

ROCK PROCUREMENT IN THE EARLY NEOLITHIC IN SOUTHERN NORWAY

Significance by Association with People and Places?

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Rocks and places of rock procurement can be significant beyond pragmatic reasons. In the Early Neolithic in southern Norway, specific rock types and quarries appear to have been deeply entangled in socio-political strategies that either bound people together or set people apart. Charted variations in the character of lithic procurement and distribution indicate two parallel but diverging processes of “Neolithization” in the western and eastern region respectively. In the west, rhyolite from a quarry atop Mt. Siggjo was especially significant, demonstrated by the intense quarrying and wide distribution of rhyolite along the west coast. Indeed, in the west, certain quarries appear to have been regarded as nodal points, anchoring people’s sense of identity and belonging. In the east, imported flint gained a similar role because of its association with farming and Funnel Beaker–related societies in southern Scandinavia. That is, rock was significant not only due to its physical qualities, but by its association with a specific place, social or cultural group.

Key words: Lithic procurement practices, rhyolite, flint, Early Neolithic, southern Norway

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INTRODUCTION

It has been argued that in the Early Neolithic, from about 4000 BC, quarrying became tightly organized, regulated, and restricted (Bergsvik 2002:14; 2006:165f). However, whereas some quarry sites may reflect increased regulation and control, other rock procurement sites imply other types of engagement and practices too. Demonstrated variation across southern Norway shows that rock procurement cannot be treated as a homogeneous phenomenon (Nyland 2016). Since procuring rocks for tool production will always involve a variety of choices, the practice is influenced by cultural and social settings and traditions. By comparing activity at 21 quarries from across southern Norway, variation in rock procurement practices has been identified (Nyland 2016:222ff). The manner in which the lithic landscape was engaged with is here regarded as social in essence, and lithic procurement as a culturally expressive phenomenon. This perspective is supported by theories where the execution and organization of tasks or activities, lithic procurement included, are always related to a cultural, historical and social situatedness (e.g. Bourdieu 1990; Ingold 2011; Lemonnier 1993; Mauss 1979). My interpretations are also built on theories of how societies can respond when confronted with external influences (e.g. Barth 1969; Berger & Luckmann 2011).

Lithic assemblages at settlement sites, and preferences and scale of exploitation of certain rock types, all display variability on both the local and regional scales. Some rock types have been intensely exploited while others were less frequently employed. Naturally, the exploitation of different rock types is both pragmatic and deliberate in terms of what kind of tools one wanted to make, and the availability of rock sources. However, variabilities beyond functional aspects and geological preconditions determining the availability of rocks can also be identified. For example, there is great variation in the period of use between the different sites. While some quarries may have been established in the Early Neolithic, others had already been exploited for several millennia. Furthermore, quarried rock could have been used in the immediate surroundings, and could have been transported across vast distances. In this article, I relate the differentiated use of rock and place to two contemporary but diverging processes of “Neolithization”, in the western and eastern region in southern Norway respectively. Lithic procurement and raw material variation can in this way contribute to expand our understanding of the “Neolithization” process in southern Norway. The process of regional diversification had commenced by the Late Mesolithic and accelerated in the Early Neolithic. In this article, I interpret the acceleration in relation to the incipient contact with farming com-

munities from southern Scandinavia in this period. It appears that in the two regions, different measures were taken to create social relations with people of different cultural affinity, or to maintain the status quo. That is, when facing new cultural impulses and people, the inhabitants in the two regions chose different social-political strategies. Material culture was employed either to bridge experienced cultural differences between groups of people or to set people apart.

Furthermore, I also regard some of the quarry sites as being places reifying collective memories and ideas, here regarded as significant *nodal points* (see Boyd 2002). That is, certain places of rock procurement were places of significance beyond pragmatics, visible in their particular exploitation. Two of the quarries I will discuss in this article had been continually exploited in the millennia prior to the Early Neolithic; another one was established and intensely exploited, and the raw material widely distributed from the Early Neolithic onwards. Interpreted in light of the Early Neolithic being the period of incipient contact between the hunter-gatherers of southern Norway and farming societies in southern Sweden, Scania, and Denmark, lithic procurement is here perceived as imbued with symbolic qualities linked to origin, territorial rights, and ancestry. Such sentiments would then pull people back to a place or a region, anchoring group identity as a result. In this way, rock from potent places, and rock types associated with different people, played an important role in the development of regional identities (Nyland 2016). As a consequence, the rock from these places of social or symbolic importance became significant by association too.

