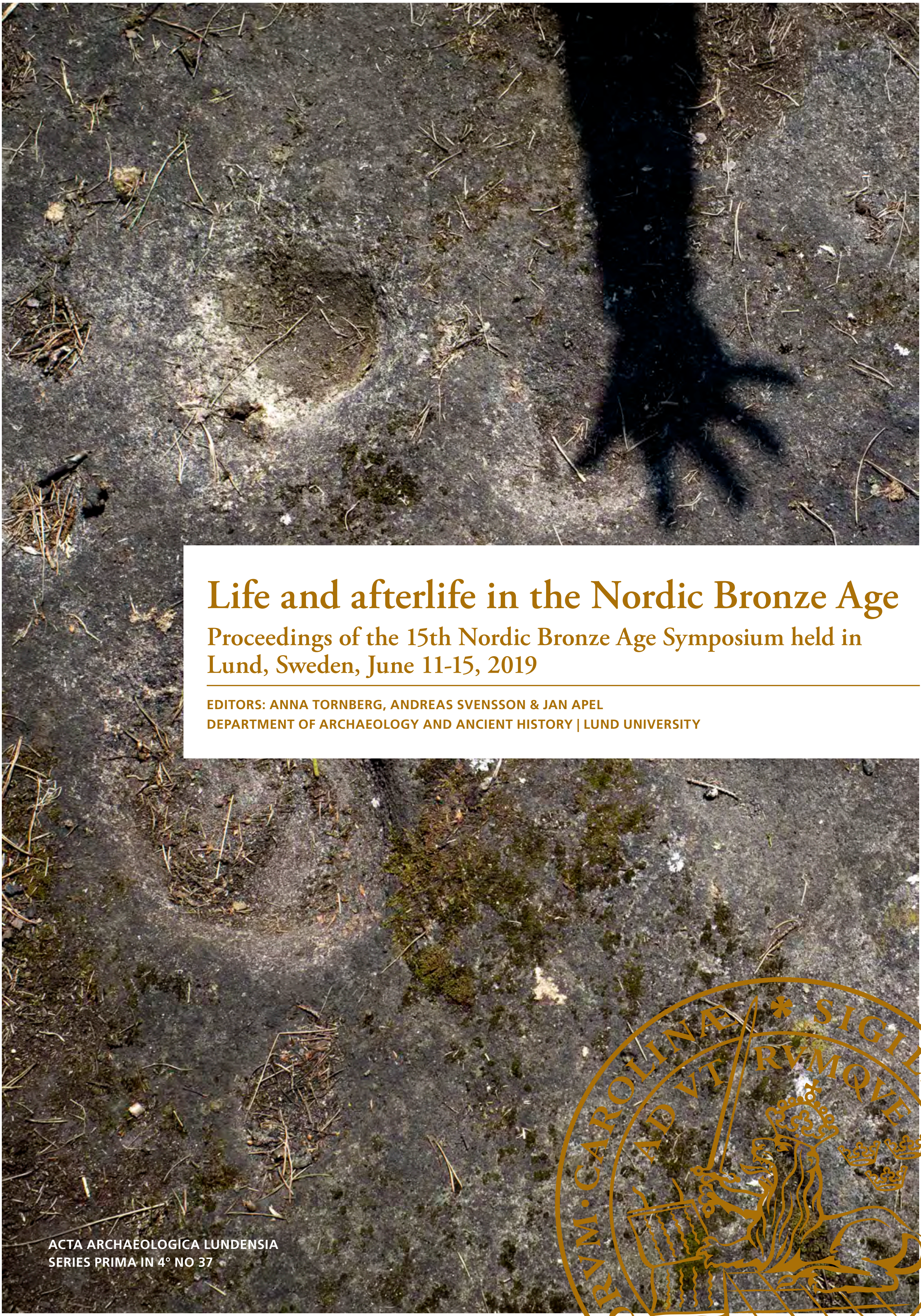

Life and afterlife in the Nordic Bronze Age

Proceedings of the 15th Nordic Bronze Age Symposium held in Lund, Sweden, June 11-15, 2019

EDITORS: ANNA TORNBERG, ANDREAS SVENSSON & JAN APEL

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Evidence of changing hunting practices in the south Norwegian highlands in the Late Neolithic/Early Bronze Age

Dag Erik Færø Olsen, Museum of Cultural History, University of Oslo

Abstract

This paper will explore hunting as an economic factor by comparing activity from the Late Neolithic/Early Bronze Age (LN/EBA) ca. 2350–1500 BC with the previous Early Neolithic/Middle Neolithic (EN/MN) periods, ca. 4000–2350 BC. Situated in south Norway, the mountain areas of Hardangervidda and the adjacent Nordfjella serve as the study area with evidence of reindeer hunting from the Early Mesolithic to present day. An important question is whether the utilization of the mountain areas fluctuated during the Neolithic and Early Bronze Age, and if so, why? Did the importance of hunting as an economic factor change after the transition to a more farm-based society in the LN/EBA? Was there an increase or decrease in the exploitation of mountainous resources? Through a diachronic analysis of settlement sites, these questions will be addressed to explore the role of hunting as part of the economy of agriculturally based societies in south Norway.

Keywords: Neolithic, Bronze Age, mountain, hunting, agriculture

The mountain areas of south Norway have a long history of human exploration with activity from the Early Mesolithic up to the present day (Indrelid, 1994; Loftsgarden, 2017; Olsen, D. E. F., 2020; 2022). This paper focuses on Hardangervidda, Europe's largest high mountain plateau, and the Nordfjella mountains to the north (Fig. 1). This area is part of a continuous mountain range called *Langfjella* ("the Long Mountains") which separates the western and eastern parts of Norway. Due to harsh climate conditions, there were never permanent year-round settlements in the high mountains. The geographical layout ensured that people from both regions visited these mountain areas for hunting reindeer and perhaps also for social interaction (Olsen, A. B., 1992; Bergsvik, 2006; Solheim, 2012; Nyland, 2016; Olsen, D. E. F., 2020; cf. also Loftsgarden, 2017 for discussions of activity in the Viking Age). Activity by various groups with different social traditions is reflected in the variation in the material culture found at the settlement sites.

Technological traditions in particular are suitable for identifying and distinguishing different regional groups, and therefore Hardangervidda and Nordfjella is an appropriate area for studying changing hunting traditions in a regional perspective.

