus [A:120]
R_Date TRa-15479, Posthole, grain, Hordeum [A:96]
R_Date TRa-14464, Agricultural layer, charcoal, Betula [A:96]
Boundary End Early Iron Age
Boundary Start Late Iron Age
Sequence Late Iron Age
Phase Phase 2
Phase Features phase 2 and iron working activity
R_Date TRa-16753, Posthole, grain, Avena sativa? [P:0]
R_Date TRa-14611, Cooking pit, seed, unspecified [A:112]
R_Date TRa-14610, Cooking pit, charcoal, Salix/Populus [A:84]
R_Date TRa-14640, Slag, charcoal, Pinus [A:100]
Bulding 3, estimated
Phase Stratigraphic information Building 3
R_Date TRa-17554, Ditch, charcoal, Betula [A:119]
R_Date TRa-14635, Cooking pit, charcoal, Betula/Alnus [A:100]
R_Date TRa-14632, Cooking pit, charcoal, Betula? [P:0]
R_Date TRa-14634, Cooking pit, charcoal, Pinus? [P:0]
Phase Phase 3
Phase Building 101
R_Date TRa-15533, Posthole, charcoal, Betula? [P:0]
R_Date TRa-14624, Hearth, charcoal, Pinus [A:105]
R_Date TRa-15534, Posthole, charcoal, Betula [A:108]
Phase Other features in phase 3
R_Date TRa-14639, Charcoal feature, charcoal, Betula/Alnus [A:105]
R_Date TRa-14636, Cooking pit/hearth, charcoal, Betula [A:108]
R_Date TRa-17557, Posthole, macrofossil, unspecified [A:108]
Phase Phase 4
Phase Building 4
R_Date TRa-15495, Posthole, seeds [A:109]
R_Date TRa-15493, Posthole, seeds [A:100]
R_Date TRa-15490, Posthole, seeds [A:99]
R_Date TRa-15496, Posthole, seeds [A:100]
R_Date TRa-15492, Posthole, Hordeum/seeds [A:99]
R_Date TRa-15491, Posthole, grain, Hordeum vulgare var. nudum [A:96]
Phase Building 6
R_Date TRa-17553, Charcoal layer, charcoal, Alnus [A:106]
R_Date TRa-15487, Posthole, grain, Hordeum [A:101]
R_Date TRa-15488, Posthole, grain, Hordeum vulgare var. nudum [A:100]
R_Date TRa-15483, Posthole, grain, Hordeum vulgare [A:97]
Phase Other features in phase 4
R_Date TRa-14628, Cooking pit, charcoal, Betula [A:107]
R_Date TRa-14630, Cooking pit, charcoal, Betula/Alnus [A:102]
R_Date TRa-15486, Posthole, nutshell, Corylus [A:102]
Boundary Tranistion Late Iron Age/Medieval period
200
400
600
800
1000
1200
1400
Modelled date (AD)

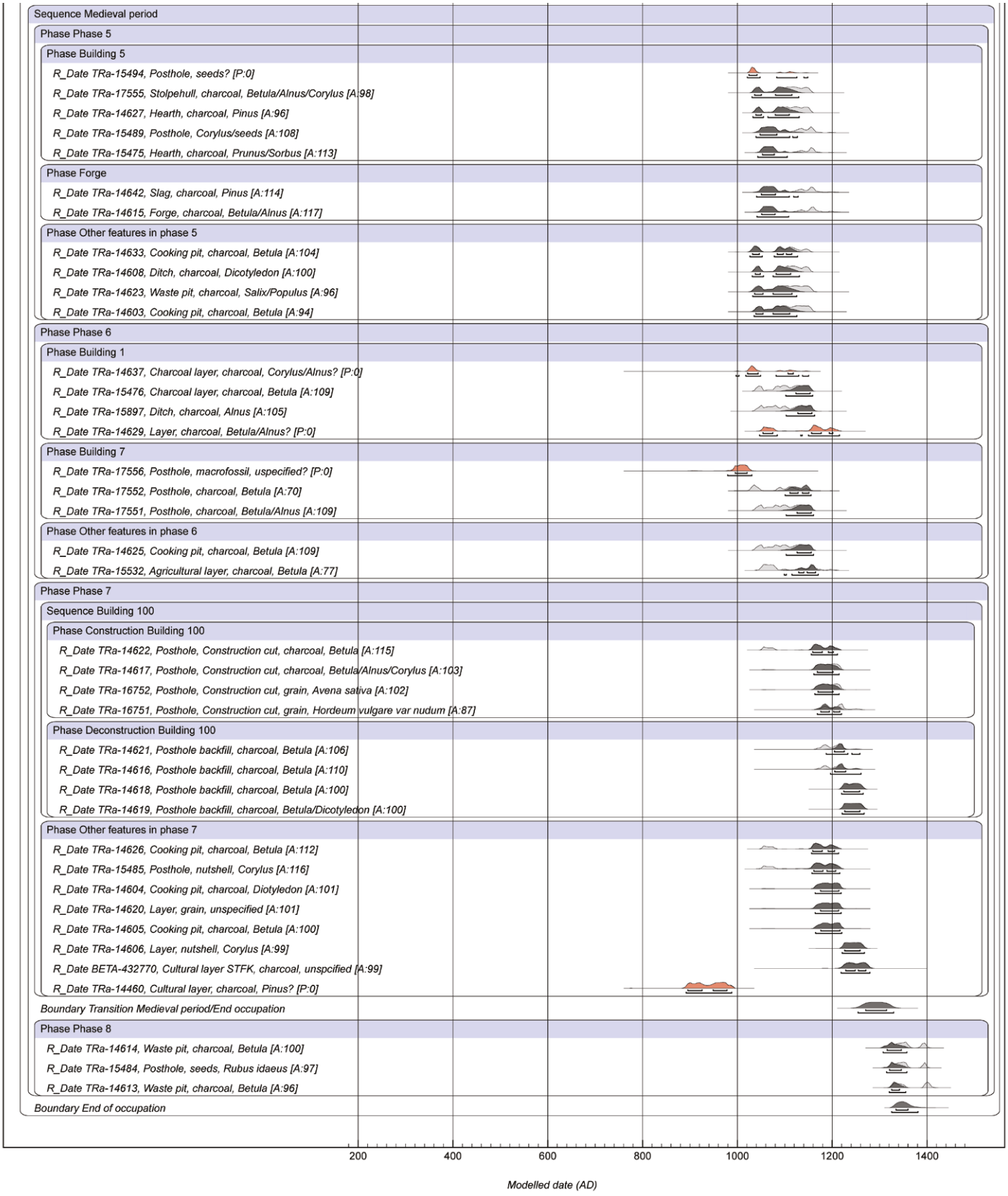


Figure 6. *The complete ^{14}C model from Skeiet divided into the settlement phases. The model is separated into Early/Late Iron Age and medieval period. Figure 6a covers the Iron Age which makes up phases 1–4, ending with the boundary transition Late Iron Age/early medieval period. Figure 6b covers the medieval period which makes up phases 5–8. Dateringsmodell over ^{14}C-dateringer inndelt i bosetningsfaser.*

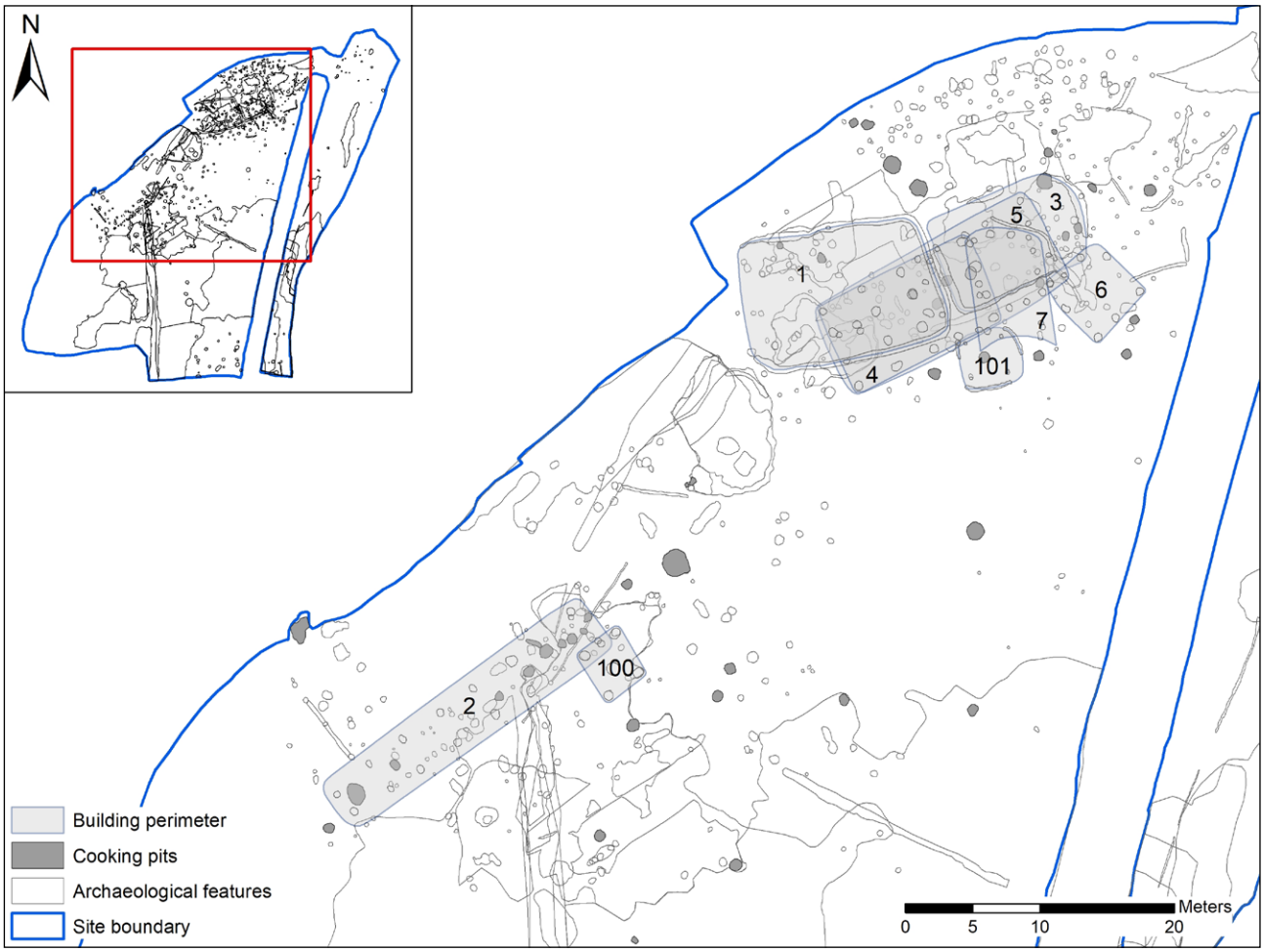


Figure 7. *Overview of the location of the different buildings at Skeiet. The illustration highlights the continuous use of the same area over long periods of time and the extent of overlapping buildings. The numbers represent the location of each building discussed in this article. Buildings 2 and 100 can be seen in central parts of the site, whereas the other seven buildings intersect in the northern part of the settlement area. Illustration: Hanne Bryn, NTNU University Museum. Beliggenhet til bygningene på boplassen.*

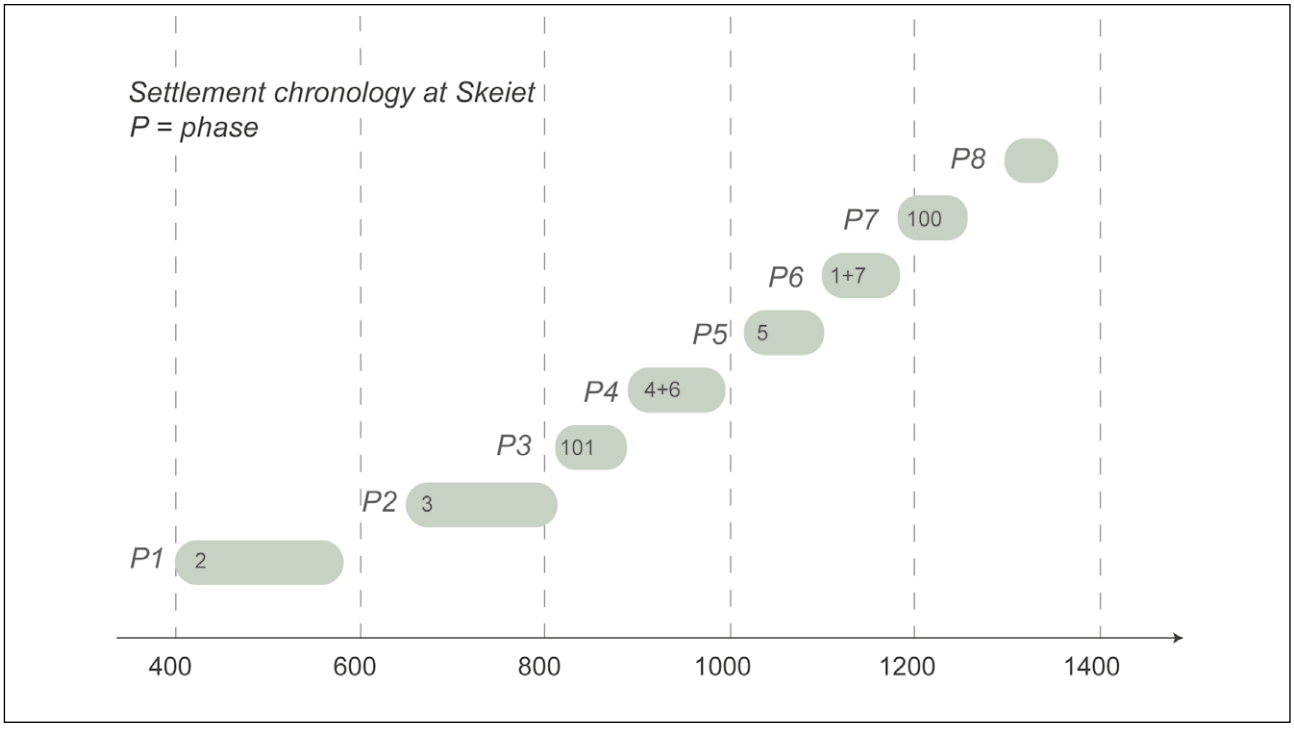


Figure 8. *A schematic representation of the settlement phases and chronology at Skeiet. Illustration: Hanne Bryn, NTNU University Museum. Skjematisk modell over bosetningsfaser.*

Table 1. *The settlement phases at Skeiet, their approximate date and type of dated features.*

Phase	Period	Approx. date	Settlement features
1	Migration Period	AD 400–570	Building 2, cooking pits, agricultural layer
2	Merovingian Period	AD 650–820	Building 3, cooking pits
3	Late Merovingian Period / Early Viking Age	AD 820–880	Building 101, Cooking pit/hearth
4	Viking Age	AD 880–990	Building 4 and 6, fenced pathway, cooking pits
5	Late Viking Age / Early Medieval Period	AD 1030–1120	Building 5, forge, cooking pits, waste pit, ditch
6	Early / High Medieval Period	AD 1120–1170	Building 1 and 7
7	High Medieval Period	AD 1170–1270	Building 100, cultural layer deposit, cooking pits
8	Late High Medieval Period	AD 1310–1350	Waste pits, posthole

were densely packed with stones and interpreted to have been backfilled after the removal of the post, and the buildings therefore had been deconstructed. By sampling the construction cut, we aimed to avoid the backfill of the deconstruction to provide a better chance of dating the time of construction of the buildings.

To establish the occupation chronology, Bayesian statistics were applied to the ^{14}C results (Figure 6), where the aim was to refine the occupation phases within the settlement combined with the spatial information gathered during the excavation. The model was used to establish phases based on which buildings were present at which time, including associated identifiable features (Table 1 and Figure 7). The model was built using the statistical tools available in OxCal V.4.4.4. The production of the models used OxCal Chronological Query Language 2 (CQL2) (Bronk Ramsey 2009) and the IntCal20 calibration curve was used to produce the ^{14}C dates (Reimer et al. 2020). The model presents the posterior density estimates at 68% and 95%. The overall and individual agreement indexes were above the recommended minimum acceptable value of 60% for all models produced for this article (Bayliss et al. 2007:6). This was necessary to produce robust chronological models, as well as to maintain consistency between the model and the data (Bronk Ramsey 2009:356–357).

RESULTS

Phase 1: AD 400–570

The earliest settlement activity at Skeiet emerged in the Migration Period. This activity was dominated by a three-aisled longhouse, building 2, as well as scattered cooking pits and traces of agricultural activity (Figure 9). The longhouse was approximately 23 m in length and lay in the central settlement cluster. The remains of the building consisted of two parallel rows of postholes representing the roof-supporting elements (trestles), as well as cooking pits/hearths along the central axis in the eastern part of the building. In this section, the trestles also stood further apart, creating a larger open space. Evidence of replacements of the roof-supporting posts was visible in relation to the easternmost trestle, where the postholes on both sides were double. No traces of outer wall posts were found. It may be suggested that the outer wall could have been made of stone or turf, which would leave few visible traces in the subsoil. Stone walls are typically seen in western Norway (Eriksen 2015: 59). Because of the extensive settlement activity on the site during the Late Iron Age and medieval period, the remains of a possible outer stone wall would then have been removed or used elsewhere.

The modelled dates (Figure 6) suggest the occupation phase started in c. 400–405 AD and lasted until c. 530–570 AD. The longhouse is dated using samples from six postholes and a cooking pit/hearth on the north-eastern side of the building, which resulted in a modelled date of approximately AD 480–560 (68%). The additional occupation evidence on site indicated that the cooking pit activity started in the early 400s, before the construction of the longhouse, and continued into the mid-500s. The earliest agricultural activity on the site was dated to c. AD 540–570 (68%), correlating with the later phase of building 2. The agricultural layer was dated on the basis of one single charcoal sample and the result does not date the timespan of the agricultural activity in general, but rather provides an indicator that the agricultural activity happened during the existence of building 2. Plant remains from ard marks recorded under a grave mound at the nearby cemetery (Sauvage Ch. 1) were dated to AD 436–540 (68%) (TRa-17279, 1580 ± 15 BP), which aligns with the establishment of building 2.

Phase 2: AD 650–820

An interruption in the ^{14}C results was observed between AD 570–650. The calibrated results of the Early Iron Age agricultural activity indicated an end around the mid-AD 500s, and the earliest result from the Late Iron Age was a grain dated to AD 651–665

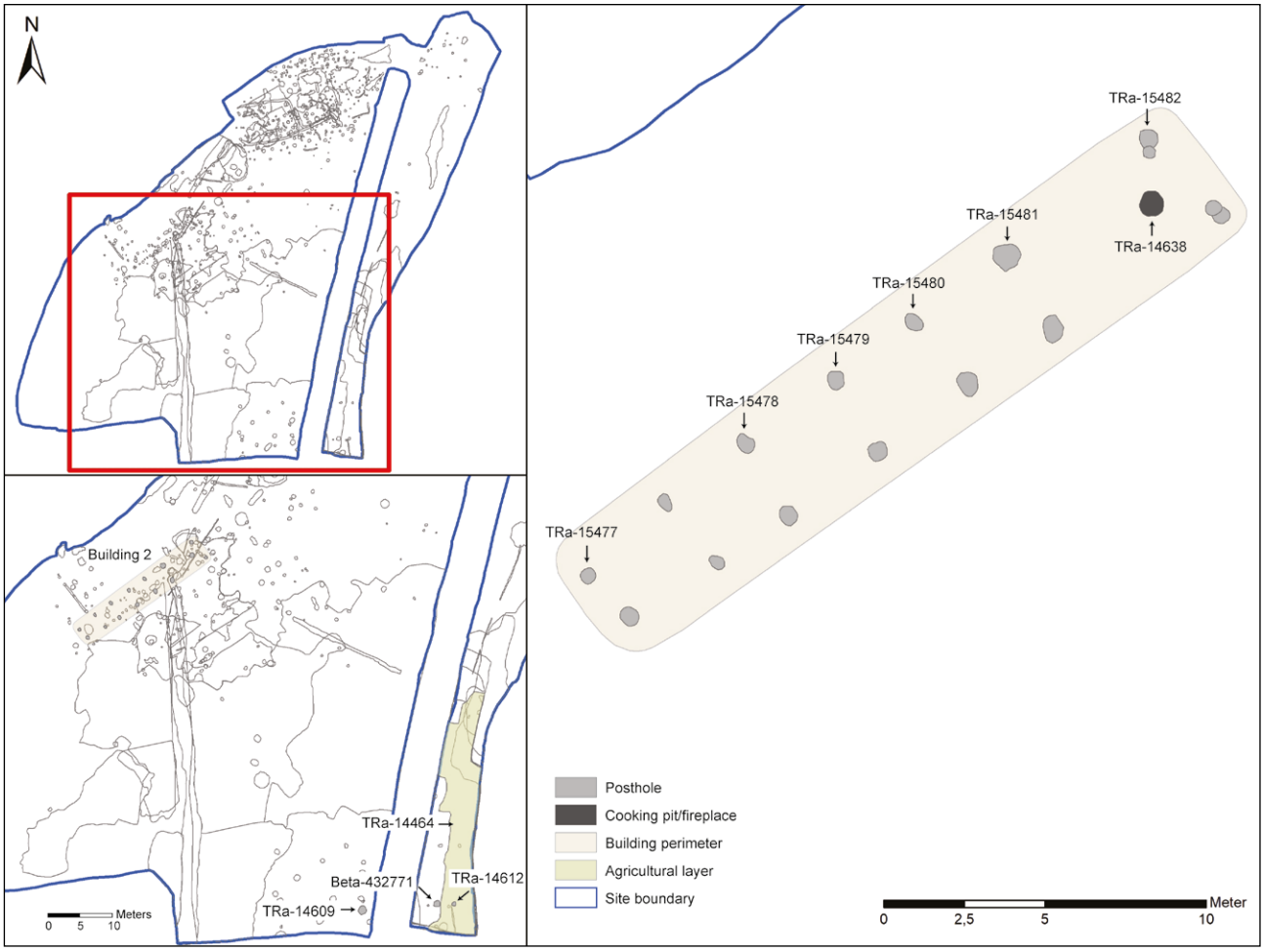


Figure 9. *Overview of archaeological features in phase 1. A detailed layout of building 2, its location on site, as well as all ^{14}C dated features in this phase highlighted by the laboratory number. Illustration: Hanne Bryn, NTNU University Museum.*

(68%) (TRa-16753), sampled from the phase 7 building 100 (Figure 6). According to the ^{14}C dates, this indicates an almost 100-year hiatus on the site.

The settlement evidence from the Merovingian Period was elusive, consisting of postholes, cooking pits and activity traces. However, there is clear evidence to suggest that at least one building, building 3, occupied the site. The building (Figure 10) measured approximately 12 × 8 m and consisted of an outer ditch that surrounded an area of approximately 70 m^2. No internal postholes were identified. The extensive activity within the area throughout the following centuries may have been a contributing factor to the lack of settlement features within this building. The outer ditch of building 3 had clear similarities to the ditch around building 1, discussed below. Here, soil micromorphology was applied, and the analysis suggested that the ditch contained anthropogenic soils probably derived from the house floor and local near-house occupation (Macphail 2021). It would be reasonable to interpret building 3 as an enclosure. However, considering the micromorphological evidence and the limited internal area, this does not seem likely. The dimensions of the ditch can also be considered oversized for such usage, measuring between 55–97 cm wide and 20 cm deep. Also, no postholes or stake holes for a fence or similar construction were seen when the entire ditch was emptied during excavation, thus excluding the enclosure interpretation. A drain around an internal building is a more plausible interpretation, based on the ditch's dimensions and soil composition seen in the micromorphology. This is similar to buildings seen elsewhere from both the Early and Late Iron Age (e.g. Bårdseth 2007:131ff, Heen-Pettersen & Lorentzen 2019, Cannell et al. 2020).

The modelled dates (Figure 6) entail that the phase started in c. 650–665 AD and lasted until c. 780–820 AD. Building 3 can, unfortunately, only be indirectly dated from stratigraphic information. Samples from the ditch itself were dated to AD 787–871 (68%), whereas a stratigraphically later cooking pit overlying the ditch was dated to AD 786–875 (68%). Both dates suggest that the building must have existed

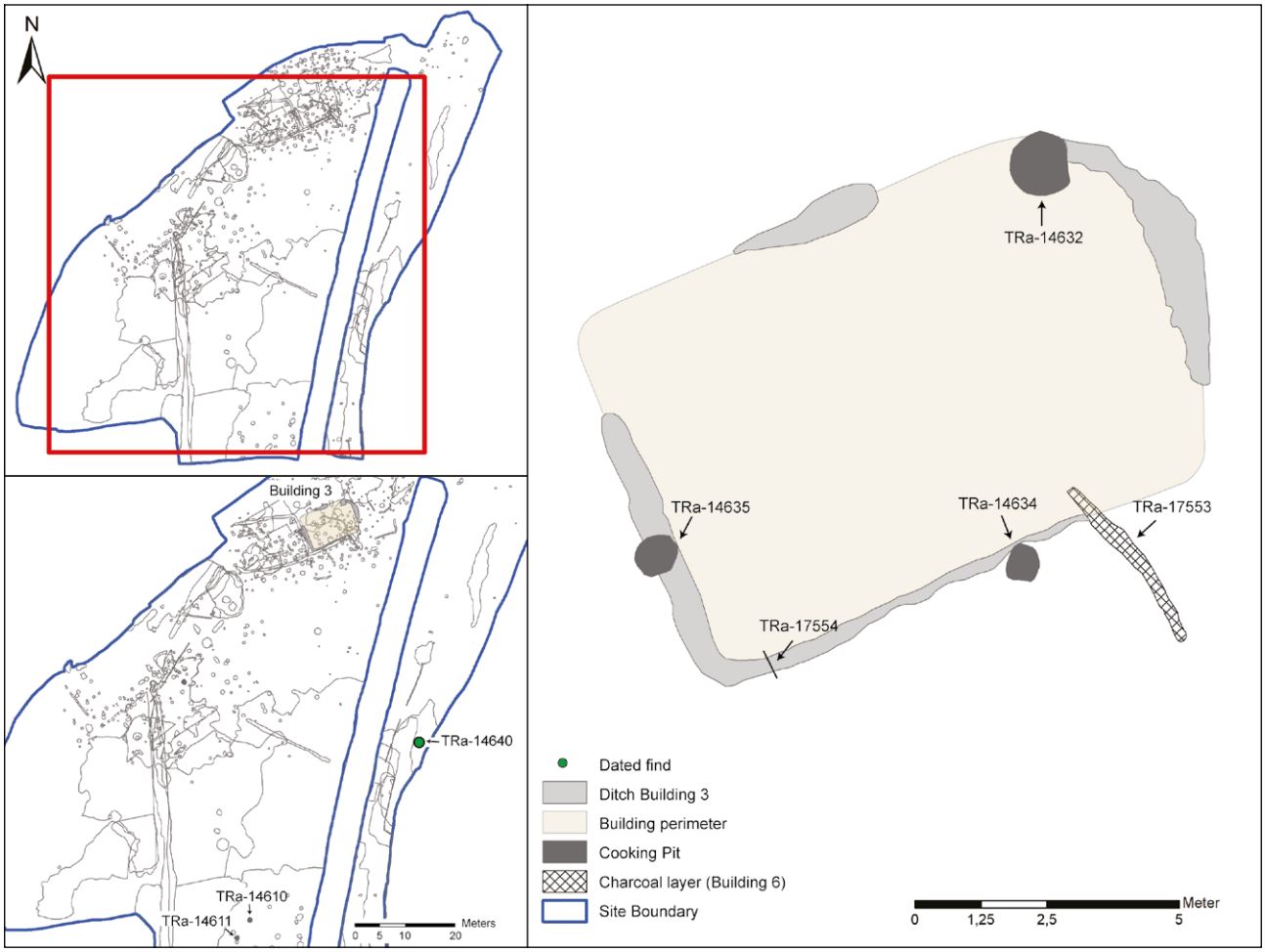


Figure 10. *Overview of archaeological features in phase 2. A detailed layout of building 3, its location on site, as well as all ^{14}C dated features in this phase highlighted by the laboratory number. Charcoal layer (TRa-17553) intersecting with building 3 belongs to building 6 in phase 4 (Figure 12). Illustration: Hanne Bryn, NTNU University Museum. Plan over bygninger og anlegg fra bosetningsfase 2.*

before these dates, since the first date came from backfill in the ditch while the second was from an overlying feature. The space for building 3 was later occupied by other buildings until the medieval period, as discussed below. The dates therefore suggest that the building must have been constructed sometime after c. 650–665 AD and was no longer in use by AD 780–820. A ^{14}C date from slag in the eastern part of the site adds to this period AD 707–822 (68%) and can point to ironworking within the area during this time. Overall, the analysis suggests that this period represents several activities on the site in the Merovingian Period: settlement as suggested by the building and cooking pits, and metalworking.

Phase 3: AD 820–880

In the Early Viking Age, following the demise of building 3, no larger buildings were recognised on the site. However, the cooking pit activity continued, together with evidence of a smaller four-post construction, building 101 (Figure 11). This was possibly a round building with a diameter of 4.5 m which consisted of four small internal postholes for roof-supporting elements spaced evenly around a central hearth. The outer part of the building was bordered by a segmented ditch, indicating a curved outer wall. The fireplace was ^{14}C dated to AD 785–877 (68%) (Figure 6), which was confirmed by a similar date from one of the postholes. The marginal posterior distribution of the modelled ^{14}C dates from the building suggested an activity phase within the period AD 825–880 (Figure 6).

Extensive agricultural layers were also excavated in the south-eastern parts of the site. Within these layers, a fireplace/charcoal-filled feature was recorded and ^{14}C dated to AD 785–877 (68%), attesting to additional activity during this phase. In general, the ^{14}C dates showed a slow but steady increase in activity on the site.

Figure 11. *Overview of archaeological features in phase 3. A detailed layout of building 101, its location on site, as well as all ^{14}C dated features in this phase highlighted by the laboratory number. Illustration: Hanne Bryn, NTNU University Museum. Plan over bygninger og anlegg fra bosetningsfase 3.*

Phase 4: AD 880–990

The late 800s AD ushered in a period of extensive and stable activity. Two buildings were constructed during this time, buildings 4 and 6, both with larger postholes and a more distinct layout than previous constructions. In addition to buildings, two parallel lines of smaller postholes indicated a fenced pathway that led from the buildings and towards the north-east.

Building 4 (Figure 12) was the largest construction from this period. The construction may be interpreted as a rectangular single-aisled construction measuring approximately 12 × 7 m. Large postholes marked the location of roof-bearing posts on the outer wall line. Also, an inner robust construction was marked by equivalent postholes in the western half of the building. The lack of visible entrances may indicate that these were integrated into the outer wall lines. The modelled ^{14}C results from the postholes indicate that the building was established between AD 890–980 (Figure 6).

The internal postholes found within building 4 were unusual. A total of five postholes were seen, all of them in the western half of the building. Since later activity had caused some disturbance to the area, a proposed sixth internal posthole was missing (Figure 12). These had the same dimensions as the outer-wall-bearing posts and were situated in pairs, creating two rows like trestles. In contrast, the eastern half of the building consisted of one large open space. Since the inner posts were situated in only one half of the building, it is unlikely that they carried the entire roof construction as discussed below.

The other building, number 6, was a small single-aisled construction of roughly 5.5 × 5.5 m with equally sized postholes in what we assumed was the outer wall, creating an open interior space (Figure 12). In addition, six possible smaller inner postholes were observed. Macrofossil samples from four of the large postholes revealed grain seeds, mainly barley and oats. Including fragments, this amounted to a total of 199 in one of the postholes (Overland 2022). It

Figure 12. *Overview of archaeological features in phase 4. A detailed layout of buildings 4 and 6, and the fenced pathway, their location on site, as well as all ^{14}C dated features in this phase highlighted by the laboratory number. Illustration: Hanne Bryn, NTNU University Museum. Plan over bygninger og anlegg fra bosetningsfase 4.*

is therefore reasonable to interpret that the building was related to farm economic activities, such as a byre or grain and fodder storage. Because of their small size, the vague inner postholes might be proposed as supports for a lightweight inner construction rather than as a main constructional element. The location of building 6 next to building 4 may be explained by the need for a sheltered location. During the excavation, strong winds and bad weather sometimes approached the area from the fjord to the west. Placing the grain or food storage behind the larger building may therefore have sheltered this farm building and its valuable contents from the weather. The modelled ^{14}C dates suggested construction within the period AD 885–990 (Figure 6). This included dates from an oblong charcoal layer, reminiscent of a tipped-over burnt-down post.

Directly to the east, two parallel lines with medium-sized postholes implied a fenced pathway leading away from the excavated area to the north-east (Figure 12). An oblong layer along the central axis of the path was analysed using soil micromorphology, indicating that it may represent waste deposit with a trampled surface, containing ash waste from a domestic hearth due to low temperature burning (Macphail 2021). Palaeobotanical analysis of the layer recorded seeds from plants that thrive in nitrogen-rich environments as well as fungi which may suggest that the feature was used by animals (Overland & Hjelle Ch. 2). Interpreting this as a fenced pathway therefore seems reasonable, and it connects to the possible function of building 6 as a byre. The feature is linked to phase 4 based on the contextual information and relation to building 6. The radiocarbon samples from the postholes marked in Figure 12 gave inconsistent results that could not be incorporated into the model. This may be caused by plateaus in the ^{14}C calibration curve during the timespan. Also, the constant use of the pathway may have resulted in replacing the fenceposts several times, causing a mix of dissimilar material in the samples. The results are found in Appendix 1.

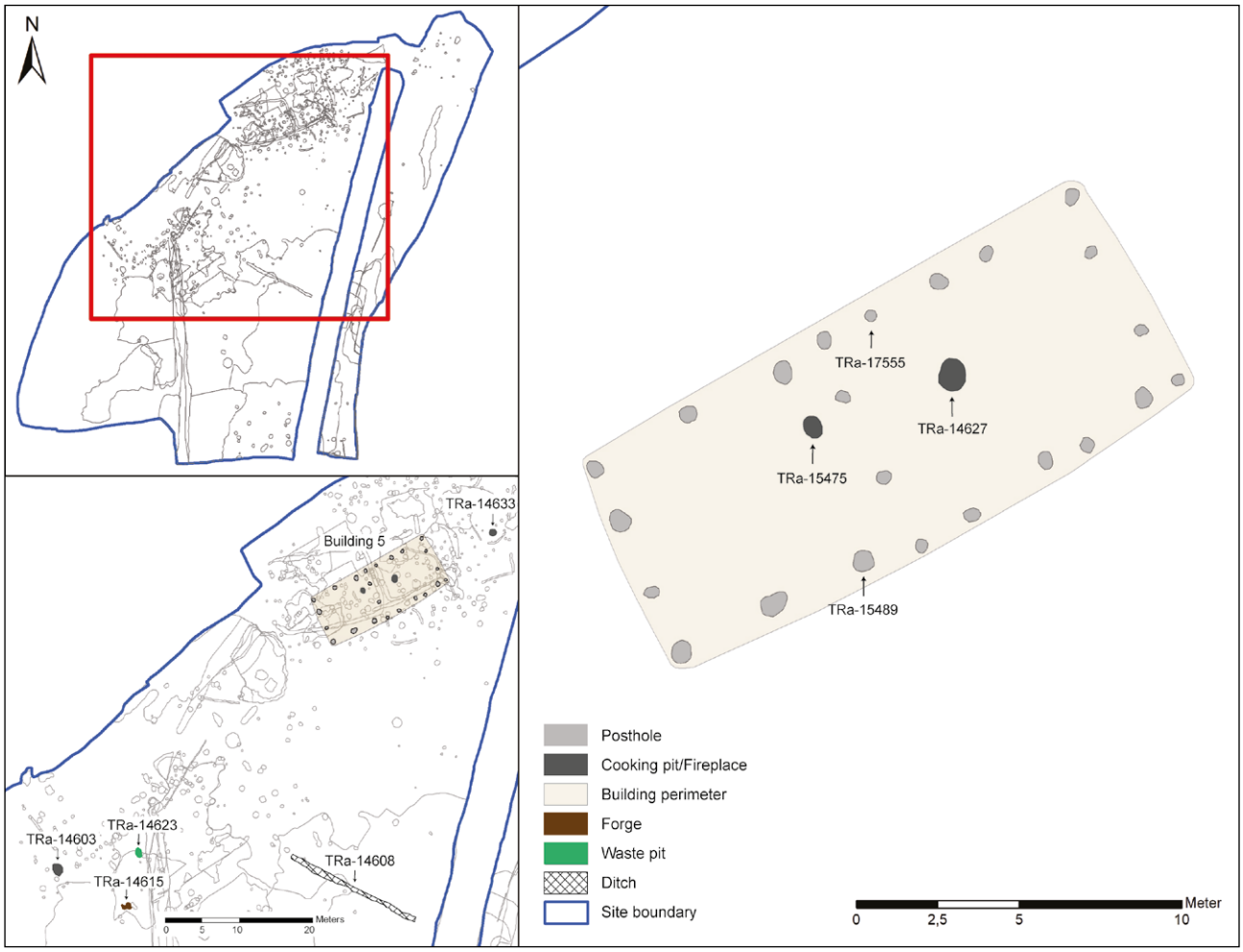


Figure 13. *Overview of archaeological features in phase 5. A detailed layout of building 5, its location on site, as well as all ^{14}C dated features in this phase highlighted by the laboratory number. Posthole TRa-15489 was originally part of building 4. Illustration: Hanne Bryn, NTNU University Museum. Plan over bygninger og anlegg fra bosetningsfase 5.*

Phase 5: AD 1030–1120

The next phase, phase 5, represents the construction of a large singe-aisled house, building 5, which replaced the buildings from phase 4. The other finds include a metalworking forge, cooking pits, hearths, waste pits and a ditch (Figure 13). Building 5 displays the same orientation and construction as the previous building 4, and the period may represent a continuation in the extensive stable settlement activity seen in the previous period, including activities such as metalworking, drainage and waste management.

Building 5 intersected with the eastern part of building 4 and was also a rectangular single-aisled construction, measuring 17.5 × 7 m, suggesting a total interior area of c. 122.5 m^2. The roof-bearing construction is indicated by the postholes on the outer wall line, and no inner construction like that in building 4 was found (Figure 13). The radiocarbon modelling suggests that the earliest date for construction was in the first half of the 1000s, in the final years of the Viking Period (Figure 6). The spatial and stratigraphic information as well as the radiocarbon dates also suggested that building 5 was a remodelling and continuation of building 4 from the previous phase (Figure 14). Due to the radiocarbon results, we know that two of the postholes from building 4 were backfilled in the Early Middle Ages (TRa-15494 and TRa-15489), and one was then overlaid by a fireplace that was dated to the same period as building 5. They are thus considered to belong to the reworked building (TRa-14627). Building 4 was probably established in the first half of the AD 900s and posts might have been replaced within building 4 as the new construction of building 5 was added. The stratigraphic information together with the modelled ^{14}C results indicates that building 5 existed until AD 1050–1120.

The forge was excavated in the central settlement cluster, placed c. 30 m to the south-west. Metallurgical analysis of slag and soil from the feature suggests that it was mostly used for secondary iron processing (e.g. forging tools and equipment from iron bars)

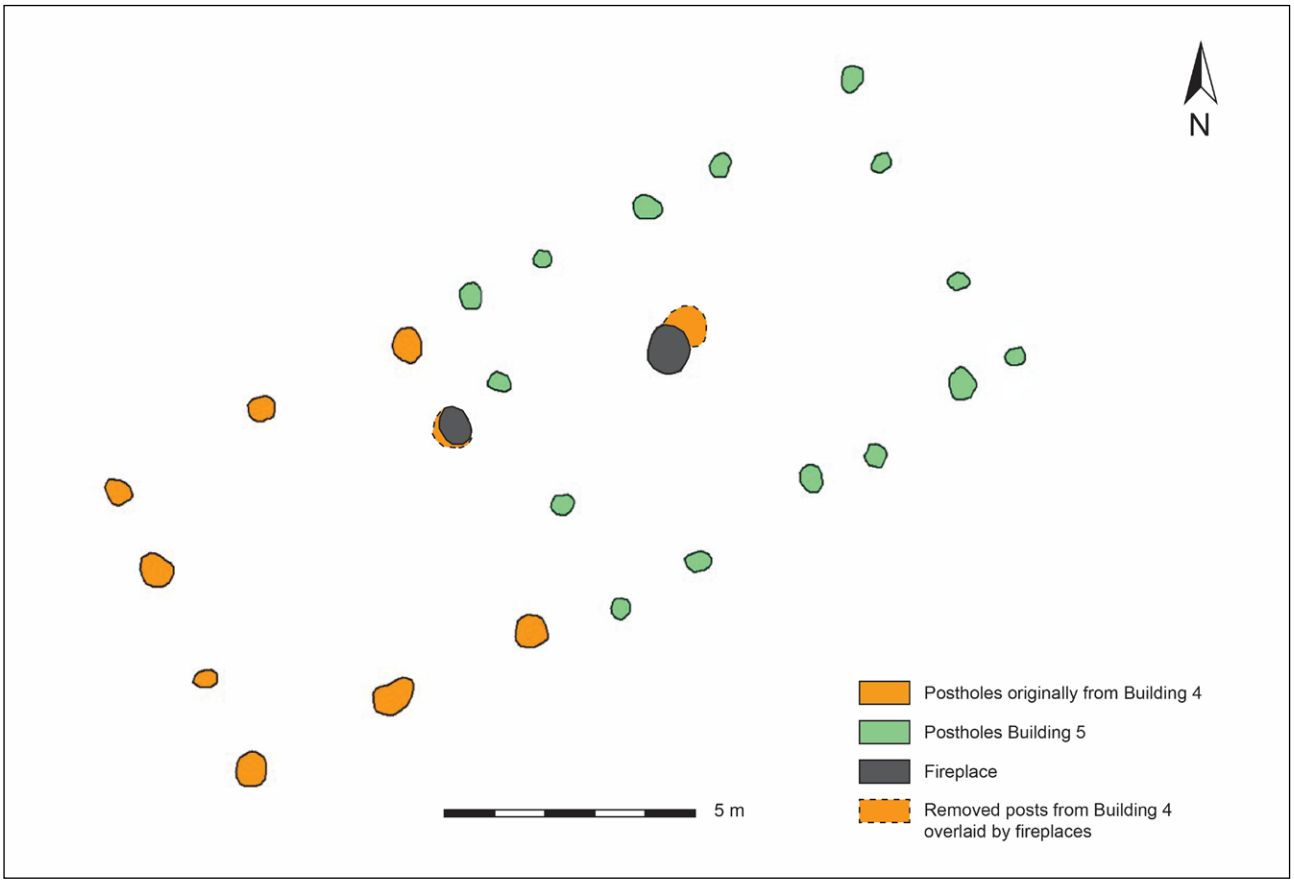


Figure 14. *Overview of the components of building 5. The features of the western half (orange) originated from building 4, while the eastern half (green) was added on to create a larger building. The postholes from building 4 were overlaid by fireplaces in building 5. For ^{14}C dates, see Figures 12 and 13. Illustration: Hanne Bryn, NTNU University Museum. Plan over komponenter som tilhører Hus 4 (oransje) og utvidelsen mot øst, Hus 5 (grønt).*

(Jouttijärvi & Johansen 2022). In close proximity to the forge was a waste pit, dated to AD 1040–1151 (68%), which contained iron objects that represent refuse from the forge. The modelled ^{14}C results suggested that the marginal posterior distribution at 68% range for the forge was AD 1050–1080. This indicates that the forge activity occurred during the last stages of building 5's existence (Figure 6). The separate location of metalworking away from the main farm building is typical, often seen as a preventive measure against accidental fire (Sauvage 2005:28). This may indicate that the settlement was organised with dedicated activity zones.

Phase 6: AD 1120–1170

When building 5 was demolished in the late 11th or early 12th century AD, a larger building (building 1) was raised slightly further to the east, with a different orientation, together with a smaller building (number 7) (Figure 15). Apart from continued agricultural and cooking pit activity, little other activity is dated to this timespan.

Building 1 was a dominating feature in the northern settlement cluster (Figure 15). It may be interpreted as an approximately 15 x10 m single-aisled construction surrounded by a large outer drainage ditch open to the west, traversing the earlier buildings 4 and 5. The ditch was emptied during excavation and did not yield any postholes or stake holes from a possible wall. The composition of the soils in the ditch was studied via micromorphology. The sample entailed that it was made up of silted anthropogenic soils with organic remains and indicators of iron panning, likely the result of house floor and (liquid) byre waste clearing (Macphail 2021:7). This is consistent with its interpretation as a drainage ditch around the plot of a building. Other examples of similar features include ditches surrounding building plots in the Viking Age trading place Heimdalsjordet in Vestfold (Cannell et al. 2020). The modelled date from a charcoal layer within the ditch includes a posterior distribution suggesting that the ditch was used within the period AD 1120–1160 (Figure 6). The presence of a building within the ditch is further suggested by a line of postholes along the inside of the southern

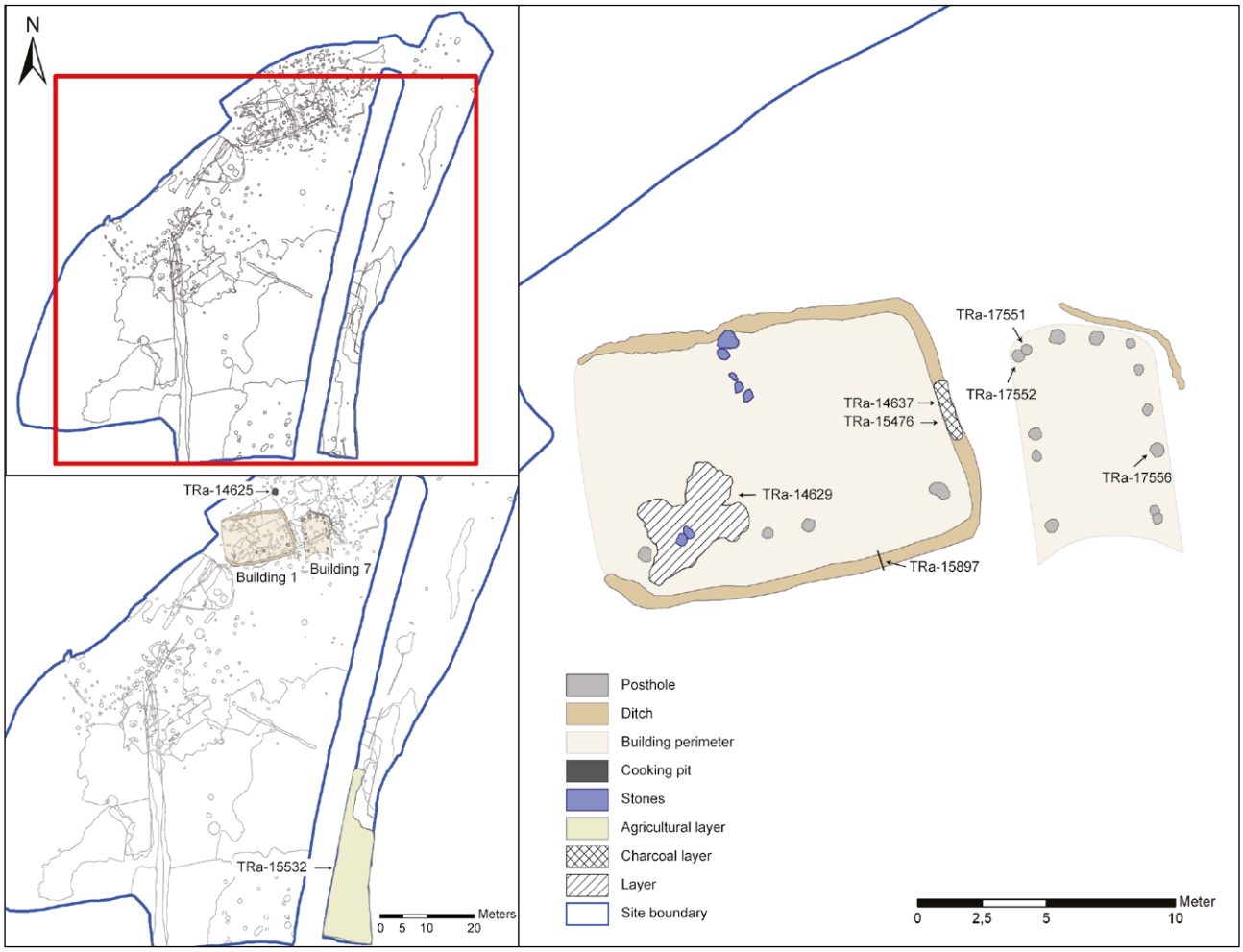


Figure 15. *Overview of archaeological features in phase 6. A detailed layout of buildings 1 and 7, their location on site, as well as all ^{14}C dated features in this phase highlighted by the laboratory number. Illustration: Hanne Bryn, NTNU University Museum. Plan over bygninger og anlegg fra bosetningsfase 6.*

perimeter, and a trampled charcoal layer (possibly remnants of an earthen floor). The line of postholes may represent the southern wall of a single-aisled building. Recent activities had caused disturbance to the northernmost part of this area (Figure 3) and a potential line of postholes for the counterpart wall was therefore impossible to locate. A line with several larger stones set perpendicular to the ditch were placed on the northern perimeter (Figure 15), indicating the use of stone for an internal construction. These stones were overlaid by later agricultural layers, thus not added by recent activity. Due to the high density of postholes in the general area, it was difficult to determine how the building would have been constructed and whether it had internal posts or not. The modelled dates indicate that the building was in use in the period between c. 1120–1170 AD (68 %).

Building 7 was placed directly east of building 1, similar to the smaller building 6 in phase 4. The construction implied a single-aisled building with roof-supporting posts in the ground, measuring c. 7 × 4.5 m. It traversed several of the earlier buildings, numbers 3, 4, 5 and 101, making a medieval period date probable based on the location and stratigraphy. The remains of a narrow outer ditch were recorded on the north-eastern perimeter, which may indicate a drain similar to building 1. The house had a sheltered location, behind the larger building 1. This location and size can point towards an interpretation of the building as related to farm economic activities, drawing parallels to building 6. The stratigraphic information from the site as well as the marginal posterior probability distribution of the modelled ^{14}C date indicate a date contemporary to building 1, c. AD 1120–1160 (Figure 6).

The other features dated to this phase included a cooking pit north of building 1 and charcoal from an agricultural layer c. 50 m south of the buildings (Figures 6 and 15). This implies continued household and agricultural activity in the settlement.

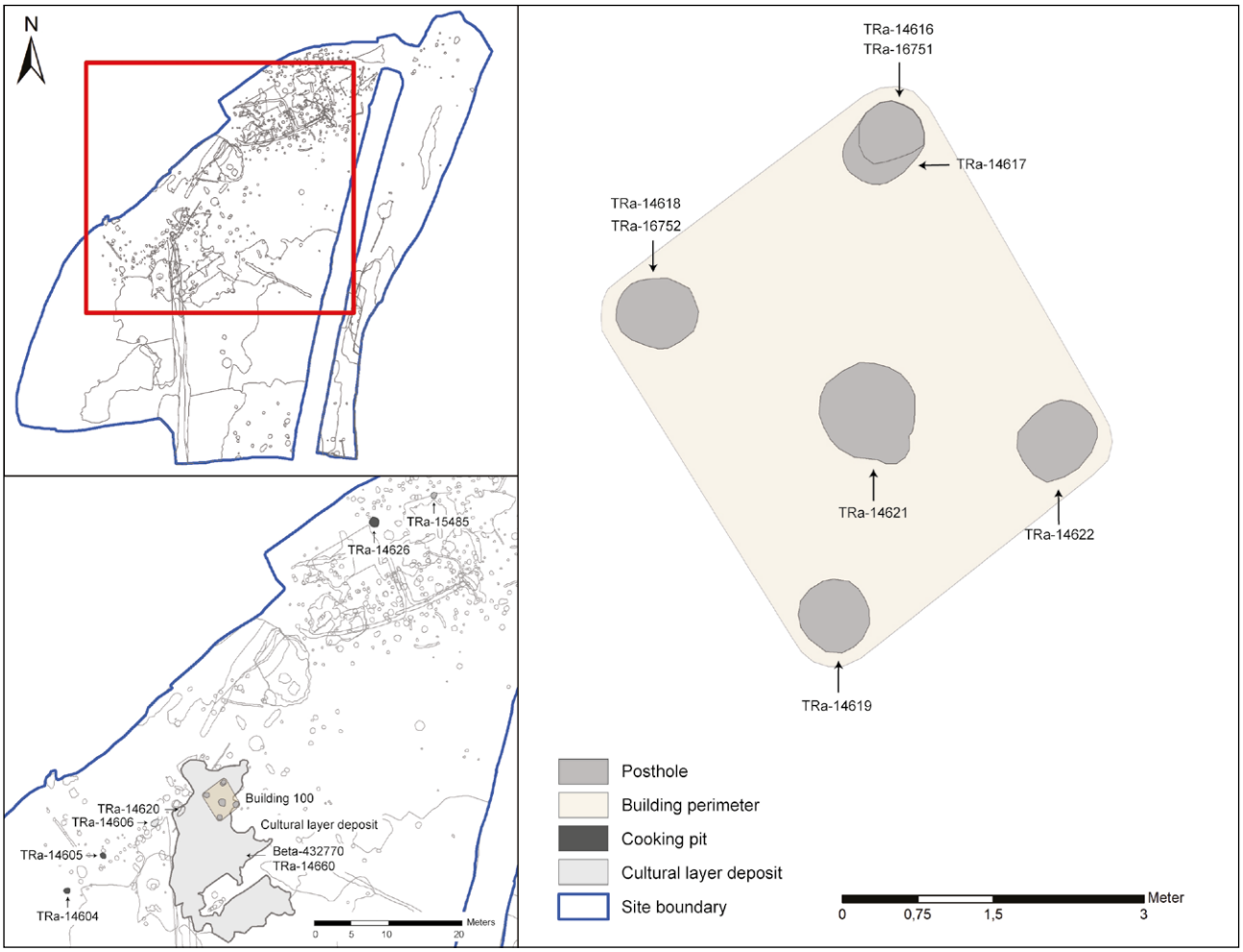


Figure 16. *Overview of archaeological features in phase 7. A detailed layout of building 100, its location on site, as well as all ^{14}C dated features in this phase highlighted by the laboratory number. Illustration: Hanne Bryn, NTNU University Museum. Plan over bygninger og anlegg fra bosetningsfase 7.*

Phase 7: AD 1170–1270

The late 12th century AD shows only a single building on the site, building 100, which was placed further south in the central settlement cluster where we previously saw metalworking activity. The phase also includes a surface with cultural layer deposits, cooking pits and postholes (Figure 16).

This building was a small square five-post construction measuring 4 × 3.5 m and stratigraphically below the cultural layer deposit dated to the late 1100s and 1200s AD. The postholes included backfill with cultural layer deposits from the removal of the posts. The backfilled post-pipe indicated that the posts had a diameter of c. 40–50 cm.

The cultural layers consisted of deposits of charcoal and fire-cracked stones, covering an area of approximately 240 m^2. They included finds such as fragments of soapstone vessels, knives and whetstones, in addition to burnt bone and slag. The stones may represent brewing stones (*bryggestein* in Norwegian), related to heating water and beer brewing on farm settlements (Grønnesby 2016: 134). However, the density of stones in the cultural layer was low, which may entail that such activity was limited. Modern activities, such as farming, were seen to have had a heavy influence in this area. This was seen as modern plough marks visible in the deposits, which entails that the area has been levelled to some degree. Because of this disturbance, the dating of the layer was based on the backfilled cultural layer in the postholes belonging to building 100, which also dated the demise of the building.

Modelled ^{14}C results indicate that building 100 was constructed around AD 1170–1220 (68%), while the cultural layer backfill suggests the building's demise in AD 1220–1260 (68%) (Figure 6). The building therefore seems to have had a short lifespan and most of the phase is dominated by the cultural layers. Even though the larger buildings from the previous dates were not seen in this phase, dates that include cooking pits and grain indicate continuing agricultural activities.

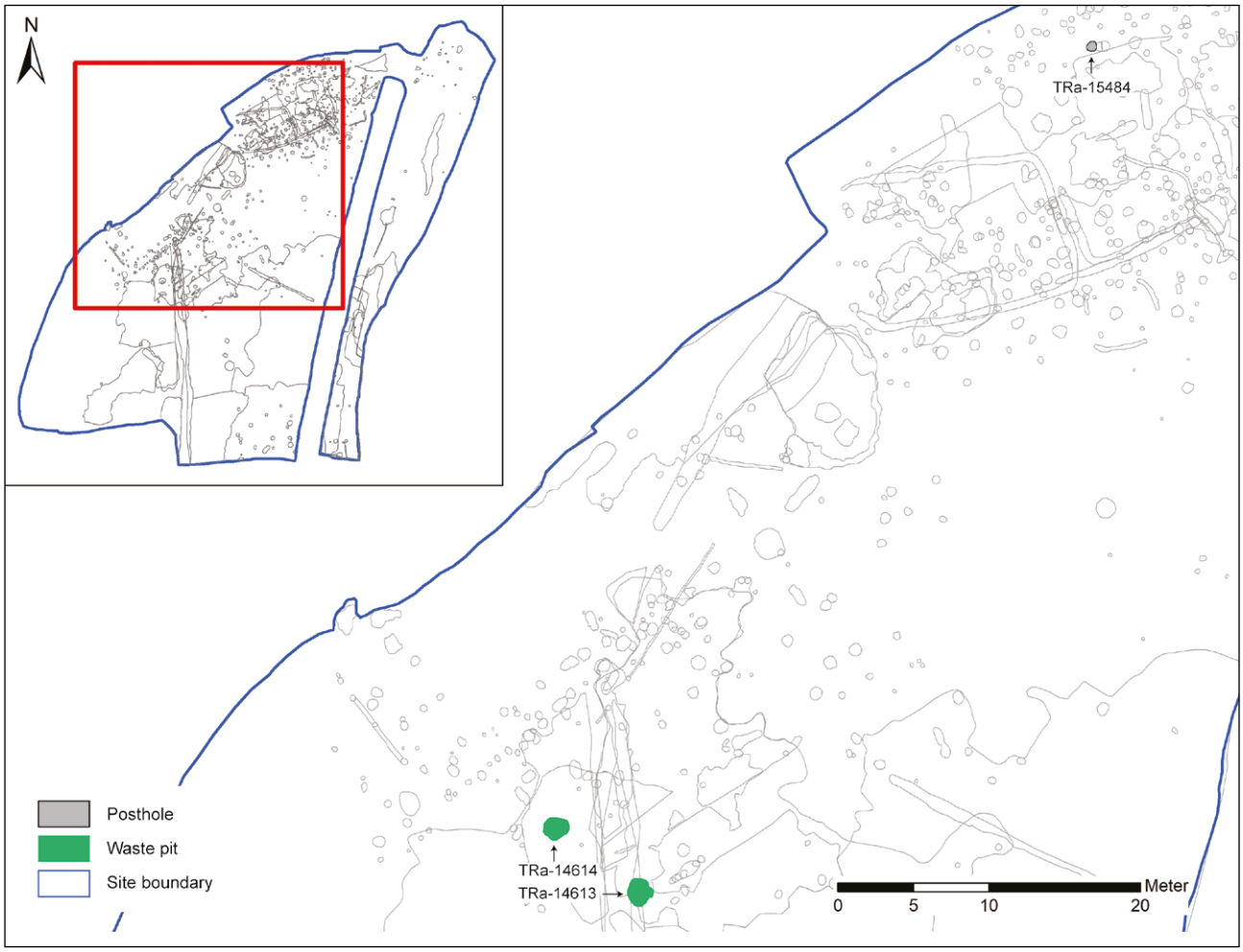


Figure 17. *Overview of archaeological features in phase 8. The ^{14}C dated features in this phase highlighted by the laboratory number. Illustration: Hanne Bryn, NTNU University Museum. Plan over bygninger og anlegg fra bosetningsfase 8.*

Phase 8: AD 1310–1350

After the end of phase 7 in the mid to late-13th century AD, there was a hiatus within the ^{14}C dates at Skeiet. The latest ^{14}C date from the cultural layer deposit was AD 1229–1274 (68%) and thereafter follows a period with seemingly low activity. However, two dates from waste pits indicated continued activity within the area in the 1300s, c. AD 1320–1406 (68%) (TRa-14614 and TRa-14613) (Fig. 17). The lack of building remains from this phase is evident. One single posthole was dated to AD 1323–1396 (68%) but could not be linked to any recognisable building structures. The modelling limits the end of activity in this phase to AD 1310–1350, whereafter no additional dates are recorded. This suggests a complete halt in the settlement activity at Skeiet in the mid-1300s.

DISCUSSION

The transition from the Early to Late Iron Age has been described as one of crisis (e.g., Myhre 1979, Gräslund & Price 2012), but over recent years, studies describe it as a series of complex events including social turmoil, cultural collapse and environmental oscillations. These upheavals are also visible in material culture, such as changed burial customs and artistic styles, as well as changed settlement patterns, and they reflect substantial changes in daily life such as economics and property rights (Hedeager 2011, Ystgaard 2014, Bukkemoen 2016, Gjerpe 2017, Grønnesby 2019, Solheim & Iversen 2019). The Migration Period three-aisled longhouse at Skeiet represents a multifunctional building tradition, which was a central feature in the Early Iron Age settlement and building organisation where all settlement and farming functions were organised under one single roof (e.g., Bukkemoen 2015, Henriksen & Bryn 2019, Løken 2020). However, at the beginning of the Late Iron Age at Skeiet the three-aisled longhouse was replaced by two smaller buildings: the single-aisled building 3, and the round building 101. These two structures belong to sequential phases, representing new influences within building traditions following the Early

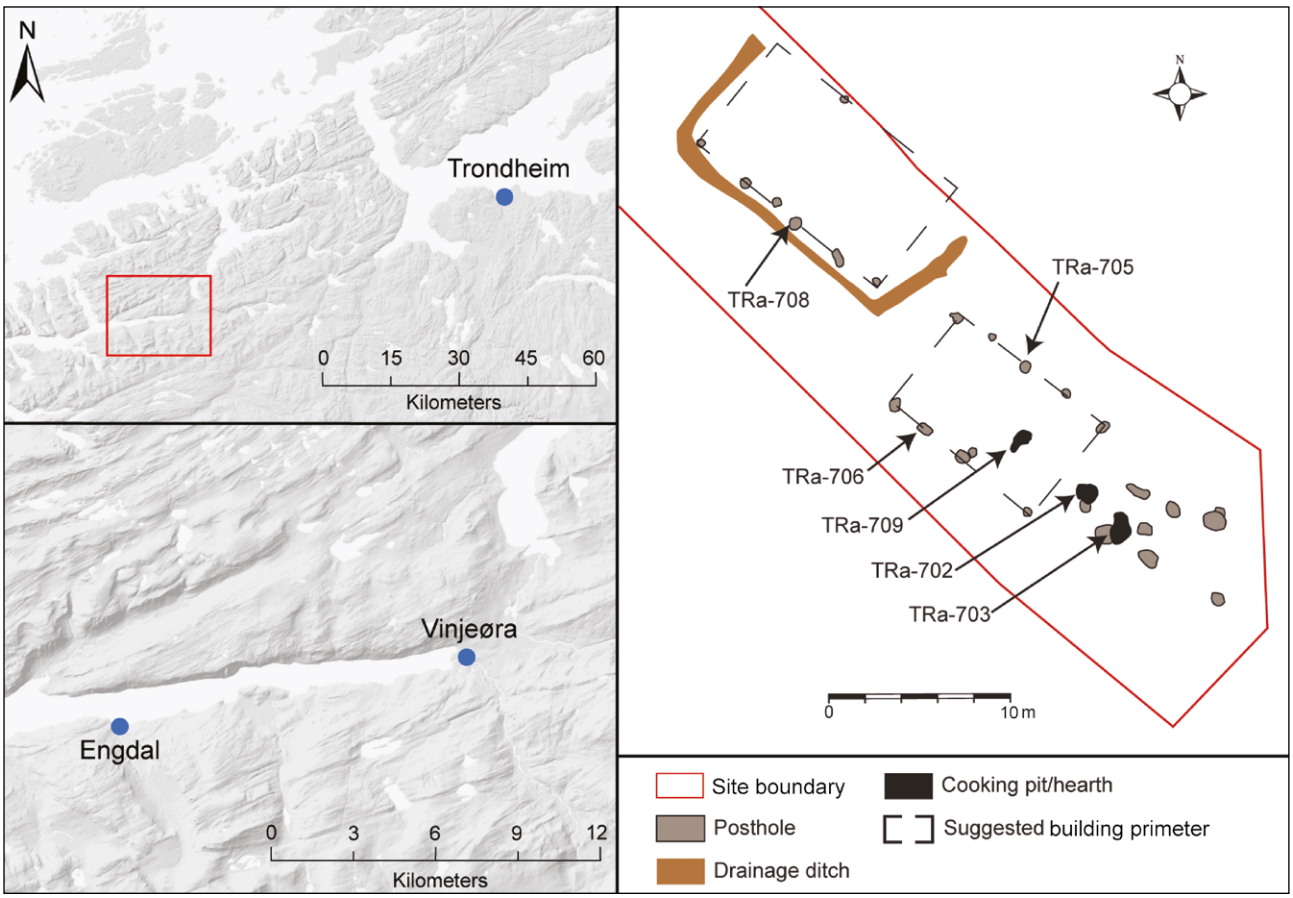


Figure 18. *Left: The location of the site at Engdal in relation to Vinjeøra along the Vinjefjord. Right: An overview of the excavated features on the site at Engdal and the interpretations of the buildings. [14]C dated features are marked by laboratory number. Illustration: Kristoffer R. Rantala and Raymond Sauvage, NTNU University Museum. Til venstre: Engdals beliggenhet; Til høyre: Plan over utgravde bygningsrester i Engdal.*

to Late Iron Age transition that are essentially different from the earlier three-aisled longhouse.

The development of the single-aisled constructions in the Late Iron Age is difficult to trace in Norwegian archaeological material as the number of excavated buildings of this type is limited. Sauvage & Mokkelbost (2016) counted a total of eight single-aisled buildings excavated in Central Norway, of which seven have been excavated since 2010. Since then, three more may be added: Engdal I and II (see below), and Byneset House 3 (Nygård 2010, Eidshaug & Sauvage 2018). All of these buildings have been ^{14}C dated to the Viking Age/medieval period. Building 3 at Skeiet may be an early occurrence of this type of construction which predates these examples. While the building was fragmented, it nevertheless represents some of the earliest evidence of single-aisled construction in Central Norway. The foundation of building 3 has a parallel in similar constructions in Central Norway, which display U-shaped outer ditches and a mixed inner posthole arrangement (Sauvage & Mokkelbost 2016, Figure 2). Building 3 at Skeiet can also be compared to the buildings excavated at Engdal (Nygård 2010, see Figure 18 below), just 13 km west of Skeiet. Here, two Late Iron Age buildings excavated in 2010 can be interpreted as single-aisled constructions, with in-ground, roof-bearing posts. Engdal I displays an outer ditch like building 3, which was ^{14}C dated to AD 776–945 (68%) (TRa-708, 1170 ± 30 BP) (Figure 19, Table 2). Even though this building was dated slightly later than building 3, it is similar in both shape and size. They also clearly differ from the three-aisled multifunctional longhouses of the Early Iron Age. Thus, these buildings are some of the earliest known examples of post-constructed single-aisled buildings in Central Norway. It is suggested that the transition from multifunctional longhouses to smaller, single-aisled buildings in the Vinjefjord region occurred during the early centuries of the Late Iron Age. This discovery pushes back the estimated timing of this shift in building traditions further than previously assumed (e.g. Skre 1996, Grindkåsa 2007, Sørheim 2005, 2015, Sauvage & Mokkelbost 2016).

From the end of the Merovingian Period and on into the Early Viking Age, the settlement activity at

Table 2. *^{14}C dates from Engdal.*

Overall context	Context	Lab. ID	Dated material	Date BP	Calibrated Age (68.2%)	Calibrated Age (95.4%)
	Cooking pit s 18	TRa-702	Charcoal, *Betula sp.*	1180 ± 30	AD 775–891	AD 771–973
	Cooking pit s 11	TRa-703	Charcoal, *Betula sp.*	1175 ± 30	AD 775–941	AD 772–973
House II	Posthole s 16	TRa-705	Charcoal, *Betula sp.*	1080 ± 30	AD 898–1017	AD 892–1023
House II	Posthole s 21	TRa-706	Charcoal, *Betula sp.*	1115 ± 30	AD 894–986	AD 775–1014
House I	Posthole s 28	TRa-708	Charcoal, *Betula sp.*	1170 ± 30	AD 776–945	AD 772–974
House II	Fireplace s 19	TRa-709	Charcoal, *Betula sp.*	1190 ± 30	AD 777–886	AD 709–952

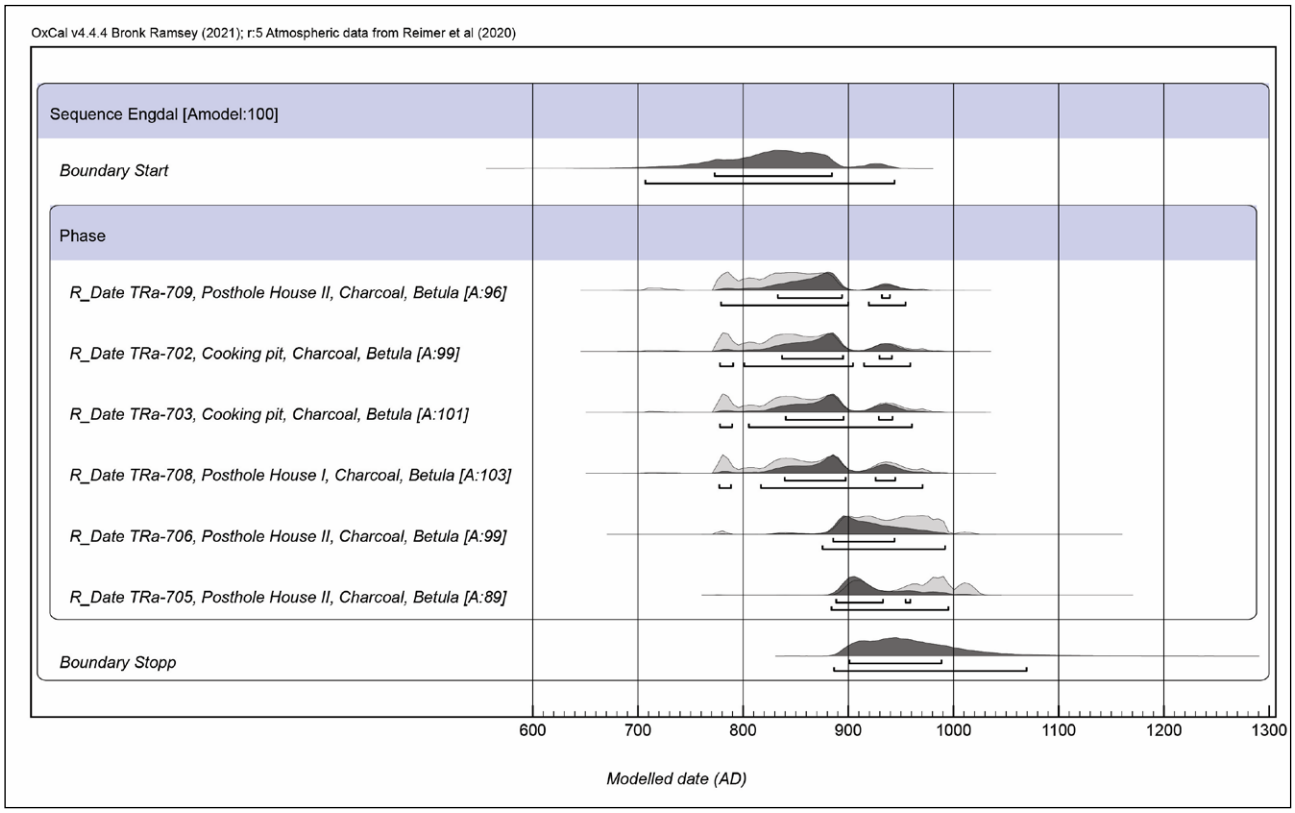


Figure 19. *Probability distributions of the ^{14}C dates from Engdal. Modell over ^{14}C-dateringer fra Engdal.*

Skeiet suggests a rather scattered pattern. Phase 3 only included the unusual small round building 101. There are no existing parallels to this construction in the material from Central Norway. However, two similar buildings have been excavated in Hundvåg in Rogaland (see Figure 20 Skeie XIX and Husabø House III) (Skare 1998, Aakvik 2000), which included similar circular ditches and four internal postholes. Based on the size, the presence of grains and the lack of a fireplace, one of the buildings is interpreted as being a possible storage for grain or hay. This is probably not the case for building 101 as it had an internal fireplace. This does not seem compatible with storage for grain and most certainly not for hay. In addition, the samples analysed from the postholes contained few macrofossils, leaving little evidence to interpret its function. The similarity in size and structure, however, suggests that we should understand building 101 as an indication of farm economic-related activity at Skeiet in this phase. The building does not indicate the function of a dwelling, but it confirms the presence of settlement activity nearby.

