

By the crossroad

A multiproxy approach to burial rituals and communication in Late Neolithic and Bronze Age Drottningtorp, southern Sweden

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ABSTRACT

Due to infrastructural work, Sydsvensk Arkeologi AB conducted an archaeological excavation in 2022 between the Scanian villages Fjälkinge and Gualöv, southern Sweden. The excavation revealed settlements and a cemetery from the Late Neolithic into the Pre-Roman Iron Age. Located at a plausible prehistoric intersection which connects the Lake Ivösjön to the Baltic Sea, and coastal south to the north, the site has the potential to provide new knowledge of ancient road systems and its possibilities for exchange of both ideas and people. The paper explores the buried population and burial tradition from the Late Neolithic to the Late Bronze Age through multiproxy data, combining traditional archaeological and osteological analyses with state-of-the-art biomolecular analyses, and microstratigraphic excavation of urns as well as trace element and lead isotope analysis of metals. The results show how the local environment substantially has affected the spatial distribution of graves and that the prehistoric roads have been important for transferring ideas and commodities from the Baltic inland as well as north to south along the coast. Reinterpretations of cremation pits to pyre remains shows that burial practice was homogenous within specific chronological boundaries and adds to the existing corpus of data that suggest that funeral pyres were grave specific and placed within the ritual arena of the cemetery.

ARTICLE HISTORY

Received

30 June 2026;

Accepted

09 September 2026

KEYWORDS

Cremation; Burial rituals; Amelogenin peptide analysis; Strontium isotopes; Funeral pyre.

Introduction

Due to infrastructural work of broadening the main road E22 to motorway standards, Sydsvensk Arkeologi AB conducted an archaeological excavation in 2022 at the site Drottningtorp, situated between the villages Fjälkinge and Gualöv in Scania, southern Sweden (Figure 1; Björk *et al.* 2025). The 21,000 m² excavation revealed not only settlement remains from the Neolithic and Bronze Age, including Late Neolithic (LN: c.2300-1700 BCE) and Bronze Age (BA: c.1700-500 BCE) houses in the western part of the excavation area (Björk forthcoming), but also a cemetery with graves from both the Late Neolithic and the Middle-Late Bronze Age (MBA/LBA: 1300-500 BCE) in the east. Besides inhumation and cremation graves, the cemetery also included possible remains of two BA ritual houses (*cf.* Bech and Nielsen 2004; Victor 2002) where the shape and dimensions are similar, but it lacked the stone

structures commonly associated with the phenomenon (Björk *et al.* 2025). The cemetery positioned on an elongated weak elevation stretching 400 m east-west in the eastern part of the excavation area (Figure 2). The LN graves were located on a small slope towards a lower area to the north of the MBA graves. The site is situated at the intersection of two main roads visible on historical maps from both the 17th and the early 19th Century (Figure 3). One of the old roads follows the same stretch as the present-day motorway and the other links the inland to the Baltic coast. It is highly likely that these roads also represent prehistoric roads since the elevation on which the graves were positioned is flanked by old marsh lands on both sides. Before the area was drained in modern times this would be the only part of the area where you could travel dry-footed.

The area is rich in both Neolithic megalithic and non-megalithic graves as well as Bronze Age



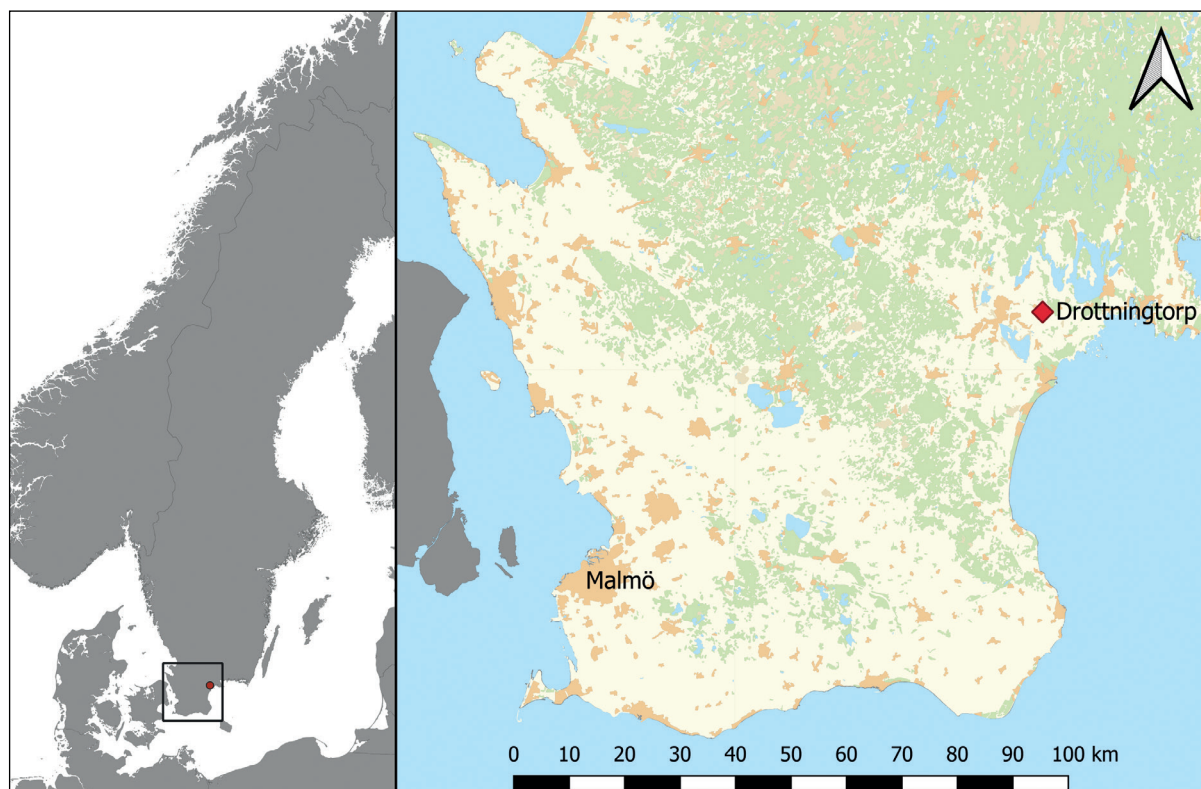
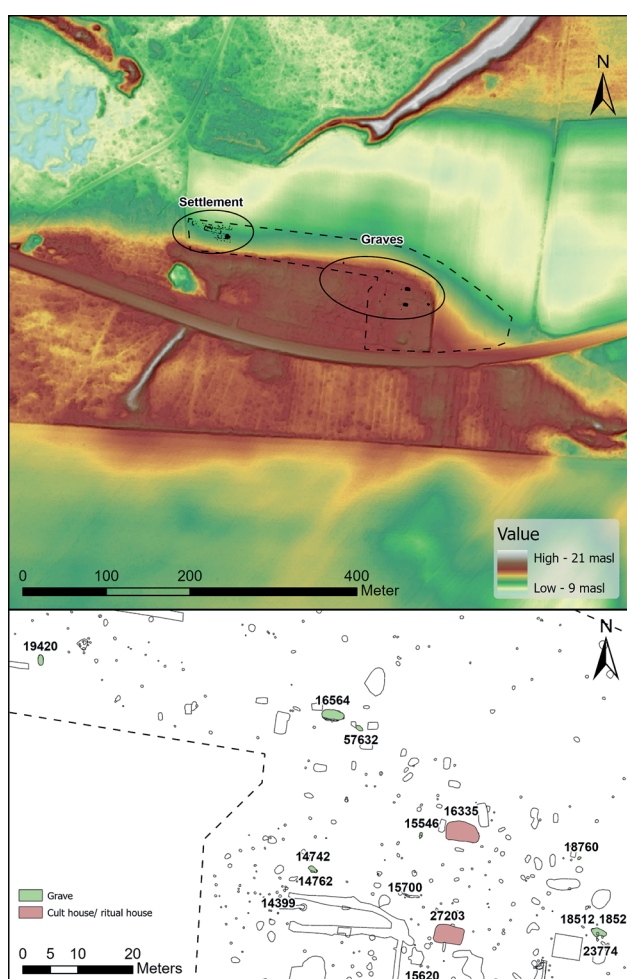


Figure 1. The site Drottningtorp situated between the villages Fjälkinge and Gualöv northeast Scania, Sweden (Map: Daniel Forsberg using QGIS v. 3.44).



mounds and flat cremation urn cemeteries (*e.g.* Arcini *et al.* 2007; Tornberg 2018, 2025). The area around Fjälkinge was favourable for agropastoral-based economy as well as for the strategic position in the landscape with closeness to both the Lake Ivösjön (<2 km) and to the Baltic coast (8 km), which afforded both land and water-based trade and mobility possibilities. These possibilities are affected by, and an effect of, the landscape. The dual land and water-based communication enable connectivity within the local, regional, and supra regional Bronze Age arena and has the potential to affect both social and ritual life. In the BA this means that Nordic amber was traded against precious metals through far-reaching trade networks which included long-distance

Figure 2. Top: The Drottningtorp site (dashed) in a topographic map that shows the slight ridge surrounded by wetlands. The burials were placed in a ridgetop position in the north-east, and the settlement remains in a lower position in the west. The main road E22 follows the same ridge, as well as the historic main road. Bottom: Site plan that shows the position of the graves and the two plausible cult houses (dashed line: survey area, unfilled features: other types of features such as postholes, hearths and pits) (Maps: Anton Uvelius using QGIS v. 3.44).