The Mesolithic-Neolithic transition and the introduction of agriculture in south Norway seemingly took another form and process than that in southern Scandinavia, as in south Norway no longhouses or megaliths have yet been recorded, and there are few indicators of agricultural practice in general (e.g., Solheim, 2012; Reitan, 2016; Reitan *et al.*, 2018; Prescott, 2020; Nielsen, 2021; Solheim, 2021). There is however a marked presence of technological and cultural traits that can be linked to different pan-regional

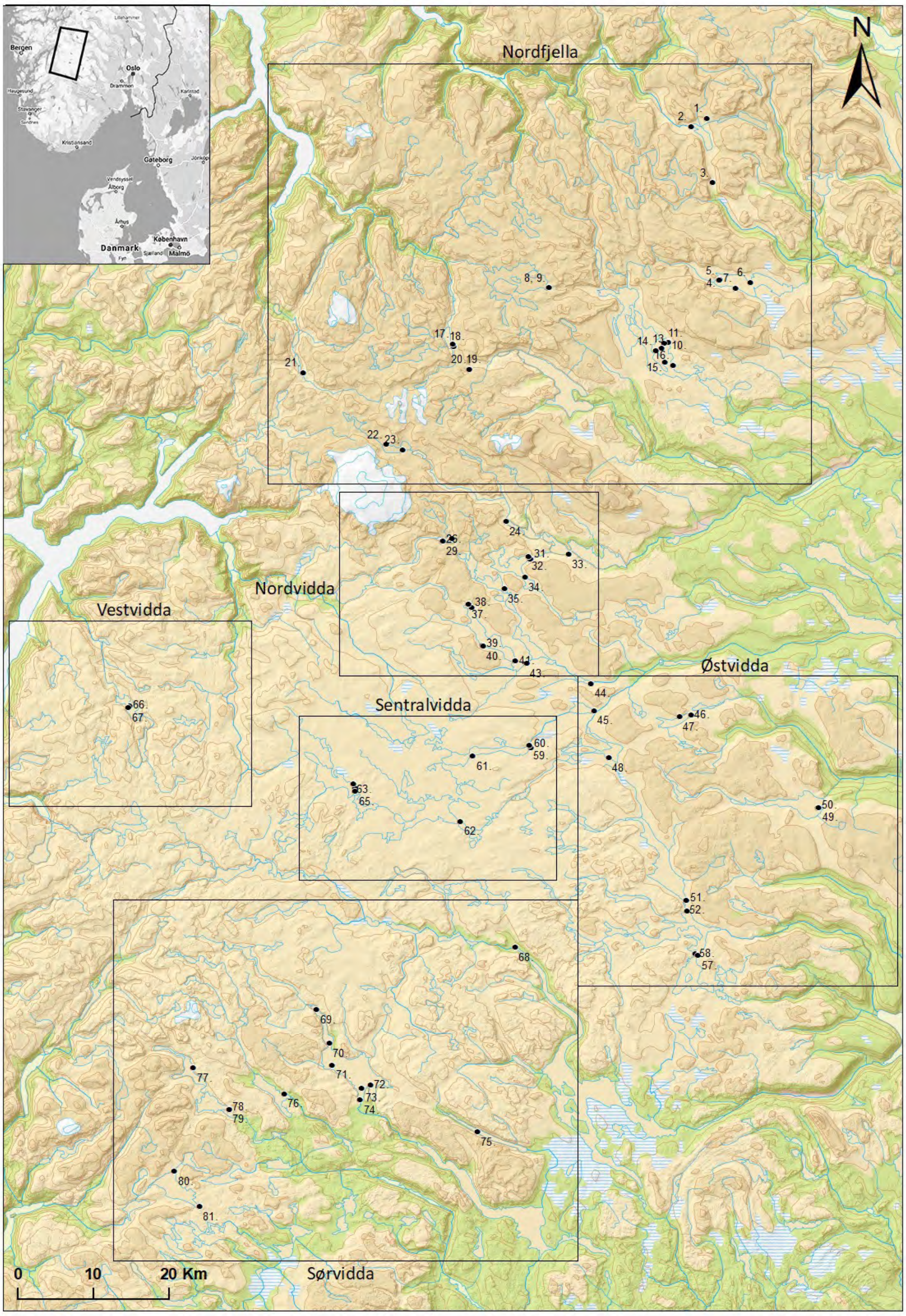

Figure 1. Map over the study area with sub regions and investigated sites.

networks in the Early and Middle Neolithic (EN/MN), such as the Funnel Beaker Culture (TRB), Pitted Ware Culture (PWC) and Battle Axe Culture (BAC). This points to active networks connecting, to varying degrees, different social groups in south Norway to south Scandinavia (Glørstad, 2010; Nielsen *et al*., 2019; Bergsvik *et al*., 2020). Agriculture did not become a transformative economic and social factor until the transition to the Late Neolithic (ca. 2350 BC) influenced by the Bell Beaker Culture (BBC) and its variants (e.g., Hjelle *et al*., 2006; Olsen, A. B., 2009; Prescott & Glørstad, 2015, Solheim, 2021). During the Late Neolithic and Early Bronze Age a farm-based society was established, and an interesting question is to what degree did this societal change influence hunting as an economic factor?

This paper presents some results of a research project that had the utilization of mountain areas during the neolithization (ca. 4000–1500 BC.) as an overall theme (Olsen, D. E. F., 2020). Two main topics served as research focus: the importance of hunting, and regional variation in material culture. Data from 81 existing archaeological mountain sites were re-examined and comprised 61 excavated sites and 20 that were surveyed (e.g., Martens & Hagen, 1961; Johansen, 1969; Indrelid, 1978, 1994). These sites were originally identified and investigated as part of the development of hydroelectricity projects from the late 1950s to late 1970s. This material has now been re-evaluated using updated typological-chronological knowledge (e.g., Olsen, A. B., 1992; Naerøy, 1993; Glørstad, 2004; Bergsvik, 2006; Jaksland & Kraemer, 2012; Mjaerum, 2012) and discussed in light of new culture-historical insights and recent research into Holocene climate variations (e.g., Bjune *et al*., 2005; Lilleøren *et al*., 2012; Nesje *et al*., 2012).

The original excavations were based on extensive surveying based on surface finds and test-pitting as part of various projects between the late 1950s and the end of the 1970s. There are some source-critical aspects that affected how sites were chosen for investigation, and these will be briefly discussed. As test-pit surveying was time-consuming, areas without much vegetation were often chosen, and this resulted in a favouring of beach areas near lakes (e.g Martens & Hagen, 1961, pp. 9, 49). The current theoretical trend based on processual archaeology led to an adaptational perspective where one assumed the Stone-Age people brought together as many functions as possible at the same site. This implied that most sites would lie near contemporary bodies of water since these areas had stray-finds, and consequently most of the effort was concentrated in these landscape types (Johansen, 1978, p. 20; Indrelid, 1994, p. 19). The challenge is that sites outside the focus areas might be underrepresented and give a biased version of the activity in the study area. This is however thoroughly discussed in my research project, and it is concluded that the settlement pattern with main occupation sites situated along or near lakes and rivers gives a representative image, but that more short-term specialized sites might be missing to some degree in the material (Olsen, D. E. F., 2020, pp. 147–148, 362ff.). As a basis for analysing long-term presence and activity in the mountain areas, the sites and archaeological material are thus thought to be of good enough quality and representation.

The sites were selected from all over the study area based on the presence of lithic material indicating activity during the Neolithic–Bronze Age. Several of the sites were also multi-phased and thus provided the potential for analysing continuity or change in activity over time. The study included all the sites with identifiable bifacial technology, also including those from the Pre-Roman Iron Age (PRIA), to increase the comparative potential across the 2350 BC border. The map (Fig. 1) shows the study area divided into sub regions with all the sites. They represent the general level of activity over time; an exception is the western parts of the Hardangervidda where only two Stone Age sites are known.

Chronology and technology

The various arrowhead technologies present at the sites have the greatest information potential for discussing chronological aspects and will be the focus in this presentation. Some of the technologies have a distinct chronological and/or regional affinity and include the use of raw material that in some cases has a geographical as well as chronological aspect. Even though the main research question in this paper is changing hunting practices after 2350 BC, it is necessary to include specific technological traditions from the Early Neolithic and onwards.