Phase 4 represents more solid and lasting buildings (buildings 4 and 6), that were built in the final years of the 800s and early 900s AD. Both were single-aisled constructions, and the largest (building 4) can be interpreted as a dwelling. The substantial postholes and the separation of the building into two separate compartments is a distinct feature. Since the internal posts were limited to only half of the building, indicating an interior construction in this part, it leaves the other half as an open common room. This architectural trait can be compared with similar buildings in Western Norway, where similar arrangements are

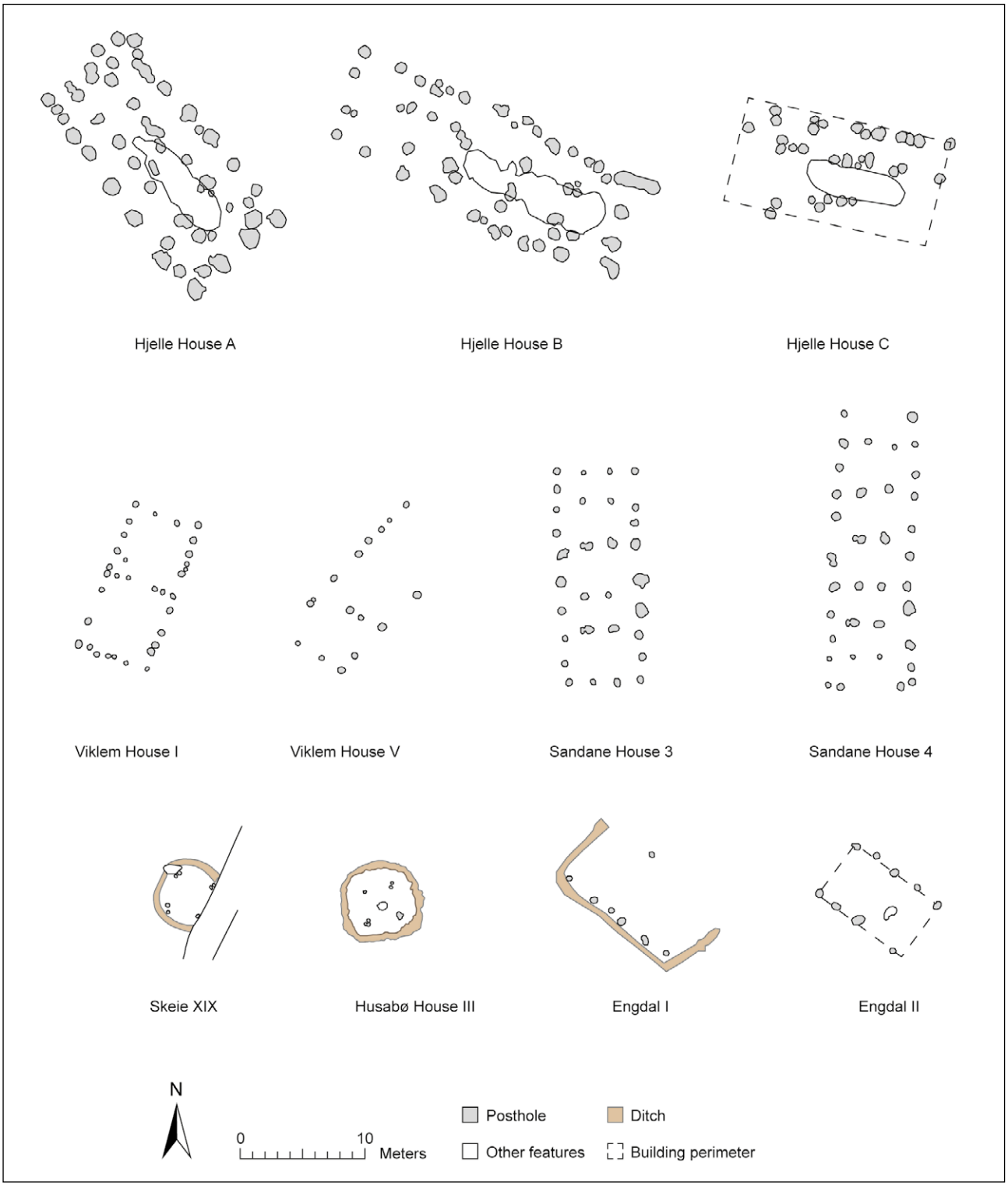


Figure 20. *Plans of all single-aisled, post-constructed buildings mentioned in the text. Illustration: Hanne Bryn, NTNU University Museum. Plan over enskipede stavkonstruerte bygninger som er nevnt i teksten.*

interpreted as supports for loft constructions (Olsen 2005, Olsen 2013). This suggests that building 4 had two differently functioning parts. In phase 5, this house was further developed into building 5 (Figure 14). This building also included two rooms but was of a greater size and had added hearths in both rooms; it can be interpreted as a dwelling and a construction type similar to Houses I and V (see Figure 20) on the high-status site at Viklem in Ørland dated to the same period (Sauvage & Mokkelbost 2016). This development may indicate increased status and wealth during the Viking Age and into the early medieval period at Skeiet. Building 5, as well as the subsequent buildings 1 and 7, entail that post-built constructions

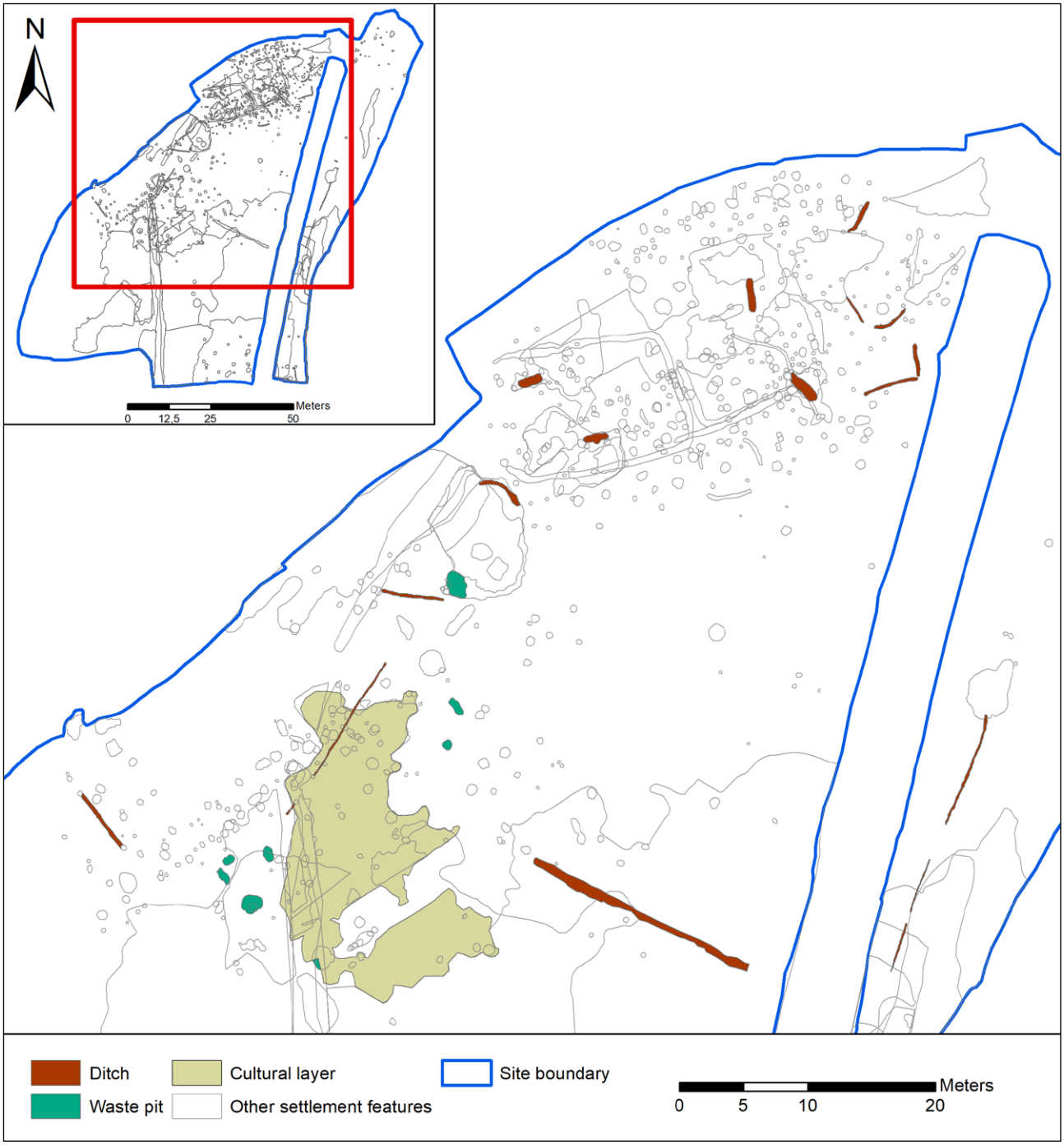


Figure 21. *Overview of short lengths of ditches recorded on site, as well as waste pits and the cultural layer deposit in the central parts of the site. Illustration: Hanne Bryn, NTNU University Museum. Plan over grøfter og avfallsgroper som ble funnet spredt på boplassen.*

continued at Skeiet for a long time, well into the medieval period. Sauvage & Mokkelbost (2016) argue that the presence of such two-roomed buildings indicates that medieval rural residences were not exclusively built using the cross-timber technique seen in medieval towns, but instead suggest that single-aisled post-in-ground constructions were still commonly used in rural areas. These observations contrast with the previous perception that post-constructed buildings were thought to have disappeared by AD 1000 at the latest (Helliksen 1997:146). However, due to recent excavations throughout Norway, an increasing number of post-in-ground constructions from the medieval period have been discovered (e.g. Diinhoff 2009, Reitan 2011, Kile-Vesik 2014, Fransson 2019, Hårstad 2023).

Following the Viking Period, the settlement at Skeiet is seen to continue to develop in the Early and High Middle Ages in phase 6, with the large building 1 and the smaller building 7. These buildings presented a slightly different orientation than the previous constructions. The solid drain surrounding

building 1 was a new phenomenon. Possibly, long-term occupation in the same place may have caused the accumulation of household and byre waste which resulted in a need to manage the conditions with a drain. Thus, the Early Middle Ages and Early High Middle Ages represents a continuity in settlement but also a slight reorganisation.

Larger buildings are absent in the data after phase 6. The only clear feature was the small building 100, dated to the 13th century (phase 7). It is doubtful that this construction represents a dwelling. On the other hand, habitation and agricultural activity is clearly represented in the form of cultural layer deposits and cooking pits. Continuity is also seen in the radiocarbon dates throughout this period, as there were no signs to indicate any breach in settlement activity (Figure 5). This indicates continued settlement activities, but perhaps in other formats than previously. These changes may be due to the introduction of new building techniques, such as the use of sills as a base for timber frames, or log constructions (e.g., Berg 1989:16, Weber 2002, Øye 2002:283, Olsen 2009, Sørheim 2009), which would leave few traces in the subsoil. However, other settlement features such as fireplaces can be preserved. Later mechanical tillage of the soils can also have had a negative impact on the stratigraphically younger settlement features, reducing the likelihood of recognition. As seen in Figure 21, several imprints and other short lengths of ditches were recorded in the settlement clusters, which could be remnants of continued farming and habitation. However, these features were difficult to interpret as they were incoherent. In addition, the stones found within the perimeter of building 1, shown in Figure 15, could represent a secondary rather than an internal construction, for example, as sills used to support a timber frame og log construction, perhaps representing reuse of the same plot. Furthermore, the cultural layer deposit dated to the 13th century is an indication of waste management related to settlement activity. The presence of these features indicates that buildings are likely to have been present during the High Middle Ages, but only in forms that left few traces behind.

From the mid-1200s the results suggest a decline in the settlement, coming to a definitive end in the mid-14th century (Figure 5). There is a hiatus within the ^{14}C dates in the mid-13th century following the demolition of building 100 at the end of phase 7. Palaeobotanical studies from local peat profiles near Skeiet indicate reforestation with pine in the 1300s, in contrast to the deforestation and cultivation implied in the previous period. This indicates that an open agricultural landscape during the Early and High Middle Ages was greatly reduced and transformed in the 1300s. An increase in Pinus woodland is also recorded regionally in this period (Overland & Hjelle Ch. 2). It seems reasonable to align these observations with the well-known agrarian and demographic crisis during the Late Middle Ages (including the Black Death) (see also Sauvage Ch. 1). Challenges such as fluctuations in climate in the 1200s AD (Lavigne et al. 2013, Thun & Svarva 2018, Stothers 2000), as well as the civil war era in the period AD 1130–1240 (Holmsen 1977:188ff), may be reflected in these data as well. The overall tendency of the ^{14}C dates from phase 8 is that they all fall within the same short period, as well as ending abruptly in the mid-1300s. This sudden end to the radiocarbon dates combined with the total silence thereafter is a strong indicator of a sudden end to the settlement at Skeiet no later than AD 1350, an event that coincides with the historically known outbreak of the plague – the Black Death – in Norway in 1348/49.

CONCLUSION

This paper aimed to explore the shifts in building traditions and settlement organisation at Skeiet, spanning from the Migration Period to the conclusion of the High Middle Ages. Given the scarcity of excavated sites from the Late Iron Age and medieval period in rural Central Norway, the study contributes fresh insights into settlement patterns and traditions over a 950-year period.

The three-aisled longhouse, prevalent in the final stages of the Migration Period, marked the culmination of a tradition featuring multifunctional longhouses. Following the transition from the Early to the Late Iron Age, a notable departure in tradition is observed. In the following phases, buildings 3 and 101 serve as examples of smaller buildings with a very different layout and construction. Although building 3 is interpreted to be single-aisled and building 101 being a four-post construction, they both represent a transitional style that anticipates the prevalence of single-aisled constructions during the later Viking Age (phases 4 and 5). The introduction of a secondary building for agricultural purposes (store, byre or something similar) and an area for metalworking situated away from the buildings, seen in phases 4 to 6, entails that the settlement in the Late Iron Age was organised in buildings and zones with dedicated functions. This is a contrast to the longhouse traditions, where most functions were organised within the same building. These findings suggest that the change in

building traditions and settlement organisation can be traced back to the Merovingian Period. While the transition from the Early to the Late Iron Age is often defined as a period of crisis, the evidence from Skeiet suggests altered settlement patterns and changes in building traditions rather than abandonment.

As architectural styles changed in the early part of the Late Iron Age, the main settlement area relocated from the central to the northern settlement cluster. The continuous occupation of this area through the Late Iron Age and into the medieval period aligns with a characteristic trait of rural Late Iron Age settlements. This trait involves the consistent use of the same area over extended periods, where new houses are repeatedly built on the same location (cf. Eriksen 2015:186ff).

The transition from the traditional three-aisled longhouse to the emergence of single-aisled constructions in the Late Iron Age challenges previously held assumptions about the timing of this architectural evolution. The early appearance of post-constructed single-aisled buildings at Skeiet and their continued use into the medieval period, along with early dates from single-aisled constructions in Engdal further along the Vinjefjord, hints at an earlier distribution of this building style in the Vinjefjord area than commonly acknowledged. This may be a bias caused by a lack of data elsewhere. However, it is possible to speculate that the strategic placement of these sites along the Vinjefjord, connecting to international trade and communication networks associated with the Norwegian coastal sea route (the *Norvegr*), possibly catalysed an early introduction. The finds from the burial ground at Skeiet are another indicator that the society had contact with the Western European area from the end of the Merovingian Period, demonstrated by the presence of trade indicators, such as insular jewellery (Maixner & Hellan Ch. 4, Sauvage & Lorentzen Ch. 5).

The continuity of in-ground post-constructed buildings and settlement activity into the Early and High Middle Ages at Skeiet is denoted by buildings 1 and 7. This phase also shows signs of a possible slight reorganisation and perhaps a need to handle moist conditions with a drain construction. In the 13th century, the post-in-ground technique continued to be present but only in the form of the small building 100. Though settlement activity continued on the site, it was not possible to trace additional buildings in the data. However, a build-up of cultural layers and the use of cooking pits entail that occupation continued on the site. However, the activity at Skeiet began to decline in the 13th century after building 100 was demolished. Still, the presence of waste pits and postholes in the last phases indicate a level of continued, yet limited, habitation or use of the area. No matter what caused settlement activity to decline in the 13th century, it can be inferred through the radiocarbon dating that the settlement ended abruptly in c. 1350 AD, suggesting that the Black Death came to Skeiet and ended the long-lived settlement.

Our understanding of settlements and their structures in rural areas from the Late Iron Age and the medieval period are still partly deficient, but as more excavations are conducted, the larger the base of comparison. The excavation at Skeiet has contributed to insights into changes in building traditions within the local area, as well as area usage, over a long period.

SAMMENDRAG

Utgravningene på gården Skeiet i Vinjeøra, Trøndelag resulterte i betydelige funn av bosetningsspor fra jernalder og middelalder. Det høye antallet bygninger som ble dokumentert samt lange tidsintervall bidro til ny kunnskap innenfor forskningen rundt byggetradisjon og bosettingsutvikling i distriktene i Midt-Norge. Artikkelen diskuterer endringer i byggetradisjon og organisering av bosettingen mellom 400–1350 e.Kr., og presenterer en detaljert kronologi og bosetningsutvikling i området gjennom århundrene, utviklet ved en detaljert strategi for innsamling av ^{14}C-prøver og Bayesiansk modellering. Resultatene viste til en endring i byggeskikk etter overgangen fra eldre til yngre jernalder på slutten av 600-tallet, med introduksjonen av enskipede konstruksjoner. Videre avdekket utgravningene at stolpebygde enskipede bygninger fortsatt var i bruk i høymiddelalderen. Nedgangen for bosetningen startet på midten av 1200-tallet før den kom til en definitiv slutt på midten av 1300-tallet, en begivenhet som sammenfalt med Svartedauden.

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APPENDIX

List of all ^{14}C dates

Appendix 1

^{14}C-results included in the model.

Context	Feature	Lab. ID	Dated material	Date BP	Calibrated Age (68.2%)	Calibrated Age (95.4%)
	Cooking pit 211678	TRa-14612	Charcoal, *Alnus sp.*	1655 ± 15	AD 403–424	AD 268–526
	Cooking pit STFK	BETA-432771	Charcoal, unspecified	1610 ± 30	AD 419–534	AD 413–542
	Cooking pit 205410	TRa-14609	Charcoal, *Dicotyledon*	1565 ± 15	AD 439–548	AD 433–560
Building 2	Posthole 214137	TRa-15482	Grain, *Hordeum Vulgare*	1610 ± 15	AD 421–531	AD 417–538
Building 2	Posthole 202688	TRa-15480	Nutshell, *Corylus*	1595 ± 15	AD 431–534	AD 425–538
Building 2	Posthole 200623	TRa-15478	Seed, *Prunus Padus*	1575 ± 15	AD 436–543	AD 432–547
Building 2	Cooking pit 214049	TRa-14638	Charcoal, *Alnus sp.*	1570 ± 15	AD 437–547	AD 432–551
Building 2	Posthole 200777	TRa-15477	Grain, *Hordeum Vulgare*	1555 ± 15	AD 441–561	AD 435–569
Building 2	Posthole 202739	TRa-15481	Nutshell, *Corylus*	1555 ± 10	AD 443–559	AD 436–568
Building 2	Posthole 202564	TRa-15479	Grain, *Hordeum Vulgare*	1540 ± 15	AD 539–569	AD 439–586
	Agricultural layer 205811	TRa-14464	Charcoal, *Betula sp.*	1540 ± 15	AD 539–569	AD 439–586
	Posthole 213666	TRa-16753	Grain, *Avena sativa*	1365 ± 15	AD 651–664	AD 646–671
	Cooking pit 207399	TRa-14611	Seeds, unspecified	1295 ± 15	AD 675–772	AD 666–775
	Cooking pit 205293	TRa-14610	Charcoal, *Salix/ Populus*	1275 ± 15	AD 682–767	AD 675–774
	Slag 214386	TRa-14640	Charcoal, *Pinus sp.*	1240 ± 15	AD 707–822	AD 686–876
	Ditch 217078	TRa-17554	Charcoal, *Betula sp.*	1225 ± 15	AD 787–871	AD 707–880
	Cooking pit 201741	TRa-14635	Charcoal, *Betula/ Alnus sp.*	1210 ± 15	AD 786–875	AD 783–880
	Cooking pit 217352	TRa-14632	Charcoal, *Betula sp.*	1115 ± 10	AD 895–977	AD 892–987
	Cooking pit 219924	TRa-14634	Charcoal, *Pinus sp.*	975 ± 10	AD 1028–1120	AD 1026–1151
Building 101	Posthole 203272	TRa-15533	Charcoal, *Betula sp.*	1595 ± 15	AD 431–534	AD 425–538
Building 101	Fireplace 203281	TRa-14624	Charcoal, *Pinus sp.*	1205 ± 15	AD 785–877	AD 782–881
Building 101	Posthole 213229	TRa-15534	Charcoal, *Betula sp.*	1200 ± 15	AD 783–880	AD 774–884
	Fireplace / charcoal filled feature 209167	TRa-14639	Charcoal, *Betula/ Alnus sp.*	1205 ± 15	AD 785–877	AD 782–881
	Fireplace 219843	TRa-14636	Charcoal, *Betula sp.*	1195 ± 15	AD 783–880	AD 774–885
	Posthole 204135	TRa-17557	Macrofossil, unspecified	1195 ± 15	AD 783–880	AD 774–885
Building 4	Posthole 201398	TRa-15495	*Seeds*	1155 ± 10	AD 777–949	AD 772–959
Building 4	Posthole 201760	TRa-15493	*Seeds*	1135 ± 10	AD 889–955	AD 885–976
Building 4	Posthole 203410	TRa-15490	*Seeds*	1130 ± 10	AD 882–971	AD 887–977

Context	Feature	Lab. ID	Dated material	Date BP	Calibrated Age (68.2%)	Calibrated Age (95.4%)
Building 4	Posthole 209751	TRa-15496	*Seeds*	1125 ± 15	AD 893–974	AD 887–986
Building 4	Posthole 201826	TRa-15492	Grain, *Hordeum Vulgare, seeds*	1105 ± 10	AD 898–988	AD 893–993
Building 4	Posthole 213387	TRa-15491	Grain, *Hordeum Vulgare var. nudum*	1095 ± 10	AD 900–992	AD 895–995
Building 6	Charcoal layer 217929	TRa-17553	Charcoal, *Alnus sp.*	1145 ± 15	AD 883–956	AD 773–977
Building 6	Posthole 203157	TRa-15487	Grain, *Hordeum Vulgare*	1115 ± 20	AD 895–978	AD 891–991
Building 6	Posthole 203091	TRa-15488	Grain, *Hordeum Vulgare var. nudum*	1115 ± 15	AD 895–977	AD 892–989
Building 6	Posthole 220192	TRa-15483	Grain, *Hordeum Vulgare var. vulgare*	1095 ± 10	AD 900–992	AD 895–995
	Cooking pit 203667	TRa-14628	Charcoal, *Betula sp.*	1160 ± 15	AD 775–949	AD 772–957
	Cooking pit 217277	TRa-14630	Charcoal, *Betula/ Alnus sp.*	1135 ± 15	AD 889–956	AD 881–979
	Posthole 210829	TRa-15486	Nutshell, *Corylus*	1135 ± 15	AD 889–956	AD 881–979
Building 5	Posthole 217767	TRa-15494	*Seeds*	985 ± 10	AD 1024–1113	AD 1021–1149
Building 5	Posthole 220063	TRa-17555	Charcoal, *Betula/ Alnus/ Corylus sp.*	955 ± 15	AD 1038–1149	AD 1031–1158
Building 5	Fireplace 203737	TRa-14627	Charcoal, *Pinus sp.*	950 ± 10	AD 1042–1150	AD 1035–1156
Building 5	Posthole 201154	TRa-15489	Nutshell, *Corylus* + *Seeds*	925 ± 15	AD 1047–1161	AD 1040–1165
Building 5	Fireplace 220194	TRa-15475	Charcoal, *Prunus/ Sorbus sp.*	920 ± 10	AD 1050–1161	AD 1045–1167
Forge	Slag from forge 216371	TRa-14642	Charcoal, *Pinus sp.*	920 ± 15	AD 1048–1163	AD 1041–1174
Forge	Forge 216371	TRa-14615	Charcoal, *Betula/ Alnus sp.*	915 ± 15	AD 1048–1165	AD 1044–1202
	Cooking pit 202972	TRa-14633	Charcoal, *Betula sp.*	970 ± 15	AD 1030–1146	AD 1026–1154
	Ditch 210572	TRa-14608	Charcoal, Dicotyledon	955 ± 10	AD 1039–1148	AD 1034–1153
	Waste pit 212425	TRa-14623	Charcoal, *Salix/ Populus sp.*	950 ± 20	AD 1040–1151	AD 1033–1158
	Cooking pit 202341	TRa-14603	Charcoal, *Betula sp.*	945 ± 15	AD 1043–1152	AD 1036–1158
Building 1	Charcoal layer 217340	TRa-14637	Charcoal, *Corylus/ Alnus sp.*	990 ± 15	AD 1022–1116	AD 996–1150
Building 1	Charcoal layer 217340	TRa-15476	Charcoal, *Betula sp.*	945 ± 10	AD 1043–1152	AD 1036–1158
Building 1	Ditch 211826	TRa-15897	Charcoal, *Alnus sp.*	935 ± 15	AD 1046–1157	AD 1040–1159
Building 1	Layer 209608	TRa-14629	Charcoal, *Betula/ Alnus sp.*	900 ± 15	AD 1053–1201	AD 1047–1216
Building 7	Posthole 203384	TRa-17556	Macrofossil, unspecified	1045 ± 20	AD 995–1021	AD 978–1030
Building 7	Posthole 217004	TRa-17552	Charcoal, *Betula sp.*	975 ± 15	AD 1028–1122	AD 1025–1152
Building 7	Posthole 218294	TRa-17551	Charcoal, *Betula sp.*	940 ± 15	AD 1044–1156	AD 1039–1158

Context	Feature	Lab. ID	Dated material	Date BP	Calibrated Age (68.2%)	Calibrated Age (95.4%)
	Cooking pit 215633	TRa-14625	Charcoal, *Betula sp.*	940 ± 15	AD 1044–1156	AD 1039–1158
	Agricultural layer 205682	TRa-15532	Charcoal, *Betula sp.*	915 ± 15	AD 1048–1165	AD 1044–1202
Building 100	Construction cut Posthole 213703	TRa-14622	Charcoal, *Betula sp.*	895 ± 15	AD 1054–1208	AD 1051–1217
Building 100	Construction cut Posthole 213638	TRa-14617	Charcoal, *Betula/ Alnus/ Corylus sp.*	875 ± 15	AD 1170–1211	AD 1160–1219
Building 100	Construction cut Posthole 213968	TRa-16752	Grain, *Avena sativa*	870 ± 15	AD 1176–1215	AD 1162–1219
Building 100	Construction cut Posthole 220174	TRa-16751	Grain, *Hordeum Vulgare var. nudum*	845 ± 15	AD 1178–1224	AD 1167–1258
Building 100	Posthole backfill 213666	TRa-14621	Charcoal, *Betula sp.*	850 ± 15	AD 1179–1222	AD 1164–1228
Building 100	Posthole backfill 220174	TRa-14616	Charcoal, *Betula sp.*	845 ± 15	AD 1178–1224	AD 1167–1258
Building 100	Posthole backfill 213968	TRa-14618	Charcoal, *Betula sp.*	810 ± 15	AD 1224–1260	AD 1220–1266
Building 100	Posthole backfill 213719	TRa-14619	Charcoal, *Betula sp./ Dicotyledon*	805 ± 15	AD 1226–1260	AD 1221–1268
	Cooking pit 215633	TRa-14626	Charcoal, *Betula sp.*	895 ± 15	AD 1054–1208	AD 1051–1217
	Posthole 210000	TRa-15485	Nutshell, *Corylus*	890 ± 20	AD 1158–1212	AD 1048–1220
	Cooking pit 202030	TRa-14604	Charcoal, *Dicotyledon*	870 ± 15	AD 1176–1215	AD 1162–1219
	Layer 213921	TRa-14620	Grain, *unspecified*	870 ± 15	AD 1176–1215	AD 1162–1219
	Cooking pit 202546	TRa-14605	Charcoal, *Betula sp.*	865 ± 15	AD 1176–1217	AD 1164–1220
	Layer 202214	TRa-14606	Nutshell, *Corylus*	805 ± 15	AD 1226–1260	AD 1221–1268
	Cultural layer STFK	BETA-432770	Charcoal, unspecified	780 ± 30	AD 1229–1274	AD 1219–1280
	Cultural layer 210901	TRa-14460	Charcoal, *Pinus sp.*	1115 ± 15	AD 895–977	AD 892–989
	Waste pit 215860	TRa-14614	Charcoal, *Betula sp.*	600 ± 15	AD 1320–1397	AD 1306–1401
	Posthole 217253	TRa-15484	Seeds, *Rubus idaeus*	595 ± 10	AD 1323–1396	AD 1317–1401
	Waste pit 216195	TRa-14613	Charcoal, *Betula sp.*	570 ± 15	AD 1328–1406	AD 1322–1410

Appendix 2: ^{14}C-results excluded from the model.

Overall Context	Context	Lab. ID	Dated material	Date BP	Calibrated Age (68.2%)	Calibrated Age (95.4%)
	Pit 202214	TRa-14607	Charcoal, *Dicotyledon*	5690 ± 20	4544–4462 BC	4590–4453 BC
Fenced pathway	Posthole 215796	TRa-17234	Charcoal, *Betula sp.*	1305 ± 10	AD 670–772	AD 665–774
Fenced pathway	Posthole 218783	TRa-17235	Charcoal, *Alnus sp.*	1155 ± 10	AD 777–949	AD 772–959
Fenced pathway	Posthole 203050	TRa-17236	Charcoal, *Alnus sp.*	1235 ± 10	AD 709–822	AD 705–873
	Charcoal layer 217929	TRa-14631	Grain, *unspecified*	1095 ± 15	AD 900–992	AD 893–995
	Slag 210174	TRa-14641	Charcoal, *Pinus sp.*	1030 ± 15	AD 995–1024	AD 993–1027

4. VIKING PERIOD TRADE AND COMMUNICATION IN THE VINJEFJORD AND HEMNFJORD AREAS, IN LIGHT OF TOPOGRAPHY, PLACE NAMES, SILVER COINS AND IMPORTED BEADS

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ABSTRACT

The 2019–2020 excavations in the Vinjefjord area in Trøndelag, Central Norway, yielded a diverse array of Viking Age imported objects. The location of the fjord, as a section of a transport route running parallel to the coastal sailing route, raises the question of the relationship between these two possible transport routes and the importance of the area covered by the E39 excavations in the Viking Age trade network. To answer these questions, we analysed the topographical situation, the occurrence of place names associated with trade and traffic, the occurrence of Viking Age coins as a means of payment and the imported bead types as a proxy for import finds in general. Our results show that there are many place names in the area that refer to harbours, small transshipment sites and assembly places. Overall, however, there is no clear evidence that the inner transport route played a role for long-distance traffic along the north-south axis, even though it may have been used sporadically through the changing of transport means. We interpret the punctual accumulation of imported beads and means of payment in Vinjeøra as a result of its location at the crossroads of land routes and the terminus of water-bound traffic. The area around Hemnfjord is clearly distinguished from its wider surroundings by its concentration of imported beads, which we interpret together with the hoard from Kyrksæterøra and various place names as an indication of an as-yet unidentified Viking Age trading centre located in the area. The range of bead types shows that this area had access to common types of imported beads from different parts of the Viking Age trade network throughout this period. The use of weighed silver as a means of payment from the 10th century onwards underlines the integration of the area in the Viking Age long-distance trade network.

Keywords: Maritime culture landscape; Middle Eastern beads; Weight economy; Viking marketplaces; Choice of transport routes; Viking Age coins; Kufic dirhams in Norway

INTRODUCTION

Excavations in the Vinjefjord area in 2019 and 2020 yielded rich finds in the form of Viking Age beads, jewellery and silver dirham coins, discovered as grave goods in the cemetery at Skeiet in Vinjeøra (see Sauvage Ch. 1, Sauvage & Lorentzen Ch. 5). A number of these objects bear witness to long-distance trade originating in other areas in Northern Europe and from faraway production areas in the Near and Far East. The majority of these objects must have been brought to the area via extensive transport and exchange of goods along the main coastal sailing route – *the Norvegr*. The Hemne region and Vinjeøra connect to this route via the long and narrow Vinjefjord towards Nordmøre, but also offer an alternative route through overland connections via the lake Rovatnet and Hemnfjord. It is possible that this situation created an optional, inner transport route, which may explain the influx of long-distance goods in the Hemne region in general and in Vinjeøra in particular, as seen at Skeiet.

Reference: Maixner, B., Masterud Hellan T. (2024). Viking Period Trade and Communication in the Vinjefjord and Hemnfjord Areas, in Light of Topography, Place Names, Silver Coins and Imported Beads. I R. Sauvage (Ed.), *From Life to Death in Iron Age and Medieval Vinjefjord* (pp. 113–128). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.218.ch4
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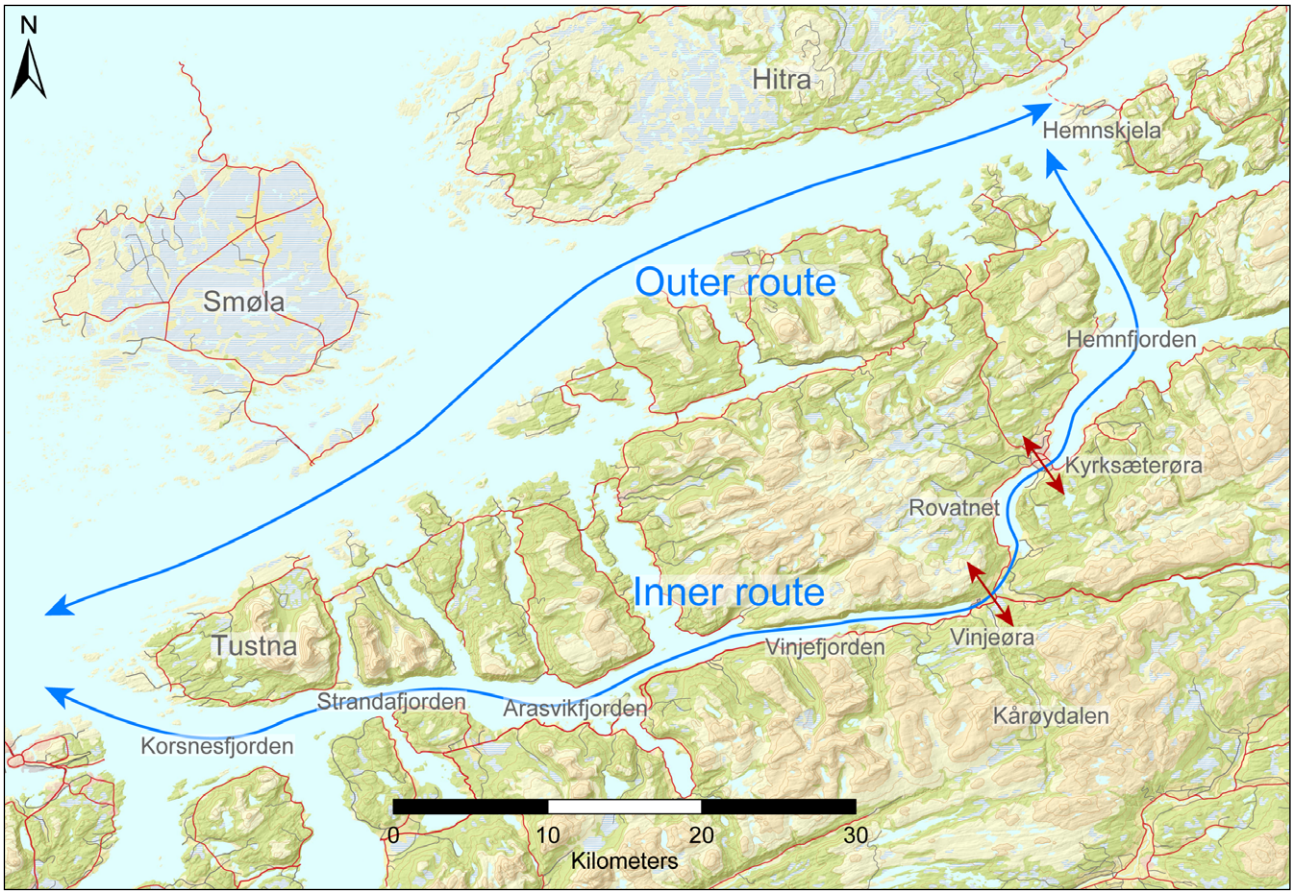

Figure 1. *Map of the surroundings of the E39 excavation. The course of the inner and outer routes and the isthmuses in present-day Vinjeøra and Kyrksæterøra are marked. By Kristoffer R. Rantala, NTNU University Museum. Omgivelsene til utgravingene langs E39 med markering av den indre og ytre leden.*

Although the exchange of goods over long distances and a dramatic increase in the volume of trade are generally seen as important characteristics of the Viking Age (Skre 2017:3), this does not mean that foreign goods were equally available in all settled places in the area covered by present-day Norway. Availability seems to have depended on the proximity to transport routes on the one hand and, on the other, a surplus of resources that could be exported. A characteristic of Viking Age transshipment and trading sites is that they were established on the borders of territories or where different trade routes or traffic areas intersected and required the transition from one means of transport to another (Sindbæk 2005). The turnover of goods at the trading places is in many cases reflected in the clustered occurrence of imported goods, hoards of silver and graves with balances and weights in their hinterland. The concentration of such finds in an area may, therefore, indirectly indicate the presence of an as-yet unidentified trading centre there (Stylegar 2009:73). Similarly, the distribution of glass beads can indirectly indicate the course of the trade routes (cf. Volkmann & Theune 2001:534, Maixner 2021a). Against this background, the question arises as to how the status of the Vinjefjord and Hemne region is to be evaluated on the basis of its import goods and means of payment in the Viking Age long-distance trade network, what conclusions can be drawn as to the extent of contacts and what the trade-related finds say about the importance of the Vinjefjord – Rovatnet – Hemnfjord traffic route leading through the area.

There are only a few written sources from the Viking Age that describe specific sailing routes. The most famous one is the travelogue of the 9th century north Norwegian chieftain Ottar, who describes his trading journey to southern Scandinavia along the Norwegian west coast (Lund 1983). But even Ottar's description of the journey does not go into detail and does not provide any information about the considerations or principles that determined the choice between alternative routes within an area. Such a choice existed on the Vinjefjord – Rovatnet – Hemnfjord route (referred to in the following as the 'inner route'), which alternated between water and land, and was an alternative transport route to the sailing route 30 km further north-west between the mainland coast and the offshore islands of Smøla and Hitra (referred to in the following as the 'outer route') (Figure 1).

The area, thus, offers a suitable case study to discuss how the occurrence of imported goods in an

area is to be interpreted, what conclusions it suggests about the economic position of an area in the Viking Age trade network and whether, in combination with other sources, it allows conclusions to be drawn about preferences with regard to transport routes. The following questions will be discussed in this chapter:

1. What was the role of the inner route in Viking Age trade and long-distance transport compared to the outer, continuously navigable, route along the coast?
2. How should the area be assessed within the Viking Age trade network and what level of Viking Age direct or indirect long-distance trade relations can be deduced from the imported goods?

To answer these questions, this chapter will follow a two-part methodological approach. The first two parts of the study take their starting point in methods of landscape archaeology: on the one hand, the analysis of the transport geography situation and, on the other, the mapping of place names associated with trade and transport. This approach should primarily contribute to answering the first question.

The third and fourth parts of the study take their starting point in an investigation of the occurrence of selected archaeological small finds, namely Viking Age coins and selected, demonstrably imported types of Viking Age beads, and are intended to contribute to answering both questions. Viking Age coins from different find contexts can provide clues to the course of trade routes and the location of trading places, as well as information about the monetary system used in an area at a particular time. Imported beads were chosen as a proxy for imported goods in general in the present study, as they represent a group of imported goods whose dating and provenance are well-researched. Thus, they can serve as reliable indicators of the extent of long-distance relations in an area.

MATERIAL AND METHODS

Two areas of different sizes were chosen for the study. The examination of the topographical situation and place names is limited to the immediate surroundings of the two alternative transport routes, the inner and outer routes. For the analysis of the occurrence of Viking Age coins and imported bead types, a larger study area (Figure 1) was chosen in order to provide a representative frame of reference for the assessment of their occurrence in quantitative terms. Although the recent excavations themselves, as an intensive archaeological operation, undoubtedly influence the representativeness of the archaeological find material, it can be assumed that the factors that affect the occurrence of the archaeological source material outside the excavation areas do not show any conspicuous variations within the study area. Thus, most of the archaeological finds are chance finds, either made in the course of agricultural activity or by private individuals, whereas private metal detector finds have not played a significant role in the area so far.

The topographical situation

Vinjefjord represents the central section of the inner sailing route, which runs parallel south of the coastal sailing route (outer route) around the islands of Smøla and Hitra (Figure 1). In the area where the islands of Smøla and Hitra are located, the fjord thus represents an alternative route section to the important trade route of *Norvegr*, which ran along the coast of Norway and was used for the exchange of goods between southern Scandinavia and Arctic Norway (cf. Baug et al. 2019:49). While ships sailing along the outer route are more exposed to wind and waves, sailing on the inner route via Vinjefjord and the lake Rovatnet is much more protected. In winter, transport across the lake could also proceed over the ice. However, in contrast to the outer route, there are two isthmuses to cross on the inner route, one of which is 5 km wide and the other is 1.7 km wide, in Vinjeøra and Kyrksæterøra respectively. The topographical situation at these points would force a change of transport and a reloading of goods. Traditionally, it was at such transitions between different transport systems that marketplaces and trading places were established in the Viking Age (cf. Sindbæk 2005).

Although the routes described represented alternative transport routes with different advantages and disadvantages, there were a number of passages between them in the form of transverse sounds which, at the same time, offered the possibility of landing in shallow bays at several points.

In addition to the favourable landing sites mentioned above on the transverse sounds between the inner and outer routes, there were countless small bays along the routes which offered good opportunities for landing Viking ships with their shallow draughts. As a rule, these bays also offered good conditions for agriculture due to the presence of fertile marine and river deposits. Place names and archaeological sources indicate the presence of agricultural settlements in these settlement chambers, from which an overall, relatively evenly scattered rural settlement can be deduced for the study area.

The isthmus in today's Vinjeøra was not only an important crossing point on the inner route but also a junction for land routes leading south and east. In

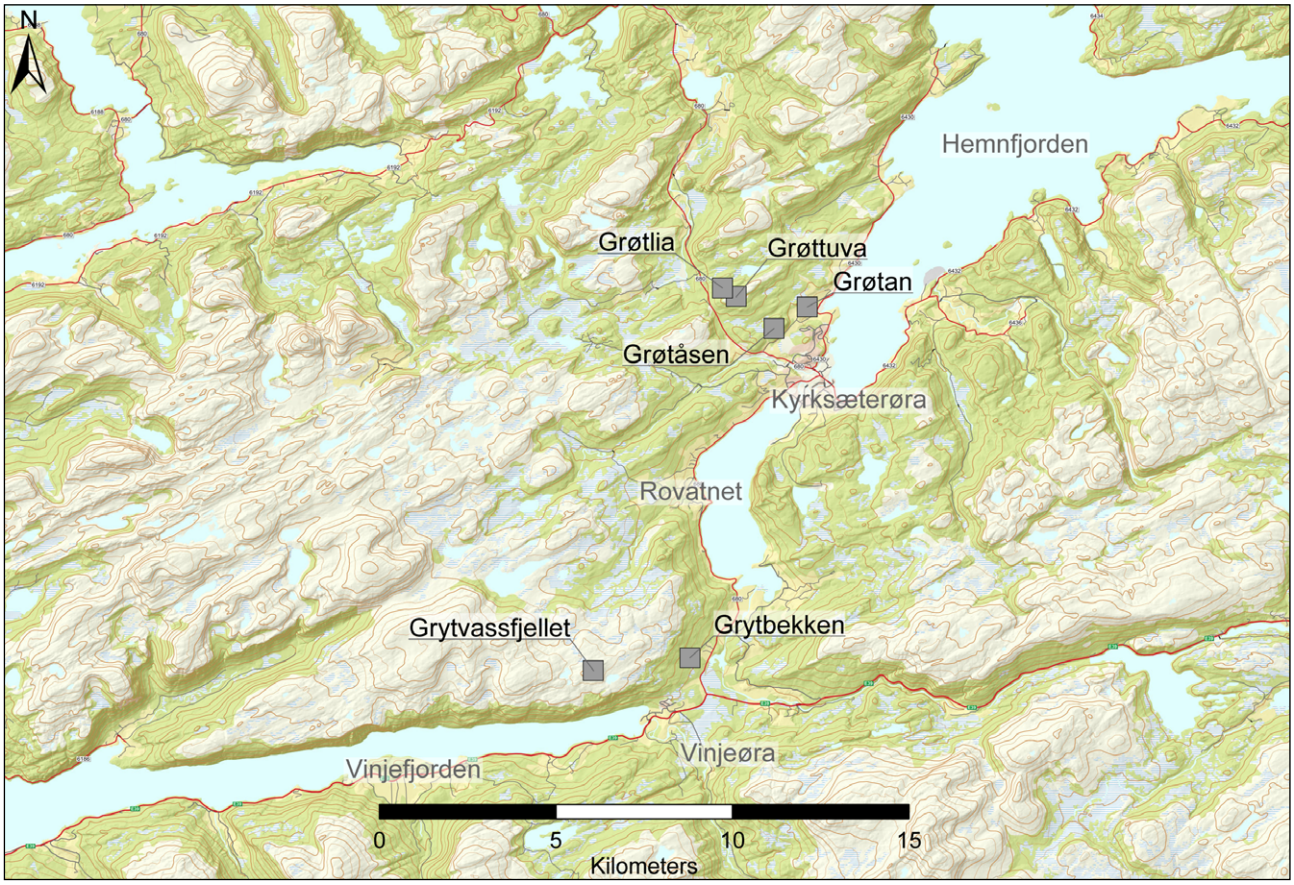

Figure 2. *Place names containing gryt and grøt in the surroundings of present-day Vinjeøra and Kyrksæterøra. By Kristoffer R. Rantala, NTNU University Museum. Stedsnavn med på gryt og grøt.*

one direction, there was the southbound valley of Kårøydalen, which connected Rindal, Trollheimen and Orkdalen, and in the other direction, there was a route leading east towards today's Orkanger on Trondheimsfjord, which may have been attractive primarily as a winter route due to the long boggy sections. Vinjeøra was supplied with fresh water by the river Fjelna, just as Kyrksæteøra was supplied with fresh water by two rivers and the lake Rovatnet.

Little evidence exists so far as to whether and to what extent classic Viking Period export goods from the exploitation of outfield resources, such as iron, antler, hides, soapstone and whetstones (cf. Skre 2017:8), were exploited in the vicinity of Vinjefjord. The area lies outside the Støren Nappe belt, which Baug et al. (2019) were able to prove was the area of origin of the dark grey whetstones of the Viking Age. The hinterland of the E39 excavations also lacks evidence of iron extraction, in contrast to neighbouring areas such as the hinterland of the Orkla and Gaula river valleys further east (cf. Stenvik 2015:88–89). Isolated pitfalls and catching installations of unknown date are known from the hinterland of the inner route, including a catching installation for wild reindeer 12 km southeast of Vinjeøra (cf. Væge 2015). Maixner (2021b) has argued that place names with the prefix *grøt* and *gryt* may be indications of soapstone quarries. Close to Vinjeøra and also Kyrksæterøra, there are several places with such names (Figure 2). Among these is a farm, Grøtan, which is located north of Kyrksæterøra. It is possible that the exploitation or trade of local natural stone played a central role in the economy of this farm and influenced its name. Further research is needed to determine whether these place names do indeed denote local stone deposits that were in demand.

The place name evidence

Christer Westerdahl's innovative works on maritime cultural landscapes are a solid foundation for studying prehistoric maritime transport based on the distribution of prehistoric place names (Westerdahl 1989, 1992). In this interdisciplinary and multi-period approach, place names including harbour names and names indicating ship types and installations under water are of central importance. Other studies have focused on selected place names, such as names referring to prehistoric harbours and marketplaces (*-bjark*, *-torg*, *-la*/*-lahelle*, *-kaupang*) (Helle & Nedkvitne 1977), ship-type names such as names containing

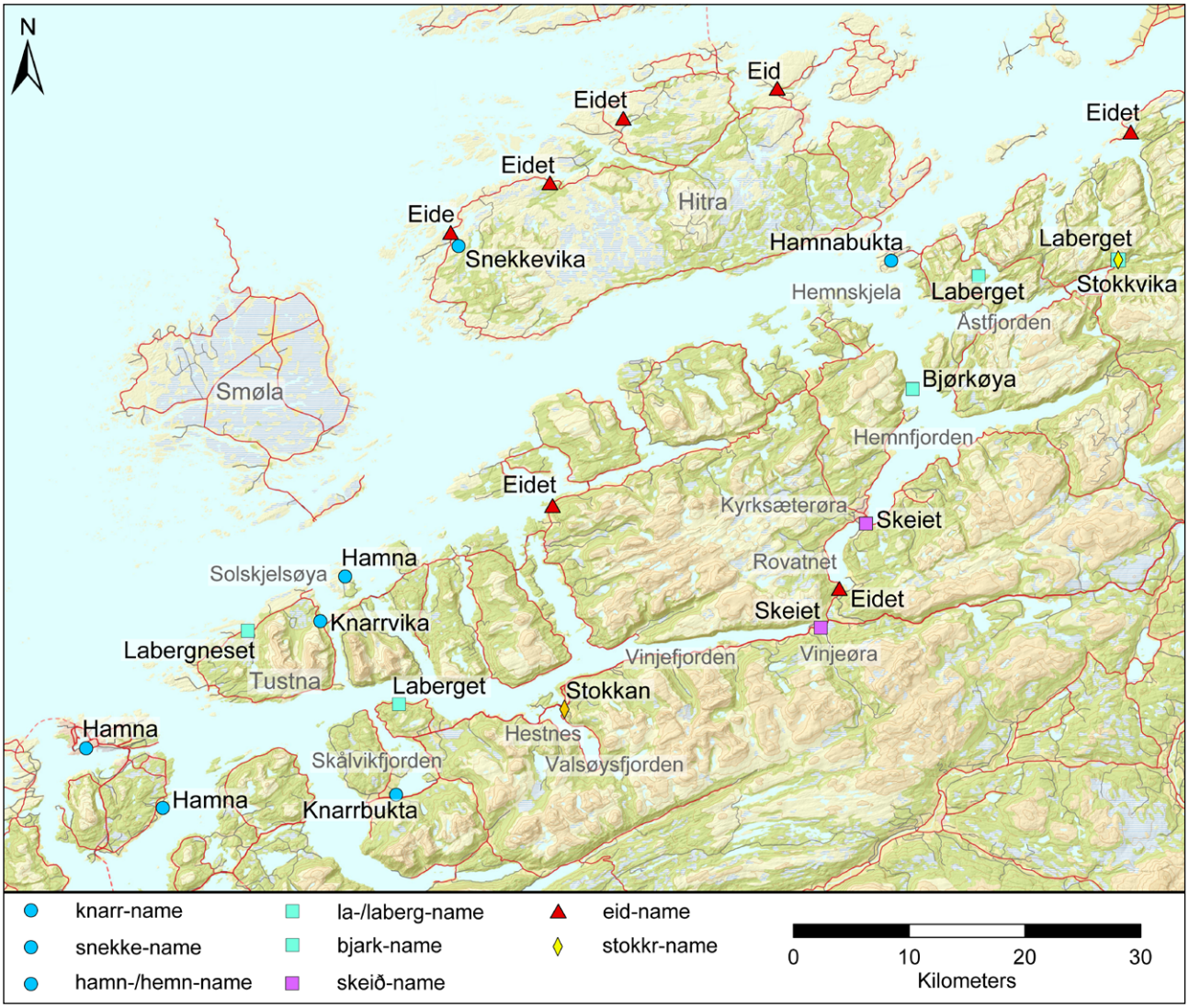

Figure 3. *Distribution of selected place names of assumed early medieval origin referring to harbours/landing places, markets/assembly places, isthmuses and possible underwater barriers. By Kristoffer R. Rantala, NTNU University Museum. Utvalgte stedsnavn som kan vise til havner, handelsplasser, eider, seilsperringer og omlastingsplasser.*

snekke, and names alluding to a warship or *leiðangr*-ship (Holmberg 1991:237, Holmberg & Skamby Madsen 1998). How promising the application of these established place names is for the reconstruction of prehistoric maritime cultural landscapes in Norway has been demonstrated by Stylegar & Grimm (2002) on the basis of a number of case studies.

There are a number of place names in the study area that can provide clues as to how the maritime transport landscape was organised, what the transport routes were, and what functions were linked to transport (Figure 3).

One group of these names refers to harbours and landing sites. These are names whose designation directly contains the element *hamn/hemn* meaning 'harbour'. The place name Hamna is found on the island of Solskjelsøya, which lies on the outer route. In addition, such elements are found in several place names at the mouth of Hemnfjord and in the name of the fjord itself, the island Hemnskjela and in the place names Hamn, Hamnaholmen and Hamnabukta, which are grouped around a natural harbour. Names containing *hamn/hemn* appear to be primarily located along the outer route, but are also found at transition points between the inner and outer routes.

In addition, there are place names that indirectly refer to harbours and landing places by being named after particular types of ships. Place names containing the element *knarr* belong to this subgroup. Originally, this element denoted a warship, but in the time period around the year 1000 it referred to a merchant ship (Stylegar & Grimm 2002:82). There are three such place names in the study area: Knarrvika (*vika* = 'bay') on the passage from the aforementioned harbour island of Solskjelsøya to the inner route, and Knarrbukta (*bukta* = 'bay') on Skålvikfjord, located on

the opposite side of the inner route. The third such place name, Knarrlagsund, refers to a sound between two islands north-east of the island of Hitra on the outer route.

While harbours and landing sites represent a beneficial infrastructure for maritime traffic, it is debated whether place names derived from the words *sperre* (meaning 'beam' or 'log') or *stokkr* (meaning 'log' or 'lumber') can indicate underwater barriers and, thus, obstacles to maritime navigation (Stylegar & Grimm 2002). In the study area, a concentration of related place names derived from *stokkr* is found along the inner route at one of the entrances to Valsøyfjord, near the Hestnes excavation site (see Sauvage Ch. 1). These include the farm name Stokkan (Stokke), the name of the bay Stokkbukta and the name of the sound Stokksund. Stokkbukta forms a protected natural harbour with two entrances, each 200 m wide. Closing off one of its entrances would prevent entry into the harbour from that side, but would also enhance the protection of the harbour. The second place in the study area where such a place name is found is Stokkvika, at the inner end of Åstfjord which is a branch of Hemnfjord.

Another group of place names might indicate markets and loading places. These are place names containing the element *la/laberg*. Particularly frequent are compositions containing *lada/hlada* (meaning 'loading') and *helle/berg* (meaning 'solid rock'), which probably denote cargo-loading places, harbours and landing-places in the Viking Age (Grieg 1969). There are four place names in the study area which contain the element *la/laberg*. Only one of them, Labergneset on the western tip of Tustna island, is located on the outer route. The other three, which are all named Laberget, are located on the inner route or on small fjord arms branching off it.

A very interesting place name which may indicate a market and trading function is the name of the island of Bjørkøya, which is approximately 20 hectares in size and is centrally located in Hemnfjord. The prefix *bjark* in island names is thought to refer to islands where markets were held (Hagland & Sandnes 1997:xii). The best-known example is the Viking trading place of Birka on the island of Björko in the Mälaren region of Sweden (Ambrosiani 1995).

Finally, place names with the element *skeið* may indicate multifunctional regional gathering places, among which the market function was obviously a central one (Loftsgarden et al. 2017, Loftsgarden 2023). The only two *skeið* names in the study area, both named Skeiet, are located on the two previously mentioned isthmuses on the inner route, in the present-day villages of Vinjeøra and Kyrksæterøra. The fact that there was an isthmus to cross in Vinjeøra is also reflected in the place name Eidet (*eid* = 'isthmus'), found on the southern shore of the lake Rovatnet. Place names containing *eid* are very common in Norway and are, in some cases, combined with the element *drag* (*dra* = 'drag'), referring to isthmuses where boats were pulled over land (cf. Stylegar & Grimm 2002:109). A number of *thing* (assembly) sites in northern Europe are located on isthmuses where they were easily accessible from several directions, and several of the known *thing* sites have place names containing *eid* (Sanmark 2017:129–130, 209–217, 239, Semple et al. 2021:108, 112, 263).

The silver coins

Viking Age coins from different find contexts can provide clues to the course of trade routes and the location of trading places, as well as information about the monetary system used in an area at a particular time. Such finds are available from three find contexts in the immediate study area, which are to be regarded as the results of different social practices at the time of their deposition (Figure 4). These contexts are located in a cluster in the inner Vinjefjord and Hemnfjord areas, while the map also show four stray finds of Viking Age coins, all more than 50 km away and mostly relevant to show the sparsity of such finds in these surroundings.

On the Continent and in Western Europe, royal mints have been in existence since the 6th century and coins were used as a means of payment (Grierson 1991:9–49). The oldest Norwegian coinage is attributed to the reign of Olav Tryggvason (AD 995–999), but it took another 50 years before Harald Hardrada (AD 1046–1066) established a national coinage with a considerable economic impact (Skaare 1976:58–107, Gullbekk 2009:29–31). The coinages were based on silver, an element people would have been familiar with. In Scandinavia, the use of weighed chopped silver coins and crushed silver jewellery as a means of payment had gradually established itself in connection with long-distance trade from the 9th century onwards, starting in the towns (Skre 2008).

An important source of silver for the Viking bullion economy was the large quantity of Islamic coins which came to Scandinavia from the east through Russia and Eastern Europe. These coins, also referred to as Kufic dirhams, originally came from Islamic-controlled areas in North Africa, the Middle East and Central Asia. The term Kufic reflects the style of calligraphy used on the coins, which was developed in the city of Kufa in today's Iraq. The oldest

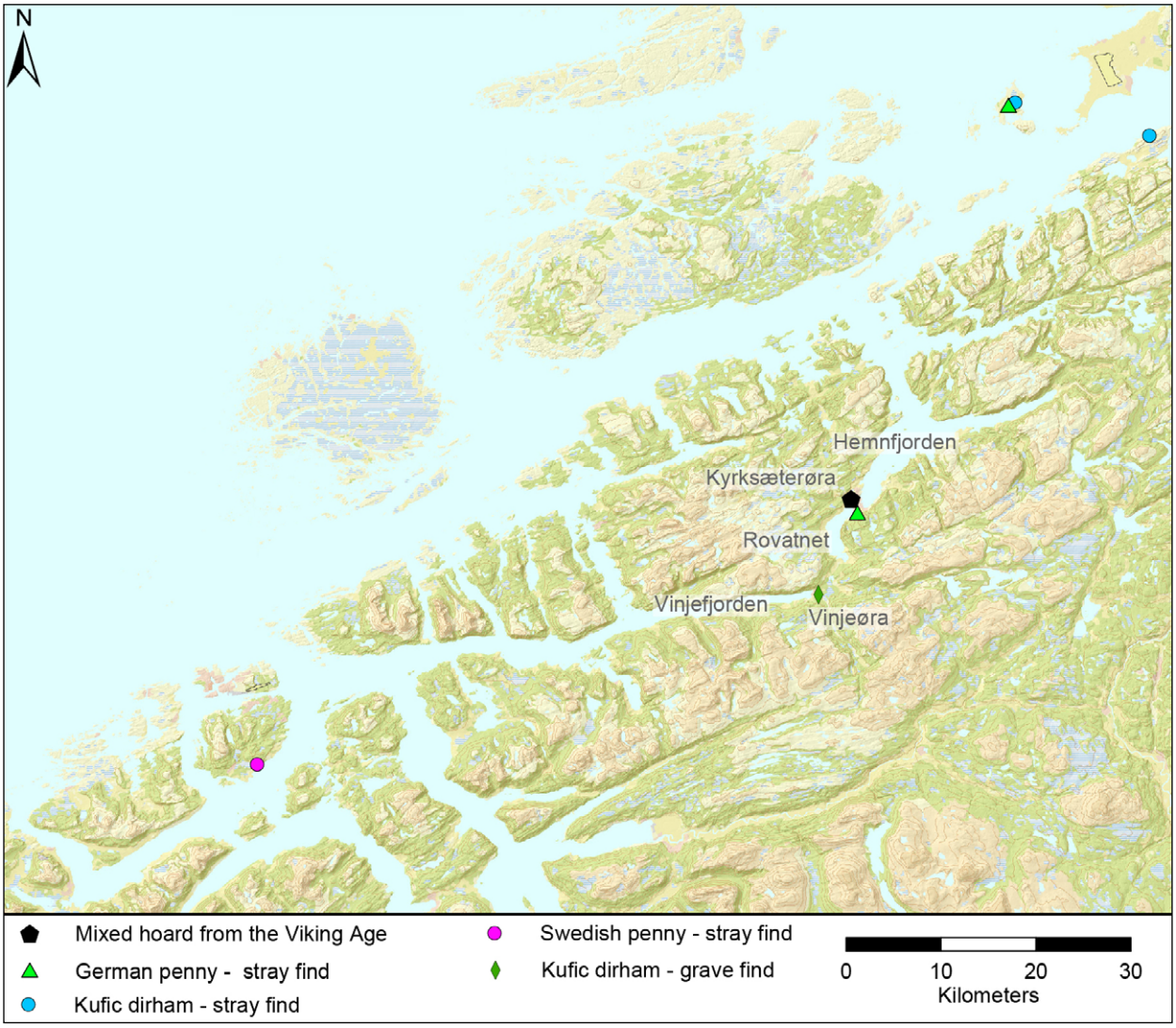

Figure 4. *Distribution of Viking Age coins. By Kristoffer R. Rantala, NTNU University Museum. Utbredelse av mynt fra vikingtid.*

of the Kufic dirhams were minted in the Umayyad Caliphate in c. AD 698. This was succeeded by the Abbasid Caliphate in AD 750. Samanid dirhams were minted under the Samanid emirs in Central Asia and dominated the flow of silver coins into the Baltic area and Scandinavia from the east in the 10th century. Besides Islamic coins, Frankish deniers and German and Anglo-Saxon pennies were also used in the Viking bullion economy.

The oldest of the find contexts in the study area is also the most recently discovered. This is an organic container made of leather and animal fibres that was part of the grave goods in Skeiet Grave 16 (T28282) in Vinjeøra (see also Sauvage & Lorentzen Ch. 5). The container may be interpreted as the buried person's purse. Presumably it had been a fur-lined leather pouch and it contained 42 Kufic coins/coin fragments and 4 other pieces of silver (Figure 5). The coins consisted of 6 whole dirhams corroded to varying degrees, as well as 36 fragments that were cut/divided or just fragmentised. Except for a couple of uncertain fragments, all the minted silver consisted of dirhams or possibly imitations thereof, although no imitations have been identified as yet. Twenty-two specimens have been identified beyond merely being dirhams; the period of their minting covers a time span of at least 160 years, with the oldest dating from the period AD 698–702 (T28282: 18) and the youngest one with a certain date from AD 863/864 (T28282: 8). The identified specimens are spread quite evenly throughout this time period. Seventeen of them are Abbasid, while 5 are Umayyad and older than AD 750. This number is relatively high, representing almost 23% of the identified coins. In Norway as a whole, the percentage of pre-AD 750 Umayyad dirhams was c. 2.3% as of 2001 (Khazaei 2001:61–65).

Most of the coins in Skeiet Grave 16 have nick marks, presumably for testing the silver quality, and/or have been subject to bending and cutting or dividing. Only three fragments among the 42 coins show

Figure 5. *The silver coins and non-numismatic silver from Skeiet Grave 16. Scale reference: 5 cm. Photo: Åge Hojem, NTNU University Museum. Sølvmynter og sølv fra Grav 16 på Skeiet.*

no indication of secondary treatment. As they were found in an undisturbed context, it seems reasonable to assume that they were divided before they were deposited. Of the non-numismatic artefacts in the assemblage, there is a probable example of melted silver bullion (T28282: 51), a couple of pieces of hacksilver (T28282: 49, 50) and a small rivet (T28282: 48). Although coins were occasionally used as jewellery in the late Iron Age, none of the specimens have traces of piercing for this use, and the rivet seems slightly too big to be an attachment for a loop for this use. The deposit bears all the indications of a treasure, where the value lies in the weight of the silver rather than in the nominal value of the coins themselves. The total weight of the silver today is slightly above 36 g in total.

When were the coins deposited? As mentioned, the youngest dated specimen was minted in AD 863/864, but there are also 20 coins that are undated. A reasonable assumption would be that most of these also fall within the same time span as the dated specimens. As the composition of the deposit shows, with at least 5 of the coins being dated before AD 750, Kufic dirhams on their own are not very useful in giving precise dates of deposition; perhaps even less so when they are found several thousand kilometres from their intended sphere of circulation. Based on the ^{14}C date from an axe shaft and typological dates from the grave goods, the construction of the grave is dated to the first half of the 10th century (Sauvage & Lorentzen Ch. 5). The absence of Samanid dirhams, which made their first impact in Scandinavia in the same time period (Kilger 2008:235–250), supports this interpretation. The rest of the grave goods consisted of both weapons and equipment, but it should be mentioned that a single lead weight was also found, another indication of the weighing and use of silver.

Another find context with Viking Age silver coins from the study area is a coin hoard from Kyrksæterøra, located 10 km north-west of Vinjeøra, which was found during farm work on the farm Vesse/Vitsø in 1843. The hoard consisted of both whole coins, coin fragments and hacksilver. Due to its content of fragmented coins and hacksilver, the hoard should be regarded as a product of the Viking bullion economy. The exact composition of the hoard is somewhat unclear at present, but it seems to have consisted of at least 44 coins and must have been deposited in the early 11th century (Hartmann & Petersen 1918:21, Screen 2013:22, Skaare 1976:163–164). It consisted of mainly German and Anglo-Saxon coins, although it included at least one dirham. The exact specimen can no longer be identified in the collections, but it has been published as both Abbasid, AD 767/768 (Hartmann & Petersen 1918:21) and Samanid c. AD 922 (Skaare 1976:163–164), a confusion of coin types that seems unlikely. Kufic dirhams in small numbers are not uncommon in larger hoards from the 11th century consisting of mostly newer German and Anglo-Saxon coins (cf. Skaare 1976:22–23) and, regardless, the oldest coin in the find is not that important in this respect since the dating of the hoard must be based on the most recent one.

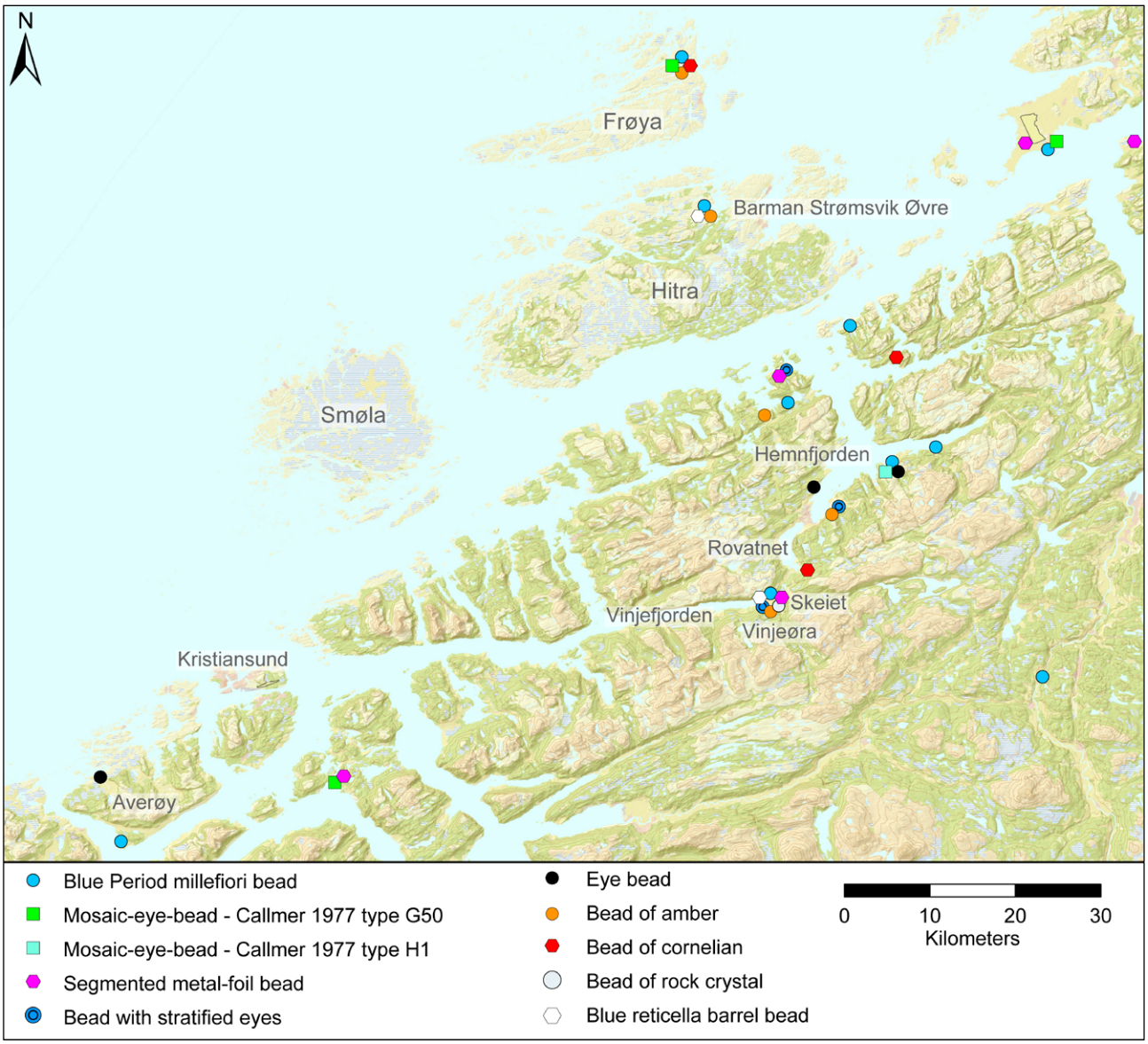

Figure 6. *Distribution of selected imported bead types. Blue Period millefiori beads: T22216/7, T28479/5–10, T17512, T15313/c, T8510, T17738/b, T3369, T14732/a, T15472, T19884, T12645. Mosaic-eye beads: T16093, T15313/c, T17738/b, T13191. Beads with stratified eyes: T28279/3, T2997, T4087. Segmented metal-foil beads: T28276/9, T28478/1, T13191, T2462, T2997, T17679/c, T13033/b. Eye beads: T18843, T17252, T15492. Carnelian beads: T1018, T15313/c, T1016. Rock crystal beads: T28479/2–4. Beads of amber: T28189/16, T28276/4–8, T15313/c, T8920, T12124/b, T4087. Blue reticella barrel beads: T28189/10, T8920. By Kristoffer R. Rantala, NTNU University Museum. Utbredelse av utvalgte typer importerte perler.*

The third find context with Viking Age silver coins from the study area also hails from Kyrksæterøra and is of a similarly late date. This is a stray find of a single German Otto-Adelheid pfennig (T26657) from the end of the 10th century or first half of the 11th, found with a metal detector next to a farm also called Skeiet. Since the coin is not intentionally cut and is pierced, it is probable that it ended its circulation not as a means of payment in the Viking bullion economy but rather as a decorative pendant.

The imported beads

To further answer the question of the relationship of the two alternative routes to each other and to be able to evaluate the extent of long-distance trade contacts (cf. Volkmann & Theune 2001:534, Maixner 2021a), we have selected nine common types of beads from the study area, represented by a total of 81 individual beads. Although specific production sites are only known for a very few of the bead types from the Viking Age find contexts in Scandinavia (for a recent overview, cf. Zimmermann 2013), Johan Callmer has identified approximate areas of origin for many of the most common Viking Age beads. Essentially, these are from Scandinavia or the Middle East (cf. Callmer 1977, 1997, 2003). For a few types of beads, a provenance from the British Isles is also discussed. On this background, we have selected the

Figure 7. *Different types of imported beads mentioned in the text. 1. Blue Period millefiori bead from Volden, Heim, Trøndelag (T15472); 2–3. Mosaic-eye beads from Venna, Heim, Trøndelag (T16093) and Enset, Tingvoll, Møre og Romsdal (T13191:2); 4. Bead with stratified eyes from Skeiet, Heim, Trøndelag (T28279/3); 5. Segmented metal-foil bead from Skeiet, Heim, Trøndelag (T28478/1); 6–7. Eye beads from Berg, Heim, Trøndelag (T17252) and Volden, Heim, Trøndelag (T15492:2); 8. Bead of carnelian from Vågan, Hitra, Trøndelag (T1016); 9. Bead of rock crystal from Skeiet, Heim, Trøndelag (T28479/4); 10. Bead of amber from Skeiet, Heim, Trøndelag (T28276/6); 11. Blue reticella barrel bead from Skeiet, Heim, Trøndelag (T228189/10). Scale reference: 5 cm. Photo: Birgit Maixner, NTNU University Museum. Typer importerte perler som er funnet i området (funnsted nevnt i engelsk tekst): 1. Sørskandinavisk millefioriperle fra den blå fasen i Ribe; 2–3. Mosaikkøyeperler; 4. Lagdelte øyeperler; 5. Segmentperle med metallfolie; 6–7. Øyeperler; 8. Karneolperle; 9. Bergkrystallperle; 10. Ravperle; 11. Blå reticellaperle.*

types whose origin is considered certain for the study (Figure 6).

Firstly, there are millefiori beads of the so-called Blue Period (Figure 7:1), whose production is attested at two places in southern Scandinavia, namely Ribe in south-west Jutland and Åhus in southern Sweden (Näsman 1978, Callmer 1984, Callmer & Henderson 1991, Jensen 1991:37–39). These beads can be dated to the period AD 705–760, i.e. to the very early Viking Age (Näsman 2000:43). The multicoloured millefiori beads of the Blue Period are fused from glass mosaic rods of different patterns and represent the most sophisticated beads produced in Viking Age Scandinavia. Their pronounced connection to the coast and major river routes in central and northern Norway suggests a link to coastal trade, possibly even in the form of a pre-monetary means of payment (cf. Maixner 2021a). A total of 19 millefiori beads of the Blue Period, or fragments of these, are known from the study area, five of which come from the recent excavations at Skeiet (Vinjeøra). The distribution of the beads shows a clear concentration in the area of Vinjeøra and Hemnfjord.

Dated somewhat later, but still in the early Viking Age, are a number of beads of Middle Eastern origin. One group of these is known as mosaic-eye beads (Callmer 1977, types G050, H001, J001) (Figure 7:2–3), the production of which is assumed to have taken place from about AD 780 (Callmer 1995:529) or 800 until the first third of the 9th century (Andrae 1975:156). The blue or green ground beads are also millefiori beads, i.e. they are made of prefabricated multi-coloured glass elements. However, in contrast to the aforementioned millefiori beads of the Blue Period of southern Scandinavian origin, whose surface is smooth as a result of the beads having been

heated one final time, the mosaic-eye beads frequently have gaps between the pattern components (Andrae 1975:109–110, 131). The mosaic-eye beads have a wide distribution area, stretching from Egypt to Scandinavia. Ion beam analyses provided additional evidence to support the previously expressed assumption (Andrae 1975:165, Callmer 1977:99) that the mosaic-eye beads are of Middle Eastern provenance (Šmit et al. 2012). Compared to the millefiori beads of the Blue Period, mosaic-eye beads are found only rarely in central and northern Norway. This trend is also reflected in the study area, with only one find from the Hemnfjord area and the nearest finds otherwise at distances of 50–80 km.

Another group of Middle Eastern millefiori beads, dating to around AD 800, are beads with stratified eyes, which are characterised by a dark-blue, green, black or rarely dark-brown ground colour with round eyes of white glass (Andrae 1975:131, 156, Steppuhn 1998:55) (Figure 7:4), as well as by circular eyes with usually blue irises in a white field with black, blue or brown rings. Only three beads with stratified eyes are known from the study area, all from the Vinjefjord and Hemnfjord area, with a dark-blue ground colour.

In the same find horizon as the beads with stratified eyes and the mosaic-eye beads, a third group of Middle Eastern beads of the early Viking Age appears, known as segmented metal-foil beads (often also called gold and silver-foil beads) (Andrae 1975:131) (Figure 7:5). In terms of production technology, these are very different from the millefiori beads. The segmented metal-foil beads were constructed from two glass tubes inserted into each other with silver foil in between, which when heated were shaped into segments over a grooved stone form; after cooling, this allowed them to be easily broken off into beads of different numbers of segments and thus lengths (Sode 2004:97, Sode & Feveile 2002:8). The segmented metal-foil beads were found only sporadically in the study area, with a total of 18 specimens. However, two such beads were unearthed during the E39 excavations at Skeiet.

The Middle Eastern beads of the 9th and 10th centuries have so far received less attention in Scandinavian Viking Age research than those of the early Viking Age. A distinctive group are the eye beads, which, according to Johan Callmer (1997), are a phenomenon of the middle and last third of the 10th century. Eye beads are represented with a total of four beads from the study area. A subgroup of these are eye beads which have a dark-purple ground colour and are decorated with applied mosaic eyes and trailed wave-form decorations (Figure 7:6). The glass overlays may be level with the bead surface or protruding. There are three eye beads with a dark ground colour from the study area; in all of them the glass overlays are at the same level as the bead surface. Two are from the Hemnfjord area, while the third bead comes from a grave in Averøy on the western edge of the study area.