Figure 3. The map of Buhrman (top), 1684, and the map Skånska Rekognosceringskartan, 1812-20, modified with name of nearby lakes and an arrow showing the location of the Drottningtorp site.

mobility over both sea and land (Vandkilde 2016; Vandkilde *et al.* 2024). Human interaction and connectivity, however, are highly dependent on routes of connection. Land-based routes of communication, i.e. roads, have long been part of archaeological investigations and considered linked to Neolithic and Bronze Age placements

of graves in the landscape (*e.g.* Rudebeck 2001; Skoglund 2005, 199-210; Stensager 2002 (printed 2005).

Burial customs are recognized as especially important in defining archaeological continuity and change since the custom of how we bury our dead are thought of as connected to strong, and slow-

altered, sociocultural bonds. Such important cultural traits tend to only get mildly adjusted rather than develop into something completely new (*cf.* Deetz 1996 for examples from 17th-18th century America). Major changes in these customs, hence, have been thought of as correlating with significant change in mentality and/or society, driven by migration or major events (*cf.* Kristiansen 2009). These changes depend on substantial socio-cultural transformations and human interaction (Oestigaard and Goldhahn 2006) but also include local and regional variation where general ideas are adapted to local preconditions and needs (*cf.* Skoglund 2005). In the BA period III inhumation graves were largely replaced by cremations. The change in burial practice here could be seen as something socioculturally remarkable (a revolution, according to P.V. Glob 1970, 130). Prestigious inhumations in mounds likely included highly visible, and maybe communal, (re)creations and accentuation of the dead individual's identity. The funeral pyre, conversely, eliminated all recognizable traits of an individual, making the individual's identity invisible.

Cremation practices were gradually adopted in Scandinavia and inhumations continued alongside cremation graves in small and large pits, however on different scales; northwestern Scania seems to lack inhumation graves, while it was the dominating practice in the southwest (Håkansson 1985, 108). Many of the period III graves are cremations distributed over a human-sized pit, often in log coffins, adjoined with full-sized bronze items, following an old inhumation burial tradition (*e.g.* Reiter *et al.* 2021; Strömberg 1975, 182-186). Urn graves did not fully take over until BA period IV, supporting regional, and sometimes even local, differences within the larger European Middle/Late Bronze Age burial tradition. At the same time, cremation seems to have been practiced already in BA period II in relatively high abundance in some Nordic areas, for example in the Thisted region in NW Jutland and in Schleswig-Holstein (Reiter *et al.* 2021, Schaefer-Di Maida *et al.* 2026). Since the deposition patterns of cremated remains differ, Reiter *et al.* (2021), argue that the cremation practice maybe should not be seen as one single grave practice, but rather reflective of various grave practices that developed locally or regionally

following local demands and preferences (*cf.* Skoglund 2025 for similar ideas). Schaefer-Di Maida *et al.* (2026), on the other hand, argues for a gradual adoption driven by a raise in mobility and, following, a more practical way to transport remains from individuals diseased away from the proper burial ground, not uncommonly children.

This paper puts the burial practices and the buried population of the Drottningtorp cemetery in relation to ancient road systems and its possibilities for exchange of both ideas and people. It explores the buried population and burial tradition from the Late Neolithic to the Late Bronze Age through multiproxy data. We here discuss continuity and discontinuity of burials at the site and propose that burial customs are an ongoing negotiation of ritual practices based in local/regional traditions and supra regional connections. This paper also provides examples of the use of state-of-the-art techniques for urn grave excavation and biomolecular analyses of cremated and un-cremated human remains, hence, reflecting the potential of substantial knowledge production within solid theoretical frameworks performed within current Swedish contract archaeology.

The Drottningtorp Cemetery

The cemetery consisted of two LN inhumation graves with poorly preserved remains, ten cremations from the MBA, and one from the LBA-Pre-Roman Iron Age (prIA) (Table 1). Radiocarbon dates from cremated bones and charcoal from the graves suggest that the most intense phase of the cemetery was in the MBA with a discontinuity of cemetery use from the LN to MBA and from the MBA to the LBA-prIA (Figure 4). No Early Bronze Age (EBA) graves were present within the cemetery; although, a single large (30 m in diameter) BA mound is present only 700 meters from the excavated area. The LN graves were located towards the westernmost part of the cemetery and

Table 1 (next page). Excavated contexts with human remains, chronological information, artefacts and osteological overview. Inhum.= Inhumation grave; Crem.= Cremations in pits; Urn= Urn graves. (P) and (O) denotes peptide and osteological sexing respectively. Adol=adolescent; Yad= young adult; Ad= adult.

Grave	Type	Colour/ temp	14C uncal. BP	14C cal. BCE (95.4%)	Dated material	Lab.no.	Period	MNI	Sex	Age	Findings & Comments
16564	Inhum.	-	3830±30	2452-2147	charcoal	Ua-82988	MNB/LNI	1	F (P)	17-25	slate pendant, shafthole axe, grindstone in fill
19420	Inhum.	-	n.a.	n.a.	typology	n.a.	LNI	1	M (P)	<17-25	Flint dagger type 1b
14399	Crem.	white/gray/ black	2863±29	1121-928	charcoal	Ua-82774	NBA III-IV	1	n.a.	>11-16	
14742	Crem.	white/gray	3097±30	1429-1277	burnt bone	Ua-82974	NBA II-III	1	n.a.	adol.-yad	
14762	Crem.	white- white/gray	3057±30	1408-1225	burnt bone	Ua-82975	NBA II-III	1	n.a.	n.a.	mostly head region represented
15546	Urn	white/gray	2874±30	1189-930	burnt bone	Ua-82976	NBA III-IV	1	n.a.	adult	
15620	Crem.	white	2934±30	1253-1016	burnt bone	Ua-82977	NBA III-IV	1	n.a.	>14-16	
15700	Crem.	white	2934±30	1253-1016	burnt bone	Ua-82978	NBA III-IV	1	n.a.	n.a.	mostly postcranium, poorly burnt in parts
18528	Urn	white	2916±31	1211-1014	burnt bone	Ua-82979	NBA III-IV	1	n.a.	adol.-ad	bronze awl, bronze button, bronze knife
18760	Urn	black-white	2404±33	742-396	burnt bone	Ua-82980	NBA V-prIA	1	n.a.	>14-16	
23774	Urn	white	2898±34	1211-987	burnt bone	Ua-82981	NBA III-IV	1	M? (O)	adult	bronze awl, pottery with nail imprints
Grave complex 18512											
18512	Crem.	white	n.a.	n.a.	stratigraphy	n.a.	NBA II-III/ IV	1	n.a.	>11-16	
Group 23931											
23931	Crem.	white	n.a.	n.a.	stratigraphy	n.a.	=/>NBAII-III		scattered bones, possibly disturbed		
24908	Crem.	white/gray	2999±35	1383-1119	burnt bone	Ua-82982	NBA II-III	1	n.a.	>14-16	most of the skeleton represented
26144	Crem.	white	3064±30	1412-1229	burnt bone	Ua-82986	NBA II-III	1	n.a.	adult	
26739	Crem.	white	n.a.	n.a.	stratigraphy	n.a.	NBA II-III	1	n.a.	adult	2/38 fragments, definitely human
Group 24920											
24920	Crem.	white	n.a.	n.a.	stratigraphy	n.a.	=/>NBAII	1	n.a.	n.a.	a few bones
24978	Crem.	white/gray	3140±30	1496-1305	burnt bone	Ua-82983	NBA II-III	1	n.a.	>11-16	bronze knife, tweezers, flint blade, bronze spirals; most of the skeleton represented
Group 25683											
24961	Crem.	white	n.a.	n.a.	stratigraphy	n.a.	NBA II-III	1	n.a.	n.a.	15 fragments, 2 definitely human
25683	Crem.	white	n.a.	n.a.	stratigraphy	n.a.	NBA II-III	1	n.a.	n.a.	44 fragments, 1 definitely human - grave?
26049	Crem.	white	3057±35	1410-1222	burnt bone	Ua-82984	NBA II-III	1	n.a.	>11-16	
Group 26120											
26120	Crem.	white	3062±32	1412-1227	burnt bone	Ua-82985	NBA II-III	1	n.a.	n.a.	

