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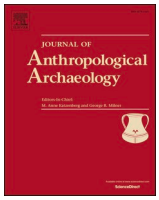

Contrasting strategies: Social organization and interaction in the Early Bronze Age of northwestern Scandinavia

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ABSTRACT

The transition to the Nordic Bronze Age included new technological innovations, social institutions and socio-political structures pushed by extensive long-distance exchange of metals and other exotica. However, traditional views often oversimplify this as a simple two-way trade system, failing to adequately explain the complex interactions in and between the regions like Scandinavia in which the societies organised themselves based on varied strategies tied to local resource potentials. Recent research, involving methods such as isotopic analysis and genomic sequencing, has provided solid evidence of movement and interaction. Despite this progress, the evidence at hand often lacks well-founded interpretations grounded in thorough theoretical frameworks. This study addresses interpretive challenges by employing an innovative framework grounded in collective action theory, integrating other aspects of social complexity and supported by regional datasets to achieve a more nuanced understanding of social dynamics. This approach informs us about the complex and contrasting organizational strategies and trade networks across northwestern Scandinavia (i.e. modern-day Norway up to the borders of Troms), illustrating further how local societies contributed to broader European networks. The study aims to offer a nuanced understanding of the region's social dynamics, highlighting the interplay between coercive and cooperative strategies within the overarching Nordic Bronze Age system.

1. Introduction

The Early Nordic Bronze Age (1700–1100 BCE) is frequently portrayed as a region of intense contact and interaction over large areas moved by the demand of metal (e.g. Vandkilde 2016; Kristiansen 2017a; Ialongo and Lago 2024) (Fig. 1). Although this undoubtedly explains part of the picture, there has been a tendency to model the region's impetus for metal and level of sociopolitical complexity through a functionalist lens. Driven by a simplified two-way trading system based on single resource flows in exchange for metal; be it amber, hide, or fur. Taken at face value, such a system is not able to adequately explain the complex interaction patterns that can be seen across the region, in particular the Scandinavian Peninsula that maintain highly diverse organisational strategies and resource potential based on its coastal landscape (Prescott 1991; 1992; Prøsch-Danielsen et al. 2018).

For the Nordic Bronze Age, interaction and trade have been among the most prominent research themes, already showcased by Montelius' (1885) cross-dating and *ex oriente lux* hypothesis. This theme was later discussed more explicitly by researchers during the 70 s and 80 s (e.g. Randsborg 1974; Bakka 1973; Thrane 1975; Johansen 1983; Kristiansen 1987) and has gained renewed interest in the last decade through an explicit maritime focus (e.g. Earle et al. 2015; Ling and Toreld 2018; Prescott et al. 2018; Wickler 2019). This has been ushered by the introduction of high-profile interdisciplinary research. In particular, mapping the life history of individuals through isotopic analysis (Frei et al. 2019), genomic sequencing of larger populations (McColl et al. 2024) and isotopic sourcing of metals (Ling et al. 2013; Ling et al. 2014). This research has produced data indicating that movement and interaction played a key-role in this period. The rapid development and application of methods from the natural sciences has allowed us to move away from simply hypothesising about prehistoric interaction and trade to present it through tangible evidence. This, however, has led to a resurgence of naive positivism, where evidence is frequently accepted as is, while the theoretically grounded foundations for explanation are

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often overlooked. It should also be emphasized that the regions used as proxies for interaction and trade during the Nordic Bronze Age have been selected on somewhat biased grounds, with a focus on metal-rich southern areas such as Denmark and southern Sweden (Vandkilde 2016; Kristiansen 2022). This issue is further complicated by the exclusion of large areas in northern Scandinavia, and even some areas of south, such as Schleswig-Holstein, where archaeological data is less amenable to laboratory analysis of metals or human remains. The latter limitation is largely due to natural conditions in these regions, which result in poor preservation of biological materials.

Consequently, this creates a rather skewed picture of interaction patterns in Europe. Identifying and explaining interaction and trade between different social groups across large areas is thus seen as major interpretive challenge in the current Bronze Age debate.

To respond to this challenge, we will implement a novel theoretical framework based on collective action and maritime travel (Blanton and Fargher 2016; DeMarrais and Earle 2017; Lund et al. 2022; Ling et al. 2022; Kanne et al. 2024). Understanding the dynamics of social complexity offers critical insights into how these interactions were organized and maintained, particularly in the context of extensive maritime trade. To explore these dynamics, we turn to the concept developed by Ling et al. (2018), known as the 'Maritime Mode of Production' a theoretical concept that we argue harmonizes well with collective action theory. In the following section, we will explain and expand on this concept, further refining our ideas by drawing on a substantial corpus of publicly available datasets compiled from national databases, published reports, and catalogues. The theoretical framework allows us to discuss social variation and interaction between local societies with different types of social and political strategies (Austvoll 2021). The datasets will permit us to identify said groupings or clusters

Fig. 1. An approximate distribution of the Nordic Bronze Age. Case study (northwestern Scandinavia) delineated with lines.

based on spatial analysis (e.g. Maddison and Schmidt 2020) and their connections through an effective use of the seaway (e.g. Bengtsson et al. 2025). By integrating these elements, we believe it will be possible to explore how Bronze Age societies at the edge of Europe managed to interact not only between each other but also partake and actively contribute to the grander European trade networks of its time.

By specifically looking for variation in social organization and tangible evidence for trade, the paper aims to reiterate existing knowledge of movement patterns and sociopolitical variation on the Scandinavian Peninsula in the Bronze Age, as well as broaden the linkage with European trade networks of the period. Lastly, with a developed theoretically model we outline how concurrent societies actively responded, engaged, and developed through each other's benefit.

Prior studies about the organizational practice in the Nordic Bronze Age point to great variation (e.g. Prescott 1999; 2005; Oma 2020b; Ljunge and Wehlin 2022; Sand-Eriksen 2025b; Melheim and Nørgaard 2025). Traditional archaeological data used to discuss social organization often employ structures such as burial mounds and houses (Earle 1997; Earle et al. 1998; Kristiansen 2002). However, these questions are often approached from a case-based perspective, relying on regional data or even single sites (e.g. Myhre 1979; Myhre 2004; Bech and Rasmussen 2018). In contrast, this study utilizes comprehensive datasets that include metals, burial and house structures recorded across the entire region. We approach these datasets through spatial analysis that provides a unique opportunity to identify more general patterns of social organization and uncover significant connections and variations.

In addition to these archaeological features, the analysis also explores trade patterns. Trade networks can be identified based on the presence of specific objects that indicate wider spheres of interaction. Apart from metal items, we explore trade through various themes or specific sources that we believed would have been important components of the trade economy (e.g. Olsen 1976; Callanan 2013; Hjelle et al. 2016; Nyland 2020; Earle et al. 2022).

By combining the examination of metals, burials and house structures with the exploration of trade networks, this study aims to shed light on the social dynamics and economic relationships within our case study of northwestern Scandinavia (i.e. modern-day Norway up to the borders of Troms), and how this region both shapes and is shaped by processes beyond its borders. Moreover, the utilization of comprehensive datasets will enable a more holistic understanding of the cultural landscape.

Based on the above outline we postulate the following:

- Bronze Age societies organised themselves based on varied strategies tied to local resource potential.
- Societies at certain nodal points along the coast were able to strategically utilize the local landscape and accumulate large resources used for individual gain, an economic concept often referred to as 'rent-seeking'.
- Variations in sociopolitical strategies were tied to the ability to build and crew boats for long-distance trade and exchange voyages that integrated societies on the Scandinavian Peninsula with a broader Pan-European exchange system.

By addressing these postulates, we argue that a re-evaluated synthesize can be presented that dynamically incorporate the material from northwestern Scandinavia into more wider European trading networks.

2. Current status and theoretical considerations on social organization and interaction

The present Bronze Age debate on social organization and interaction has become more polarized over time. A science-based epistemology (Frei et al. 2015; Kristiansen 2017b; Ling et al. 2019) has evolved alongside more materiality-focused interpretations of the past (Sørensen 2015; Fowler 2017; Sofaer et al. 2020). Both discourses are seen as beneficial to the study of movement and social organization in prehistory, however, the definition of scale is an important component that needs to be considered. By directing our focus to large-scale (top-down) perspectives, certain factors that are not as relatable or visible in local small-scale studies become significant, for instance, population fluctuation – or other oscillating patterns. On the other hand, top-down perspective are less precise, and ecological and geographical restriction and/or opportunities are often more manageable through bottom-up approaches (e.g. Furholt et al. 2019). As such, bridging these perspectives can enrich us with more nuanced views on social organization at different analytical and spatial scales (Eriksen and Austvoll 2020: 188, 92).

The Scandinavian Peninsula offers an ideal case to understand social variation in affiliative networks and their connections due to spread of a relatively homogenous material assembly distributed throughout a highly heterogeneous landscape and ecology. However, despite social variation, co-dependency has been proposed as a key factor for Nordic Bronze Age communities' development (Prescott 1991: 45-46; 2000; Austvoll 2021: 188-91).

This co-dependency can be traced back to dual-culture debate of the early 20th century (see Bakka 1973; Melheim 2015b). For northwestern Scandinavia, this debate centred on the apparent lack of metal objects compared to the South Scandinavia, ultimately compelling some researchers to argue for existence of two distinct cultures, one with roots in the Neolithic and the use of stone tools, and another smaller group of metal wielding communities located in certain coastal areas along the coast. Even though this long-standing debate has been reiterated over several decades, lack of metal finds is partly tied to excavation activity and preservation conditions. There is also generally a consensus among researchers today that communities on the Scandinavian Peninsula where part of an overarching Nordic Bronze Age sphere of interaction – to various degrees (Skandfer and Wehlin 2017). Recently it has been shown that even though there are material and cultural similarities over large areas in Scandinavia, social and political strategies tend to vary depending on availability to resources and landscape zones (Prøsch-Danielsen et al. 2018; Austvoll 2021; Ljunge and Wehlin 2022).