Another subgroup is formed by eye beads with protruding eyes on a yellow or blue-green ground (Figure 7:7). Since there are indications that at least the blue-green beads were produced at the trading centre of Haithabu in what is now northern Germany (Steppuhn 1998:52), it is obvious that such beads were produced not only in the Middle East but also in Scandinavia, which makes it difficult to determine their provenance and necessitates further research into this group before it is possible to conclude with any certainty as to their origin. Only one such bead, with a yellow ground, is known from the study area, which comes from the same find context in the Hemnfjord area as one of the above-mentioned eye beads with a dark ground colour.

While the last types of glass beads presented are assumed to have originated in the Near East, polished beads made of the semi-precious stone carnelian came to Scandinavia from even further afield, namely from the Far East, i.e. Iran, India and the Caucasus (Resi 2011b:145) (Figure 7:8). A total of seven carnelian beads have been found on three sites in the study area, two of which are located along the inner route and one on the island of Frøya. The two beads from the Hemnfjord area are faceted prismatic beads of regular form, while the find from Frøya includes three faceted polyhedrical beads and two faceted discoid, round beads.

Rock crystal beads cut in this way are also considered imports. Spherical rock crystal beads, however, such as the three specimens found in the Skeiet excavations (Vinjeøra) (Figure 7:9), are assumed to have come from Scandinavia (Resi 2011b:144). In the high mountains of south-western Norway, there are several deposits of rock crystal that can be proven to have been exploited in the later Iron Age, and from which there is also evidence of bead production (Myhre 2010, Nyland 2020). Carnelian and rock crystal beads occur sporadically already in the early Viking Age, but are essentially a phenomenon of the late 9th and 10th centuries (Resi 2011b:145). Apart from the three rock crystal beads, no such beads have been found in the study area.

Among the finds from Skeiet (Vinjeøra) were also six beads of amber, which came from Graves 2 and 11. Apart from one specimen, which is of faceted discoid, oval shape, all of the beads have a round disc shape (Figure 7:10). Amber does not occur naturally

in Norway but is found on the Continent, especially on the southern Baltic coast, present-day Jutland, northern Germany and the Netherlands, and in East Anglia in England. The coastal amber of this region is referred to in scholarly literature as 'Baltic amber'. Amber was a popular raw material for the production of beads and amulets in the Viking Age, as extensive traces of its processing at several large Viking Age trading sites show, especially in Wolin, Hedeby and Ribe. The few provenance analyses that have been carried out so far on amber objects from Viking Age trading sites in Scandinavia identified the material as Baltic amber (Resi 2011a:108–109). Apart from the six amber beads from Skeiet (Vinjeøra) mentioned above, there are a further 14 amber beads found in the study area, which come from four graves.

The last type of imported beads to be presented here are blue barrel beads with blue and white striped reticella overlays (Figure 7:11). Such beads are comparatively rare in Viking Age material from Norway and usually only occur singly, often appearing in exclusive find contexts. It is assumed that the beads originate from Ireland and England (Kristoffersen 2010:49), where they occur in great numbers. One such bead comes from Skeiet Grave 2, where it was found in a container together with an equal-armed brooch and eight other beads (Sauvage & Lorentzen Ch. 5). The only other bead of this type from the study area comes from a woman's grave on Barman Strømsvik Øvre on the island of Hitra.

RESULTS

The area surrounding Vinjefjord was investigated with regard to its topographical situation, maritime place names, Viking Age coin finds and imported Viking Age beads. Among the maritime place names, a large number indicate harbours and small transshipment sites. These are concentrated in the western part of the study area, especially in the vicinity of the sounds between the outer and inner route, and also around Hemnfjord. From Vinjefjord itself and the western branch of Hemnfjord there are no place names indicating harbours or landing places. However, the two place names of Skeiet on the isthmuses near present-day Vinjeøra and Kyrksæterøra may indicate meeting places, in connection with which trade was probably also carried out, at exactly these two points. In both of these places we also find end points for water-borne traffic. Viking Age coins have been found in only three find contexts from the immediate study area and these come from the aforementioned isthmuses on both sides of the lake Rovatnet. One of these is the purse from Skeiet Grave 16 containing 42 coins/coin fragments and four pieces of hacksilver, which can be dated to the first half of the 10th century. The other two are the hoard from Kyrksæterøra, comprised of at least 44 Islamic, German, Anglo-Saxon and Swedish coins as well as hacksilver, and the single find of a German Otto–Adelheid pfennig, also from Kyrksæterøra. Both the hoard and the single find date to the transition from the late 10th to the early 11th century.

As a proxy for imported goods in general, the occurrence of beads verifiably imported from other regions was investigated. In order to be able to assess their occurrence also in quantitative terms, the study area was chosen to be correspondingly large. Several results emerged. The distribution of the verifiably imported beads shows a very uneven distribution (Figure 6). While there is a clear concentration around Hemnfjord and its extension from lake Rovatnet and Vinjeøra, the surrounding area is devoid of finds apart from two single graves on the islands of Hitra and Frøya, which each contain several types of imported beads. The nearest concentration is 50 km down the coast, in the vicinity of the fjord system near present-day Kristiansund.

On the other hand, the existing type spectrum shows that the beads that make up the described concentration in the Hemnfjord area come from very different and differently distant parts of the Viking Age trade network: Southwest Norway, Southern Scandinavia, the British Isles, and the Near and Far East. The most numerous single type in the study area and, at the same time, the largest group of imported beads are the Blue Period Millefiori beads of the 8th century from southern Scandinavia, which are represented by 12 specimens. The second largest group, with 10 specimens, is made up of different types of Islamic beads from the late 8th century and the period around 800, which originate from the Middle East and include the mosaic-eye beads, beads with stratified eyes and segmented metal-foil beads. Islamic beads of the 10th century, in the form of eye beads, are only sparsely represented with five specimens. The same applies to the seven carnelian beads, which also date mainly to the 10th century and originate from the Far East.

The occurrence of the bead types investigated in the study area thus tends to show a somewhat more extensive import of beads in the early than in the late Viking Age. However, several types of imported beads cannot yet be dated more accurately within the Viking Age. This applies to the three round rock crystal beads from Skeiet, which may have come from south-west

Norway, as well as to the rare type of blue barrel beads with blue and white striped reticella overlays, which are thought to have come from Ireland or England. Finally, there is a large group of 17 imported amber beads from the Baltic Sea Region and the southern North Sea area, which are also not more precisely datable.

DISCUSSION AND CONCLUSIONS

One of the two central questions of the chapter was to examine what the relationship was between the outer, weather-exposed sailing route along the coast and the inner, more sheltered but alternating route over water and land. To answer this question, the occurrence of place names indicating harbours and transshipment places, Viking silver coins as a means of payment and imported beads as a proxy for imported goods in general were examined. Place names indicating transshipment places are present along both the outer and inner routes, but place names indicating harbours are only present on the outer route.

Although the place names of Skeiet on the two isthmuses on the inner route may indicate important assembly and probably market places, supported by the occurrence of Viking Age coin finds on these locations and the place name Eidet, which designates the western isthmus, the place names alone do not provide sufficient evidence that the inner route was actually chosen to any significant degree for transit traffic as an alternative to the outer route in the Viking Age. The fact that there were several types of imported beads found in Vinjeøra, which is certainly partly due to the extensive excavations there, is also not sufficient to argue that the inner route was a real alternative to the coastal route. Rather, Vinjeøra is probably to be seen as a hub, where outfield resources came together on the described land routes from several directions to be sold/exchanged there and shipped across Vinjefjord. The accumulation of raw materials destined for export was probably the prerequisite for the acquisition of imported goods. The place name Vinjeøra refers to two topographical features on the site which formed good conditions for larger gatherings of people, namely the prefix *vin* meaning 'a natural grassy field' and the suffix *øyr* which refers the alluvial plain at a river mouth (Sandnes & Stemshaug 1990:345). Together with its location on an isthmus at the crossroads of water and overland routes, and the fresh water supply from the river Fjelna, there were excellent conditions for a multifunctional regional gathering place at this location, possibly even with *thing* functions, in connection with which trade/exchange may also have taken place.

An underlying assumption of this chapter is that the distribution of beads, by and large, follows the course of the trade routes (cf. Volkmann & Theune 2001:534, Maixner 2021a). It is therefore all the more surprising that the selected types of imported beads mark neither the course of the outer nor the inner routes. Thus, they do not contribute to answering the question of the relationship between the two routes. However, this result may be due to the length of the studied stretch, about 70 km, which may not necessarily allow for representative results. Instead, the uneven distribution of imported beads in the study area is striking, which is essentially concentrated around Hemnfjord. It is tempting to attribute this phenomenon to the presence of an as-yet unidentified trading place in the Hemnfjord area, which is supported by the presence of place names ending in *hamn/hemn* which refers to harbours and the island name of Bjørkøya, which occurs several times in Scandinavia in connection with trading places. A general problem in the interpretation of archaeological distribution maps is the question of what the mapped occurrences represent and what causes their occurrence in individual cases. Thus, the imported beads may indicate trade routes and harbours, reflect purchasing capability acquired through resource exploitation, or simply show where people settled and buried their dead. A combination of several, as well as other unnamed factors are also possible.

A challenge here is that there is no current detailed overview of the Viking Age settlement in the study area that would allow an evaluation of the occurrence against this background. Also, almost nothing is known about the specific economic basis and the surplus production of the study area that can be assumed due to the imported goods. If the place names containing *grøt* do indeed refer to the exploitation of local natural stone in the vicinity of Vinjeøra and Kyrksæterøra in the Viking Age, this could explain the concentration of imported beads and Viking coins as a means of payment on the two isthmuses and in the Hemnfjord area. However, compared to seasonal meeting places in the outfield and mountain region of southern Norway, which had a huge catchment area for products from iron extraction, hunting and trapping (cf. Loftsgarden et al. 2017), the catchment area of Vinjeøra is modest, as its outfield is much smaller and additionally had many alternative, and shorter, routes to river valleys and waterways.

The second central question of the chapter was how to assess the status of the area surrounding Vinjefjord and the Hemne area within the Viking Age trade network, and what extent of Viking Age

direct or indirect long-distance trade relations can be deduced from the imported goods. The occurrence of the selected types of imported beads shows that the area already had access to beads produced in southern Scandinavia in the early Viking Age, i.e. in the second half of the 8th century, as well as to those from the Near East in the period from 800 onwards. To what extent both of these groups reached the area equally from markets in southern Scandinavia via the sailing route along Norway's west coast, or to what degree the eastbound connection in extension of the Trondheimsfjord via Kjølen, the border mountains between present-day Norway and Sweden, played a role for the Middle Eastern beads, cannot be clarified within the framework of the present study. It should also be taken into account that the beads of the early Viking Age may well have fulfilled a function not only as jewellery, but also as a means of payment (recently Maixner 2021a).

In addition to glass beads from the Near East, carnelian beads from the Near and/or Far East also reached the area around Vinjefjord in the 10th century, i.e. in the late Viking Age. Also taking into account Baltic amber beads, rock crystal beads probably from south-western Norway and reticella beads from the British Isles, the picture emerges that Vinjeøra and the Hemnfjord area had access to common types of imported beads from different parts of the Viking trade network throughout the Viking Age. Furthermore, this area clearly stands out from the rest of the study area because of its extraordinary concentration of such imported goods. As suggested, this phenomenon may be explained by the existence of an as-yet unlocated trading place in the area. The location of today's Kyrksæterøra would suggest itself as such a place. The place name Skei found there, as well as the suffix *øyr* in the name Kyrksæterøra, which indicates an alluvial plain, also points to a special site at this location, which could have hosted the gathering of larger crowds, probably from the area around Hemnfjord.

The evidence of the Viking Age coin finds can also be interpreted in this direction. An extensive influx of Kufic dirhams in the western parts of Scandinavia did not seem to start until the second half of the 9th century (Kilger 2008, Sindbæk 2011:48–50). In the early Viking town of Kaupang in eastern Norway, hacksilver appears around the middle of the 9th century (Hårdh 2007:114). In Central Norway, on the other hand, there is as yet no definite evidence that weighed silver was used as a means of payment before the end of the 9th century. The earliest evidence comes from the area around Stjørdal on Trondheimsfjord. This includes a balance from a boat grave from the second half of the 9th century on the farm Moksnes Søndre and a small silver hoard from around AD 900 on the neighbouring farm Mæle (Maixner 2023). Otherwise, the graves containing balances in Central Norway are a phenomenon of the 10th century AD, predominantly in the second half, and also the majority of the hoards with hacksilver date to the 10th and early 11th centuries AD (Skaare 1976:163–172). The hoard from Kyrksæterøra from the early 11th century fits into this picture. It is all the more interesting to have another piece of evidence of the use of hacksilver in Central Norway from as early as the first half of the 10th century, in the form of the organic container from Skeiet Grave 16. Means of payment in the form of hacksilver are only known from a few graves in Central Norway, which, if datable, point to the 10th century, as do the graves with balances.

The distribution of both the hoards with hacksilver and the burials containing hacksilver in Central Norway shows a clear connection to important water and land routes and thus trade routes (cf. Maixner 2020:299). In this respect, the close proximity of Skeiet Grave 16, containing a weight and a purse with hacksilver, and the hoard from Kyrksæterøra also underlines the trade significance of the area. Further research is needed for a better understanding of the area. A promising future approach would be systematic detector surveys in the area of the two isthmuses and on the islands of Hemnskjela and Bjørkøya, to better estimate the extent to which silver was used as a means of payment for transactions in the area and to specifically identify areas used for trade and market activities.

SAMMENDRAG

De arkeologiske utgravningene ved Vinjefjord i Trøndelag resulterte i et mangfoldig materiale av importerte objekter fra vikingtiden. Fjordens plassering som en del av en transportrute gående parallelt med seilingsruta langs kysten åpner for spørsmål om forholdet mellom disse to mulige transportrutene og betydningen av utgravningsområdet i vikingtidens handelsnettverk. For å besvare disse spørsmålene analyserte vi den topografiske situasjonen, forekomsten av stedsnavn assosiert med handel og trafikk, forekomsten av vikingtidsmynter i bruk som betalingsmiddel og importerte perler som en stedfortreder for importfunn generelt. Resultatene viser at det er mange stedsnavn i området som refererer til havner, lossesteder og samlingsplasser. Det er likevel ingen klare indikasjoner på at den

indre transportruten hadde noen særlig betydning for langdistansehandelen mellom nord og sør, selv om den av og til kan ha blitt brukt. Vi tolker forekomsten av importerte perler og mynter på Vinjeøra som et resultat av beliggenheten i krysningen av landbaserte ruter og sluttpunkt for båttrafikk. På den annen side skiller området rundt Hemnfjorden seg fra nærliggende områder med sin høye konsentrasjon av importerte perler. I kombinasjon med skattefunnet fra Kyrksæterøra og stedsnavn i området tolker vi dette som et indisium for en hittil uidentifisert vikingtids handelsplass i området. Spennet i materialet viser at området hadde tilgang på perler fra forskjellige steder i vikingtidens handelsnettverk, og bruken av veid sølv som betalingsmiddel understreker områdets integrasjon i dette nettverket.

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5. LATE IRON AGE AND VIKING AGE LOCAL BURIAL PRACTICES: THE CEMETERY AT SKEIET, VINJEØRA

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ABSTRACT

A Late Iron Age and Viking Age cemetery was recently excavated in Vinjeøra, Central Norway. The cemetery contained 18 graves and presented a mix of local burial traditions including cremations, boat burials and inhumations. A mix of local burial practices and approaches in dealing with the dead was indicated and a temporal order to the practices has been established, with cremation burial practice being the most common in c. AD 600–800, followed by a gradual preference towards simple dug inhumation graves during AD 800–950. Increasing international influences at the start of the Viking Age changed the local mortuary behaviour towards inhumation and boat burial practices. At the same time, several contemporary interactions with the graves are indicated. These include looting pits, exhumation, inserting secondary graves into old graves and a possible excarnation phase in the boat graves. Findings imply that complex actions involving active interaction with graves and mortuary remains formed part of the local burial practice. The graves were the result of very differently arranged burial rituals and indicated considerable variation in concepts and ideas of death, the afterlife and the transformation of identity in death. These rituals could co-exist and be rapidly adopted, especially from the start of the Viking Age. The study implies that local mortuary behaviour was systematic, underwent several changes during the period and suggests an active use of cemeteries as spaces for long-term mortuary rituals and interactions with the dead and their monuments.

Keywords: Viking Age Mortuary rituals; From cremation to inhumation; Reopening graves; Boat graves; funerary archaeology; Removing grave goods

INTRODUCTION

Late Iron Age (AD 575/600–1050), including Viking Age (AD 800 – 1050), burial practices and mortuary behaviour are characterised by diversity and variation. We can see varying approaches to treatment of corpses where both cremation and inhumation can be observed. Also, diverse ways of burying corpses were practised: examples are inhumations in coffins, ships, boats and wooden chambers, and cremation remains interred in pits and various types of containers, or as spread layers of pyre remains. Graves also display a considerable variation in grave goods, such as personal adornments and equipment, textile production tools, weapons, personal belongings and other tools. Diversity also exists in behaviour that involves interacting with and relating to the dead and mortuary remains such as removing parts of the deceased or the grave goods by grave robbing, placing graves over earlier graves, placing graves over or near dwellings and entrances, as well as burials staged as mortuary rituals which could last for considerable time periods (Brendalsmo & Røthe 1992, Price 2008a, Price 2010, Lund 2013, Fahlander 2016, Eriksen 2019, Toplak 2022, also Sauvage & Macphail Ch. 7). This compound of mortuary practices is observed in the material remains from across the entire Norse pre-Christian world (Price 2008a, Lund 2013), and attests to a heterogeneous picture which may contrast with many of the cultural similarities cited as an important feature of the Norse world (Svanberg 2003). This may reflect a considerable variation in the conceptions of beliefs, death and the afterlife (Andrén 2005, Lund 2013:53).

Reference: Sauvage, R., Lorentzen A.B. (2024). Late Iron Age and Viking Age Local Burial Practices: The Cemetery at Skeiet, Vinjeøra. I R. Sauvage (Ed.), *From Life to Death in Iron Age and Medieval Vinjefjord* (pp. 131–160). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.218.ch5
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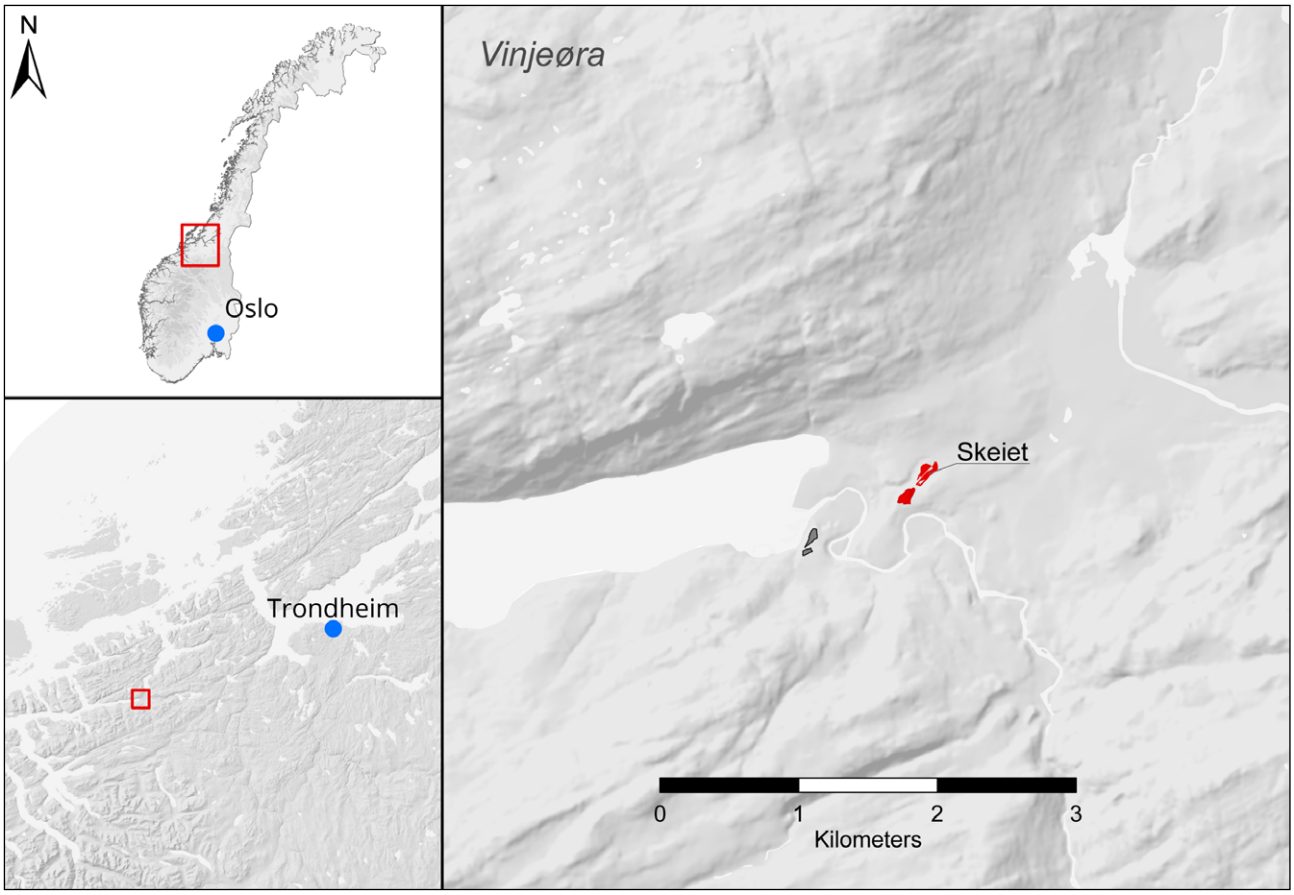

Figure 1. *Location map. Illustration: Kristoffer R. Rantala, NTNU University Museum. Lokasjonskart.*

Since many of the cemeteries that form the basis for research were excavated using less-developed techniques and documentation in the late 19th and the early 20th centuries – often based on excavations of single graves or mounds – we may lack fundamental information on aspects of dating, chronological development, concurrency and spatial relationships between the observed practices. Since studies indicate the presence of regional traditions which can be observed in different Norse communities and landscapes, it is clear that several local customs and standardisation existed (Callmer 1991, Svanberg 2003, Price 2008a). The analysis of local customs in a single cemetery may provide a better frame and the necessary chronological and spatial control to study how such practices materialised and changed over time in local communities. However, except for the excavation of cemeteries with levelled mounds in Gulli in Vestfold (Gjerpe 2005a) and Langeid in Agder (Glørstad & Wenn 2017), both in southern Norway, and cemeteries such as Lilla Ullevi in Central Sweden (Jakobsson & Lindblom 2011, Fahlander 2016), very few examples of modern-day investigations of entire cemeteries are known in the literature.

The recent excavations of the flattened cemetery at Skeiet in Vinjeøra, Central Norway (Figure 1) provided an opportunity to investigate a closed assembly of Late Iron Age burial practice material remains that spanned the entire Late Iron Age, using up-to-date excavation approaches and documentation. The find included cremations, boat burials and inhumations, as well as diverse assemblages of grave goods in the graves. In addition, several contemporary intrusions and interactions with the graves were observed, including a boat grave dug into an earlier boat grave, and looting pits that intruded on two graves. Three proposed mortuary houses suggested interactions with mortuary remains, which formed part of the local practice (discussed by Sauvage & Macphail Ch. 7). While this indicates considerable variation in local burial practices, chronological analysis suggests a development from cremations in the period c. AD 600–800 to inhumation in boat burials in c. AD 750–850, and a preference towards inhumation in dug graves in c. 800–950, implying mortuary behaviour that changed over time. Giving the first presentation of the graves and the development of burial practices at Skeiet, the aim of this chapter is to explore what the cemetery can tell us about local development and its relationship to the heterogeneous nature of Norse mortuary practices.

Figure 2. *The excavation areas at Skeiet with the village of Vinjeøra below. The cemetery in the foreground and settlement area to the left. Aerial photograph: Raymond Sauvage, NTNU University Museum. Utgravningsområdet på Skeiet sett mot sørvest med Vinjeøra i bakgrunn.*

MATERIAL AND METHODS

Remains of the cemetery were located on ploughed agricultural land on the farm Skeiet in Vinjeøra, Central Norway (Figure 2). This was initially recorded in 1996 using test trenching before planned road construction, which revealed parts of circular ditches that implied levelled grave mounds under the ploughed soil. The survey also uncovered a Viking Age grave with weapons, discovered by chance next to one of the ditches,[1] leading to the identification of a Late Iron Age cemetery with a Viking Age phase set about 200 m north of the current farm buildings. An extensive excavation of the site was undertaken by the NTNU University Museum in 2019 and 2020, commissioned by the Norwegian Public Roads Administration prior to planned road construction in the area.

The land consisted of open ploughed fields set to the west of an open ravine, which divided the landscape and formed a natural barrier. A strategy using mechanical topsoil stripping was adopted to expose the entire area (11,000 m^2), revealing the complete spatial layout of mortuary-related features, which established that the cemetery covered an area of approximately 4,000 m^2 and contained 11 circular and oval ring ditches (Figure 3). Imprints of an additional ring ditch suggested in aerial photography of the unstripped site suggest that at least one additional mound was originally present, which implies that the cemetery was not preserved in its entirety. A nearby contemporary settlement was also investigated, and the cemetery was considered to belong to its inhabitants. The development of the settlement is discussed by Hanne Bryn in Chapter 3.

The burials were located both within and scattered around the ring ditches (Figure 3). A total of 17 graves was examined and, including the grave excavated during the survey in 1996, this makes a total of 18 known burials on the site (Table 1). In addition to the graves, three mortuary houses were located within two of the circular ring ditches. As some of the ring ditches lacked related graves, this indicates that some of the graves were not preserved, most likely due to modern ploughing.

1 T22216. The grave is included here as Grave 20.

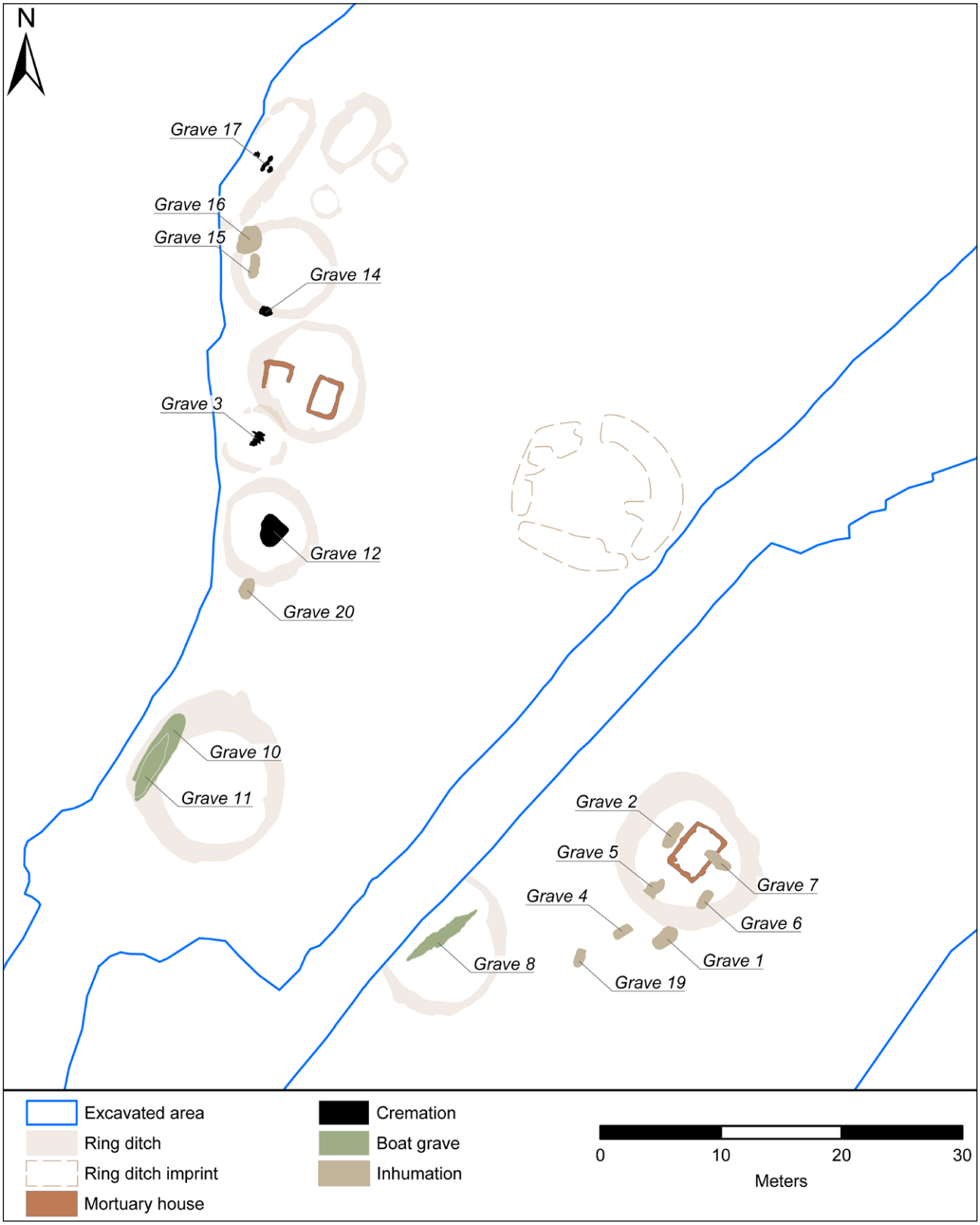

Figure 3. *Plan of the cemetery. Illustration: Kristoffer R. Rantala, NTNU University Museum. Plan over gravfeltet.*

Table 1. *General overview of the burials from Skeiet. Note that Graves 9, 13 and 18 (the mortuary houses) are not included in this overview (see Sauvage & Macphail Ch. 7).*

Grave no.	Museum number	Aprox. date (AD)	Burial type	Body treatment	Number of grave goods	Comment
1	T28188	850–925	Simple dug inhumation	Inhumation	6	Iron nails/rivets not counted in the total
2	T28189	800–925	Oval pit grave	Inhumation	30	Iron nails/rivets not counted in the total
3	T28190	575–650	Cremation deposit	Cremation	41	Iron nails/rivets not counted in the total
4	T28191	850–950	Simple dug inhumation	Inhumation	1	
5	T28473	850–950	Simple dug inhumation	Inhumation	0	
6	T28192	875–925	Simple dug inhumation	Inhumation	7	Iron nails/rivets not counted in the total
7	T28474	675–775	Simple dug inhumation	Inhumation	0	
8	T28273	675–850	Boat grave	Inhumation	4	Clinker nails not counted in the total
10	T28275	750–800	Boat grave	Inhumation	31	Clinker nails not counted in the total. 30 decorative fittings on bridle not counted separately
11	T28276	800–850	Boat grave	Inhumation	57	Clinker nails not counted in the total
12	T28277	575–700	Cremation deposit	Cremation	1	
14	T28279	700–775	Cremation pit	Cremation	170	Iron nails/rivets not counted in the total
15	T28281	775–900	Simple dug inhumation	Inhumation	3	
16	T28282	900–950	Stone lined dug inhumation	Inhumation	78	Iron Iron nails/rivets not counted in the total
17	T28475	575–650	Cremation deposit	Cremation	1	
19	T28476	900–1000 (uncertain)	Simple dug inhumation	Inhumation	1	
20	T22216	875–975	Simple dug inhumation	Inhumation	12	
21	T28479	750–800	Redeposited grave goods, probably removed from Grave 10 during construction of Grave 11	–	31	Individual prongs from wool comb not counted in the total

The excavation emphasised a strategy to map the chronological development of mortuary practices on the site by establishing a chronological model of the mortuary features. To achieve this, we relied on Accelerator Mass Spectrometry (AMS) radiocarbon dating in combination with single context recording of relationships between graves, ring ditches and related features. Sampling included objects and grave goods within the funerary features, such as cremation pyre remains (charcoal), cremated bones, decomposed remains of wooden artefacts and objects, and textile remains. Also, typological dating was evaluated to get possible dating ranges for the grave goods. The typological dates were primarily based on Jan Petersen's (1919, 1928, 1951) studies of Viking Age chronology. Beads were dated based on Callmer (1977), and finds from the Merovingian Period (c. AD 550–800) were dated based on Gjessing (1934) and Nørgård Jørgensen (1999).

To evaluate the possible start and end dates for the construction and range of each grave (posteriors), a simple Bayesian model was calculated for each burial using OxCal V.4.4.4, following the structure recommended by Bronk Ramsey (2009), using the

IntCal20 calibration curve (Reimer et al. 2020). The model also includes dating ranges suggested by the artefact typology, which was defined in OxCal using the *Top-Hat* function (Bronk Ramsey 2008). This makes it possible to include typologically dated artefacts (when present), expressed as a range of calendar years where we assume that any of the ages within the span is equally likely. The model used dates from features that were stratigraphically earlier and later than the graves as constraints when this information was available.

During the exploration of the datasets, we rejected ^{14}C dates that were clearly out of the range of the Late Iron Age. These samples usually consisted of mixed materials (such as charcoal in backfilling) and poorly preserved materials, such as decomposed wood, and were easily spotted as outliers as they had ranges outside of other dates from the same contexts. These are indicated and shown as outliers in the models.

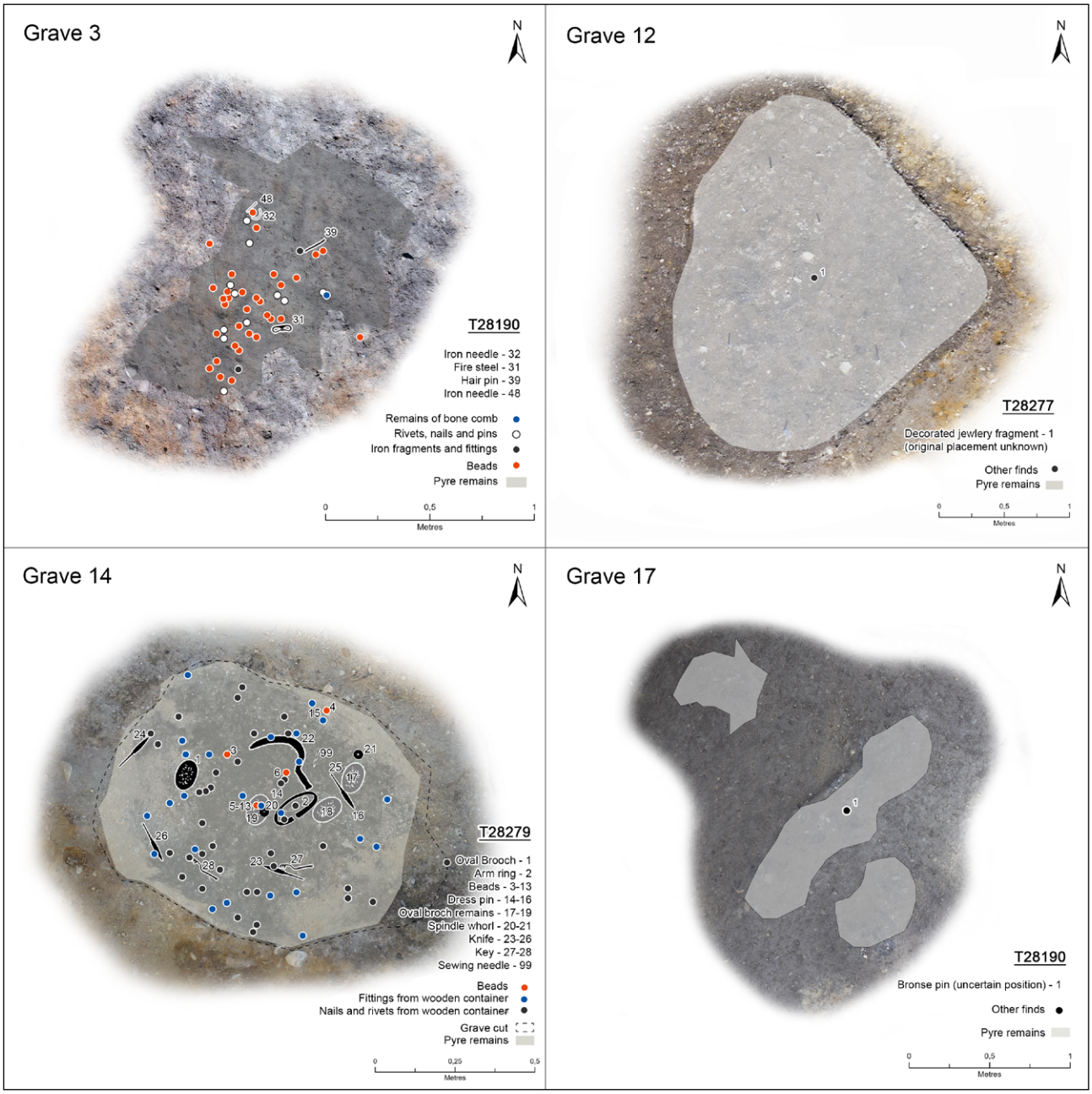

Figure 4. *Plan of cremation graves 3, 12, 14 and 17. Illustration: Magnar M. Gran, NTNU University Museum. Plantegning over kremasjonsgravene.*

RESULTS

Cremating the dead

Four cremations attest to the practice of burning dead bodies on a pyre before burying the remains at the cemetery. Two different variations of cremation were discovered: cremation deposits and cremation placed a pit.

Cremation deposits represent redeposited and scattered pyre remains, which were seen as approximately 10 cm thick charcoal layers with an inconsistent shape, consisting of pyre remains such as charcoal and soot mixed with burnt bone, all set directly on the underlying surface in the centre of ring ditches (Figure 4), indicating that they were covered by a mound. Two of the graves (Graves 12 and 17) had scattered appearances, best seen in Grave 12 which had been heavily spread by later levelling and ploughing, while Grave 3 consisted of more substantial remains. The amount of grave goods varied. Graves 12 and 17 only contained fragmentary artefacts, while the furnishing of Grave 3 was more substantial, constituting personal adornments in the form of glass beads, personal belongings and textile production tools. Evidence of sacrificial animals included on the pyre was also present (Table 2, see Kjellström et al. Ch. 9).

The fourth cremation (Grave 14) represented an altogether different type, where the pyre remains were collected in a small dug-out pit about 100 × 80 cm wide and 40 cm deep (Figure 4). In contrast to the cremation deposits, which were found in the centre of ring ditches, Grave 14 had been inserted into a ring ditch, indicating that it was placed as a secondary grave on the edge of a burial mound. It also contrasts with the others by containing a considerable quantity of cremated bones (more than 6 kg), including human remains, as well as a large amount of animal bones from sacrificial animals (domestic animals, wild animals and a surprisingly large amount of wing bones from various bird species). This evidence is discussed in more detail by Kjellström et al. in Chapter 9. The grave also contained a large assemblage of personal adornments, beads, keys, chest nails, fittings and locks, personal belongings and textile production tools (Table 2, Figure 5), which was by far the most elaborate furnishing in the cremations.

The dates (Figure 6) show that the first cremations were carried out in c. AD 600–650 (Graves 17 and 3), a third cremation (Grave 12) was carried out in c. AD 600–750, and the last cremation dates from c. AD 700–800. The three cremation deposits date to the period c. AD 600–750, while the cremation pit (Grave 14) represents a change in the cremation deposition practice in c. AD 700–800, at the advent of the Viking Age. This grave also represents the last known cremation. Therefore, it can be suggested that the cremations were not a unified and regular practice but attest to variation and change over 200 years. This involved the way cremated remains were deposited, from scattered spreads to deposition in pits, while the general continuity of the practice of burning dead bodies remained the same. Also, the amount of grave goods was considerably greater in the last cremation compared to the earlier ones (Table 2). This may indicate that the cremation ritual became more elaborate towards the start of the Viking Age (see discussion in Kjellström et al. Ch. 9).

No clear evidence of in situ burning (like burnt sands and soils) was observed; thus, we assume that both cremation types represent redeposited pyre remains. This seems to contrast with the notion that

Table 2. *Overview of the cremation burials*

Grave no.	Museum number	Aprox. date (AD)	Grave goods	Personal adornment	Beads	Keys	Personal belongings	Insular objects	Textile production tools	Weapons	Coins and trade indicator	Horse equipment	Tools	Sacrificial animals	Total number of grave goods
3	T28190	575–650	Glass beads, fire steel, sewing needles, bone hair pin, bone comb fragmetns, fitting, tacks, nails, cobber alloy fragment.	×	×		×		×				×	×	41
12	T28277	575–700	decorative element from brooch, rivets	×											1
14	T28279	700–775	Oval brooch R643, cobber alloy bracelet, c. 100 glass beads, spindle whorld, sickle, 4 knives, sewing needle, two keys, casket fittings, rivets, tacks, nails, textile fragmetns	×	×	×	×		×				×	×	170
17	T28475	575–650	Iron tack				×							×	1

Figure 5. *T28279. Finds from Grave 14: a) iron scythe, sewing needle, spindle whorls and two scissors; b) hinges, fittings, lock parts and keys from chest; c) remains of oval brooch (R643). Scale reference: 5 cm. Photo: Åge Hojem, NTNU University Museum. Funn fra Grav 14: a) sigd, synål, spinnehjul og to sakser; b) hengsler, beslag, låsdeler og nøkler til kiste; c) rester av oval spenne.*

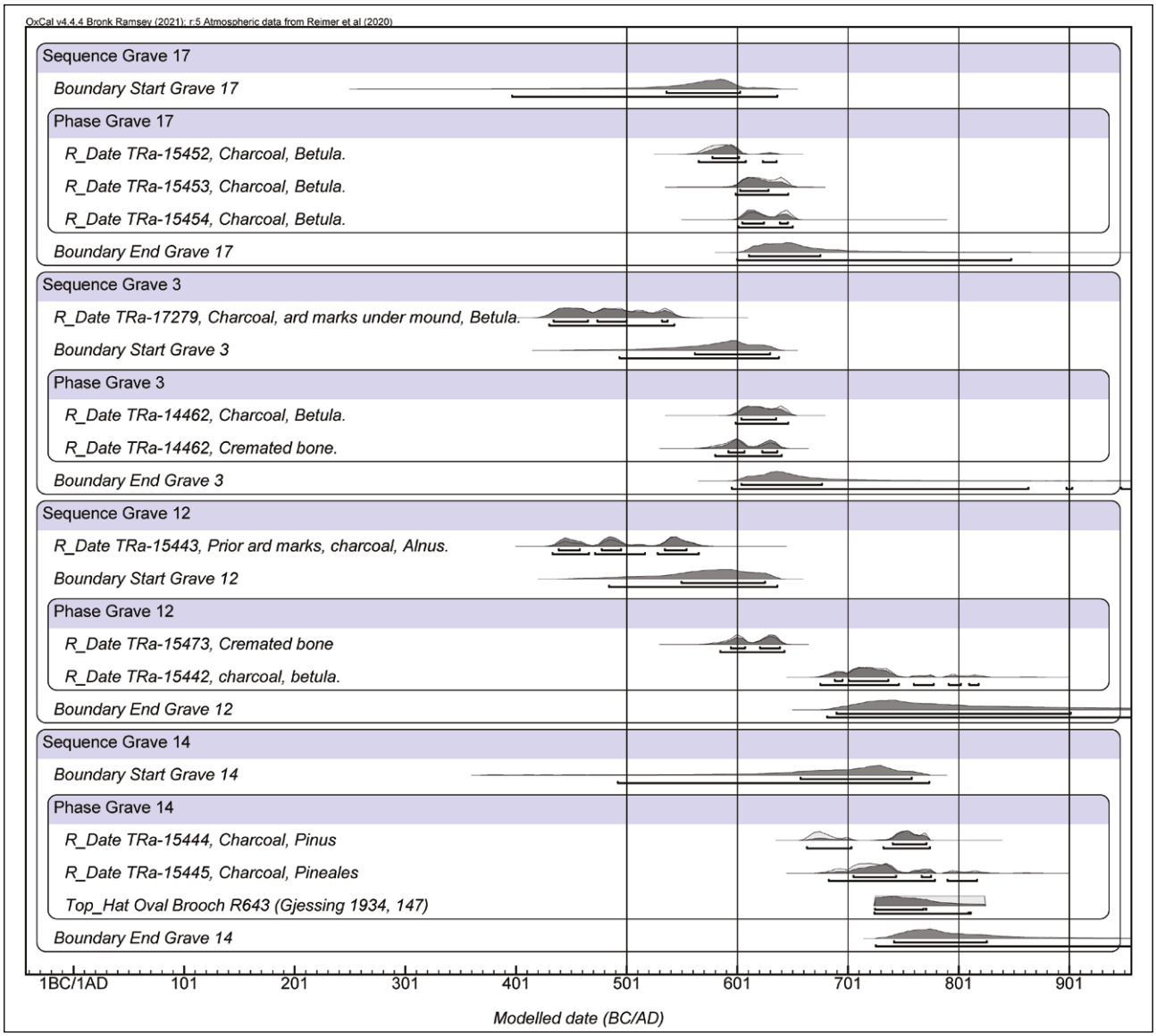

Figure 6. *OxCal calibration plot of modelled ^{14}C dates and typologically dated grave goods from cremations. Dateringsmodell over kremasjonsgravene.*

corpses were normally burned in situ and a mound raised over them (Price 2008a:259). The practice at Skeiet seems rather to have been to construct the cremation pyre somewhere else before moving the remains. Analysis of the cremated bones by Kjellström et al. (Ch. 9) may indicate that the cremations were conducted with a degree of professionalism, and it can be suggested that they were also carried out by a ritual specialist. However, no clear indications of where this occurred were observed.

Burying the dead in boats

Burials in boats and ships are one of the most unique and best-known aspects of Late Iron Age mortuary practice, of which the ship graves (such as Oseberg, Gokstad and Tune) are the most famous and elaborate examples. However, burials in smaller boats and vessels were by far the most common. At least 800 boat graves are known in Norway alone (Paasche 2021:67). A small proportion of these graves were burned, and previous assessments have identified at least 30 instances of cremations with boat remains (Müller-Wille 1970). Boat grave burial practice is demonstrated by three graves at Skeiet: Graves 8, 10 and 11 (Figure 7, Table 3). Two of the boat graves also attest to a very peculiar feature in the observed mortuary practices: one boat burial (Grave 11), dug down into an older and larger boat burial (Grave 10). This unique sequence of events is discussed in the section about interacting with the dead (below).

The remains of the boats measured about 6 × 1.3 m (Grave 11), 7.3 × 1.3 m (Grave 8) and 7.5 × 1.9 m (Grave 10) and were visible as pointed oval shapes. No wooden parts of the hulls were preserved except for mineralised wood preserved in connection with

Table 3. *Overview of the boat burials*

Grave no.	Museum number	Aprox. date (AD)	Grave goods	Personal adornment	Beads	Keys	Personal belongings	Insular objects	Textile production tools	Weapons	Coins and trade indicator	Horse equipment	Tools	Sacrificial animals	Total number of grave goods
8	T28273	675–850	Horse bridle parts and fitting, iron swivel, textile remains, iron rivets				×					×	×		4
10	T28275	750–800	Single egded sword (SAX4), spear R520, shield boss, arrow heads, knife, whetstone, fire steel and flint, bridle, rivets, fittings, tacks, nails, textile fragments				×			×		×	×		51
11	T28276	800–850	Oval brooches R647/649, insular mount, glass and amber beads, sickle, whale bone weaving sword, spindle whorls, shears, sewing needle, key, awl, nails, textile fragments	×	×	×	×	×	×				×	×	35

metal corrosion near the boat clinker nails and as layers of completely decayed wood, and the only data on their shape is based on the in-situ boat nails. The assumed original length was accordingly estimated to be at least 9 m (Grave 10) and 7 m (Grave 11), while the fragmented Grave 8 did not yield enough information to estimate its size other than a suggested size similar to Grave 10 (for a detailed description of the boats, see Rantala Ch. 10). This indicates that one or maybe two moderately large vessels and one smaller vessel were used as grave boats.

None of the boats were burned; thus, the boat graves attest to the practice of inhumation. Unfortunately, due to poor preservation conditions for organic matter, little skeletal material remained. However, a very fragmented human skull and tooth enamel were found in Grave 11 (Figure 7). The personal adornments worn by the deceased (Figure 8b–c), comprised of a pair of oval brooches, glass and amber beads, and an Insular cross-shaped mount, were arranged in a fashion corresponding to interment in a supine position, with the head towards the north-east. This is supported by the orientation of the remains of the cranium (Figure 7). Also, an assemblage of tools (a sickle, a knife and a key) was placed in what we assume to be the belly or hip region, which shows that some of the items were worn in a belt or placed on top of the corpse (Figure 8a). Analysis of textile fragments from funerary clothing and bedding in the grave suggest that the body and most of the jewellery and tools were covered with a down-filled quilt or body wrap, leaving only the Insular brooch open to view (Øien & Heen-Pettersen Ch. 8).

Grave 10 contained a sword and a spear placed to the north-west of its centre line, in the north-east half of the boat (Figure 7). Their orientation and position indicate that they were placed on the right-hand side of the body, suggesting a similar orientation to Grave 11, with the head towards the north-east (based on the study of weapon placement and orientations in graves by Sayer et al. 2019:550–559). A shield boss found in the centre of the grave, in the same area, suggests that the body was partially covered by the shield during interment. Unfortunately, Grave 8 did not yield similar information, due to its shallow position and a looting pit in the central area where a body would be expected to lie (Figure 7); thus, less could be deduced about the burial and the body.

In Grave 11, tools, textile production tools and personal belongings were found in groups in proximity to the boat's bow and stern (Figure 7). Graves 8 and 10 did not contain tools, but both included equine equipment in the south-west half of the boats (Figure 7). Grave 11 also included sacrificial animals, indicated by a decapitated bovine cranium placed in the upper stern in Grave 11. The animal probably represents an adult which was deposited in anatomical order with the soft tissue still present (Mazza, Cambridge University, e-mail 2023). Since only the cranium was recovered, we assume that the animals were decapitated as part of the boat grave burial ritual.

The modelled ^{14}C and typological dates (Figure 10) indicate that the boat burial tradition was introduced in c. AD 700–800. Since no stratigraphic relation existed between Graves 8 and 10, and with a lack of datable grave goods in Grave 8, it was challenging

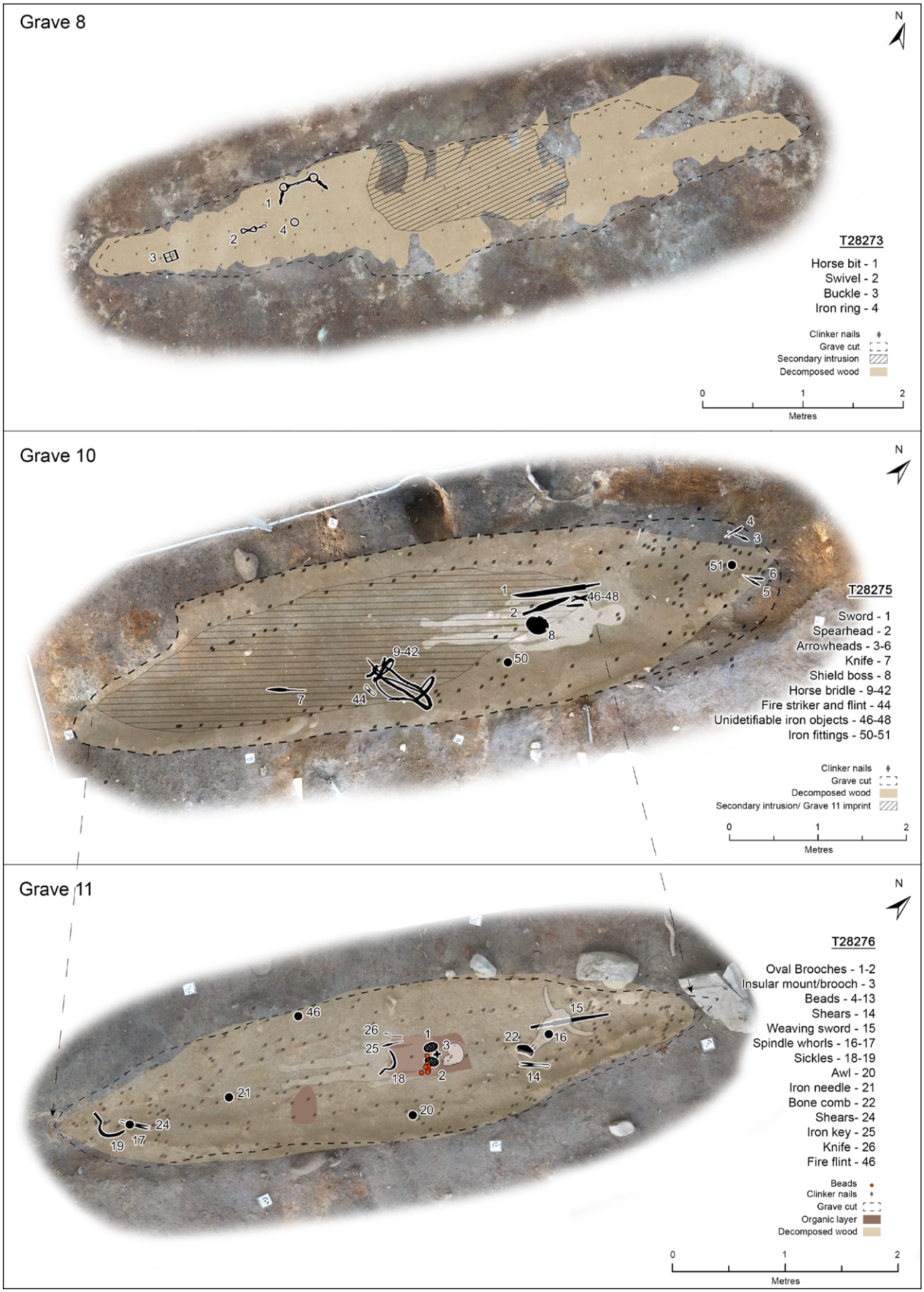

Figure 7. *Plan of boat burials, Graves 8, 10 and 11. Illustration: Magnar M. Gran, NTNU University Museum. Plantegning over båtgravene.*

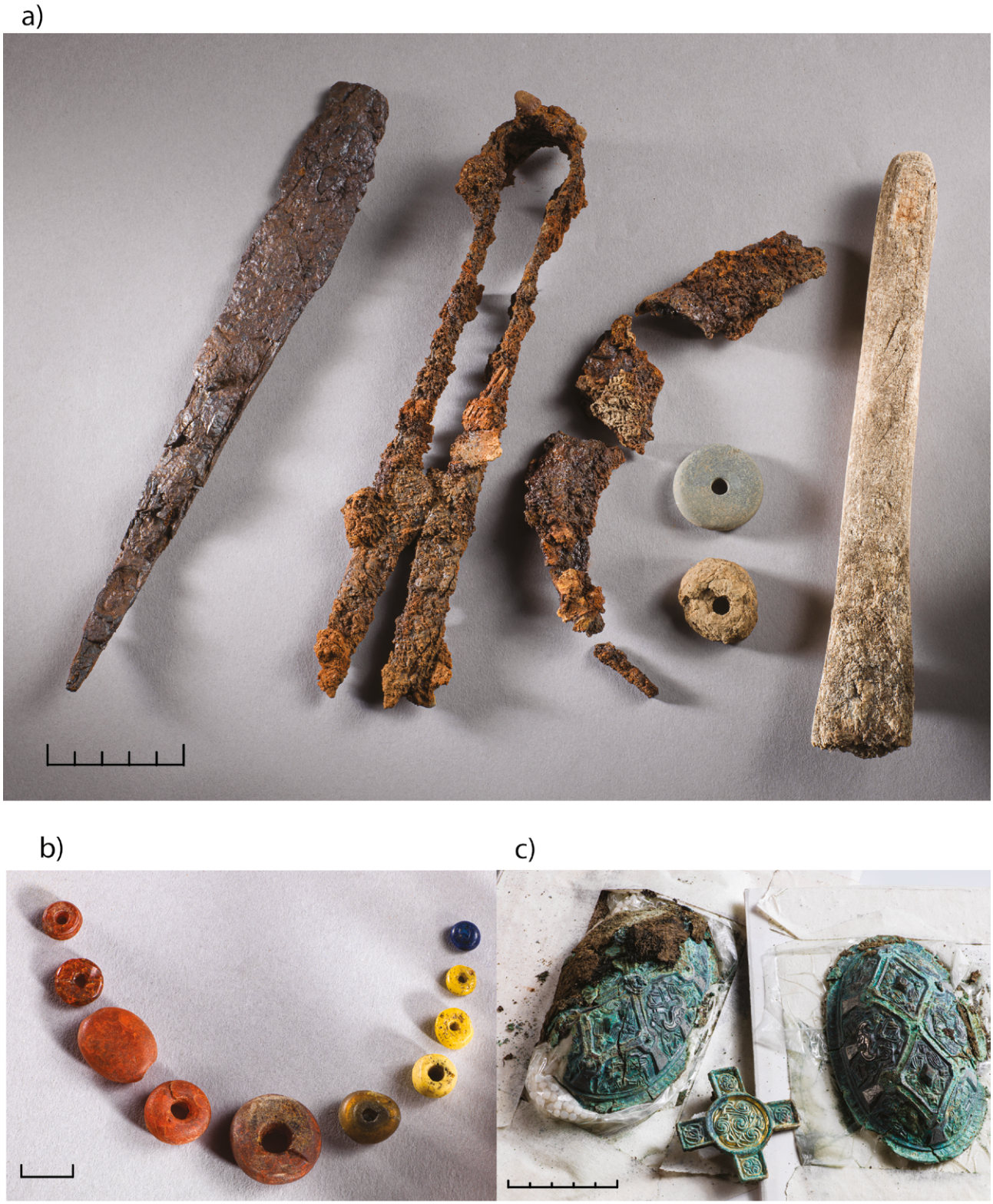

Figure 8. *T28276. Finds from Grave 11: a) weaving knife, iron shears, iron sickle, spindle whorls and whale-bone weaving sword (recovered underneath the bovine cranium); b) amber and glass beads (in original order); c) oval brooches and Insular mount. Scale reference: 5 cm and 1 cm (beads). Photo: Age Hojem, NTNU University Museum. Utvalgt gravgods i Grav 11: a) vevkniv, saks, sigd, spinnehjul og vevsverd av hvalbein; b) Rav- og glassperler (i opprinnelig rekkefølge; c) ovalspenner og inslulært seletøybeslag (gjenbrukt som tredjespenne).*

Figure 9. *The bovine cranium placed upside down in the northern stem of the boat in Grave 11. One of the spindle whorls is also visible. Scale reference: 50 cm. Photo: Kjersti Krogsæter, NTNU University Museum. Storfekranium, plassert opp ned i den nordlige stevnen i Grav 11.*

to evaluate the temporal relationship between the two oldest boat graves. The radiocarbon dates entail that Grave 8 was the earliest boat grave. However, considering the possible old wood effect when dating pine (probably the construction material for the boat) (Loftsgarden et al. 2013), this should be considered an estimate. The ^{14}C dates from the superimposed Graves 10 and 11 also overlapped considerably. However, their stratigraphic relationship provided the necessary variable to model the most likely range of the dated events, indicating that the lower grave (Grave 10) dates to c. AD 750–800 and the upper grave (Grave 11) dates to c. AD 800–850. Based on the typologically dated weapons in Grave 10, it also appears that some of the included weapons were quite old when interred as grave goods, while the oval brooches in Grave 11 seem to have been contemporary to their deposition. Grave 11 was the last boat grave made at Skeiet, which demonstrates that the boat burial tradition was short-lived, lasting only about 100–175 years.

Burying the dead in simple dug graves

Inhumations (not including boat graves) were observed as c. 1.7–2 × 0.9–1.3 m, and up to 40 cm deep, oval graves cut into the subsoil (Figures 11, 12 and 13). With a total of ten graves, this burial type comprised half of the graves at Skeiet, indicating that it was the most common burial practice (Table 4).

Due to poor preservation conditions, no osteological material remained from the buried individuals. However, the remains of the deceased, together with other organic components included in the burial, were alluded to by dark-brown organic layers on the floor of the graves. Soil micromorphology samples from two graves (Graves 1 and 6) provided additional information. In Grave 6, the sample showed iron-phosphate-stained pelletised wood. This was probably caused by a decayed body in the presence of decayed wood or bark. Comparable iron-stained wood remains were seen in Grave 1, but a stronger decay or exposure was suggested, indicating the grave

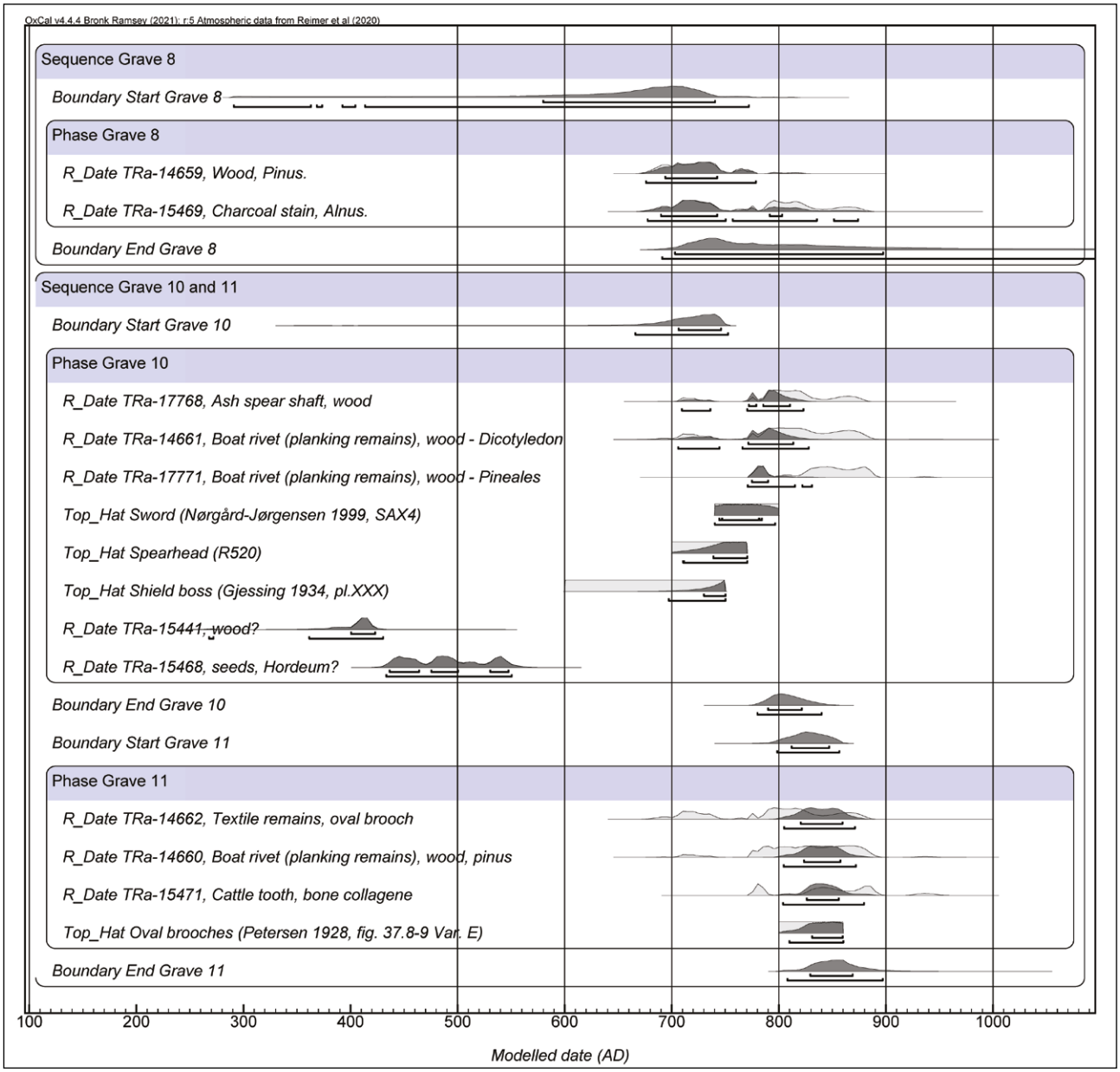

Figure 10. *OxCal calibration plot of modelled ^{14}C dates and typologically dated grave goods from boat graves. Outliers are marked with a question mark. Dateringsmodell over kremasjonsgravene.*

was more exposed to weathering (see more details in Macphail & Sauvage Ch. 6). This indicates that the dead were indeed buried in the pits, indicated by the organic layers (body stains) which also included traces of wood and possible bark, indicating that coffins and/or bark were used as containers, floors or lining.

The buried individuals and their position and orientation in the graves were revealed by the display, placement and orientation of grave goods, which varied from none or very few items to larger assemblies (Table 4). Most of the dug inhumations indicate that the deceased was interred with their head towards the north-east. This is indicated by the arrangement of weapons in Graves 1, 4, 16 and 20 (Figures 11 and 12). Likewise, three beads placed in the north-west part of Grave 6 allude to a similar orientation (Figure 12). However, two graves diverged from this pattern. This was seen in Grave 2 (Figure 11), which included a pair of oval brooches, a ring pin and a single amber bead, together with textile remains from the dress, keys and a knife (see Øien & Heen-Pettersen Ch. 8), placed towards the south-west. This suggests a burial in a supine position, with the head to the south-west. A similar orientation is indicated by the axe in Grave 15 (Figure 12). However, this grave was heavily disturbed by a looting pit, thus making the interpretation uncertain. A clear preference for orienting the body with the head towards the north-east

Table 4. *Overview of the simple dug inhumation graves*

Grave no.	Museum number	Aprox. date (AD)	Grave goods	Personal adornment	Beads	Keys	Personal belongings	Insular objects	Textile production tools	Weapons	Coins and trade indicator	Horse equipment	Tools	Sacrificial animals	Total number of grave goods
1	T28188	850–925	Sword type M, spear type F, axe type E, shield boss R.562, copper alloy belt clasp, iron knife, 3 small iron rivets	×			×			×					6
2	T28189	800–925	Glass beads, cobber alloy beads, oval brooches, equal armed brooch, ring -headed pin, whetstone, keys, knife	×	×	×	×	×					×		28
4	T28191	850–950	Axe type E							×					1
5	T28473	850–950	No finds												0
6	T28192	875–925	Glass beads, iron fittings	×			×								7
7	T28474	675–775	No finds												0
15	T28281	775–900	Axe type D, knife, arrowhead R551							×			×		
16	T28282	900–950	Sword type H, Axe type I, Shield boss R564, arrowhead R551 and combat arrow, 6 complete and 36 fragmented dirhems, silver tack and hacksilver, hammer R394, lead weight R481, weaving sword R440, 2 spindle whorls, sewing needle, whetstone, strike-a-light and flint, tacks, nails, hasp	×			×		×	×	×		×		70
19	T28476	900–1000 (uncer-tain)	Knife										×		1
20	T22216	875–975	Sword type M, Q, or R (including a pattern welded blade with an inlaid pattern), Spear type M, Shield boss, 4 glass beads, sickle, knife, iron and copper aloy fragments		×					×			×		

is thus suggested, while the opposite orientation was also practised, but to a lesser degree.

The dug inhumations also included personal belongings and tools that did not yield information on the orientation of the body. Grave 2 included a second assembly of personal adornments in the form of thirteen glass, amber and copper alloy beads, an equal-armed brooch and a piece of flint, placed at the foot of the grave. Amongst the beads is a rare blue and white embellished tripartite bead (reticella barrel bead), indicating a possible Irish/Hiberno-Norse origin (Figure 14) (Mannion 2015). Remains of decayed wood under the objects indicate that they were placed in a circular wooden container (Figure 11). Thus, the deceased interred in Grave 2 was buried with a second set of personal adornments that were not presented as part of the deceased's funeral attire. This included 'the third brooch' and a full set of beads – items that could be paired with the oval brooches as a complete second set of personal adornments. The choice to display the deceased with a simple ring pin and a single amber bead with the oval brooches must be seen as a deliberate choice concerning the deceased's role or identity.

Grave 16 included the remains of a leather pouch containing 6 complete and 36 fragmented eastern dirhams, a small silver rivet and three pieces of hacksilver, implying eastern connections (Figure 15, see also Maixner & Hellan Ch. 4). Another indication of trade was the presence of a small lead alloy weight. The grave also presented an iron weaving sword/ beater, which was placed alongside the iron sword. Since textile production tools are most common in graves with jewellery and oval brooches (as seen in Graves 2 and 11), this may seem to diverge from the usual pattern of combinations in graves with weapons, although

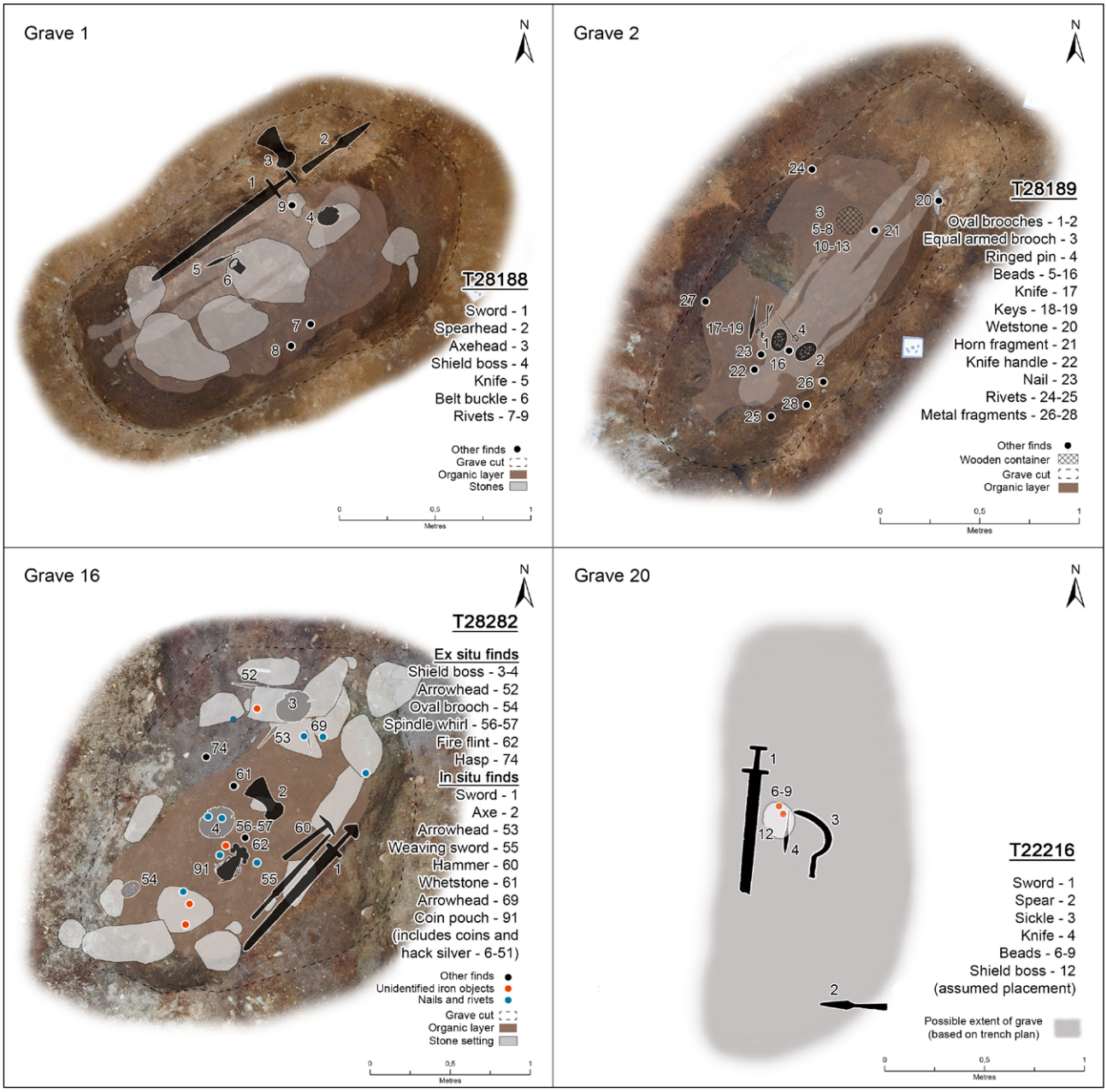

Figure 11. *Plans of simple dug inhumations: Graves 1, 2, 16 and 20. Illustration: Magnar M. Gran, NTNU University Museum. Plantegning over jordfestegraver.*

graves with this combination are indeed known to exist (Lund & Moen 2019). Another divergence in Grave 16 was that the sword and weaving beater were placed on the left-hand side of the assumed position of the body, as opposed to the more frequent position on the right-hand side (e.g. Sayer et al. 2019:550–559).

Only three of the dug inhumation graves had indications of possible external markings that might have marked their location in the cemetery. This was seen in Graves 1 and 6, which had larger stones placed in the upper strata of the graves' backfill. The stones in Grave 1 were aligned in the middle of the grave's longitudinal direction; this was also seen in Grave 6, although it presented a more random placement (Figure 12). Another example is seen in Grave 16, which was lined with larger stones at both ends, perhaps alluding to a faint boat shape where the 'stem-stones' protruded above the others (Figure 11), possibly a form of miniaturised ship setting. The fact that external markings were only seen in three graves could be a case of preservation bias, considering that later ploughing might have removed such evidence. Most inhumations seen on sites such as Lilla Ullevi in southern Sweden and Lindholm Høje in Denmark were marked by stones or settings (Marsen 1959, Fahlander 2016). Thus, we cannot rule out that similar elements marked the location of the other simple dug

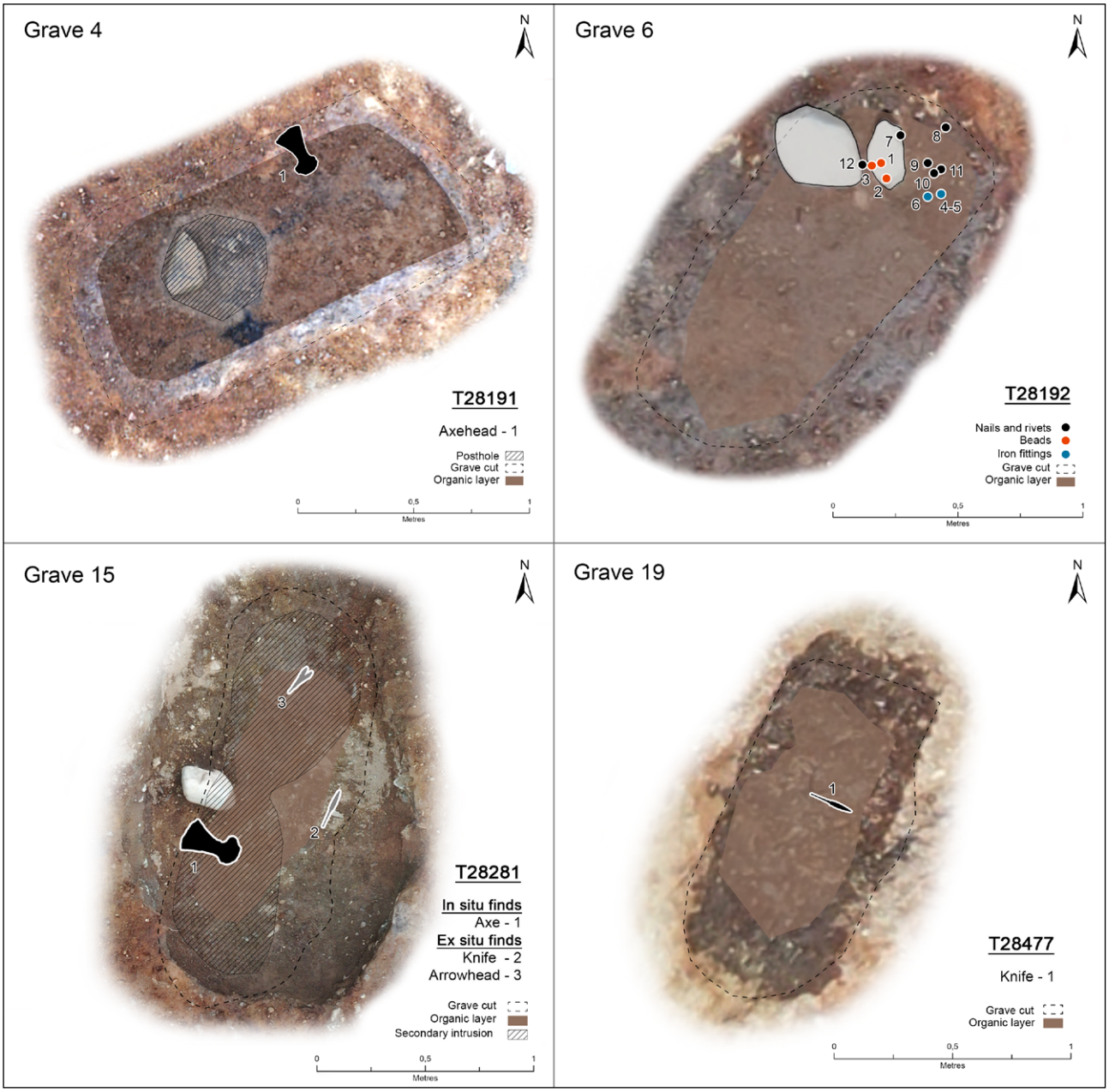

Figure 12. *Plans of simple dug inhumations: Graves 4, 6, 15 and 19. Illustration: Magnar M. Gran, NTNU University Museum. Plantegning over jordfestegraver.*

graves. Some of the graves from Skeiet were probably also covered or inserted into a mound (such as Graves 2, 6 and 15) which marked their location.