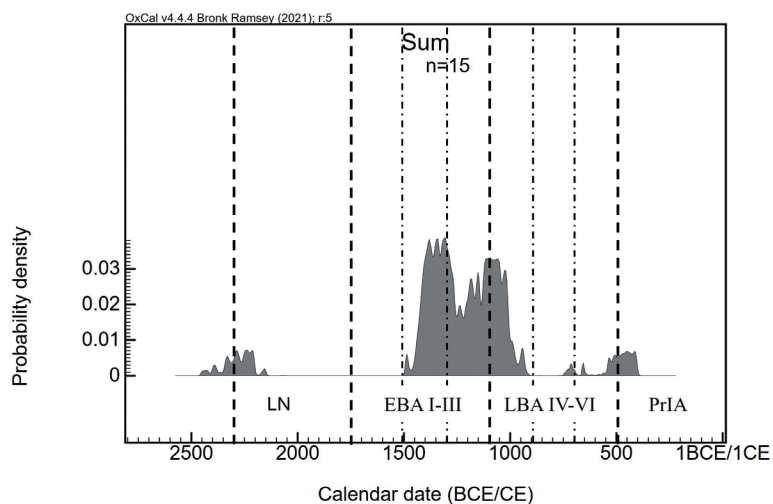


Figure 4. Sum plot of all radiocarbon-dated graves supports discontinuity from the LN-EBA II and from LBA IV-LBA VI/prIA (Sum plot: Anna Tornberg using OxCal version 4.4.4).

likely indicate that more LN graves are present outside the excavated area. Furthermore, we don't know the extent of possible destroyed graves; the excavation area was significantly disturbed from modern activities, such as tree plantation, house foundations and waste pits (Björk *et al.* 2025, 81).

Some BA cremations formed complex groups of cremation pits and layers, sometimes with spatial and stratigraphical relations between clusters of cremated bones (Table 1). Some of these contexts are diffuse and contain only few bones, especially osteologically identifiable as humans (Forsberg 2025). These contexts might rather reflect looted graves and/or bioturbation, the latter commonly documented during the fieldwork (Björk *et al.* 2025). Another possibility is that some, or most, pits should be interpreted as remains of funeral pyres. Arcini *et al.* (2007) provide examples of BA pyre remains at the closely located Gualöv. They argue that pyre remains are

often overlooked and misinterpreted as graves or bone deposits due to them being archaeologically diffuse (for experimental work see Henriksen 1991). What is generally left of the pyre is a rather shallow hole where the fill consists of charcoal, soot and ashes, and low amounts of small fragments of burnt bones from a limited anatomical region (Arcini *et al.* 2007, 146). This feature would correspond to the hole dug beneath the pyre for better air flow.

The two LN graves were quite different in appearance. Grave 16564 measured 4.08x1.77 m and was covered by a stone packing, while grave 19420 measured 1.89x1.01 m and lacked stone packing, although some smaller stones were found in the fill. Remains from at least one individual were found in each grave together with one half of a shaft hole axe and a slate pendant in grave 16564, and a flint dagger grave in 19420 (Figure 5). A radiocarbon date of 2452-2147



Figure 5. Slate pendant and shaft-hole axe from grave 16564 (left) and flint dagger in grave 19420 (right). The slate pendant is 7.2 cm and the dagger is approximately 12 cm long (Photo: Sydsvensk Arkeologi AB).

Grave	Contexts	Size	14C cal BCE (95.4%)	Period	Find
14742	14742, 17396	1.9x0.8	1429-1277	NBA II-III	Double button
-14762		0.6x0.3	1408-1225	NBA II-III	
-18512		1.74x0.7	n.a.	NBA II-III	
24978	24978, 24920, 24961, 25683, 26120, 26049	2.15x0.48	1496-1305	NBA II-III	tweezers, knife, flint blade
26049		2.3x0.65	1410-1222	NBA II-III	
15546*		0.38x0.38	1189-930	NBA III-IV	
18528		0.3x0.3	1211-1014	NBA III-IV	knife, double button, awl
23774		0.9x0.8	1211-987	NBA III-IV	
18760*		0.35x0.35	742-396	NBA V-prIA	
Pyre remains	Size	14C cal BCE	Period	Find	
14399		0.34x0.28	1121-928	NBA III-IV	
15620		0.6x0.6	1253-1016	NBA III-IV	
15700		0.43x0.43	1253-1016	NBA III-IV	
26144		0.5x0.3	1412-1229	NBA II-III	

Table 2. New interpretation of contexts, dates, measurements, and associated contexts. * marks graves that presumably have been dug into the pyre. () denotes features that are uncertain graves.

cal BCE (2 sigma) from oak charcoal (16564) corresponds to the transition Middle Neolithic B (MNB)/LNI but the finds are LN. The flint dagger in the other grave is of early type (1b) and dates the grave to the LNI (Apel 2001; Blank 2022; Lomborg 1973).

Cremated human remains were found in both pits and urns. There are several examples of BA period III cremation graves from Scania where the architecture of the grave resembles what would be expected from an inhumation grave, but where the remains are cremated and spread along the long-stretched pit (e.g. Arcini *et al.* 2007, 118; Strömberg 1975). One might argue that this is a transitional burial form, and, thus, older than the urn graves. At first glance, some small pit graves were of same date as the urn graves. However, there are reasons to believe that the grave types are more homogenous than what first appears. If we consider the morphology of pyre remains suggested by Arcini *et al.* (2007), it is likely that most, if not all, previously interpreted small pit graves are in fact pyre remains.

Four contexts – 14399, 15620, 15700 and 26144 – correspond to small sooty, ashy, and charcoal fills with small amounts of burnt bones from limit-

ed anatomical regions which would fit the definition by Arcini *et al.* (2007). Additionally, the complex grave group 18512-24920 relates to several layers of stones in the same cut with inclusions of burnt bones and might instead be reduced to one grave (24978) with intermixing between layers. This would in such case reduce the number of actual cremation pit burials to zero, or possibly one, context 14762 which is a pit that partly cuts context 14742 which is a distinct grave (Table 2). If context 14762 is excluded, all remaining graves without urns are of the human-size format. This interpretation reduces the total number of graves to between seven and nine, and with four pyre remains that are of similar dates as the graves. There are three pyre remains that date to the BA III-IV and one to the period II-III. This could indicate that all urns have associated pyre remains: two of the urns were plausibly placed in the remains of the pyre, while one pyre does not have an associated urn grave. The BA period II-III pyre also has a matching date in some of the distinct grave features. However, none of the pyres from the BA are located in the closest proximity of the certain graves and might therefore be associated with



Figure 6. Urn 18760, dated to the Pre-Roman Iron Age, in the sooty and charcoal-rich fill, probably remains from the pyre. Urn is still not visible. The feature was first interpreted as a hearth. Scale bar is approximately 23 cm in length (Photo: Sydsvensk Arkeologi AB).

graves that were not found during the excavation while the distinct graves are associated with undetected pyres. Another alternative is that the graves were not placed at the exact place of the pyre, but at some distance.