Arrowheads

The introduction of cylindrical blade technology and tanged arrowheads is one of

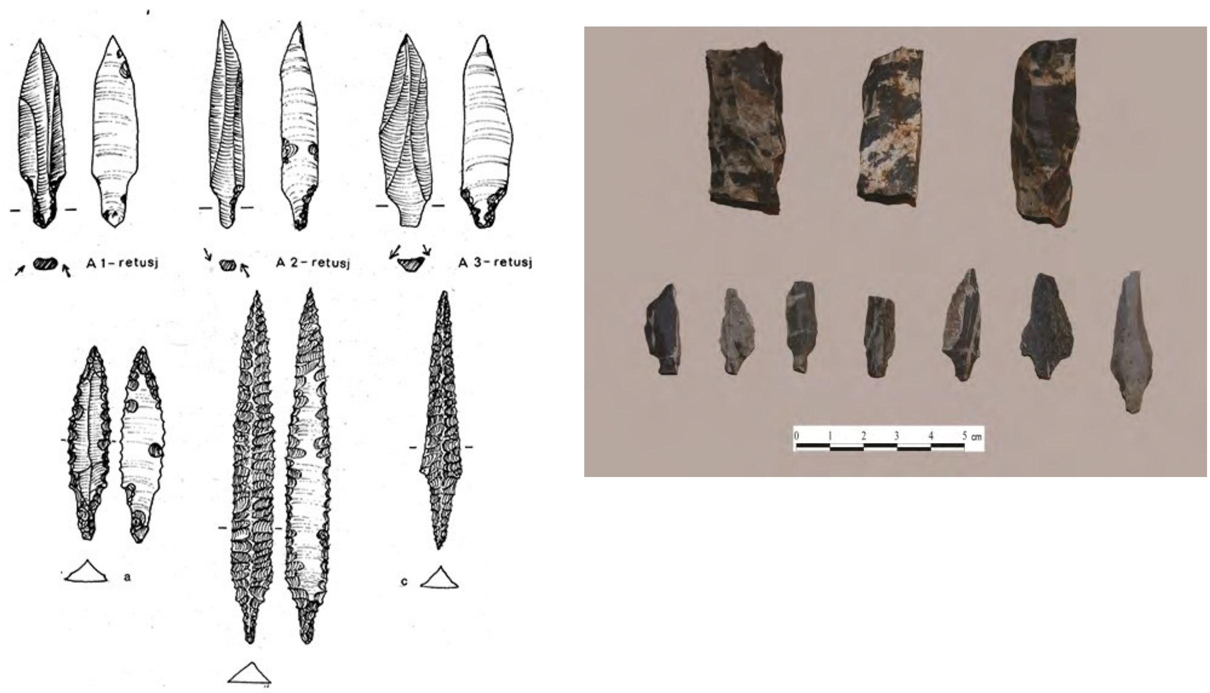

Figure 2. Left: Various types of tanged arrowheads mentioned in the text. After Olsen, D. E. F., 2020, based on Indrelid, 1994. Right: Cylindrical cores and tanged arrowheads type A of rhyolite. After Solheim, 2012.

the primary markers of the Mesolithic-Neolithic transition in western Norway ca. 4000 BC (Olsen, A. B., 1992; Naerøy, 1993; Bergsvik, 2006; Olsen, D. E. F., 2021).

Although various types of raw material were exploited, the technology is mostly connected to rhyolite, an igneous, magmatic rock that has only been quarried from Mount Siggjo on the island of Bømlo. This technology spread rapidly all along the western seaboard with a regional differentiation based on variation in raw material. Flint dominated in the south-west while rhyolite and various quartzites were more common further north. From 3500 BC, the technology was largely replaced by other technologies in western Norway such as bipolar and slate-based technologies. Using an indirect percussion technique alternating between two opposing platforms (Fig. 2, top right), regular blades could be produced for making tanged arrowheads of type A (Fig. 2, bottom right). The blade technology based on cylindrical dual-platform cores eventually spread to eastern Norway after 3500 BC at the end of the Early Neolithic. Here, flint was predominately used as raw material and can be identified at sites along the coast, inland and in the mountain areas. The early western Norwegian version of this technology is characterized by blades and arrowheads that are smaller relative to the later flint-made versions in eastern Norway (Olsen, D. E. F., 2021) and the difference can be used as a chronological marker. In the latter region, this type of blade-based tanged arrowhead gradually replaced various types of flake-based arrowheads, e.g., tanged, transverse and single-edged arrowheads which were predominately used during the Early Neolithic (Solheim, 2012) (Fig. 2, left).

Differences in lithic arrowhead technologies also distinguished western and eastern social groups in the Middle Neolithic A (3500/3300–2800 BC). Tanged arrowheads of type A remained important, based on flint along the coast and lowlands, but also with some use of quartz in the inland areas. Along