Theoretically, such social diversity is often studied through political economy approaches (Earle 2002; Service 1962), and traditionally through evolutionary models of tribes, chiefs, and states that were outlined by cultural anthropologists of the 1950 s and 1960 s (Carneiro 1970) and heavily debated during the 1990s and 2000s (McIntosh 1999; Pauketat 2007). Useful elements of this debate have recently gained renewed attention through an approach frequently referred to as *collective action theory* that try and bridge the traditional narrative, which has been a "top-down" approach, with the alternative "bottom-up" perspective that investigate social and political organisation through more specifically historical contexts (Blanton and Fargher 2007; Carballo et al. 2014; DeMarrais and Earle 2017; Stanish 2017).

The key lies in identifying the economic basis and surplus of local societies. A society may be more hierarchically inclined if the ruling elite is able to mobilizes surplus through both internal and external surplus and sources, leading the upper strata to have fewer obligations towards the lower classes. On the other hand, if wealth is mainly derived from the local staple economy, the upper strata become more dependent on collective support, leading to the implementation of a more cooperative system, which in turn leads to less top-down hierarchy (e.g. DeMarrais and Earle 2017; Willer et al. 2017).

Gary M. Feinman (2000; 2012; 2017; Carballo and Feinman 2016) distinguishes between coercive and cooperative sociopolitical strategies, highlighting their varied degrees of complexity. These strategies are influenced by factors like source of wealth and local ecological potential, but they are generally studied within single societies and their evolutionary trajectory over time, such as the rise and fall of the Inka society or Early Mesoamerican societies (Carballo and Feinman 2024). This raises important questions recently highlighted by Schaefer-Di Maida et al. (2024: 258-59), regarding how power strategies and political

processes evolve, overlap, and are negotiated within a defined cultural sphere.

2.1. The Nordic Bronze Age and a maritime mode of production

In the context of the Nordic Bronze Age, there existed a shared world view that can be observed through a homogeneous material assembly. This includes metal artefacts, architectonic similarities in longhouse construction and funerary rites in large earthen mounds or cairns (Kristiansen 1998). While there is also degrees of variation in the way people lived and buried their dead across the Nordic Bronze Age, especially further north (e.g. Bakka 1976; Ojala and Ojala 2020), the fundamental similarities are significant and were likely facilitated by effective utilization of the sea (Kvalø 2007; Prescott et al. 2018; Bengtsson et al. 2025), which fostered a shared understanding of skills, knowledge, and norms across vast areas of Scandinavia (Kristiansen 1998: 68-70). This maritime-based system has been coined the 'Maritime Mode of Production' (MMP) (Ling et al. 2018; Horn et al. 2024: 11-15). The concept has recently attracted interest by scholars worldwide to conceptualize the structure of marine trade in pre-state societies (Hudson 2022; Fauvelle et al. 2024b; Mull 2022; Chao and Earle 2024; Fauvelle and Ling 2025). The MMP, as conceptualized within the political economy approach in anthropology, centres on the coordination and control of two interdependent economic sectors: the land-based domestic economy and the maritime sector, which was more closely linked to the political economy. The dynamic interaction between these sectors was essential for the expansion and sustainability of the system (see Fig. 2).

The model hypothesise that the land-based sector produced surplus resources, such as agricultural products, timber, raw materials, and labour, primarily through agropastoral households. These outputs were likely vital for sustaining the maritime sector, which, in return, could supply the domestic economy with warriors, slaves, metals, non-local commodities and exotic goods. This reciprocal relationship between the domestic and political economies illustrates a structurally integrated system of production and exchange, emphasizing the critical importance of surplus mobilization and redistribution in enabling both the growth and the long-term stability of the MMP system.

However, for local groups, participation in an expanding over-regional trade system were likely an unstable affair, dictated by regional power struggles and local environmental differences, which led different regional groups to either specialize in the domestic or political economy. This is where MMP-model integrates well with the ideas of collective action theory (Austvoll 2021: 188-91). This specialization resulted in a regional division of labour, a process consistent with the principle of comparative advantage (Ricardo 2015 [1817]), which has been broadly applied to the Eurasian Bronze Age (Rowlands and Ling 2013; Earle et al. 2015). For example, some coastal parts of northern Scandinavia benefited from access to timber (Sand-Eriksen 2023: 202-03), a resource already scarce in deforested agropastoral areas in southern Scandinavia (Holst et al. 2013; Kristiansen et al. 2020: 271; Caple and Løvschal 2025: 10), whilst these regions held a comparative advantage in agricultural production. This created an unequal accumulation of wealth, power, and demographic build up between regions (Ling et al. 2018: 488). The dialectic nature of this model between regions with different environmental and social conditions makes it complementary with collective action theory.

In such a system, stable communication is key, and successful societies were able to consolidate power by controlling both trade and raiding, primarily through boat ownership and funding expeditions,

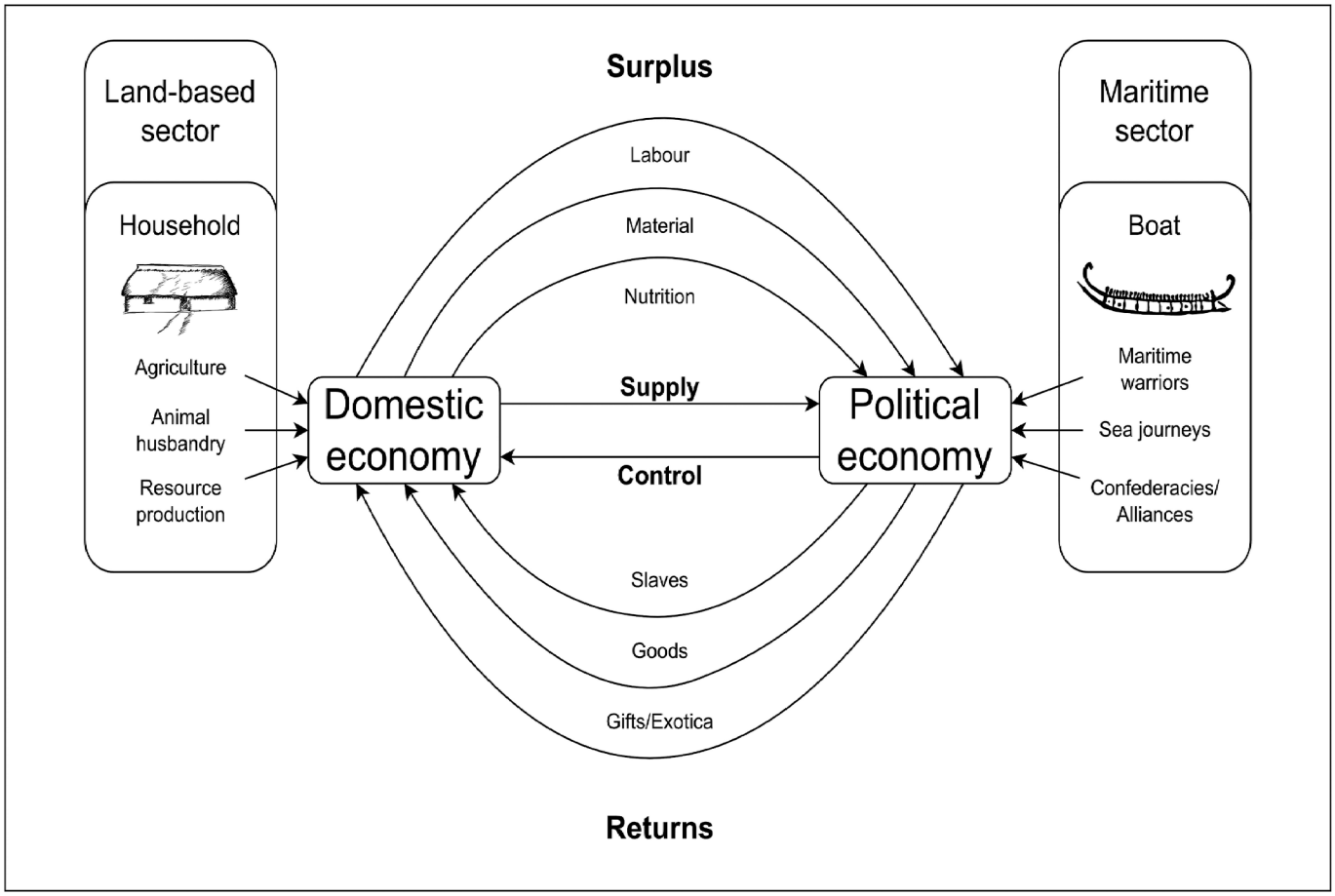

Fig. 2. A model of the dynamics between a Bronze Age maritime and land-based sector. From Horn et al. 2024.

thus creating extensive decentralized networks (Gilman 1981). To understand the institution that executed the maritime sector and long-distance exchange we turn to Brian Hayden's (2018) ethnohistorical study of secret societies. These sodalites, often composed of travellers and warriors, exerted control over surplus production and trade through intricate power networks based on gift exchanges and exclusive pilgrimages (Hayden 2018). Members placed high value on spiritual knowledge, including exotic goods, martial arts, and navigation techniques such as astronomy, which provided them with a strategic advantage in trade and exploration. As noted by Hayden (2018) and further developed by Chacon et al. (2020) and Hayden et al. (2023) these societies also produced rock art as potent social and ritual symbols, reflecting their dominance and influence. The ethnohistorical cases where secret societies are identified, they are often associated with 'Big Man' or chiefdom-level societies (Hayden 2018), but arguments have also been made for their appearance in prehistoric societies, including Scandinavia (Chacon et al. 2020; Fauvelle and Ling 2025).