Except for urn grave 23774, which was dug through one of the grave-pit complexes (18512), the urns were found separated from other graves. They were of different kinds and sizes but urn 23774 is significantly different as it is covered with nail impression decoration. A bronze awl was found in this urn. Urn 18528 included several bronze objects – an awl, a double button, and a knife – while urn 15546 did not contain any artefacts. Urn 18760 differs from the rest of the urn graves due to its late date corresponding to BA period VI-prIA. The grave was also somewhat spatially separated from the other graves and probably buried in the pyre (Figure 6).

The Bronze Artefacts

The number of bronze artefacts retrieved from the BA graves is rather low and were found in only four graves, two urn graves (18528 and 23774) and two human-sized graves (24978 and 14742). Grave 23774 only included a bronze awl and grave 14742 a double button, while the two others contained several bronzes: a knife, tweezers, and bronze spirals in 24978, and an awl, double button, and a knife in 18528 (Figure 7 a-f).

Typologically, the only bronze artefacts that are possible to date are the knife and tweezers in grave 24978, and the double buttons in graves 14742 and

18528. The knife and tweezers in grave 24978 both point to an early period III date (Montelius 1917; Oldeberg 1974) which is relatively consistent with the radiocarbon date (1496-1305 cal BCE). The double buttons correspond to a period III button (grave 14742) and a period IV button (grave 18528). The typological dating also corresponds to the radiocarbon dates of the graves (1429-1277/1211-1014 cal BCE). A very similar double button with star ornamentation (period III) was recently found in a transitional period III high status inhumation grave in Dalköpinge, southern Scania (Andersson *et al.* in prep), however, the Drottningtorp button seems to be of lesser quality.

There are a couple of artefacts that are connected to each other; the double button and the knife in grave 18528 were placed in contact in the periphery of the urn. The last bronze object, an awl, was placed with some distance from the other objects. The connection between the double button and knife is interesting as double buttons are known for buttoning leather straps, such as belts or knife sheaths (*cf.* Bergerbrant 2007, 78). There are several examples from inhumation graves in Denmark where these types of buttons (although of earlier date) were found with the leather sheaths/belts still preserved (Aner and Kersten 1977). It is possible that the knife was still placed in a sheath, which was fastened with the double button in a belt that was wrapped around the knife when placed in the urn.

Material and Methods

The collection strategies needed to be adapted to



Figure 7. Bronze finds from Drottningtorp graves, one bronze awl from grave 23774 not depicted. a=double button grave 14742; b= double button grave 18528; c= knife grave 18528; d= awl grave 18528; e= tweezers grave 24978; f= knife grave 24978 (Photo: Maria Jensen, Lund University, Historical Museum).

fit the needs of each context due to the diversity of graves. Osseous remains from inhumation burials were hand collected after sieving as well as from block excavation in the laboratory. Uncontained cremated remains were hand collected from sieves as well as from floatation/water sieves in the laboratory and cremated remains in urn burials were collected as blocks and excavated in the laboratory through a microstratigraphic method following a CT scan (see below). Remains from a total of 22 contexts (graves and plausible pyre remains) were osteologically analysed, out of which two were inhumation burials. The urns themselves were also analysed with ICP and for lipid residues to gain insight in possible previous use and geographical origin of the vessels and clays (Brorsson 2025). The bronze objects also underwent XRF and lead isotope analysis to gain insight into metal composition and plausible origin (Bogh Jensen and Jouttijärvi 2025). All radiocarbon dates were performed

at Ångströmlaboratoriet, Uppsala University (for methods description see Björk *et al.* 2025, appendix 3).

All three urns were excavated with state-of-the-art techniques using CT-scanning, 3D visualization, and a microstratigraphic method. The CT-scanning was performed at the Scania University Hospital (SUS) in Malmö, Sweden. CT-scans and 3D modelling offer non-destructing ways of investigating and doing preliminary osteological analysis (*e.g.* Anderson and Fell 1995; Cavalli *et al.* 2015; Harvig *et al.* 2012; Higgins *et al.* 2020). Since the density between artefacts, bones, and the surrounding area in a burial urn is so similar, it requires manual segmentation of tomographic imagery (Higgins *et al.* 2020). We used the free open-source software platform 3D-Slicer (<http://slicer.org>) for visualization of the CT imagery, primarily as documentation and a visual guide during the excavation since manual segmentation is very time-consuming.

The urns were excavated in layers of approximately 3 cm. A microstratigraphic excavation offers potential for investigating internal stratigraphy, and, hence, the deposition sequence in well-preserved urns. This is not possible through more traditional approaches where the content has been emptied out and sieved (*cf.* Forsberg and Isberg forthcoming). The approach increases the chances of fruitful retrieval also of larger fragments and more cancellous parts of the skeleton which are more brittle and fragile. Colour and fractures of the burnt bones were registered to gain insight in under which temperature/-s the remains were cremated. Analyses of taphonomic markers related to the cremation event aids in the understanding of the ritual practice of prehistoric cremations (*e.g.* Walker *et al.* 2008).

Due to the poor state of preservation for both the inhumation and cremation burials, the osteological analysis focused on basics: assessment of number of individuals, age, sex/gender, and anatomical representation. Pathological lesions were registered if encountered. The inhumation graves only included fragments of enamel which limited the information that could be gained substantially.

The age in the inhumation burials (16564 and 19420) was assessed based on dental attrition following Brothwell (1981). The remains from cremation graves were age assessed through the degree of epiphyseal union of long bones according to data in Cunningham *et al.* (2016). Sex/gender was assessed based on morphological differences of the cranium (Buikstra and Ubelaker 1994) in the cremation graves and through biomolecular analysis of amelogenin peptides (Stewart 2017) for the inhumation graves. Amelogenin peptide analysis is a relatively new technique that has great potential to provide new understanding of sex/gender patterns in the past since it allows chromosomal sex estimation also in poorly preserved human remains. The method was developed by Stewart *et al.* (2017) and provides a minimally destructive and robust tool for identifying the sex/gender in human remains by acid etching of tooth enamel, either on complete teeth or fragments, and following identification of sexually dimorphic isomers of amelogenin peptides (strains of proteins) through mass spectrometry. The analysis was performed at the Archaeological Isotope and Peptide Research

Laboratory (AIPRL) at the Archaeology Department at Durham University and at the School of Pharmacy and Biomolecular Sciences, University of Brighton, United Kingdom following the Stewart *et al.* (2017) method.

We also employed bulk strontium isotope analysis of five individuals, two inhumations and three urn graves, to assess possible mobility. Strontium originates primarily in minerals from eroded rock; consequently, it reflects the type and age of the bedrock and overlying soils (Faure 1986). Strontium is incorporated in human and animal soft and hard tissue through ingestion of food and water throughout life. Since the level of fractionation, *i.e.* the change in strontium ratios throughout the food chain, is minimal between organisms (Bentley 2006), it is possible to detect mobility, *i.e.* a difference between the human value and the local baseline, if we can assume that humans and animals have been eating and drinking local products. This distinction is however only possible to make between areas that are geologically different with different strontium isotope baseline values. Scania is known to have similar geological conditions with similar strontium isotope values over large areas, which could mask mobility (*cf.* Ladegaard-Pedersen 2021). Different products also contribute differently to the incorporation of strontium; a marine diet, especially small fishes, can for example affect the strontium isotope signal unproportionally in relation to the actual marine input in the diet (Lahtinen *et al.* 2021).

We sampled only fully calcined cranial bones (cremations) and dental enamel (inhumations) since both are considered at low risk of contamination from the surrounding soil (Snoeck *et al.* 2015). We have compared our strontium isotope values derived from human skeletal tissue with baseline values previously published by Ladegaard-Pedersen *et al.* (2021). The samples were prepared and analysed at the department of Marine and Environmental Sciences, University of North Carolina, Chapel Hill, NC, United States.¹

Results

ICP and ceramic analyses

ICP-analysis of the grave urns shows that all urns

were produced out of local clay, or clay from a relatively close vicinity (Brorsson 2025). Overall, the urns are of local BA style, however, urn 23774 with nail imprints is somewhat special since most BA pottery is undecorated (if different surface furnish is not considered as decoration), however, still one of the most common MBA decorations (Eriksson 2009, 142-143). The urn type is spread over all southern Scandinavia as well as northern Germany (Eriksson 2009, 142); there are examples from e.g. Mälardalen, central Sweden (Eriksson 2009), Halland, southwestern Sweden (Lundborg 1972, 106-107), Hysstad in Norway (Wendelbo 2020, 430f), and Lusehøj and Voldtofte on Funen, Denmark (Jensen 1967, 100; Thrane 1984). The choice of vessels for burials was diverse – either on intentional or pragmatic grounds. Lipid analysis shows that at least one of the vessels (18528) was previously used for storing or cooking ruminant fat whilst the others bare no traces of lipid residues (Brorsson 2025). Interestingly, this is the urn that contained the highest number of bronze objects.