The modelled ^{14}C and typological dates (Figure 16a–c) imply that the graves predominantly date to the period between c. AD 800–950 in the Viking Age. A single date from Grave 7, which was cut by a later mortuary house (Sauvage & Macphail Ch. 7), may indicate the introduction of this burial ritual before this. However, since this is a singular date and occurrence, and the grave contained no grave goods which could confirm this date, it should not be given weight in dating the introduction of simple dug inhumation graves at Skeiet. Although some of the graves present dates that must be considered outliers (specifically Graves 1 and 16), there was a good overall correlation between radiocarbon and typological dates. However, like Grave 10 (a boat grave), the typological dates from a mosaic bead in Grave 20 and an oval brooch included in Grave 16 indicate that they predate the actual burial, which could attest to a practice of including old objects in the burial (see next section). Grave 19 appears to indicate a burial in c. AD 1000–1150. However, this date was based on a single sample from a decayed knife shaft and, as seen in the outliers in Graves 1 and 16, dates from decayed material might not provide reliable results. Thus, we

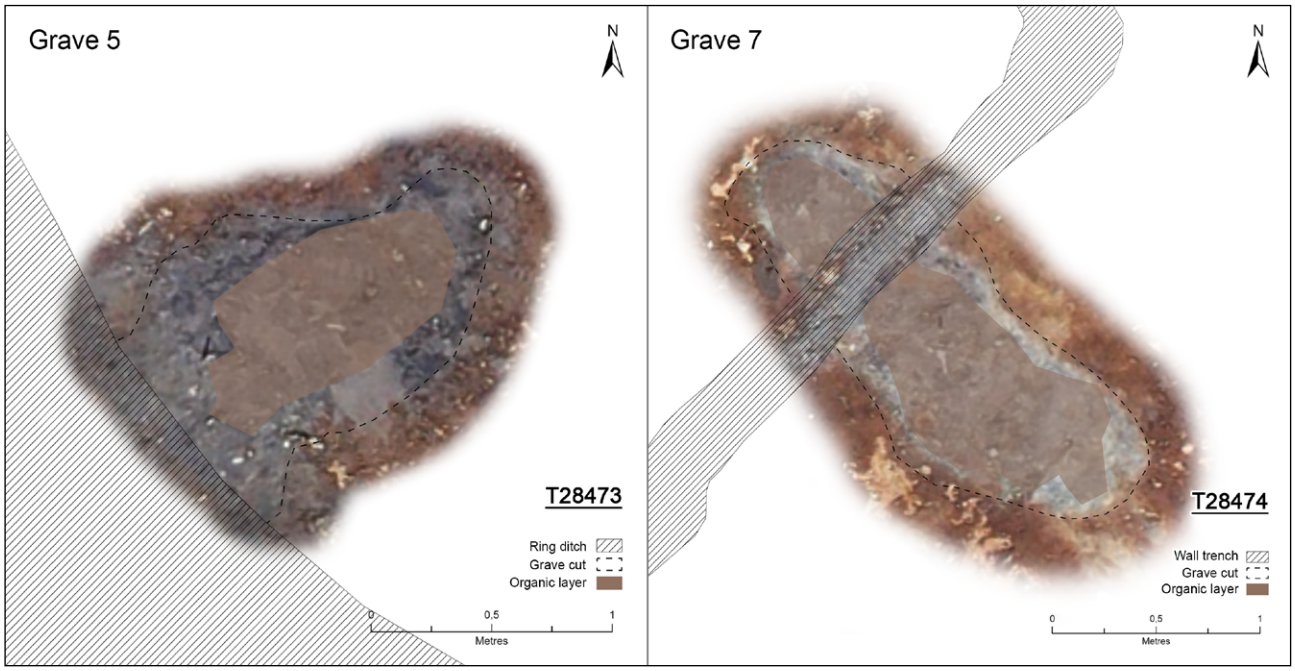

Figure 13. *Plans of simple dug inhumations: Grave 5 and the possible Grave 7. Illustration: Magnar M. Gran, NTNU University Museum. Plantegning over jordfestegraver.*

Figure 14. *T28189. Glass and copper alloy beads from the possibly wooden container in Grave 2. Upper-right blue bead, possibly Irish/Hiberno-Norse origin (Mannion 2015:24). Scale reference: 1 cm. Photo: Åge Hojem, NTNU University Museum. Sekundært perlesett fra Grav 2.*

Figure 15. *T28282. Selected dirhams from Grave 16. Scale reference: 5 cm. Photo: Åge Hojem, NTNU University Museum. Utvalgte islamske dirham-mynter fra Grav 16.*

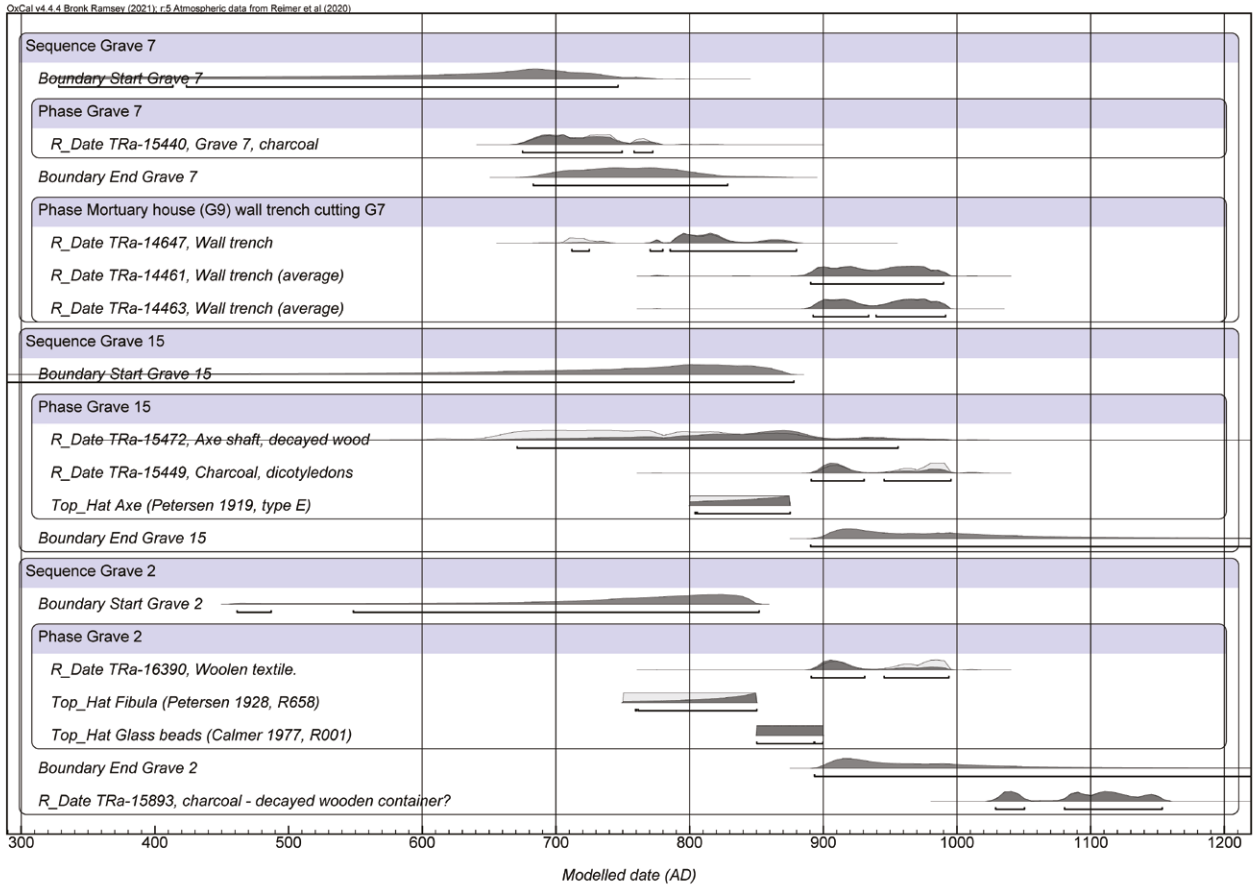

Figure 16a. *OxCal calibration plot of modelled ^{14}C dates and typologically dated grave goods from simple dug inhumations. Outliers are marked with a question mark. Dateringsmodell over jordfestegravene.*

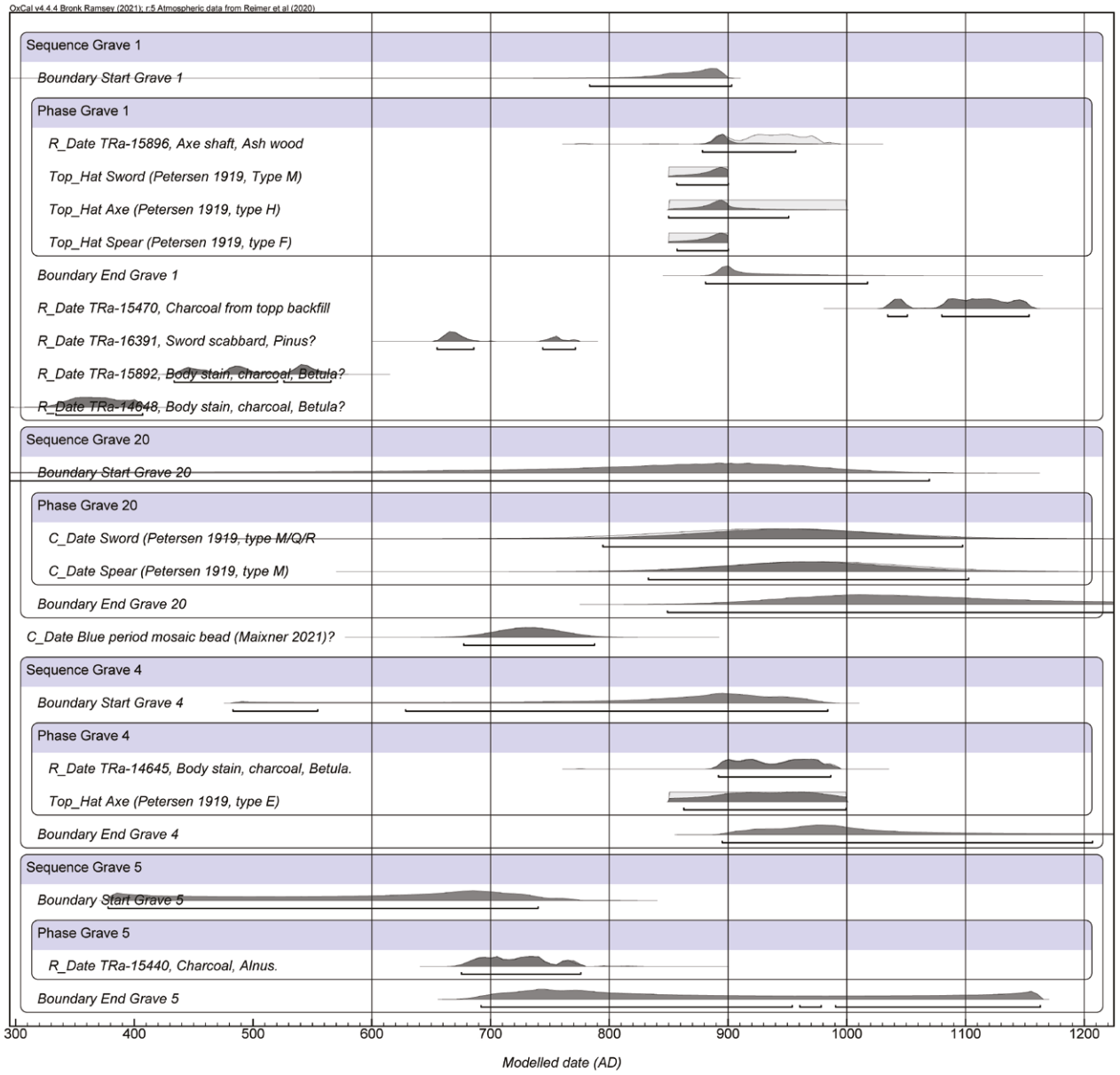

Figure 16b. *OxCal calibration plot of modelled ^{14}C dates and typologically dated grave goods from simple dug inhumations. Outliers are marked with a question mark. Dateringsmodell over jordfestegravene.*

consider the last certain inhumations in dug pits to date to c. AD 900–950 (Graves 20, 6 and 16).

Intruding on graves

The graves included several post-depositional manipulations that suggested contemporary intrusions and evidence that hints at interacting with mortuary remains, grave goods and previous graves (Table 5). This was perhaps best seen in two superimposed boat graves (Graves 10 and 11), which involved excavating into and making room for a second boat burial in an existing grave. Their chronological relationship (see section above) suggests this happened around AD 800–850. Unfortunately, the evidence did not indicate how much time had passed between the two events. However, visual evidence of damage to the lower boat's hull in the form of missing clinker nails (Figure 17) suggests that the grave was in a state of decay at the time the soil was removed to make room for Grave 11. Therefore, it may be suggested that a period of 50–100 years separates Grave 10 and Grave 11. In addition to damaging the hull, an assembly of objects recovered in the backfill around Grave 11 and in the deposits surrounding it hint that the reopening may also have involved removing remains and grave goods from the first burial (Figure 17). Among the objects were high-status artefacts such as parts of a disc-on-bow brooch and

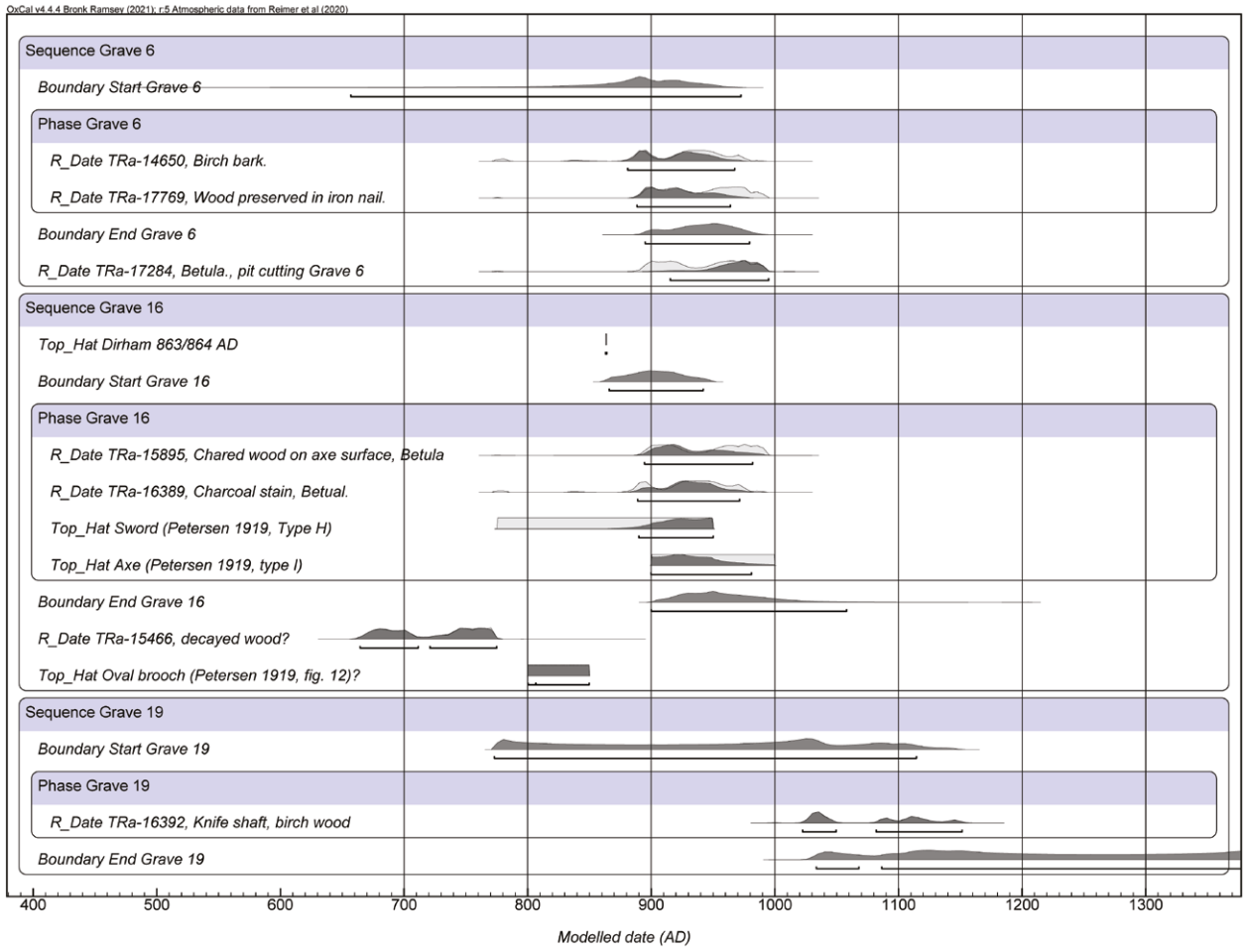

Figure 16c. *OxCal calibration plot of modelled ^{14}C dates and typologically dated grave goods from simple dug inhumations. Outliers are marked with a question mark. Dateringsmodell over jordfestegravene.*

millefiori glass beads (Table 1 Grave 21, Figure 18), which point to a date contemporary with Grave 10, c. AD 750–800 (Callmer 2003:44, Glørstad & Røstad 2015:181). It may be suggested that these objects were exhumed when making room for Grave 11 (from the area of the missing clinker nails) and later redeposited in the backfilling around and on top of Grave 11. This may hint that Grave 10 originally included a second set of grave goods located in its southern half, which may imply a second buried person with grave goods in the former grave, that were entirely or partially removed when Grave 11 was made.

Soil micromorphological evidence may expand on the suggested events (Macphail & Sauvage Ch. 6). Samples showed a concentration of charcoal and weathered decayed wooden remains in Grave10, which might indicate a burning event before sealing the grave. Similarly, a burning event may even be suggested in Grave 11, indicated by woody, charred remains, charcoal and burnt sands. It is also suggested that both graves might have remained as excarnations for a period. This assumption may be strengthened by an assessment of the mandibles in the deposited cattle cranium (above), which show some sign of weathering (stage 1–2) (Mazza, Cambridge University, e-mail, 2023, with reference to Behrensmeyer 1978). A similar suggestion has been made in relation to the Oseberg Ship burial chamber (Gansum 2004, Price 2008a), although this interpretation has been questioned (Nordeide 2011a). However, signs that boat graves were left (partially) exposed are not uncommon elsewhere, such as in Valsgärde in Sweden, Kaupang and Gulli in southern Norway, Tjora in Western Norway and Bitterstad in northern Norway (e.g. Blindheim & Heyerdal-Larsen 1995, Gjerpe 2005b, Price 2008b, Aannestad & Glørstad 2017:174 with references). Excarnation or exposure is also suggested in relation to a burial chamber in Hesby in Vestfold (Gollwitzer 2012:157, Viklund et al. 2013:45). Thus, it may be suggested that the exposure of burials was frequently practised, perhaps particularly related to boat graves.

Table 5. *Overview of secondary intrusions and related observations*

Grave no.	Museum number	Aprox. date (AD)	Burial type	Secondary intrusions
4	T28191	850–950	Simple dug inhumation	Post hole cutting grave (date uncertain)
8	T28273	675–850	Boat grave	Looting pit, heavy disturbed in central areas
10	T28275	750–800	Boat grave	Inserted in ring ditch. Disturbed by insertion of Grave 11. Cremated scull fragment possible added to grave
11	T28276	800–850	Boat grave	Inserted in Grave 10
14	T28279	700–775	Cremation pit	Inserted in ring ditch
15	T28281	775–900	Simple dug inhumation	Looting pit, heavy disturbed
16	T28282	900–950	Stone lined oval pit grave	Inserted in ring ditch. A predating oval brooch (JP 12, Berdal) and three shield bosses (R562) left in grave filling
21	T28479	750–800	Redeposited	Completely removed from original context in grave 10, probably by insertion of grave 11. Redeposited in the back-fill surrounding Grave 11.

Both graves also seem to indicate a small fire before sealing. A cremated skull fragment recovered in Grave 10 (see Figure 7) may support this idea. However, no charcoal or evidence of burning was observed by the excavators and the boats were assumed to be unburnt. Thus, we should assume that the fire must have been of small scale that did not encompass the entire burial; it is unlikely that such a fire would have resulted in a complete cremation of the bone fragment. Possibly, this indicates that it may be an older fragment from the site that was left in the grave.

The evidence from Graves 10 and 11 consequently suggest the following events: 1. Making the first boat grave (Grave 10, probably including 'Grave 21') which possibly remained as an excarnation for a period, followed by an internal fire and sealing the grave; 2. Reopening Grave 10 after c. 50–100 years and perhaps exhuming grave goods belonging to a deceased person placed in the southern half of the boat; 3. Inserting the boat belonging to Grave 11, which also remained as an excarnation for a time, before lighting a smaller fire and sealing the grave.

Similar post-burial manipulations were also implied by looting pits excavated and targeted at central areas in the graves (Graves 8 and 15, Figure 17). Grave 8 (a boat grave) presented a 'looting pit' excavated into the centre of the boat, where we would expect primary remains and grave goods to be located. In contrast to Grave 10, decomposed wood and clinker nails were in this case still partly present in situ, underneath the secondary intrusion (Figure 17). This indicates that the boat was not yet completely decomposed at the time of intrusion, indicating it happened not long after the time of burial. Since no grave goods or remains were recovered in or under the looting pit, they may have been removed during the reopening. Another looting pit was seen in Grave 15 (a pit grave), where it covered almost the entire extent of the burial cut, preserving only a narrow strip of its original backfilling around its outer edge. The organic layer in the bottom of the grave was undisturbed and an axe was found remaining in place just outside of this layer (Figure 17), indicating it could have been deliberately left in place. A knife and an arrowhead were collected from the backfilling in the intrusion, indicating that they had been moved from their original positions.

Table 5 suggests additional possible manipulations of the graves that were observed on site. This includes the possible insertion of weapons and an oval brooch in Grave 16 that were found in a layer well above the primary grave context (see ex-situ finds in Grave 16, Figure 11). Also, a posthole in Grave 4 (Figure 12) may indicate that a wooden post was sunk into the grave. However, since the posthole is not dated, we cannot rule out that this intrusion was more recent and therefore unrelated.

Chronological development of burial practices

Overall, we can suggest three steps in the timeline from cremations via boat graves to inhumations in dug graves. Cremations dominate the first phase, from c. AD 600–800, with a transition from cremation deposits (Graves 17, 12 and 3) to a pit cremation in the last part (Grave 14). Boat graves with inhumations are introduced in the second phase, from c. AD 700–850, marking the first occurrence of inhumation in Graves 8 and 10 in the first part and Grave 11 in the last. They also indicate temporal overlap with the last cremations, indicating that cremation and

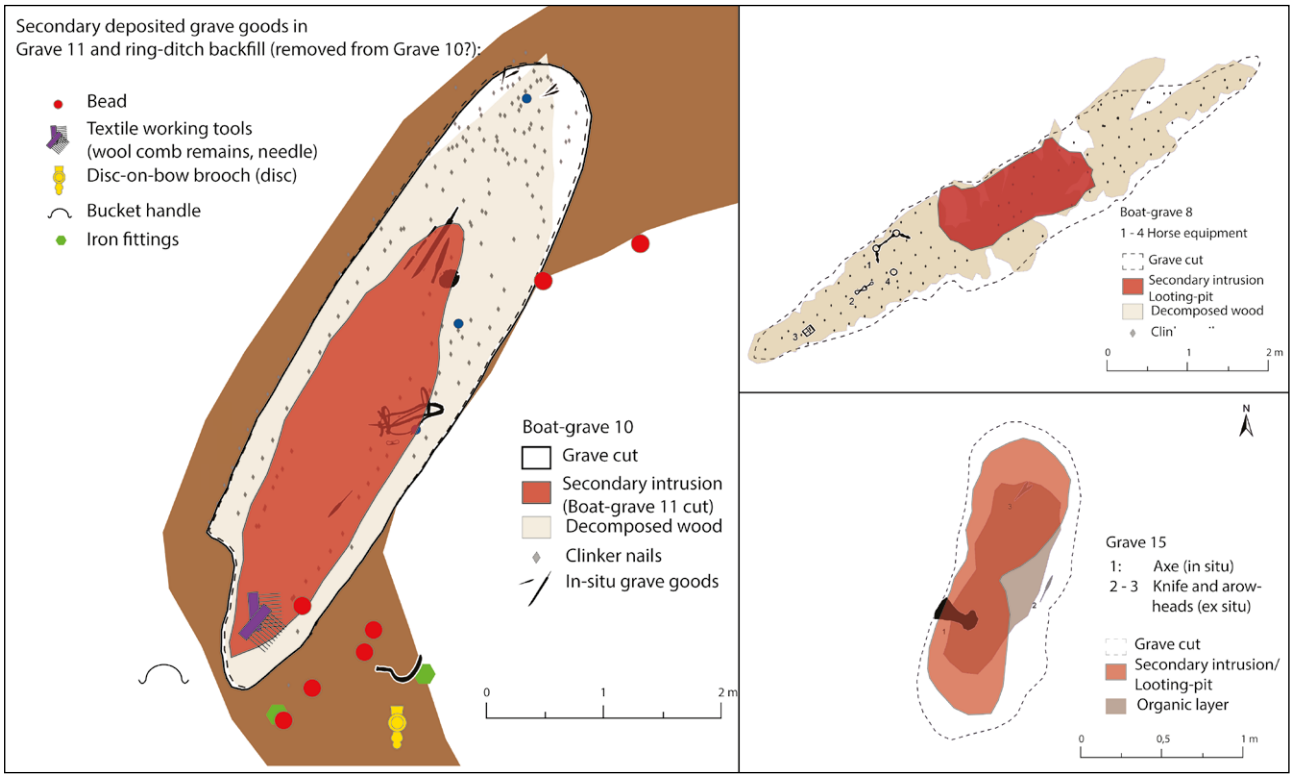

Figure 17. *Graves with secondary intrusions. Grave 10 with secondary deposited grave goods (Grave 21), removed by Grave 11 construction. Graves 8 and 15 with looting pits. Illustration: Raymond Sauvage & Magnar M. Gran, NTNU University Museum. Graver med spor etter inngrep.*

Figure 18. *T28479. Disc-on-bow brooch disc, millefiori beads and rock crystal beads from Grave 21, possibly removed from Grave 10 during the construction of Grave 11. Scale reference: 5 cm. Photo: Raymond Sauvage, NTNU University Museum. Gravgods som har blitt flyttet fra Grav 10 ved nedsetting av Grav 11: Knapp fra forgylt ryggknappspenne, to millefioriperler, og bergkrystallperler*

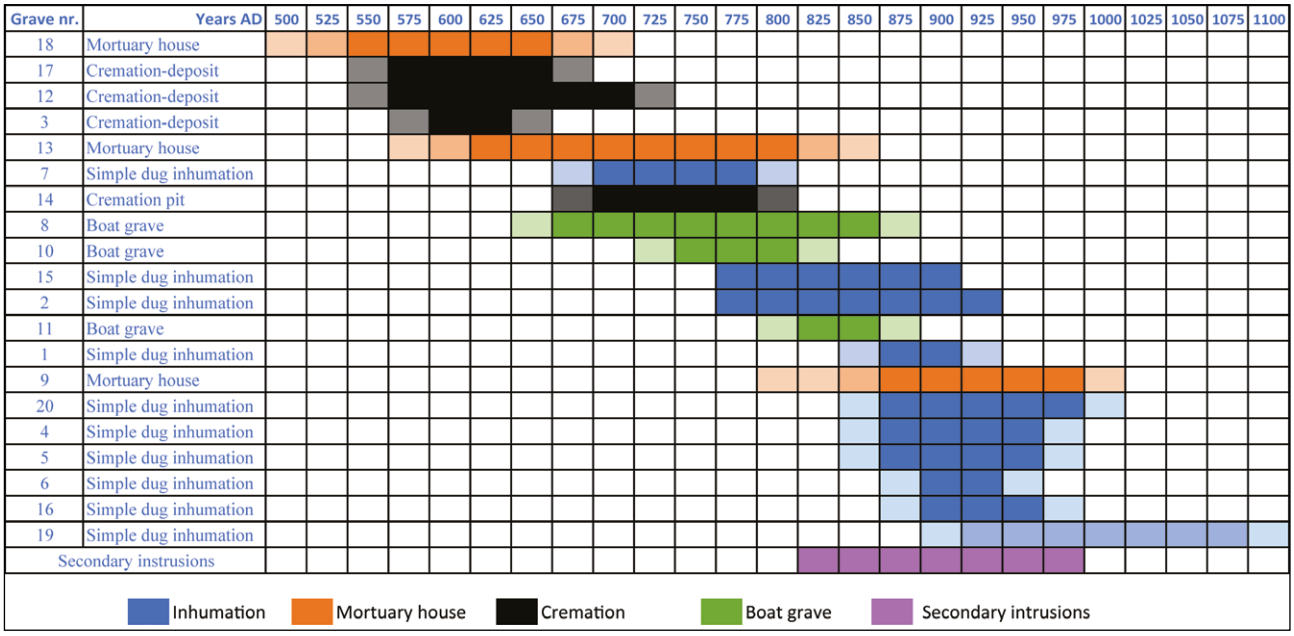

Figure 19. *Summary of burial chronology models and ranges in Figures 6, 10 and 16. Also includes the three mortuary houses (discussed by Sauvage & Macphail Ch. 7) and illustrates a proposed timespan for the main period of secondary intrusions. Illustration: Raymond Sauvage, NTNU University Museum. Kronologisk modell over utvikling av gravfeltet.*

inhumation co-existed for a period. The last phase is dominated by simple dug inhumations, which seem to start in the period c. AD 800–900 (Graves 15 and 2), disregarding the early date for Grave 7 (as argued above). It also indicates temporal overlap between boat graves and dug inhumations. Burial in dug graves continued until about AD 950, with Graves 6, 16 and possibly 20 as the last burials, taking into account the very uncertain date for Grave 19 (the figure emphasises this with a paler colour). The occurrence of secondary intrusions, demonstrated by the insertion of Grave 11 into Grave 10, and the supposed time frame for intrusions in Graves 8 and 15, as well as the dates of the graves that incorporated old grave goods (Grave 16), suggests that all the intrusions occurred in c. AD 825–950. This implies that they occurred exclusively in the last part of the Late Iron Age (Viking Age).

DISCUSSION

Variations in Late Iron Age mortuary behaviour might be expressions of local traditions where local communities or farms mainly favoured one ritual (such as cremation or inhumation) (Svanberg 2003, Callmer 1991, Price 2008a, Nordeide 2011b:259). The results from Skeiet imply a mix of local burial practices and approaches in dealing with and arranging the dead during the c. 350–year (AD 600–950) life of the cemetery. This may mean that there is a correspondence between local expressions and the observed plurality of Late Iron Age and Viking Age beliefs and burial practices recorded across Northern Europe (e.g. Andrén 2005:121, Lund 2013:51). However, the chronological model established for Skeiet implies a temporal order to the practices, where cremation burials were most usual in c. AD 600–800, followed by a gradual preference towards inhumations placed in simple dug inhumation graves from c. AD 800–950. Thus, it is implied that the local mortuary behaviour was not random and indeed passed through several changes.

The last cremation, Grave 14 from c. AD 700–800, was different from the previous ones in both its form (placed in a pit) and its substantially larger inventory of grave goods and sacrificial animals – similar to that seen in some of the later inhumations. The data implies that several other burial practices coexisted at Skeiet at the time of this burial. This included the earliest boat graves, which constitute the first instances of inhumation (Graves 8 and 10), which were made during the same period. This entails that very different burial rituals were experienced by the same generations in the community (see chronology figure). The complexity seen in Grave 14 may therefore be seen to reflect reciprocal influences between inhumations and cremations during this time. However, cremation and inhumation of the body in essence represent very different concepts of passing, afterlife and death (Kaliff & Østigaard 2017). The graves resulted from very different arranged burial rituals. Grave 14 was the redeposited result of a complex ritual which included

Figure 20. *T28189. The Insular/Hiberno-Norse glass bead from Grave 2. Photo: Åge Hojem, NTNU University Museum. Insulær/hiberno-norrøn glassperle fra Grav 2.*

Figure 21. *T28276. Insular mount used as a brooch from Grave 11. Photo: Åge Hojem, NTNU University Museum. Insulært beslag brukt som tredjespenne i Grav 11.*

burning the body and the grave goods, together with a large array of animals (including complete and individual body parts), on a funeral pyre placed off-site (possibly by a specialist) (Kjellström et al. Ch. 9). Such a ritual can be seen as unifying animals, humans and artefacts by fire (Fahlander 2014, Williams 2005). The boat grave ritual, on the other hand, consisted of a spectacular arrangement of the unburned dead body with weapons and tools placed onboard a boat. This was probably arranged to be watched by the next of kin and spectators as a performance where representing, displaying and forming the identity and personhood of the deceased through the burial ritual were important aspects (cf. Williams 2005, Gräslund 2006:161). These examples reflect that considerable variation in concepts and ideas of death, the afterlife and the transformation of identity in death could coexist and/or be rapidly adopted by the same group of people (Lund 2013:51). Similar coexistence is also noted in other cemeteries, such as in Mälardalen in Central Sweden (Lilla Ullevi and Valsta) (Fahlander 2016:152), indicating that this is not a unique local occurrence.

A tendency towards the practice of inhumation can be regarded as a gradual transformation towards Christian burial customs in the last part of the Viking Age (Gräslund 2000:85, Gräslund 2008:639). This is, for example, suggested in Mälardalen, where some of the last inhumations in the pre-Christian cemeteries are interpreted as Christian (Fahlander 2016). The first inhumations at Skeiet align in time with the expansion and rising international influences at the start of the Viking Age (cf. Heen-Pettersen 2018a, Baug et al. 2019). Two of the graves, 2 and 11, include Insular objects in the form of personal adornments (Figures 20 and 21), which indicate a clear relationship with the British Isles during this phase. The earliest was a cross-shaped mount with Celtic ornamentation used as a brooch, found in Grave 11, which was buried in c. AD 800–850 (cf. Heen-Pettersen 2020:437). Even though it was used as a personal adornment in a non-Christian burial context, the shape alludes to an original Christian background in Ireland. The second was the Hyberno-Norse tripartite bead in Grave 2. This implies that the local community were in touch with Christian ideas and objects, at least indirectly, coinciding in time with the introduction of inhumation practices at the cemetery.

But even though Christian influences could influence mortuary behaviour towards inhumations, both boat and simple dug inhumations were clearly carried out within a non-Christian practice. The presence of grave goods, as seen at Skeiet, is often taken as a clear sign of non-Christian burials, even though this is debated and the transition is nuanced (Nordeide 2011b, Fahlander 2016, Gräslund 2000). Also, the indications of excarnation and the possibility of exhumation as seen in the superimposed boat graves (see below), do not comply with what we normally think of as Christian burials. Similarly, the orientation of both boat and dug inhumation graves were predominantly north-east to south-west (Figure 3, above) and therefore did not align with the usual east-west orientation of Christian graves (Nordeide 2011b, Gräslund 2000). A general preference towards orienting inhumation graves (both boat graves and dug inhumation

graves) on this axis, with the head to the north-east, is often noted in Viking Age inhumations and boat graves, as seen in both Mälardalen and in southern Norway (Gulli and Langeid) (Gjerpe 2005b, Glørstad & Wenn 2017, Eriksen 2019). This may relate to a Norse pre-Christian worldview where the realm of the dead was set in the North (Eriksen 2019:204).

The inhumations from Skeiet also imply that the orientation of the body in relation to this axis could differ since the placement of grave goods implied that the direction of the head could be either direction. This implies a variation within the orientation and placement of bodies. Likewise, variations in the placement and selection of grave goods displayed in the inhumation graves can be suggested. Viking Age weapon graves often display the sword on the right-hand side of the body (Sayer et al. 2019), as seen in Graves 1, 10 and 20. However, Grave 16 displays the sword on the opposite (left-hand) side, as well as including an iron weaving beater placed alongside the sword (perhaps instead of a spear), a collection of eastern Kufic dirhams, hacksilver and a lead weight (See Figure 11, above). Even though textile production tools are occasionally found in weapon graves (Lund & Moen 2019), it makes an impression of a deliberate display of grave goods that diverges from the general picture. Viking Age burial acts were settings where aspects of the identity and personhood of the deceased were important, and the displays of objects, the body and the funerary ritual could have been an active means for the family to mediate and transform who and what the person was (Lund 2013, Williams 2005). The variation seen at the individual level may be understood by applying plurality in perceptions of personhood, individuality and identity which was mediated in the display of grave goods. The combination of eastern trading indicators (implied by the coins) and the atypical combination and placement of tools and weapons may suggest a burial ritual that emphasised an individual who participated in long-distance trade and expeditions, warfare as well as textile production, and this plurality was underlined in the funeral ritual.

Another aspect of the observed mortuary behaviour at Skeiet are the many secondary manipulations of the graves. What was earlier regarded as pillaging for valuables (also known as grave robbing), is instead seen today as motivated by either political reasons or claims to land (e.g. Bill & Daly 2012, Klevnäs 2016) or, of most relevance in this case, reflecting the active use of Viking Age cemeteries as spaces for mortuary rituals and interactions with graves and the dead. Intruding on graves, removing and exhuming grave goods and human remains can, thus, be seen as a wider phenomenon related to the mortuary practices in Norse culture (Brendalsmo & Røthe 1992, Price 2010, Gardeła 2016, Fahlander 2016, Toplak 2022). A related phenomenon is also implied at Skeiet by three mortuary houses, which are seen to provide a space for frequent visits and interactions with mortuary remains, as well as providing a ritualised space or threshold between the living and their dead ancestors (see Discussion in Sauvage & Macphail Ch. 7, also Gardeła 2016, Eriksen 2019). The results indicate that all of the observed intrusions in the graves occurred while the cemetery was in use in the Late Iron Age. This could be directly dated by the intrusion in Grave 10 and the insertion of the second boat grave (Grave 11) within, suggesting a close temporal relationship. Also, the looting pits in Graves 8 and 15 clearly target only the centres of the graves, avoiding damage to the hull in Grave 8 and the organic layer in Grave 15. This implies intimate knowledge and care in regard to the grave's location and contents (cf. Gjerpe 2005c:145). It suggests that these intrusions happened within a generation or two after burial and dates the intrusions as a phenomenon mainly restricted to the Viking Age.

A 50 to 100-year gap between making Grave 10 and reopening it to insert Grave 11 has been suggested, supported by the missing parts of the older boat. This act involved entering a grave in a state of decomposition, causing heavy damage and possibly removing remains and grave goods from the first burial. This can be viewed as a hostile act towards the older grave. However, the deliberate positioning of the second grave within the first grave rather alludes to the continuity and active use of the cemetery for mortuary rituals, providing a strong link between the two. Suggested excarnations in both, followed by the burning and sealing of each grave (indicated by micromorphology), imply a burial ritual where the bodies and grave goods remained accessible for a time before sealing. This could provide a period of continued ceremonies and visits. This is not unique to the cemetery on Skeiet, and similar Viking Age extended burial rituals in boat graves have been suggested in relation to the Oseberg Ship grave, the boat graves at Valsgärde in Central Sweden and a boat grave on top of an inhumation grave in Kaupang in Southern Norway (Price 2010:140 with references). Thus, the recorded remains in Graves 10 and 11 should not be seen as isolated sealed burial events but as the result of a series of practices that relate to prolonged mortuary rituals. Consequently, in furnishing a boat grave like Grave 11, the placement of the body (shown by remains

and brooches), textile production tools and sacrificial animals (indicated by the bovine cranium) may have transpired as separate events. This contrasts with the notion that Late Iron Age graves represent closed assemblies from a single burial event. Consequently, what we excavate should be seen as the result of several mortuary rituals, including secondary intrusions.

Another way to understand Graves 10 and 11 is that they involved a direct link to the past through the insertion of the secondary boat grave. Secondary graves in Viking cemeteries, especially those intruding into more recent graves, are seen as an active link to specific ancestors and family genealogies (Fahlander 2016, Toplak 2022). Combining two burials can also be seen as merging two bodies, creating a 'duovidual', a hybrid of the two persons (Fahlander 2013). By applying these perspectives to Skeiet, Graves 10 and 11 can therefore be seen as a way of merging past and present relations in the community by merging the two graves. However, this view contrasts with the results which strongly suggest that grave goods (and maybe human remains from another person) were removed from the southern end of the underlying Grave 10 boat when constructing the second grave. Parts of this assembly (Grave 21) indicated high status, best implied by the disc-on-bow brooch fragment (Figure 18, above), which was removed and redeposited during the excavation for Grave 11. It is quite common that only fragments of these brooches were deposited in graves, a phenomenon often interpreted as a *pars pro toto,* and they were seen as important symbols and heirlooms along the maternal line in high-status families in the centuries before the Viking Age (Glørstad & Røstad 2015). Therefore, exhuming the brooch and depositing it in the backfill of Grave 11 may seem strange. However, interring disc-on-bow brooches in graves decreased all over Norway at the start of the Viking Age. This is seen as a reaction to new ideas of symbols of social status catalysed by Viking raids and increased integration with the British Isles at this time (Glørstad & Røstad 2015), which could have promoted new family lines with new symbols of social status. Including a Celtic mount/brooch in the secondary Grave 11 can be viewed as a direct expression of this notion. It is therefore interesting that the analysis of funerary clothing suggested that the mount was the only visible adornment when the body was displayed in the grave (Øien & Heen-Pettersen Ch. 8). In this light, it is possible to view the insertion of Grave 11 as a burial ritual aimed at manipulating identity or memory, by physically manipulating the material remains and artefacts, and strongly emphasising objects that promoted new ideas and status. Thus, we can speculate as to whether this was a deliberate manipulation to connect the family and community to the new ideas and relations in the Viking world which manifested in mortuary rituals.

CONCLUSION

This chapter aimed to present the material remains of Late Iron Age burial practices from Skeiet in Vinjeøra in Central Norway and to discuss its relation to the supposedly heterogeneous nature of Norse mortuary practices. The investigations imply a mix of local mortuary practices that could be recognised in the material remains from the cemetery. Spanning cremations, boat burials, simple dug inhumations and different types of secondary interactions in graves, it displays clear heterogeneity in the mortuary expressions of the local settlement, corresponding to the plurality of funerary practices seen across the Norse domain over the course of the period. The chronological model implies that there was an evolution in the recorded burial rituals, entailing a gradual development from cremation depositions in c. AD 600–800 to a practice of inhumating bodies in c. AD 750–950. Thus, the local practices may seem less heterogeneous when considering the time aspect and they pass through several changes. The expansion and increasing international influences at the start of the Viking Age seem to have caused a strong impact which resulted in new types of mortuary materialisations. After two centuries of solely cremation deposits, this phase included increasing diversity and complexity in mortuary expressions seen in the introduction of inhumation practices, boat burials with possible excarnation phases and an increasing number of secondary intrusions. The coexistence of cremations and inhumations implies that this was a transitional period where different approaches to death and the afterlife were reflected and adopted. This reflects mortuary expressions seen in other Scandinavian areas at this time. The transition to the Viking Age may reflect leaving the old ways and introducing new ideas and symbology into the community. Removing grave goods which reflected old ideas of heritage and family lines, such as the removal and discarding of parts of a boat grave with a disc-on-bow brooch and replacing it with a new boat grave containing an individual with Insular objects worn as dress ornaments, was a strong reflection of a break in tradition. This can be seen as a deliberate expression of the local group's involvement in overseas voyages (e.g. Heen-Pettersen 2018b), replacing old traditions and promoting new

family lines through burial rituals that related to and promoted the social status of those participating in Viking raids and expeditions.

Variations and the heterogeneity of Norse burial rituals reflect a multifaceted ritual and religious landscape. Late Iron Age Northern Europe was not a singular continuity, and a pan-Scandinavian religious pantheon as suggested in later medieval written sources is not reflected in the burial rituals. On the contrary, local and regional beliefs must have differed considerably, particularly when relating to death and the afterlife (as noted by Svanberg 2003, Andrén 2005). However, a common theme is the active use of cemeteries as spaces for long-term mortuary rituals and interactions with graves and the dead. As discussed, using the mortuary houses from Skeiet (Sauvage & Macphail Ch. 7) as an example, ancestral worship using mortuary expressions that relate to the past and dead ancestors often seems to be a common theme. If burial expressions mostly reflect these aspects of religious life, plurality in the mortuary rituals and graves should be seen to reflect local familial and communal rituals and traditions, which must have had many different manifestations across Scandinavia.

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SAMMENDRAG

Et gravfelt fra yngre jernalder og vikingtid ble nylig utgravd i Vinjeøra i Trøndelag. Feltet inneholdt 18 graver og det ble funnet flere lokale begravelsestradisjoner, inkludert kremasjonsgraver, båtgraver og jordfestebegravelser. Undersøkelsen viser en variasjon av ulike lokale begravelsespraksiser og måter og håndtere de døde på, og analysen antyder en tidsmessig rekkefølge, der kremasjonsbegravelser var vanligst ca. 600–800 e.Kr., etterfulgt av en gradvis overgang til jordfestebegravelser nedlagt i ovale groper ca. 800–950 e.Kr. Økende internasjonale påvirkninger i starten av vikingtiden ser ut å ha påvirket den lokale gravskikken mot større grad av jordfestebegravelser og begravelse i båt, samtidig som det kan ses flere indikasjoner på samtidige interaksjoner og inngrep i gravene . Dette inkluderte plyndring av graver, mulig eksponering av graver i båt, og innsetting av sekundærgraver i eldre graver. Funnene peker på komplekse handlinger som del av den lokale gravskikken og antyder en aktiv interaksjon med gravene og de døde. Gravene var resultatet av flere ulike begravelsesritualer og indikerer betydelig variasjon i begreper og ideer om død, etterliv, og transformasjon av identitet i døden. Ulike ritualer kunne eksistere samtidig og nye impulser ble raskt adoptert i det lokale miljøet, spesielt fra starten av vikingtiden. Studien antyder at lokal gravskikk ikke var tilfeldig, at den gjennomgikk flere endringer i løpet av perioden, og antyder en aktiv bruk av gravfelt som steder for langvarige begravelsesritualer og interaksjoner med gravene og de døde.

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6. SOIL MICROMORPHOLOGY OF FUNERARY FEATURES AT SKEIET, VINJEØRA

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ABSTRACT

This chapter presents geoarchaeological findings from the cemetery at Skeiet in Vinjeøra, Central Norway, focusing on Late Iron Age funerary practices. A range of funerary features were sampled to study the composition of soils. These included two mortuary houses (Mortuary house 13 and 9), an inhumation inside (Grave 6) and outside (Grave 1) Mound 1, and three boat graves, including Grave 10 and a double boat grave (Graves 10 and 11). In total, 13 thin sections were analysed as part of a much wider study (the E39 Betna–Stormyra project). The findings suggest that the mortuary houses were constructed of wood and had a roof, with an entranceway for access. Soil micromorphology analysis revealed that the inhumation in Grave 6 below Mound 1 was characterised by an organic layer composed of moderately well-preserved wood/bark, likely from the coffin, showing some iron-phosphate staining. In contrast, the less well-protected Grave 1 outside Mound 1 showed pelletised wood traces and natural soil sesquioxide impregnation. The excavation and soil micromorphological studies suggest that Grave 8 was an excarnation burial, with pelletised wooden boat residues showing body staining. The double boat graves also showed evidence of excarnation. The double boat grave was also apparently characterised by excarnation, according to the archaeological and thin section results. The lower grave, Grave 10, showed pelletised wood remains indicating body staining. Before the insertion of the ensuing excarnation of Grave 11, a layer of wood charcoal fragments indicated that the decayed remains of Grave 10 were first 'cleansed' by fire and then sealed with soil and turf. The boat and body stain in Grave 11 were also probably burnt/'cleansed' after a period of decay.

Keywords: Boat burials; mortuary practices; funerary features; soil micromorphology, Viking Age

INTRODUCTION

The cemetery at Skeiet in Vinjeøra, Central Norway, is composed of typical Late Iron Age funerary features: ring ditches from burial mounds, boat graves, inhumations, cremations and three suggested mortuary houses. Data from the graves suggest that burials started in the sixth century AD and ended in the mid-tenth century AD. This chapter aims to present geoarchaeological findings (soil micromorphology) from two of the mortuary houses with associated burial mounds, two inhumation graves and three boat graves.

The buried soils and makeup of numerous grave mounds and some barrow cemeteries have been investigated across Europe, including experimentally (Bell et al. 1996, Breuning-Madsen et al. 2001, 2003, 2012, Drewett 1976, 1989, Gebhardt 1993, Macphail et al. 2003, Mikkelsen et al. 2006, Runia 1988). Few funerary features, however, were studied in relationship to associated settlement activities (Macphail et al. 1998, Rødsrud 2020). As an exception to this, several Norwegian coastal settlements have come under scrutiny and include examples linked to grave mounds (Avaldsnes) and other funerary examples (e.g. the boat grave in Heimdaljordet) (Macphail et al. 2013, 2017, Macphail & Linderholm 2017). In addition, a series of boat grave sites in Trøndelag have been characterised (Melhus gård and Røddekrysset, Macphail 2017, 2019). The site of Skeiet, however, provides the opportunity to investigate a variety of funerary practices (cf. Goldberg et al. 2022 Ch. 15) dating

Reference: Macphail, R.I., Sauvage R. (2024). Soil Micromorphology of Funerary Features at Skeiet, Vinjeøra. I R. Sauvage (Ed.), *From Life to Death in Iron Age and Medieval Vinjefjord* (pp. 163–175). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.218.ch6
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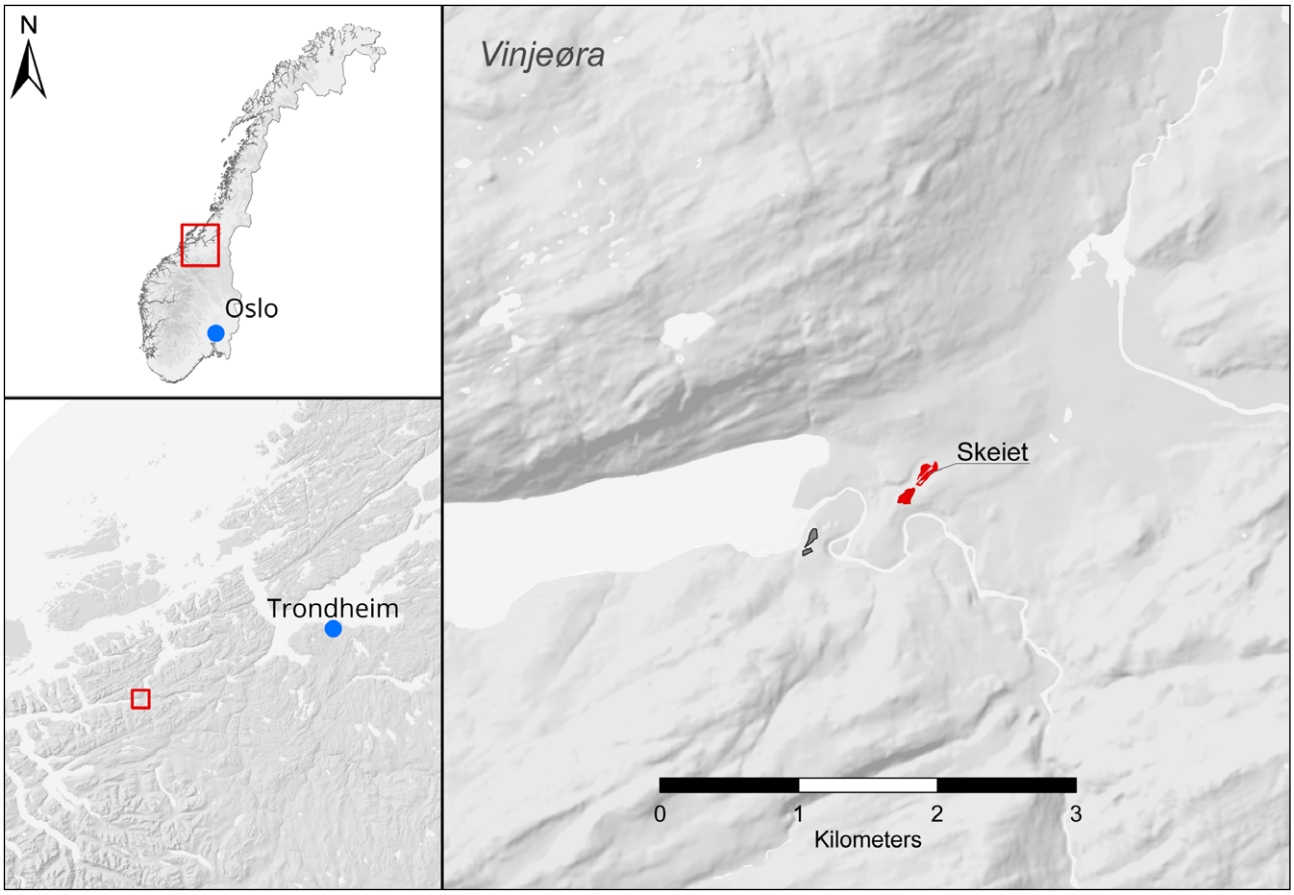

Figure 1. *Location map. Illustration: Kristoffer R. Rantala, NTNU University Museum. Lokasjonskart.*

from the late Iron Age to Viking times in one near-settlement coastal location (Macphail 2021a). Grave mounds on this site have been incorporated into a geoarchaeological model of settlement morphology (Macphail et al. 2017).

MATERIAL AND METHODS

Sampled funerary features at Skeiet involved two mortuary houses Mortuary houses 13 and 9, with an inhumation below Mound 1 and three boat graves including a double boat grave (Graves 8, 10 and 11) (Figure 2). In all, 13 thin sections were analysed in this part of a wider study in Vinjeøra, Trøndelag (the E39 Betna–Stormyra project).

The undisturbed monolith samples (Tables 1 and 2) were impregnated with a clear polyester resin-acetone mixture, then topped up with resin, ahead of curing and slabbing for 75x50 mm-size thin section manufacture by Spectrum Petrographics, Inc., Oregon, USA. The thin sections were further polished with 1,000 grit papers and analysed using a petrological microscope under plane polarised light (PPL), crossed polarised light (XPL) and oblique incident light (OIL), at magnifications ranging from x1 to x200/400. Thin sections were described, ascribed soil microfabric types (SMTs) and microfacies types (MFTs) and counted according to established methods, as used on Norwegian sites previously (Bullock et al. 1985, Goldberg et al. 2022, Macphail & Goldberg 2018, Stoops 2003, Stoops et al. 2018, Viklund et al. 2013).

RESULTS AND DISCUSSION

Soils at Skeiet are podzols formed in late-glacial terrace sands and gravels and, for example, the entranceway deposits in Mortuary house 13 (below) have developed on a truncated Bs horizon (Van Ranst et al., 2018).

Mortuary houses with associated ring ditches/grave mounds

The following were studied:

- Mortuary House 13, with a wall ditch and entranceway
- Mortuary House 9, with a wall ditch and ring ditch (Mound 1)

The investigated mortuary houses consisted of rectangular, c. 30 cm deep wall trenches, set inside ring ditches. AMS radiocarbon dates from the wall trenches and related features suggest that the

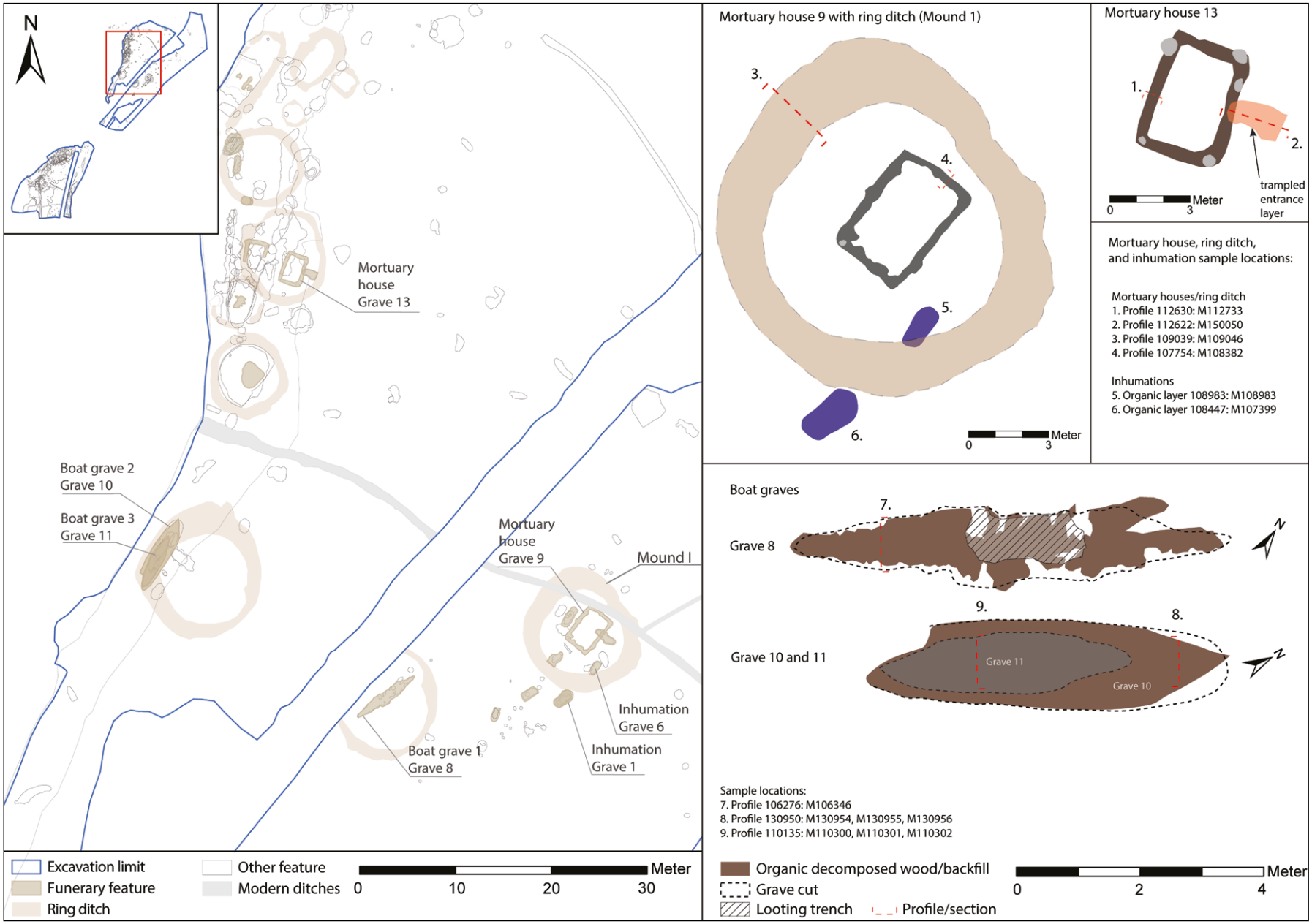

Figure 2. *Sampled funerary features at Skeiet 1 with sample locations; two mortuary houses (Graves 13 and 9, with Mound 1 ring ditch), two inhumations (Grave 6, inside Mound 1, and Grave 1, outside); and three boat graves including a double boat grave (Graves 8, 10 and 11). Illustration: Kristoffer R. Rantala & Raymond Sauvage, NTNU University Museum. Undersøkte gravkontekster med plassering av prøveuttak.*

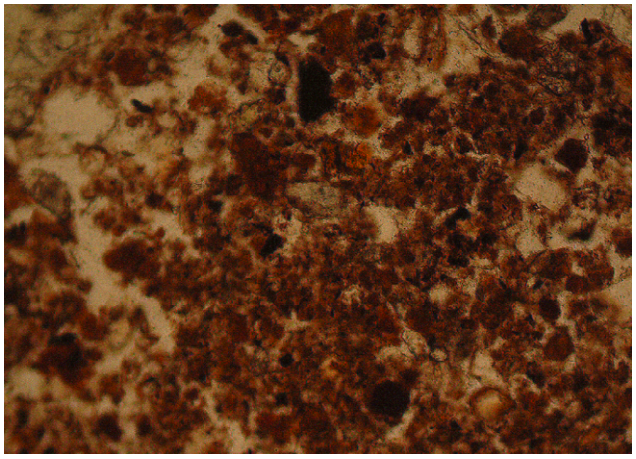

Figure 3a. *Photomicrograph of M112733 (Profile 112630, Ditch 150000); compact lower fill is composed of reddish brown inclusions which could be woody residues. Plane polarised light (PPL), frame width is ~0.90mm*

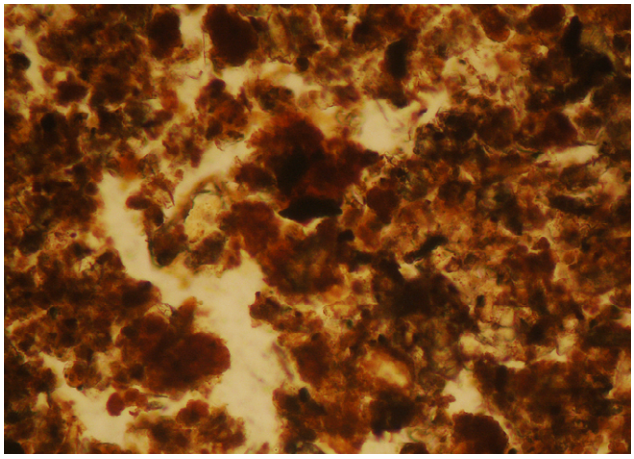

Figure 3b. *High magnification image of Figure 3a, showing oxidised, humified and pelletised remains of probable wood (of wooden walled mortuary house origin). PPL, frame width is ~0.47mm.*

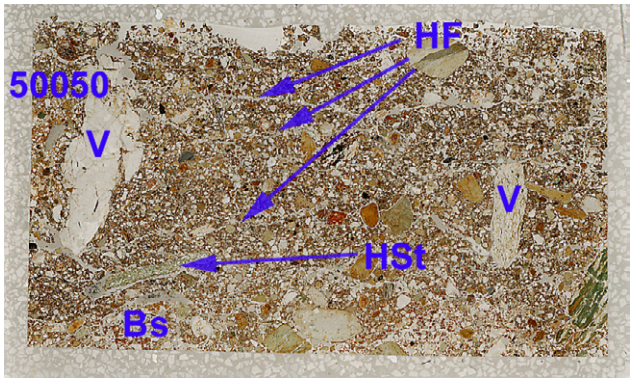

Figure 3c. *Scan of M112677 (Profile 112622, Layer 150050); compact trampled entranceway soil (50050) over original podzol subsoil (Bs - Bs horizon), with typical horizontal fissures (HF) and horizontal stones (HSt), as well as enigmatic vertically oriented larger stones (V). Frame width is ~75mm.*

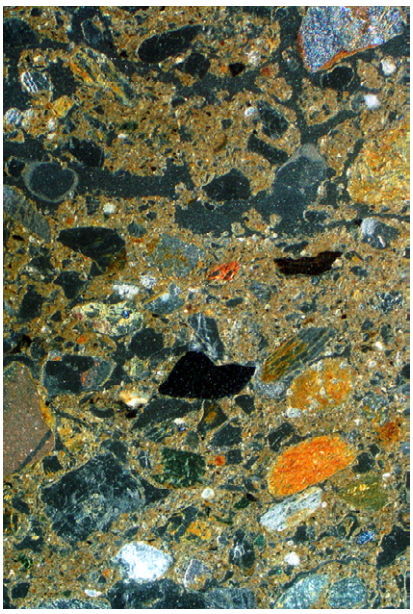

Figure 3d. *Photomicrograph of M112677 (Figure 3c); compact occupation soil with minor subhorizontal fissures and two fine charcoal grains. Oblique incident light (OIL), frame height is ~4.62mm.*

Figure 3a–d. *Mortuary House 13. Mikrofotografi og skanning av jordmikromorfologiprøver fra dødehusene.*

structures were built and replaced each other in the interval from the 7th to the 10th century. In total, four samples were studied from these features. Two of the thin sections were sampled from the wall ditches, one from each. A trampled layer recorded at Mortuary House 13, which suggested the existence of a possible entranceway, was also sampled (see Sauvage & Macphail Ch. 7 for details). Finally, a thin section from the lower strata in the ring ditch associated with Mortuary House 9 was sampled (refer to Figure 2).

The present authors are unfamiliar with any geoarchaeological investigations of mortuary houses elsewhere. At both mortuary houses, however, it was clear that wall ditches probably preserved oxidised and pelletised wood residues, indicating that these structures had wooden walls (Figures 3a–b). Moreover, Mortuary house 13 had an entranceway recording a 'dry' trampled occupation surface (Figures 3c–d) (Gé et al. 1993, Macphail & Goldberg 2018:Table 10.1, 368–379, Rentzel et al. 2017). This finding appears to be good evidence for suspecting that the mortuary houses were roofed structures.

The ring ditch (Mound 1) associated with Mortuary house 9 also accumulated sediments relating to the post-depositional history of this monument (Figure 4a). A primary fill of sands and gravel was followed by 'silting' that included small amounts of charcoal and possible burnt sands and gravel possibly reflecting

Figure 4a. *Scan of M109046 (Mound 1 ring ditch, Profile 109039). Ditch cut into sands and gravels of regolith substrate and has a weakly humic fill (Layer 101658) that includes a particularly diatom-rich lens – the diatom layer (DL) also being a focus of rooting – now often ferruginised. The earliest weakly humic fills with small amounts of fine charcoal were burrowed down into the sands and gravels. Frame height is ~50mm.*

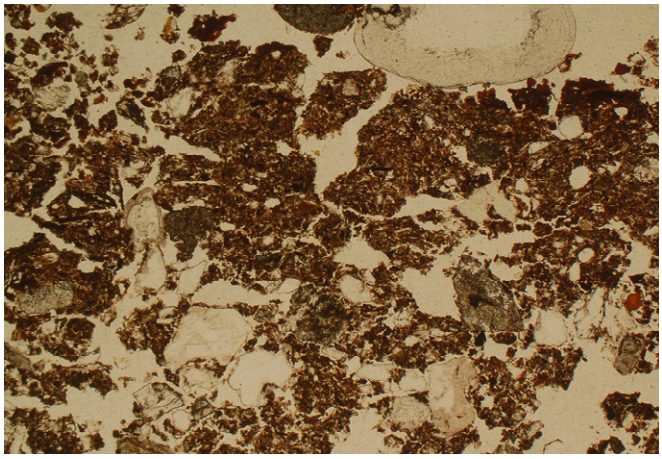

Figure 4b. *Photomicrograph of M109046 (Layer 101658); weakly humic silting lens rich in diatoms (DL in Figure 3a). PPL, frame width is ~4.62mm.*

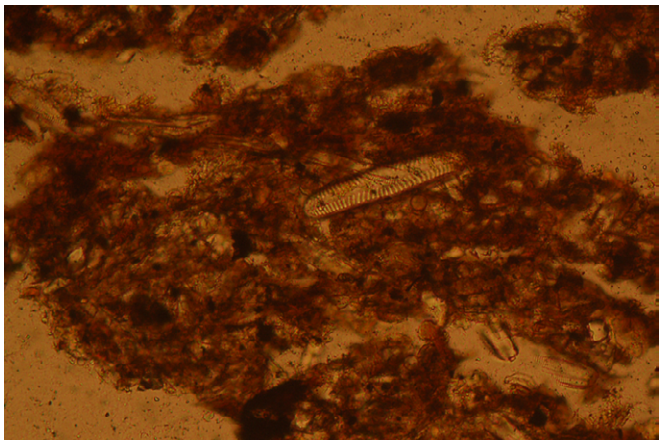

Figure 4c. *High magnification image of Figure 4b, with a clear image of a diatom (centre). PPL, frame width is ~0.47mm.*

Figure 4a–c. *Mound 1, associated with Mortuary House 9. Mikrofotografi og skanning av jordmikromorfologiprøver fra fotgrøften til Haug 1.*

background (possibly funerary associated) activities. Of further interest is that later on in the monument's history, weakly humic fine silting material contains rare to abundant diatoms, with a semi-intact layer (subunit 3?) forming a diatom-rich silt loam lens (Figures 4a–c). Although affected by post-depositional bioworking, this later fill seems to retain evidence of stasis, when small amounts of organic matter accumulated due to waterlogging (possibly due to standing water) and was an ideal habitat for 'soil diatoms' and other diatoms to bloom. This could suggest stable, undisturbed conditions pertaining after ditch digging and mound construction, at least for several seasons. As a comparison, a grave mound ring ditch in Bamble, Telemark also showed such a history, with supposed site disuse leading to a humic, diatom-rich layer eventually forming in the ditch (Rødsrud 2020).

Inhumations

The following were studied:

- Grave 1 outside Mound 1
- Grave 6 below Mound 1

Grave 6 below Mound 1 and Grave 1 outside of Mound 1 came under scrutiny. Both were inhumation graves dug into the subsoil, in the form of c. 1.7–2 × 0.9–1.3 m, and 40 cm deep, oval graves. While no human biological remains were preserved, both graves presented dark organic layers at the base, together with related grave goods, which combined with AMS radiocarbon dating suggest that they date to the 9th and 10th centuries (Sauvage & Lorentzen Ch. 5). Two samples were studied from the inhumations. Both thin sections were sampled in the lower

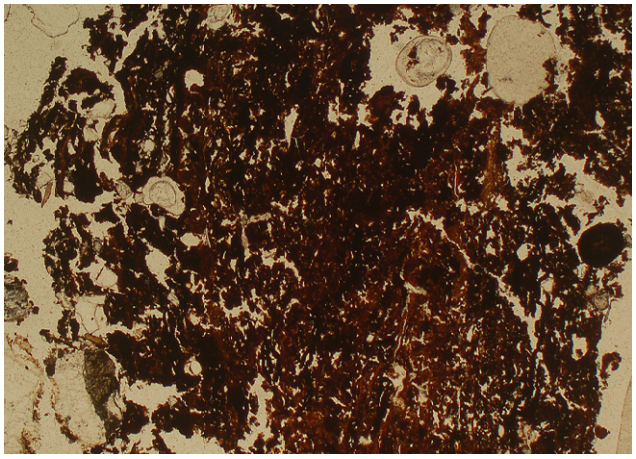

Figure 5a. *Photomicrograph of M109010 (Grave 6, Layer 108983); woody remains showing finely laminated woody fibres – possibly bark – with finely comminuted/pelletised remains. PPL, frame height is ~4.62mm.*

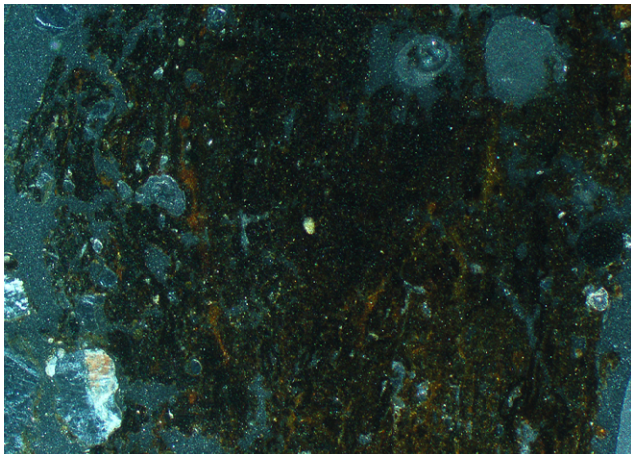

Figure 5b. *As Figure 5a, under OIL; some remains are weakly iron (iron phosphate) stained.*

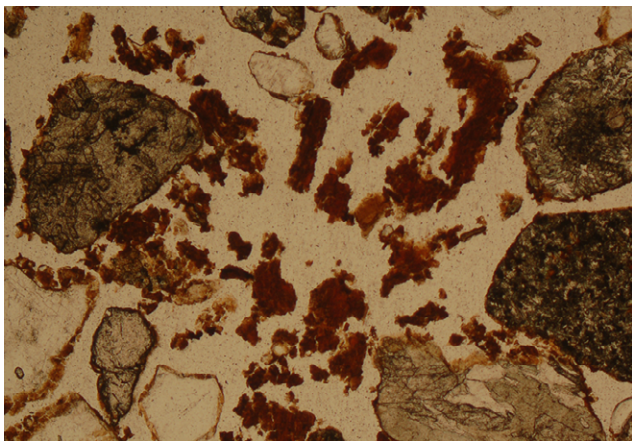

Figure 5c. *Photomicrograph of M107399 (Grave 1, Layer 108447), reddish wood (bark?) remains in moderately sorted medium and coarse sands. PPL, frame width is ~2.38mm.*

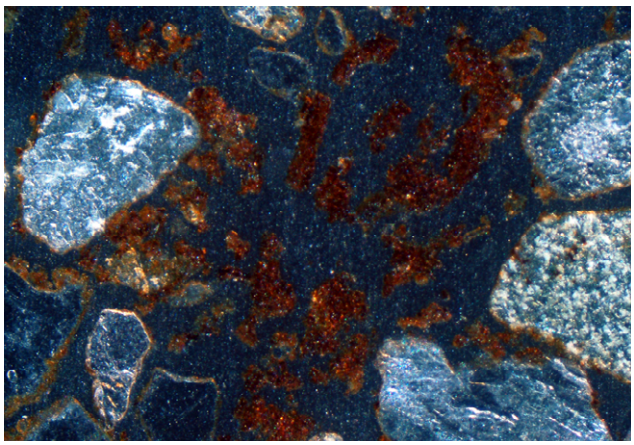

Figure 5d. *As Figure 5c, under OIL, showing likely post-depositional sesquioxidic (Al_2O_3 and Fe_2O_3) staining from continuing podzolisation on the site.*

Figure 5a–d. *Inhumations at Graves 6 and 1. Mikrofotografi av jordmikromorfologiprøver fra bunnlag i jordfestegravene.*

archaeological strata in the grave cuts, encompassing the dark organic layers seen at the base (Figure 2).