VARIABILITY IN EARLY NEOLITHIC LITHIC PROCUREMENT IN SOUTHERN NORWAY

Mountainous plateaus divide southern Norway into two main regions: western and eastern Norway (Figure 1). From the Early Neolithic onwards, there are more exploited quarries in the west than in the east, although repeated procurement from selected sources does not seem to have been dominant. Indeed, the only large-scale and enduring quarry known in eastern Norway, the Flendalen jasper quarry, was abandoned at the start of the Neolithic (see discussion of chronology in Nyland 2016:152). Quarrying of immense time-depth is instead a characteristic mark of procurement practices in western Norway and the mountainous region, but there is also variation in contemporary practices within the regions. This article will focus on nine quarries exploited simultaneously during the Early Neolithic.

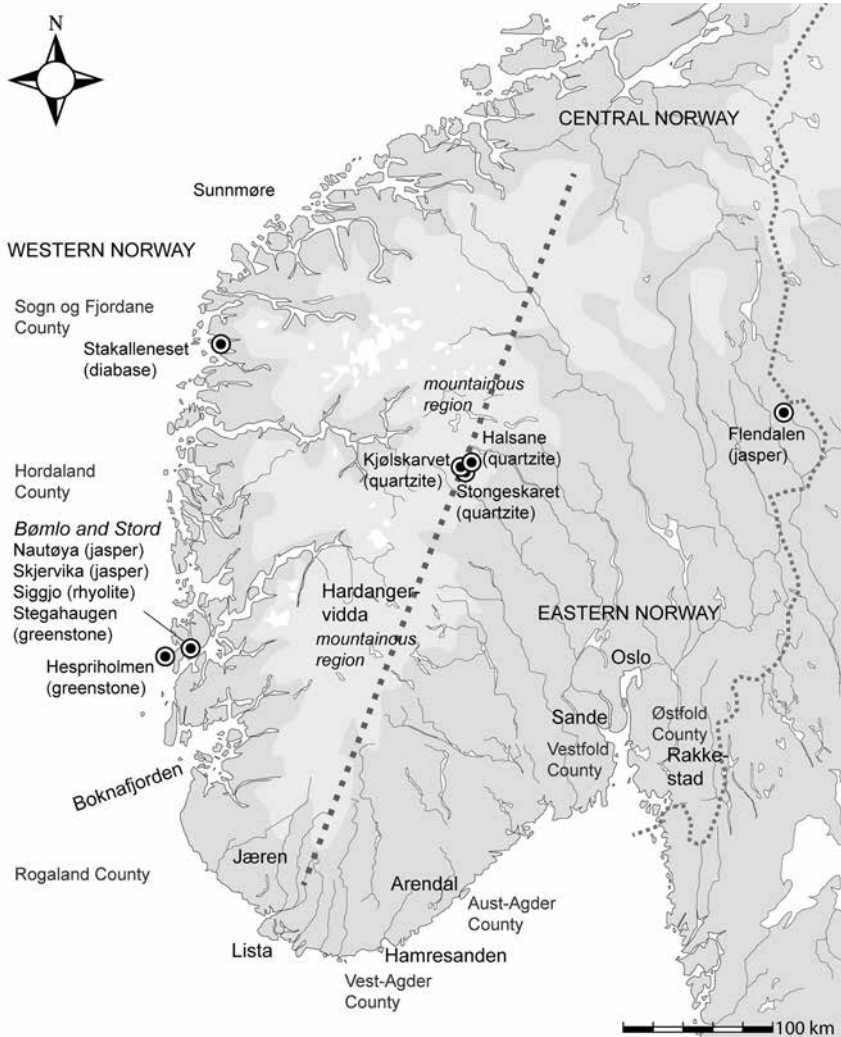


Figure 1. The two principal regions of southern Norway: "western" and "eastern" Norway. The map includes sites and place names referred to in the article and in Table 1.