Metal analyses

The XRF analysis showed a trace element composition that clustered in three different groups where all but one item (an awl) was separated into two groups, one high-tin and one low-tin group. Two items each from the two large groups were selected for lead isotope analysis. Based on the lead isotope values in the bronzes, it seems as if the copper origins from two different sources, Sardinia and probably the southern Alps (Bøgh Jensen and Jouttijärvi 2025). Interestingly, the geographical origin of the copper is the same within one grave but differs between them. The knife in grave 24978 (period III) has Sardinian origin, while both the double button and the knife in grave 18528 (period IV) are of plausible southern Alp origin (or Sardinia). It is possible that this corresponds to a change in primary copper source trade networks from period II-III to period IV. Although Sardinian and other mediterranean copper sources have been suggested for some early BA bronzes by Ling *et al.* (2014), Nørgaard *et al.* (2021) argue that Scandinavian EBA bronzes with

mediterranean copper origin should be considered as re-casts of, or, imported objects from other parts of Europe rather than reflecting local trade networks directed directly to the Mediterranean. Copper from the Italian Alps has however been documented in several period II-III artefacts from southernmost Scania and comprise the main copper source starting at around the onset of the BA period II (Nørgaard *et al.* 2021).

Amelogenin Peptide Analysis

Amelogenin peptide analysis revealed that the two inhumed LN individuals correspond to a genotypical female in grave 16564 and a genotypical male in grave 19420 (Supplement 1). Both individuals died in their late teens or early 20s (Table 1). The size of grave 16564, twice the size of the other, might indicate that it originally included two individuals, but with the remains of the other individual being completely lost or represented by single teeth that have not been subjected to sampling for amelogenin peptide sex assessment. All teeth were collected from the sieve and might thus represent more than one individual. Therefore, it is not certain that the shaft hole axe and slate pendant is associated with the female.

Osteological analysis of cremations and urn excavation

The cremated remains from the BA graves were overall calcined, burnt at temperatures over 1000 degrees Celsius and severely fragmented. There were some instances where the fragments were burnt at lower temperatures (200-800 degrees Celsius) and thus were of brown-black-grey-blue colours, however, these fragments were low in numbers (Forsberg 2025). There was no obvious difference in colour between the cremation grave types, but the cremains from the urns were generally better-preserved regarding fragment sizes and anatomical representation, probably because they were better protected (Forsberg 2025). Another option is that remains in pit graves were collected differently from the pyre than those in urns.

The osteological analysis of the BA graves could unfortunately reveal little about demographic composition of the cemetery. However, the anatomical representation of the graves suggests that cremated bones were selected from the entire body and that only one individual was buried in each grave. Age could only be assessed through the degree of epiphyseal fusion. The method is imprecise since it can only provide estimates below or above a certain age. None of the cremated remains showed unfused epiphyses, which indicates that all individuals died above the ages of 11/14–16 years. Only one individual could be assessed osteologically to sex/gender, a probable male in urn 23774, and, only one individual, an adolescent or adult of unknown sex/gender in grave 24978, showed evidence of pathologies; three skull fragments exhibited a porotic surface indicative of *porotic hyperostosis* (anaemia).

The CT scan and microstratigraphic excavation of the urns enabled better resolution of the placement of artefacts in the vessels as well as the fragmentation and positions of skeletal elements. The excavation revealed that all artefacts were placed on top of the cremated remains, and, hence, were placed in the urns as the last activity before covering the urns with soil. Some of the cremated remains were found in rather large fragments but were brittle. The methodology, including solidifying very fragile remains, enabled the extraction of much larger bone fragments for analysis than would be possible with more traditional excavation techniques (Forsberg 2025). The urn 23774 also provided insight into the collection and deposition of the human remains from the pyre. Skull bones were found intermingled with other elements in all arbitrary spits of the urn ($n=17$), showing that the cremated remains were not collected and deposited in anatomical order (Forsberg 2025, 290).

None of the graves provided any identified animal bones, hence, no animal carcasses seem to have been put on the pyre in addition to the humans. Some of the graves, however, only included a few fragments that could be assessed to species and could therefore include animal bones. Still, if present, at least single bones should be attributable to animals, especially in the relatively well-preserved urn grave 23774. The plausible lack of animal bones in the graves is somewhat peculiar since

fragments from livestock, especially lamb/sheep, are commonly found in BA cremation graves (*cf.* Arcini *et al.* 2007; Sabatini 2022). In the nearby Gualöv, livestock (lamb and occasional dogs) was found in 25/44 contexts related to burials (including pyre remains) (Arcini *et al.* 2007, 122), and in Simris, lamb and sheep (and occasional pig, one moose and one horse) were found in 20 out of 68 contexts (Sabatini 2022, 129–132). It seems as if animal bones are primarily associated with urn burials. In Simris only 3/25 (12%) of the urn-less pit graves contained animal bones, the number for urn burials was 17/40 (42.5%) (Sabatini 2022, 129–132). It is possible that the lack of other species in the Drottningtorp graves represents local burial traditions and other ritual activities than that of Gualöv and Simris, but it might also be an effect of the low sample size.

Strontium Isotope Analysis

Bulk strontium isotope analysis was conducted on the two LN individuals (one male and one female) and three individuals from BA urns (one plausible male, two indetermined sex).

The strontium isotope values of all individuals correspond to the local values defined by Ladegaard-Pedersen *et al.* (2021). The individuals in urns 18528 and 23774 exhibit very similar strontium isotope values while the third urn burial provides somewhat lower values. The two graves with very similar, higher, strontium isotope values are also the only two urn graves with preserved bronzes. The LN individuals show strontium isotope values that differ with 0.0034 which might indicate different backgrounds of the two individuals even if both values are within the local baseline (Table 3, Figure 8). It should be noted that the individuals in the LN graves correspond to Sr-values attained

Grave	Sr value	$\pm$ (1s%)	$\pm 2s$ abs.
A15546	0.713026	0.0007	0.000009982546
A18528	0.7155	0.0011	0.000015741264
A23774	0.715897	0.0006	0.00000859092
A19420	0.714629	0.0007	0.000010004988
A25326	0.711231	0.0006	0.000008534928

Table 3. Strontium isotope values with uncertainties.

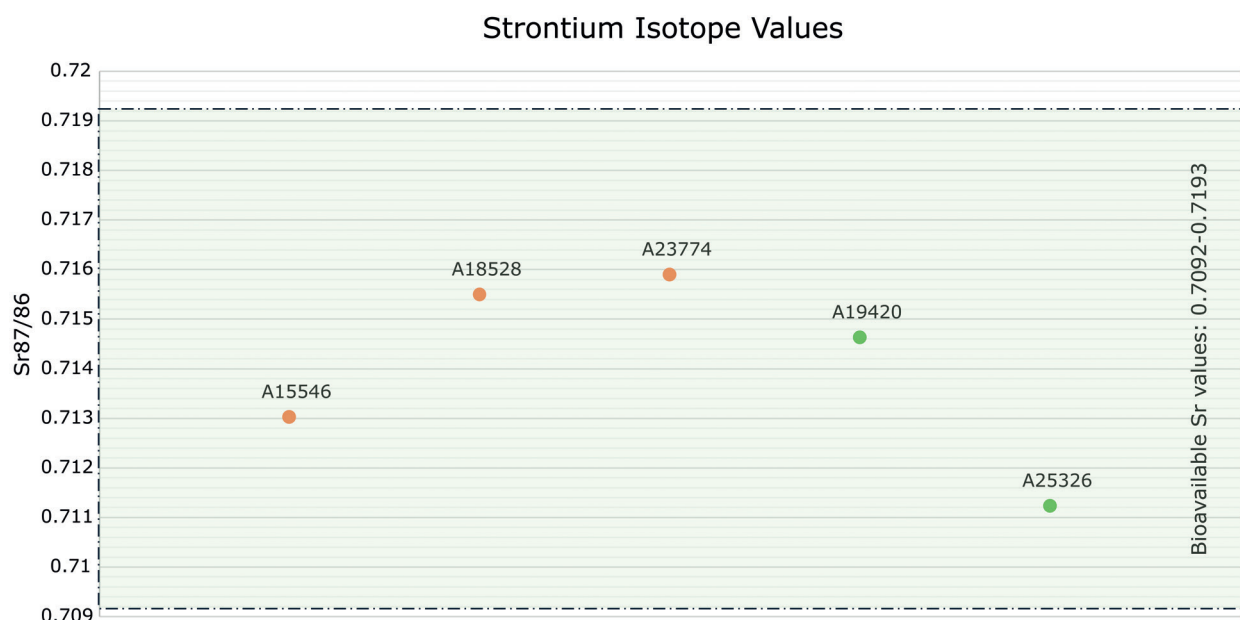


Figure 8. Strontium values of the individuals under study. All values are within the local bioavailable baseline (0.70918-0.71930) suggested by Ladegård-Pedersen (2021). Green=Late Neolithic, Orange=Bronze Age urns.

in childhood (dental enamel) while the MBA cremations correspond to the average of the living space over the last 10-20 years of life (burnt bone), hence the latter being more mixed and more difficult to interpret.