As argued by Hayden (2018) throughout his book, these groups were often led by an emergent aristocracy, with leaders who prioritized personal gain, frequently at the expense of outsiders. They maintained power by guarding ritual knowledge and asserting that supernatural dangers threatened the uninitiated, employing intimidation, deprivation, and even violence to enforce compliance. By transcending traditional kinship ties, these societies created "fictive" supra-kinship structures that could replace conventional clan systems. Their influence was further solidified through public ritual displays connected to important social undertakings such as long-distance exchange, warfare, shifts in power, and death, which further emphasized their control and authority. They also conducted private initiation pilgrimages in remote and symbolic landscapes, adding an element of exclusivity and mystique to their practices. By establishing competitive ritual grounds manifested by rock art or monumental constructions in the landscape (Hayden et al. 2023) these institutions facilitated long-distance trade, spreading artistic styles and symbols across regions and extending their cultural and political influence over distant territories.

2.2. Sociopolitical variation

While the institutional articulation of secret societies could be a structuring element of Bronze Age societies we argue further that political strategies are never mutually exclusive or independent of each other in a given region. The coexistence of coercive and cooperative strategies and their impact within a sociohistorical system is an overlooked research field (DeMarrais and Earle 2017; Willer et al. 2017). Strategies are constantly determined by institutions, groups or individuals' abilities to categorize others within a defined social system (e.g. Barth 1969; Jenkins 2000). Travel and exchange, pervasive in societies like the Nordic Bronze Age, would therefore enhance self-awareness through meetings with others and at the same time increase co-dependence of agents and institutions. This makes network strategies crucial for both more coercive wealth-financed societies and cooperative staple-finance groups (cf. Blanton et al. 1996). We find it analytically useful to present a dualistic distinction between the two groups; however, in reality, we acknowledge that there were likely more overlaps. The key distinction is that coercive wealth-financed groups relied more heavily on the procurement and control of goods and services, while cooperative staple-financed groups depended more on local resource procurement and collective decision-making.

There is always a continual process behind sociopolitical strategies, through ongoing negotiation (categorization) between shifting political strategies (coercive or cooperative), restricted and propelled by ecological circumstances (Fig. 3). Even though active power struggles between competing communities can bring about sociopolitical change, it is played out against a background of shared culture sphere, i.e. the Nordic Bronze Age.

This merging of "top-down" and "bottom-up" perspectives is seen as useful for studying the Bronze Age, which is known to span different levels of sociopolitical complexity but, at the same time, to be highly connected. This connectivity is witnessed through the archaeological data that share similarities across vast distances. Constructions, such as house structures and burial mounds, share a common ideological and architectural language, indicative of frequent communication. Other, more tangible objects, such as metals and lithic artefacts, point to actual trade transactions between individuals or groups. At the same time, the sociopolitical contrast between, for example, the larger chiefdoms in South Scandinavia to the small individual households tucked away in the Inner-fjord districts of western Norway, must have been significant. In terms of scale, these areas are quite different as would have been their choice of sociopolitical strategy, but they were nevertheless bound together, quite possibly through a mutual dependence on each other. More specifically, they were connected through the trade of goods, such as metal objects, fur, skins, antlers, and possibly unfree labour.

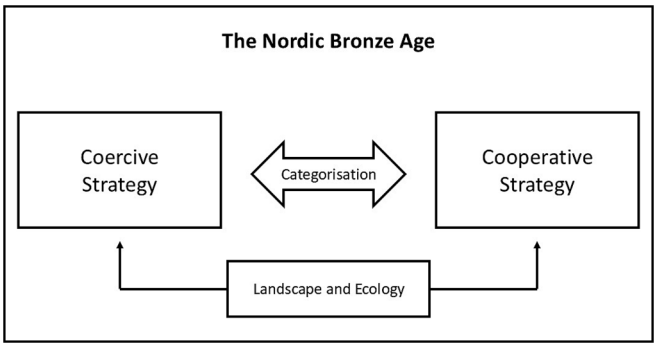

Fig. 3. A model of how variation in organisational strategies is mediated within an overarching Nordic Bronze Age system. Coercive strategies often develop in higher populated regions, where social stratification is more common. Cooperative strategies seem to develop in lower populated regions, negating social stratification and hierarchisation. The two opposing strategies are constantly being negotiated through social categorisation and structured by natural limitation and/or opportunities in the local landscape.

The connectivity between regions were upheld up by boats, but boats also represented a key bottleneck through which elites could accumulate wealth (Fauvelle et al. 2024b; Fauvelle and Ling 2025). Through the ownership of boats and the sponsorship of boat voyages, elites could control the proceeds of raiding and trading expeditions, providing them with a critical source of wealth. On the other hand, the increased mobility associated with boat use could provide people with the means to escape authoritarian control by facilitating migration to other regions (i.e. vote with your paddles) (Furholt et al. 2019: 177). Furthermore, while every boat needs a captain there is also often a strong egalitarian ethos that permeates through boat crews. Pirate crews are a prime example of groups based on widespread sharing of profits (Graeber 2023), as are Indigenous whaling crews from Greenland (Tejsner 2014). In this sense maritime societies are prone to representing diverse sociopolitical pressures due to the unique dependence of boat crewing and boat use.

A 'collective-action theory' helps us identify varied forms of organisation cross-culturally; however, there are major interpretive challenges within this theoretical framework as well. Specifically, the theory does not effectively explain how different organisational patterns change or overlap within a defined cultural sphere, by combining other models such as the MMP, we argue that it is possible to frame a much more dynamic picture of how social organization and communication in the Nordic Bronze Age operated (Fig. 4).

3. Northwestern Scandinavia as case study

Northwestern Scandinavia (i.e. modern-day Norway up to the Troms boarder) is among, if not the most, diverse region in Europe (Moen 1999:

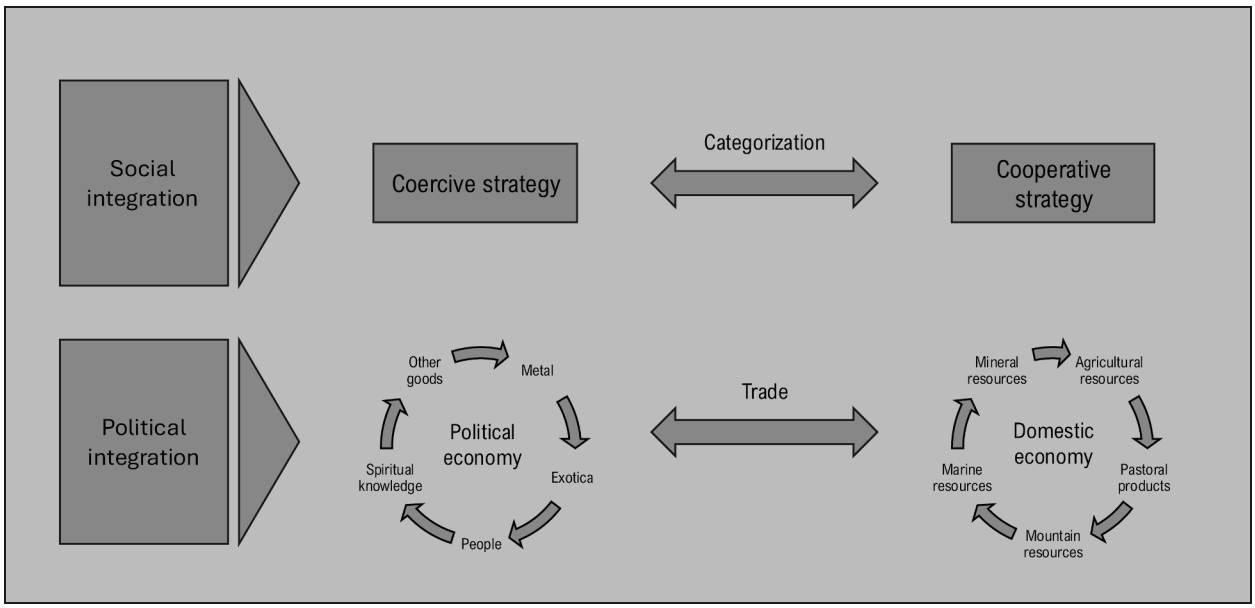

Fig. 4. A model with two levels of sociopolitical integration and interaction. One social integration between two different organizational groups, and a second integration where the functional and political organization is implemented, tied to a maritime mode of production.

169-70). Some areas can contain as much as five different vegetation zones within a radius of just five kilometres (Moen 1999: 94). The region is characterised by warm nemoral climate zones in the south where broad-leaved deciduous trees thrive and where there are few days below freezing temperatures. The more wide-ranging boreonemoral zone is recognised by mild temperatures, well-suited for cereal cultivation and keeping livestock out year-round. Further north and in higher regions, the boreal zone is recognised by coniferous woodland, forests regions and mires, in the sub-alpine and alpine zone, the climate is colder and harsher but have the benefits of extensive summer pastures, and well-suited hunting grounds for wild game, such as reindeer, but also other exotic commodities not readily available in continental Europe, such as pine marten, beaver and bear (Indrelid 1994; Prescott 1999). The overall variability naturally lends itself to different strategies, in subsistence, commodities for trade and social organization.