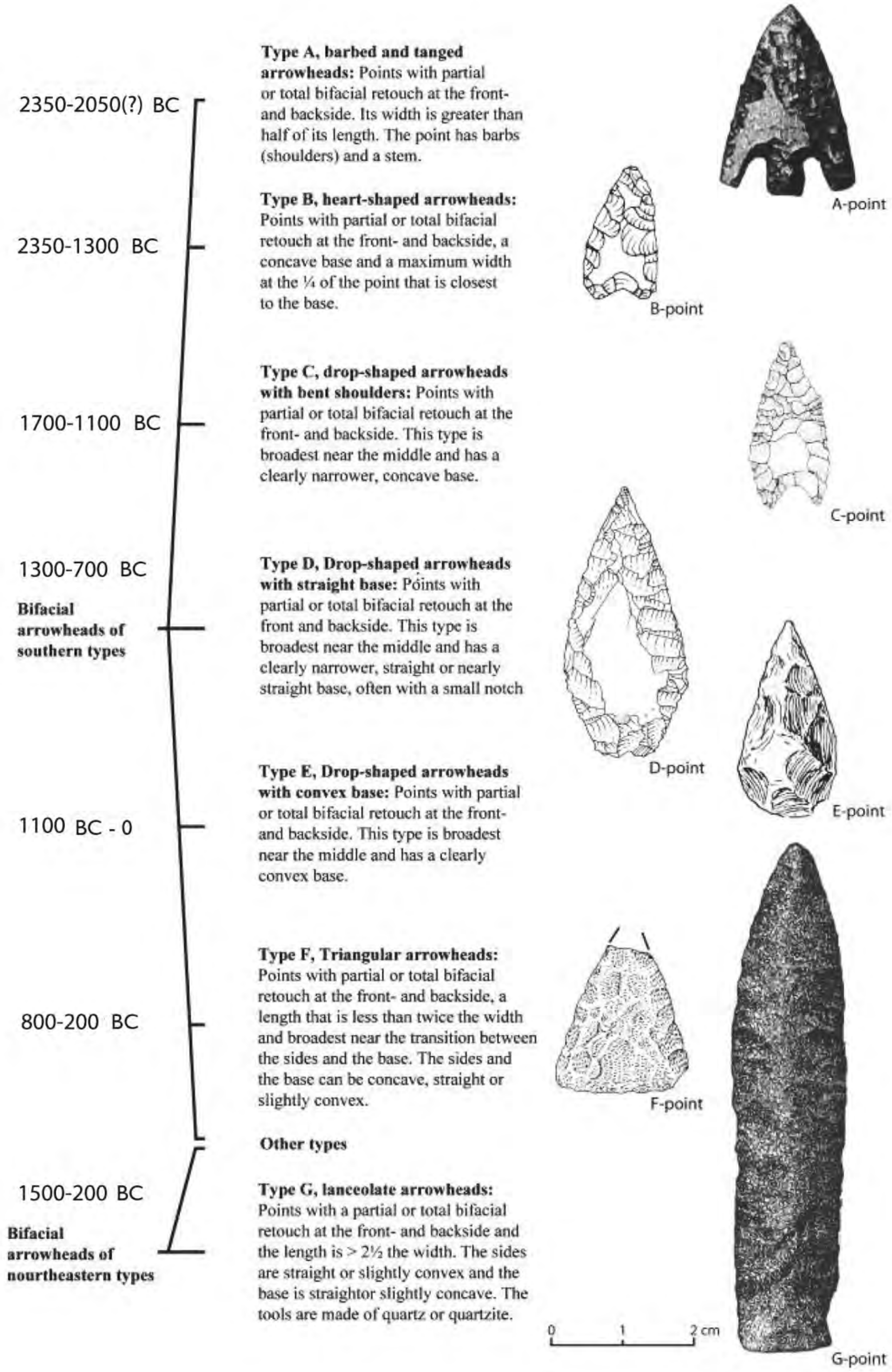

Figure 3. Chronological presentation of various typologically distinct bifacial arrowheads used as basis for analysing and dating activity at Hardangervidda and Nordfjella. After Mærum 2012.

the western parts of Norway slate technology became important, and this was a development shared with eastern parts. This resulted in a mix of locally unique and shared technologies that are also represented at mountain sites. Eastern Norway seemed more connected to southern Scandinavian networks as indicated by the presence of ceramics and various flint axe types. Western Norwegian groups were more semi-locally oriented and involved in other types of networks (Bergsvik, 2006). This seemingly changed during the Middle Neolithic B (ca. 2800–2350 BC) with the introduction of tanged arrowheads of types B–D in both eastern and western Norway (Fig. 2, bottom left). Slate technology continued to be used, and one interpretation is that central parts of west Norway became more integrated in southern Scandinavian networks (Olsen, A. B., 2012; Bergsvik *et al*., 2020), perhaps through increased activity in the mountain areas and more interaction with groups from eastern Norway (Olsen, D. E. F., 2020).

A change occurred during the Late Neolithic (2350–1700 BC), based on a more-commonly shared material culture with agriculture as a central economic factor. The shift to bifacial technology can be traced throughout south Norway and shows more homogenous and far-reaching networks (Apel, 2012; Mjaerum, 2012; Prescott, 2012) (Fig. 3). How did this affect the activity at the Hardangervidda and Nordfjella mountain areas?

LN-PRIA indicators—bifacial arrowheads

Bifacial arrowheads comprise approximately 15% of all arrowheads in the study and are comparable in numbers with the transverse type and type A tanged arrowhead. Figure 4 shows all the sites (26) with bifacial arrowheads in absolute numbers and as a percentage of all arrowheads at the sites. The variation of the sites is interesting regarding two important aspects: the extent of bifacial technology and if the sites are single- or multiphased. Sites with high relative numbers are represented in most of the study area (missing in western parts), but in the central parts of Hardangervidda bifacial arrowheads are in low relative and absolute numbers (site nos. 62–64). This area stands out from the rest and indicates less continuity in activity. The sites with medium absolute and relative numbers are interesting as examples of places with greater time depth and more continuity of activity related to hunting and fishing.

Also prominent are eleven sites where bifacial arrowheads make up 80–100% of all the arrowheads found. These sites are interesting as they represent mostly activity from the Late Neolithic and later periods. Six of them are defined as rock shelters; naturally occurring outcrops in cliffs or glacier-transported boulders under which shelters could be made. A hypothesis has been that rock shelters and caves became more frequently used from the Late Neolithic and thus represent a shift in settlement preferences linked to the introduction of transhumance (Indrelid, 1994, pp. 229, 269). A total of eleven rock shelters and caves were included in the study and 50% showed significant activity from the Late Mesolithic, and some even earlier. The data from this research project allowed the conclusion that the previous interpretation needs refining and that these types of settlements have always been valued (Olsen, D. E. F., 2022).

Bifacial arrowheads are divided into six subgroups (A–G) in addition to blanks, fragments and unknown/undefined (Fig. 3). The chronology and classification is primarily based on the work of Axel Mjaerum (2012), who studied most of the material in the collection of the Museum of Cultural History (University of Oslo). Types A–C can be dated to the Late Neolithic/Early Bronze Age and types D–G were mainly used in the Late Bronze Age/Pre-Roman Iron Age. Type A, also known as Bell Beaker point (*klokkebegerspiss*) is not represented in the study area, but occurs frequently in the coastal areas (Mjaerum, 2012). The B-type arrowhead, also called heart-shaped (*hjerteformet spiss*), was primarily used from