Discussion

Although the human remains in both the Late Neolithic inhumations and the Bronze Age cremations were of poor preservation, the multiproxy approach to understanding the Drottningtorp cemetery and the people buried there, have yielded interesting results regarding both burial practice and networks. Unfortunately, the bone preservation was too poor for in-depth demographic analysis, but it can be concluded that young children are missing at Drottningtorp. Kaul (referenced as personal communication in Walsh and Reiter 2024) argues that children were accompanied by adults in BA Scandinavian graves because of a belief that they needed a guide on their way to afterlife, as exemplified by the Egtved burial with a cremated child and a young female inhumation. That children are missing in Drottningtorp could either be a result of taphonomic processes, differences in burial customs between adults and children, or that the children were

buried elsewhere. It might also just be an effect of the relatively low number of graves that were excavated.

Chronology and grave architecture

The dates show that there is a clear hiatus in the earliest BA. The cemetery was established in the LN but only represented by two graves. As provided in the introduction to the site, it is plausible that more LN graves are present outside the excavated area. This area might also contain early BA flat earthen graves since there are several examples of EBA graves at the same site as LN graves in Scania (*c.f.* Törnberg 2018).

The human-sized graves are rather early, pointing to late BA period II-early period III date. Since cremation practices are usually considered to begin after 1300 BCE/period III (although present also in period II), these dates might point to an earlier local change in burial customs in this area than what is more commonly observed (Figure 9). The risk of “old wood-effect”, that the dates might come out as older than they are (Olsen *et al.* 2013; Rose *et al.* 2020), has been considered, and could have had some effect on the dates, however, the bias seems to be rather low in fully calcined bones (*c.* 50-100 y).

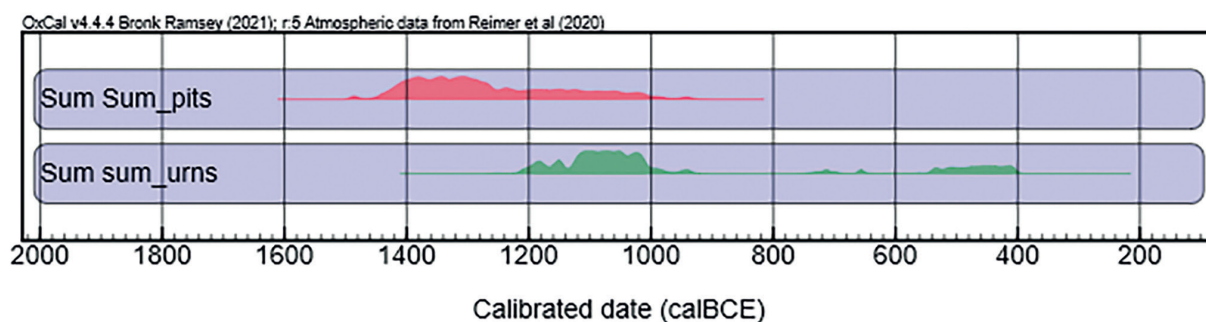


Figure 9. Sum plots of cremation pits, including probably pyre remains, and urn graves in Drottningtorp. Crem: $n=10$; Urns: $n=4$ (Model: Anna Tornberg using OxCal version 4.4.4).

Burial Rituals

Drottningtorp is revealed as a combined ritual and mundane site that is strongly influenced by the local environment with the wet and dry lands as the main prerequisites for the spatial distribution of activities. The mundane and rituals spheres (although not necessarily distinctly separated by Neolithic and BA people) are spatially separated but still in proximity to one another, the settlement in the west and the cemetery in the east. Except *e.g.* pits and hearths, the settlement comprised remains from three or four longhouses dated to LNII-EBAI and two farm phases from the LBA period V-prIA (Björk forthcoming; Björk *et al.* 2025). There are no houses corresponding to the BA period II-IV in the excavated area, however, due to the trench being narrow, it is possible that these periods are represented by houses outside of the excavation boundaries (Björk forthcoming). The cemetery has been in use on at least three different occasions: the LN, the MBA, and the transition LBA/prIA. This supports both a continuation of practice and hiatus. The main usage time is in the MBA when most cremations were established. Peculiarly, this is also the time where there is a lack of mundane activity. This denotes a continuous perception of where graves were to be established (although with a hiatus in the earliest BA) while preferences for where to build houses changed. It is possible that the change of house construction sites in the MBA relates to changes in agropastoral organization, going from communal to family-based herding (*e.g.* Forsberg 2026; Kristiansen *et al.* 2018).

The ritual behaviour in Drottningtorp could also be addressed through microstratigraphic ex-

cavation of urns together with CT-scans. The method allowed us to detect that remains from all anatomical regions were intermingled, showing that they were not collected from the pyre for example from head to toe (Forsberg 2025). This pattern is in contrast with what is described by Flohr Sørensen (2014) for period II-III cremation graves in Denmark but in line with the depositional pattern in six later urn graves, that underwent similar examination as ours, reported by Harvig *et al.* (2012). It is possible that the discrepancy between cases depends on a changed idea of how to deposit cremated remains between the EBA and LBA, related to a change in preferred container of remains from cists in the EBA to urns in the LBA. The depositional data of the EBA cremation graves in our case is not detailed enough to allow comparisons with the Danish data. It is likely that the remains were first stored in a temporary container before being buried, perhaps in the ritual houses. It is noteworthy that none of the cremation graves included animal bones – this seems to be a highly local phenomenon. Maybe the absence reflects differences in economy och social status, maybe a more agriculturally rather than pastorally based society?

The first cremations in Drottningtorp are early, plausibly of BA period II date where inhumations are the most common burial practice. What these early cremations imply is difficult to assess and might also be an artefact due to possible “old wood-effect”. However, following the argumentation from Oestigaard and Goldhahn (2006) and Reiter *et al.* (2021), it might also imply that the population of Drottningtorp had some of their allies far away, hence making cremations more practical (see below). The results from the strontium

isotope analysis provide little insight into these possible networks. All individuals subjected to mobility analysis gave results within the local bioavailable baseline values. The bioavailable strontium values of Scania are however very homogenous, and the lower values could be found in most of Scania, and all of Denmark, including Bornholm (Frei *et al.* 2022; Frei and Frei 2013; Ladegaard-Pedersen 2021) while the higher values can be found in e.g. Småland and Västergötland (Kjällquist and Boethius 2026). There are however differences between the values; two of the urn burials provide very similar strontium values, while the third urn differs somewhat. It is possible that this individual does not share the geographical origin of the other two and this urn is also of later date. The same goes for the LN individuals who seems to have come from different places; here, the female individual has lower values than the male. The plausible male in urn burial 23774 was equipped with a bronze awl and buried in a vessel covered with nail imprint decoration 23774. One of the other two urn graves (18528) also contained an awl, a button, and a knife fragment, all in bronze. Bergerbrant (2007, 132) argues that awls, as well as daggers, arm- and finger rings, pins, fibulae, and double buttons are unisex grave goods. The presence of an awl in urn 23774 where the sex is estimated to be male, could point to a male sex/gender also in urn 18528 if there are local gendered burial traditions but the data is too scarce for conclusions. The last urn grave (15546) that underwent strontium isotope analysis did not contain any surviving grave goods. The male LN individual clusters well with the urn graves with awls (one osteologically identified as probable male). These individuals might reflect the absolute local area around Drottningtorp. Given previous examples of female exogamy in Neolithic-BA northern Europe (*cf.* Knipper *et al.* 2017, Mitnik *et al.* 2019, Seersholm *et al.* 2024, Sjögren *et al.* 2020), the differences in strontium isotope ratios between sexes/genders might align with female exogamy in the LN and possibly in the BA also in our case. However, due to the low number of samples, this should be considered merely as a hypothesis. Some of the artefacts found in Drottningtorp are very frequent in Bornholm and seems to have higher distribution on the Scanian south and east coast

than on the west coast, especially in combination. This might imply networks involving Bornholm, perhaps spreading northwards by sea, and into Drottningtorp and northwards by a combination of land- and water-based communication.