Still, a common denominator for these societies was the sea. Compared to continental Europe that relied on river systems, open fields, and grassland for wheeled transport, Scandinavia was instead structured by a stimulating open seafaring setting, which allowed local societies living along the coast to develop all-important alliances and trade routes. This network, we argue, was founded on a unique pal-impsestic system reliant on cooperation, but also, in part, by more co-ercive control at strategic passageways (e.g. Earle et al. 2015; Austvoll 2017; Prescott et al. 2018).

3.1. *Potential trading goods*

The Scandinavian Peninsula role in a wider trading network is well attested for in the massive import of copper (e.g. Kristiansen 2017a; Ling et al. 2014; Nørgaard et al. 2019). Still, one of the major questions that still puzzles archaeologists today is what products were exported from Scandinavia. Amber is often put forth as a central commodity from South Scandinavia that were exported long distances throughout Europe, even reaching northern Africa and the Levant (Singer 2016; Varberg et al. 2020; Vandkilde et al. 2024). However, we would argue that amber can hardly explain the full picture of the Nordic Bronze Age's source of wealth. In the following, we will reassess the relationship between amber and metals, presenting six key arguments that challenge the prevailing theory.

(Vandkilde et al. 2024). In the region of Thy, a key amber source, only small fragments, mainly in children's burials, have been found, challenging its significance in elite mortuary practices (Earle et al. 2022). Third, Baltic amber is largely absent from Denmark's most richly furnished graves and hoards in the Bronze Age. Unlike bronze and gold, amber was not prominently displayed by local Bronze Age elites, unlike in other European Bronze Age societies (Vandkilde et al. 2024). Thus, the idea that all amber was exported oversimplifies its role and lacks precedent. Fourth, amber shows a negative correlation with metals in Denmark and Scandinavia. Metal-rich areas overlap with fertile agricultural soils, while amber is largely absent in most of these regions. In Thy, metal use peaked in the Early Bronze Age when amber finds were minimal (Earle et al. 2023). By the Late Bronze Age, metals declined, and amber became more prominent in low-status households, underscoring its varied economic value (Earle et al. 2023). Fifth, the 'amber coast' in southwestern Jutland, a key source region, shows no systematic evidence of large-scale amber collection, such as major settlements or halls. This absence raises doubts about amber's centrality in an economic practice, akin to the unlikely claim that prime farmland lacked established farmsteads. Sixth, if amber were more valuable than copper, systematic prospecting, like copper mining, would have occurred in Denmark, Scandinavia, Poland, and the Baltic in general. Such efforts would likely have uncovered the sources later exploited during the Iron Age, challenging claims of amber's paramount economic role in the Bronze Age.

The minimal presence of amber in elite graves, its absence in richly furnished hoards, its negative correlation with region with most metals, and the lack of systematic collection in source regions all point to a more nuanced role for amber in Nordic Bronze Age society. Amber's perceived value and socio-economic role need to be reconsidered, particularly in comparison to metals such as bronze and gold, which were far more visibly integrated into elite networks and displays of power. It may be possible that amber served as a commodity currency in other parts of Europe, but for the Nordic Bronze Age economy we suggest based on the evidence above that amber's significance may have been overstated by past researchers.

In the following we would therefore like to explore other potential trading goods that may fit better in a model based on crisscrossing trade networks operating both within and outside of Scandinavia. These potential goods are not necessarily operating on an equal footing, however, the multi-scalar nature of goods traded, ranging from micro-level local

exchanges to macro and long-distance transactions, illustrates the complex interdependencies within a broader Bronze Age trade network, where each commodity plays a pivotal role in maintaining a systemic function of the economy.

3.1.1. Hunting goods

The higher regions of Scandinavia have for a long time been used as an explanatory frame to argue for fur and pelts as commodity for trade (Marstrander 1950; Johansen 1981; Prescott 1995). Intense use of the mountains during prehistory was already pointed out by the surveys done by Johannes Bø (1942). The idea of wild produce such as fur has frequently been argued as a plausible commodity (Olsen 1976; Hufthammer 1995; Prescott 1995). Recently, however, the melting snow and ice patches in the central mountainous districts of Norway have revealed evidence of more targeted hunting strategies during the Bronze Age (Nesje et al. 2012; Callanan 2014; Finstad et al. 2018; Olsen 2022). Possibly, these discoveries may point to a scale of hunting that goes beyond local consumption needs. This includes well-preserved arrow hafts, arrowheads made of flint and local freshwater mussels, leather shoes and even skies for traversing the snowy landscape (Callanan 2013; Finstad et al. 2018). While no wild game produce in continental Europe can be linked to Scandinavia, it seems more likely than not that these hunting expeditions served a purpose in the larger integration networks of Scandinavia and beyond. The large corpus of material that is being collected each year from the high mountains will only become more apparent in the following years.

3.1.2. Agricultural resources

The archaeobotanical data show a clear transition to agriculture at the turn to the Late Neolithic and into the Early Bronze Age (Prøsch-Danielsen and Simonsen 2000; Hjelle et al. 2016). This would have been a central part of the local subsistence economy, yet its role as a commodity for trade is less clear. Cereal cultivation is evident by charred cereal grains found in, for example, postholes, but combinations of macrofossils and pollen samples found at settlement sites, fields, lynchets and clearance cairns point to local societies embracing this new economy in both central and more peripheral regions (Hjelle et al. 2016; Halvorsen and Hjelle 2017; Prøsch-Danielsen et al. 2018). It is likely that regions with wide-ranging and well-drained soils could produce a surplus that could be used within local trading networks.

3.1.3. Marine resources

Deep water and coastal fishing were recognized as valuable resources during the Bronze Age, as evidenced by numerous preserved fish bones, hooks found in rock shelters, and corresponding depictions in rock art (Gjessing 1920; Gjessing 1943; Ling 2014: 221; Bergsvik 2016). The preservation of food was essential for undertaking extended maritime voyages. While concrete evidence of preserved fish, such as stockfish, from the Bronze Age is lacking, it is known that targeted cod fishing was prevalent along the coasts (Austvoll 2021: 170-72). Consequently, it is plausible that travellers needed to carry preserved food that could endure long journeys. Although salt was a well-known preservative and commodity in the European Bronze Age (Harding 2013; 2021), the extent of its use in Scandinavia remains uncertain. Conversely, the production of stockfish is a straightforward process requiring only a cool climate and wind, conditions that Norway's coastal areas abundantly provide. In addition to fish, other northern products included seal skin, may have been specifically targeted for skin boats, as has been suggested by earlier societies in Scandinavia (Fauvelle et al. 2024a). Also, marine mammals were likely targeted for blubber to produce oil, which is documented at sites in northern Norway and Åland, Sweden (Nilsen 2016).

3.1.4. Wool

Wool was first documented in Scandinavia around the Late Neolithic, this is concurrent with the osteological material in northwestern Scandinavia. Although the opening of grazing pastures is well attested for in South Scandinavia (Haughton and Løvschal 2024), there seem to have been an emphasis on keeping cattle rather than sheep (Holst et al. 2013: 277). Yet, in the well-preserved oak log coffins of South Scandinavia, wool is part of their attire, serving perhaps as a representation of luxury products for the elite. Analysis of the isotope signatures of wool from South Scandinavia points to it being non-local (Frei et al. 2017), and while several southern European regions could be its source, it is important to note that we know very little about the isotope baseline signatures on the Scandinavian Peninsula, and northwestern Scandinavia in particular. When examining some of the more indirect evidence in northwestern Scandinavia, we should consider several factors. This includes the high presence of pasture-indicative species, such as ribwort plantain (*Plantago lanceolata*), found in pollen diagrams (Hjelle et al. 2016), as well as textile production tools like loom-weights at settlement sites (Hemdorff 1993) and bone pins for working woollen textiles (Prescott and Melheim 2017). Together, these findings suggest the benefits of keeping sheep as livestock in northwestern Scandinavia, as also indicated by various researchers (Prescott and Melheim 2017; Oma 2018). In particular, the wide-ranging summer pastures in the mountains would allow for surplus production, similarly, areas with thick, compressed marine clay can be more effectively utilized for pastoral purposes than cereal cultivation (Prøsch-Danielsen et al. 2020). Also, archaeological evidence, such as osteological remains of caprine bones and various bone tools, may point to wool production at various sites along the coast (Prescott and Melheim 2017). It is also worth noting that wool textiles have been documented in a handful Early Bronze Age coastal burials in northwestern Scandinavia (Sloman 1947; Myhre 1981; Myhre 1998; Rast-Eicher and Bender Jørgensen 2013), possibly representing luxury attires of a local elite network.

3.1.5. Tar

Over 70 loaves of tar, resin, or pitch have been unearthed in Scandinavia, with numerous specimens originating from the Bronze Age (Nordby and Sørgaard 2020; Horn et al. 2024: 27). While most have been found in Denmark and Sweden, a smaller number have also been uncovered in Norway, including two loaves retrieved from a bog in Ålberg, Nord-Trøndelag (Johansen 1993; Nordby and Sørgaard 2020). These Nordic Bronze Age loaves are typically round with a small hole in the center, indicating they were likely strung together on a rod or string for ease of transport, allowing for the simultaneous movement of multiple loaves. Their distribution is concentrated along the coast, strongly suggesting that they were transported by boat (Horn et al. 2024: 27).