Grave 6 (Layer 108983, M109010) was excavated into layered sands and sands-and-gravels which have a probable lower podzolic Bs horizon character. The organic layer (108983) occurs as traces along the top of these sands, with one coarse – 7 × 5 mm size – organic fragment remaining from this grave feature (Figures 5a–b). It is composed of microlaminated woody/bark fibres, comminuted/pelletised residues and amorphous organic matter, with a rare trace of fungal sclerotia and fungal spores, with some woody fibres showing iron – possibly iron-phosphate – staining. Previous analysis of coffin remains and woody residues in general have shown that body decay can lead to iron-phosphate staining of coffin wood and its preservation, while bark, because of its decay-resistant lignin content, may also be preserved (Macphail & Goldberg, 2018:478–486, Rødsrud 2007).

In contrast, when the organic layer in Grave 1 (Layer 108447, M107399) was studied, only a very diffuse acidophyle invertebrate mesofauna-mixed boundary between the podzolic Bs horizon and the pelletised remains of the wood (or possibly bark) lined grave, was found (Figures 5c–d). The strongly decayed wood remains are also associated with fungal activity. No intact bark layer was encountered in this grave, as was found in Grave 6 (M109010), probably because Grave 1, although more recent (Viking Age), was not so well-sealed. In addition, illuvial sesquioxides from continuing podzolisation at the site seem to have stained the relict wood residues (cf. Macphail et al.

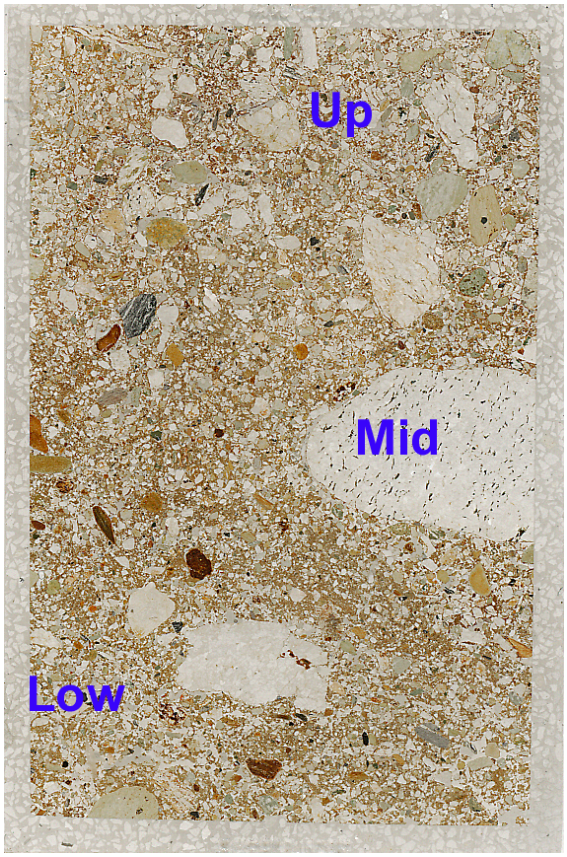

Figure 6a. *Scan of M106346 (Profile 106276); diffusely stratified fill with relict Bs horizon subsoil and rather pure pelletised wood remains in the lower part (Low), with above, mixed soil and woody residues showing possible body staining (Mid), and in the biomixed upper part also some relict instances of suspected body stain features (Up). Frame width is ~50mm.*

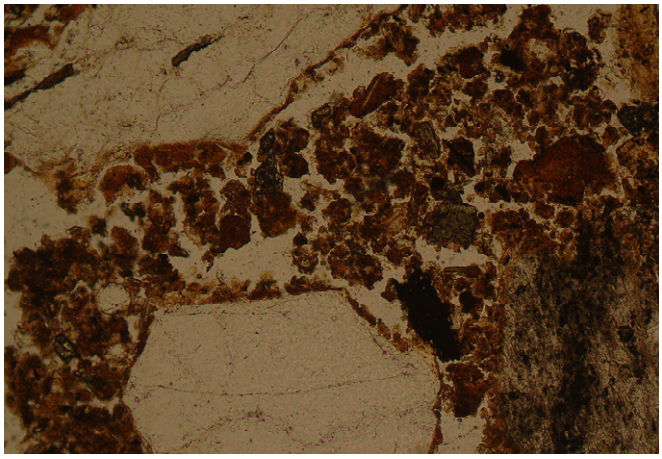

Figure 6b. *Photomicrograph of M106346; middle layer through suggested body stain and boat residues – all pelletised and biomixed. PPL, frame width is ~2.38mm.*

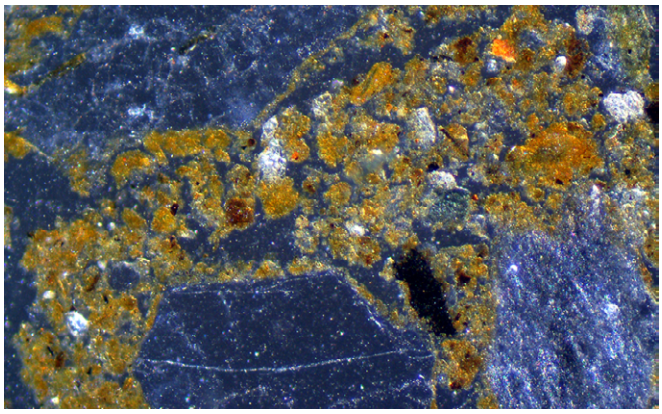

Figure 6c. *Detail of Figure 6b, under OIL; note ochreous iron (FeP?) stained woody residues and mixed-in fine charcoal. OIL, frame width is ~0.90mm.*

Figure 6a–c. *Grave 8. Mikrofotografi og skanning av jordmikromorfologiprøver fra Grav 8.*

2003, Runia 1988). Also, in the context of inhumations, it can be noted that in Viking Age Aalgård 33 in Sørum, Eastern Norway, a grave (A1124) included bone 'ghosts' and a phosphatic body stain preserving gut remains which included probable parasite eggs (Macphail, 2020). Here, ~4000 ppm P and 2.9% LOI, and an anomalously low PQuota (0.75) were measured because of the bone 'ghosts' and mineralised body stain that were present (Johan Linderholm, MAL, University of Umeå, pers. comm.).

Boat burials: Graves 8, 10 and 11

The following were studied:

- Grave 8, a boat grave set inside a ring ditch
- Graves 10 and 11, a double superimposed boat burial set into a ring ditch

Three boat graves were investigated. Grave 8 was a singular boat burial set centrally within a ring ditch, while Graves 10 and 11 were superimposed boat burials set into a ring ditch. As with the inhumations (above), no biological human remains were preserved, but grave goods and organic layers indicated the location of the bodies. Also, no intact wooden parts of the boats remained, but in situ, boat rivets and traces of decomposed wood suggested the former presence of wooden hulls. Grave goods and AMS radiocarbon dating indicate an 8th-century date for Grave 8. The superimposed boat graves are dated to the 8th century (Grave 10) and 9th century (Grave 11), respectively, using Bayesian modelling of AMS radiocarbon dates and grave goods typology. This indicates that the later boat grave was a secondary intrusion that was committed within a century after the primary burial (Sauvage & Lorentzen Ch. 5).

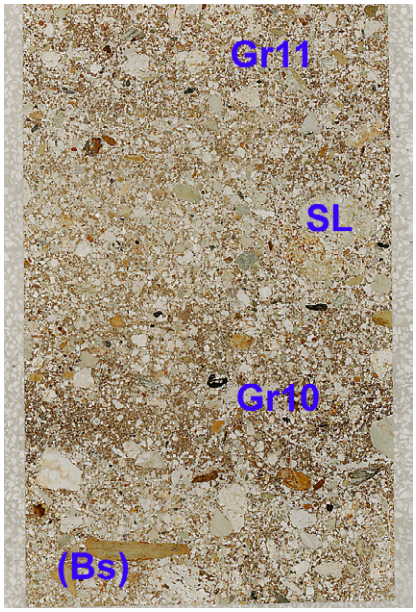

Figure 7a. *Scan of M130956 (Profiles 130959 and 106003); showing a basal layer of pellety woody residues mixed with podzolic subsoil Bs horizon (Bs), overlain by the dark soil remains of Grave 10 (Gr 10), and sealing layer (SL; Figures 7d–6f) with mixed dumped subsoil and burrowed down pellety soil from Grave 11 (Gr 11). Frame width is ~50mm.*

Figure 7b. *Photomicrograph of M130956 (Profile 130959, Profile 106003); Boat Grave 10, with dark stained pelletised woody residues – mixed boat and body stain (?); trace concentrations of 0.16–0.23% Fe, 0.02–0.06% P, 0.0–0.01% S and 0.03–0.04% Ca characterised these woody residues (SEM/EDS data). PPL, frame height is ~4.62mm.*

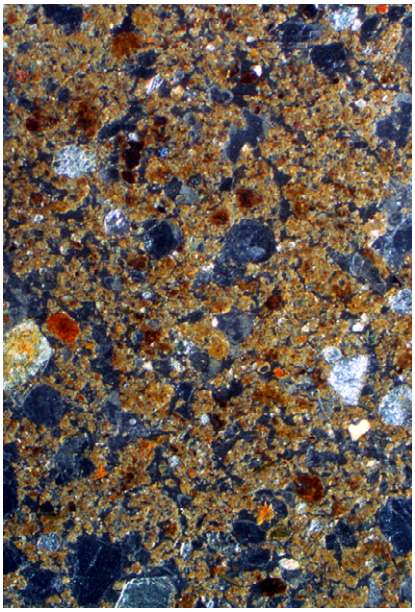

Figure 7c. *As Figure 6b, under OIL, showing humic-iron-phosphate (?) staining.*

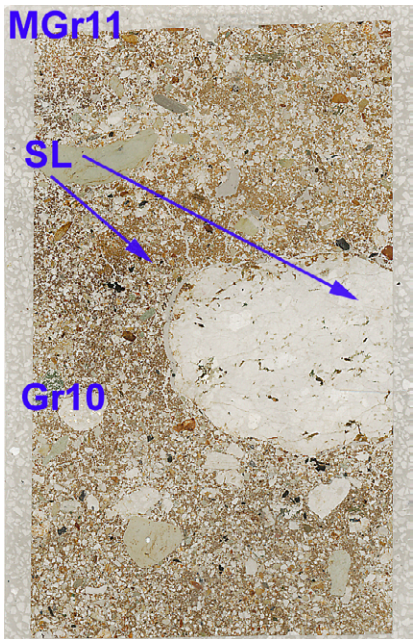

Figure 7d. *Scan of M130955 (Profiles 130950); here are the remains of suggested body-stained residues of Grave 10, which includes much fine charcoal occurring below a sealing layer (SL) composed of stones and a possible turf fragment. Upwards, part of the overlying Grave 11 is mixed with the dumped sealing layer (Gr 11). Frame width is ~50mm.*

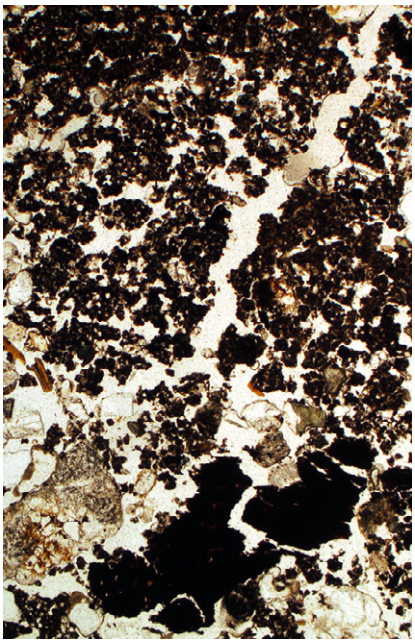

Figure 7e. *Photomicrograph of M130955, illustrating junction of body stained (?) woody boat remains (Grave 10), containing charred wood and overlying possible dumped turf soil. PPL, frame height is ~4.62mm.*

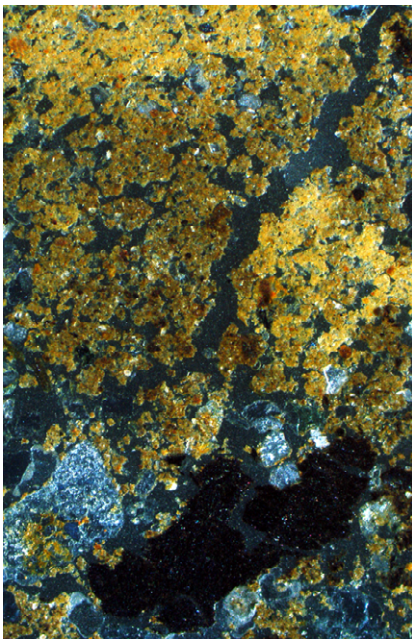

Figure 7f. *As Figure 7e, under OIL, illustrates marked boundary of the weakly humic 'boat grave' soil and dumped anthropogenic 'turf' soil.*

Figure 7a–f. *Grave 10. Mikrofotografi og skanning av jordmikromorfologiprøver fra Grav 10.*

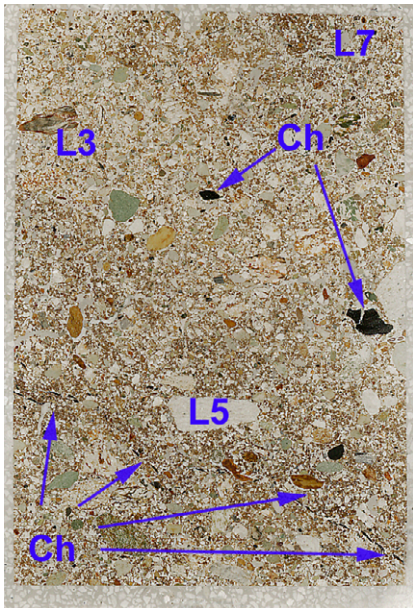

Figure 8a. *Scan of M110301 (Boat Grave 11, Profile 110135, Layer 109701); sloping deposits with woody soil remains in Layer 5 with suggested in situ semi-continuous charred wood/charcoal layer (charred boat strake?), with additional charcoal in overlying Layer 3 and dark overlying inwash soil (L7). Frame width is ~50mm.*

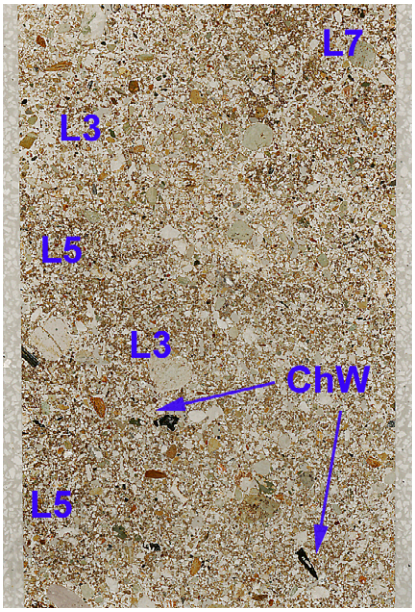

Figure 8b. *Scan of M110300 (Grave 11, Profile 110135; Layer 109701); diffuse sloping layers with charcoal and charred woody remains of boat strake (?) (ChW) in lower Layer 5, with intrusions of sands and gravels (Layer 3), weakly humic woody residues in upper Layer 5 (Figures 8c–d) and overlying sands (L3) and bioworked remains of soil inwash (L7). Frame width is ~50mm.*

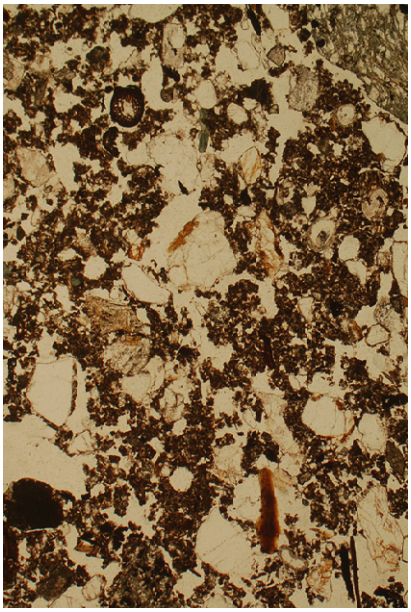

Figure 8c. *Photomicrograph of M110300 (Grave 11, Profile 110135, Layer 109701); middle Layer 5, composed of fine woody soil residues and very fine wood fragments. PPL, frame width is ~4.62mm.*

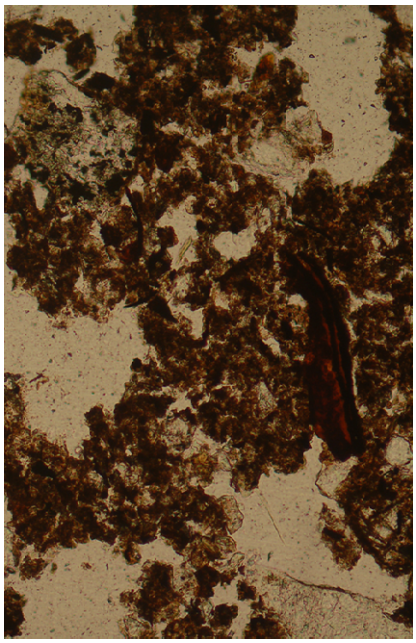

Figure 8d. *Detail of Figure 7c, pellety wood soil residues with embedded fine bark (?) fragment (0.15–0.21%Fe, 0.03%P, 0.07% Ca; SEM/EDS data). PPL, frame width is ~0.90mm.*

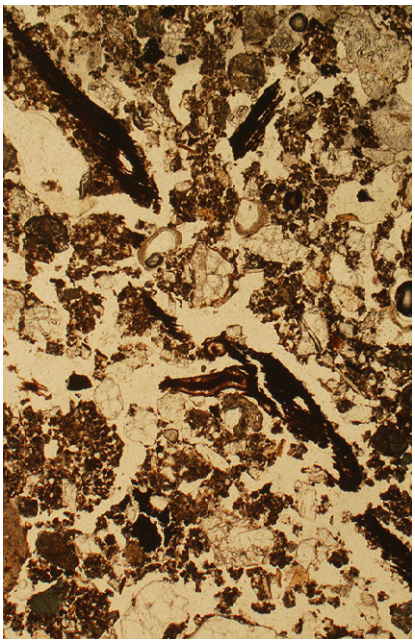

Figure 8e. *Photomicrograph of M110301 (Grave 11, Profile 110135, Layer 109701); woody residue fine soil in Layer 5 with semi-continuous charred wood (bark wood?) at base of sample. PPL, frame width is ~4.62mm.*

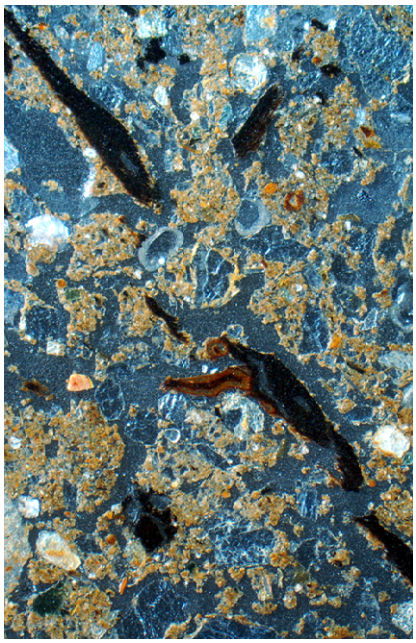

Figure 8f. *As Figure 8e, under OIL.*

Figure 8a–f. *Grave 11. Mikrofotografi og skanning av jordmikromorfologiprøver fra Grav 10.*

Seven thin sections were sampled from sections within each grave (Figure 2). One sample was taken from Grave 8, which included the lower strata in the form of organic layers believed to represent the decomposed wooden hull (Layer 106536) and the backfill in the grave. In the double boat graves, two profiles were made with three samples from each. The lower (Profile 130959) covered the first boat grave (Grave 10), and included the subsoil, the decomposed wooden hull and the grave backfill, as well as possible sealing layers and infill from making room for, sealing and the transition to the second boat grave (Grave 11 inside). The other section (Profile 110135) cut the upper Grave 11 and included decomposed wooden layers from the hull, organic components from the burial and deposits from sealing and backfilling the grave (for details see Macphail 2021a, Bryn et al. 2023).

Grave 8

In Grave 8 (M106346), Layer 106536 is diffusely layered. At the base, there is the junction between the podzolic Bs subsoil horizon and some rather pure pelletised remains of presumed boat timbers (cf. Macphail 2017, 2019) (Figures 6a–c). Upwards, finely fragmented and sometimes iron (FeP?) stained wood remains are intimately mixed with fine soil. Some staining here may record possible traces of a body stain (Burns et al. 2017, Carver 1998, Keeley et al. 1977, Macphail et al. 2022). At the top of the sample, boat and body stain soils are increasingly mixed with local anthropogenic soils, but there are instances of relict, rather pure iron (FeP?) infills and coatings. These are probably relict of the body in the boat (cf. Heimdaljordet, Vestfold, Macphail et al. 2013). Although traces of fine charcoal and burnt sand occur, there is no definitive evidence of burning being carried out in the decayed grave in this location. As the boat and body stain residues closely resemble those in Graves 10 and 11 (see below), the taphonomic processes are probably comparable, indicating that the body in Grave 8 was likely exposed – as an excarnation grave (cf. Hesby, Vestfold, Gollwitzer 2012, Viklund et al. 2013).

Double boat graves (Grave 11 inserted into Grave 10) – Profiles 130959 and 110135

At Profile 130959, the three thin section samples (PX 130954–130956) showed that basal Grave 10 remains occur as pelletised wood, which is biologically mixed with fine polymorphic organo-sesquioxides of *in situ* subsoil Bs horizon origin. The moderately compact weakly humic pelletised boat remains show marked staining of woody residues; SEM/EDS studies suggest that these are possibly humic-iron (Fe, P, S and Ca) combinations (Figures 7a–c) (Goldberg et al. 2022 Ch. 15, Macphail et al. 2022). This probable boat and body stain layer was sealed with dumps of stones, gravels and subsoil Bs horizon and possible turf soils (Figures 7d–f). It is also possible that small concentrations of fine charcoal could indicate that the weathered remains of Grave 10 were burnt ahead of this sealing event. In this profile (130950), the overlying Grave 11 remains show less obvious evidence of being 'body stained', as indicated by SEM/EDS data (see Figure 8d), and is mainly represented by pelletised and oxidised wood, relict of the boat. There can also be mixing with later deposits burying the weathered boat grave.

At Profile 110135 (Grave 11, Layer 109701), the three samples (M110302–M110301–M110300) record a series of weakly humic layers of pelletised wood, which are interpreted as the remains of individual boat strakes/planks; surrounding soil slumped into the gaps between these decayed boat strakes (Figures 8a–d). This decay of wooden ship planks and associated soil slumping was also a common feature found in the Gjellestad longship, Halden (Macphail, 2021b). In addition, at Profile 110135 there are some semi-intact woody, charred wood and charcoal remains, and these form semi-continuous sloping deposits (Figures 8a–b, 8e–f). These are assumed to be burnt decayed boat grave residues. Moreover, these residues include rubefied (burnt) sands in places, further evidencing this burning episode. This again suggests the practice of burning the weathered and decayed remains of boat graves. In summary, it can be suggested that Graves 10 and 11 have a history of:

1. Excavation into the subsoil Bs horizon and emplacement of Grave 10 as an excarnation grave (cf. exposed grave chambers in Hesby, Vestfold), and its decay and development as a boat-body stain.
2. After ~100 years, 'cleansing' of this Grave 10 by fire produced a scatter of charcoal and charred wood, which was sealed by a soil dump.
3. The emplacement of Grave 11, probably also as an excarnation, and after a period of decay again producing a boat residue and a weakly developed body stain.
4. A second 'cleansing' of the location was carried out (on Grave 11), leading to the present semi-intact charred wood and charcoal layer.

CONCLUSION

Within a larger soil micromorphology study of sites along the E39 Betna–Stormyra routeway, thin section analyses of a concentration of funerary features at Skeiet 1, Vinjeøra identified a series of unusual and possibly unique features. The study at Skeiet 1 focused on two mortuary houses (Mortuary house 9 and 13), two inhumations (Graves 1 and 6), and three boat graves (Graves 8, 10 and 11), including two successive boat burials in the same location (Graves 10 and 11). The chief findings from the mortuary houses involve evidence of these being roofed wooden structures, with one accessed by an entranceway. Mound soils silted into the ring ditch, eventually producing a weakly humic soil layer containing diatoms testifying to surface waterlogging and probable disuse/abandonment of this funerary feature.

Organic layers in inhumation graves recorded the remains (Grave 6) and traces (Grave 1) of wooden coffins. In the Mortuary House 9 mound-buried Grave 6, the likely bark remains of a wooden coffin were identified, which showed some probable iron-phosphate body staining. In the unburied and more recent (Viking) Grave 1, only pelletised residues of the presumed coffin were observed; some of these seem to have become sesquioxide stained due to ongoing podzolisation in the area.

A suggested excarnation burial in Grave 10 was recorded by the remains of the boat and likely 'body staining' of wooden boat residues. After some 100 years (?), this decayed boat grave site was conceivably cleansed by a burning episode before being sealed by dumps of subsoil and probable turf, ahead of a second boat grave (Grave 11) excarnation burial. This second boat grave also seems to have had a history of being cleansed by fire. In Grave 8, a presumed excarnation burial is evidenced by 'body-stained' wooden boat residues; no definitive indications of a burning event were observed in this location.

ACKNOWLEDGEMENTS

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SAMMENDRAG

Dette kapittelet presenterer studier av jordmikromorfologi og geoarkeologiske funn fra gravfeltet på Skeiet i Vinjeøra, i Trøndelag, med fokus på gravskikk og bruk av gravene. 13 tynnslip av jordsammensetningen i en serie med graver og begravelsesrelaterte strukturer ble gransket. Dette inkluderte to dødehus (nummer 13 og 9), to jordfestegraver (Grav 6 innenfor en gravhaug (Haug 1), og Grav 1 utenfor haugen); samt tre båtgraver: Båtgrav 8 og en dobbel båtgrav, Grav 10 og 11. Funnene antyder at dødehusene var konstruert av tre og hadde et tak og en hardtrampet inngang som ga tilgang. I begge jordfestegravene ble det undersøkt et organisk lag i bunnen av gravene. I Grav 6, som lå under en gravhaug, inneholdt dette spor av tre/bark, sannsynligvis fra kisten, med noe spor etter farging av jernfosfat. Grav 1, som ikke var beskyttet av en haug, var mer nedbrutt, men inneholdt spor av pelletisert tre og naturlig impregnering via jordsmonn. Studien av jordmikromorfologi i båtgravene antyder at begravelsene i en periode har vært eksponert og har fungert i en periode som ekskarnasjonsgraver. I Båtgrav 8 var det spor etter pelletisert tre fra selve båten samt spor som indikerer nedbrutt organisk masse fra den begravde. Det samme ble sett i den doble båtgraven. I den nedre båtgraven, ble det påvist et lag med trekullfragment, som trolig er forseglet av et lag med torv, stein, og nedbrutte rester av innholdet i graven. Den mindre Båtgrav 11 ble satt ned over dette nivået. Også her ble det påvist forvitrede rester etter båten og den avdøde, og et lag med trekullfragment. Det foreslås et samlet hendelsesforløp der de eksponerte restene i den nedre graven (Grav 10) ble renset med ild før, den ble forseglet med stein og jord. Deretter ble den øvre båtgraven (Grav 11) satt ned. Også denne ble sannsynligvis brent eller «renset» etter en periode med nedbryting, før graven ble forseglet med jordmasser.

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7. RITUAL PRACTICE AT LATE IRON-AGE AND VIKING-AGE CEMETERIES IN NORWAY: THE MORTUARY HOUSES FROM SKEIET, VINJEØRA[1]

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ABSTRACT

Three proposed Late Iron- and Viking-age mortuary houses were recently excavated in Central Norway. Excavations and geoarchaeological investigations imply underground wooden buildings resembling domestic houses with doors. Radiocarbon dating indicates three succeeding buildings dating c AD 500–950. The finds included animal and food sacrifices. With their funerary context, the buildings provided an opportunity to frequently visit and interact with mortuary remains, as part of the rituals practised at cemeteries. They provided a ritualised space between the living and their dead relations.

Keywords: Funerary house; Viking burial practise; door; funerary archaeology; ancestorial worship

INTRODUCTION

Mortuary and funerary houses have existed in a wide range of periods and places. Examples are Neolithic Northern Europe, Ancient Egypt, the Iron-Age Baltic, and Viking-Age Scandinavia. We can recognise them as house-like structures found in funerary contexts; some contained tombs and furnished graves or functioned as depositories for the bones of cremated or excarnated ancestors, while others might have been used as shrines and places of worship and offerings related to the dead. In the Nordic late Iron Age (AD 575/600–1050) and particularly the Viking Age (AD 800–1050), several mortuary features may represent similar structures. One example is the wooden chamber graves from fifth- to 8th-century Western Europe. They are found later in Scandinavia; with the best-known examples from Sweden and Denmark near the early towns of Birka and Hedeby. Both pre-dating and contemporaneous, comparable chamber graves are also recorded in the Baltic and within the medieval Rus territory in today's Russia and Ukraine (Gräslund 1981, Eisenschmidt 1994, Mikhailov 2011). A parallel may also exist in the wooden house- or tent–like chambers in the grave ships of Oseberg and Gokstad, Norway (Gansum 2004, Price 2008). However, the features most often mentioned in literature as Scandinavian mortuary houses, are special buildings discovered at cemeteries in Denmark, Sweden, and Norway (Gardeła 2016:188). One type consists solely of four-post constructions, which may sometimes surround a dug inhumation, like a late Viking-Age grave from Langeid, Southern Norway (Glørstad 2020). Other more substantial constructions consist of wall trenches, entrances, and post holes, which seem to represent free-standing buildings. Recently discussed finds of this type are from a late Iron-Age cemetery at Gulli in Southern Norway, and a longhouse-like building with mortuary finds from a Viking-Age cemetery in Sannagård at the Swedish western coast (Artelius 2000, Gjerpe 2005, Eriksen 2019, 192). In Norway, both types are unusual occurrences, but a few scattered examples are found; particularly from the southern and western regions and may be set both inside gravemounds and free-standing (Myhre 1976, Magnussen 2013, Glørstad 2020). A common theme for these constructions at cemeteries, is that they were spaces the living could enter, display, and

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Figure 1. *Location map with mentioned sites and places. By Raymond Sauvage, NTNU University Museum. Lokasjonskart med stedene som er nevnt i dette kapittelet.*

interact with the dead, both literally and figuratively (Eriksen 2019:191). By reflecting houses, they may also imply a continued existence of the dead inside gravemounds, as attested in later Icelandic saga literature (Price 2002:134, Gardeła 2016:174). In any case, they evoke the image of an active use and interaction between the living and the dead performed at Viking-Age cemeteries. Such interactions may be viewed as a way of worshiping the dead as part of ritual practice performed at cemeteries, corroborating previous hypotheses that ancestorial worship played a role (Birkeli 1943; Gräslund 2001, Gardeła 2016, Murphy 2018, Østigård & Kaliff 2020). Mortuary houses may be one of the features left on these sites where we see the notion of relating and interacting with dead ancestors most clearly.

Excavations in 2019 and 2020 of a pre-Christian cemetery from the late Iron-Age at Skeiet in Vinjeøra, central Norway (Figure 1), revealed three probable mortuary houses evident as wall trenches set within ring-ditch enclosed burial mounds. While no burials survived within (an observation to be discussed below), the discovery indicates a continuing presence of three successive underground house-like buildings at the cemetery, from AD 575/600 to the end of pagan burials in the mid-900s. Two houses contained evidence of an entrance, demonstrated by trampled soil entrance-ways and support for a doorway. Vestigial finds of poorly preserved horse bones may provide clues to the actions that were undertaken within. With their clear mortuary setting, the buildings provided a space for interacting with the dead by enabling visits and access and evoke a strong link between the living and the dead. By discussing the function of the mortuary houses from Skeiet, this paper aims to broaden our understanding of the rituals practised at late Iron- and Viking-Age cemeteries.

MATERIAL AND METHODS

The discovery of a Viking -Age cemetery with mortuary houses at Skeiet

Flattened gravemounds under the fields on the farm of Skeiet in Vinjeøra were first discovered in 1996. Test trenching prior to planned road construction uncovered several parts of flattened, ditch-(ring ditch) enclosed gravemounds, indicative of a pre-Christian cemetery. Additionally, a Viking-Age grave containing weapons was found close to the

Figure 2. *Aerial view overlooking the cemetery (foreground) during excavation in 2019 and the village of Vinjeøra beyond, looking south-west. Photograph by Raymond Sauvage, NTNU University Museum. Utgravningsområdet på Skeiet med Vinjeøra i bakgrunnen, sett mot sørvest.*

ring ditches, which confirmed that the features were remains of gravemounds and graves, dating to the late Iron Age.

In 2019 and 2020, an extensive excavation was undertaken by the NTNU University Museum at the Norwegian University of Science and Technology, before the planned road construction. The entire area (11,000 sq m) was uncovered using mechanical topsoil stripping, ad was shown to contain 11 circular and oval ring ditches covering an area of approximately 4,000 sq m. A nearby settlement with post-constructed buildings was also investigated and considered contemporary with and related to the cemetery (Figure 2).

By employing large-scale topsoil stripping, the goal was to map the entirety of the spatial layout of the cemetery. Using single context documentation and extensive ^{14}C-sampling, we set out to map the chronological development of the cemetery. A broad range of burials (18 in total) was excavated: cremations, inhumations, and boat graves (Figure 3). Two of the more intriguing finds were a pair of superimposed boat burials, and the suggested mortuary houses, which received considerable media attention (eg Best 2019, Hansen 2019). Initial analysis suggests that funerary activity started with cremations c AD 575/600, with a transition to inhumations and introduction of boat graves AD 750–800 (Figure 2). The last burials seem to have occurred c AD 950 (Sauvage & Lorentzen Ch. 5).

Geoarchaeological sampling (for soil micromorphology) was undertaken on buried soils and deposits in the funerary features. Samples from the mortuary houses consisted of three thin sections: one from a suggested trampled entrance layer, and two from wall trenches (Figure 4, Figure 9c). The composition of the deposits suggests that the features should be understood as wooden-walled and roofed houses, probably accessed by a doorway (Macphail 2021).

The discovery of the mortuary houses provides an exceptional glimpse into complex burial- and mortuary practice in the Viking Age. The graves also contained a large corpus of gravegoods and biological remains, which is still being processed with publication planned for 2024, including a discussion on the chronological distribution of the burial practice (Sauvage, forthcoming).

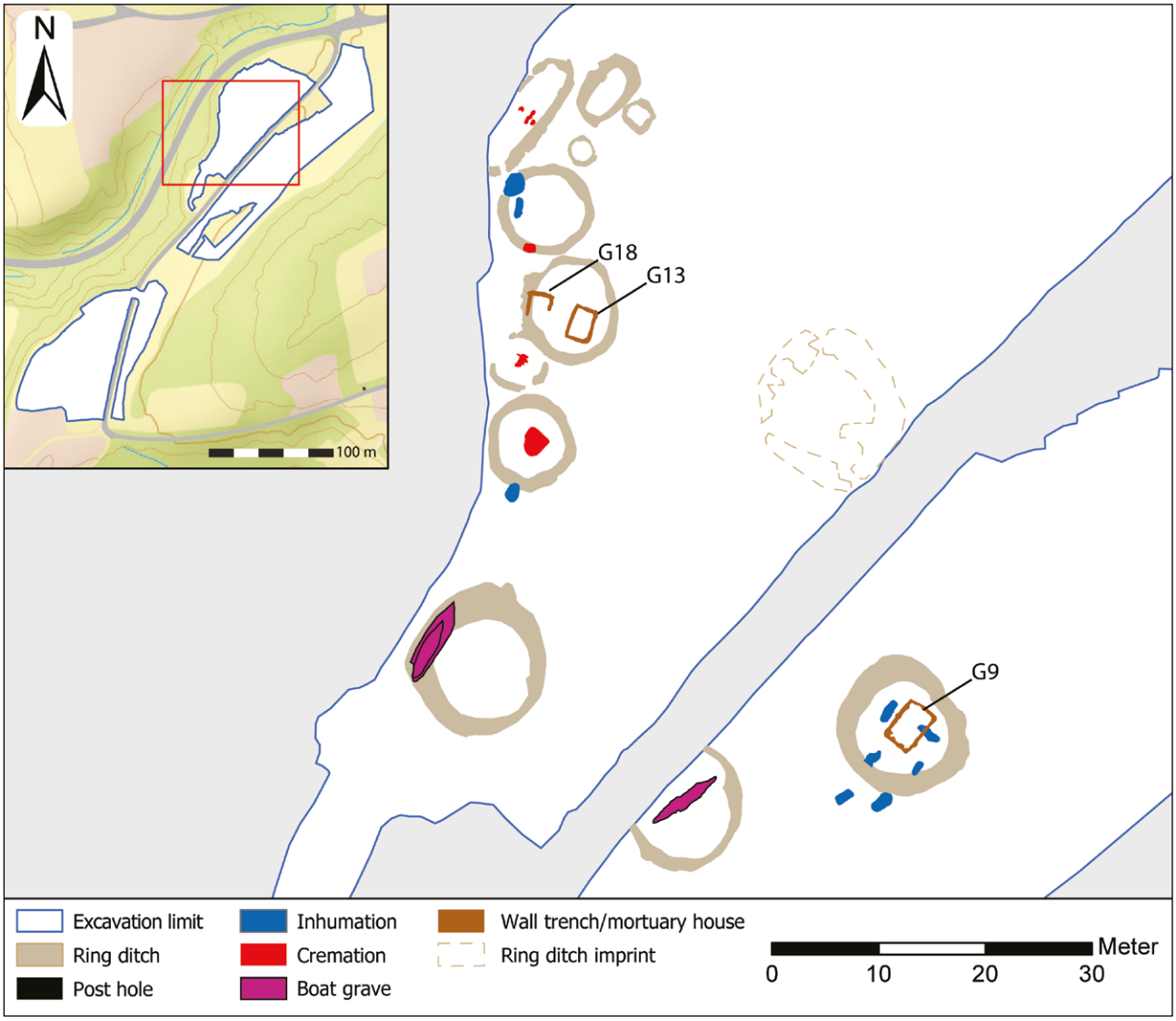

Figure 3. *Plan of the cemetery excavated at Skeiet in 2019 and 2020. Illustration by Kristoffer Rantala, NTNU University Museum. Plan over gravfeltet.*

RESULTS

Mortuary house construction

The mortuary houses show a clear consistency in layout, orientation, and shape. While the smallest building was only partially preserved due to later activity (Figure 4:G18, Figure5a), we could determine that the remains consisted of 0.2 – 0.3 m deep wall trenches enclosing rectangular interior space. The enclosed spaces were 2.4 × 2.5 m (G18), 3.3 × 2.3 m (G13) and 4.2 × 2.6 m (G9). G9 and G13 were within circular ring ditches, indicating that they were covered by a mound, while G18 had no clear indication of a related mound and was discovered under the ring ditch belonging to G13 (Figure 4). Excavation revealed standing stones placed along the outer edge of the wall trenches in both G13 and G9 (Figure 6), which may have supported a wooden structure of split logs or planks. Traces of supports for corner posts or staves remained in the four corners of the two larger buildings (Figures 4, 6 & 7a).

Evidence of wooden walls was also apparent in the soil micromorphology samples. The fine soil in the wall ditch had many very fine charcoal and amorphous organic inclusions — conceivably humified and pelletised wood fragments and coarse mineral materials (Figures 8a & 8b). Previously, such pelletised wood has been found in association with house floors, coffins and boat remains (Macphail & Goldberg 2018:479–84). This suggests fine organic sedimentation from the decomposing supposed wooden wall, at the same time as sands and gravels were 'silting' in from the sides of the wall trench. Possibly this all happened relatively rapidly, theoretically implying rapid decay of the 'wooden' structure (especially at the base of the wooden wall?).

Wooden walls were also suggested by a charred pine plank in the wall trench belonging to G13 (Figure 7b).

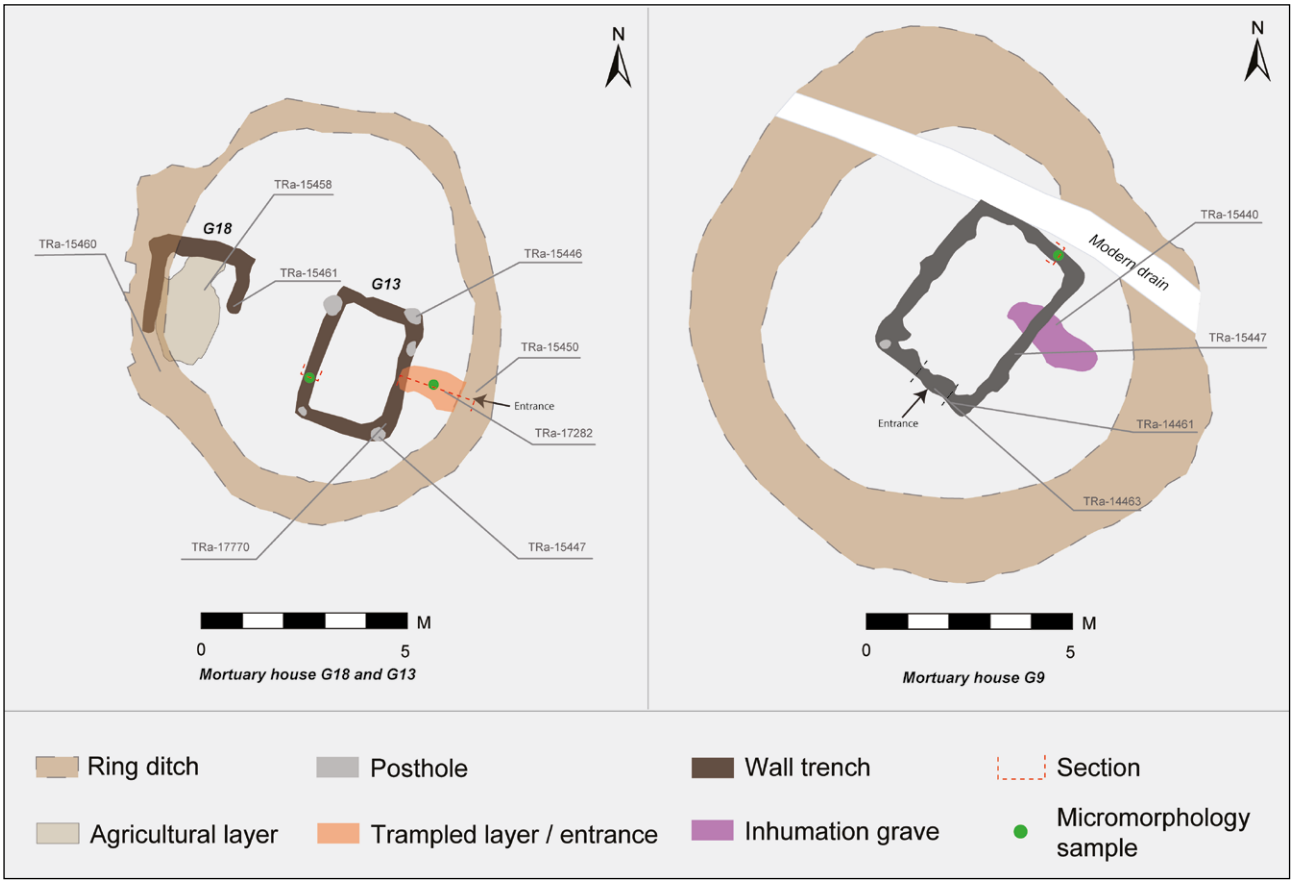

Figure 4. *Plan of the mortuary houses and sample locations. The Tra-numbers refer to the radiocarbon date samples (see Table 2 for details). Illustration by Kristofer Rantala and Raymond Sauvage, NTNU University Museum. Plantegning over dødehusene.*

There was no other evidence to suggest that the building had burned down, making the charred fragment of planking incongruous. However, the state of the fragment may derive from a known practice of pre-treating wood by charring, which may delay rotting in any subterranean elements such as the buried part of a wall or a post (Jensenius 2010:158). This practice may also be attested by the charred appearance of one of the corner-post holes in G9 (Figure 7a).

Thus, the mortuary houses appear to have been of wooden stave construction with earthfast corner posts and outer walls supported by raised stones in trenches. They are comparable with single-aisled corner stave buildings known across Northern Europe (eg Hauglid 1989, Jensenius 2010). This style is most famously recognised in the medieval Scandinavian stave churches, but its principles are also attested in domestic buildings such as dwellings and outhouses, as well as early ecclesiastical wooden buildings with earth-dug corner posts, at least from the early 10th century AD (Jensenius 2010, Sauvage and Mokkelbost 2016). Since both the walls and the

Table 1. *Identified and unidentified osteological remains from the wall trenches of G9 and G13. Data from Kjellström et al 2021.*

Identified species/element	Mortuary house G9		Mortuary house G13	
	Weight (g)	Number of fragments	Weight (g)	Number of fragments
Horse				
Carpal bone, C2	1,2	1		
Medium medium-sized mammal				
Front leg, Ulna bone?	0.6	1		
Mammal				
carpal bone	0,9	1		
Longbone	1,3	2	3,1	4
Unidentified	6,5	43	1,5	8
Total	10,5	48	4,6	12

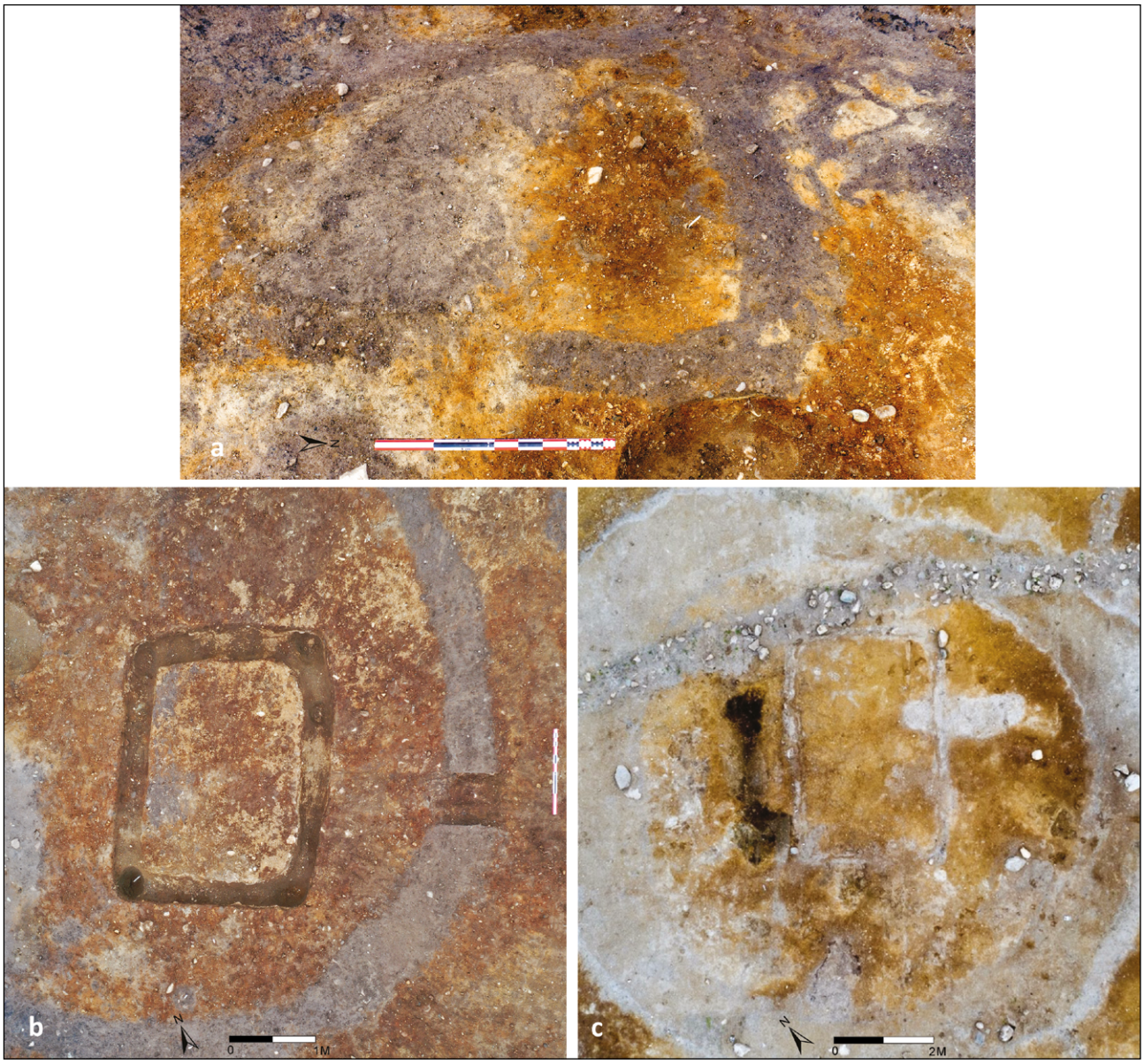

Figure 5. *Excavation photographs: a) Remnants of the U-shaped wall trench belonging to G18 mortuary house (photograph taken 2020). b) G13 mortuary house with emptied wall trench and entrance (aerial photograph from 2019). b) G9 mortuary house within ring ditch (aerial photograph from 2020). Photographs by Ole Husby (a) Kristoffer R. Rantala (b) and Raymond Sauvage (c), NTNU University Museum. Utgravningsfoto med oversikt over veggrøftene til dødehusene.*

corner posts were earthfast, it may be defined as a palisade building with corner posts (cf Almvik & Westin 2017, Figure 19). The smallest building (G18) was different. No evidence of corner posts was found in it, which may indicate a building made of contiguous earthfast timbers without corner posts, similar to some of the earliest wooden churches in Sweden, Denmark and England (Gardiner 2021).

Mortuary house entrances

Access to the buildings was made possible by doorways, seen at G9 and G13. At these houses, were found the visible remains of possible entrances. In the first case (G9) it was apparent as an area of disturbed and mixed sand in the south-western gable (Figure 9a), which superimposed and blended with the wall ditch. In the other case (G13), it was visible as a darker trampled soil surface at the south-eastern long-side wall trench, blending into the associated ring ditch, almost like a small pathway (Figure 9b-c). In the same area, a single posthole in the wall trench evidenced a support for an opening or doorway in the building structure.

The geoarchaeological study made for a better understanding of the composition and depositional processes behind the trampled surface leading into the entranceway at G13. The sample is characterised by occasional fine charcoal and possible burnt

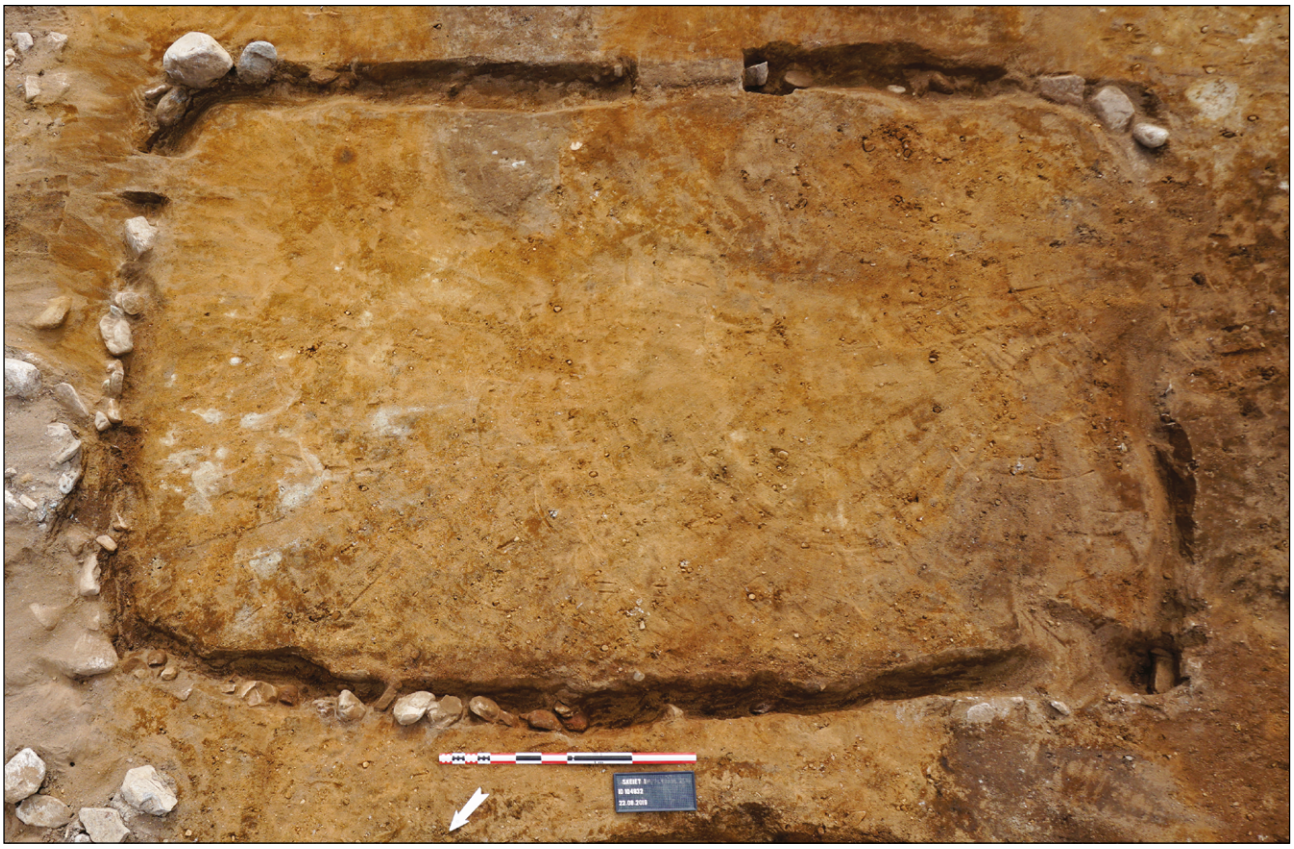

Figure 6. *Photograph of the excavated wall trench from the G9 mortuary house displaying raised stone supports. Photograph by Eystein Østmoe, NTNU University Museum. Foto over den utgravde veggrøften til dødehus G9 med reiste steiner.*

sands and gravel — fine size charcoal and compaction being consistent with trampling; fissuring is also common in 'beaten floor' deposits, especially when not open to the weather, as found at ethnoarchaeological experiments (Figure 8c) (Gé et al 1993, Macphail et al 2004, Rentzel et al 2017, Macphail & Goldberg 2018:tab 10.1:368–79). It can therefore be suggested that this was a 'roofed' entrance way into the mortuary house.

The entrances at the mortuary houses thus seem to resemble doorways as one would expect in a normal wooden building. The surfaces going into the doorways seem to be considerably trampled, suggesting more than just occasional usage, and speak of active use of the doorways and the buildings. The living could literally enter the gravemound to interact with its content.

Mortuary house interior functions

The small number of finds and lack of an associated grave at the Mortuary Houses, contrasts heavily with the richly furnished graves recorded elsewhere in the cemetery. This may be a preservation bias, considering that the original floor levels were lost due to later levelling. Other graves, being typically subterranean, were less affected. However, the fact that the entrances contained disturbed and trampled soil due to usage, may suggest that the recovered ground level was not far from the original. Thus, some evidence of a related burial (if present) would be expected to survive. Also, no evidence of a disturbed grave was present in the plough-soil and secondary layers that superimposed the buildings (as seen, for example, in a recent Danish find of an equestrian grave inside a similar house-like chamber from Fregeslev, Denmark) (Bagge 2020). This led us to suspect that a permanent grave was not present.

However, a limited amount of finds and osteological material were recovered from the wall trenches, which may shed light on related activity. The artefacts consisted of arrowheads and iron nails (Figure 10), recovered while excavating the fill from the trenches. These artefacts were quite fragmented and were difficult to date using typology. Also, a limited amount of burned osteological remains was recovered from G9 and G13 (Tab 1) (Kjelstrøm et al 2021). Interestingly, no human remains could be identified. Some of the mammal bones may in theory have human origin; however, it is interesting to remark that the only identifiable species were horse and bones from mammals that could be of similar stature.

Presence of horse bones may imply that killing horses and the preparation of a ritual meal were

Figure 7. *Excavation photographs: a) Charred posthole in the south-western corner of the G9-wall trench. b) Charred plank in the excavated G13-wall trench. Photographs by Eystein Østmoe (a) and Ole Husby (b), © NTNU University Museum. Utgravnignsfoto med forkullet stolpehull og planke.*

associated with the function of mortuary houses. The sacrificial ritual known as *blót* was a central act in Norse religious practice, where killing and consuming flesh from animals was an important factor (Bray 2004). Being the second most frequent mentioned animal in ritual contexts in both contemporary and later written sources of old Norse religion, it is often assumed that horses were an important ritual animal (cattle has a slightly higher incidence) (Magnell 2019:305–6). While archaeological finds imply other animals could be almost as important, the larger mammals seem to particularly relate to communal feasts and ritual practises such as burials (Magnell 2019:315). Prevalence of horse remains and

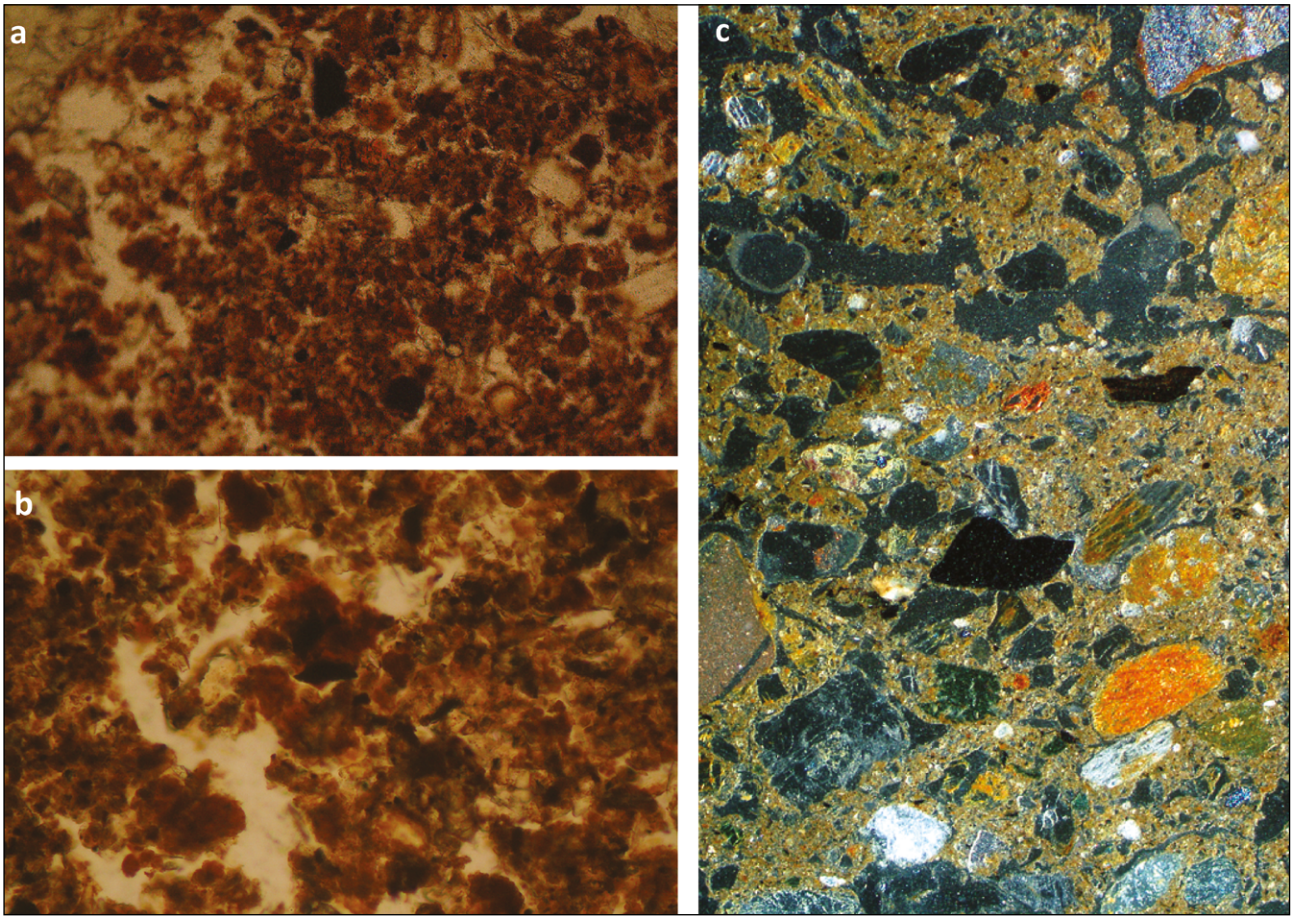

Figure 8. *Photomicrographs of the micromorphology samples: a) Micromorphology sample from G9: compact lower fill is composed of reddish-brown inclusions which could be woody residues. Plane polarised light (PPL), frame width is ~0.90 mm. b) High magnification image of A, showing oxidised, humified and pelletised remains of probable wood (of wooden walled mortuary house origin). PPL, frame width is ~0.47 mm. c) Micromorphology sample from putative entrance way to G13; compact trampled entrance way soil over original podzol subsoil (Bs–Bs horizon), with typical horizontal fissures and horizontal stones, as well as enigmatic vertically oriented larger stones. Frame width is ~75 mm. Photographs by Richard Macphail, © UCL. Mikrofotografi fra jordmikromorfologiprøver fra veggrøfter og inngangsparti.*

frequent presence of bridles and harnesses in graves, demonstrate the importance of horses and the ritual killing of horses in Norse burial traditions, particularly in Norway and Iceland (Leifsson 2018). Presence of horse bones might therefore relate to sacrificial practises associated with ritual functions of mortuary houses. However, it may be problematic to conclude that their presence indicates a practise of 'sacrifice', which can involve the slaughter of something (e.g. the animal) and an offering to a god (or an ancestor) who, hopefully, reciprocates, thereby establishing and nurturing the relationship between the giver and receiver (Insoll 2011:151–2). Defining and identifying this relationship from the archaeological evidence is often problematic (Gräslund 2001:224). However, considering that all animal bones from the wall trenches at Skeiet were burned, it might suggest the cooking and preparation for consumption. Considering the Mortuary houses strong association with the dead, the bones could imply ritual meals in close connection with burials and the dead, although if this should be considered a sacrifice is ambiguous. A comparable interpretation has been suggested for similar remains in the wall trench of the mortuary house at Gulli in Southern Norway, as well as other finds of animal bones in mortuary contexts (Gräslund 2001, Gardeła 2016:196). It is likely that the fragments from G9 derived from such rituals, where small fragments lost on the floor, and moved to the wooden palisade wall by trampling, finally 'trickling' into the wall trench. G9 was set in an area of the cemetery with no previous cremations (Figure 2), thus 'pollution' from earlier activity seems unlikely.

Mortuary house chronology

In the absence of closely datable artefacts and a continuing stratigraphic sequence, we relied on AMS radiocarbon dates from material from the wall trenches

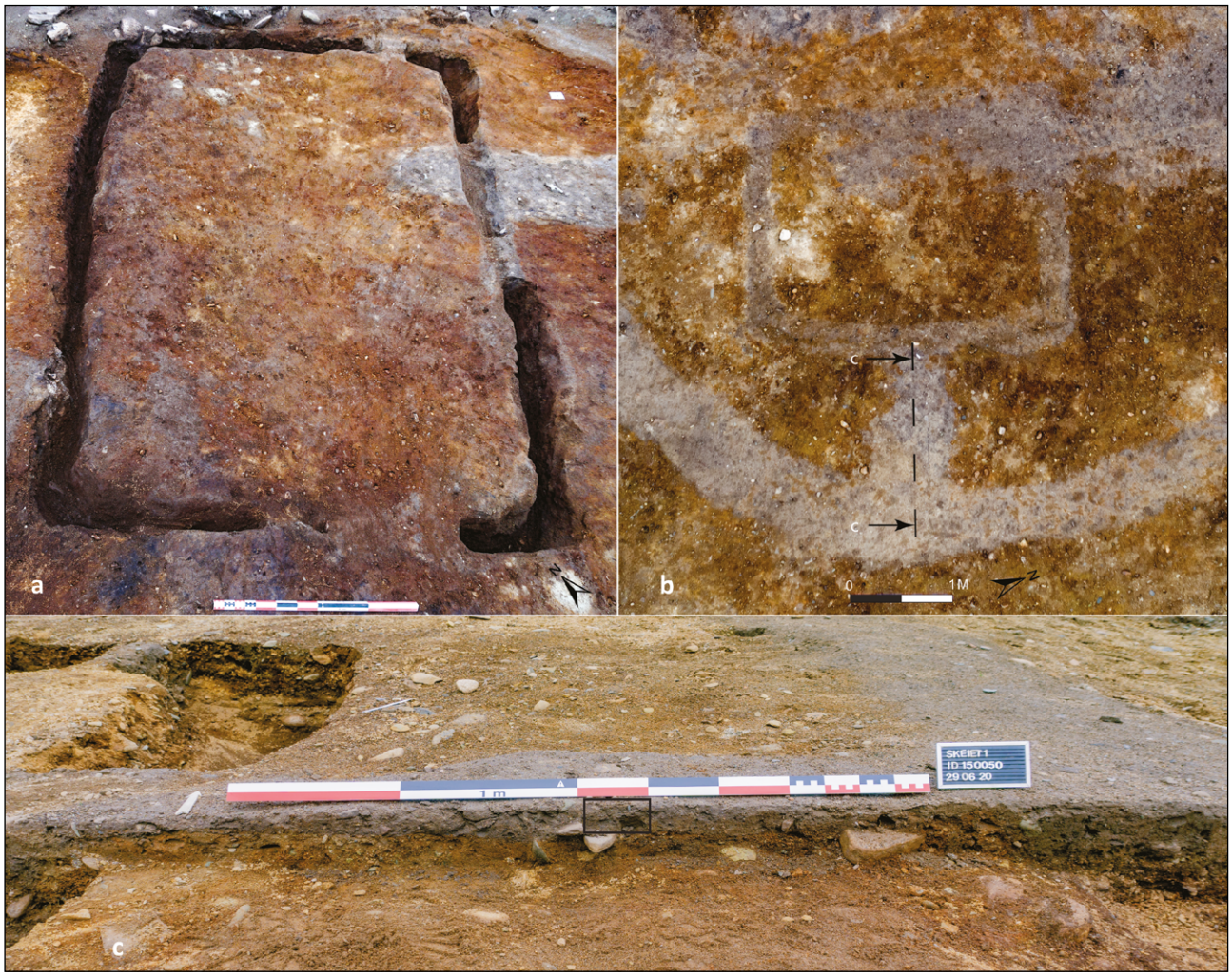

Figure 9. *Excavation photographs with traces of entrances: a) Disturbeded trampled soil over the S wall trench in G9. b) Aerial photograph showing the outline of the G13 mortuary house and the trampled soil surface leading from the ring ditch into the wall trench. Sectioned area indicated with the arrows. c) The section through the trampled soil surface in G9. The black box indicates the location of the micromorphology sample. Photographs by Eystein Østmoe (a), Kristoffer Rantala (b), and Ole Husby (c), © NTNU University Museum. Utgravningsfoto over spor etter innganger.*

(Tab 2). To evaluate possible start- and end points for the construction of each building (posteriors), a simple Bayesian model was calculated using OxCal V.4.4.4, following the structure recommended by Bronk Ramsey (2009) and using the IntCal20 calibration curve (Reimer et al 2020). Dating mixed contexts such as wall trenches may be challenging, considering the lack of a clear closed relationship between the archaeological feature and the dated material (particularly when no stratigraphical relationship is established) (Herschend 2016). The evaluated dates therefore also include samples from stratigraphic related features, and the model (Figure 11) includes dates from features that were stratigraphically earlier and later than the wall trenches as constraints. Also, the G9 wall trench samples were double measured using two separate pieces of charcoal from the same sample, and an average determined (Tab 2).

Overall, the dates and the calculated model indicate a three-step chronological timeline for the mortuary houses. The first house (G18) was probably built sometime between AD 450–600, the next (G13) between c AD 600–800, and the final c AD 800–to the mid or late 900s (Figure 11). It was not possible to estimate the lifetime and durability of each house, but based on the distribution of dates, we would suggest each building was used for 100–200 years.

DISCUSSION

The results demonstrate that mortuary houses were a central component on the cemetery from the very start, and were replaced in two stages, underlining a need for continuity in the buildings. Based on the dates, we suggest a life span of each building of c. 100–200 years, before being replaced. Durability of

Table 2. *List of ^{14}C dates from the mortuary sites and stratigraphically relevant features. Tra14461 and Tra-14463 are calculated as an average of two measurements from each sample (in italics). Outliers (in bold) are not included in the model (Figure 11).*

Lab ID	Context	Dated material	Date (BP)	d13C	Calibrated age (1–sigma)	Calibrated age (2–sigma)
TRa-15458	Agricultural layer (113702) cut by G18 wall trench	Charcoal *Betula*	1685 ± 15	–26.5 ± 0.4 ‰	AD 365–410	AD 262–415
TRa-15461	G18, wall trench (113705)	Charcoal *Betula*	1555 ± 10	–24.3 ± 0.9 ‰	AD 443–561	AD 436–569
TRa-15446	G13, posthole	Charcoal *Betula*	1425 ± 15	–26.3 ± 0.3 ‰	AD 607–649	AD 605–650
TRa-15447	G13, corner posthole	Charcoal *Betula*	1280 ± 15	–24.2 ± 0.3 ‰	AD 680–770	AD 672–774
TRa-17282	**G 13, trampled layer**	**Charcoal Betula**	**1690 ± 10**	**–18.6 ± 1.8 ‰**	**AD 365–409**	**AD 264–413**
TRa-17770	G13, chared wooden plank	Charcoal One piece *Pinus*	1265 ± 10	–20.7 ± 0.2 ‰	AD 702–741	AD 679–768
TRa-15460	Ring ditch contemporary with G13	Charcoal *Corylus*	1210 ± 10	–25.4 ± 0.5 ‰	AD 787–873	AD 784–878
TRa-15450	**Ring ditch Contemporary with G13**	**Charcoal Betula**	**1545 ± 15**	**–25.2 ± 0.6 ‰**	**AD 538–567**	**AD 439–577**
TRa-15440	Inhumation grave cut by G9	Charcoal *Alnus*	1270 ± 15	–27.5 ± 0.1 ‰	AD 685–743	AD 675–775
TRa-14647	G9, wall trench	Charcoal *Betula*	1235 ± 15	–22.5 ± 1.2 ‰	AD 709–825	AD 705–877
TRa-14461 — average	G9, wall trench		1115 ± 15		AD 894–977	AD 891–990
TRa-14461	*G9, wall trench*	*Charcoal Betula*	*1115 ± 15*	*–26.8 ± 0.8 ‰*	*AD 894–977*	*AD 891–990*
TRa-14461	*G9, wall trench*	*Charcoal Betula*	*1115 ± 20*	*–29.5 ± 0.4 ‰*	*AD 894–978*	*AD 891–991*
TRa-14463 — average	G9, wall trench		1110 ± 15		AD 899–970	AD 893–979
TRa-14463	*G9, wall trench*	*Charcoal Betula*	*1140 ± 15*	*–28.0 ± 0.6 ‰*	*AD 887–953*	*AD 877–973*
TRa-14463	*G9, wall trench*	*Charcoal Betula*	*1080 ± 15*	*–26.8 ± 0.2 ‰*	*AD 902–994*	*AD 898–1014*

buried wooden features depends on many elements, such as the type of timber, treatment, and local soils (Webley 2008). Being covered by mounds, we should at least expect that structural problems would arise after a century. The geoarchaeological evidence also point to a (fairly) rapid decomposition of the buried element of the lower walls (see above). This does not however necessarily compromise the entire stability of the structure (Reynolds 1995). We do not know if they were covered from the start, or if they were left free-standing for a while before being covered. In any case we suggest that the chronology illustrates a continuing need for this type of feature at the cemetery throughout its life, indicating that their use was an integrated part of performed routines and practises at the cemetery.

Other putative mortuary houses are of varied construction, some consisting of only a four-post frame or supports for a simple roof or canopy (Gardeła 2016:188). In contrast, Skeiet attests to more substantial house-like constructions (Figure 12). This relates them to finds that rather resemble contemporary domestic buildings with entrances, such as the small three-aisled longhouse with mortuary evidence at Sannagård in Southern Sweden, and the small building with postholes and a U-shaped wall trench at Gulli in Vestfold in Southern Norway, both interpreted as mortuary houses (Artelius 2000:147, Gjerpe 2005, Eriksen 2019:191). Thus, the mortuary houses from Skeiet may seem to echo contemporary buildings like the domestic dwellings which we recorded at the nearby settlement (Bryn Ch. 3). Accordingly, we can also see them as allusions to domestic houses, with doorways, walls, and roofs.

Since they were covered by earthen gravemounds, they also reflect a clear mortuary motif. Several examples of funerary contexts contemporary to the Skeiet mortuary houses are encountered in the Norse world which seem to echo similar domestic imagery. Examples are the tent-like wooden grave houses at the Oseberg and Gokstad ship graves, and the late Iron-Age wooden chamber graves, recorded in Western Europe and the Norse sphere of influence, especially in South Scandinavia, the Baltic, and within the Rus territory (Gräslund 1981, Eisenschmidt 1994, Mikhailov 2011). Later Icelandic saga accounts that reflect a notion of a continuing existence of the dead inside gravemounds, may be what is alluded to here (as indicated by the description of the mound burial of Freyr in *Ynglinga saga* and a grave intrusion

described in *Grettis Saga Ásmundarsonar*) (Ynglinga Saga:Ch. 10, Grettis Saga Ásmundarsonar:*Ch. 18,* Price 2002:134; Gardeła 2016:174). Hence, the mortuary houses at Skeiet significantly enrich the known corpus of mortuary monuments that reflect houses and the domestic realm. The corner stave-method applied at Skeiet, was interestingly also characteristic for the construction and architectural principles of contemporary feasting halls, later reflected and transferred as the chosen construction for the early wooden churches (Gansum 2008). Therefore, we may also view the Skeiet mortuary houses as underground funerary reflections of halls, similar to the hogback stones used as grave markers in Anglo-Scandinavian Britain; the latter funerary objects were made in the image of halls and reflected imagery of houses for the dead (Lang 1984). It may be relevant to see such mortuary monuments as alluding to a belief in dead warriors' continuing existence in the feasting hall, like in Valhalla as part of the Odin-cult (although it must be kept in mind that the literary sources on which Norse mythology rest significantly postdate the archaeological evidence).

It is however not clear if providing a dwelling for the dead (as a reflection of a domestic or eternal feasting-existence) is the main purpose of the mortuary houses. The results, which suggest entrances that were used actively, implied by the trampled entrance floor surfaces, tell us that the interior was visited repeatedly. It has previously been suggested that a purpose of mortuary houses was to display and interact with the dead (Eriksen 2015:89, 2019:191–3). The dry trampled floor indicates that visitations were quite frequent, perhaps showing they were performed not only during the actual burial, but also repeatedly throughout an active use of the cemetery as a ritual and performative space (e.g. Price 2010, Moen 2020). Since the dry trampled entrance-floor at G13 blended into the ring ditch, we may also suggest that the entrance had a protruding super-structure, perhaps making room for a portal or covered doorway into the mound, passed when entering.