Identifying funeral pyres

Remains from funeral pyres are, like ritual houses, significantly under-reported. Arcini *et al.* (2007, 118-119) argues that the reason that archaeological excavations rarely have been able to identify pyre remains is because there has been a misconception that funeral pyres were communal and established some distance apart from the cemeteries. Henriksen (1991; 2016) provides experimental data that supports that the pyre is visible but, in parts, difficult to detect. His study also shows differences between the newly burnt pyre and what normally is archaeologically detected which he argues to be caused by human post-cremation activities (Henriksen 2026). The new interpretation of the cremation contexts in Drottningtorp adds to the corpus of plausible cases of pyre remains present near the graves. Like the situation in Gualöv (Arcini *et al.* 2007), the pyre remains in Drottningtorp match the dates of the distinct graves, although the preservation in Drottningtorp was too poor to allow matching of pyre remains with specific graves. New analyses of cremation contexts in Simris, southeastern Scania, have addressed that some of these should probably be regarded as pyre remains instead of graves (Sabatini 2022). Sabatini (2022) also put forward that a stone packing in the cemetery could have been a ritual house. The re-interpretation of some of the Drottningtorp cremation pits as pyre remains reduces the variation in grave types at the site; the tradition in BA period III is cremations in a human-sized pit and, from period IV and forward into the prIA, in urns. This is in contrast with the heterogeneity in MBA-LBA cremation practice reported by Reiter *et al.* (2021). In their analysis of early cremations in Denmark, they have found a large variety of practices, suggesting local negotiation of ritual behaviour. BA period III is clearly a transitional period where the use of human-sized cremation pits strongly binds these early cremations to

previous and contemporaneous inhumation practices – *i.e.* the size and outline of the grave as well as the grave goods – but with different ways to handle the dead body. It is somewhat unclear what the difference in preference depends on. Reiter et al (2021) and Oestigaard and Goldhahn (2006) explores the possibility that turning towards a cremation practice might indicate more complex and far-reaching social networks. Oestigaard and Goldhahn (2006) argue that the death of a leader is also a time where power needs to be renegotiated, hence, there is a necessity to gather allied partners for the funeral. Cremation would allow “storing” of the remains for a prolonged period until all parties could be gathered, an option more difficult with a decomposing body. Based on e.g. strontium isotope analyses, the work by Schaefer-Di Maida *et al.* (2026) also put forward the adoption of cremation practices as linked to higher levels of mobility; a more convenient way to transport the remains of someone diseased far from home. However, a more conventional explanation is that it couples with a change in religious beliefs, *e.g.* that the soul (at least one soul) is easier set free (*cf.* Kaul 2004). It is plausible that such a drastic change would have had both practical and religious reasons.

Distribution of Typological Elements in Scania

The decorated double button and the knife with framed shaft provide some typological traits that can be explored in further detail in relation to geographical distribution. A compilation of similar finds in Scania based on the catalogue in Andreas Oldebergs seminal work (1974) shows that both finds primarily clusters along the coast in south Scania (Figure 10). A total of 27 similar knives and 21 double buttons were part of the catalogue, of which 18 knives and 11 double buttons are found along the south coast from Malmö in the west to Österlen/Simrishamn in the east. Interestingly, similar types of double buttons and knives were found in the same context in eleven cases, clustering in the area around Österlen and in the few cases of these finds in northeastern Scania, the area around Fjälkinge/Drottningtorp. The combination of these artefacts at the same site seems

to be more common on the Scanian east coast than on the west coast, although, as single finds, these are more widespread. This situation might imply specific ideas that are local, and/or different networks that were organized along the eastern coastline, plausibly by boat, perhaps connected to the islands of Bornholm and Zealand, where both similar knives and double buttons are frequent. Aner and Kersten, in comparison, provide 24 examples of knives and six double buttons of similar types as those in Drottningtorp on Bornholm (Aner and Kersten 1977) and eight knives and 17 double buttons in Holbaek amt in NW Zealand (Aner and Kersten 1976). Knives seem to be more frequent on Bornholm while the double buttons are frequent in NW Zealand. The possible connection to Bornholm seems reasonable depending on the very close proximity from the south Scanian coast. Considering all find categories, one grave in Österlen (Oldeberg no 766) has a combination of finds – urn, knife, double button, and awl – that is identical to the combination found in Drottningtorp grave 18528.

Roads to Networks

Supra regional network approaches (*cf.* Kristiansen 1998; Kristiansen and Larsson 2005) are valuable and helps position local attributes in a wider perspective. At the same time, only investigating general patterns fails to provide the nuances present in the past, and can, in the long run, limit what is known about variability. By a local multiproxy approach, we can instead provide a deep-study of features and patterns in one site in relation to the local/regional landscape. This approach provides a better understanding of local and regional variations and how rituals, such as burial customs, were negotiated within both the local and supra regional arena.

It seems clear that the placement of both the LN and the BA graves is highly dependent on the local environment, where the elevated long-stretched area with graves are flanked by marshlands, hence, also inevitably being the only route that you could travel inland. The marshlands might also have been used for ritual activities other than burials; wetlands