The production of tar required specialized knowledge, from sourcing the raw materials to distillation processes that ensured high quality (Bergström 2004). Tar production also demanded pyro-technological expertise, as shown by the analysis of residues in ceramic vessels, which indicates an increase in tar production during the Nordic Bronze Age (Isaksson 2009). The largest concentration of tar production evidence is found in Mälardalen, Eastern Middle Sweden, while other regions, such as Thy, lack such evidence. Nevertheless, traces of tar use have been identified in South Scandinavian burials, demonstrating its significance in burial practices (Horn et al. 2024: 27-28). It is possible that tar producers were traveling specialists, either combining their skills with other pyrotechnics, such as metal and ceramic production, or operating independently. Berit V. Eriksen (2018: 341) have for example suggested such a perspective through the role of flint tool makers, enabling a system of communication, travel, and trade.

3.1.6. Timber

Timber would have been a vital resource, not only for heating and building houses, but for building Bronze Age boats for travelling (Ling et al. 2024). While timber in itself is an unlikely trade commodity, products made from timber, such as boats, are probable. It is often acknowledged by researchers that the turn to the Bronze Age involved new boat technology in the form of larger and more seaworthy planked-

built boats (Østmo 2005; Kvaløe 2007; Bengtsson et al. 2025). The significance of this technological shift is highlighted by the thousands of ships depicted on rock art, which interestingly correspond with the geographic cluster of simple shaft-hole axes (Austvoll 2021: 127-30). This connection could be related to important boat building sites, as recently proposed by Ling et al. (2024). Here, so-called cooking pits, with fire-cracked stones, large amounts of charred timber and no foodstuff are suggested to represent building activity for steaming planks for boat construction (Ling et al. 2024). Such sites are known from ethnographic sources (e.g. Best 1925: 38; Goldenweiser 1940: 139; Wood 2018: 205), but room for other interpretations should of course be acknowledged, such as communal feasting sites for local consolidation or alliance ties (cf. Schaefer-Di Maida 2022). Additionally, surpluses generated from cereal cultivation and animal husbandry in these regions could have sustained the workforce needed for these boat-building endeavours, a phenomenon well-documented in ethnohistorical sources (e.g. Hudson et al. 1978; Ames 2002; Fauvelle et al. 2024b).

3.1.7. Mineral resources

Other local products include mineral resources, like stone. Aside from the obvious South Scandinavian flint deposits, stone types like quartz, quartzite, basalt, slate, pumice and soapstone were exploited during the Bronze Age for various purposes (Nyland 2016; 2020), such as arrowheads, grinding stones and axes (Melheim 2015b). Soapstone is a particularly interesting resource as its source is often found at inland sites on the Scandinavian Peninsula (Storemyr and Heldal 2002), while the location of casting moulds made of soapstone can be found across large parts of the Peninsula, but most commonly along the coast (Melheim 2015b; 2015a). And, as argued by Christopher Prescott (2020: 384) "mineral resources like stone (quartz, quartzite, basalt, slate, pumice and possibly steatite), clay, and potentially ores […] entered the economy. This production met local and regional subsistence needs, but was also driven by a need for surplus to enter the expanding trade networks".

3.1.8. People

The proposition that unfree labour or slaves formed part of certain prehistoric societies is contested and heavily debated (e.g. Graeber and Wengrow 2021: 186-91; Cameron 2016). Still, looking at socially complex societies structured through trade, such as the Coast Salish (Donald 1997; Angelbeck and Grier 2012: 554), the Vikings (Raffield 2019), or the Philippine chiefdoms of southeast Asia (Junker 1999), unfree labour, in some form, seems to have been an integral part of their economy. Similarly, Catherine Cameron's (2016), empirically detailed study shows how captives played an important part in small-scales societies. More importantly, the study emphasizes how captives were not only exploited but could also reshape the cultures that absorbed them. Recently, the use of slaves during the Bronze Age has been proposed by Ling et al. (2018). This hypothesis is based on a re-interpretation of various archaeological data sets (e.g. Mikkelsen 2013; 2020; Bergerbrant et al. 2017; Fyllingen 2003).

One of the most detailed archaeological arguments comes from Mikkelsen (2020), who examined over 300 longhouses in the Viborg area of northwest Jutland. In this area divisions within farmsteads are notable, such as smaller houses with hearths or longhouses with internal divisions, which may suggest social differentiation, and possibly unfree labour. Separate entrances and room partitions are seen as material markers of social hierarchy. It is, however, important to note that Mikkelsen (2020: 180-81) himself concedes that such differences could reflect generational, gendered, or kin-based divisions rather than slavery. Others, such as Bech and Olsen (Bech and Olsen 2018) warn that small houses may simply have been storage buildings or workshops.

Identifying slaves is equally challenging in the burial data. However, one interesting cases comes from an excavations at Cliffs End Farm in Kent, where they uncovered the remains of several non-local individuals, including a woman, most likely from Scandinavia, based on the isotope signatures (McKinley et al. 2014). The individual was buried in a simple pit, contrasting strongly with formal burials at the same site. It is speculated that this could be evidence of slavery or servile status. Comparable examples have been found at Obříství in Central Bohemia, where isolated pit graves lacking grave goods and interpreted as burials of non-locals, potentially unfree-labour (Unger and Pecinovská 2015: 82).

In southern Scandinavia, Bergerbrant et al. (2017) show that commoners formed a large part of the society through simple flat inhumation graves. While commoners do not equal slaves, the article does hypothesise that unfree labourers may be part of this picture, based on the unceremonious treatment after death (Bergerbrant et al. 2017: 45). Signs of social exclusion aligns with overarching bioarchaeological interpretations of social inequality (e.g. Roberts and Cox 2003; Knüsel and Smith 2013).

Besides architecture and burials, rock art is also used in the discussion of unfree labour. Horn et al. (2024: 39-43) interpret Bronze Age Scandinavian rock art as depicting scenes of captivity, bound figures, kneeling postures, and individuals being led, including sites such as Leirfall, Ekenberg, and Aspeberget. These images may reflect societal awareness of coercion and subjugation. Ling et al. (2018) goes even further suggesting that the export of slaves, alongside amber, formed part of a 'maritime mode of production' that linked Scandinavia into wider Bronze Age exchange networks.

While the archaeological evidence is limited and elusive, we believe the combination of comparative cases and indicative archaeological finds makes it plausible that some form of unfree labour may have formed a part of the Nordic Bronze Age economy – a dynamic very reminiscent of later Viking practices (e.g. Price 2016; Raffield 2019).

4. Method

4.1. Density distribution

In order to identify regional polities, i.e. groups organised through a shared identity and decision-making capabilities, we utilise a Kernel Density Estimation tool (KDE) based on the distribution of metal objects, burials and longhouses dated to the Early Bronze Age (1700–1100 BCE). The method allows us to get a consistent and comparable framework of point pattern clusters that can be used to discuss variation and similarities across different archaeological sources, which in turn can help us understand sociopolitical organization (Baxter et al. 1997). By calculating feature densities within a specified radius (bandwidth), the KDE can provide a detailed visualization of feature clustering across our study area (Silverman 1986). While KDE is sensitive to the chosen radius (bandwidth), it is also neutral, which is why the KDE needs to be considered in relation to the local topography. Natural barriers like high mountain ranges and challenging coastlines may hinder expansion and interaction between groups, while in other instances the topography may present navigable pathways such as mountain passes, straits, and harbours. These elements constrain and direct the movement and interaction of prehistoric societies, influencing material culture dispersion and choice of sociopolitical organization. The KDE analysis was used in ArcGIS Pro v. 3.2.1, with point data available in Supplement 1. We used a grid cell size of 0.5, and a search radius (bandwidth) of 13 km, based on an h_{opt} calculation ($h_{op} = 1.06 \cdot \sigma \cdot n - 1/5$) of the sampled metals from the regions Rogaland and Agder, which had a standard distance of 44,833 m.

4.2. Results – A synthesis

Our study compiled and analysed a substantial dataset comprising 460 metal objects, 455 burials, and 158 house structures, most with dates securely placed within the Early Bronze Age (Fig. 5). The data were meticulously sourced from publicly available databases, excavation reports, and were further scrutinized by us to ensure accuracy and