Doors and portals could be highly ritualised, and the thresholds were especially important liminal spaces, where the living could contact the dead and the death realm as part of Viking-Age funerary practices. If we see mortuary houses as spaces where the living could enter and interact with the dead, the entrances may be seen as doors and portals for crossing the threshold between the world of the living and the world of the dead (as argued by Eriksen 2013, 2015, 2019). A parallel which illustrates similar motifs are the so-called south-western portals, rectangular stone cists with possible supports for a portal, placed at the edge of gravemounds in eastern Sweden. Presence of cooked animal bone remains in these structures has suggested they were used to offer or share food with the dead (Gräslund 1969, 2001). Adding to this, they have also been seen as ritualised portals or thresholds created at the edge between the dead and the living (Eriksen 2013, 2019, 203). Another example is the Gotlandic picture stones which were often placed at grave sites and whose shape is seen to replicate portals or doorways (Arrhenius 1970, Eriksen 2019). These examples indicate that the doors in the mortuary houses were not a unique mortuary expression but show that doors and portals could manifest in different ways in mortuary contexts. In any case the notion of providing a space and threshold between the living and the dead seems to have been an important aspect.

However, if passing the doorway and interacting with the dead was the prime purpose for visits, the lack of an internal grave at Skeiet may seem strange. What was kept inside? Since it is impossible to construct burial mounds and graves during the Norwegian winter, they may have functioned as temporary graves until burial was possible. This is of course a viable option which would leave similarly few archaeological remains.

It does not necessarily need to be (only) a functional reason to keep bodies accessible. A close connection between the living and remains of the dead seems to have been common, indicated by a wide practice of grave re-opening and interacting with human remains seen in contemporary cemeteries in both Western Europe and in the Norse world (Klevnäs 2016, Klevnäs et al 2021). Prolonged death rituals and burials is another occasion that may have provided the time and room for living-dead interaction. This is exemplified in the Oseberg ship grave, where studies of the original field data show that the grave chamber was only partially covered by a mound during the burial. The mound was finished only after considerable time had passed (Gansum 2004, Price 2008). Even though the longevity of the Oseberg burial has been questioned (Nordeide 2011), the effort of constructing the monumental burial mound and the elaborate burial rituals must have lasted long enough to allow for a period of visiting and interactions with the dead, before a final 'burial' of both ship and chamber. Similar actions may also be alluded to in Ibn Fadlan's description of a possible elaborate Norse burial ritual in the Rus territory, where the body was placed in a temporary buried wooden chamber during the ten-day burial

Figure 10. *Ferrous finds from the wall trenches: a) T28278:1, arrowhead from G13. b) T28278:2, nail from G13. c) T28476 :2, arrowhead from G18. d) T28274 :1, probable iron nail from G9. Photograph by Stian Ingdahl, © NTNU University Museum. Metallfunn fra veggrøftene.*

ritual, with food and gravegoods (possible a chamber grave or mortuary house?), before the climax of the burial ritual and the cremation (Montgomery 2000, Gardeła 2016:191). If we transfer similar practice to Skeiet, bodies could have been kept temporarily in the mortuary houses until final burial or cremation elsewhere on site, not primarily as a functional response to frozen ground, but to allow for a liminal transition period between death and final burial. This would also allow time to lay out and wash the body, and to conduct essential rituals and preparation before burial or cremation. Interestingly, none of the chamber graves seen at Birka or at Hedeby in southern Denmark (Gräslund 1981, Eisenschmidt 1994, Bagge 2020), nor the eastern chamber burial in the Baltic and in the Rus territory (Mikhailov 2011), seem to have evidence of entrances. The same is true for the four-post constructions discovered at some Scandinavian cemeteries like at Langeid in southern Norway, which, like the chamber graves, included a permanent burial (Glørstad 2020). Thus, it may seem to be a difference in the notion between these features, where the chamber burials and the four-post constructions were perceived as a permanent residence for the dead, compared to the mortuary house where doors facilitated visiting and directly interacting with the remains. Hence, we can see the mortuary house as a vessel for symbolic transfer from biological death to social death (similar to arguments by Eriksen 2019:189–90).

Finds of burnt animal bone, such as equine in the G9 wall trench, may suggest the offering of food to the dead and ritual meals, similar to observations made in other Scandinavian cemeteries for example the south-western portals in Sweden and in the mortuary house at Gulli (Norway) (Gräslund 2001, Gardeła 2016). Food offerings to the dead and conducting ritual meals at the graveside has historically occurred several places – a recent nearby example of a suggested long-lived tradition is from the Setomaa district in southeast Estonia (Valk 2006). Feasting with the dead is also recorded as part of preparation for burial (a wake with feasting and dancing) in pre-modern Norway, as well as a practise of offering food and drink at burial mounds which have been documented until the 19th-century AD, both possibly a remnant of pre-Christian ancestor worship

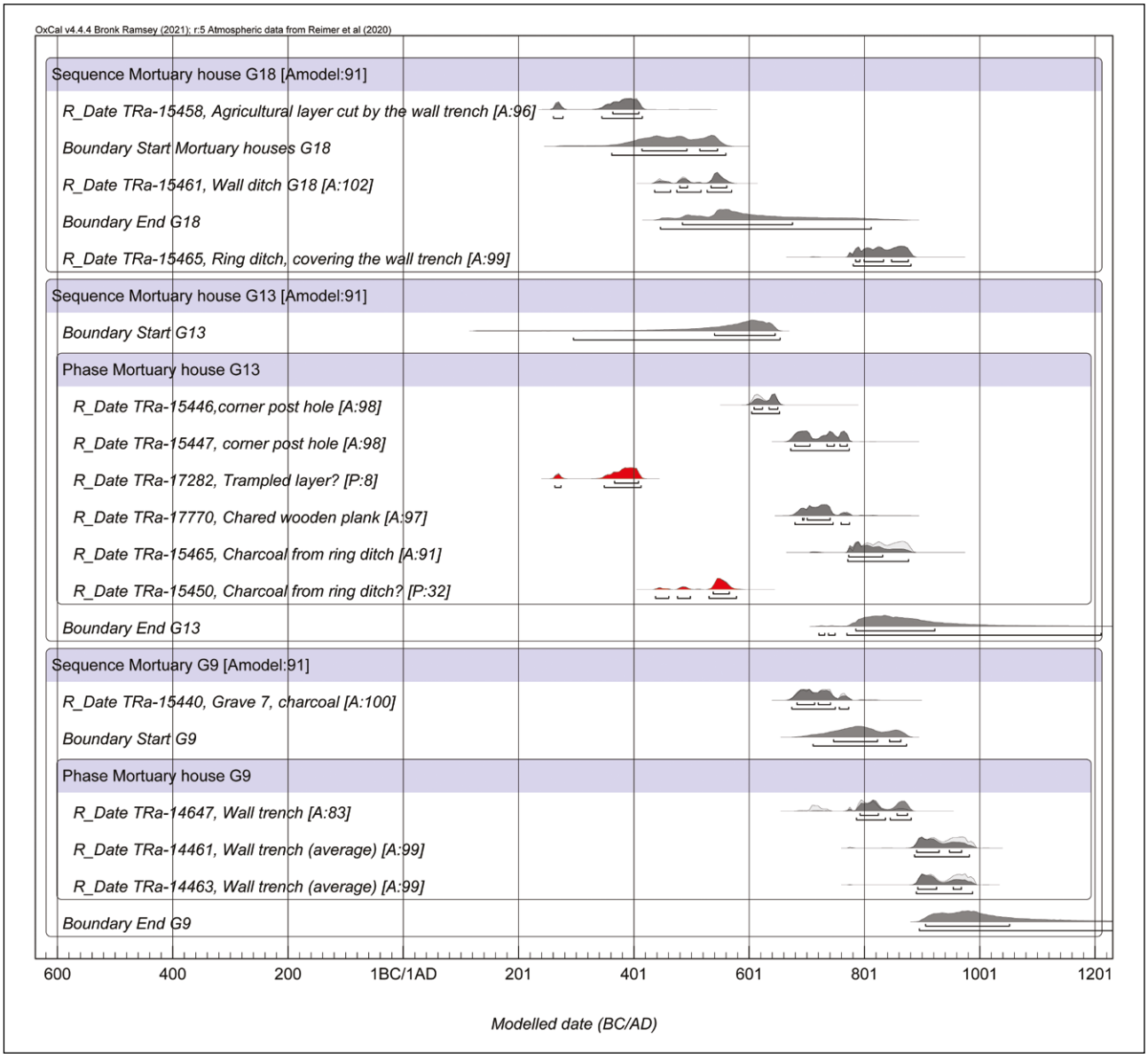

Figure 11. *Oxcal calibration plot with the bayesian modell of the ^{14}C-dates from the mortuary houses, and the related features used as constrains (Oxcal v 4.4 Bronk Ramsey 2021; atmospheric data from Reimer et al 2020). Information on the sampled material for each date is available in Table 2. The two outliers (in red) are not included in the calculation of the result. Modell over ^{14}C-dateringer.*

(Birkeli 1943:25, 45). If dead bodies were temporarily kept inside the buried mortuary houses, the doorways and indicated food offerings may record that similar offerings and rituals could take place in a designated building *inside* burial mounds, perhaps in the form of sharing ritual meals with the dead, during the transitional period between biological and social death.

Late Iron-Age, and particularly Viking Age burials display significant diversity in burial practices and may be influenced by such things as local traditions, beliefs, and social status (Price 2008, Williams 2016). As noted above, the actual burials detected at Skeiet represent burial practices that changed throughout the late Iron Age, with a transition from cremations to inhumations and an introduction of inhumations and boat burials c AD 700–800 (as discussed above, Figure 3, see also Sauvage & Lorentzen Ch. 5). The chronological distribution of the mortuary houses, however, reveals they were a continuing presence at the cemetery for four centuries. Thus, the mortuary houses provide an example of long-time continuity in practised mortuary rituals, providing a contrast to the heterogenous and changing burial practises seen in the graves. Therefore, understanding the role of late Iron-Age mortuary houses may be a good foundation to discuss the nature of long-term funerary practices carried out by each farm at their cemeteries. Cemeteries had many roles and functions in society, one of them being an arena for the practice of worshiping the dead (Gardeła 2016). Considerable parts

Figure 12. *Artist's interpretation of the G9 mortuary structure during use. The conjectured lines indicate the possible outline of the burial mound. Illustration by Arkikon, NTNU University Museum. Tolkning av dødehuset G9. Linjene illuderer utstrekningen på gravhaugen.*

of pre-Christian Norse rituals took place as part of everyday life in the dwellings and farms where most people lived their life, and at the cemeteries where their ancestors were buried. Ancestors marked by their gravemounds also legitimised property rights. Important ancestors may have been worshiped and treated with revered status in their family lineages, whether ancestors of kings and queens, or the original founder of the family farm (Birkeli 1943, Gardeła 2016, Zachrisson 2017, Murphy 2018) The investigations at Skeiet reveal that the mortuary houses were a continuous presence at the cemetery until the end of pagan burials, and as spaces for handling, displaying, and interacting with the dead, they enabled visits and access and evoked a strong link between the living and the dead. By echoing dwellings and possible halls, they may also have signified belief in a continuing existence of deceased ancestors in the burial mounds.

One of the new contributions is the doorways and the possible portals that allowed frequent access, which may have constituted a ritualised threshold between the land of the living and the dead (as argued by Eriksen 2019:200–5, see above). If related to ancestorial rituals, this may have allowed communication with deceased close kin and ancestors. Food offerings, and perhaps feasting with the dead, may also be recorded, and probably associated with the use of the buildings. In the pre-Christian world, where religion, death, and daily life were highly interwoven elements, an intimate relationship with the dead was probably perceived as a natural part of the associations between the family and the ancestors.

CONCLUSION

By examining construction, entrances, and traces of related activity in the mortuary houses from Vinjeøra, it was possible to identify important aspects of their function as funerary features and their role in burial rituals in the period AD 550–950. While the construction of these features shares commonalities with contemporary house-like and building-like mortuary structures, the existence of entrances, backed by geoarchaeological findings, suggests that these spaces were actively utilized. This suggested activity that is not recognised in other grave features, such as chamber graves. The study suggests that these entrances served as doors and portals into burial mounds, which functioned as a threshold between the world of the living and the world of the dead, that may have facilitated ritual communication with deceased close kin and ancestors. The entrances may have featured super-structures or covered doorways,

further emphasising their ritual significance. In terms of the interior, it appears they did not contain permanent graves, raising questions about what was kept inside these structures. It is suggested they served as temporary graves until final burial or cremation. The longevity of late Iron-Age mortuary rituals makes is apparent that this phase provided a period of visiting of and interacting with the dead, which suggests mortuary houses facilitated the body's transfer from biological death to social death. The presence of burnt animal bones in wall trenches suggests the occurrence of ritual meals and food offerings to the dead during this phase. As a continuing presence at a cemetery with changing burial practices during its life, they are an example of stable funerary ritual activity which indicates continuing close and intimate connection between the living and the dead within the community, and underlines the importance of ancestors in mortuary rituals. This is clearly related to a widespread practice of interacting with mortuary remains as part of funerary rituals, such as secondary intrusions and grave manipulations. It may prove beneficial to study these phenomena as related expressions within the ritual practices performed at cemeteries.

Because of the fragmentary nature of the evidence, caused by ploughing and poor preservation conditions, this study provides only some insights into the function of the three buildings. This is particularly relevant to the missing floor levels, resulting in a lack of direct evidence of interior activities and structures. The same can be said for the proposed super-structure over the entrances, where only indirect construction elements remained. There is also a question of when the construction was covered by the burial mound. However, by focusing on a combination of archaeological observations, soil-micromorphology, finds, and radiocarbon dating, the interpretation of the features as mortuary houses and the suggested functions appears persuasive. To further understand the phenomena, future studies should focus on providing more detailed information on the interior, entrances, and the chronological relationship to the burial mound. This can be achieved by sampling floor levels (if present) for additional geoarchaeological information, identifying construction elements from the proposed entrance super-structure (such as postholes), and determining stratigraphic information on the relationship between the mortuary house and the burial mound.

SAMMENDRAG

Tre foreslåtte dødehus fra yngre jernalder og vikingtid ble nylig utgravd i Vinjeøra i Midt-Norge Norge. Utgravninger og geoarkeologiske undersøkelser antyder at det dreier seg om underjordiske trebygninger, med klare likheter med bolighus komplett med innganger og dører. Radiokarbondatering indikerer at bygningene har stått etter hverandre, i tidsrommet ca. 500–950 e.Kr. Funn av dyrebein indikerer at ofringer av dyr og mulig rituelle måltider relatert til byggene. Bygningene gav en mulighet til besøk og interaksjon med avdøde levninger, som en del av den rituelle praksisen som ble utøvd på gravfeltene. Bygningene utgjorde et ritualisert rom mellom de levende og deres avdøde slektninger.

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8. FUNERARY CLOTHING AND BEDDING IN THE VIKING-AGE: THE EXAMPLES FROM HESTNES AND SKEIET, CENTRAL NORWAY

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ABSTRACT

This article presents a detailed analysis of textile fragments from three Viking Age womens' graves that were examined at Skeiet and Hestnes, Trøndelag, Central Norway. These fragments form the basis for a discussion about women's burial clothing and the visual functions provided by textiles in burial rituals. The analysis concludes that each of the women wore a traditional suspended dress made of woollen fabric. Traces of outer clothing were also found in all the graves. The woman in the chamber grave at Hestnes was wearing a lined woollen cloak, decorated with embroidery (of uncertain extent) and a braided cord along the edge. In Skeiet Grave 2, the deceased woman wore a lighter shawl-like garment in linen which was fastened together with a ring pin. This woman also had an additional linen cloth attached to a trefoil brooch placed in a small chest at the foot of the grave. Most textile remains were found in the boat grave, Skeiet Grave 11. In addition to the traditional suspended dress, the deceased was wearing an apron-like garment and a woollen cloak. The most spectacular textile find was the remains of a blue-dyed, down-filled woollen blanket which partially covered the deceased. Covering quilts are highly unusual in Viking Age graves in Scandinavia and only one case, from the famous Oseberg Ship, has, until now, been found in Norway.

Keywords: Viking Age textiles; Norse female clothing; shawls and cloaks; burial quilt; mortuary display

INTRODUCTION

This paper presents and discusses the evidence of Viking Age clothing based on an in-depth analysis of textile remains from three graves at Hestnes and Skeiet Trøndelag, Central Norway, excavated in 2019 and 2020.

While the Viking Age is characterised by the abundance and wide variety of elaborate dress ornaments, the clothing of those buried has rarely survived, except for small textile fragments fastened to brooches or otherwise preserved in association with other types of metalwork. Even though studies have investigated the quality and distribution of the textile remains from Viking Age Norway (e.g. Bender Jørgensen 1986, Christensen et al. 1993:209–223, Ingstad 1999), these have focused mainly on the technical aspects, such as the spinning direction, weave and thread count, while the issue of clothing and costume are more briefly addressed. This is especially due to the fact that the graves were excavated in the late 18th and early 19th centuries and therefore lack crucial contextual information regarding the textiles' placement and layering, which are vital when identifying different garment types. Furthermore, earlier conservation practices in Norway in the 1960s and 70s led to textiles being removed from many metal objects as it was believed that the weight of the metal would be destructive over time. Unfortunately, this separation was typically done without recording how the textiles were originally positioned on the objects (Lukešová 2011:149). Although in fragmented condition, the textiles from Hestnes and Skeiet are thus highly significant as they represent some of the most recent and best recorded graves from Norway

Reference: Øien R.I., Heen-Pettersen, A.M. (2024). Funerary Clothing and Bedding in the Viking-Age: The Examples from Hestnes and Skeiet, Central Norway. I R. Sauvage (Ed.), *From Life to Death in Iron Age and Medieval Vinjefjord* (pp. 197–216). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.218.ch8
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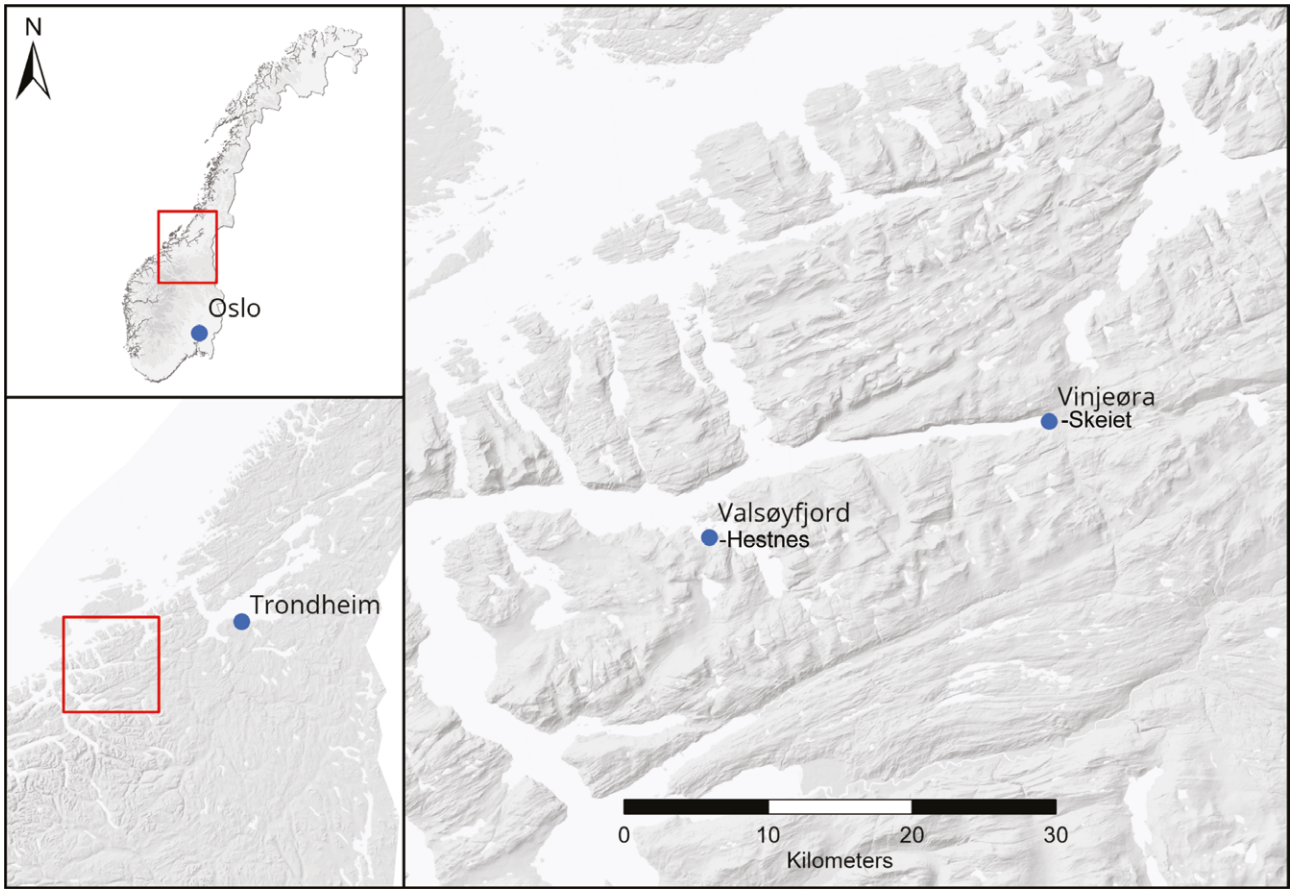

Figure 1. *Location map showing the Hestnes and Skeiet sites. Lokasjonskart.*

containing Viking Age clothing. Presenting the textile remains for the first time, this paper asks: What can the burial evidence from Hestnes and Skeiet tell us about Viking Age clothing and dressing practices related to mortuary rituals at the time?

THE SITES – A BRIEF INTRODUCTION

The sites at Hestnes and Skeiet were part of a larger scheme of excavation carried out between 2019 and 2020 in connection with the E39 road project between Betna and Stormyra in Hemne municipality. Both sites are presented in detail elsewhere in this volume (Sauvage Ch. 1, Sauvage & Lorentzen Ch. 5, Østmoe et al. 2023).

In terms of topography, the two locations are situated at opposite ends of Vinjefjord: a fairly narrow and long fjord stretching from Vinjeøra to Valsøyfjorden. Skeiet is in Vinjeøra in the innermost part of the fjord: an area of cultivated land with favourable agricultural conditions. The site (Skeiet 1) lies on a natural terrace approximately 47 m above sea level overlooking Vinjeøra and Vinjefjord. Within the investigated area, the remains of 11 burial mounds were discovered, all of which were heavily truncated by ploughing. These contained at least four cremation graves, three boat graves and eight inhumation graves. In addition, settlement remains were identified close to the cemetery. The overall archaeological evidence from the site shows activity over a wider time span from around AD 550–950, with the most intensive use in the Viking Age (Sauvage & Lorentzen Ch. 5).

Hestnes (meaning 'The headland of the horses') is situated in Valsøyfjord, in close proximity to the main coastal sailing route of the *Norvegr* (the Northern Way). The location provides excellent views of any passing traffic to and from the inner part of Vinjefjord, including Vinjeøra. Here, the most significant discovery was the remains of a Viking Age chamber burial, and this was the only grave on the site. In addition, settlement activity in the form of cooking pits, postholes and cultivation layers was also identified. The dates from the site range from approximately AD 250 up to the medieval period (Østmoe et al. 2023).

CLOTHING AND COSTUME IN THE VIKING AGE

While not receiving the same academic attention as dress ornaments, textile remains from Viking Age Scandinavia have been the subject of specialist studies since the late 1930s (Geijer 1938), while most research has been carried out from the late 1970s onwards (see below). In addition to textiles preserved

in connection with metalwork, clothing remains are also known from contexts with favourable, humid conditions, such as the harbour of the Viking town Hedeby (Hägg 1991), the submerged settlement at Viborg, Denmark (Ejstrud et al. 2011:6–7) and the recently discovered tunic from the Lendbreen glacier in Innlandet, Norway (Vedeler & Bender Jørgensen 2013).

These finds, sometimes supplemented by written sources and iconographical depictions on metalwork and tapestries, have provided valuable insight into Viking Age clothing, and have formed the basis for ideas concerning the composition and designs of the different elements of dress. Most attention has been given to female clothing, typically based on smaller textile fragments preserved on brooches or other metalwork such as scissors, bowls and keys. These remains have shown that Scandinavian women typically wore one or two suspended dresses of wool or linen with a longer undergarment of linen underneath (Geijer 1938:138–156, Hägg 1974, Holm-Olsen 1976, Bender Jørgensen 1986, 1992, Ingstad 1999:243–244, Stenvik 2001:36–37, Lukešová et al. 2017, Smith et al. 2019:99–103). Each suspended dress was comprised of a front and back piece, held together by a total of four loops/straps. Each pair of loops (one top and one lower) were normally fastened together with an oval brooch. The outfit could be accompanied by further garments, such as a shawl or a cape held together by another fastener (Geijer 1938, Lukešová et al. 2017). However, while the shift, one or two suspended dresses and a cape are regarded as the most standard components of the female costume, the dress composition could also vary. Sometimes a tunic was worn under the suspended dress, above the shift (Bau 1982:28–29, Lukešová 2011:156–162), and Hägg (1974) has suggested that a further outer garment could be worn in the form of a shirt or kaftan secured by a brooch at the front (see also Bau 1982:28–29, Christensen et al. 1993:216–221, Mannering 2014). It has also been proposed that women sometimes wore additional garments, such as a long train and a strapped apron outside the main dress (Bau 1982).

While most scholars support the idea of the shift as a longer garment, there has been considerable debate concerning the construction and design of the suspended dress. In these discussions, the actual textile remains are typically discussed in relation to different Scandinavian, Slavic and Baltic folk costumes and contemporary iconographic depictions on metalwork such as gold foil figures. Based on the material from Birka, Geijer proposed in 1938 that the dress consisted of two panels of fabric with open sides, each with two straps (Geijer 1938). Others have argued in favour of a closed dress (Hägg 1974) or a garment that was open in the front to expose decorative undergarments (Bau 1982:22–28). This debate highlights the problem that while different elements of clothing may be identified, the fragments are typically too small to determine the design and cut of the garments (Vedeler 2004:57–58, 72–73). It is also likely that there were other types of female dress fashions that did not require the use of oval brooches (Christensen et al. 1993:215–222, Ingstad 1999:243–244), but these are rarely preserved due to a lack of metalwork. Accordingly, suspended dresses secured with brooches are clearly overrepresented in the archaeological records due to preservation conditions (Bender Jørgensen 1986:83). Oval brooches were most widespread in Viking Age Scandinavia in the 9th century and the first half of the 10th century, although in Denmark, the brooches had apparently begun to fall out of fashion already by the turn of the 10th century (Ewing 2007:69). While oval brooches were widely used, they were generally regarded as dress ornaments reserved for the freeborn, married woman of a particular social standing. Consequently, textile remains from graves are somewhat biased towards the higher, although not necessarily elite, strata of Viking Age society. The lack of oval brooches does, however, not necessarily reflect lower status, as there are many examples of burials representing the upper social strata where the women were apparently dressed differently from the traditional strapped dress (see Ingstad 1999:243–244, Øye 2022:76–77, 157–161).

A further bias is the fact that the discussions concerning Viking Age clothing have centred on finds from the cemeteries and harbours of the Scandinavian Viking Age towns, especially Birka and Hedeby. However, those buried at these locations may represent a particular social and economic segment of society. One must therefore 'be careful about generalizing from these finds' when discussing dress codes for the wider Viking Age population (Ejstrud 2011:20). Local variations are likely to have existed (Bau 1982:46), but graves from areas remote from the Viking Age trading places, such as the examples in this study, are currently underrepresented in the analysed material from this time.

METHODOLOGICAL APPROACHES

The three burials addressed here were apparently largely undisturbed at the time of excavation. While some objects may have moved slightly in the graves due to post-deposition circumstances (such as the decomposition of the deceased), their in-situ positions

are likely to be very close to their original placements. In the cases where textile remains were preserved on metal, the objects were taken up as soil blocks and further excavated/investigated in the laboratory. This included detailed recording of how the textiles were originally positioned on their respective objects before the fragments were subsequently separated (as further described in Øien 2023). A traditional textile analysis was then carried out, where qualities and details such as fibres, spinning direction, thread counts, seams, décor, hemlines, selvage and stitching were described accordingly. The identification of textile fibres (plant or animal fibres) was mostly done visually, but in five cases analysis was carried out using Fourier Transform Infrared Spectroscopy (FTIR) and Attenuated Total Reflection (ATR). FTIR and ATR were also used to identify potential dyes used on the selected fabrics.

These methods, combined with the textiles' contextual information, form the basis for the results presented here. The burials in this study represent rare cases from Norway where information relating to the textiles' layering and their position on objects were thoroughly recorded. However, due to the fragmented nature of the material, this study aims not to reconstruct female Viking Age dress in terms of form, cut and design. Instead, the material will be limited to identifying and distinguishing between different pieces of garments (and other potential uses of textiles): their use, quality and sometimes decorative elements. These results will form the basis of a further discussion considering dressing practices related to mortuary rituals during the Viking Age.

DRESSING THE DEAD: THE TEXTILE REMAINS

The graves addressed here are presented in detail in other papers in this volume (Sauvage & Lorentzen Ch. 5). Consequently, the following analysis will only include burial elements that are relevant for interpreting the textile remains. While all cases are female inhumations dated to the Viking Age, they represent very different cases in terms of grave structure: a chamber burial, a boat burial and a simple dug burial. In terms of artefacts, the type and number of grave goods also differed, and while the graves from Hestnes and Grave 2 at Skeiet were modestly to well-equipped, only Skeiet Grave 11 can be defined as richly furnished. It is therefore reasonable to suggest that the women represent a certain social segment of society. The textiles in the graves were sometimes well-enough preserved to enable suggestions about garment types, but this was not always possible for the small fragments with poorly defined textile structures. All fabrics from the graves are presented in further detail in Øien (2023) and the following section will focus on the remains which can be most confidently identified as different garment types worn by the deceased.

Female chamber burial from Hestnes, c. 850–950

In the chamber burial from Hestnes, textile remains were preserved on the front and back of two oval brooches (variant P51F: Petersen 1928), an equal-armed brooch, a sickle and a spindle whorl. Based on the position of the objects, the woman was laid to rest with her head to the north-east with the brooches and beads placed on the upper part of her body (Figure 2). The equal-armed brooch lay upside-down in the grave and had probably fallen into this position as a result of post-deposition circumstances. The spindle whorl and two wool combs were placed to the left of the upper body of the woman. The sickle was probably placed in the hip area of the deceased (see below) and the remains of a shrine were found by the foot of the grave.

As previously noted, oval brooches were used to fasten the fabric loops of a suspended dress. In the Hestnes burial, the remains of the lower loops were partly preserved around the pins of both brooches. These were made from 1/1 tabby weave and were folded lengthwise and stitched along the sides.

One of the better-preserved loops was 0.9 cm wide and located close to the pinhead on the reverse side of one of the brooches (T28348:1). Its position indicates that this is the bottom loop from the front piece of the suspended dress, and a small piece of degraded organic material associated with it is probably the remains of this fabric. Further textile fragments of two different qualities were also preserved on the reverse side of the brooch. Both fabrics were Z/Z-spun tabby weave, with a thread count of 24/24 and 12/12, respectively. The finer 24/24 textile is probably made of plant fibres, while the coarser 12/12 fabric was analysed with FTIR-ATR, which implied protein (wool) fibres (Christophersen & Peacock 2023). From this it seems most likely that the coarser tabby weave is the remains of the suspended dress, while the finer plant fibre fabric probably stems from the inner garment which was worn closest to the body. Three small fragments of fine 1/1 tabby weave associated with the pin on the equal-armed brooch, located just above the oval brooches, are likely to stem from the same shift.

In addition to the shift and suspended dress, the grave contained clear evidence of an outer layer represented by two-layer textiles preserved on top of the oval brooches. One oval brooch (T28348:2) was completely covered with textiles, while the same fabrics

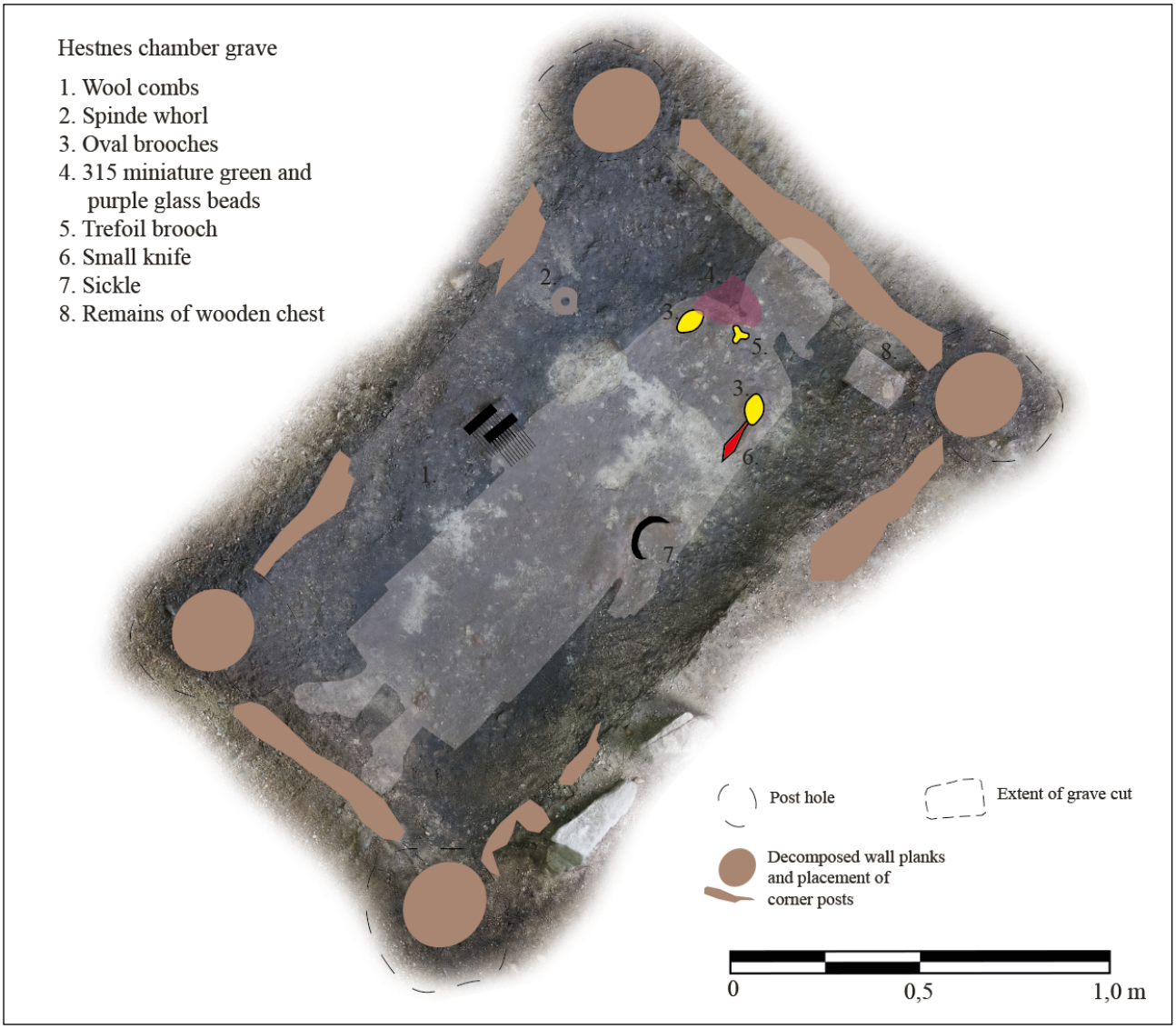

Figure 2. *Sketch of the chamber grave from Hestnes (T28348). Illustration: Raymond Sauvage, NTNU University Museum. Skisse over kammergraven på Hestnes.*

were only preserved in three small sections on the second brooch (T28348:1). The inner textile layer, which lay directly on the brooches, was a tabby fabric from Z/Z spun yarn of probable animal fibre, with a thread count of 16/16 on brooch 1 and 10–12/10–12 on brooch 2. The presence of a 2ZS spun thread on brooch 1 could derive from a dissolved seam edge on the fabric. The inner textile layer was covered by a coarser 2/2 twill fabric with a minimum thread count of 14/10. Some of the well-preserved fragments were clearly woven in lozenge/diamond twill. This includes a piece of fabric with a thread count of 16/12 on the lower front of the triangular brooch (T282348:12), which probably also stems from the outer layer. The main types of outerwear identified in Viking Age female burials are cloaks and kaftan-like clothing: a type of loose-fitting outer garment with sleeves. Examples of the latter are known from elsewhere in Scandinavia based on the presence of toggles, decorative trims of silk or tablet-woven bands from the sleeves (Hägg 1974, Mannering 2014). No examples of kaftans are known from female Viking Age burials in Norway and the Hestnes burial also lacks these components. This, combined with the overall properties of the outer layer described above, implies that the outer layer may rather have been a cloak-like item.

Significantly, textile embellishments in the form of braided cord and decorative stitching were identified. The textile fragment with the cord was positioned vertically along the upper part on the reverse side of one of the oval brooches. This implies that it belonged to the cloak rather than the suspended dress, since a decorative trim from a dress is more likely to have been positioned horizontally on the lower part of the brooch (see e.g. Bau 1982: Figure 8). The cord survived as a 1.8 cm long section stitched onto

Figure 3. *Cloak remains with embroidery on oval brooches T28348:1. Photo: Åge Hojem, NTNU University Museum. Kappefragment med spor etter brodering over skålspenne.*

Figure 4. *Diamond twill fabric T28348:12. Photo: Ruth Iren Øien, NTNU University Museum. Animalsk tekstilfragment fra under-siden av trefliket spenne vevet i diamantkypert.*

Figure 5. *Pattern interpretation of the embroidery on the cloak fragment. Scale reference: 5 cm. Illustration: Ruth Iren Øien and Raymond Sauvage, NTNU University Museum. Tolkning av brodering på kappefragmentet.*

the hemline of the twill cloak fabric. It consists of a 0.4 cm wide simple braid made of three 2Z2 spun double-stranded threads. While the original colour of the cord cannot be determined, the fibre pigmentation visually differs from the 2/2 twill fabric. Whilst probably serving as a decorative element, the braided cord may also have had an additional function in reinforcing the edge of the fabric. Nonetheless, the most significant outer layer detail was the presence of a small area with possible embroidery. This shows up as pinholes that break the woven fabric together with single contour stitches and contour stitches with overlap. Each stitch is between 0.4–0.6 cm long and sewn with Z spun threads. The fibre pigmentation of the Z spun threads used in the stitching appears different to the cloak fabric. While very fragmented, the stitching appears to form tendril-like patterns, similar to the embroidery on a tabby weave from Oseberg (Ingstad 2006:209–211).

Very degraded textiles were preserved on both sides of a sickle found at the presumed hip height of the woman. This could indicate that the sickle had been lying on top of the suspended dress and that the cloak had covered the sickle. If so, the cloak would have had a minimum length down to the woman's waist. Finally, a layer of organic material of probable 1/1 plain woven fabric was preserved over the spindle whorl (T28348:16) found on the woman's left-hand side, at what is thought to be at the woman's chest height. Since the spindle whorl was placed beside the deceased, the textile is unlikely to stem from a garment. Could this indicate that the spindle whorl had been placed in a small, plain-woven bag?

Simple dug burial, Skeiet Grave 2, c. 900–950

The second case in this study involves textiles recovered from Grave 2 in the cemetery at Skeiet. A number of items were found in the area which must have been the upper body of the deceased, including two oval brooches, a ring-headed copper-alloy pin, beads, the remains of a knife, a knife handle and two keys. The oval brooches had deteriorated too much for type identification, but they belong to a type with 7 bosses. A further collection of items comprised of beads and an equal-armed brooch (R658) lay together in the lower-left-leg area of the body. These dress items were probably originally contained within a small basket or similar item (Bryn et al. 2023). Horn fragments,

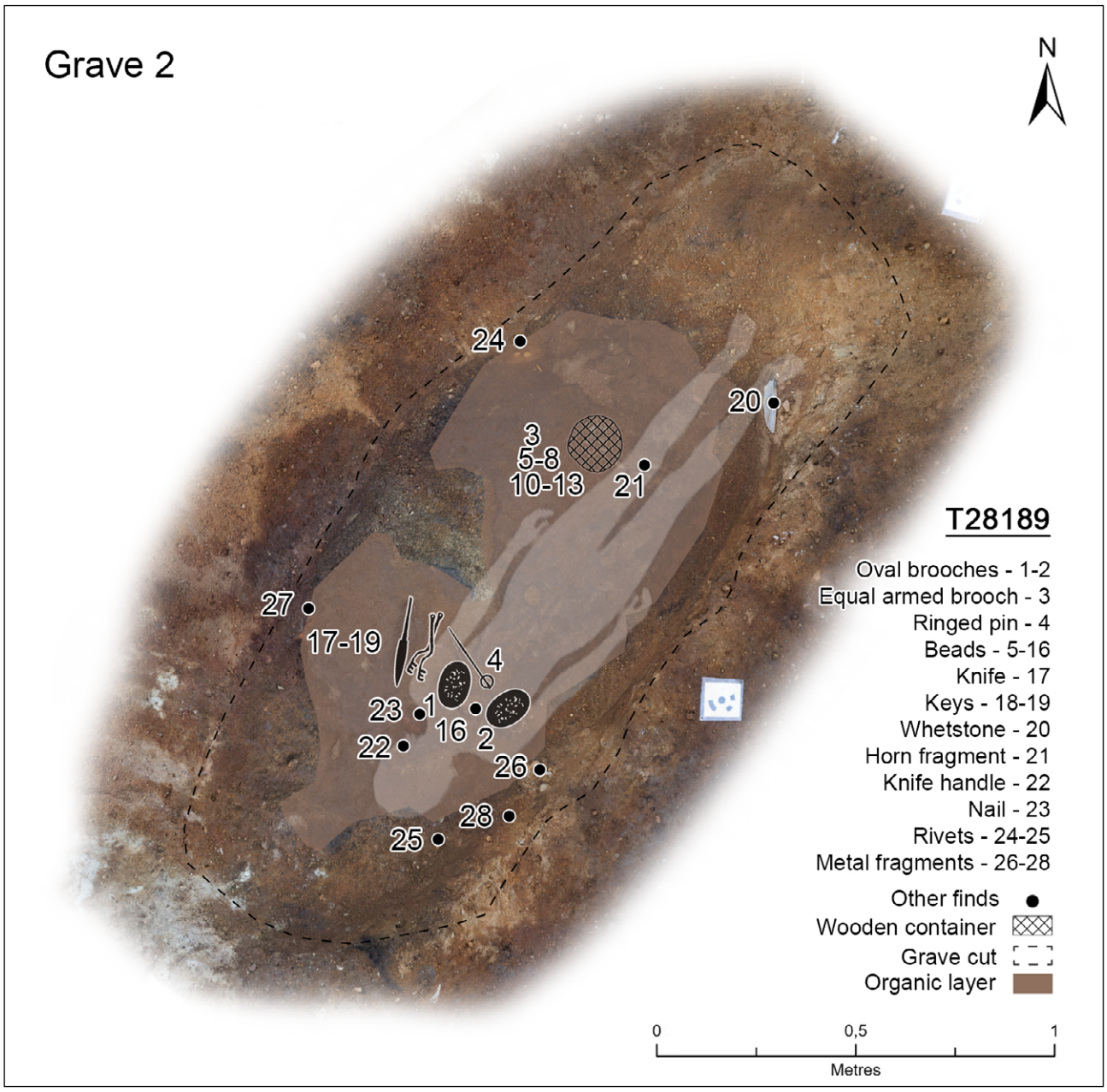

Figure 6. *Skeiet Grave 2. Illustration: Magnar Mojaren Gran, NTNU University Museum.Plan over Skeiet, Grav 2.*

possibly from a drinking horn, were discovered close to the jewellery and a whetstone was recovered from the foot of the grave.

The textile remains were mainly found in association with two fragmented oval brooches (both on the front and reverse sides of the brooches), together with heavily mineralised fragments on the two hooked keys. The brooches had deteriorated badly, which naturally affected the condition of the textiles, but some details concerning the garments worn by the deceased can, nevertheless, be suggested.

Small fragments of the innermost garment in tabby weave had survived on the reverse side of the oval brooches. This was also the case for the loops of the straps to the woman's main gown. One piece of a very fragmented and mineralised loop survived behind brooch T28198:2, and two slightly better-preserved loops, with a width of 0.7 cm and 0.4 cm, lay behind the second oval brooch T28198:1. The widest loop was at one end, attached to a piece of woven fabric which may stem from the front piece of the suspended dress, but the weave type could not be identified. The second strap was not attached to any textile and may therefore have belonged to the back piece of the dress.

Fabrics were also preserved on top of both oval brooches. Brooch T28189:1 was completely covered by a 1/1 tabby weave spun in Z/Z with a thread count of 20/16. FTIR-ATR analysis shows that this garment was made of plant fibres, and while some areas

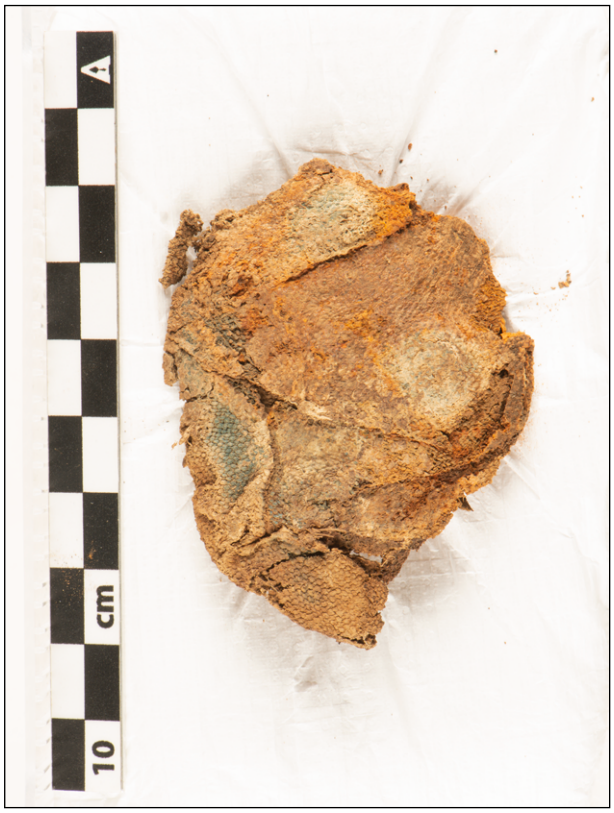

Figure 7. *Remains of shawl on top of oval brooch T28298:1. Photo: Ruth Iren Øien, NTNU University Museum. Rester av sjal dekket overfalten av skålsepnnen.*

clearly appear slightly blue in colour, no trace of dye was identified (Christophersen & Peacock 2023:6). The textile was creased, with up to 6 layers visible, with no apparent systematicity or symmetry between the folds. The fine structure of the textile combined with the use of plant fibres and the folds in the fabric suggest that this fragment is the remains of a shawl or similar piece of clothing that was fastened with the ring-headed pin located between and just below the oval brooches. It certainly represents a finer, thinner and far lighter outerwear than the thicker, woollen, cloak-like pieces from Hestnes and Skeiet Grave 11 (below). Smaller pieces of finer plant fibre textile in 1/1 plain weave spun in Z/Z were also found directly on top of the second oval brooch (T28189:1). One fragment has a thread count of 14/14 and appears creased. Further smaller fragments had a thread count that varied from 14/14–18/18 and appear visually to derive from two different textiles. While the thread counts differ, the overall properties of the finer textiles and the in-situ position indicate that at least some of these fragments are remains from the same shawl that covered oval brooch T28189:1.

Some of the possible shawl fragments on brooch T28189:2 were covered by a coarser, Z/Z spun 2/2 twill. The thread count was difficult to establish due to the condition, but was probably c. 10–12/8–10. While the textile quality would be appropriate for outerwear clothing, it is uncertain what type of garment or other type of fabric it may stem from. It does, nevertheless, indicate the presence of a fourth fabric associated with the body.

Finally, evidence of a fifth garment was evident on the front and the reverse side of an equal-armed brooch (R658) found together with some glass beads placed in the possibly open basket in the lower-left-leg area. The textile fragments consisted of 1/1 tabby weave of Z/Z spun thread, with a thread count of 16/10. The fabric is probably made of plant fibre and displays several weave qualities similar to the probable shawl fragments on the oval brooches (especially on T28189:1). This could indicate that the equal-armed brooch was originally attached to a similar garment which was folded and thereafter put in the small basket together with the beads.

Skeiet, Grave 11, Boat burial, T28276, c. 800–850

The final collection of textiles was recovered from Grave 11 at Skeiet: a 6 m long boat grave dug into the ditch of an earlier mound Grave 11 is part of a burial sequence consisting of two boats buried in the same place, of which Grave 11 is the more recent burial, placed directly on top of the older one. As shown in the figure below, several concentrations of finds were placed in different parts of the boat. As usual, the textiles were preserved in association with the brooches and other metal objects located in the chest and waist area of the deceased. Some of the fragments can be linked to the woman's funerary clothing and bedding, and these are comprised of a minimum of an inner garment, a traditional strapped dress (main gown), a further suspended garment (with only two straps), a possible cloak and, most significantly, a down-filled, blue-dyed quilt. Additional fragments of miscellaneous fabrics of uncertain function were also identified and are listed in Appendix A.

The two oval brooches (R647, E) (Rygh 1885) in this burial were differently preserved, resulting in most of the textile fragments surviving on the reverse side of T28276:1. This includes the remains of an inner garment made of Z/Z spun tabby weave, with a thread count of 20/14. This textile was creased, perhaps accidently. Small threads from a woven textile of plant fibre (confirmed by FTIR-ATR analysis) associated with the pin fastener behind an Insular brooch found between and above the oval brooches may be the further remains of this garment. The suspended dress itself was represented by the top and lower strap-loops, together with the remains of a strap

Figure 8. *Boat burial, Skeiet Grave 11. Illustration: Magnar Mojaren Gran, NTNU University Museum. Båtgrav, Skeiet, grav 11.*

behind oval brooch 1. Both loops were 0.4 cm wide and made of rolled-up tabby weave. One of the loops was sewn onto a fragment of 2/2 twill using 2ZS spun thread. This and further twill fragments on the reverse side of the brooch probably represent one or both dress straps. A further loop belonging to this garment was preserved behind the second oval brooch (T28276:2). It was stuck together with a 1 cm long fragment of a tablet-woven band, but no patterns were identified. The band was attached to an underlying fabric, which probably stems from the upper hem of the front piece of the suspended dress.

A third loop, which does not belong to the suspended dress, was preserved behind oval brooch 1. It was 0.7 cm wide and made of rolled-up tabby weave. This loop shows the presence of a further suspended garment which, according to the loop sequence, was apparently worn over the front piece of the main gown, possible an apron-like piece of clothing as suggested by Bau (1982). Another fragment measuring 2.3 cm × 1.5 cm behind oval brooch 2 may also stem from this second garment. The fragment has a starting border in half-basket weave. After four weft threads in the half- basket weave, the textile structure continues in diamond/lozenge twill. It does not belong to the main gown, and it is therefore reasonable to link it to the apron-like garment.

Moreover, remains of fabric woven in 2/2 twill on oval brooch 1 and the reverse side of the Insular cross-shaped brooch indicate that the woman was further dressed in a cloak. The fragment closest to the pin fastener on the Insular brooch consisted of a possible loop and hemline, while a 2/2 twill fragment (the binding type could not be identified) through which the pin had been inserted was preserved towards the tip of the pin. There was no preserved textile in the middle section of the pin, which may support the interpretation that the brooch held together two parts of a cloak garment. It is possible that a fragment woven in 2/2 lozenge/diamond twill directly on top of oval brooch 1 stems from the same garment. The same is true for the lower of the minimum 3 layers of textiles preserved on oval brooch 2, but this fabric could not be further analysed as it was compressed together with the layers above.

Finally, the possible cloak fragments on top of the oval brooches were covered by a minimum of one layer of 2/2 twill on brooch 1 and two layers on brooch 2. The top twill layer on brooch 2 was fairly coarsely woven from Z/Z spun yarn, with thread-counts of 9/9 per cm. The underlying layer was also 2/2 twill, but neither thread count nor spinning direction could be established. The twill layer on brooch 1 was the largest preserved fragment (4.4 cm × 2.8 cm) and was also woven from Z/Z spun yarn with thread-counts of 12/8. The fragment appears to be fine and evenly woven, and was analysed with FTIR-ATR, which implied protein (wool) fibres (Christophersen & Peacock 2023:8–9). The fragment also tested positive for indigo, showing it had been dyed blue. Furthermore, the remains of down and feathers from seagulls and ducks were stuck to many of the twill fragments and were also found on the reverse side of the oval brooches. The seagull feathers were from the genus *Larus* and the duck feathers from a species of diving duck, probably among the genus *Mergini*

Figure 9. *Fabric preserved on the reverse side of oval brooch T28276:1. a: Thread for suspending beads. b: Loop of the upper strap of the main gown. c: Loop of apron-like garment. d: Textile from the inner garment. e: Loop of the lower strap of the main gown. f: Suspended dress fabric. Photo: Ruth Iren Øien, NTNU University Museum. Tekstilrester bevart på undersiden av skålspennen: a: tråd for perlekjede. b: øvre stropp til selekjole. c: Stropp til mulig forkle. d: tekstilfragmenter fra innerplagg. e: Nedre stropp til selekjole. f: Fragmenter av selekjolen.*

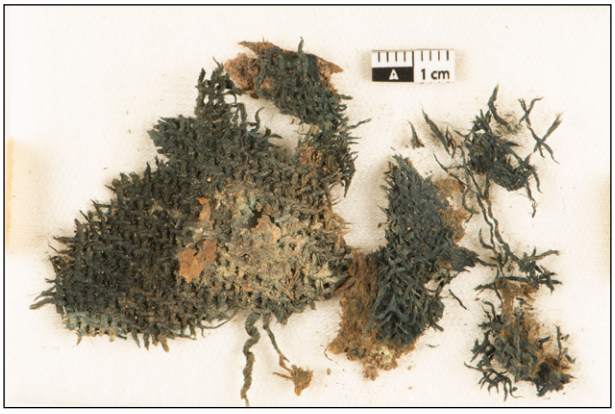

Figure 10. *2/2 twill textile believed to be from a quilt (T28276:59). Photo: Ruth Iren Øien, NTNU University Museum. Tekstilrest i 2/2 kypperbinding. Trolig fragment av teppe/pledd fylt med dun.*

(Rosvold 2022). There was also feather/down on top of and behind the oval brooches, but not on the Insular dress fastener placed slightly higher up.

Combined, it is plausible to suggest that the layers of twill and the associated feathers represent the remains of a blue-dyed, down-filled quilt or body wrap which covered the deceased from the neck area and down. The two layers of twill on brooch 2 probably represent the quilt's over and underside, and the down and feathers stem from the material which originally filled the bedding. The sickle at the waist of the deceased was covered with a very similar twill fabric, which indicates that the grave goods in this area of the burial were also covered by the quilt.

Down-filled pillows and bedding are known from a small number of Viking Age and Merovingian Period burials in Scandinavia, including Valsärde 6, 7 and 8 in Sweden, Oseberg in Vestfold, and Søndre Moksnes and Vernes in Trøndelag (Arwidsson 1942, 1954, 1977, Christensen & Nockert 2006, Berglund & Rosvold 2021, Bender Jørgensen 1986, Vedeler 2017). However, in most cases the down/feathers were found in the bases of the graves and thereby interpretated as fillings from bedding serving as mattresses beneath the deceased. At Skeiet, the down/feathers were mainly found in association with the oval brooches and textiles covering the brooches, clearly indicating a different use as a covering quilt, or a form of body wrap/shroud. This is similar to one of the two women in the famous Oseberg Ship grave, excavated in 1904. The initial assessment of the main burial chamber (often referred to as a royal bed chamber) describes this as follows: 'The body has been dressed and laid on a bed with quilts and blankets' (Shetelig 1917:213–214, translated in Vedeler 2017:281). A reassessment of the material supports the presence of a covering quilt or shroud (Ingstad 2006: 229), although most of the down probably stems from a large mattress used as an underlay (Vedeler 2017:290).

RITUAL DRESSING AND FUNERARY DISPLAY

The analysis above provides a valuable basis for further consideration of how funerary clothing formed a distinctive part of the mortuary display in the investigated burials. Burials may be viewed as ritually charged scenes, in which the specially selected clothing and grave goods formed part of the mortuary performance (Ekengren 2009, Price 2010, Williams 2001, 2016, Lund & Arwill-Nordbladh 2016, Aannestad & Glørstad 2017, Vedeler et al. 2018). Indeed, the

significant diversity of burial practices throughout the Viking world provides a multifaceted and complex picture where a combination of elements such as religion, worldview, local traditions, individual adaptations, and the social status of the deceased and/or his/her family are likely to have affected the individual funerary displays (Williams 2016:401–403). Within this framework, the funeral clothing in direct association with the body and the other objects in the grave created a 'visual tableau' which carried specific associations depending on who they belonged to, how they were made and used, and the social relations within which they were once entangled (Williams 2001, 2016). The arrangements of funerary clothing and dress ornaments may therefore not necessarily be a true reflection of costumes worn in real life. Instead, mortuary displays may be viewed as situations where 'elements of dress relevant to life are combined with elements that appears to be specific to the death ritual' (Vedeler et al. 2018:22). Furthermore, it is highly plausible that the seasons may have influenced the funeral clothing of the deceased. While difficult to demonstrate in the archaeological material, the textiles included in the mortuary scene of a person buried in the coldest season of winter may have varied significantly from grave rituals that took place during the height of summer.

While the burials in this study shared certain dress elements, such as suspended dresses fastened with oval brooches worn over inner garments, the graves also differed significantly in terms of outer garments and their fastenings, additional textiles present in the graves and the qualities and details of the fabrics. The gown worn by the woman at Hestnes was accompanied by a lined cloak in lozenge/diamond twill which was held together by tucking the edges around the oval brooches. The cloak was embellished with braided cords along the edges and, most significantly, embroidered tendril-like patterns. Embroidered textiles from the Viking Age are rare and only known from a small number of wealthy graves, such as the significant Oseberg Ship burial in Vestfold and the Mammen grave in Denmark (Hald 1980:107–110, Ingstad 2006:208, Rimstad et al. 2021:746). The wool combs in the grave indicate that the woman was involved in textile production; the cloak itself may also support this. Nonetheless, with relatively few artefactual grave goods exposed to onlookers, it seems apparent that especially the embroidered cloak must have added a significant dimension to the visual display in the burial scene.

Instead of a thick cloak, the woman from Grave 2 at Skeiet was dressed in a lighter shawl-like overgarment of finely woven plant fibre, presumably linen. This finding emphasises the importance of knowing the exact location of textile fragments, as the shawl has textile qualities similar to the inner garments. The shawl was held together by a copper-alloy ring-headed pin, which is an unusual feature as this type of garment fastener is most commonly found in men's graves (Petersen 1928:137). The remains of a coarser twill fabric covered some of the shawl fragments, but it was not possible to determine whether this represented a further overgarment or some other form of clothing. Moreover, another piece of fine, linen textile with a trefoil brooch attached was put in an open basket together with some beads and placed by the left-leg area of the deceased.

Finally, the woman buried in the boat grave at Skeiet was the most richly equipped individual in this study, both in terms of artefactual grave goods,

Table 1. *Overview of identified garments and the results from the FTIR-ATR analysis.*

Site	Garment types	Weave	Dye (FTIR/ATR)	Fiber identification (FTIR/ATR)
Hestnes (T282348)	Shift/inner garment	1/1 tabby	-	-
	Strap-dress	1/1 tabby	-	-
	Layered cloak	Inner layer: 1/1 tabby	-	-
		Outer layer: 2/2 twill/diamond twill	-	-
Skeiet, Grave 2 (T28189)	Shift/inner garment	1/1 tabby	-	-
	Strap-dress	Uncertain	-	-
	Shawl	1/1 tabby	-	Plant fiber (presumed linen)
Skeiet, Grave 11 (T28276)	Shift/inner garment	1/1 tabby	-	Plant fiber (presumed linen)
	Strap-dress	2/2 twill or diamond twill	-	-
	Apron-like garment	Diamond twill	-	-
	Possible cloak	2/2 twill	-	-
	Quilt	2/2 twill	Indigo (blue)	Protein fiber (presumed wool)

Figure 11. *Schematic reconstruction of the clothing worn by the Hestnes woman. Illustration: Kristoffer R. Rantala, NTNU University Museum. Skjematisk rekonstruksjon av klærne slik de framvist på kvinnen i Hestnesgraven.*

Figure 12. *Schematic reconstruction of the clothing worn by the woman buried in Skeiet Grave 2. Illustration: Kristoffer R. Rantala, NTNU University Museum. Skjematisk rekonstruksjon av klærne slik de ble framvist på kvinnen i Grav 2 på Skeiet.*

clothing and bedding. Her woollen suspended dress was accompanied by a further garment, possibly an apron-like piece of clothing which was suspended at the front. While additional suspended garments were a common feature of the female costumes at Birka, where 70 of the 105 graves studied by Hägg (1974) had more than two loops per brooch, similar examples from Norway are rare and are currently only known from Sandanger and Hopperstad (Holm-Olsen 1976, Lukešová 2011). The woman from Skeiet was also buried in a twill cloak, possibly lozenge/diamond twill of similar weave quality to the cloak from Hestnes, although no further embellishments were identified. In the final burial event, it was probably only the very top of the cloak and the neck area of the inner garment which were visible, since most of the woman was otherwise covered by a blue-dyed, twill quilt. To our knowledge, this is the only example of blue-dyed bedding known from Viking Age Scandinavia and is therefore a significant and rare discovery. Indeed, the only further evidence of Viking Age quilts from Norway stems from the Oseberg Ship burial in Vestfold. In the remaining cases from Scandinavia, down-filled bedclothes were placed under the 'sleeper', rather than covering him or her (see above). The woman buried in the extravagant, blue-dyed quilt at Skeiet must therefore have held a special position in her society, as further emphasised by the additional grave goods and the boat in which she was placed. Considering the number of items

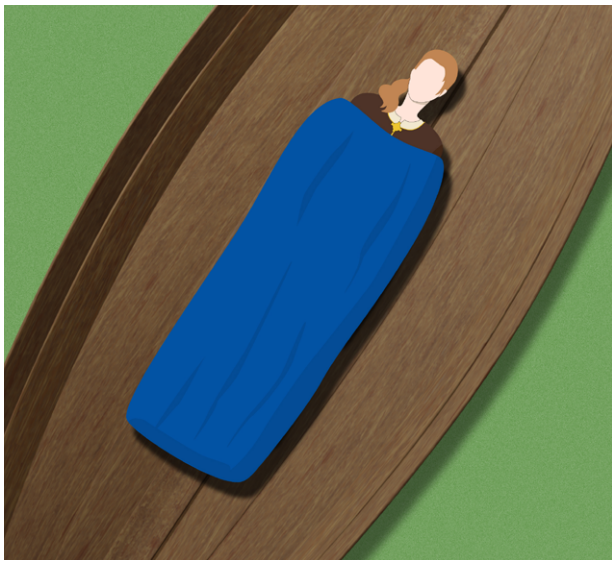

Figure 13. *Schematic reconstruction of the clothing and the quilt in Skeiet Grave 11. Illustration: Kristoffer R. Rantala, NTNU University Museum. Rekonstruksjon av bekledning og sengetøy/teppe, Grav 11, Skeiet.*

related to weaving and spinning, it is very likely that her elevated social position may, at least partly, be linked to her involvement in textile production.

While this study is only comprised of textile remains from three graves, a noticeable and consistent feature is that all the women were laid to rest wearing different types of outer garments that covered the upper body, including the oval brooches. While Holm-Olsen (1976:204) concluded in an older study that

there was no certain evidence of cloaks in the textile material from western Norway, our findings indicate that an outer garment may have been a common element in Viking Age funerary clothing. Indeed, when re-examining 23 Viking graves from western Norway, Lukešová (2015) identified 16 instances of fabrics that originally covered the brooches which she interprets as the remains of outer wear, although she does not always distinguish between different garment types, such as shawls or cloaks (for a more detailed description of cloaks from Trå, Hyrt and Hegg, see Lukešová 2011, Øye 2015:13–23). There is also an example from Kaupang, Skiringssal, where a possible cloak in diamond twill apparently covered the deceased (Blindheim 1999:242), and remains of outer garments covering oval brooches are known from other parts of Scandinavia, especially Birka (Hägg 1974:84). In the graves at Skeiet, each of the outer garments were held together with an additional brooch, but the example from Hestnes shows clearly that this was not always the case. Here, the cloak was held in place by tucking the edge around the oval brooches. Presumably, this solution would only be suitable for funerary clothing, and further examples of outerwear without fasteners are also known from graves in Birka (Hägg 1974:84).

In terms of funerary display, it is apparent that the outerwear in this study would have visually covered the beads and oval brooches. Consequently, it was only the brooches attached to the neck area of the inner garment at Hestnes and the cloak and shawl fasteners at Skeiet that were exposed during the final funerary display. This feature of covering the suspended dress brooches stands in contrast to a find from Hyrt in Voss, where the oval brooches were fastened on top of the cloak (and the underlying dress straps), together with a third buckle which held the edges of the cloak together. These examples demonstrate that there were different customs for the exposure of costume jewellery in 'mortuary displays'.

CONCLUSION

By studying various aspects of the textiles' qualities and the contextual information for the fabric placement and layering, it has been possible to identify different types of mortuary garments and outfits worn by three women who were buried in central Norway in the period 850–950. While the women were buried in traditional suspended dresses fastened with oval brooches, the graves differed significantly in terms of outer garments and the number and types of additional textiles present. In terms of display, it is apparent that the clothing and bedding must have played a major role in the mortuary rituals, especially since the garments lay over and therefore covered many of the dress ornaments and, indeed, other grave goods. The textiles identified in this study were not limited to garments; evidence of bedding in the form of a blue-dyed, down-filled quilt which covered the woman in the boat burial at Skeiet is a remarkable reminder of the visual aspect provided by textiles in Viking Age mortuary displays. By moving the attention to funerary clothing and bedding, we hope to have provided a further facet to the topic of burial rituals in Viking Age Norway, which has traditionally focused on artefactual grave goods.

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OPPSUMMERING

Denne artikkelen presenterer en detaljert analyse og tolkning av tekstilfragmenter fra tre kvinnegraver datert til vikingetid som ble undersøkt på Skeiet og Hestnes i Møre og Romsdal i 2019. Disse funnene danner grunnlaget for en diskusjon omkring kvinnenes gravbekledning og tekstilenes visuelle funksjoner i gravritualer. Analysen konkluderes med at alle kvinnene har vært gravlagt i selekjole av ullstoff hvor selene har vært festet sammen av ovale skålspenner. Det ble også funnet spor av ytterbekledning i alle gravene. Kvinnen fra kammergraven på Hestnes var ikledd en foret ullkappe, dekorert med påsydd broderi (av uviss utstrekning) og en flettet snor langs kanten. I Skeiet, grav 2 bar den avdøde kvinnen et lettere sjal-lignende plagg i lin som var festet sammen med en ringnål. Denne kvinnen fikk også med et ytterligere lintøy som var lagt ned i en liten kiste ved fotenden av graven. Det ble funnet flest tekstilrester i båtgraven Skeiet, grav 11. I tillegg til den tradisjonelle selekjolen har den gravlagt vært ikledd et forkle-lignende seleplagg samt en ullkappe. Det mest spektakulære tekstilfunnet var imidlertid rester av et blåfarget, dunfylt ullteppe som delvis dekket den gravlagt. Slike dekkende dyner er svært uvanlige fra vikingtidsgraver i Norge og har frem til nå kun vært kjent fra Osebergskipet i Vestfold.

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APPENDICES

Appendix A. Catalogue of textile remains from the Hestnes Grave (T28348)

T-number	Context	Fiber (visually determined)	Colour	Weave	Spinning	Thread count	Garment type	Size
T28348:1	On top of oval brooch T28348:1, area 1, fabric 1	Animal fiber?	Reddish brown	-	-	-	Cloak (outer layer)	2 × 1,8 cm
T28348:1	On top of oval brooch T28348:1, area 1, fabric 2 (underneath fabric 1)	Animal fiber?	Reddish brown	Tabby	Z/Z	16/16	Cloak (inner layer)	2 × 1,8 cm
T28348:1	On top of oval brooch T28348:1, area 2.	Animal fiber?	Reddish brown	Tabby	Z/Z	15-16/?	Cloak (inner layer)	2 × 1,4 cm
T28348:1	On top of oval brooch T28348:1, area 3.	Animal fiber?	Reddish brown	-	-	-	Cloak?	3 × 1,7 cm
T28348:1	On/around the pin on the reverse of oval brooch T28348:1	Animal fiber?	Reddish brown	Tabby	-	-	-	1,2 cm × 0,9 cm
T28348:1	On/around the pin on the reverse of oval brooch T28348:1	Animal-/ plant fibers	Reddish brown	Tabby	Z/Z	-	Strap-dress	1,2 cm
T28348:2	On top of oval brooch T28348:1, Area 1, fabric 1	Animal fiber	Brown	2/2 twill	Z/?	14/10	Cloak (outer layer)	-
T28348:2	Oval brooch, Area 1, fabric 2 (underneath fabric 1)	Animal fiber?	Brown	Tabby	Z/?	10-12/10-12	Cloak (inner layer)	-
T28348:2	On/around the pin on the reverse of oval brooch T28348:2	Animal-/ plant fibers	Brown	Tabby	Z/Z	12/12	-	-
T28348:3	On/around the pin on the reverse of trefoil brooch T28348:3	Plant fiber?	-	Tabby	-	-	-	0.4 × 0.3 cm
T28348:5	On the reverse of oval brooch T28348:1	Plant fiber?	Light brown	Tabby	Z/S	24/24	Shift/inner garment	0.5 × 0.4 cm
T28348:6	On the reverse of oval brooch T28348:1	Animal-/ plant fibers	Light brown	Tabby	Z/S	12/12	Shift/inner garment	0.3 × 0.3 - 0.5 × 0.6 cm
T28348:7	On or partly below the edge of oval brooch T28348:1.	Animal fiber?	Brown	Diamond twill	Z/?	16-17/12?	Cloak?	1.5 × 1.9 cm
T28348:8	On the reverse of oval brooch T28348:1	Animal-/ plant fibers	Brown	Tabby	-	-	-	-
T28348:9	On the reverse of oval brooch T28348:2	Animal-/ plant fibers	Reddish brown	Tabby	-	-	Strap-dress?	2.2 × 1.1 cm
T28348:10	Textile found in connection with oval brooch T28348:1, fabric 1	Animal fiber	Reddish brown	2/2 twill	Z/Z	-	-	1.1 × 0.8 cm
T28348:10	Textile found in connection with oval brooch T28348:1, fabric 2	Animal fiber	Reddish brown	Tabby	-	-	-	2 × 1 cm
T28348:11	2 fragments of the same textile found in association with oval brooch T28348:1	Plant fiber?	Light beige	Tabby	-	-	-	1 × 0.5 - 1 × 1 cm
T28348:12	On top of the lower front of trefoil brooch T28348:3	Animal fiber	Brown, dark brown/ blue	Diamond twill	Z/Z	16/12	Cloak (outer layer)	4 × 4 cm
T28348:13	On top of sickle T28348:13	Animal fiber?	Brown	-	-	-	-	-
T28348:16	On top of spindle whorl T28348:16	Animal-/ plant fibers	Brown	Tabby?	-	-	-	3 × 3.5 cm

Appendix B. Catalogue of textile remains from Skeiet Grave 2 (T28198)

T-number	Context	Fiber (visually determined)	Colour	Weave	Spinning	Thread count	Garment identification	Size
T28189:1	On top of oval brooch T28189:1	Plant fibers	Brown, dark brown/blue	Tabby	Z/Z	20/16	Shawl	7.5 × 6 cm
	Strap under oval brooch T28189:1.	Animal-/ plantfiber	Brown	-	-	-	Strap-dress	0.7 cm
	Strap and textile under oval brooch T28189:1	Animal-/ plantfiber	Brown	-	-	-	Strap-dress	0.4 cm
T28189:2	On top of oval brooch T28189:1, fabric 1	Animal fiber	Brown	2/2 twill	Z/Z	-	Uncertain	-
	On top of oval brooch T28189:1, fabric 2 (underneath fabric 1)	Animal fiber	Brown	Tabby	Z/?	14/14	Shawl ?	0.5 × 0.5 cm
	Strap under oval brooch T28189:2	Animal-/ plantfiber	Brown	-	-	-	Strap-dress	-
T28189:3	Equal-armed brooch	Plant fibers?	Brown, dark brown/blue	Tabby	Z/Z	16/10	-	1.5 × 0.5 cm
T28189:18	On top of key	-	-	-	-	-	-	-
T28189:19	On top of key	-	-	-	-	-	-	-
T28189:33	Under oval brooch T28189:1	Plant fibers?	Brown/grey	Tabby	Z/Z	16/14?	Shift/inner garment	1 × 1 cm
T28189:34	Under oval brooch T28189:1	Plant fibers?	Brown/grey	Tabby	Z/Z	18/18	Shift/inner garment	0.3 × 0.3 cm

Appendix C. Catalogue of textile remains from the Skeiet Grave 11 (T28276)

T-number	Context	Fiber	Colour	Weave	Spinning direction	Thread count	Garment identification	Size
T28276:1	On top of oval brooch T28276:1	Animal fibers	Brown, with some dark fibres.	2/2 twill	Z/Z	-	Quilt?	2 × 1,5 cm
T28276: 1	Found on the edge of the reverse side of oval brooch T28276:1, area 1	Animalfibers	Brown, With some dark fibres.	Diamond twill	Z/Z	14 - 16/10	Strap-dress	4.4 × 2 cm
T28276: 1	On the pin of oval brooch T28276:1, area 2, fabric 1	Animal-/ plant fibers	Reddish brown		2ZS		String/twine	1.4 × 0.1 cm
	On the pin of oval brooch T28276:1, area 2, fabric 2	Animal-/ plant fibers	Reddish brown	Tabby	Z/Z		Strap-dress	1 × 0,4 cm
	On the pin of oval brooch T28276:1, area 2, fabric 3	Animal-/ plant fibers	Reddish brown	Tabby	Z/?		Strap-dress	1.7 × 0.6
	On the pin of oval brooch T28276:1, area 2, fabric 4	Animal-/ plant fibers	Reddish brown	Tabby	Z/Z	20/14	Shift/inner garment	2.8 × 2 cm
	On the pin of oval brooch T28276:1, area 2, fabric 5	Animal-/ plant fibers	Reddish brown	Tabby?	-	-	Strap-dress	1.4 × 0.4 cm
	On the pin of oval brooch T28276:1, area 2, fabric 6		Reddish brown	Twill?	-	-	Strap-dress	
T28276:2	On top of oval brooch T28276:2, area 1, fabric 1	Animalfibers	Brown	2/2 twill	Z/Z	9/9	Quilt	
	On top of oval brooch T28276:2, area 1, fabric 2 (underneath fabric 1)	Pant fibers?	Dark brown	Tabby/2/2 twill	Z/Z	-	Quilt?	
	On top of oval brooch T28276:2, area 1, fabric 3 (underneath fabric 2)	-	-	-	-	-	-	
T28276:2	Found on the edge of the reverse side of oval brooch T28276:2, area 1, fabric 1	Animalfibers	Brown	2/2 twill	Z/?	-	Strap-dress	4 × 0.8 cm

T-number	Context	Fiber	Colour	Weave	Spinning direction	Thread count	Garment identification	Size
	On the pin of oval brooch T28276:2, area 2 , fabric 1	Animalfibers	Brown	2/2 twill	Z/Z		Strap-dress?	2 × 0.8 cm
	On the pin of oval brooch T28276:2, area 2 , fabric 2	Animal-/ plant fibers	Brown	Tabby	Z/Z	20/18		1 × 0.7 cm
	On the pin of oval brooch T28276:2, area 2 , fabric 3	Animal-/ plant fibers	Brown	-	-	-	Strap-dress	0.4 cm
	On the reverse base of oval brooch T28276:2, area 2 , fabric 4	Animal-/ plant fibers	Greybrown	Tabby	Z/Z	-	-	0.7 × 0.4 cm
	On the reverse base of oval brooch T28276:2, area 3 , fabric 1	-	-	-	Z?	-	-	1,6 × 0,3
T28276:3	On/around the pin and pin fastnerer of Insular brooch T28276:3	-	-	-	2ZS	-	-	-
T28276:7	Remains of thread inside bead T28276:7	Animal fibers	Dark brown	-		-	String/twine	-
T28276:8	Remains of thread inside bead T28276:8	Animal fibers	Dark brown	-	2ZS	-	String/twine	-
T28276:18	On top of sickle	Animal fibers	Brown	2/2 twill	Z/Z	12/6	Quilt?	2.2 × 2.5 - 5.3 × 2 cm
T28276:25	On top of key	Animal fibers	Brown	Tabby	Z/?	-	-	1-3 cm
T28276:43	On top of iron object	Animal fibers	Reddish brown	Tabby	Z/Z?	10/6	-	4.8 × 2.7 cm
T28276:51	Fiber					-	-	
T28276:55	On the front of the oval brooch T28276:1	Animal fibers	Dark brown to black	Diamond twill	Z/Z	16/10?	Quilt?	3.5 × 1.7 cm
T28276:56	Textile/feathers on the front of the oval brooch T28276:1.	Animal fibers	Brownish grey	-	-	-	Quilt?	3.8 cm
T28276:57	Textile/feathers on the front of oval brooch T28276:1	Animal-/ plant fibers	Brown	-	-	-	Quilt?	0.5 - 1.5 cm
T28276:58	Textile/feathers on the front of oval brooch T28276:1	Animal-/ plant fibers	Light brown	2/2 twill ?	Z/Z	-	Quilt?	1.5 × 1 cm
T28276:59	On top of oval brooch T28276:1	Animal fibers	Dark brown	2/2 twill	Z/Z	16/12	Quilt	0.2 × 0.3 - 4.4 × 2.8 cm
T28276:60	Textile and wood	Animal fibers	Brown	2/2 twill	Z/Z	-	-	2 × 0.3 cm
T28276:61	On the reverse of oval brooch T28276:1	Animal-/ plant fibers	Reddish brown	Tabby	Z/Z	14/12	-	1 × 0.5 - 1 × 1.5 cm
T28276:62	Braided cord on the reverse of oval brooch T28276:1	Animal-/ plant fibers	Reddish brown	Braid	Z	-	-	-
T28276:63	On the reverse of oval brooch T28276:1	Animal fibers	Brown/Light brown	2/2 twill	Z/Z	18-20/12-14	-	4 × 2.8 - 4.5 × 3.5 cm
T28276:64	On the reverse of oval brooch T28276:1	Animal fibers	Brown/Light brown	2/2 twill	Z/Z	-	Strap-dress	1 × 1.3 cm
T28276:65	Textile, down, feather on the reverse of oval brooch T28276:1	Animal fibers	Brown	-	-	-	-	2 - 3 cm
T28276:67	Textile, straps, on the pin of oval brooch T28276:2	Animal fibers	Light brown	Tabby, tablet weave and 2/2 twill	Z/Z, 2ZS	14/14	Apron-like garment	2.1 × 2.3 cm
T28276:68	On the pin of oval brooch T28276:2	Animal fibers	Brown	Tabby	Z/Z , Every 4th thred is S-spun. 2ZS	25/18	-	0.8 × 0.9 - 1 × 0.6 cm

T-number	Context	Fiber	Colour	Weave	Spinning direction	Thread count	Garment identification	Size
T28276:69	On the pin of oval brooch T28276:2	Animal-/ plant fibers	Light brown	2/2 twill?	Z/Z	20/12?	Apron-like garment?	0.5 × 0.4 - 1 × 1.2 cm
T28276:70	On the pin of oval brooch T28276:2	Animal-/ plant fibers	Light brown	Diamond twill	Z/Z	20/16	-	0.5 × 0.4 - 1 × 1.2 cm
T28276:71	On the reverse of oval brooch T28276:2	Animal fibers	Brown	-	Z	-	-	0.25 -0.4 cm
T28276:72	Textile, straps, on the reverse of oval brooch T28276:2	Animal fibers	Reddish brown, brown	Tabby, 2/2 twill	Z/Z, 2ZS	-	-	-
T28276:73	On the pin of Insular brooch T28276:3	Animal fibers	Brown	2/2 twill	Z/Z	-	Cloak?	0,6 x1 cm
T28276:74	On the pin of Insular brooch T28276:3	Animal fibers	Brown	2/2 twill	Z/Z, 2ZS	-	Cloak?	2,2 × 1 cm
T28276:75	On the pin of Insular brooch T28276:3	Pant fibers	-	-	-	-	Shift/inner garment	-
T28276:76	Fur in association with Insular brooch T28276:3	Animal fibers	-	-	-	-	-	-

9. CREMATION AND DEPOSITIONAL PRACTICES OF CREMATED REMAINS AT SKEIET

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ABSTRACT

The mortuary practices at Skeiet encompassed both cremations and inhumations. The cremations were skilfully executed. The deceased was burned on a pyre at an unknown location, together with grave goods and complete animals. Afterwards, the remains were moved to the place of deposition in the cemetery. The excavations revealed burnt skeletal remains in four (cremation) grave, two mortuary houses and in one boat grave. All of the cremations (Graves 3, 12, 14 and 17) included burned human remains from adults, while one of the inhumation boat graves (Grave 10) included a likely deposited burnt cranial fragment from a subadult. Except for hares and birds, the identified animal species were all domesticated. This included horses, cattle, sheep or goats, and dogs. Grave 14, a richly furnished cremation pit, held the largest assembly, including the remains of an elderly woman with several pathological and age-related skeletal lesions. Notably, the grave featured numerous bird bones, coming from at least 50 wings. Grouse formed the largest group of birds, but also waterfowl and smaller birds such as thrushes accompanied the deceased. The anatomical selection of wings for the funeral pyre, likely for their visibility and black-and-white contrast, indicates intentional ritual practices. The cremation rituals at Skeiet reflect common patterns seen in other Iron Age graves, but also show unique local – or specific - peculiarities.