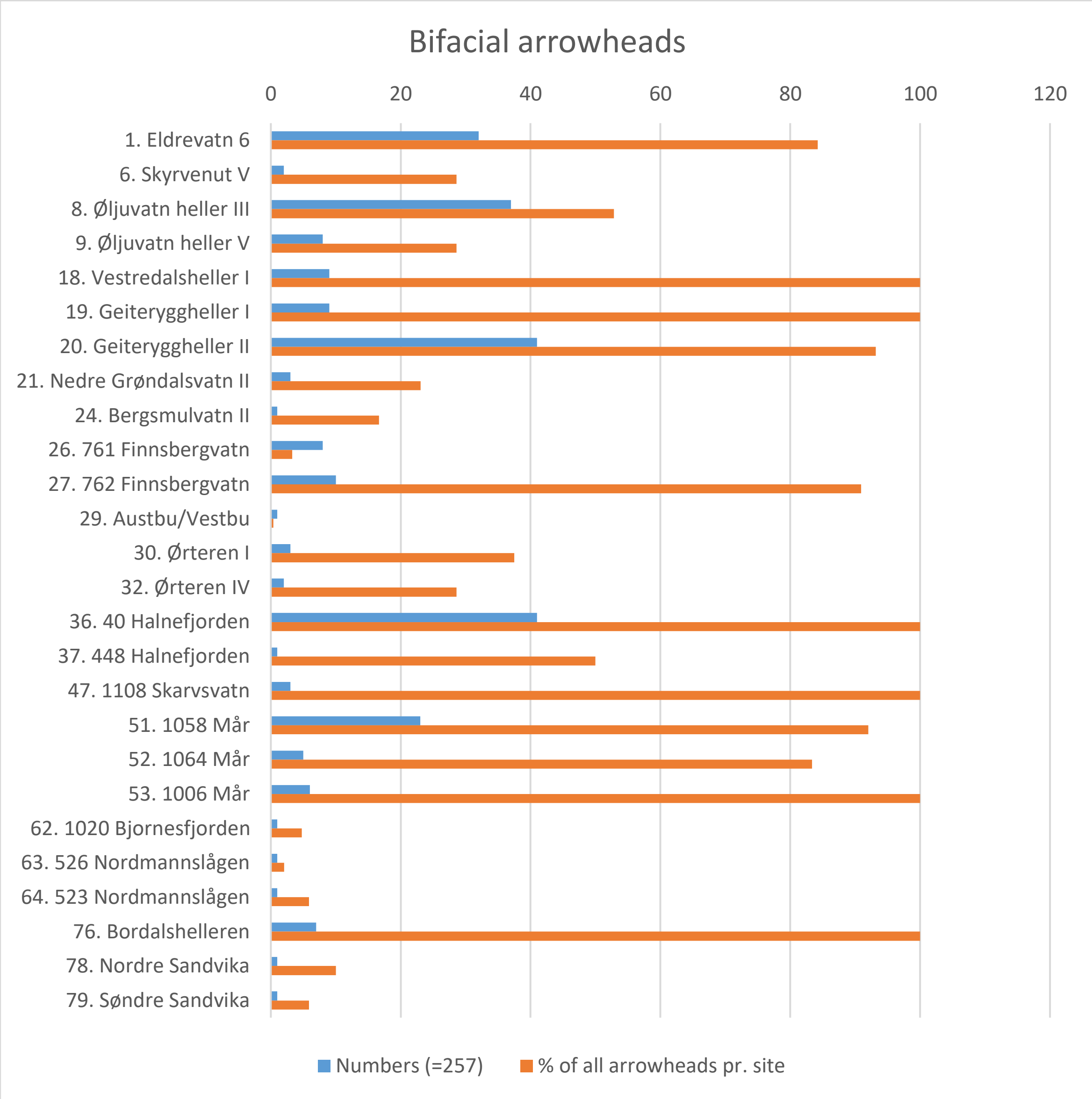

Figure 4. Distribution of bifacial arrowheads by sites. The diagram shows absolute numbers by site and relative numbers as percentage of the total numbers of arrowheads by site.

around 2100 BC (LN II) and into the beginning of the EBA (Mjaerum, 2012).

Quartzite is the predominant raw material and its use is a trend that increases over time (Fig. 5). Flint has also been used to some degree, unlike quartz which was rarely used in this technology. Easy access to high-quality quartzite in Nordfjella can at least partly explain the attraction to this raw material (Nyland, 2016), a tradition which was practised for almost 2,000 years.

Thirteen sites include arrowheads of the early types (B and C) with a majority in northern, central and eastern parts of the study area, but none in southern and western parts. A possible explanation for this trend is changing practices and traditions after 2350 BC by various groups, but arrowheads and ^{14}C dates indicate an increase in activity at least from the latter part of the Early Bronze Age (Olsen, D. E. F., 2020, 288). These trends can be further explored by comparing with earlier activity in the same mountain areas.

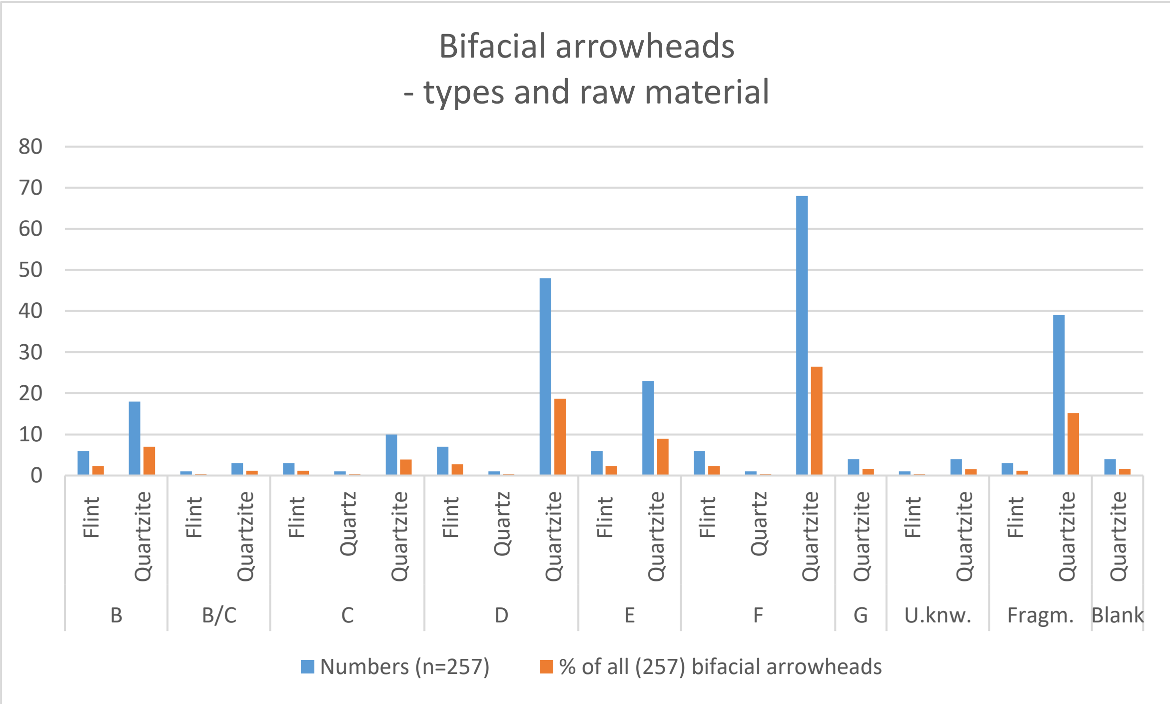

Figure 5. Distribution of bifacial arrowheads by type and raw material shown as absolute numbers and as percentage of all bifacial arrowheads.

Activity phases

The majority of the 61 excavated sites (47) can be defined as multiple-phased based on chronologically distinct technological material. About two-thirds of the sites include remnants of cultural layers and suggest revisitation of the same sites or local areas over hundreds or even thousands of years. In the following, artefacts will be used to establish different activity phases that can indicate variation over time. The focus will be on the 2350 BC transition by comparing the activity before and after this point.

Based on various types of technological traits, the activity was divided into a low-resolution timeline based on the classical chronological division of the Neolithic and the Bronze Age. As this chronology is mostly established based on south Scandinavian material culture, there is not always a clear correlation between technology and chronology. A pragmatic approach is necessary to quantify the activity over time and does not reflect variation in the degree of activity at sites between different phases. This low-resolution chronology is not suitable for identifying short-term changes, but can show larger transitional changes such as the proposed deneolithization in Middle Neolithic A (MN A) and the transition to agriculturally based societies at the end of the Neolithic. Each chronologically distinct activity, as represented by lithic material, is counted as a separate activity phase even if the actual numbers of arrowheads or other material varied. The focus in this paper will be the transition between Middle and Late Neolithic which includes a more distinct technological change.