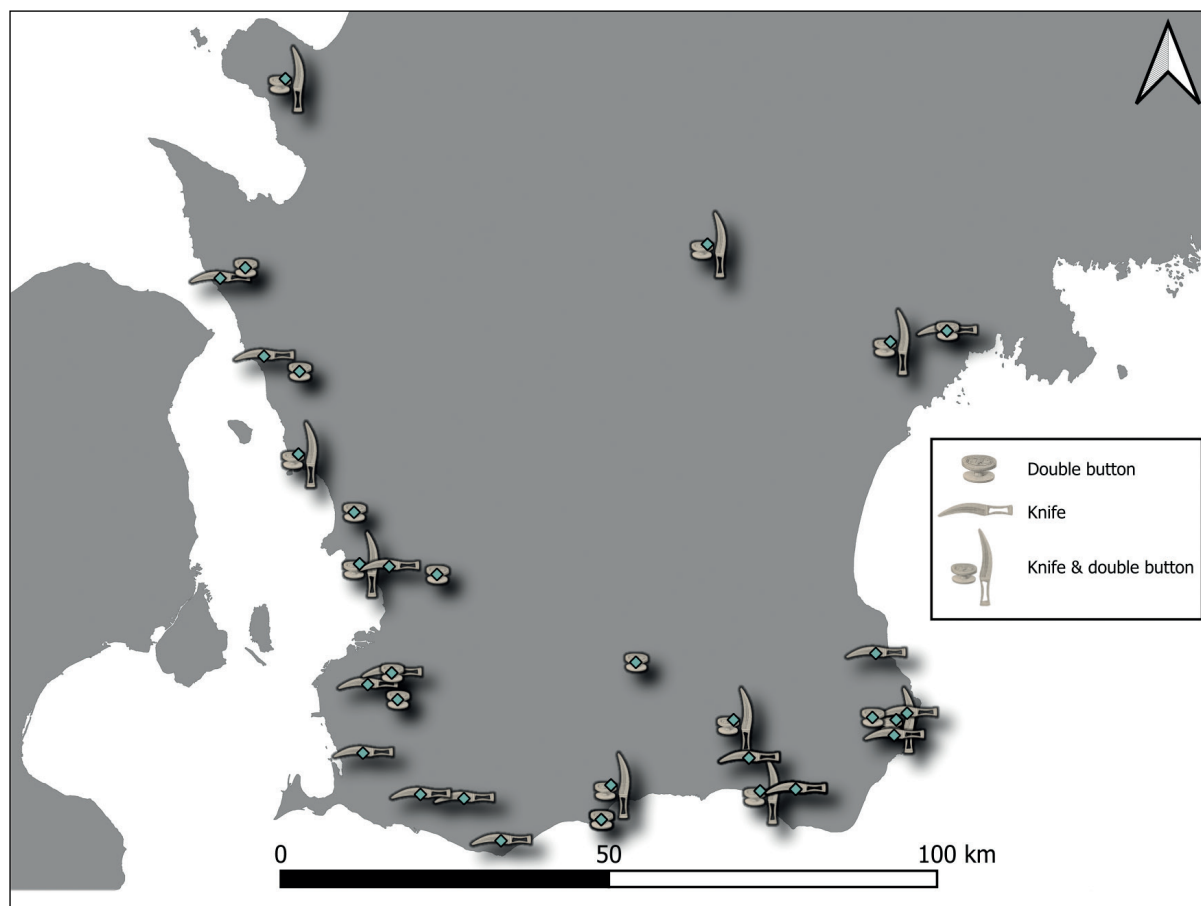


Figure 10. Distribution of knives with framed grip and double buttons with star ornamentation of the same types as found in Drottningtorp. Each green dot represents one locality, and the red star represents Drottningtorp site. The data comprised from Oldeberg (1974) and the Drottningtorp finds are not plotted. The combination of the two finds is more common on the east coast. “Knife and double button” represents finds within the same grave (Figure: Daniel Forsberg).

have often been used for ritual deposits both in the Neolithic and in the Bronze Age (*cf.* Berggren 2010; Larsson 1986). Surely, this has made the site a special place. However, presence of both LN and BA graves at the same site is common in Scania, and there are several known examples (*cf.* Hansen 1924; Tornberg 2018), especially from southern Scania where excavations have been performed to a higher extent. It is likely that this situation represents a similar favouritism for grave milieu, not unlikely linked to prehistoric roads where cemeteries – which probably included other activities than only occasional burials – would be easily reachable for participants from near and far. The graves, which were probably originally marked above ground (for examples, see Rudebeck and Ödman 2000, 152; Sabatini 2022), could also function as markers of territories or be adorned by passersby. Graves seem to have been constructed by ancient road systems from the Neolithic forward and have thoroughly

been examined by Klassen (2014) in relation to palisade enclosures (*cf.* also Andersson and Wallebom 2013 for Scanian examples).

The cemetery is complex, especially in the MBA, and seems to be inclusive of at least two different types of cremation graves (chronology dependent), remains of funeral pyres, and, hypothetically, two ritual houses. Maybe it should be seen as a ritual arena by the road rather than a cemetery only. The structure of the cemetery has similarities with the closely situated Gualöv (reachable by the road that now is E22), where several pit and urn cremation graves were combined with grave-specific pyre remains as well as structures from ritual houses (Arcini *et al.* 2007). The road that follows the same stretch as the E22 today, seems to have been an important route for spreading ideas and people in the BA (and probably in other periods as well). Recent years’ archaeological excavations with broadening of the E22 in Blekinge, on the

east coast north of Scania, have revealed similar complex BA cemeteries with graves and ritual houses (e.g. Strandmark and Arcini 2021; Åstrand *et al.* 2026). The ritual houses are enigmatic but seems to have been a general south Scandinavian tradition. They are clearly linked to the graves by their proximity to the burials and overall presence at the cemetery, although not in itself constituting a grave. Their function is unknown, but they have been thoroughly explored by Victor (2002) who also links them to BA house urns; they were different expressions of the ritual and cultural idea of a house (cf. Skoglund 2005 for similar ideas about BA ships). Although being placed at a communication route, the site lacks graves from the earliest BA, however with a mound situated only some hundred metres away. The phenomenon of EBA graves being placed outside of the settlement area is known from southern Scania (e.g. Edenmo 2000) and might be a result of the large area of arable land that is necessary for the construction of mounds; it is not economically suitable to live close to these constructions.

Although similar, the cemetery in Gualöv seems to include graves of higher social status than those in Drottningtorp. This is indicated by high-status adornments, e.g. an *oath ring*, which might imply a regional ruling echelon in Gualöv and local chiefs or commoners in Drottningtorp (cf. Kristiansen 2013). The ICP analysis of the urns in Drottningtorp supports that the ceramics were produced locally while the trace element and lead isotope analysis support different origins of the bronze objects, Sardinia and southern Alps. There seems, however, that bronze artefacts within one grave have similar copper origin while it differs between graves which could be an effect of different chronology. The quality of the bronze work was rather low, maybe reflecting local production/re-production. Recasting of older metal objects is well-known from the Scandinavian Bronze Age and would not destroy the isotopic signature of the original copper origin, if not mixed (Matta and Vandkilde 2023, 10; Nørgaard *et al.* 2021). That the metals have share origin within the burials is in contrast with analyses of the Ølby grave where there were differences in copper origins between objects (Reiter *et al.* 2019). The same pattern is seen in a newly excavated rich mound burial from southern Scania (Andersson *et*

al. in prep.). Perhaps differences within one grave points towards broad networks, maybe favouring exotica, while similarities within graves points to current common trade routes and graves of lower status. As such, the differences in the composition of bronzes in Drottningtorp might reflect changes in regional networks rather than in complexity of international trade.

Conclusions

In this paper we add to the corpus of available data that supports that cremation pyres were grave specific and located within the cemetery, and not communal and located elsewhere. The reinterpretation of some of the features from cremation grave pits to pyre remains shows that, in the Drottningtorp case, there are only two distinct cremation grave types, which clearly are chronologically separated; human-sized pit graves in the BA period II-III and urn graves in period IV and forward. The location of the cemetery is plausibly connected to a prehistoric intersection where the favourable position in the landscape serves as explanation for the long continuity of both houses and graves. The direct link to the Baltic coast is visible through the composition of bronzes in the graves as similar finds are concentrated to, and distributed along, the south and east coast of Scania. Drottningtorp might, due to its position, have been an important ritual and social site on the road between the Baltic and the aristocratic farms in Gualöv, although itself not a high elite milieu. Despite the placement at an intersection, all human remains provided strontium values within the local baseline, however, the baseline is broad and homogenous over large areas. There is variation within the human values, indicating that all of them might not originate from the absolute local environment. Tentatively, the sex/gender distribution herein might be indicative of female exogamy in the Late Neolithic and perhaps also the Middle Bronze Age, but the sample size is too small to allow conclusions.

Funding

The authors declare that financial support was received for the research, authorship, and/or publication of this article. The authors declare that the research conducted for this study was part of an archaeological excavation project, commissioned to Sydsvensk Arkeologi AB, through the competitive bidding process of Swedish contract archaeology system. The project has the no. 431-12391-2021 appointed by the Regional County Administrative Board (Länsstyrelsen). The funders were the Swedish Transport Administration (Trafikverket) and the Swedish National Heritage Board (Riksantikvarieämbetet). The funders was not involved in the study design, collection, analysis, interpretation of data, the writing of this article, or the decision to submit it for publication.

Acknowledgements

We would like to thank Skåne University Hospital (SUS) for the collaboration and help with CT-scans

of the grave urns and Anton Uvelius for help with site plans and GIS support. We would also like to direct our gratitude towards the two anonymous reviewers for their insightful comments to improve the manuscript.

Declaration of interest

All authors approved to participate in this paper. All authors approved publishing the results of this study. The authors declare no competing interests.

Notes

- 1 The strontium isotope analysis report is missing, and the methods can therefore not be given in detail. For a description of sample preparation and analysis protocol from the same laboratory, we refer to Macheridis, S., Sandstrom, M., Svensson, A., Wilhelmson, H., Berggren, Å., and Wranning, P. (2024). Preliminary strontium isotope ($^{87}\text{Sr}/^{86}\text{Sr}$) baselines for the Bjäre Peninsula and Halland in southern Sweden. *Frontiers in Environmental Archaeology*, 3, 1379055.

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Supplementary Material

Material see also .pdf-attachment on the website

Table captions:

Table 1. Amleogenin peptide result from male in grave 19420 with peaks showing presence of both X and Y peptides.

Table 2. Amleogenin peptide result from female in grave 16564 with no peak for Y chromosome peptides.