Keywords: Cremation burial practice; Avian remains; Birds in Iron Age burial practices; Birds as burial gifts; Taphonomy of cremation burials; Animals in Iron Age cremations

INTRODUCTION

This chapter presents and discusses the assemblage of burned bones recovered from cremation graves in the Late Iron Age cemetery at Skeiet in Vinjeøra, Central Norway, excavated in 2019 and 2020 (Figure 1). The excavations at Skeiet revealed four cremation graves from c. AD 550–800. While no direct evidence of the actual cremation pyre was located at the site, the grade of firing recorded in the burned bones reveal that bones from both human and companion animals were well cremated. The osteoarchaeological analyses of finds from Skeiet illuminate different aspects of the execution of Late Iron Age cremation rituals in the region. Cremating the dead is one of several shared burial practices during the Nordic Late Iron Age (AD 550–1050). The ritual involved burning the body on a funerary pyre, often accompanied by grave goods and animal offerings, typically followed by interment of the remains in a grave. Late Iron Age burial practices exhibit marked variation in both the treatment of the corpse (e.g. cremation and inhumation), and the way in which the human remains were interred on the burial sites (Price 2008:258, see also Kjellström et al. 2021). The remains of the pyre could either be buried in situ with markings or in a burial mound. The remains of cremated bones and grave goods could also

Reference: Kjellström A., Gummesson, S., Storå J., Sauvage R. (2024). Cremation and Depositional Practices of Cremated Remains at Skeiet. I R. Sauvage (Ed.), *From Life to Death in Iron Age and Medieval Vinjefjord* (pp. 219–238). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.218.ch9
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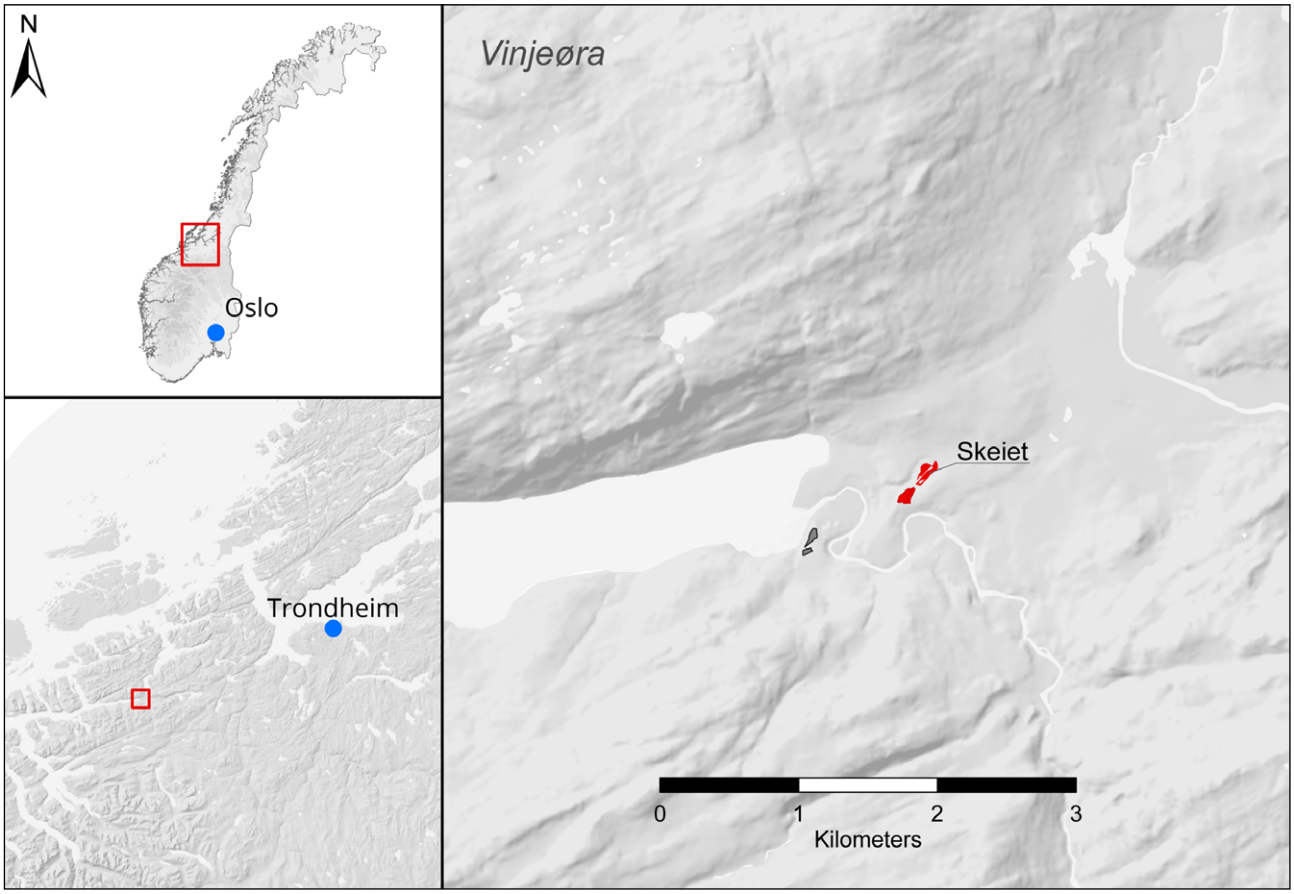

Figure 1. *Maps showing the location of Skeiet in Vinjeøra, Central Norway. Map: Kristoffer R. Rantala, NTNU University Museum. Lokasjonskart.*

be retrieved from the ashes, to be buried elsewhere in a container or pit, or spread on the ground. Relocated remains were often covered by a grave construction. All of these methods are seen at Skeiet.

Conducting a successful cremation with thorough combustion of the human remains and the accompanying animals requires considerable skill (see e.g. Holck 1997, Kaliff 1992, Østigård 2000, 2013). The common factor for all depositions containing burnt remains is the transformation of the body or bodies using fire. This choice had specific goals, both in a practical way to handle the body of the dead, but also in a wider context of common burial practices or rituals. A cremation pyre is a powerful funerary display that may be seen to transform and unify the dead with accompanying animals and grave goods through fire. Varying degrees of firing of bones may reflect the skill of those performing the cremations. Together with the subsequent handling and final deposition of the cremated bones, the cremation ritual functioned as an important mnemonic act in constructing and forming the remembrance and personhood of the deceased (Østigård 1999, Williams 2004). This is not the place for an extended discussion or evaluation of the general burial rituals themselves, but it is important to note that cremation was not the final act in the burial ritual (Østigård 1999, 2013). Hence, the selection of remains from the funerary pyre in the graves may provide insight into the implementation of the cremation ritual, how the funerary display was perceived and transformed through fire, and the subsequent handling and final deposition of the cremated bones. These are the significant parts – or actions – of the burial ritual (Østigård 1999, 2013). Since these actions start with the cremation ritual, some attention should be paid to factors that illuminate the performance of the cremation itself and the funerary pyre.

The general aim of the chapter is to investigate what the finds from Skeiet tell us about the execution of Late Iron Age cremation rituals and funerary display. The limited amount of human remains in most features hinders a wider comparative interpretation of the cremation practices at the site; however, the finds in Grave 14 are unique and deserve a detailed evaluation, together with data from the three features which contained smaller amounts of burned bones. The other contexts will be briefly commented upon. We investigate the species distributions and anatomical representation to illuminate the handling

practices, burial offerings and taphonomic aspects of the depositions. Furthermore, we evaluate whether the cremations at Skeiet may be characterised as professionally performed or not.

MATERIAL AND METHODS

The cremation and grade of firing of the skeletal remains

In most cremations, it is reasonable to assume that complete bodies, at least in the case of humans, were cremated. Human and animal bodies undergo transformations during the cremation process and the condition of the remains may vary for several reasons. The amount of bones remaining after the cremation of a human body varies. The destruction of soft tissue and exposure to fire causes the organic matter in bones to evaporate and, in connection with this, a chemical alteration of the inorganic material takes place. The bones shrink, between 5–30% in humans (Mays 2020), they twist and deform, and finally they fracture. For an adult human, the total volume of burnt bone in modern contexts amounts to 2.3–3.8 litres if all fragments are preserved (Holck 1997:Table 9), or between c. 880–5,400 g in weight (Silva et al. 2009, Ubelaker 2009 and references therein). In general, the cremated remains of females weigh less than those of males. Unfortunately, no reliable information on the total weight of different burnt animal skeletons is available. The loss of bones in archaeological cremations may be caused by many factors, such as the deliberate selection or crushing of fragments (Kaliff 1992:69, 1997, Sigvallius 1994:29, Williams 2004), as well as post-deposition taphonomic processes in the soil and archaeological recovery methods (Gonçalves et al. 2013, Harvig 2015, Sjöling 2007).

The level of firing of the bones may vary, and this in turn may shed light on how (well) the cremation has been executed (Holck 1997, Østigård 2000, see also Back Danielsson 2008). In the present analysis, the degree of combustion (i.e. oxidation) of the bone fragments was recorded according to a slightly modified scheme presented by Stiner et al. (1995) to be able to highlight the cremation process (for a description, see Kjellström et al. 2021). In this scheme, a score of 0 represents unburnt bones, while a score of 6 represents bones exposed to full combustion. Score 6a, added here, denotes completely white-burnt fragments, with a soft and sometimes porous and floury surface, while 6b fragments are white-burnt, completely recrystallised fragments exhibiting a hard surface with an almost crystalline structure (see also Herrmann 1988). The colour of cremated bones is, however, also dependent on the availability of oxygen during combustion (Reidsma et al. 2016). A report with the complete osteological evaluation from the site and detailed descriptions of the applied methods is found in Kjellström et al. (2021).

The cremations at Skeiet

The cemetery is comprised of 11 ring ditches that constitute the remains of levelled earthen burial mounds, located in an area covering approximately 4,000 m^2. Eighteen burials in the form of cremations, (inhumation) boat graves and inhumation graves were discovered within and related to these remains. The site chronology indicates that the cemetery was used from c. AD 550–950. The four cremations date to the first phase of this period, c. AD 550–800 (Figure 2), and it is possible that Graves 3 (with human bones only) and 17 (with human, horse and dog bones) represent the earliest burials on the site. Four of the cremations have been radiocarbon dated; in all cases, the result was based on at least two charcoal samples. Grave 3 falls between roughly AD 572–650, Grave 12 between 661–823, Grave 14 between 580–823 (excluding the probably erroneous date of a cremated bone) and Grave 17 between AD 560–653 (Sauvage & Lorentzen Ch. 5).

The area of the cemetery was dominated by well-drained sand and gravel. This caused poor preservation conditions for bone, particularly unburned bone. Hence, the human and faunal remains from these graves were mainly recovered from the cremations. These were of two different types: cremation deposits and a cremation pit. In both types, the actual cremation pyre seems to have been located outside of the cemetery (the excavated area). Thus, the depositions represent a selection of ashes and remains taken from the pyre and then relocated to another place.

The cremation deposits (Graves 3, 12 and 17, Figure 3) consisted of pyre remains with cremated bones deposited directly on the original soil surface and later covered by a mound. There was no clear evidence of in-situ burning (such as burned oxidised sand); thus, it is assumed that the remains were moved from the pyre before deposition on the site. Only Grave 3 contained grave goods to some extent, in the form of glass beads.

Another type of deposit was seen in Grave 14 (Figure 4). In this grave, the pyre remains had been deposited in a small, c. 100 cm wide and 40 cm deep, dug pit, placed in a ring ditch (Figure 2). The remains consisted of cremated bones, charcoal and ashes, containing by far the largest assembly of burned bones, including larger mammals such as a horse and a cattle

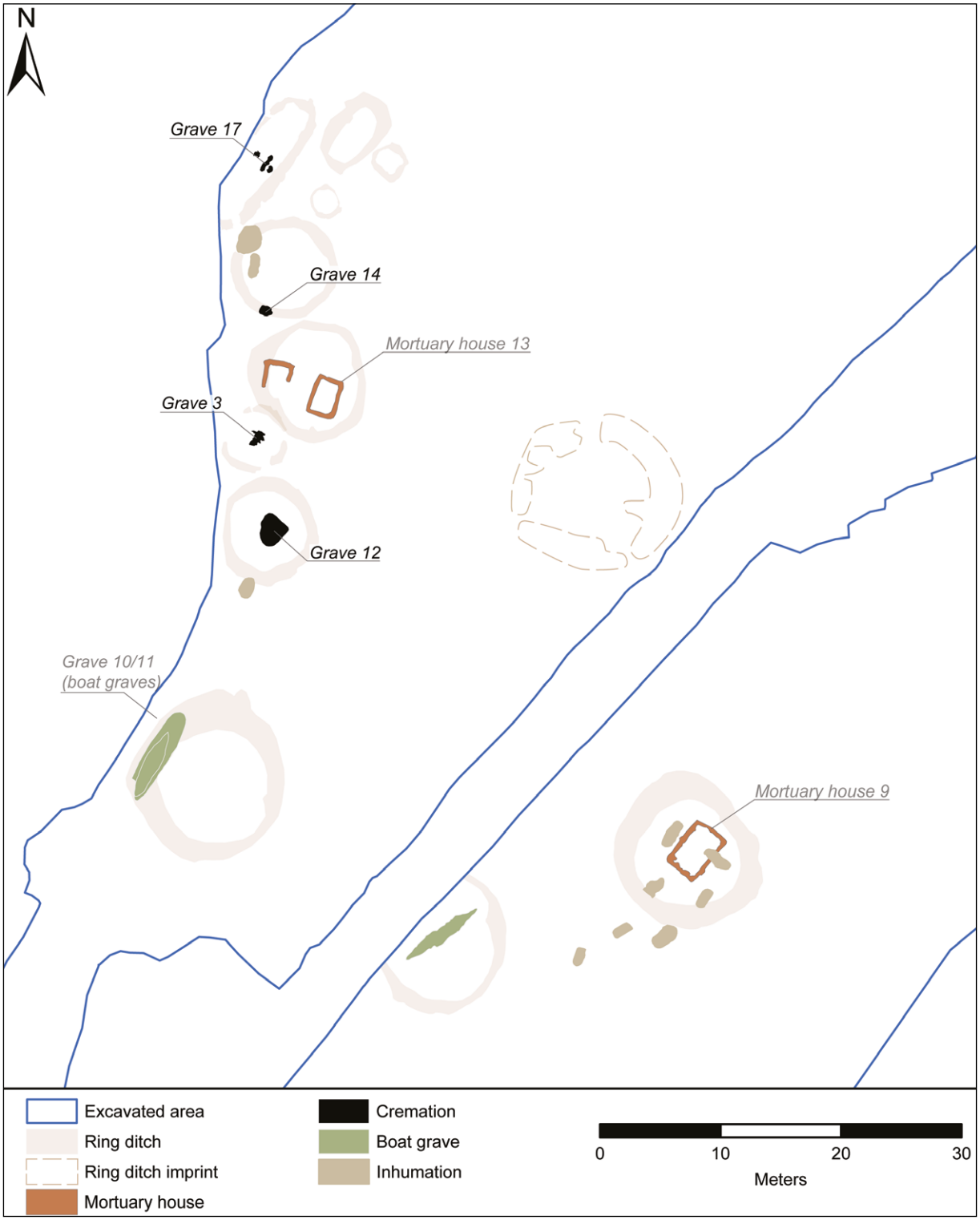

Figure 2. *Location of the cremation burials (black) and mentioned contexts with bones (grey text labels) from Skeiet. Illustration: Kristoffer R. Rantala, NTNU University Museum. Oversikt over kremasjonsgravene og nevnte kontekster.*

(see below). A large amount of grave goods, in the form of jewellery, tools, personal belongings, as well as fittings and parts from a wooden chest, were scattered among the remains (170 items in total, see Figure 3 and details in Sauvage and Lorentzen Ch. 5). Like the cremation deposits mentioned above, there was no evidence of in-situ burning, and this should be seen as a redeposited cremation. However, the grave differs from the others in regard to the large amount of cremated bones and grave goods, and by being placed in a pit.

In addition to the four cremation graves, a small number of burned bones were recovered from the wall trenches belonging to two proposed mortuary houses

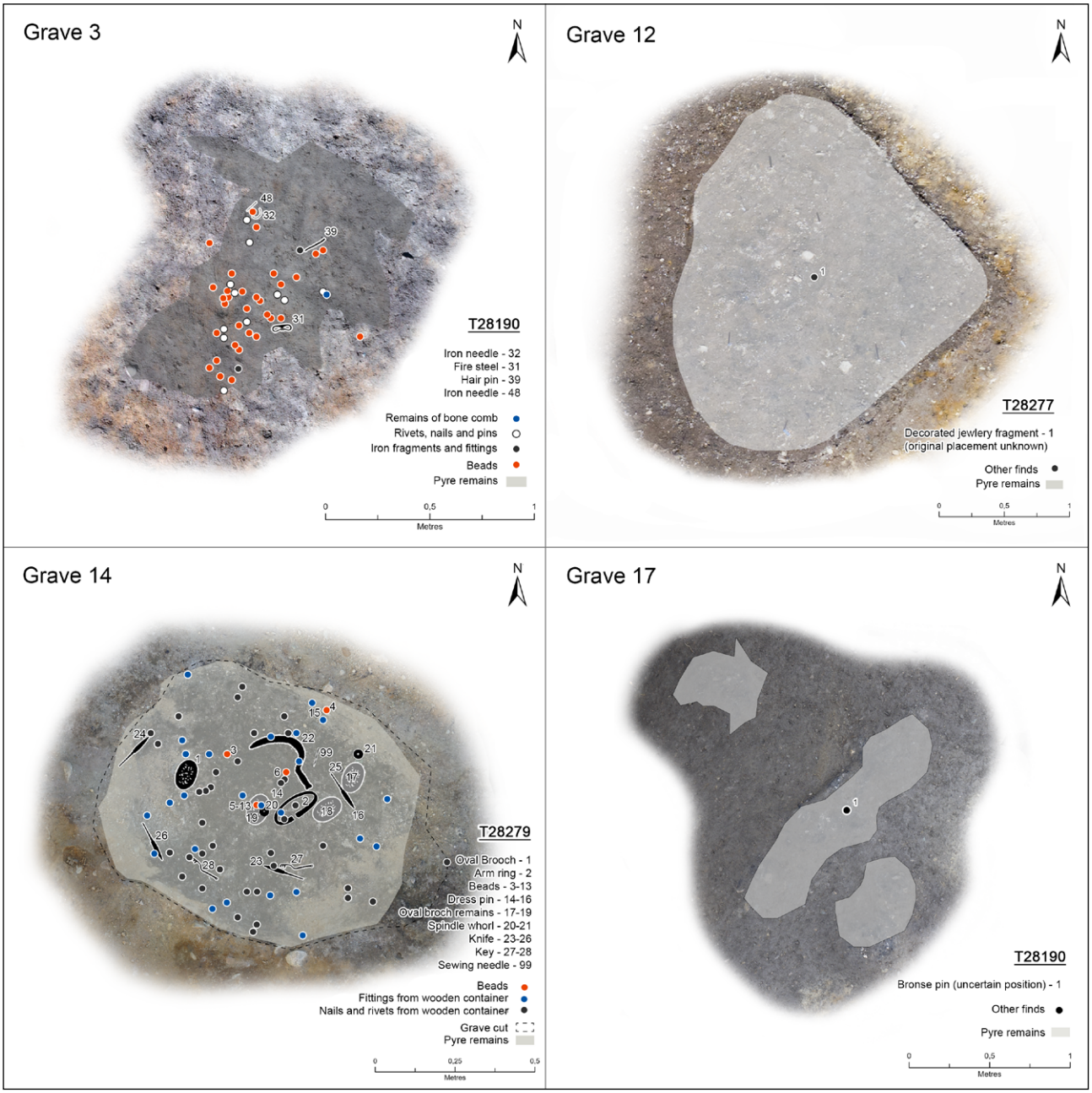

Figure 3. *Plans of the cremation graves. Illustration: Magnar M. Gran, NTNU University Museum. Plantegning over kremasjonsgravene.*

(see Sauvage & Macphail Ch. 7). Also, one cremated fragment of a human cranium was discovered in one of the boat graves. It is possible that this piece of cremated human bone was placed in the grave as part of the burial ritual (Kjellström et al. 2021). The only recorded unburnt faunal and human remains from the burial contexts were also from one of the boat graves (Grave 11), which contained one bovine cranium and some very fragmented remains of a human cranium (Kjellström et al. 2021). This find will, however, not be discussed in further detail in this chapter.

RESULTS

Bodies, skeletons and cremation at Skeiet

The excavations at Skeiet revealed an interesting assemblage of burnt skeletal remains (c. 6,647 g) (Table 1). In agreement with the observed variation in burial forms and general character of the depositional patterns, the cremation and the associated handling of the body and pyre remains were also apparently performed in various ways.

Arranging a funeral pyre, especially of the magnitude of Grave 14 with the inclusion of large mammals, must have required an extensive effort in terms

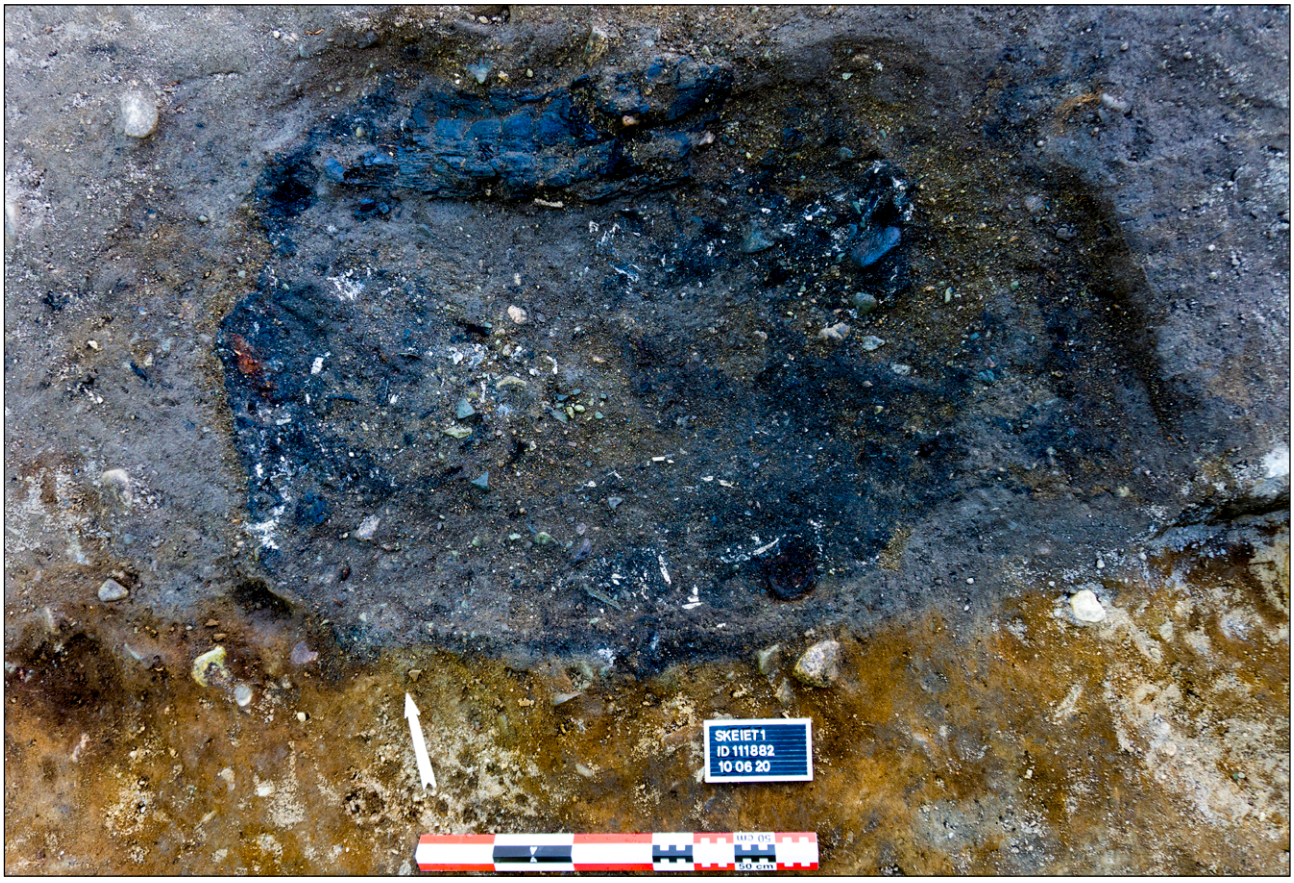

Figure 4. *The cremation pit (Grave 14) being excavated. Visible in the picture are the scattered (white) burnt bones together with archaeological artefacts and charcoal. Photo: Astrid Kviseth, NTNU University Museum. Kremasjonsgropen (Grav 14) under utgraving.*

Table 1. *Distribution of burnt bones in the different find contexts at Skeiet according to weight (g).*

Grave	Type of context	Find ID	Weight (g)
Features with human remains			
3	Cremation deposit	110990	542.87
10	Boat burial	130664	0.4
12	Cremation deposit	150537	161.7
14	Cremation pit	150565	133.32
		150600	5705.2
17	Cremation spread	150634	9.1
		150635	26.1
		150636	52.2
Features lacking human remains			
9	Mortuary house	107299	6.6
		107302	0.8
		107307	1
		107518	0.4
		107747	1.7
11	Boat burial (in G10)	109820	0.7
		109991	0.2
13	Mortuary house	150603	0.5
		150604	2.2
		150606	0.4
	Post hole	150602	1.4
	Mortuary house	150605	0.1
Total amount			**6646,89**

of preparation, maintenance and post-processing (Sigvallius 1994:15–32, Williams 2004:271). The analysis showed that the human and faunal remains at Skeiet are well cremated and almost all of the fragments are white coloured with a crystalline character (Table 2). It is worth noting that the bone fragments of horses, cattle and other animals are also highly incinerated. Thus, the cremations were all 'well performed'. Even though the human, horse and dog remains were well cremated, one may note a slight difference in the grade of firing between Mortuary House 9 and Grave 17. In Mortuary House 9, the calcined fragments were completely recrystallised with a hard surface and almost crystalline structure, while the fragments in Grave 17 exhibited a more porous surface. It is not possible to evaluate what caused these differences and fragments of both types have been recovered from the other graves as well. However, the hard-crystalline fragments primarily occur in graves with a higher number of fragments (Graves 3 and 14, and also Mortuary Houses 9 and 13), whereas fragments with more porous surfaces were recovered in Graves 10, 12 and 17 (Table 2). It may be that these fragments indicate a lower grade

Table 2. *Grade of firing of the burnt bones in different contexts according to weight (g). M-H = mortuary house. BB=boat burial.*

Grade of firing	Grave 3	M-H 9	BB 10	BB 11	Grave 12	M-H 13	Grave 14	Grave 17	Total
5							2.8		2.8
6	303.1							65.1	368.2
6A			0.4		161.7		1.54	22.3	185.94
6B	239.77	10.5		0.9		4.6	5867.04		6122.63
Total	542.87	10.5	0.4	0.9	161.7	4.6	5871.38	87.4	6679.75

of firing and/or secondary treatment; both may have resulted in a higher taphonomic loss.

The subsequent handling of the cremated remains differed between the graves as, in most cases, not all the remains from the funeral pyre were recovered and they do not seem to have reached the place of deposition. Already at the start of the analysis it was evident that most of the graves did not include all of the cremated remains of complete human skeletons. The amount of burnt bones was, in general, low, except for Graves 3, 12 and 14. The largest amount of recovered osteological material was from Grave 14, with more than 5,800 g of bones. This large quantity is probably due to the inclusion of large mammals on the pyre. The remains were brought to the place of deposition at Skeiet. Thus, some of the practices and rituals related to the cremations took place in a different location than the context of deposition. The excavations show that they did not take place in the immediate surroundings of the features.

Species, age, sex and anatomical representation at Skeiet

The bone fragments were identified in regard to species, element, part of element, body side, grade of combustion and fragment size (Kjellström et al. 2021). As far as possible, sex and age were assessed in relation to the human bones (Buikstra & Ubelaker 1994, White et al. 2012, for additional references, see Kjellström et al. 2021). Furthermore, in vivo skeletal changes were documented. Traumatic injuries (i.e. different bone fractures) occurring before or in connection with an individual's death can be difficult to distinguish from those occurring naturally in the cremation process, but injuries that differ from the expected fracture pattern can, under favourable circumstances, be identified (Symes et al. 2008).

A total of 1,445 burned bone fragments were identified in eight graves, of which the majority were recovered in Grave 14 which will be presented separately (Tables 3–5). Except for Grave 10 and Grave 3, human bones were found together with animal remains. The anatomical representation shows that in Graves 3, 12 and 14, there are parts from the entire human body, i.e. the cranium, torso and limbs, even if all the remains are not present.

The morphology of age-indicative fragments suggests that the (human) individual in Grave 3 was middle-aged. All of the bones in Grave 3 probably come from the buried individual. The cranial fragment in Grave 10 may come from a younger person, possibly a teenager, but this cannot be determined with certainty. Due to poor representation and fragmentation, it was only possible to determine that the individuals in Graves 12 and 17 were adults. No sex assessments were possible with the exception of Grave 14.

Regarding animals, horses are represented in three contexts: Mortuary House 9 and Graves 14 and 17; while dog remains were only recovered in Grave 17 (Table 3). The horse remains in all contexts probably come from fully mature animals. In Mortuary House 9 and Grave 17, only single fragments of bone elements from the limbs were identified. Furthermore, the horse in Mortuary House 9 appears to have been relatively small. Three fragments from the two hind paws (left and right) of a dog were documented in Grave 17. The size suggests that the animal was of 'middle size', i.e. roughly estimated to have a withers height of between c. 35 cm and 55–65 cm. In Grave 17, there was also a long bone from a large mammal showing an incision or cut that may be related to slaughter.

Grave 14

Similar to the bones in the other graves, the entire assemblage recovered in Grave 14 was cremated at a high temperature (Table 2). However, the assemblage differs greatly in size and character from those of the other contexts. The feature itself also differs from the other burials, as these remains were recovered in an oval pit feature. The remains are discussed here in greater detail.

The buried human individual

A total of 162 fragments (excluding long bone fragments) were identified as human and most

Table 3. *Identified species at Skeiet, NISP. Indeterminate fraction not included. In addition, one artefact of bone was found among the bones in Grave 12.*

Species/group of species	Grave 3	M-H 9	BB 10	BB 11	Grave 12	M-H 13	Grave 14	Grave 17	Total
Human (*Homo sapiens*)	103		1		12		163	1	280
Human?							15		15
Horse (*Equus caballus*)		1					33	1	35
Cattle (*Bos taurus*)							68		68
Large sized mammal							61	1	62
Sheep/goat (*Ovis aries/Capra hircus*)							49		49
Middle sized mammal		1					32		33
Dog (*Canis familiaris*)								3	3
Hare (*Lepus timidus*)							4		4
Human/faunal?							58		58
Mammal*		3			4	4	208	18	237
Indeterminate mammal		43		3		12			58
Black grouse (*Lyrurus tetrix)*							95		95
Lagopus sp. or Ptarmigans/Hazel grouse (*Tetrastes bonasia*)							72		72
Grouse (Black/Hazel grouse)							4		4
Grouse (Black g./Western capercaillie (*T.urogallus*)							15		15
Indeterminate grouse							43		43
Galliformes							2		2
Shearwaters/Gadfly petrels							10		10
Charadriidae/Sandpipers							5		5
Black guillemot (*Alca torda*)							4		4
Auk (*Alcidae*)							2		2
Thrushes (*Turdidae*)							4		4
Passerine (*Passeriformes*)							1		1
Bird, indeterminate							269		269
Bird/fish							14		14
Fish?							2		2
Total	103	48	1	3	16	16	1233	24	1444

Table 4. *Anatomical representation of human bone fragments, NISP. Indeterminate long bone fragments were not included in the comparison.*

Anatomical region	Grave 3	BB 10	Grave 12	Grave 14	Grave 17	Total
Cranium	84	1	6	92	1	184
Teeth				20		20
Back bone	2			10		12
Rib cage				2		2
Upper extremity				13		13
Lower extremity	4		1	12		17
Metapodia				3		3
Hands/feet			2	10		12
Total	90	1	9	162	1	

Table 5. *Anatomical representation of different species in Grave 14 according to weight (%).*

Anatomic category	Human+ human?	Horse	Cattle	Large mammal	Mammal	Sheep/ goat	Middle-sized mammal	Hare
Cranium	68.2	52.0	28.7	7.1	55.2	26.3	5.8	
Torso	4.7	10.6	14.1	34.3	44.8	2.4	73.8	
Upper/front extremity	12.0	5.4	9.6	8.7		27.9	5.8	
Lower/rear extremity	12.0	6.9	0.8	5.7		7.1	8.7	
Carpal/tarsal+metapodia	2.4	21.1	39.0	36.8		30.6	3.9	100
Hand/foot/hoof	0.9	4.1	7.7	7.5		5.7	1.9	
Total weight (g)	176.2	71	106.2	56.3	52	29.7	10.3	0.4

of the fragments were homogeneously cremated. Fragmentation was high and only three fragments were 4 cm in size or larger. Most of the remains were white in colour but some fragments from the cranial vault exhibited black-grey streaks. Additionally, two fragments clearly differed in calcination. The first was a fragment of the zygomatic process of the right temporal bone, which was black in colour. The second fragment was a part of the first rib on the left side, where the upper surface was black and the lower part (viscerally) was white. As mentioned above, all anatomical regions were represented (tooth roots and elements from the cranium, spine, rib cage, and upper and lower extremities, including bones from the hands and feet), and there were no duplicate fragments or other indications implying that more than one individual was represented.

The fragments came from elements that were fully developed in size. Joint fusion could be assessed in a couple of cases and all tooth roots, including those from the molars, were fully developed. In two cases, the suture closure could be studied endocranially showing almost completely obliterated junctions. Both the occipital and the temporal bones exhibited uniformly thin external and internal tabulae and a thick diploe. Two sex-diagnostic features were identified: the larger muscle attachment on the occipital bone (the external occipital protuberance) was weakly developed and judged to be female (Buikstra & Ubelaker 1994:20), and the left mastoid process on the temporal bone was classified as female (Figure 4).

Despite a successful incineration and a high level of fragmentation of the remains of the deceased, several pathological changes were discovered. Changes associated with chronic maxillary sinusitis were noted in the upper right jaw (Figure 5). The changes consisted of star-shaped new bone formation located on the sinus floor (antrolaterally). No fistulas or connections between the tooth socket and the sinus, which would suggest a dental origin of the sinusitis, were noted. The changes can be classified as low to moderate (Ahlin Sundman & Kjellström 2013). Maxillary sinusitis may be initiated by infections of the nasal cavity and sinuses, where the mucous membranes thicken, causing pathogens or other irritants to become trapped inside. When the inflammation continues for more than two months, it is considered chronic and eventually bone changes may occur (Roberts 2007 and literature cited therein).

In a fragment of the mandible, periapical changes were noted. This was seen as a local destruction of the bone around the apex (the tip of the root) of the second right incisor. The dental alveolus (tooth cavity) was partially resorbed and the alveolar walls towards the lip (labially) and right canine were almost destroyed. The bone damage seems to be related to periodontitis where the tissue that holds the tooth has been destroyed after an inflammation of the gums and subsequently the jawbone (Ogden 2008). It is also possible that severe caries lesions or a trauma may have damaged the blood supply to the tooth pulp, which can lead to necrosis around the root tip. The process most likely led to the loss of the tooth before the individual died.

In addition, changes to the apophyseal joints of the cervical vertebrae were documented. The odontoid process (the dens) on the second cervical vertebra showed a slightly porous surface and bony projections (osteophytes) on the anterior aspect, i.e. the surface articulating with the first cervical vertebra. Another cervical vertebra fragment shows marginal osteophytosis of the superior articulating facet. In another fragment of the same vertebral type, similar changes were noted to both the superior and inferior articulating facets, and it is possible that the vertebral arch was about to fuse with that of the overlying vertebra. In a fourth cervical vertebra fragment, bone growth at the margin of the inferior vertebral body was noted, which indicates disc degeneration. The apophyseal joints are synovial joints, meaning that

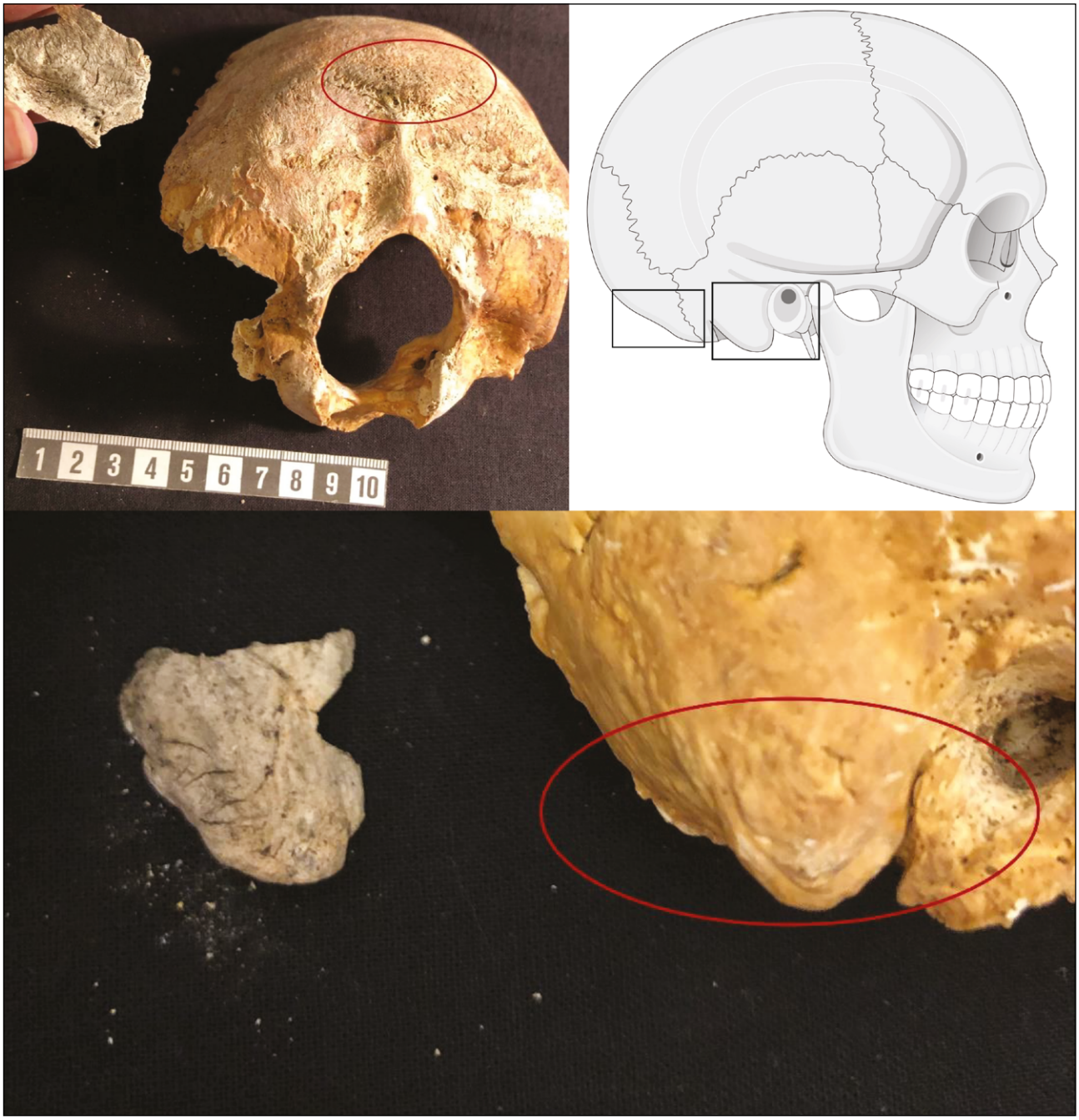

Figure 5. *Fragments of the cranium assessed as coming from a female individual. Photo: Anna Kjellström. Illustration: https://humanbiomedia.org/ (CCBY 4). Fragmenter av kraniet i grav 14 med kvinnelig anatomisk karakteristikk.*

they consist of a cartilage-lined joint capsule with synovial fluid that encloses two adjoining bone elements. If the articular cartilage is damaged or thinned and broken down, the consequence is that the joint gap narrows and bone wears against bone. Shiny spots (eburnation) can then appear on the joint surface and the surface becomes porous. Osteophytes can form (Aufderheide & Rodrigues-Martin 1998:95). In general, joint degeneration is multifactorial and can arise from a variety of causes, but cervical spondylosis is usually perceived as age-related and rarely occurs in individuals under 40 years of age (Shedid & Benzel 2007). The changes in the odontoid process of the second cervical vertebra appear to be strongly related to chronic neck pain (Zapletal et al. 1996). Thus, the observed pathologies indirectly hint that the woman buried in Grave 14 was probably an elderly adult.

The included mammals

The large bone assemblage in Grave 14 was the only one that included bones from cattle, goats or sheep, hares and birds. In addition, 33 fragments from a horse were identified (Table 3). The anatomical regions represented are the cranium, various parts of

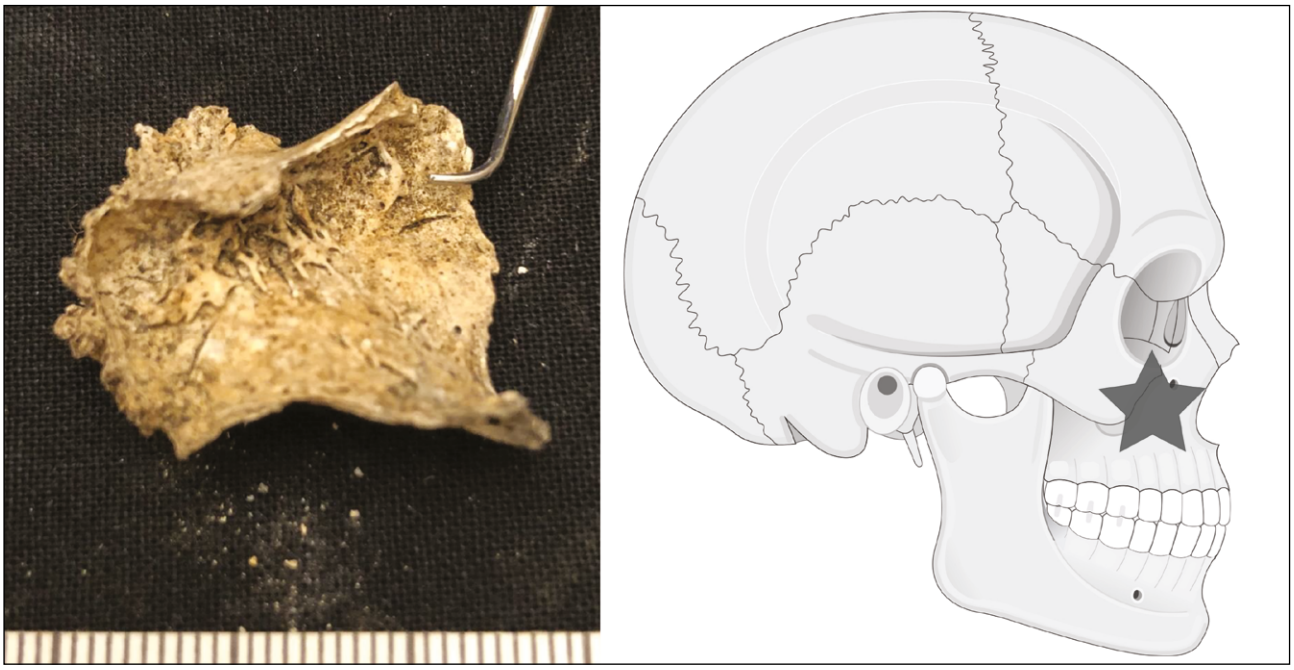

Figure 6. *Observed bony changes associated with chronic maxillary sinusitis in the upper right jaw of the individual in Grave 14. Photo: Anna Kjellström. Illustration: https://humanbiomedia.org/ (CCBY 4). Beinforandringer i overkjeven assosiert med kronisk bihulebetennelse til individet i Grav 14.*

the spine, forelimbs, both metacarpals and metatarsals, and the hooves. No duplicate fragments or other characteristics were noted to suggest more than one individual. Judging by the size of the elements, all of the fragments came from an adult animal. A fully fused distal joint of a tibia was observed, indicating that the horse would have been at least 20–24 months old (Habermehl 1985, Silver 1969).

Likewise, it is probable that a complete cattle was cremated. Sixty-eight fragments were identified from all bodily regions: the cranium, teeth, horns, spine (including several vertebral types), forelimb, metapodials and hooves. The remains most likely came from a single animal and all fragments appeared to be fully developed in size. Full joint fusion was noted in one proximal phalanx and two distal metapodial fragments, indicating an age of more than 1–1.5 years based on the proximal phalanx or even 2.5–3 years based on the metapodial remains,. Probably, the animal was older than 2.5/3 years, i.e. a fully grown adult individual (Habermehl 1985, Silver 1969).

A total of 49 fragments from sheep or goats were identified. The characteristics of two metacarpal bones suggested that they came from sheep (Boessneck 1969). All of the fragments were fully cremated and all bodily regions were represented, with fragments from the cranium, spine, fore- and hind limbs, as well as metapodials and hooves. Two fragments of the same element from the left side of the tarsal region were identified, indicating the presence of two individuals: one of which was a sheep and other was identified as a sheep or a goat. The size of the elements suggests that both animals were adults or nearly adults, since there were bones that were not fully developed but of adult size. The ages of both animals fall within a large age span of between 10 months and 3.5 years. The large number of fragments and the anatomical distribution make it reasonable to assume that the complete bodies of both animals were included.

Four fragments were identified as hare remains. The fully cremated fragments came from metacarpal bones and an indeterminate metapodial, i.e. a paw. There is no indication that more than one animal was represented. No exact age determination could be made, but as the fragments came from large but not fully fused elements, the animal would have been almost fully grown. Considering the selective (limited) anatomical distribution, it may indicate that the rest of the animal was not included in the cremation. The fact that only bones of one left paw were found may indicate that the paw came from a skin and could then be regarded as an 'artefact'.

Deposited birds

Bones from as many as 29 individual birds from six different families have been identified in Grave 14, represented by 526 burned fragments (Table 3). The identified birds are presented below by order or family, and then species.

Table 6. *Representation of different elements of birds at Skeiet. Dxt=right, sin=left.*

Anatomic region	Element	NISP	Weight (g)	MNE
Wing, upper part	*Humerus*	5	0,71	3 (3 sin, 2 dxt)
	Radius	31	1,65	12 (7 sin, 11 dxt)
	Ulna	28	2,68	9 (9 sin, 6 dxt)
Wing, distal part	*Carpometacarpus*	95	13,82	26 (26 sin, 25 dxt)
	C.u.	27	1,15	14 (13 sin, 14 dxt)
	C.r.	18	0,57	9 (9 sin, 9 dxt)
	Phalanges 1, carpi, digiti maj	28	1,4	-
Lower extremity	*Tibiatarsus*	7	0,59	4 (3 sin, 4 dxt)
	Tarsometatarsus	16	1,54	5 (5 sin, 3 dxt)

There is a clear predominance of wing bones, regardless of the quantification method (Table 6, Figures 6 and 7). Numerous of the bone fragments are from the carpometacarpus, os carpi ulnare, os carpi radiale and the phalanges. Other bones from the wings (radius and ulna) are also numerous. However, the number of fragments from the upper wing (humerus) is markedly low. It should, nevertheless, be considered that this bone is fairly large/robust and that fragments from this element may be found in the category of unidentified long bones. Still, it is notable that only the distal articular end and fragments from the shaft of this element have been observed in the material. Proximal parts of the humerus are missing, which indicates that the wings had been separated from the body prior to deposition. In total, 53 wings were identified (26 from the left side of the body and 27 from the right side).

Elements from the lower extremities are present, mainly phalanges which are numerous in birds. Fragments from the tarsal region (tarsometatarus) and lower leg (fibula and tibiotarsus) were also identified. However, no fragments of the thigh bone (femur) have been recovered. It is possible that fragments from this slightly larger bone, like fragments from the humerus, are among the unidentified long bone fragments. Probably fragments from the tibiotarsus may also be 'hidden' in this category. The skewed anatomical distribution becomes even more evident if the minimum number of elements (MNE) is calculated and species identification is considered (Table 6). No fragments from the vertebrae, ribs, breastbone, the pelvic or the shoulder girdle have been found. These are generally fragile bones that easily fragment and are, hence, possibly less well-preserved and more difficult to identify. However, the total absence of these elements, especially the coracoid, which is usually preserved in archaeological materials, is notable and extraordinary, again suggesting that the birds' wings were selected.

Fowl

Grouse is the most numerously represented group of birds. In total, 231 fragments were identified as fowl, the majority of which are judged to come from wild species, i.e. grouse. At least 23 individuals of grouse have been identified: a minimum of 12 of these were identified as black grouse and six were ptarmigans or hazel grouse. No bones of western capercaillie have been identified, but it is possible that fragments of larger individuals of indeterminate grouse may come from capercaillie. A few fragments resemble domestic hens based on size, but these fragments probably belong to larger individuals of grouse. Wing bones predominate (MNE 23) and only a few fragments from the lower leg have been identified. Both sides of the body are present, and the distribution is even for almost all bone elements.

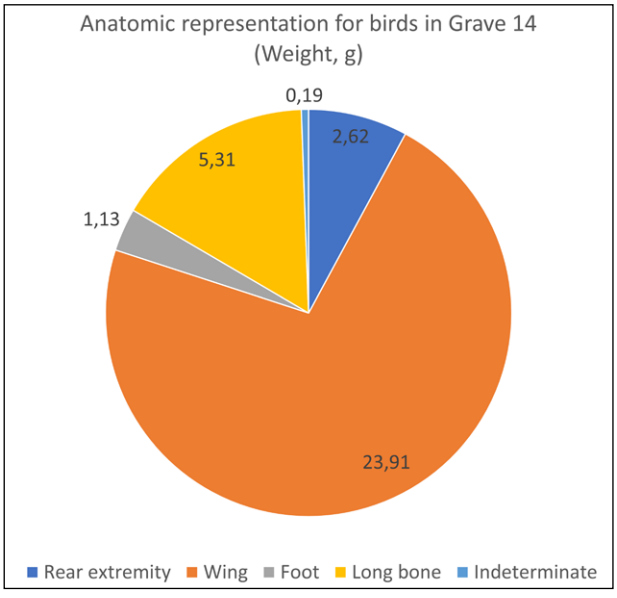

Figure 7. *Anatomic representation of birds in Grave 14, according to weight (g). Anatomisk representasjon av fuglebein i Grav 14.*

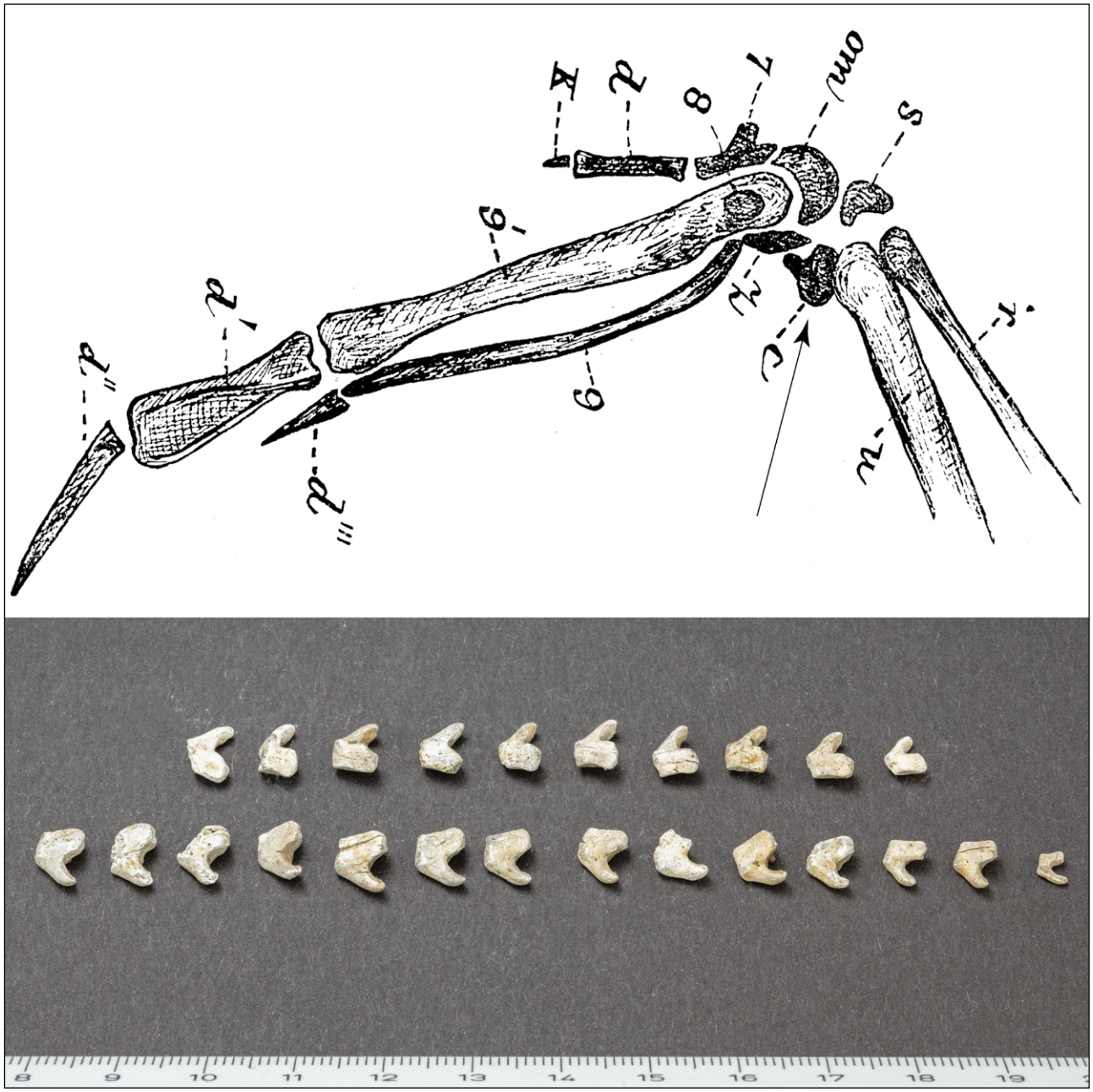

Figure 8. *The abundant bones of Os carpi ulnare from Grave 14 and the location of the carpi ulnare on a grouse wing. Illustration: Elliot Coues, Key to North American Birds (1884, Estes and Lauriat, Boston). Photo: Raymond Sauvage, NTNU University Museum. Os carpi ulnare fra vingene til ryper som ble kremert og nedlagt i Grav 14.*

Seabirds

A total of 13 fragments have been identified as belonging to the order Procellariformes. All of them have been identified as shearwaters (*procellariidae*). At least two individuals are represented. Three fragments may be identified as Manx shearwaters and all of the bones fall within the size range of the species. However, Balearic shearwaters cannot be ruled out in relation to the remaining fragments, nor can gadfly petrels or sooty shearwaters. Only wing bones have been identified from procellariidae, but both sides of the body are represented.

Shorebirds/waders

Eleven fragments representing at least two different species from the order Charadriiformes are represented in the material. One fragment was identified as black guillemot, the other can only be identified as belonging to the species-rich groups of charadriidae/sandpipers but corresponds in size to a bird such as the European golden plover. In addition, there are two finds that can only be identified as belonging to the group of auks; both come from smaller auks. It is also possible that they represent black guillemots or possibly common puffins. The bones of auks come

from at least two individuals. Thus, from the order of shorebirds/waders, at least three individuals have been identified. From auks, only elements from the wings have been identified, while elements from the wings and the lower legs were identified as coming from the group charadriidae/sandpipers.

Thrushes

Within the order of Passeriformes, five bone fragments were identified from at least one individual. About half of the world's birds belong to the order and many are small-sized, which complicates identification. Four of the bones have been identified as thrushes but it has not been possible to specify which species. The fifth fragment comes from a small bird (not the smallest within the order), which cannot be further identified. The fragment may come from a thrush. Four of the thrush bones come from the wings while one fragment is from the lower leg.

DISCUSSION AND CONCLUSION

Human remains were identified in all the cremation graves, excluding the Mortuary Houses. In addition, one burnt human cranial fragment was recovered from a boat grave (inhumation) (Grave 10). The grave was probably to some degree disturbed but possibly also rearranged by the addition of a secondary boat grave (Grave 11); thus, it is hard to interpret the deposition of the cranial fragment (details in Sauvage & Lorentzen Ch 5). Most likely, it came from a younger individual but perhaps not from the primary inhumation burial in the grave. Boat Grave 11 contained a deposited unburnt bovine cranium (Kjellström et al. 2021). This is the only find of unburnt faunal remains in the burial contexts at Skeiet. It suggests that animals also had a role in burial practices in addition to cremations.

There is some diversity in the assemblages, such as the lack of animal bones in Grave 3 and the lack of human bones in the wall trenches of the two mortuary houses. This may partly relate to post-depositional taphonomy, but cultural motives such as handling and depositional practices in different types of contexts must also be considered. It may be suggested that Grave 14, being placed in a pit, was provided with some protection from post-depositional destruction. Post-depositional disturbances in the other cremations cannot be ruled out, which could, for example, explain the lack of animal remains in Grave 3. However, this does not explain the lack of human bones in the two mortuary houses. Bone fragments from these features exhibit the same level of firing as the cremations. As discussed by Sauvage and Macphail (Ch. 7), these contexts and the included animals may have served a different purpose than the graves. As none of these are human bones, they probably do not originate from a funeral pyre. Similar types of contexts to those at Skeiet have been found in places like Hedmark at Innlandet in eastern Norway, where three out of 14 cremation burials only contained animal remains (Moe 2016:37). This indicates that the selection is not unique to the mortuary houses. Since the bone assemblages from the mortuary houses at Skeiet are small and fragmented, it is difficult to conclude anything about the specific handling of the animals themselves, i.e. how they were killed and/or dismembered.

It is possible that the animals, or perhaps more often parts of animals, represent food waste after a meal in connection with the funeral or represent unconsumed food left for the deceased. This might be the case in Grave 17, which contained a long bone from a large mammal that exhibited an incision or cut mark, conceivably related to slaughter or meat processing. The depositions in the mortuary houses may be interpreted in a similar manner (Kjellström et al. 2021). However, in reference to ethnographic records, the depositions may also be the remains of animal offerings (Kjellström et al. 2021, Sauvage & Macphail Ch. 7). It is not enough to consider only the utilitarian aspect of animals or species as the reason for their inclusion in the burial contexts. The animals were probably not only regarded as companions either, which is often the case for horses and dogs, when considering their (often) completeness in the burials. It may be noted that the cattle bones in Grave 14 probably come from a complete animal. Other reasons for the inclusion of animals may have been connected to their use as riding/draft animals, for protection or even for their symbolic aspects, which may have affected the handling and deposition.

Among the faunal remains, all species except for hares and birds (Grave 14) are domesticated animals, all of which were common and may have filled different functions in the prehistoric environment. The importance of animals in graves varies over time. Deposits of animals in graves in Norway and Sweden increase from the Migration Period to the Viking Age (Mansrud 2006). Investigations of cremation burials from, for example, Østfold show that dogs were the most common species, followed by horses, cattle and sheep or goats (Mansrud 2006:Table 2). Horses and dogs seem to occupy a special position in the burial rituals, as seen in particular in the rich finds of these species at large graves such as those at Oseberg, Gokstad and Borre (e.g. Gansum 2018).

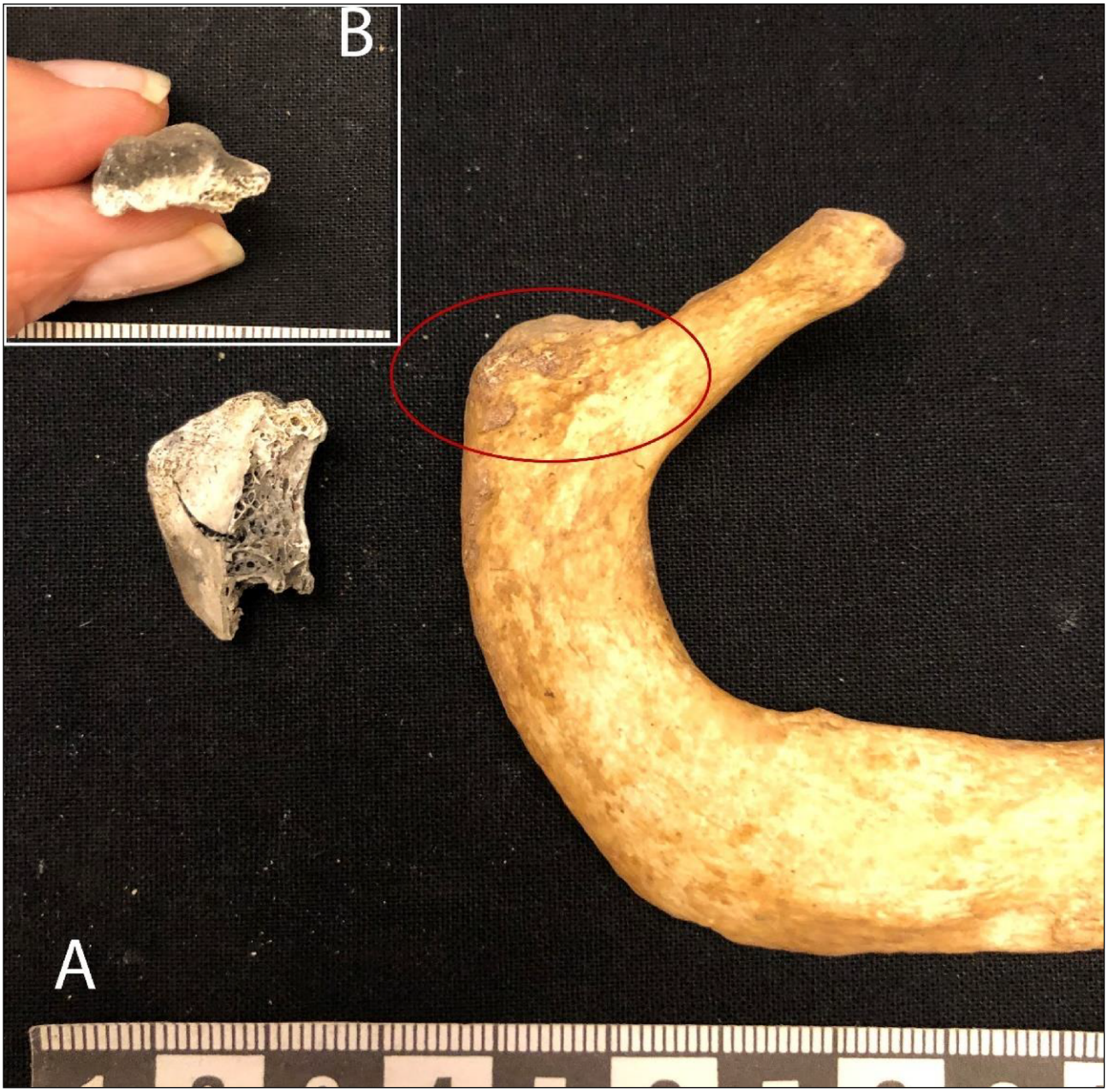

Figure 9. *A rib fragment of the proximal part of the bone (a) showing a lower grade of firing on one side of the element (b) in the cremation pit (Grave 14). Photo: Anna Kjellström. Ribbeinsfragment fra Grav 14 med ufullstendig forbrenning på en side.*

However, species-specific investigations have shown that there are regional differences in Norway. For instance, more graves with horse remains have been identified in the southern and western regions (Leifsson 2018:53). These (companion) animals, but also other species, may have been prestigious objects with possibly economic and social, or even symbolic/religious, significance. The fact that animals are found in burial contexts highlights the relationship between humans and animals, and implies that the animals in these contexts may have had a purpose beyond the functional and had their own agency. It has been suggested that horses could have been selected already at birth for future ritual purposes (Ingstad 1995:35). It is (on the contrary) also possible that the individual animal may have been 'anonymous' or 'unimportant', and that it was rather the horse as a species that held a symbolic value (Leifsson 2018:55–60). Similar ideas are also related to other species (Mansrud 2006, Hedeager 2004, 2006). In addition to horses, bones from cattle, sheep or goats, pigs and dogs have also been found together with human remains in several Norwegian Iron Age wetland contexts, which have been interpreted as ritual deposits (Bjørkan Bukkemoen & Skare 2018). The species found at Skeiet may be associated with burial traditions in other areas even if there is also a regional or local variation.

Conducting cremations – the spectacular Grave 14 funeral pyre

The results imply that entire human bodies and large animals were incinerated during the cremation. In addition, the general high grade of firing of the bones (i.e. well-cremated bones), indicates that those who performed the cremation rituals at Skeiet must have had some level of expertise and skill. Holck (1997) has observed varying grades of firing of bones in other Norwegian Iron Age contexts (see also Østigård 2000), implying a variation that may be related to the professionalism of those performing the cremations. The remains from the cremations at Skeiet suggest thorough and complex rituals.

Grave 14, which represents a unique find in Iron Age Scandinavia, exemplifies this in particular. The grave itself differs from the other cremations on the site, as these remains were recovered in a depressed pit and included a large number of grave goods such as jewellery, tools and parts of a wooden chest (implied by burned fittings and locks). It also represents the youngest known cremation in the cemetery. In the cremation pit, the remains of the complete bodies of one horse, one cattle, two sheep (or a sheep and a goat), one paw from a hare and 29 birds were deposited. The hare bones are of interest as they may have belonged to a skin and, thus, possibly a garment, or perhaps just the paw was included on the funeral pyre. This resembles the selection of birds' wings (below). Generally, finds of animal bones in Late Iron Age graves, at least in some parts of Norway, seem to be more common in female graves than in male graves (Dommasnes 1982). Grave 14 confirms this pattern. Noteworthy though, is the absence of a dog in this burial, an animal that is very common in other graves of the period, especially large graves.

The overall homogeneous degree of combustion in Grave 14 shows that the entire mammal bodies were cremated at a high temperature. This is remarkable, since the pyre contained one human and so many animals, and the bodies of the horse and cattle at least seem to have been complete, all equally well cremated. Interestingly, two fragments from the right temporal bone (zygomatic process) and part of the left first rib of the woman exhibited a slightly lower level of combustion than the other fragments (Figure 9). The dark areas may indicate a locally lower oxygen supply and poorer combustion. Possibly the body was stretched out on its back, and the combustion pattern implies that the head was turned to the side, facing right, and that something on the upper chest caused these deviations. It is, however, difficult to verify this.

The buried woman suffered from chronic inflammation of the sinuses, tooth loss and was affected by changes in the apophyseal joints of the neck. Although common colds are the most common cause of sinusitis, other factors such as severe dental diseases, allergens or air pollution (e.g. inhalation of smoke) can also lead to the same types of changes. Chronic maxillary sinusitis has been found in other skeletal assemblages from the Late Iron Age and seems to have been common in some areas, e.g. in Eastern Middle Sweden (Ahlin Sundman & Kjellström 2013). The changes to the odontoid process of the second cervical vertebra appear to be strongly related to chronic neck pain (Zapletal et al. 1996). In sum, the observed pathologies indirectly hint that the cremated woman was an elderly adult. The observed changes, thus, contribute to the picture of an aged woman suffering from several ailments, who received a distinctive funerary display on the cremation pyre.

The number of bird bones included in the cremation ritual for Grave 14 is remarkable; at least 29 individuals have been deposited in the grave. The presence of birds in Iron Age graves is not unusual and finds occur in both cremation graves as well as in boat graves belonging to high-status individuals (Berglund 2009). However, in a recent survey of Viking Period burials, Karpińska (2022:51–52) has recorded only eight cremations and three inhumation burials in Norway featuring bird bones. In northern Norway, seabirds are dominant in graves (Klokkervoll 2015:134, Berglund 2009, see also Karpińska 2022), while in Eastern Norway, there are reported graves containing domestic fowl, pigeons, starlings and thrushes (Arcini & Magnell 2019). This may reflect both biotope and cultural differences between different geographical areas within the Nordic region. In Sweden, chickens and ducks have been discovered in various graves, but so too have birds of prey, which have received much attention. In a study of large high-status funeral pyres from Mälardalen dated to the Late Iron Age, Sten and Vretemark (1988:Table 3) describe one grave which exhibited the remains of 12 birds. These were mainly birds of prey that were considered to have been trained for hunting, a sport that has been associated with the aristocracy and war ideology (Berglund & Rosvold 2021, Hedeager 2004, Sten & Vretemark 1988). Karpińska (2022) reports only one find of birds of prey in Norwegian burials, in the famous Gokstad Ship grave from the 8th century (also Gansum 2018). The general absence of birds of prey in both Norwegian and Danish graves has been noticed previously and could be seen as a contradiction to the medieval sagas where falconry

is mentioned in Norway (Ericson & Tyrberg 2004, also Grimm & Stylegar 2018). It is also likely that Norway during the Middle Ages, possibly as early as the 11th century, was part of the trading route for bright white, highly prized gyrfalcons (*Falco rusticolus islandus*) from Iceland and Greenland (Ericson & Tyrberg 2004, Vretemark 1983).