A total of 154 distinct activity phases has been identified at 81 sites (including the surveyed sites). Figure 6 shows two timelines dividing the activity into four approximately 1000-year chronological phases. The topmost timeline includes all the activity phases while the lower divides the activity per 100 years within each chronological phase. They are comparable, indicating

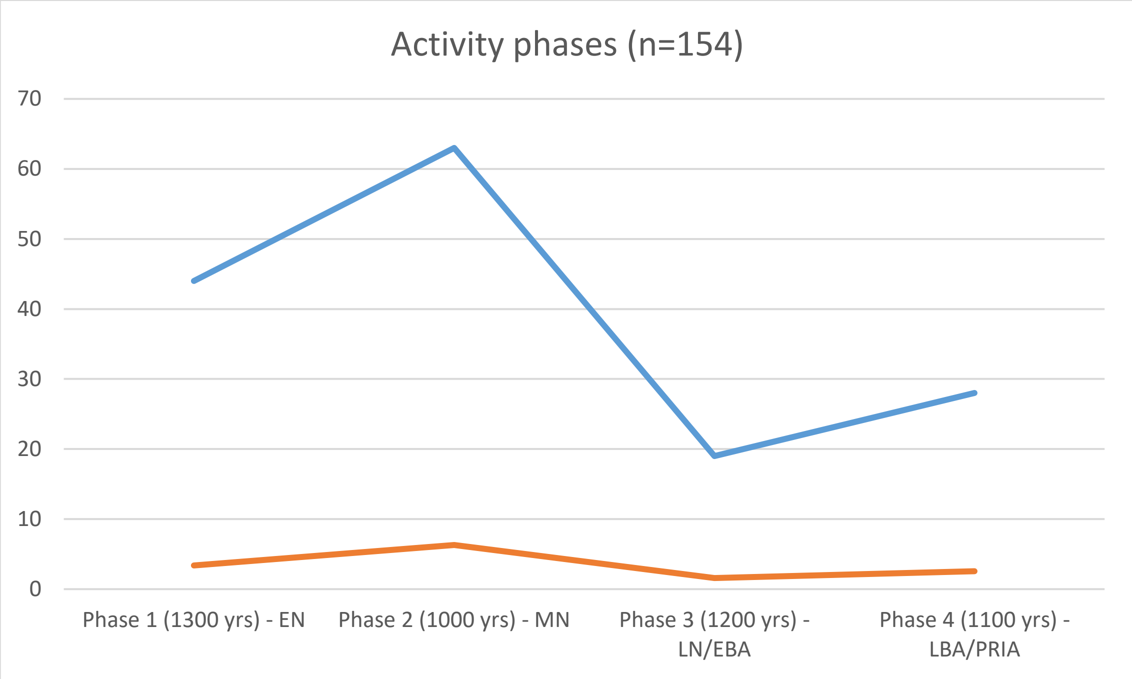

Figure 6. Activity phases. Top curve shows all activity phases by chronological phases. Bottom curve shows number of phases by 100 years.

similar trends with an increase in activity between the Early and Middle Neolithic and a decrease between the Middle and Late Neolithic/Early Bronze Age. We can also see a possible increase in activity in the Late Bronze Age/Pre-Roman Iron Age. This gives an indication of the relative activity at the mountain sites over 3000 years, but the trend does not apply in general for the mountain areas. This is reflected in Figure 7 where the same trend is divided by sub-regions (see also Fig. 1), showing clear variations in activity. The activity over time is not evenly distributed throughout the study area, where the trends are most prominent in the northern and eastern areas (Nordfjella, Nordvidda and Østvidda). The central and southern areas (Sentralvidda and Sørvidda) have few indicators of activity in phase 3 (LN/EBA), and this points to a differentiation in the use of these mountain areas in the last part of the Neolithic. The phases only give us a general and condensed picture of variation in activity and cannot indicate if the changes were over longer or shorter periods of time.

The apparent abrupt changes between phase 2 and 3 might have happened over a longer period, and if so would have appeared differently in the diagrams. Nor does the curve in Figure 6 indicate if the changes took place in the transition/early in the LN, or if it had already started towards the end of Middle Neolithic B (MN B). In order to explore this further, other factors such as demographic and climatic changes must be incorporated into the analysis to discuss these trends in order to illuminate hunting as an economic factor in the LN/EBA.

Discussion

Activity phases and demographic trends

Arguments have been made that changes in settlement pattern happened from the end of Middle Neolithic B, which prepared or instigated the transition to farm-based societies after 2350 BC (Hjelle *et al.*, 2006; Olsen, A. B., 2009; Bergsvik *et al.*, 2020). A challenge in exploring this narrow time period is that few artefacts present at mountain sites can be delimited to MN B alone. Most were also in use from MN A or

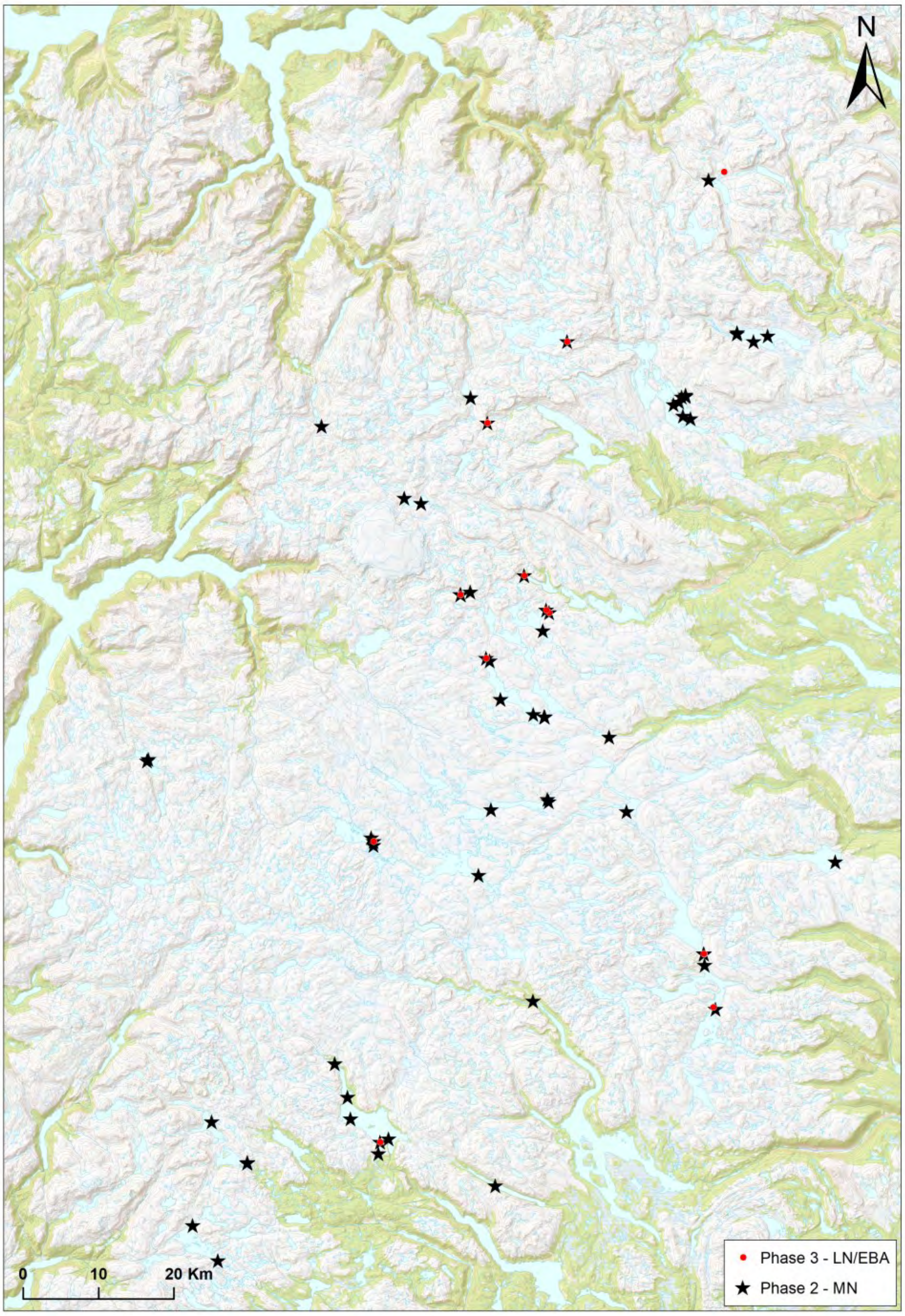

Figure 8. Distribution of all sites with activity from the Middle Neolithic and the Late Neolithic/Early Bronze Age. The current forest line is equivalent to the situation after the decline in temperature at the transition between the Middle Neolithic B and the Late Neolithic. Earlier in the Neolithic the forest line was higher.