Dating lithic extraction sites can be problematic, and requires a combination of methods. In southern Norway, the preservation of organic material is poor at Stone Age sites in general. However, this is not the only reason why charcoal is not found at most quarries, as the use of fire does not appear to have been a common quarrying technique in southern Norway. Still, there is evidence of fire having been used to obtain diabase in a large adze quarry at the Stakalleneset headland (Olsen 1981), and at the greenstone quarry on the islet of Hespriholmen (Alsaker 1982, 1987). It was also used in a quarry atop Mt. Siggjo

(Alsaker 1982, 1987). Sampled charcoal from the waste piles at Flen-dalen jasper quarry is believed to date fire used to clear vegetation in relation to quarrying, but not as a technique to loosen it (Mikkelsen 1984; Sjurseike 1994). Nevertheless, the few ^{14}C -dates do not exhaust our options for dating. The relations of sites to ancient seashores can be relevant if the site was at some point transgressed by the sea. Because of isostatic movements of the land after the last Ice Age, most of the south Norwegian coastline rose quicker than the sea. However, the sea caught up with the land in parts of the southernmost and western coast, causing a temporary seashore transgression. This affected the quarries located close to the sea, as pertains to this article, especially the quarry at the islet Hespriholmen.

Typology has proven to be the most reliable method of dating. That is, the activity in the quarries has been dated through relations to chronologically distinct artefacts or lithic technology, such as preforms for certain adze types or bifacial tools, or some core types, (Nyland 2016:161). Tools or preforms can be discovered through investigations of the immediate waste piles. However, many quarries cover large areas and investigations are more often than not of a very modest scale. Therefore, investigations of quarries can look beyond the procurement site itself and include studies of lithics at adjacent workshops and other types of sites in the vicinity of the quarried outcrops too. Hence, information on the activity in the quarries can be derived from archaeologically excavated settlement sites in the vicinity of the quarries. For instance, excavated and surveyed sites at and around Bømlø, in the surrounding area of the quarries of Siggjo, Nautøya, Skjervøya, Stegahaugen, and Hespriholmen, have demonstrated the contemporary use of jasper, rhyolite, and greenstone, and artefacts made of rock from these quarries have been found together at the same sites (e.g. Kristoffersen & Warren 2001). Further north along the coast and in the mountains, sites contribute to contextualize quarries too, e.g. Stakalleneset (in Olsen 1981), and the mountainous quarries at Halsane, Stongeskaret, and Kjølskarvet (Gjerland 1980; Matsumoto & Uleberg 2002; Uleberg 2003; Årskog & Åstveit 2014). Lithics from dated sites have thus been essential when attempting to establish a timeframe of activity. Hence, through a combination of dating methods, looking beyond the quarries themselves, I have built a tentative timeframe of activity at each of them (see also Nyland 2016:159–161) (Figure 2).

It should be noted that most of the lithic-source relations discussed in this article have been identified visually. This has been relatively unproblematic as many of the discussed rock types are visually distinct and the distance between sources and sites is short. I have also been able to rely upon other researchers' provenance work for greenstone, diabase