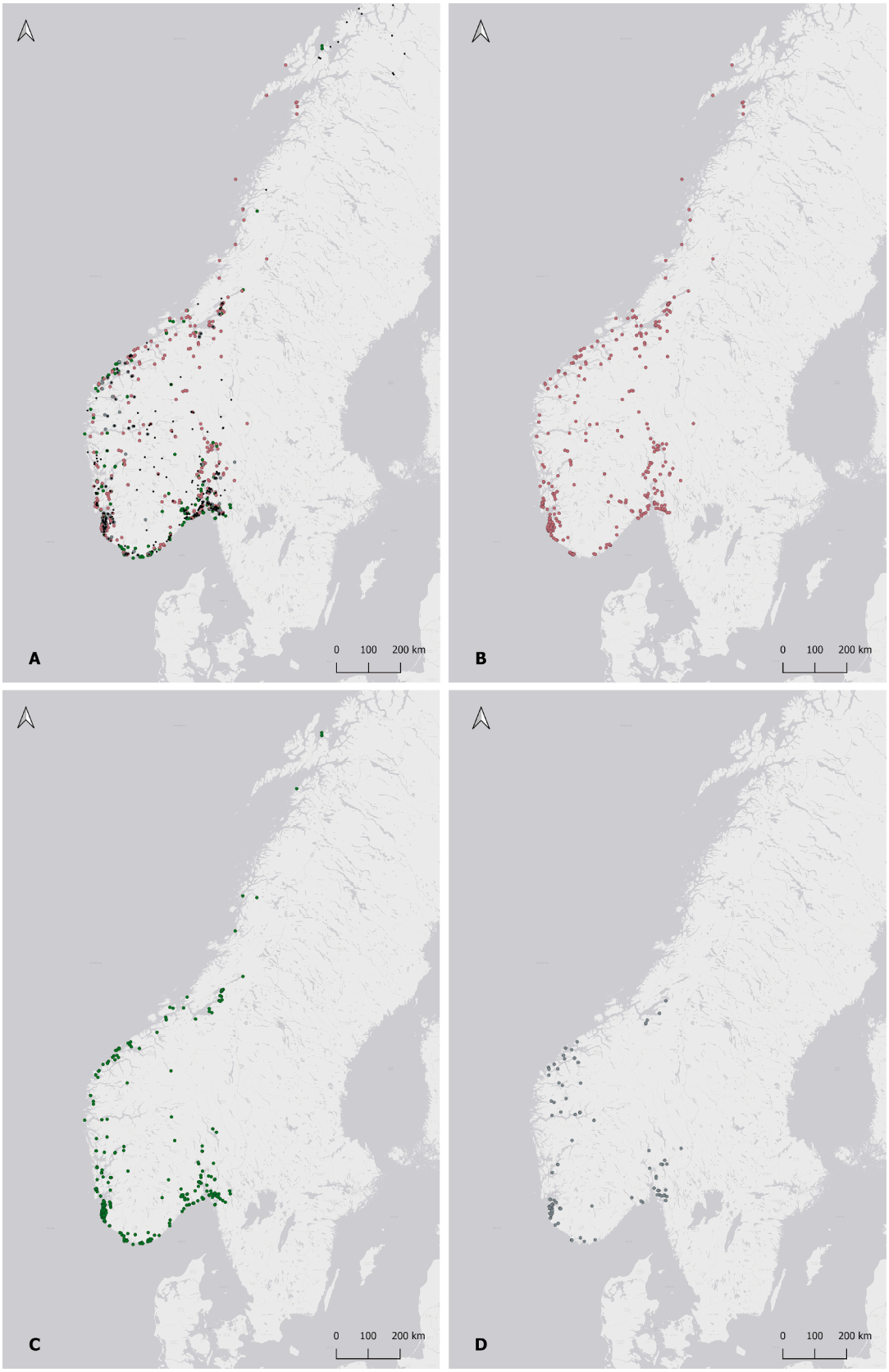

Fig. 5. Distribution of archaeological sources. A. Distribution of every source, including radiocarbon dates. B. Distribution of metal objects. C. Distribution of burials. D. Distribution of house structures.

relevance. In addition to these primary data, we incorporated 925 recently published radiocarbon dates from the Early Bronze Age (Bunbury et al. 2023) as supporting proxy. We argue that the selected datasets provide an approximate representation of significant social clusters typical of the Bronze Age, allowing for meaningful comparisons across the northwestern Scandinavia between 1700 and 1100 BCE. All data used in this study are available in Supplement 1.

Our analysis identified 50 noteworthy regional clusters along the coast using a KDE analysis with all available data (Figs. 6 and 7). These clusters represent significant concentrations of Bronze Age activity, as indicated by the distribution of metal objects, burials, and house structures. In a straight line, the average mean distance between each cluster is approximately 43 km. The closest clusters are located in Østfold and Vestfold, separated by the narrow Oslo Fjord, and between Jæren and Karmøy, as well as Jæren and Forsand. Similarly, we observed close groupings along the coast of Sunnmøre, and between Stjørdal and Steinkjer in Trøndelag, with an average distance of 33 km between each group within these tight-knit regions. In some of the more densely clustered regions there are noteworthy internal clusters as well. For example, in Jæren there are marked clusters in Klepp near the natural harbour of Orre, the area of Sola, and the Tananger Peninsula, which all would have benefitted from having natural harbours, strategic straits or portages.

Conversely, the longest distance between clusters in South Norway is between Hordaland and Inner Sogn, and in the inland districts of eastern Norway. As expected, the distance between clusters increases further north. Notably, there are no significant clusters north of Steinkjer in Trøndelag until reaching the southern border of Troms, with possible exceptions around Sandnessjøen and Steigen. This pattern could reflect actual population distributions, but it is more likely influenced by archaeological sampling biases related to excavation practices and the intensity of research in these regions.

While the temporal resolution of the dataset is too coarse to construct detailed chronological variations, several noteworthy patterns emerged. Early metal objects exhibit a more northerly and inland distribution along the western coast, particularly in regions such as Sunnmøre and Inner Sogn. This distribution contrasts with the general coastal domination observed among the clusters, suggesting a settlement strategy that favoured coastal locations for their strategic and economic advantages. It can be argued that the spatial distribution of the identified social clusters supports the hypothesis of significant regional interactions and a preference for coastal settlement strategies during the Early Bronze Age. Despite this coastal focus, more peripheral regions, such as the Inner Fjord districts and the inland areas of eastern Norway, also possessed substantial amounts of metal imports and featured house structures of similar architectural design to those found in the rest of the Nordic Bronze Age. The detailed examination of these clusters reveals the existence of both close-knit regional groupings and more isolated clusters, underscoring the diverse organizational strategies employed by Bronze Age societies in northwestern Scandinavia.

5. Discussion

One of the major postulates of the Nordic Bronze Age is its supposed development into more hierarchical, down-the-line organization based on a chiefdom-like structure (Earle 1997; Kristiansen 1998). While these types of societies certainly existed, our analysis points to a more complex pattern, consisting of both coercive hierarchical strategies as well as more cooperative strategies that did not rely on the strong-armed actions of individuals. Rather, they were centred around the collective decision-making of the group or family nucleus. Our analysis shows that these varied organizational practices can be identified along the entire coast, indicating that local groups were adaptable and not oblivious to varied forms of social organization. On the contrary, Bronze Age groups seem to have thrived through mutual co-dependency.

This complexity is perhaps most clearly illustrated in the region of southwest Norway, where we identify distinct clusters of local Bronze Age societies. In Jæren, monumental constructions are spread throughout the landscape in the form of large earthen and stone-built burial mounds. These structures not only held ritual significance but also projected an outward expression of power and control (Austvoll 2019; 2020). Evidence of long-distance exchange in this region is robust. For example, metal objects indicate clear connections with the continent, mainly southwards but also towards the west and east (Melheim 2015a; Nørgaard et al. 2019). The burial tradition of earthen mounds is typical of South Scandinavian practices but on the Peninsula, this is generally not observed beyond the southwest coast of Norway and some parts of Sweden. Additionally, the longhouse building tradition in this part of Norway has been highlighted as sharing strong ties with South Scandinavia (Bech and Rasmussen 2018). Some burials also hint at long-distance marriage ties, which suggest a complex network of social bonds and alliances (Oma 2020a).

Just a couple of kilometres north of Jæren lies the island of Karmøy, which, despite lacking evidence of longhouses from this period, compensates with a wealth of material artifacts. This area boasts a rich collection of metal objects in bronze and gold, large burial mounds, and an abundance of stray finds (Myhre 2004; Austvoll 2019). Part of this region's source of wealth has been credited to its strategic location as a bottleneck (Austvoll 2021). Situated between the harsh and dangerous open sea on one side and a narrow strait on the other, the island benefited from its strategic location by controlling the seaway along the Norwegian coast. This strategic position was a long-term source of power, exploited not only in the Bronze Age but also later in the Iron and Viking Age (Skre 2014; Stylegar and Reiersen 2018).

However, the island held little in terms of valuable resources, making the inhabitants most likely reliant on other regions for certain goods. Resources such as timber, larger game, and minerals could have come from the inland districts, reachable by boat through a network of fjords. The combination of the island's local maritime bottleneck strategy and its external resource dependency likely fostered the remarkable material homogeneity, as evidenced by the uniformity in burial practices, cist constructions, and the predominant presence of warrior equipment in mounds (Myhre 2004: 147-62). These patterns strongly suggest the emergence of a rapidly developing local identity and customs, cultivated internally through conditional cooperation among community members while at the same time projecting a formidable coercive presence outwardly for economic gain. The political economy likely played a pivotal role in this process, with investments in the maritime sector generating substantial wealth. This wealth accumulation could have been achieved through strategic alliances with regions further north and south, as well as through more coercive means. Evidence of this outward projection of power can be discerned from the temporal patterns in the archaeological record. For instance, Jæren, a region south of Karmøy, is notably prominent in Period II (1500–1300 BCE) based on the archaeological data. However, while Jæren continues to be influential, there is a noticeable regional shift during Period III (1300–1100 BCE) from the southern part of Jæren toward areas further north. This shift coincides with the emergence of burial mounds and material wealth in Karmøy, which could potentially indicate competition between these regions (Austvoll 2019). Another alternative is the effective use of 'rent-seeking', a concept often used in modern economic and political theory to explain how resources are controlled and distributed. In our context, we can observe how certain nodal regions, such as Karmøy, used physical bottlenecks, i.e., straits, as a way to accumulation metal imports from the continent.