even earlier, resulting in treating the whole of the Middle Neolithic as a separate chronological phase. The same is also relevant for the LN/EBA, where the two oldest types of bifacial arrowheads (with a concave base) present at mountain sites could be from the last half of the LN and the first half of the EBA (Fig. 3). If we look at the spatial distribution of the activity phases, the variation is obvious between the Middle Neolithic and the Late Neolithic/Early Bronze Age (Fig. 8).

We clearly see a spatial reduction in sites from the LN/EBA, concentrating the activity in fewer areas and most markedly the northernmost and eastern parts. This correlates with the trends from Figure 7 and visualizes the variation in activity within the study area. How can this be interpreted? Was there a general decrease in activity in the LN/EBA or does it represent changes in landscape use not reflected in the discovered settlement sites? A comparable area is the Nyset-Steggje mountain area further north that was surveyed and excavated in the 1980s. This project focused on identifying activity from the LN and found that the settlement localization in this period differed from earlier in the Neolithic (Bjørgo *et al*., 1992; Prescott, 1995). The sites were found further away from contemporary bodies of water than at other mountain areas and these locations were interpreted as due to pasture being the primary factor for choosing settlements. However, there was also less activity in this area in the LN/EBA compared with the EN and LBA/PRIA. An explanation was that some mountain areas became less important during the early phases of farm-based societies and that this changed again later (Prescott, 1993, p. 215). Could this have been the case for Hardangervidda and Nordfjella?

Figure 9 combines several timelines for comparing the trends shown in the archaeological activity phases (to the left). The different curves in the diagram are not exactly correlated but give a representative and relative comparison. The coloured bars in orange and purple represent population increases and decreases respectively (cf. Nielsen *et al*., 2019) and those in grey mark chronological delimitations. The sum curve for ^{14}C dates is based on 70 dates from sites in the study area. The curve by Nielsen *et al.* shows the demographic development in south Norway during the Neolithic based on 643 ^{14}C dates from 204 coastal, inland and mountain sites (Nielsen *et al.*, 2019). The climate curve to the right reflects Holocene temperature variations based on Lilleøren *et al.*, 2012.

The ^{14}C sum curve for sites in the study area gives an indication of the activity that can be compared with activity as reflected through the lithic material. The ^{14}C dates stretch over a period from ca. 8000 cal. BC to the end of the PRIA (Olsen, D. E. F., 2020, p. 356, fig. 131) but in Figure 9 only dates from ca. 4000 BC are included. There is an increase in dates starting at the end of the Late Mesolithic, peaking around 3800 BC before dropping to a low point around 3500 BC. A new increase can be seen from ca. 3200 BC with a high point towards the end of the MNB around 2500 BC. After this the number of dates once more decreases until the transition between LN I-II ca. 2100 BC, with a subsequent rise until the transition to EBA I ca. 1700 BC. After this there is a marked drop in ^{14}C dates which lasts at least until the middle of the LBA (Olsen, D. E. F., 2020, p. 356). Although the number of dates is few, there is a clear correlation in the trends described by Nielsen *et al.* in Figure 9. They interpret the demographic trajectory in the Neolithic in terms of four population changes. The first increase was in the EN between 3900–3600 BC and the next in LN II between 2000–1750 BC. Two phases with a population decrease have been suggested, the first a being a short decline at the transition to MN A at approximately 3300 BC and then early in LN I between 2200–2100 BC (Nielsen *et al*., 2019, p. 85). The ^{14}C dates from the study area and the demographic trajectory overlap to a large degree, which is expected as most of the dates from the mountain areas are included in the data set of Nielsen *et al*. The latter includes more dates from comparable mountain areas and thus lends more credibility to the data from the mountain sites in comparison with the archaeological data, especially when seen together with the dates from other parts of south Norway. It is important to note that the people active in the mountain areas are the same that lived in coastal and/or inland areas the rest of the year. The activity in the different regions must then be analysed within the same interpretative frame as they reflect a diverse resource exploitation by groups moving laterally between coastal/lowlands and alpine areas. In the curve for the activity phases, there is a possible increase in activity from