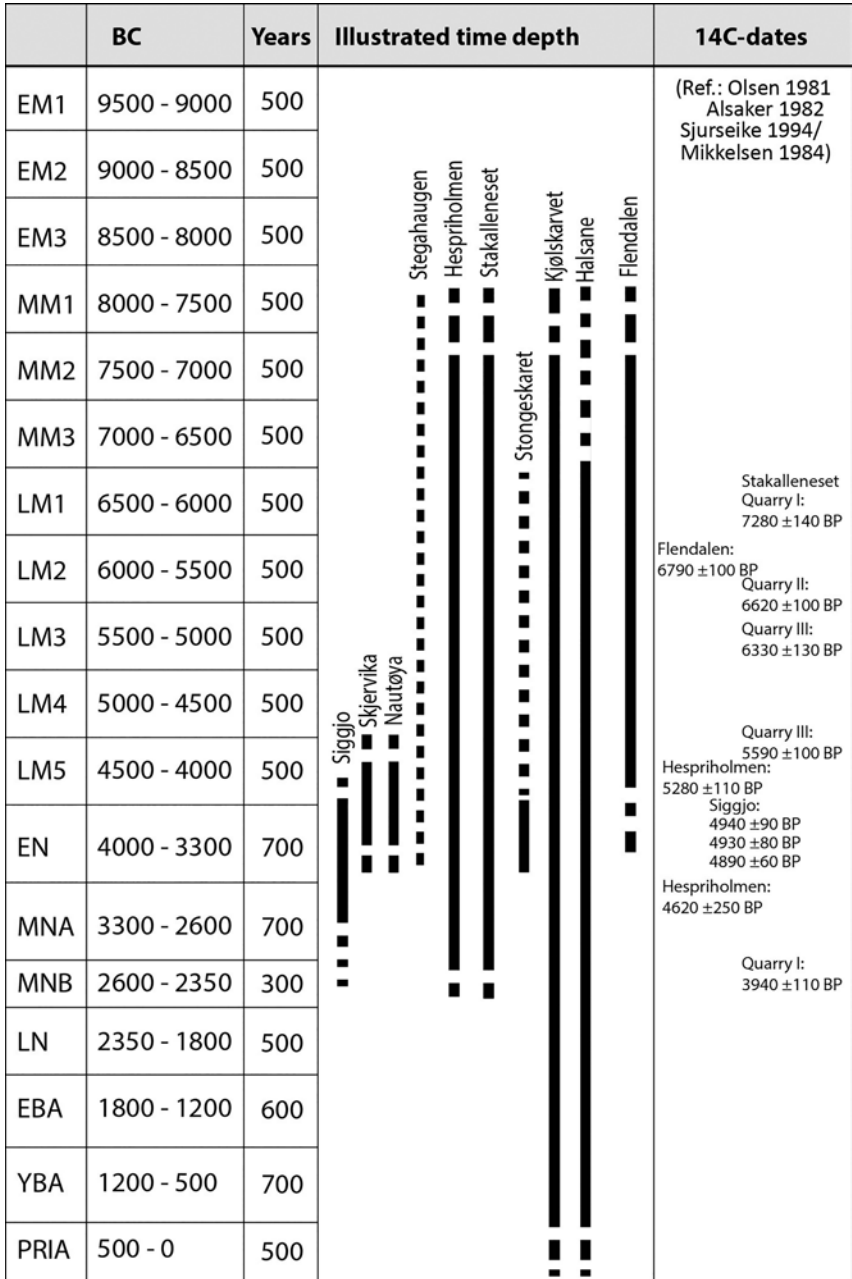


Figure 2. Illustrated time depth of quarries in use in the Early Neolithic. The left column lists abbreviations for the Early, Middle, and Late Mesolithic, Early, Middle, and Late Neolithic, Early and Late Bronze Age, and Pre-Roman Iron Age sequences. In the far left column, the few known radiocarbon dates are “pinned” to the time line. Note: a dashed line indicates only that the site has been demonstrated in use at some point within that period, sequence, while a solid line marks more continual and repeated use.

and rhyolite (see Alsaker 1982, 1987; Bergsvik 2006; Olsen 1981; Olsen & Alsaker 1984).

Having undertaken a detailed study of each of the quarries and lithics from related sites, I have found that Early Neolithic procurement practices do vary significantly internally. This is detectable in three main areas: (1) the intensity and character of direct lithic procurement at different sites; (2) the range and character of distribution of the quarried rock; (3) the deliberate targeting and repeated use of specific quarry sites.

1. *The intensity and character of direct lithic procurement at different sites*

Quarrying was a common and necessary activity in the Early Neolithic. Some sources of lithic raw material appear to have been preferred over others, as indicated by both a repeated occurrence of specific rock types at settlement sites, and the intense and continuous exploitation of certain quarry sites. However, when the exploitation of the quarries is compared, the particular character of exploitation of the different rock sources ranges from intense to limited, some sources being visited continually and others sporadically. Such contrasting practices are exemplified by the five quarry sites located on and around the island of Bømlo on the west coast (see Figure 1).