For this to have been possible groups in Karmøy would have needed to partake in a more complex interdependence system between the inner fjord districts and coastal regions further south. In such a situation, the interplay of local elite strategies, maritime skill, and the influential roles played by secret societies, as discussed above, becomes highly significant. By leveraging their control over trade routes and employing sophisticated networks of power and knowledge manifested by bronze

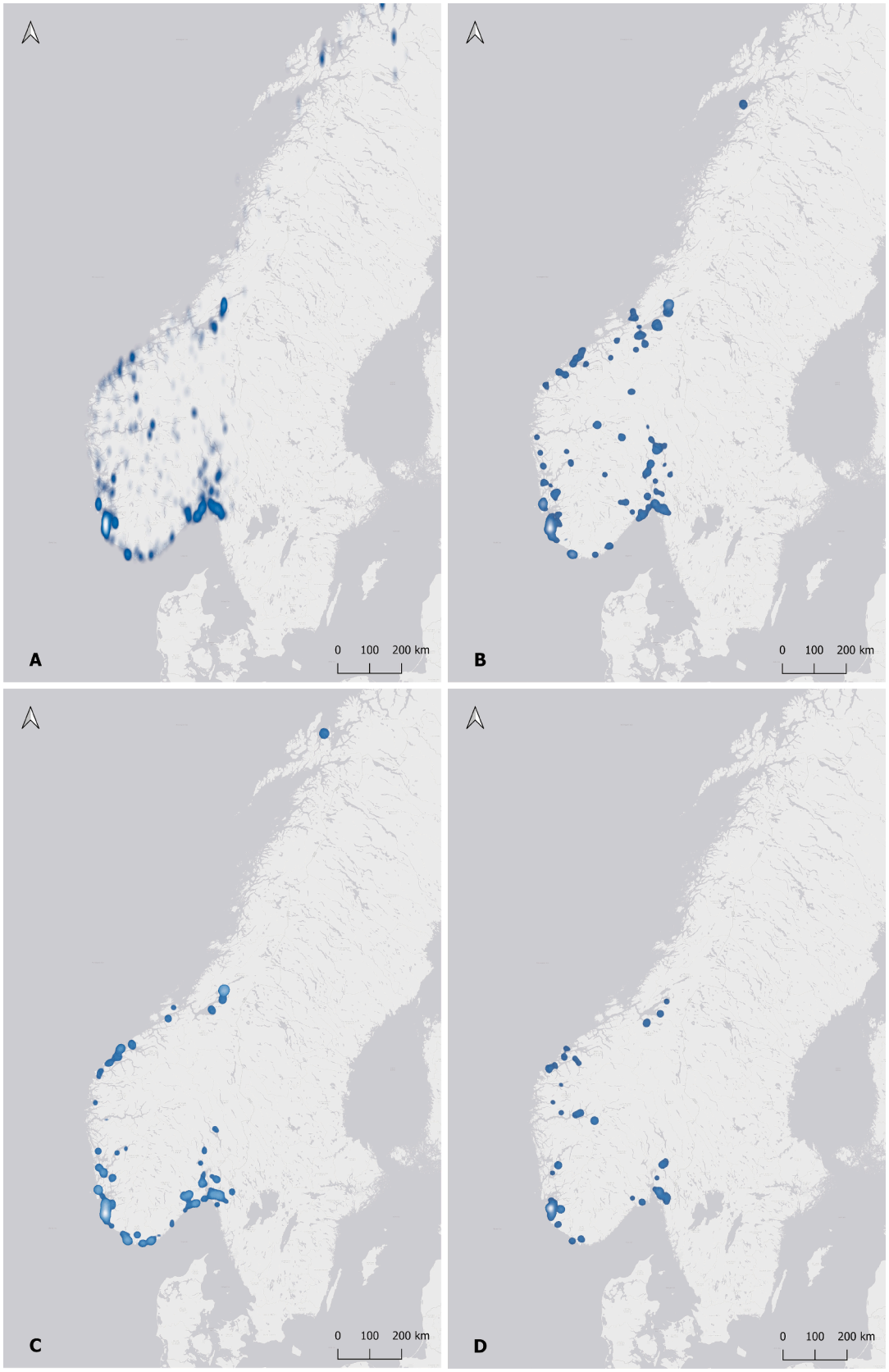

Fig. 6. KDE of the combined data sets. 50 locations are identified. A. KDE of every source, including radiocarbon dates. B. KDE of metal objects. C. KDE of burials. D. KDE of house structures.

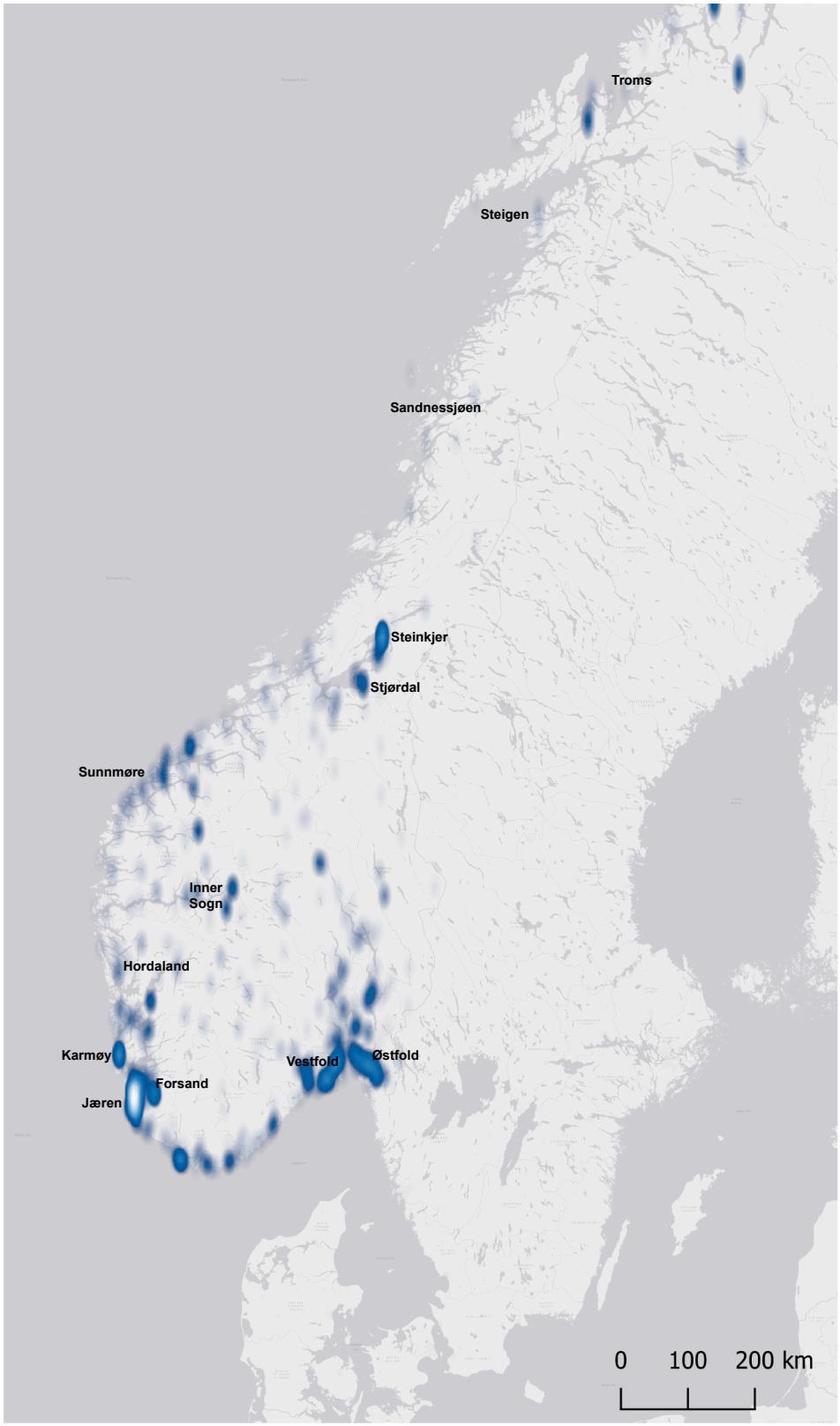

Fig. 7. KDE map with some of the place names mentioned in the section 4.2.

objects and ritual arenas of rock art (Hayden et al. 2023), these societies may have significantly shaped the sociopolitical and cultural landscape of northwestern Scandinavian during the Early Bronze Age, fostering both regional heterogeneity and interconnectedness (Fig. 6).

This dynamic allowed for the sharing and trading of material culture while simultaneously enabling variations in social and political strategies. For instance, in more peripheral regions identified in our analysis, the situation appears quite different: burial mounds are few or entirely absent, yet house structures and metal finds are still prevalent (Fig. 6). Metals are often found as stray finds or in hoards, suggesting that their

social meaning may have altered. The landscape and local ecology also played crucial roles (Hjelle et al. 2016). While coastal societies in areas like Karmøy and Jæren had more homogeneous economic bases, the inland regions were significantly more diverse. The Inner fjord districts had access to small but good patches of arable land at the mouths of rivers and fjords, extensive mountain pastures a short distance from settlement sites, and wide hunting grounds at higher sub-alpine and alpine zones, utilized during the summer months. Similarly in inland regions of eastern Norway forests, waterways, and valleys seem to have had a similar effect on social organisation (see Sand-Eriksen 2025b).

Given the lower population densities in these regions, it is likely that cooperation between communities or households was imperative for the successful and effective utilization of these diverse landscape zones. The relative scarcity of traditionally recognized indicators of hierarchical organization and overt expressions of power (such as richly furnished burials) suggests that a different organizational strategy was in place. In these inland areas, cooperation rather than coercive top-down force appears to have been the guiding principle, emphasizing communal effort and mutual support over rigid hierarchical structures (see also Lund et al. 2022; Schaefer-Di Maida et al. 2024; Sand-Eriksen 2025a).