Grouse make up most of the bones in Grave 14, but also waterfowl and smaller birds such as thrushes have accompanied the deceased. Grouse would probably have been available at a short distance from Skeiet. Remains of hunting methods and equipment are scarce in archaeological contexts. In Norway, however, several sites with finds of *myrepinner* are known. This find category consists of small wooden stakes found in wetland areas, in different formations (e.g. in lines or in circles); these have been suggested to be connected with fowling. Several have also been dated to the Iron Age (Sylvester 2012). There are two localities with finds of *myrepinner* (formations of lines) in the vicinity of Vinjeøra, however, both remain undated (Sylvester 2012:96). Grouse have generally been considered closely related to other forest game, such as hares (Storå 1968), of which there are also remains in the grave. It is possible that the display of this species on the funeral pyre may not be associated directly with fowling, but the interpretation deserves more attention.

The finds of shearwaters could provide a seasonal indicator for when the cremation occurred. These birds move long distances over open water, nesting on islands and steep cliffs. Today, in general, this seabird family is not found in the North Atlantic, but the Manx shearwaters move along the coast of Norway in connection with migration during the period August to October and are even rare guests as far south as the Kattegat in connection with westerly autumn storms (Mullarney & Zetterström 2009). Finds from Bohuslän, Sweden, and numerous Norwegian finds of the species indicate a presence in the past and have been interpreted as signs of possible breeding in the area (Lepiksaar 1958, Peterson et al. 1985, Ericson & Tyrberg 2004). Iron Age finds of petrels in Britain have been interpreted as birds captured at sea and then brought ashore by humans (Serjeantson 2005, 2009). Depending on whether nesting took place in the area or not, the finds may indicate that the burial took place during the autumn. However, this needs to be confirmed with other findings and further investigation of the fauna history of the species. It should also be considered that the time of the death of the birds may not correspond to the time of deposition. The presence of seabirds in the north Norwegian graves has, among other things, been interpreted as reflecting elements of Sami traditions. In addition, the anatomical representation with bones from wings and lower legs/feet has been seen as an indication that bird bones do not represent food or meals (Klokkervoll 2015, Berglund & Rosvold 2021).

The proportion of bones from wings and the absence of thigh bones, as well as elements from the chest in Grave 14, is notable. The thigh bone is close to the trunk of the body and generally more muscles (meat) are attached to this element than to the wing and the lower leg. Hence, it seems that the more fleshy parts of the birds are not represented in the burial remains. This implies the conscious selection and deposition of wings in the grave.

Wings and feathers have been used as clothes, headgear, bags and arrowheads, etc. and for decorative purposes, in both ritual and everyday contexts. The presence of wing bones in (Mesolithic) graves has been seen as indicative of the use of wings in burial customs (Mannermaa & Kirkinen 2020, also see Serjeantson 2009). In the famous boat graves at Valsgärde 7 and 8, Sweden, analyses of feathers found under equipment in the boats have shown that they were used to fill pillows and bedding (Berglund & Rosvold 2021). The species identification (geese, eider, ducks, black grouse/capercaillies, corvids, eagle owls and waders) of the feathers from these birds is largely consistent with the finds of birds on or near the site, and they are interpreted as animals captured in their immediate environment. Furthermore, the down and contour feathers had been cut so that the pointed part would not stick through the fabric. These are the outermost parts of feathers on the wings, as well as down from the rest of the bird's body (beyond the wings). It is unlikely that the bones would still have been attached to the feathers when used as stuffing. Finds of feathers and down are not the same as finds of bones (as in the case at Skeiet). Feathers may have functioned as stuffing in textiles, but they may also have been more exposed in connection to the burial ritual.

The colouring of the birds and their feathers included in Grave 14 is noteworthy. Even though species identification is not always possible and the bones may come from similar birds in the same size class, for example willow or rock ptarmigan, one can still reflect on the large number of wings and the birds' plumage. The most represented element in the material is the carpometacarpus of the wing. The primary feathers are attached to this element, while the secondary ones are attached further up on the elbow bone. Black grouse males have black plumage

with white covert feathers and wing bands, while females are barred in grey-brown and dark brown. In females, the primary and secondary feathers are the same colour, while males have some all-black primary feathers and several that are both black and white, such as parts of the white wing bands. The ptarmigans generally have a white winter coat, while the summer coat is marbled brown (lighter and greyer in rock ptarmigan than willow ptarmigan). Hazel grouse, on the other hand, have throughout the year a finely patterned plumage with a greyish upper part, white underparts, and brown wings. Black guillemots have completely black plumage on the upper side of the body with a large oval white spot on the wings. Even if the plumage is lighter during winter, the white spot remains. Manx shearwaters have a plumage with black in the upper parts and white in the under part of the body, although birds with a worn plumage in summertime may appear browner. In the groups of thrushes and charadriid/sandpipers there are birds with many different plumages.

Karpińska (2022) recently suggested that the black and white colour of black guillemots and ptarmigans may have played a part (as decoration) in burial ceremonies during the Viking Age, more specifically in a grave in Egge in Trøndelag, Norway. This burial, a cremation boat grave dating to the 10th century, was also furnished with a sword, two spearheads, one axe head, fragments of a shield box, arrowheads and gaming pieces (also Sørheim 1997). Although of different date and with a significantly lower number of bird bones (NISP 9), the burial is interesting as it displays the same species and high-status attributes. If about 50 bird wings were left visible on the funeral pyre of Grave 14, possibly in connection to the body of the deceased, the colour shifts in white and black must have offered a striking sight to the onlookers.

We may speculate on the underlying reasons for the choice of animals and body parts that were allowed to accompany the deceased on the pyre and what they represented. The black and white colours in several of the plumages of the accompanying birds and their contrasts provide exciting prospects for thoughts about the colour representation and possibly decoration in connection with the funeral and cremation ritual. Other aspects of the birds may be considered. Different groups of birds seem to carry gender-related connotations, as birds of prey in the Mälardalen area in general are found in male graves. The gender of the deceased may have been relevant in relation to the rich finds of grouse (hens), as these may have been linked to ideas of rebirth and fertility (Gräslund 1980:54). It is likely that the burial content reflects the special social position of the elderly female cremated in the burial.

In Grave 14, the inclusion of a complete horse seems to follow the 'common norm' in such a (rich) burial context. On the other hand, and as noted above, the exclusion of a dog in this grave could be considered an uncommon practice. To some extent this is true also for the inclusion of complete bodies of cattle and sheep (goats), which is something out of the ordinary. The animals may well have been complete on the funeral pyre and the loss of (some) elements seen at Skeiet may have occurred in the handling of the pyre remnants after the cremation but prior to deposition.

The osteological remains from Skeiet provide a fascinating glimpse into the complex burial practices of the Late Iron Age. There is a marked variation in the funerary practices which aligns with the observations of marked heterogeneity and variation in how the human remains were interred on Scandinavian burial sites (Price 2008:258, see also Kjellström et al. 2021, Sauvage & Lorentzen Ch. 5). The remarkable Grave 14 provides a local particularity which showcases a spectacular funeral pyre, and illustrates that cremations could be intricate elaborate rituals, like the more famous boat and ship graves of the period. The meticulous cremation process, evidenced by well-cremated bones, suggests a high level of expertise. The presence of a complete horse, cattle, sheep or goat, and the possible gender-related selection of species and symbolic use of bird wings, provides insight into the symbolic significance of this ritual.

SAMMENDRAG

Gravskikken på Skeiet inkluderte både kremasjons- og jordfestebegravelse. Kremeringene er profesjonelt utført. Den døde ble brent med både gravgods og hele dyr på likbål, på et ukjent sted. Deretter ble restene nedlagt på gravfeltet. Undersøkelsene viste at kremerte skjelettrester fantes i fire kremasjonsgraver, i to dødehus og i en båtgrav. Kremasjonene (Grav 3, 12, 14 og 17) inneholdt brente menneskelige levninger fra voksne individer, mens en av båtgravene (Grav 10) inkluderte et sannsynlig intensjonelt plassert brent kranialfragment fra et ungt individ. Bortsett fra hare og fugl var alle identifiserte pattedyr tamdyr. De identifiserte pattedyrene var hest storfe, sau eller geit, hare og hund. Grav 14, en kremasjonsgrop, var den klart rikest utstyrte graven. Funnet inkluderte inkludert restene av en eldre kvinne med flere patologiske og aldersrelaterte skjelettlidelser. Det mest bemerkelsesverdige var funn av fuglebein fra minst

50 vinger. Den største gruppen av fugler var rype, men også vannfugler og mindre fugler som trost fulgte den døde. Bevist seleksjon av vinger i svart og hvitt til likbålet, sannsynligvis for deres synlighet og kontrast, utgjør trolig en bevisst rituell praksis relatert til gravskikken. Kremasjonsritualene på Skeiet reflekterer flere vanlige mønstre som ses i andre jernaldergraver, men også unike lokale – eller spesifikke – særegenheter.

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10. THE SHADOWS OF BOATS: VISUALISING THE REMAINS OF TWO LATE IRON AGE BOATS

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ABSTRACT

The excavation of a double boat grave on the farm Skeiet in Vinjeøra, Trøndelag, contained important observations to further the study of Late Iron Age wooden clinker-built boats. Precise excavation data of the poorly preserved boats was complemented by the constructional principles of traditional clinker-built boats. The two boats were then preliminarily reconstructed digitally and compared with both contemporaneous and more recent traditional clinker-built boats. The reconstructions showed two boats of a similar type to other known contemporaneous boats, though it also highlighted that several elements of the boats were missing or unidentifiable due to the state of preservation. Boats excavated in Norway are often poorly preserved, and little or nothing of the organic materials survive. However, the preliminary digital reconstruction of these boats has shown that with targeted excavation and documentation, there is still potential for expanding the knowledge on Late Iron Age inshore vessels.

Keywords: Viking age boats; boat graves; Nordic clinker boats; traditional boats; 2D and 3D reconstruction; reconstruction from clinker nails

INTRODUCTION

The Viking Age is known for daring voyages departing from the Scandinavian coast, travelling on the waterways of Europe to the Middle East and even crossing the Atlantic. Being motivated by trade, warfare or a combination of both, their lightweight and flexible clinker-built ships, often purpose-built for the given voyage, made these journeys possible (Greenhill & Morrison 1995:191–192, Bill 2008). However, these larger ships would have been unsuited for the routines of everyday life at home. Smaller clinker-built boats were a more common sight along the Scandinavian coastline in the Iron Age. As they required far less resources, labour and crew, these smaller vessels would have constituted the backbone of trade, communication and resource exploitation.

Their typological lineage and tradition are traced from the Late Iron Age through historical times up to the present day (Christensen et al. 1992:138, Crumlin-Pedersen et al. 1997, 2006, Bill 2008, Paasche 2010, 2011, Planke 2011, 2021, Godal 2021). There is still a strong tradition of building clinker boats in Norway and Scandinavia. Because of their long lineage and highly specialised construction methods, the boats are inscribed on UNESCO's List of Intangible Cultural Heritage (UNESCO 2021).

Most research on the seafaring vessels of the Viking Age has relied upon the large ships of Oseberg, Gokstad, Tune, Klåstad and Skuldelev, investigating details of construction and sailing capabilities (Paasche 2010, Planke 2011, Bischoff 2020). Boat and ship graves have also been understood in the context of power relations, as markers of territory or as cultic symbols (Müller-Wille 1970, Gansum 1997, Nilsen 1997). These examples are some of the few remaining ships from the Late Iron Age and thereby constitute important subjects of study in an otherwise scarce dataset. Preserved remains of boats are even rarer. There are examples of excavated remnants of boats, like the Bårset and Øksnes boats (Gjessing 1941, Pedersen-Leijon 2002), but the best preserved are the three Gokstad boats. They were buried together with the Gokstad Ship and were found dismantled on its deck (Nicolaysen 1882, Planke 2011). Two of these were rebuilt and exhibited, while the last one is still in pieces, although it has been reconstructed as a full-scale replica (Planke 2011).

Due to the few finds of well-preserved clinker-built boats, research on them is also limited. The discovery of a total of four boat graves during the excavations at

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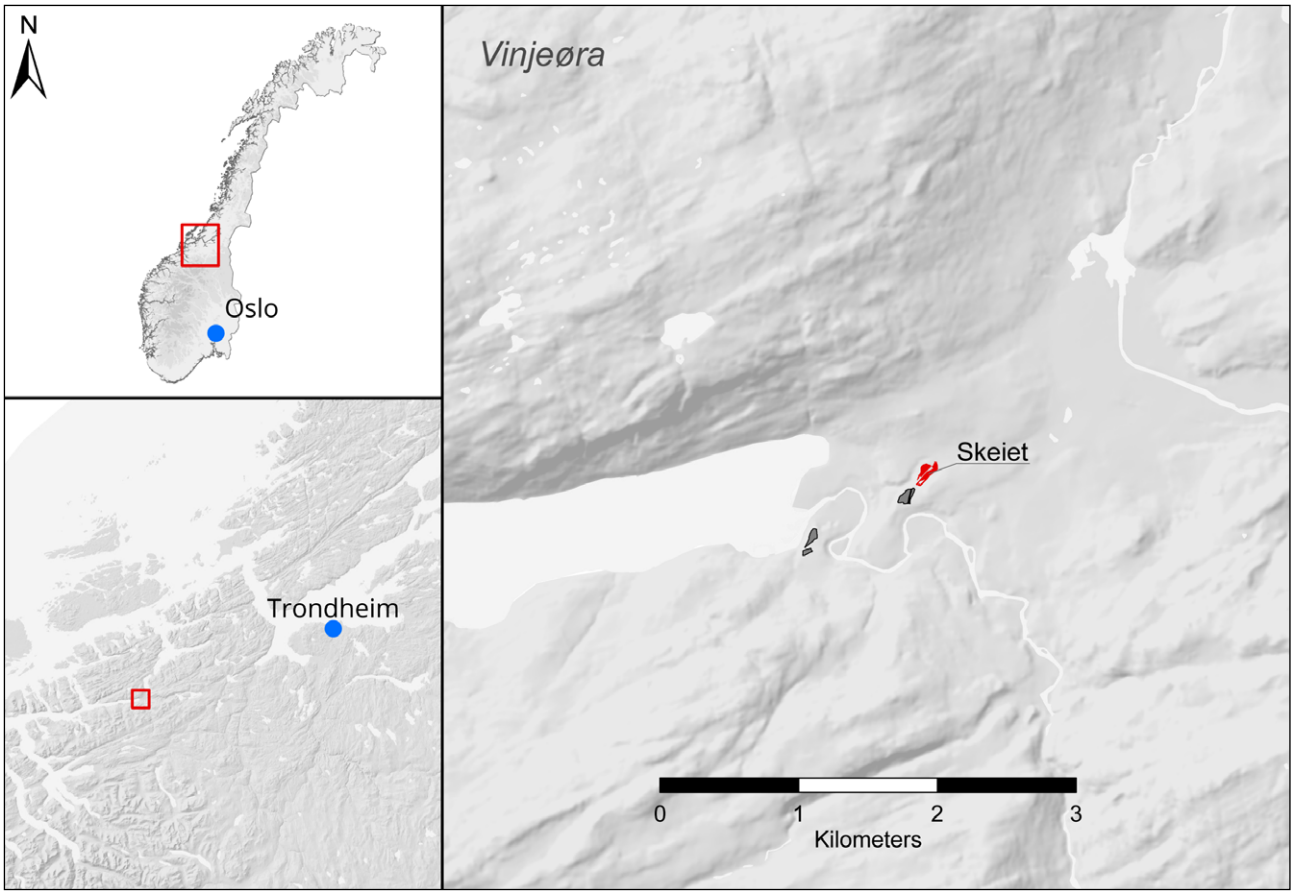

Figure 1. *Location map. Illustration: Kristoffer R. Rantala, © NTNU University Museum. Lokasjonskart.*

Vinjeøra in 2019 and 2020 is therefore an important addition to the limited collection of what was probably the most common type of vessel during the Viking Age. Three boats were excavated in 2019 at Skeiet in a varying state of preservation. The last and most poorly preserved boat was excavated at the nearby site Fjelnset in 2020. This paper will focus on the two boats from Skeiet (the boats are referred to as S2 and S3), found buried in a grave mound's ring ditch. Both were preserved as boat-shaped imprints in the ground, with their clinker nails mostly in situ. Together, the boats made up the rather unusual funerary ritual of a double boat grave, where a smaller boat was buried inside a larger one. They were traceable as two different sets of clinker nail lines and through vague differences in soil colour. Certain parts of the boats were compressed into each other, while other parts were more easily distinguishable. Skilled archaeologists on the site separated the boats as they were being excavated, all the while documenting them with a high level of accuracy.

The over 800 known boat graves in Norway (Paasche 2021:67) attest to the widespread use of these vessels. Due to poor states of preservation however, their construction, shape and uses are not extensively recorded or studied. In general, the wood they were made of is long gone, which means that most of the boat graves contain only the remains of the boat's clinker nails. Even though these might sometimes be dislocated throughout the grave, it is common to find many of them in situ inside a boat-shaped cut in the ground. Together, they create an imprinted shadow of the original boat. If preserved well enough, the imprints indicate the general shapes and sizes of the boats, making it possible to extract some of the boats' constructional details. In these cases, emphasis on the accuracy of the documentation is highly important, in contrast to the earlier practice of defining and assigning boat size on the number of excavated clinker nails (Nicolaysen 1868:91, Müller-Wille 1970, Herstad 2007, Lund 2018). Field documentation of boats has developed considerably since the late 19th century, and today, archaeologists are able to document excavated wrecks on site with millimetre precision (Paasche 2010:90).

However, accurate documentation alone is not enough. The traces and remnants of boats are often found distorted from what their original shape would be, due to decomposition and ground pressure deforming their shape. By combining high-precision documentation with knowledge obtained from studying the contemporary clinker-building tradition (e.g., Paasche 2010, Godal 2021), we may achieve

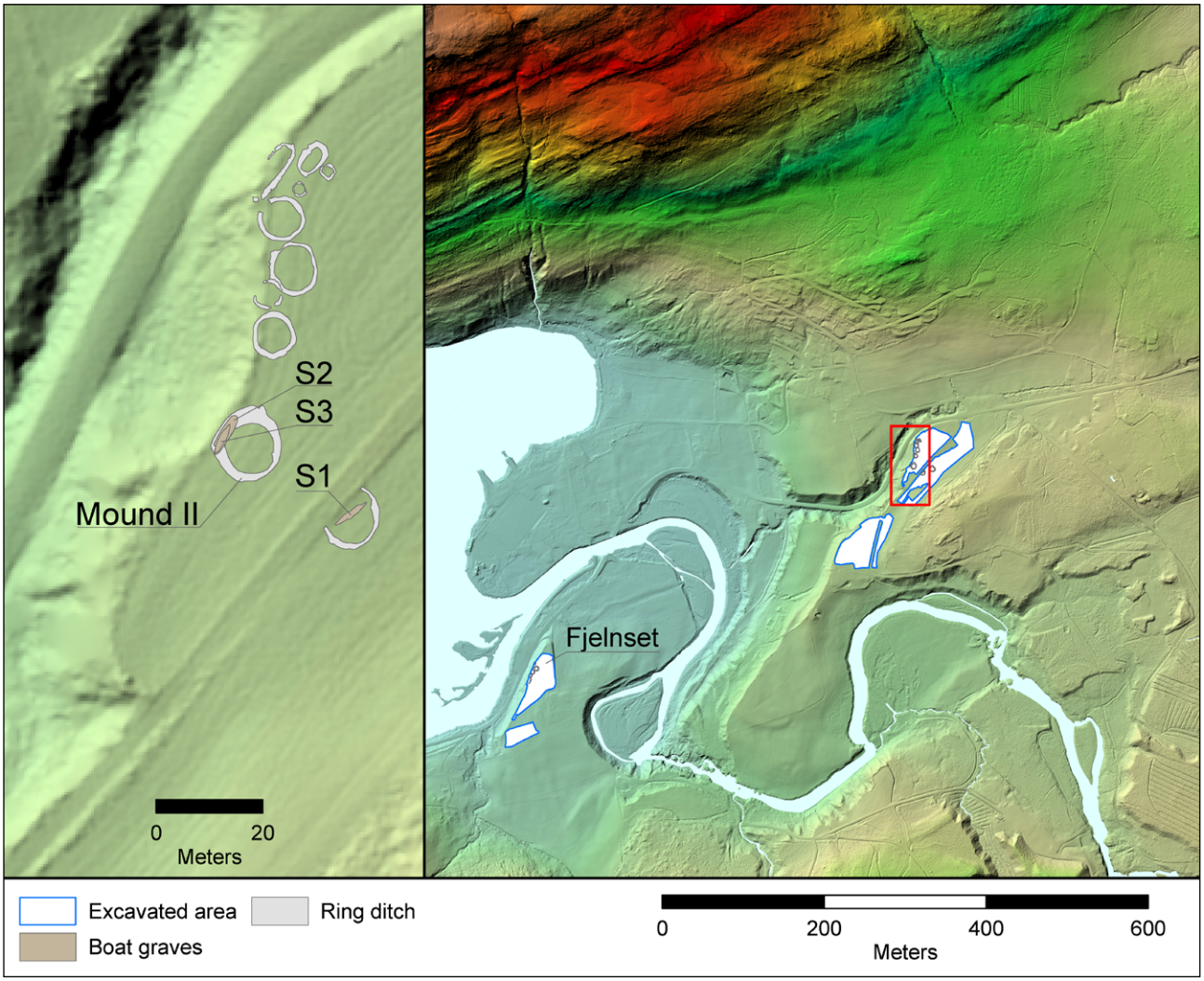

Figure 2. *Topographical map of the grave site at Skeiet and the surrounding area. Illustration: Kristoffer R. Rantala, © NTNU University Museum. Topografisk kart over Vinjeøra med Skeiet og gravfeltet.*

further insight into their original shape and construction, making it possible to explore their appearances and functions. Thus, the aim of this paper is to make preliminary reconstructions of the boats digitally, by combining the excavated source material with constructional principles of traditional wooden boats, and to compare them with contemporaneous boats and traditional wooden clinker-built boats.

MATERIAL AND METHODS

The known grave site at Skeiet was comprised of 11 grave mounds, with 20 graves in and around the mounds. S2 and S3 were discovered in the southernmost mound of a series of nine grave mounds on the edge of a plateau. (See Sauvage & Lorentzen Ch. 5 for a more detailed presentation and discussion about the grave site and burial rituals at Skeiet).

The grave mound containing S2 and S3, numbered as Mound II, was originally 9 m in diameter, while its original height is unknown. The ring ditch had an outer diameter of 13 m, with its width varying from 0.6 m to 3.3 m, the widest part being where the boats were buried. This section of the ring ditch was closest to the edge of the plateau, 1.3 m away (see Figures 2 and 3). The topmost and newest boat (S3) was found orientated north north-east/south south-west in the north-western part of Mound II's ring ditch, inside of the older boat (S2), with both pointing in the same direction. In total, there was 554 preserved clinker nails from the boats (see Figures 6 and 8). The wooden remains had decomposed, but traces were still present as mineralised remains in the bottom-most layer and on some clinker nails.

Both boats from Mound II are clinker built, also termed lap strake (Crumlin-Pedersen 2006:34). To systemise and understand our material findings, it is important to know the building method of these wooden boats. The following is a short description of the main principles of the building technique for clinker-built boats, as these constructional details

Figure 3. *A rendition of the grave site based on a lidar-scan of the area. The grave mounds are sculpted back into the landscape, albeit the present-day landscape. Lidar data was collected from* www.hoydedata.no *(visited 24.02.2022.). Illustration: Kristoffer R. Rantala, © NTNU University Museum. Tredimensjonal framstilling av den opprinnelige formen til gravhaugene satt i dagens topografi.*

are found in S2 and S3. Each strake, built of planks, overlaps the underlying strake by a few centimetres all along its lengthwise direction, called the *land*. First, the keel, stem and stern are laid, from which the strakes are built upwards. Each strake usually reaches the boat's full length from stem to stern and is spliced with scarf joints where necessary to reach the full length. The hull is further strengthened with ribs inside the strakes. This order of construction is classified as a *shell first* construction, as opposed to *skeleton first,* the prevailing building method in later periods (McGrail 1995:141), with the clinker tradition being an exception to this. The most common method of fastening the different pieces is by driving clinker nails along the land. Iron nails are driven in from the outside, through the wood and an iron washer called a rove, which is then fastened by peening the tail of the nail over it. It is these nails and their placement that are the main bulk of the studied material.

Plan drawings of graves, showing the distribution of clinker nails, are the most widely used form of documentation of and comparison between excavated boats (e.g., Samdal 2005, Herstad 2012). However, the Gokstad boats were not excavated or recorded in this way, and therefore no plan drawings of the boats were ever made. Planke et al. (2021:276) made illustrations of the clinker nails from both Gokstad boats, G1 (largest) and G2 (smallest), and illustrated them as the typical plan drawings we know from excavational surveys. I have done the same for a *geitbåt*, *nordlandsbåt*, and an *oselvar* based on technical drawings by Øystein Ormbostad (Godal 2021:57), Bernhard Færøyvik (Eldjarn 1990:236) and Bjarne Engen (https://www.oselvarverkstaden.no/historia/).

The *geitbåt* is the local traditional wooden clinker boat in the area of Nordmøre, around Vinjefjord. The traditional wooden clinker-built boats were built for use on local waters (Godal 2014:67). Assuming that S2 and S3 were used on Vinjefjord and the surrounding waters, the *geitbåt* is chosen for comparison between then and now. The *nordlandsbåt* is built for waters further north and has characteristic stems, reminiscent of the high-rising stem boards of the Late Iron Age boats (Eldjarn 1990:226). The *oselvar* is a boat commonly used in south-western Norway. The boat is recognised as an old type and has been described as 'the boat of a thousand years' (Greenhill & Morrison 1995:208). Both boats have

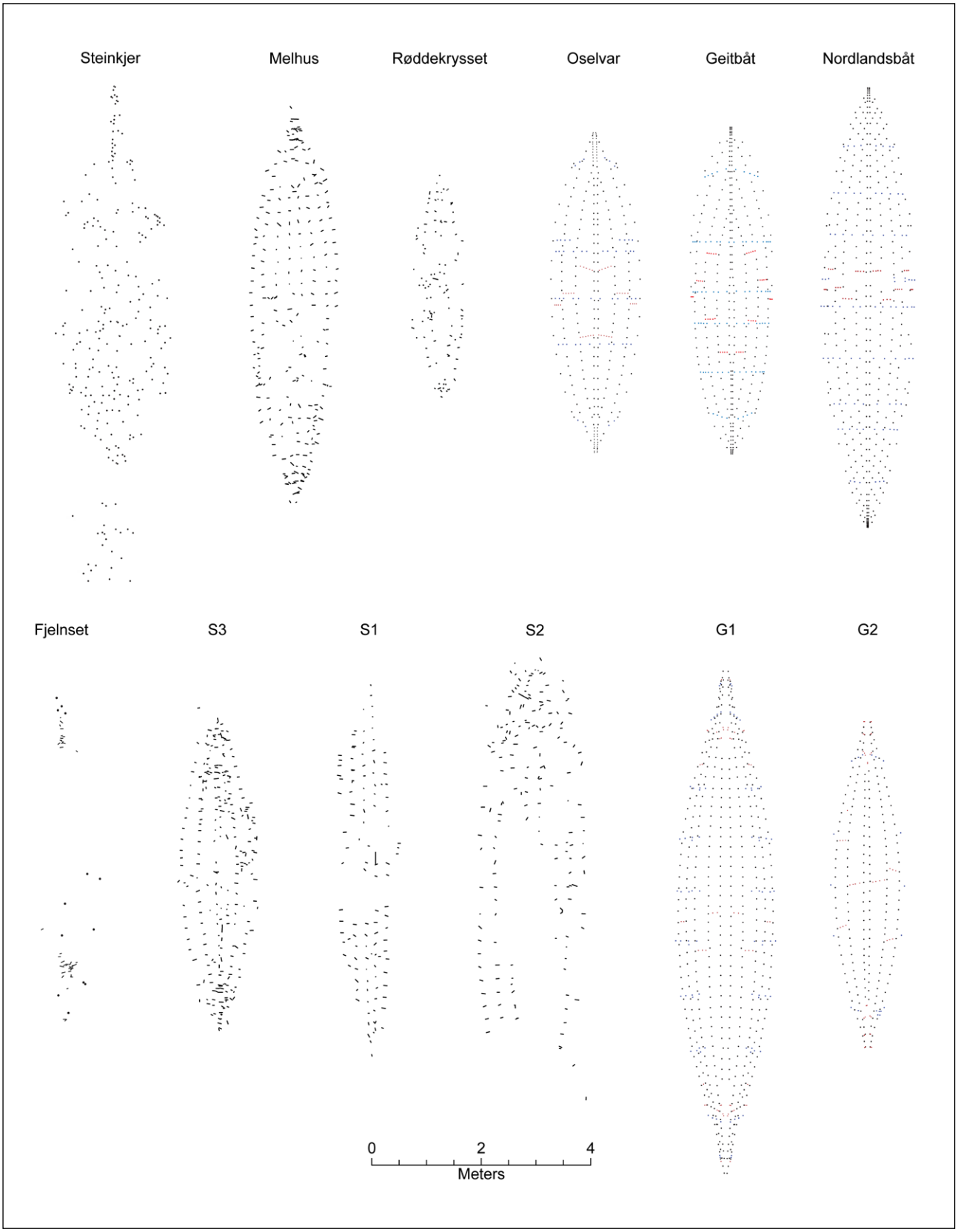

Figure 4. *Excavated and illustrated boats. The differences in the state of preservation between the Iron Age boats are stark (Røddekrysset: Krag & Henriksen 2018, Geitbåt: Technical drawing by Øystein Ormbostad in Godal 2021:57, Nordlandsbåt: Technical drawing by Bernhard Færøyvik in Eldjarn 1990:236, Melhus: Rantala & Henriksen 2019, Steinkjer: Ellingsen & Grønnesby 2012:16, G1/G2: Planke et al. 2021:276, 279, Oselvar: Technical drawing by Bjarne Engen 1982 at (https://www.oselvarverkstaden.no/historia/. Illustration: Kristoffer R. Rantala © NTNU University Museum. Uttegning av båtsøm fra norske båtgraver og tradisjonsbåter.*

Figure 5. *The mini prism reflector used with the total station. Photo: Raymond Sauvage, © NTNU University Museum. Miniprisme brukt til innmåling av båtsøm med totalstasjon.*

been chosen because of their design differences from the *geitbåt* and their use on different local waters, both to the north and south of the area where the *geitbåt* is used.

I have also included the surveys of some of the boats excavated over the last 20 years by NTNU University Museum, from Melhus, Trondheim (Røddekrysset) and Steinkjer in Central Norway, as well as the first boat excavated at Skeiet (S1) and the few remains of the boat from Fjelnset. The traditional boats and Gokstad boats are presented in their entirety, but for a more realistic comparison with the excavated boats, the topmost clinker nails could be removed from the drawing.

To systemise the findings, I will use the categories defined by Crumlin-Pedersen et al. (1997:16–17) in their framework of analysis for boat finds. The main categories are as follows: *dating*, *origin*, *type of ship*, *size and capacity*, and *context*. Regarding S2 and S3, evidence to some extent is present for all five categories, but not for all subcategories. The following subcategories have been identified in the material: *year of construction*, *materials*, *basic type*, *shape*, *module measurements*, *metric*, *political/sacral background* and *fate of ship at deposition*. As this paper focuses on the reconstruction of the two boats from Skeiet, I will therefore mainly use the categories within *type of ship* and *size and capacity*. More specifically, *basic type*, *shape, module measurements,* and *metric*, as these subcategories describe the build and shape of the boats. The subcategories help to identify *structural lay-out* and *methods of joining*, *lines* and *shape of stem and stern*, *number of strakes* and *main dimensions*, respectively (Crumlin-Pedersen et al. 1997:16–17).

Reconstruction: from three dimensions to 2D

On site, every clinker nail was surveyed using two measuring points, one at each end – head and rove – using a total station with global navigation satellite system (GNSS) receiver and a mini prism reflector. The mini prism was only 10 cm high and thereby reduced the margin of error, as the operators could complete the survey by crouching close to the clinker nails. The results of this method were that all the clinker nails were precisely documented regarding both absolute and relative placement, their orientation and their size measurements. The nails found beneath the modern ploughing layer were found, for the most part, in alignment with the rows of strakes. Because the bottoms of both boats were compressed into each other, this thorough survey process became an important tool for making the documentation as accurate as possible. These features would otherwise have been particularly difficult to distinguish in the post-excavation data set. In combination with on-site images and photogrammetry of both boats, detailed field documentation constituted the basis of the preliminary reconstruction.

The preliminary reconstructions began with processing the surveyed clinker nails as a dataset in *ArcMap 10.7* for a plan drawing, and *ArcScene 10.7* for 3D space. These workspaces were used in tandem to identify the different constructional elements. The dataset was exported into *Adobe Illustrator 24.1*, and further refined as two separate drawings of the boats, both plan and longitudinal. These were then combined to make a cross-section view. The plan view was drawn by following the curves of the strakes as seen in the surveyed dataset. The scarf joints were

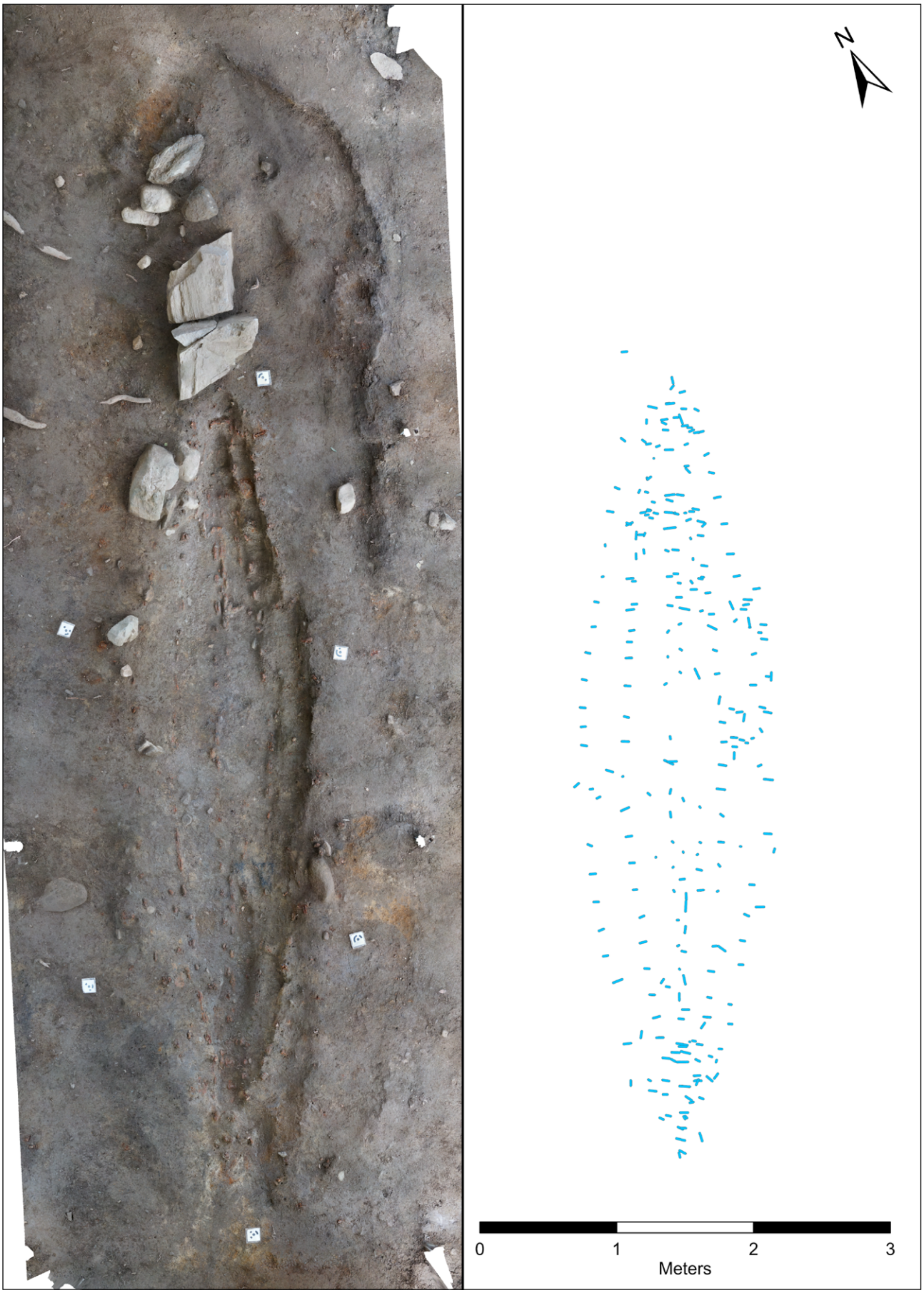

Figure 6. *Orthogonal photo and the surveyed clinker nails of S3. Photo and illustration: Kristoffer R. Rantala, © NTNU University Museum. Ortofoto av S3 med uttegning av innmålt båtsøm.*

Table 1. *Categories of analysis which have been identified in S3, as defined by Crumlin-Pedersen et al. (1997:16–17). Shape relates to the boat's shape and is better shown in the illustrations.*

Main category	Sub-category	Results
Dating	Shipwreck/deposition	First half of the 9th century
Origin	Material	Pine
Type of ship	Basic type Shape	Clinker-built See Figures 6 and 7
Size and capacity	Module measurements Metric	Four strakes on each side 6.7 m × 1.8 m
Context	Fate of ship at deposition	Grave

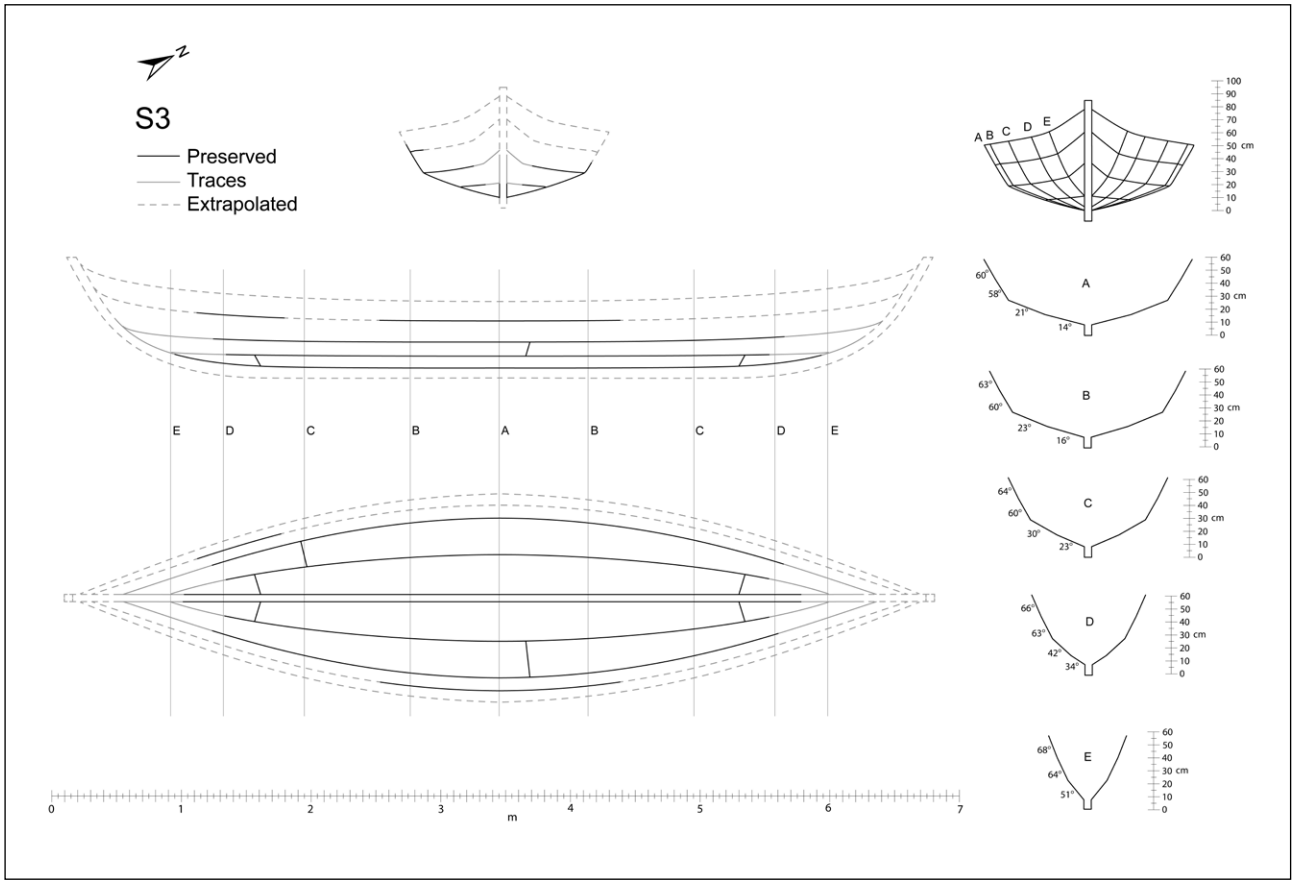

Figure 7. *Preliminary reconstruction of S3. The illustration shows which parts of the boat are preserved, what there are traces of and what has been extrapolated. Illustration: Kristoffer R. Rantala, © NTNU University Museum. Foreløpig rekonstruksjonsforslag over S3.*

marked wherever identifiable, seen as a line of rivets perpendicular to the strakes. The missing sections were extrapolated. The longitudinal view was made by combining excavation data and a set of specific angles provided by boat builder and traditional craft scholar Jon B. Godal (personal commentary). A strake will not have the same angle throughout the boat and will always curve along the whole length. They tend to flatten amidships and bottom, and become more upright towards fore and aft as well as further up on the sides (Godal 2016:58).

…and back to 3D

The 3D models were made in the open-source 3D creation suite *Blender 2.9*. They were modelled the traditional way on orthogonal drawings, both plan and longitudinal, as a template (Idesawa 1973). Both the plan drawing and longitudinal drawing were initially used, and then the clinker nail-surveys and 3D models from the photogrammetry were imported to Blender for comparisons, using Blender GIS addon (Blender GIS 2.2.8 2022). Illustrations showing the area were made from publicly available lidar scans surrounding

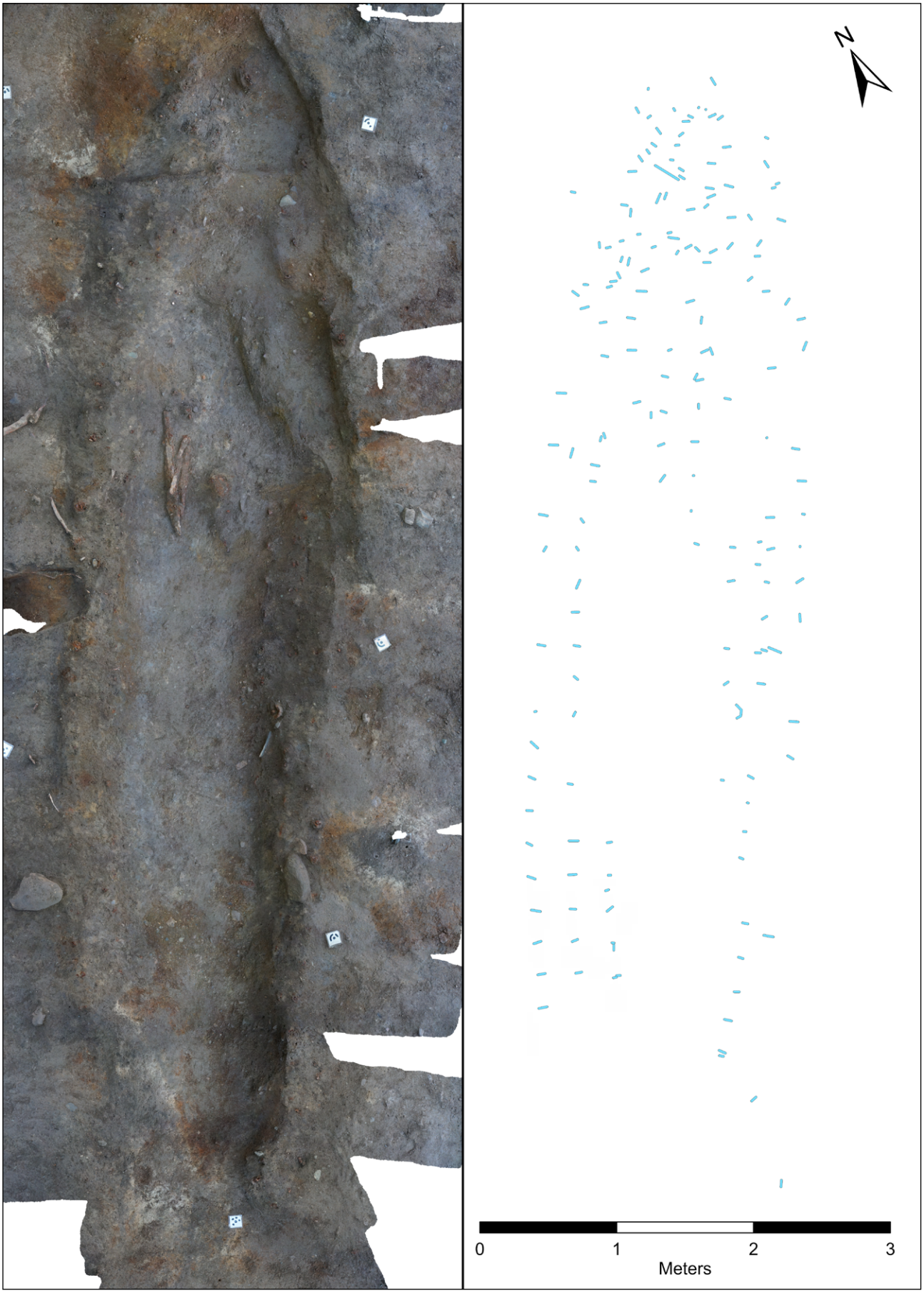

Figure 8. *Orthogonal photo and the surveyed clinker nails of S2. Photo and illustration: Kristoffer R. Rantala, © NTNU University Museum. Ortofoto av S2 med uttegning av innmålt båtsøm.*

Table 2. *Categories of analysis which have been identified in S2, as defined by Crumlin-Pedersen et al. (1997:16–17). Shape relates to the boat's shape and is better shown in the illustrations.*

Main category	Sub-category	Results
Dating	Shipwreck/deposition	Latter half of the 8th century
Origin	Material	Conifers, possibly pine
Type of ship	Basic type Shape	Clinker-built See Figures 8 and 9
Size and capacity	Module measurements Metric	Five strakes on each side 9.6 m × 2.3 m
Context	Fate of ship at deposition	Grave

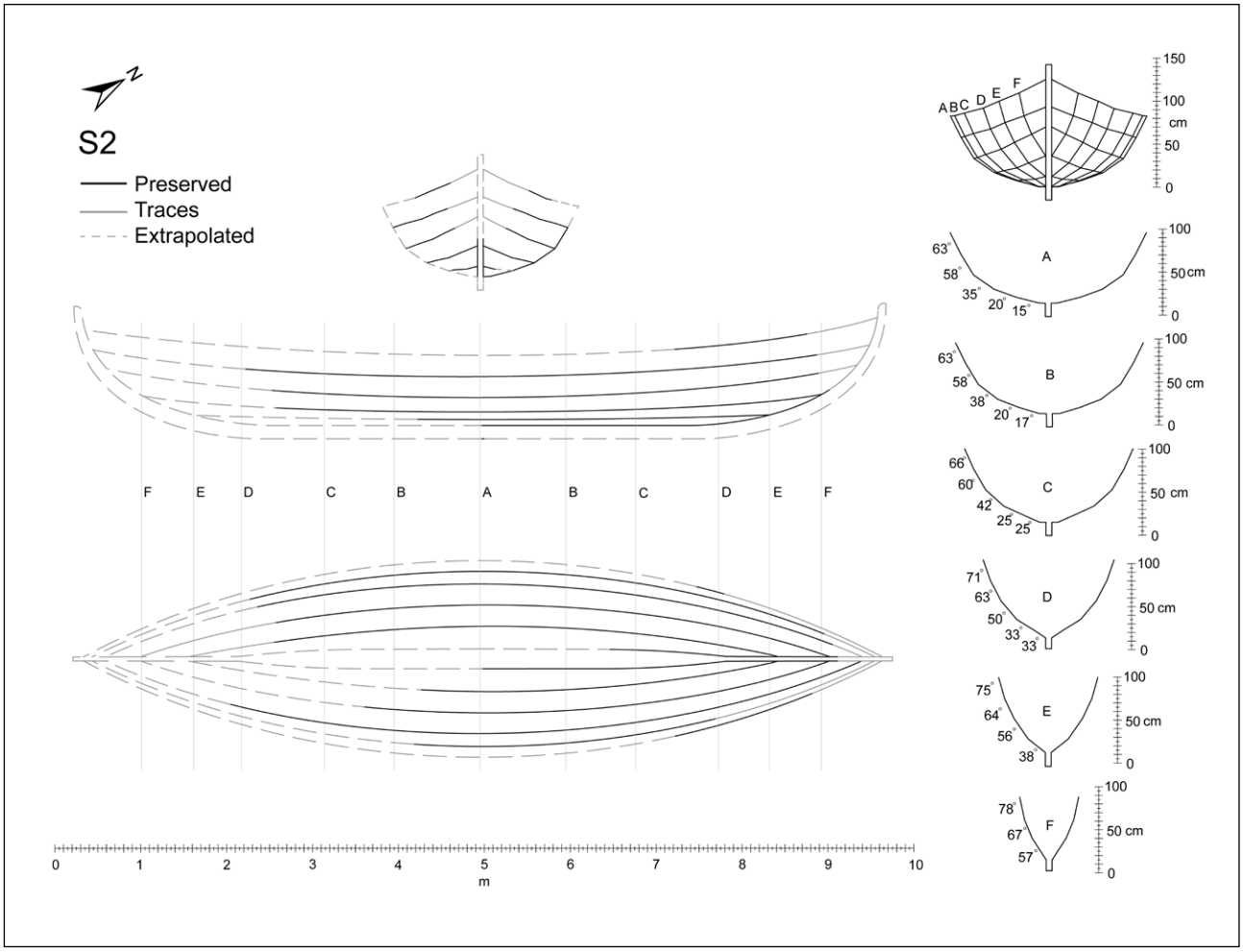

Figure 9. *Preliminary reconstruction of S2. The illustration shows which parts of the boat are preserved, what there are traces of, and what has been extrapolated. Illustration: Kristoffer R. Rantala, © NTNU University Museum. Foreløpig rekonstruksjonsforslag over S2.*

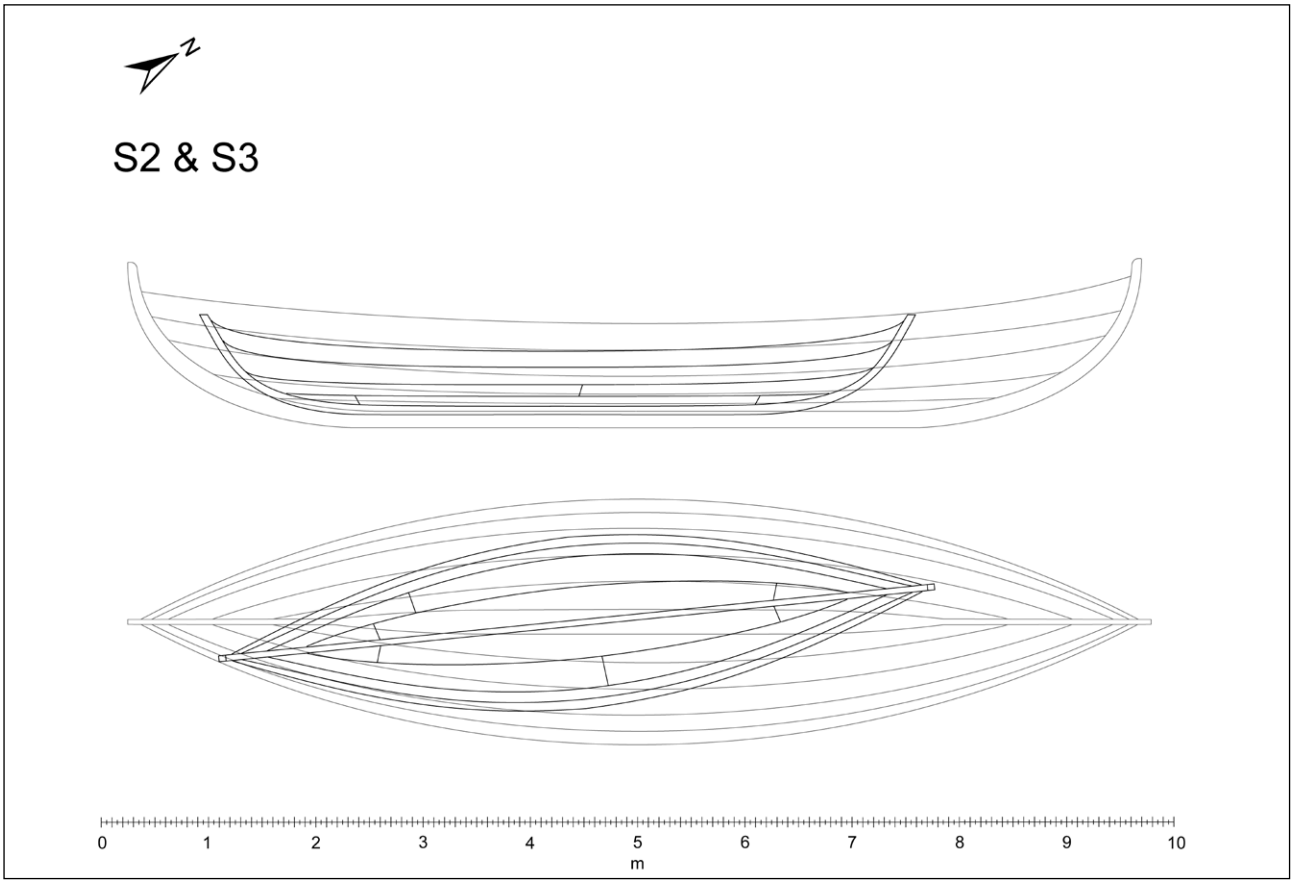

Figure 10. *The smaller S3 within the larger S2, illustrating their relative placement to each other within the grave. Illustration: Kristoffer R. Rantala, © NTNU University Museum. Forholdet mellom de to båtene med S3 inni S2.*

the excavated area (Hoydedata.no 2022), and were imported into the game engine *Unreal Engine 5.2* to create an image of the grave site together with the corresponding terrain.

RESULTS

The following is a presentation of the boats and how a set of clinker nails discovered in a pattern was interpreted and recreated post excavation. The topmost boat (S3) was the best preserved of the two and thereby had the best potential for preliminary reconstruction using the method previously described.

S3

S3 had a preserved length and width of about 6 m × 1.3 m. The interpreted size of the original boat is estimated to be about 6.7 m × 1.8 m (see Figures 6 and 7). This corresponds to a L:W ratio of 4:1, a usual ratio found in present-day traditional wooden boats. The boat was built of pine, as identified from preserved wood within a clinker nail. It had a T-shaped keel, four strakes on each side, with a thickness of the planking of about 2 cm at the thickest and gradually decreasing towards the stems, based on the width of the clinker nails. The spacing between the nails was about 20 cm throughout most of the boat. No indications of ribs were present. Every strake was at full length, as they reached from stem to stem, with scarf joints placed asymmetrically throughout the boat, meaning that their placements are not mirrored on either side of the keel (see Figure 4 and the difference between the traditional boats and the Late Iron Age boats).

It is unknown if the boat was constructed with the high rising stem boards that are characteristic of Late Iron Age vessels. No evidence of a sailing rig was identified. The boat was radiocarbon dated to AD 708–890 (Tra-14660, 1205±25 BP) by sampling the preserved pine wood from one of its clinker nails. Taking the grave goods of the deceased into account, the chronology of the grave dates the burial to the first half of the 9th century (see Sauvage & Lorentzen Ch. 5 for a detailed discussion on the dating).

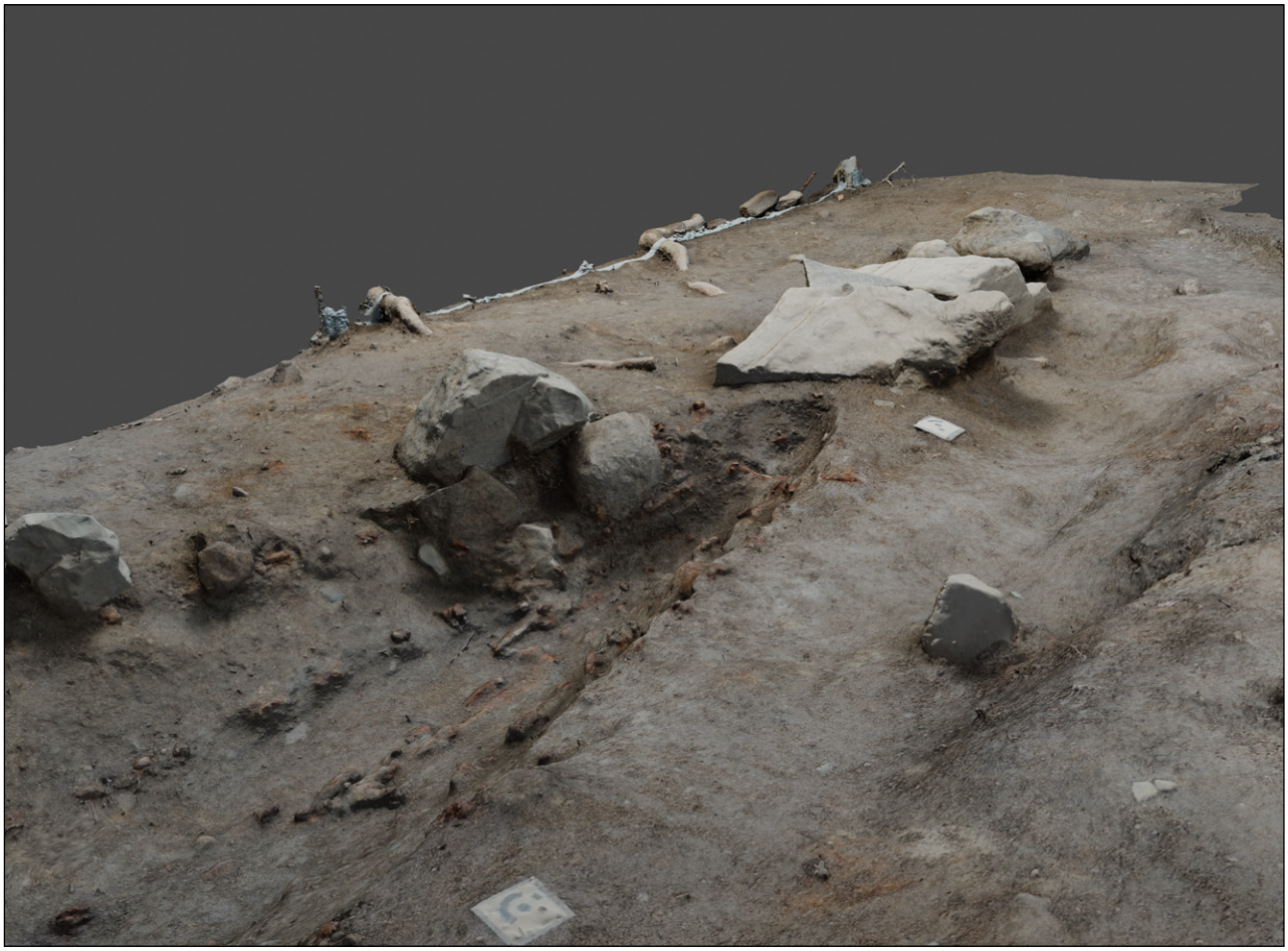

Figure 11. *Stones in the northern stem of S3, following the shape of S3's stem. Clinker nails seen in situ. Photo: Kristoffer R. Rantala, © NTNU University Museum. Stein som var plassert under og i flukt med nordstevnen til S3.*

S2

S2 had a preserved length and width of about 7.5 m × 1.9 m and an estimated size of about 9.6 m × 2.3 m based on the L:W ratio of 4:1 (see Figures 8 and 9). It is, however, important to note that in the case of S2, the estimate is more uncertain than S3, as a large section of S2 is missing from the boat's southern end. The closest identification of the wood was to the conifers: cone-bearing seed plants, such as pine. It had a wider T-shaped keel than S3, but only about 3 m of the keel's length was preserved. Whether the boat had rabbet stems like the Gokstad boats was not possible to establish. It had five strakes on either side, also with the thickest planking of about 2 cm thickness. The clinker nail spacing was about 23 cm throughout most of the boat, gradually narrowing towards the stems. The number of ribs are unknown. It was not possible to identify any scarf joints. As with S3, it is unknown if this boat was constructed with high rising stem boards.

The wood from two clinker nails was dated to AD 704–885 and AD 722–890 (Tra-14661, 1220±25 BP and Tra-17771, 1185±15 BP, respectively). The radiocarbon dating is similar to S3 and points to the two boats being roughly the same age. However, the chronology of the grave goods and placement beneath S3 dates the burial to the latter half of the 8th century (see Sauvage & Lorentzen Ch. 5).

Their placement

The precise placement of S3 within S2 shows that the position of S2 was well known at the time of S3's burial. S3 was placed towards the southern end of S2, rotated about 6 degrees westward (see Figure 10). This seems to have had the added benefit of using the remaining parts of the larger boat to support the smaller boat in an upright position. Large stones were deposited within S2 to support S3's northern stem. These stones follow closely, though not perfectly, the shape of the S3's northern hull, suggesting a general hull shape (see Figures 6 and 11). In addition to giving S3 the best-preserved stem of these two boats, this in turn preserved this part of the underlying S2 as well.

S2's southern stem and most of its southern half were not found. This part is assumed to have been

Figure 12. *The placement of the boats in the ring ditch (disregarding decomposition). Illustration: Kristoffer R. Rantala, © NTNU University Museum. Modell av begge båtene plassert i fotgrøften, uten hensyn til nedbryting.*

removed prior to or during the burial of S3, as the other clinker nails of S2 are well preserved, making it unlikely that these were completely corroded at the time of S3's burial. It must be noted that many clinker nails were also discovered scattered throughout the surrounding area, and likely originated from the two boats and the greyed-out areas of Figures 7 and 9. This is most likely due to the upper parts of the grave mound being ploughed using modern farming equipment, causing the destruction of the upper parts of the vessels.

DISCUSSION

Boats are complex constructions, and reconstructions of the few preserved boats from the Late Iron Age in Norway are heavily debated. Recent studies have shown flaws in the original reconstructions of the three Viking ships Gokstad, Oseberg and Tune, as well as the two Gokstad boats. The reconstructions are mainly criticised on the basis of being remade from a decomposed material that is not representative of their original shapes (Paasche 2010, 2020, Planke 2011, 2020, Bischoff 2020). Given the difficulties in reconstructing boats, combined with the fact that the cases from Skeiet were in an even poorer state of preservation, the illustrations presented here are only preliminary reconstructions and intended to serve as a stepping stone for further investigations.

The purpose of my reconstructions is to illustrate the recognisable details of the boats with the identifiable basic elements showing, such as the general size, the number and width of the strakes and the placement of the scarf joints, within the framework of analysis defined by Crumlin-Pedersen et al. (1997:16–17). The process of visualising the boats helped in understanding the *basic type, shape, module measurements* and *metrics* of the boats, as every category is analysed throughout the process of drawing. The illustrations then present the boats as they were found and contextualises them by adding on elements barely present in the material, such as the upper strakes. Further details will depend on the state of preservation.

Although the drawings are preliminary, S2 and S3 are shown as complete. The 3D models can be used to illustrate the physical manifestation of these burials in a wider context, such as the curious funerary ritual of placing one boat inside another and not within the mound itself, but rather in the ring ditch. As they were placed in the ring ditch of the mound, the estimated height of the mound at the time of burial would not have covered the boats completely. This placement implies that the boats would have been visible after the burial. Perhaps the boats themselves, together with the mound, were a visual marker in the landscape. The visual impression is presented in Figure 12 and shows one possibility for the use of 3D models of excavated boats.

Figure 13. *X-ray of a clinker nail with a curved rove. Photo: Ellen L. W. Randerz, © NTNU University Museum. Røntgenfoto av kloformet båtsøm til innfesting av band.*

What my illustrations are not, are technical drawings. While measurements and dimensions are accurate, Figures 7 and 9 show what little actually remains, as presented by the black and grey lines. The dotted lines are only interpretations rooted in evidence in the material. Ribs are also not present in my illustrations, as they were not identified in the dataset, apart from one clinker nail (see Figure 13). This clinker nail had a curved rove and might suggest the placement of a rib in S3's northern stem (type G rove according to Bill (1994:57). Due to the state of preservation, where only parts of the subcategories *basic type*, *shape*, *module measurements*, and *metrics* have been identified, the drawings are designed to give a more neutral expression of the boats' shapes, which means they are drawn entirely symmetrical fore to aft, and port to starboard. I intentionally gave them a neutral expression to keep the preliminary reconstructions open for further refinement. For instance, traditional wooden boats usually have a wider fore and narrower aft (see Figures 4 and 14). It is unknown whether this trait is present or not in the Skeiet boats, and it does not appear to be present in the Gokstad boats (Planke et al. 2021:276–279, Figures 5, 7). It might not be visible in the Skeiet boats due to decomposition and compression of the ground. Comparing the plan drawings of the traditional clinker nail wooden boats the *geitbåt*, *nordlandsbåt,* and *oselvar*, a stark difference is seen in the clinker nail layout of even intact and complete boats (see Figures 4 and 14). The *geitbåt* has a distinctively wide forward, while the *nordlandsbåt* and *oselvar* have a more subtle design. One can imagine what a thousand years of decomposition and compression might have done to the displacement of the clinker nails on the *nordlandsbåt* and the *oselvar*, so that the trait of a wider fore and narrower aft would have been erased in an excavational survey. Would the more distinct design of the *geitbåt* still be present after a thousand years in the ground?

In Figure 14 I have grouped the boats according to size. In this side-by-side comparison, all three traditional boats have their widest point forward of amidships. In the *geitbåt*, this design has been taken a step further, as the entire bow has a larger construction and has an extra strake that does not reach all the way aft. The *nordlandsbåt* and the *oselvar* are generally more symmetrical in their design. If based solely on the clinker nail plan drawings, the *geitbåt* stands out as its own distinct design, while both the *nordlandsbåt* and the *oselvar* have more in common with the Late Iron Age boats.

Going back to the other Late Iron Age boats in Figure 4, we can disregard the boats from Steinkjer and Fjelnset from this analysis as their preservation is rather poor, and even the *metrics* are hard to assess from the plan drawing. S1 only has its bottom preserved, but parts of the *basic type*, *shape*, *module measurements* and *metrics* are visible and even recognisable. S1, S2, the Melhus boat and G1 feature a wide T-shaped keel and long narrow strakes. The *nordlandsbåt* has a narrower keel than these, but other than that, it can be grouped together with the boats with a wide keel

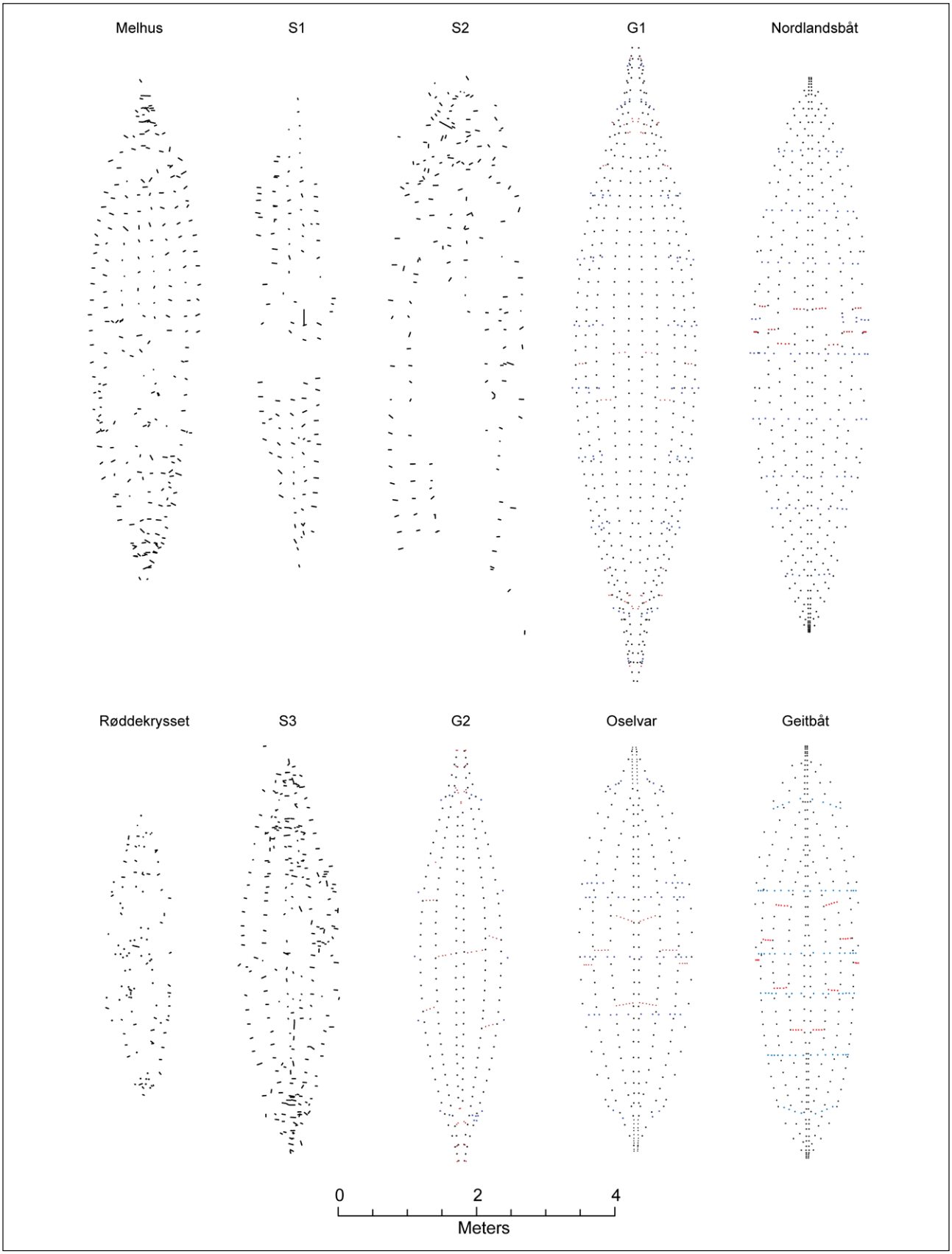

Figure 14. *Grouping of the larger and smaller boats in a side-by-side comparison of their clinker nail plan drawings (Melhus: Rantala & Henriksen 2019, G1: Planke et al. 2021:276, Nordlandsbåt: Technical drawing by Bernhard Færøyvik in Eldjarn 1990:236, Røddekrysset: Krag & Henriksen 2018, G2: Planke et al. 2021:279, Oselvar: Technical drawing by Bjarne Engen 1982 at* https://www.oselvarverkstaden.no/historia/*, Geitbåt: Technical drawing by Øystein Ormbostad in Godal 2021:57). Illustration: Kristoffer R. Rantala, © NTNU University Museum. Sammenligning og gruppering av uttegning av båtsøm fra båtgraver og tradisjonsbåter.*

and long and narrow strakes. The shorter boats in Figure 4, S3 and G2, form another group. Both keels are built with a T-shaped keel of fairly similar width and with the same spacing between all clinker nails. They also show that the clinker nails are not fastened parallel to each other along the keel's length and have a lengthwise offset by a few centimetres. The strakes are of a similar width, as well as the spacing of the clinker nails, and the shorter length gives the strakes a larger curve. The small boat from Røddekrysset belongs to this group. Some similarities are observed between the clinker nail plan drawings of S3 and G2. This exercise is harder with S2, due to its poorer state of preservation. S2, as inferred from the clinker nails, has lost more of its height and shape than S3, and the missing southern part makes the comparison with G1 challenging. Some elements, however, stand out. The keels seem to be of the same design on these two boats, with a similar distance between the clinker nails, both length and widthwise.

CONCLUSION

The documentation of the boats at Skeiet proved to illustrate the amount of information that is possible to extract from the sparse material of clinker nails in situ. I studied the plan drawings of clinker nails to discover their construction and then made preliminary reconstructions as a tool to present the boats. The reconstructions were based on their overall size, the T-shaped keel, the number of strakes, the size and spacing of the clinker nails, and the placements of the scarf joints. All show different constructional features that are important in order to piece together their *basic type*, *shape, module measurements,* and *metric*, which in combination paint a clearer picture of these boats. A step further was to build 3D models to expand on the context surrounding the boats and to aid in the visualisation of the *fate of ship at deposition*.

The clinker nail plan drawings of both traditional boats and the Gokstad boats served as a point of reference for studying other Late Iron Age boats. These boats are often discovered in varying states of preservation, as shown in Figure 4, and this baseline will benefit their study. However, a study of plan drawings does not incorporate the three-dimensional shape of the boats in a good way. These shortcomings are important to acknowledge, but it is always possible to add depth to the drawings at a later stage.

During this study, it became clear that the Skeiet boats do not appear as their own distinct type, and at this point in the study, they seem to have more in common with contemporaneous boats rather than traditional counterparts.

SAMMENDRAG

Ved utgravingen av en dobbel båtgrav ved gården Skeiet i Vinjeøra, Trøndelag, ble det gjort viktige observasjoner for å videreføre studien av konstruksjonen til yngre jernalders klinkbygde båter. Nøyaktig utgravningsdata fra disse ofte dårlig bevarte båtene ble supplert med konstruksjonsprinsippene fra dagens klinkbygde tradisjonsbåter. De to båtene gjennomgikk en innledende rekonstruksjon, for så å bli sammenlignet med andre lignende fartøy, både fra yngre jernalder og nyere tradisjonsbåter. De innledende rekonstruksjonene viste to båter av lignende type som andre kjente samtidige båter, samtidig som det også påpekte manglende eller uidentifiserbare deler nettopp på grunn av de dårlige bevaringsforholdene. Båter som blir utgravd i Norge er ofte dårlig bevart, og lite til ingenting av det organiske materialet overlever. Imidlertid har disse innledende rekonstruksjonene vist at med målrettet utgraving og dokumentasjon, har de fortsatt et godt potensial for å utvide kunnskapen om yngre jernalders båter.

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Archaeological excavations in 2019 and 2020 at Vinjefjord in Central Norway uncovered extensive evidence of settlements and graves from societies that thrived in this region during the Iron Age, the Viking Age, and the medieval period. Set against the backdrop of the fjord, the area revealed a rich cultural-historical development including shifts in settlement patterns, burial and ritual practices, increased influence through trade and communication, and varying impacts on the natural and cultural landscape.

In this anthology, we investigate the physical remains of Vinjefjord's past, including remnants of settlements, buildings, traded and plundered goods, botanical evidence, as well as cemeteries with graves, grave goods, textiles, and signs of interactions with the deceased. The results of our studies reflect the intertwined threads of life and death in past societies, emphasizing the close relationship between the living and the dead. The book aims to engage scholars and enthusiasts alike, while also appealing to the curious public.

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