Three of the five quarries represent two opposite ends on the scale of exploitation. On one end, there is the low-scale use of the two jasper quarries, Skjervika and Nautøya. Both of these quarries had been quarried to obtain rock for blade and flake tool production. Tools made of rock types from these quarries have been recovered from dated settlement sites in their vicinities and place the onset of the exploitation of both in the Late Mesolithic. The same small-scale exploitation continued in the Early Neolithic. The estimated scale of extraction at each of the sites is only 3 m³ and 2 m³ respectively (Nyland 2016). This limited exploitation is also indicated by the average amount of jasper found at settlement sites in their vicinities being below 1%, in spite of its high accessibility (Nyland 2016:273, Table 9.3, numbers compiled from Kristoffersen and Warren 2001). The two sources are visually similar, but can still be differentiated, as the jasper from Nautøya is more purple while the jasper found at Skjervika has an orange tint and is cut by darker micro-thin veins of darker rock. Neither of the deposits can be said to be of high quality, both being comprised of veins and patches of other rock types. Still, the sources were definitely deliberately quarried.

Representing the other end of the scale is the contemporary and massive quarrying of a dark bluish-grey rhyolite, crisscrossed with white veins, atop Mt. Siggjo. The quarry is quite literally at the top of the

mountain, 474 m a.s.l. The sudden and intense exploitation of this distinct looking rock type can be seen at dated settlements all along the west coast. Indeed, the use of rhyolite marked the start of the Early Neolithic in western Norway, long before the Siggjo quarry was even discovered. By the end of Middle Neolithic A, about 100 m³ had been extracted and the use of this quarry appears to fade out. The rhyolite was distributed widely, from Sunnmøre in the county of Møre and Romsdal, to Lista in Vest-Agder and beyond. The assemblages generally consist of between 30% and 60% rhyolite, but it can be as much as 90% (Bergsvik 2006:93; Solheim 2007:63). As I will return to shortly, the scale of quarrying and distribution of rhyolite attest to its significant position in western Norway. Compared to the exploitation of the jasper quarries, the exploitation is massive, intense, and dominating.

One way to demonstrate the variation in intensity of lithic procurement at quarries is to visualize the intensity with which a site is used. In order to do so, an estimate of the periods of use (years), and the scale of extraction (volume) is required (Table 1).

The estimates of quarried volumes listed in Table 1 are based on the extent and thickness of the waste piles at the quarry sites. At some quarries, one may estimate removed masses based on distinct scars from the prehistoric quarrying on an outcrop, but this is only relatively reliable in rare situations. The suggested volumes are probably only a minimum of what was really quarried, but having approached all of the quarries similarly, the estimates of scale are comparable, and, if nothing else, make it possible to distinguish between large, medium and small quarries.

The precise timeframes of duration of activity at each quarry can only be tentatively established based on the aforementioned methods. I have therefore summarized the years of the duration of the sequences in which

Table 1. Estimates of scale of exploitation and time period of use, substantiating the figures used in the diagram in Figure 2.

Site	Extracted volume (m ³)	Years/estimated sum time periods	Litre (dm ³)	Scale of activity
Hespriholmen	400	5700	70	Large
Stakalleneset	400	5700	70	Large
Siggjo	110	1900	60	Large
Kjølskarvet	100	8000	13	Large
Halsane	10	7000	>1	Moderate
Stegahaugen	6	1700	4	Moderate
Stongeskaret	6	1200	5	Moderate
Skjervika	3	1200	3	Moderate
Nautøya	2	1200	2	Moderate