It is nonetheless interesting that despite variation in social strategies, there is arguably an overarching system in place where land and maritime sectors operate in co-dependency. From the analysis it was shown that there is a mean straight-line distance of 43 km between notable regions, which would be a distance that is well within an average days travel by boat according to recent models (Bengtsson et al. 2025). The clusters are closest along the coastline, while the distance between inland groupings is often much greater (Fig. 6), suggesting that the seaway was a prime mover for communication. This pattern is likely influenced by the landscape, with large parts of the inland consisting of mountains and plateaus where year-round living would be challenging. Interestingly, in inland areas where clusters are more closely spaced, they are situated along river systems, further emphasizing the importance of boats for communication (Fig. 6). It is also plausible, as presented in section 2.1 and 3.1, that specialised knowledge in itself facilitated increased mobility within the Nordic Bronze Age region. This could have happened either through pyrotechnological knowledge (metallurgy, ceramic or tar production) or other craftsmanship skills, such as boat building. This would effectively create an overarching economic system where mobile workers, both directly and indirectly, served to enhance trade communication, foster alliance ties, and drive other societal advancements (see also Prescott 2012; Melheim and Prescott 2016).

We propose that, at least in the context of northwestern Scandinavia during the Early Bronze Age, the unique local ecology would have significantly influenced how groups organised themselves, and that this in turn necessitated a more dynamic trade network of multifaceted resources linked together by local and interregional networks (Fig. 8). And while previous studies tend to emphasise specific goods, like amber, or in the case of northwestern Scandinavian, fur; our reassessment reveals we should implement a broader spectrum of integrated goods, consisting of natural resources unique to Scandinavia, agropastoral products, and human commodities, either through skilled craftmanship or as labour force. This integration necessitated diverse political strategies across regions, ranging from cooperation, alliances and trade partnerships to competitive displays of wealth and power and sometimes coercive force. Rather than singular, and simplistic way of looking at social organization, strategies were constantly adapted and negotiated. Building on the concept of secret societies, it is plausible to propose that institutions composed of mobile workers, traders and warriors held a multifaceted role in communication and trade across vast regions of the Nordic Bronze Age (Chacon et al. 2020; Hayden et al. 2023). The dynamic within and across these institutions likely varied, sometimes relying on cooperation, negotiation and gift exchange, while other times they could maintaine their influence through more coercive ways. In the context of northwestern Scandinavia in the Bronze Age, this system is particularly apparent in the movement of bronze from more accessible coastal areas to remote mountainous regions in the interior.

6. Conclusion

The study has sought to understand how interaction and trade of past societies were organised and how we can identify and explain regional variation and fluctuations of sociopolitical strategies. Although the study focuses on the Nordic Bronze Age, the questions raised are highly relevant for other periods and regions as well, above all, the primary concern is how we can understand the intricacies behind social organization.

Our findings reiterate the importance of combining traditional archaeological features with trade patterns to offer a holistic understanding of the cultural landscape. The robust trade networks, evidenced by specific trade goods such as flint daggers, sickles, and high-quality metal items, extended well beyond local boundaries. Although some trade items, like wool, pelts, and timber, are harder to trace archaeologically, their implied importance in the trade economy remains significant.

Our results show how both top-down and bottom-up organizational principles can coexist within a wider political economic system. In some areas, such as the coastal regions of southwestern Norway, we see clear evidence for the projection of power through monumental construction and the accumulation of metal wealth acquired through long distance exchange. These patterns are consistent with an organizational structure by dominated politics of coercion. Inland regions, on the other hand, lack evidence for economies of accumulation and instead seem to have been characterized by more dispersed and cooperative political structures. Critically, these different regions were in proximity and were engaged in a system of mutual interdependence, with mountainous regions providing trade goods such as furs which would have been important to entrepreneurial coastal societies. It is suggested that these different forms of organising oneself were tied together through frequent communication among mobile workers, traders, and warriors. This pattern is consistent with a Maritime Mode of Production in which maritime and land-based sectors complement each other within a maritime trade-oriented network. In the northwestern Scandinavian case, however, we see how different components of the MMP can be mutually re-enforcing and interdependent while also practicing highly different political organizational strategies.

Lastly, our study provides an enriched synthesis of a section of the Nordic Bronze Age, presenting a dynamic and interconnected picture of the region's integration into broader European trade networks. In the future, we believe an incorporation of bigger datasets, including all of Scandinavia, and regions beyond, will be essential to understand variation in social organisation and change over time. A large data set would allow for higher chronological resolution to help discuss sociopolitical change over time. Moreover, other spatial methods, such as network analysis and more advance spatiotemporal analyses (e.g. Wright et al. 2020), may be fruitful to enhance our understanding of these processes.

Nonetheless, the diverse organizational strategies and adaptive socioeconomic practices of Scandinavian Bronze Age societies highlight their active and influential participation in extensive trade and cultural exchanges. This improved understanding not only underscores the complexity of past human interactions but also sets the stage for future research to unravel the intricacies of the Bronze Age world. Integrating varied archaeological datasets and theoretical frameworks is crucial for fully appreciating the multifaceted nature of prehistoric societies, offering valuable insights into broader patterns of social organisation and economic activities.

CRediT authorship contribution statement

Knut Ivar Austvoll: Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation,

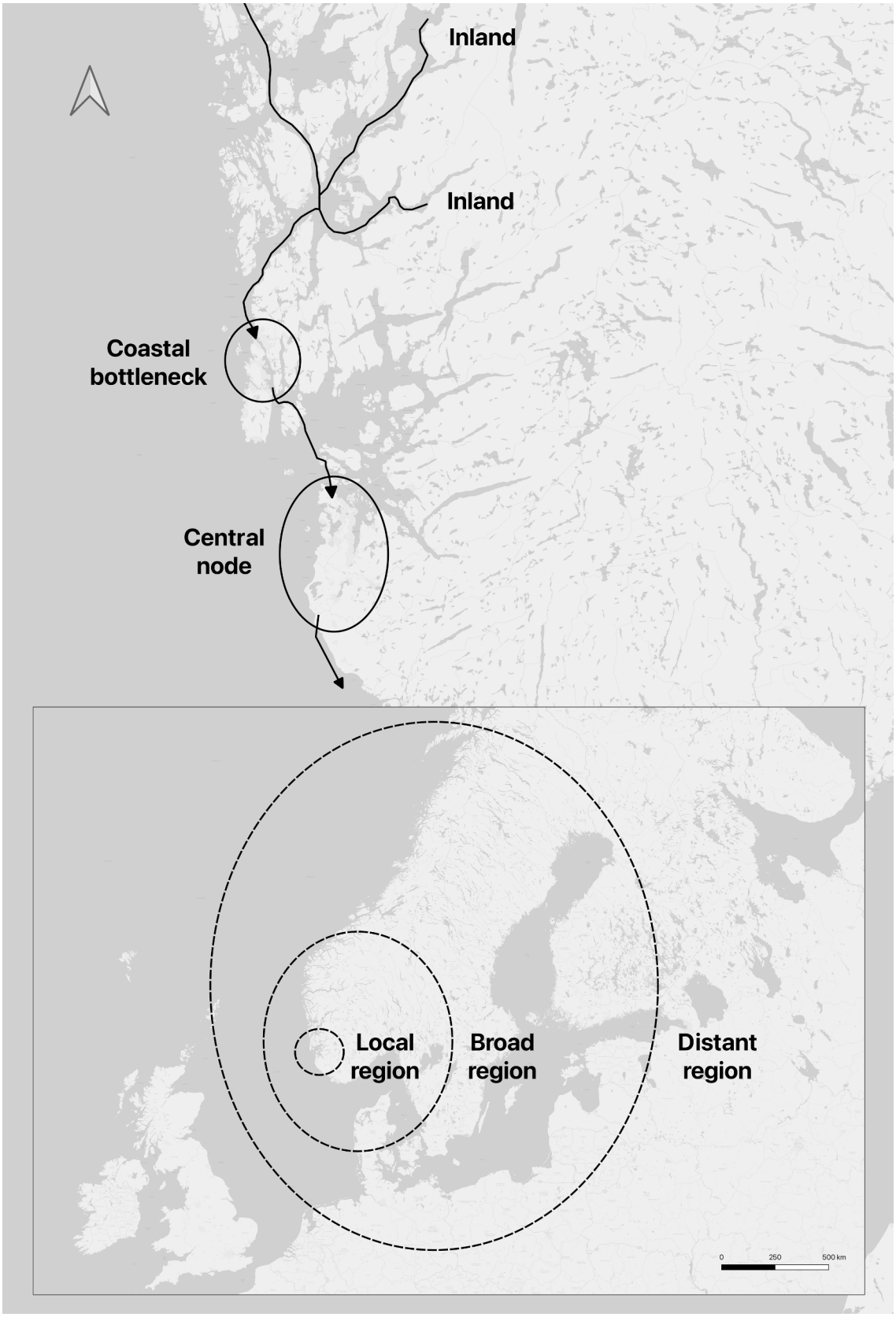

Fig. 8. A model of how trade and interaction might have worked within northwestern Scandinavia, with staple goods coming from cooperative groups inland, that are then managed or controlled through coastal bottlenecks, which are then directed through central nodes. Based on Horn et al. 2024.

Funding acquisition, Formal analysis, Data curation, Conceptualization. **Mikael Fauvelle:** Writing – review & editing, Funding acquisition. **Johan Ling:** Writing – review & editing, Funding acquisition, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jaa.2025.101708.

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