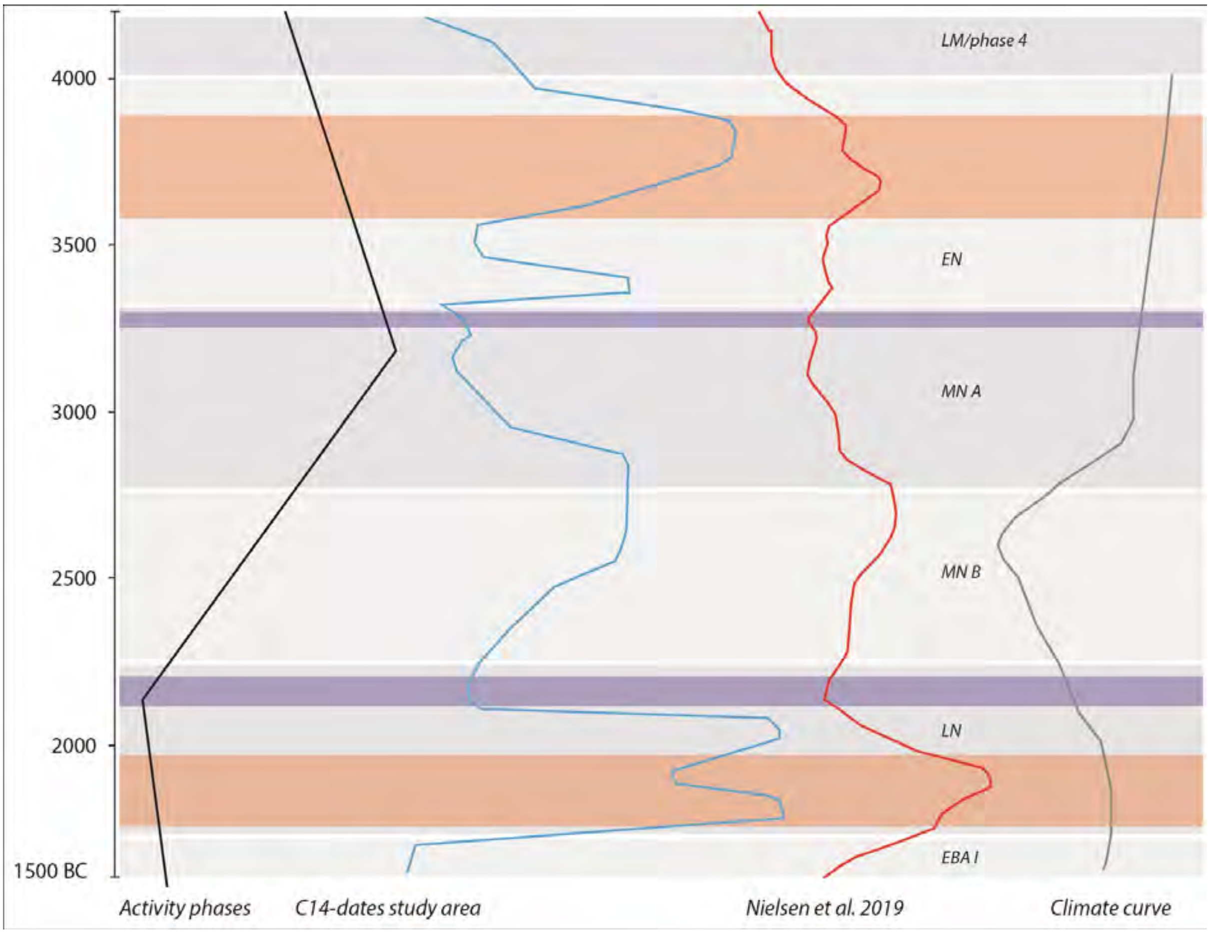

Figure 9. Diagram with activity phases, 14C-curve for the study area, demographic development and a temperature curve both for South Norway. The orange and purple bars reflects population increases and decreases respectively (based on Nielsen et al. 2019).

the LM/EN and the MN. The ^{14}C data from the study area indicate that this could have happened at the end of the EN, but is not reflected in Nielsen *et al*. Their proposed population increase in the EN can also be seen in the ^{14}C data but not in the activity phases. A possible explanation is that the apparent increase in archaeological activity actually took place in the LM/EN transition but this is difficult to pursue, as the resolution is too low. The intensification in activity in the Middle Neolithic as reflected in the archaeological material can possibly be more precise when compared with the other data. The short-termed decline in the demographic curve is hard to correlate to the activity phases, but is indicated in the ^{14}C data and by other researchers (e.g., Selsing, 2010, p. 240). There is however an increase in ^{14}C dates from the study area from just before 3000 BC with a peak between 2700–2500 BC. This is also discussed by Nielsen *et al.* but the deviations are not considered significant enough (cf. Nielsen *et al.*, 2019, fig. 2b). It is however, important to consider that trends from more general population studies for the entire area of south Norway does not necessarily reflect specific areas and that the situation described by the data from the study area could be more accurate in this particularly case. I would suggest that the increase in activity as seen in the archaeological material (activity phases) reflects the situation from the last part of MN A and the start of MN B (see also Selsing, 2010, p. 255). An interesting correlation is the temperature curve to the right in Figure 9, which shows a significant temperature drop within the same period, and could be a factor for explaining the fluctuation in activity at the mountain sites.

The last change in activity that will be discussed here is the relation between the

MN and the LN/EBA. The ^{14}C data and the demographic trends provide important insights that can be used to narrow down the activity phases. The population decrease in LN I has been argued to start at the end of MN B after 2500 BC (cf. Nielsen *et al.*, 2019 and can be seen in the ^{14}C sum curves. The next population increase in LN II is harder to correlate to the activity phases, but again it is possible that this specific demographic change did not occur in the study area. The activity decrease in the mountain areas in the LN/EBA has been proposed earlier (Indrelid, 1994, fig. 99; Selsing, 2010, pp. 252–253) and a hypothesis is that the activity in the study area from the LN/EBA was between 2000–1700 BC.

Climate changes—the 5.2 ka. event

A cold spell can be traced throughout Fennoscandia (Wanner *et al.*, 2008, p. 1795) and has been detected in glaciation growth in south Norway (Bakke *et al.*, 2008; Gjerde *et al.*, 2016). During a period of 500 years the mean temperature dropped by almost 1.5° C from just over 1° C warmer than today to almost 0.5° C colder (Olsen, D. E. F., 2020, p. 79). This temperature curve is general for south Norway and the fluctuations were not necessarily homogenous. It is however clear that this had an impact on the forest line in the mountain areas as it was slowly lowered. At the start of the EN the forest line reached as high as 1200 m.a.s.l., meaning most of the settlement sites were in a forested landscape comprised mainly of birch and some pine in lower altitudes (Faarlund & Aas, 1991, p. 116, tabell 1; Eide *et al*., 2006, pp. 77–78). This changed during the cold period beginning after 3200 BC, and gradually both the Hardangervidda and Nordfjella mountains gained an alpine vegetation without woodland. The most important effect of this change is hypothesized to be larger grazing areas for reindeer leading to larger herds than previously (Selsing, 2010, p. 241; Olsen, D. E. F., 2020, p. 369). This in turn would have meant an increase in hunting resources and consequently more activity in the mountain areas in general. This climate and environmental change fits with the archaeological and demographic data and is an important factor for explaining the activity during the MN. After 2700/2500 BC the temperature rose again and reached its maximum at ca. 1° C warmer than today at around 2000 BC (Lilleøren *et al.,* 2012). After this, the temperature fell gradually towards the transition to the LBA (Olsen, D. E. F., 2020, p. 368). This could mean a higher forest line again at the transition to the LN and thus fewer or smaller reindeer herds.

Hunting in the Late Neolithic

The available data suggest changing trends in activity between the end of the Middle Neolithic and the Late Neolithic. The use of landscape as reflected by settlement sites seems to be more focused on fewer areas in the Late Neolithic/Early Bronze Age than before. There are some possible sources of error, one being the premise that transhumance/herding became important and led to changing settlement requirements. As argued earlier in this paper, there is little evidence that this was the case from 2350 BC and it certainly was not a homogenous development for the whole of south Norway. There is convincing evidence that there was a change and possible lowering of activity at the Hardangervidda and Nordfjella mountains in this period. The task has been to specify and to narrow the timeframe, and to propose some explanations as to why this happened.

It is clear that the activity never stopped, and that hunting and trapping in the mountain areas continued to be an economic factor throughout the Neolithic and Early Bronze Age. The results from this study also show that the activity fluctuated during this time, caused by various factors. To understand the changes in the Late Neolithic/Early Bronze age, both population changes and cultural upheaval must be considered. A general population decline is suggested starting after 2500 BC and with a low around 2100 BC (Nielsen *et al*., 2019). This in itself might have affected the activity at Hardangervidda and Nordfjella with fewer people migrating seasonally between the coast and mountains. The transition to a farm-based society might also have had consequences for activity in more "marginal" areas such as the high mountains. Establishing a new agricultural economy centred on permanent settlements with longhouses could have led to less focus on these types of subsistence activities, at least initially. One can also argue that permanent settlements led to land ownership and that farms closest to the Hardangervidda might have had a claim on these areas and resources. In addition, the climate fluctuations could have led to a rise of the forest limit again, resulting in fewer and/or smaller herds of reindeer and consequently less activity concentrated around key sites. There was however, an expansion again from the Late Bronze Age/Pre-Roman Iron Age with a broader utilization of the landscape, and hunting also continued to be an important economic factor in agrarian societies.

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