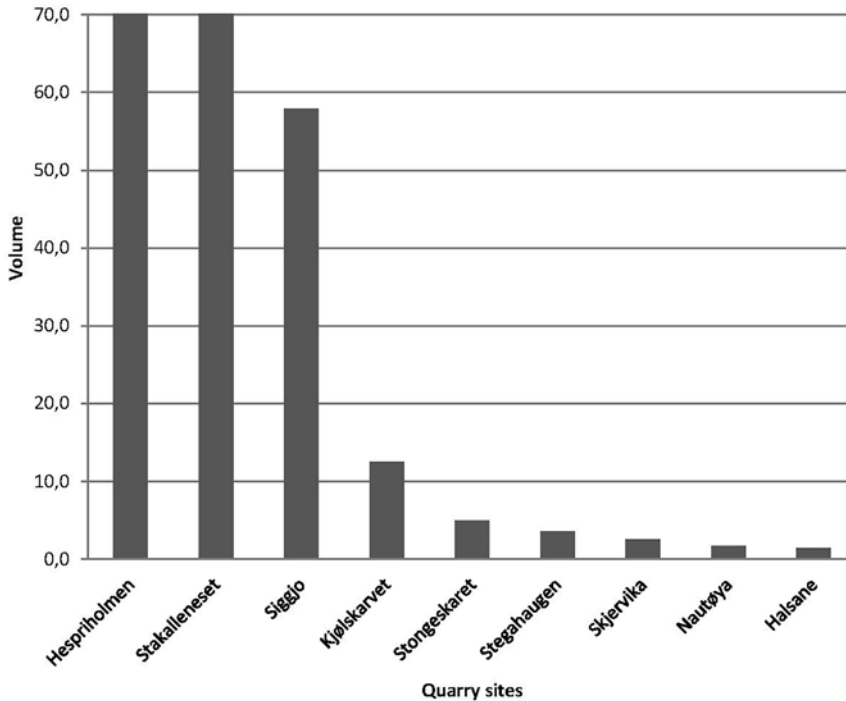


Figure 3. An index of the intensity of quarrying of nine quarry sites known to have been in use in the Early Neolithic.

activity at the quarries could be detected, shown in the chronological framework of southern Norway in Figure 2. To do this most likely overestimates the duration of use of some of the sites but, although probably not accurate, this gives quantitative data which can be internally compared since all sites have been approached similarly. The volumes are then divided among the assumed periods of activity. This approach provides a rough index of the variability between sites in terms of the *intensity of quarrying* (Figure 3). The intensity of activity has probably varied through time too, so the diagram is to be regarded cautiously. Still, it reflects a dimension of the quarrying that is important if we are to understand variability in the character of use of the different sites. As I will return to shortly, the varied intensity of use can in turn signal diversified social significance.

2. *The range and scale of distribution of quarried rock*

Parallel to variability in the intensity and scale of procurement, the scale of distribution of rock from contemporarily exploited sources varies too. Ranging from very local to cross-regional, distribution can indicate differing significance of rock types and quarry sites. Important to note are

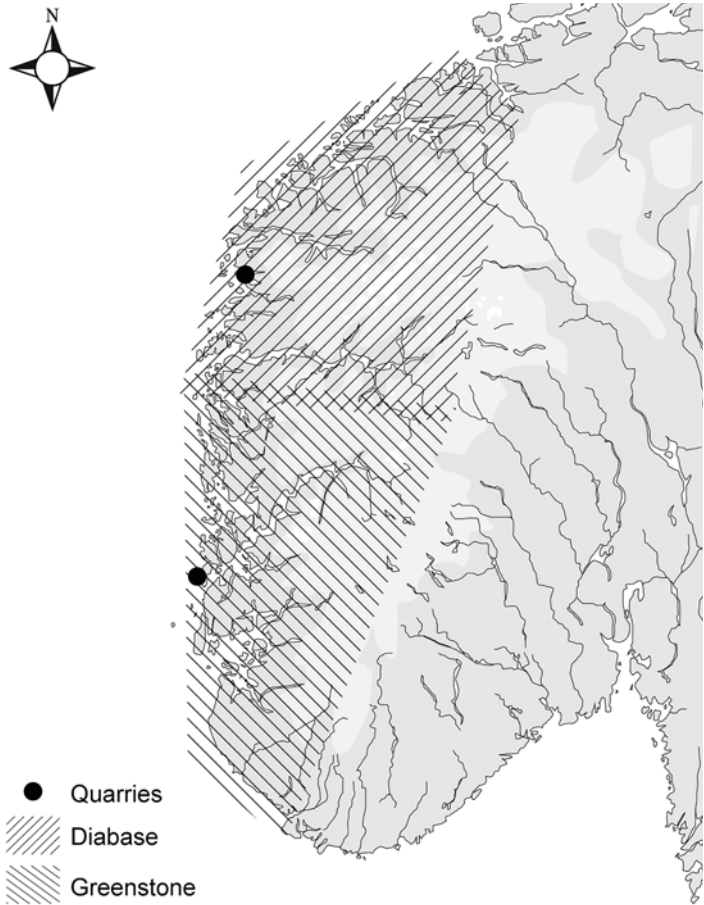


Figure 4. Distribution map of greenstone from Hespriholmen and diabase from Stakalleneset extraction sites. Redrawn from original figure in Olsen & Alsaker 1984, Figure 16, with permission from the authors.

situations where rock from certain sources has been transported into districts where similar suitable rock types were already readily available. For example, diabase from Stakalleneset and greenstone from Hespriholmen were distributed widely even if there were other similar quality rock sources readily available (Figure 4).

More than 1000 adzes dated from the Middle Mesolithic to the Late Neolithic from the northern and southern part of the west coast have been examined. The dispersal pattern of rock from Hespriholmen and Stakalleneset distinguishes two dispersal areas, traditionally interpreted as two social territories (Alsaker 1982; 1987; Olsen 1981; Olsen & Alsaker 1984). The exploitation of these two quarries had been continuous

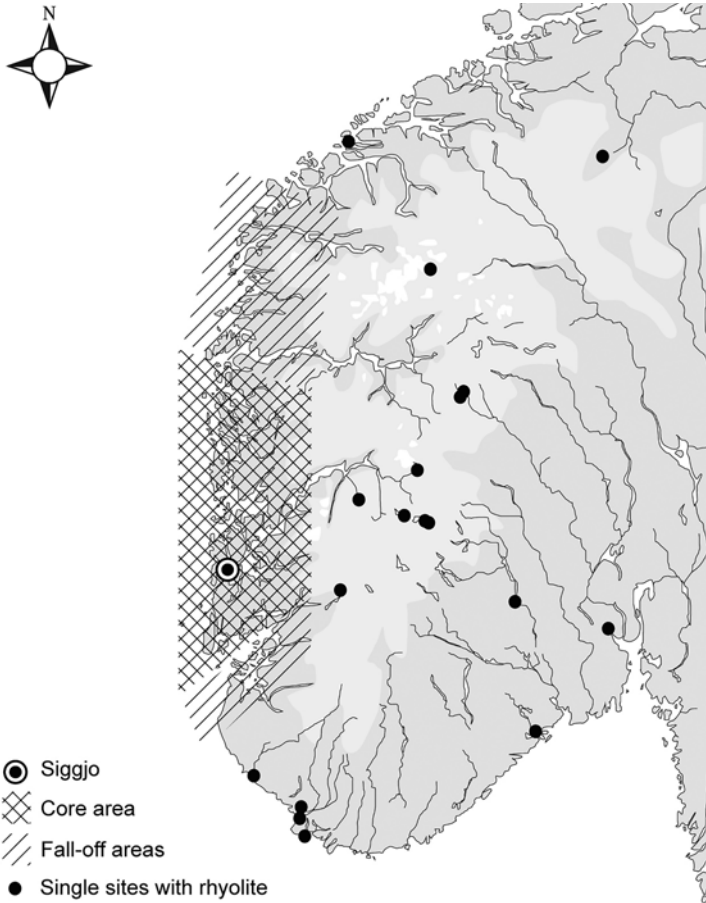


Figure 5. The core distribution area for rhyolite is along the coast of Hordaland and the northern part of Rogaland just south of Boknafjorden, with “fall-off” areas both to the north and south. Compiled information from Alsaker 1981, 1987; Bergsvik 2006; Gundersen 2013; Nyland 2016; Reitan 2015; Solheim 2012.

for millennia prior to the Early Neolithic, yet from the Early Neolithic onwards the character of exploitation of the rock from these sites appears to have changed. Studies of raw materials used in adze production in Early Neolithic settlement contexts demonstrate an increase in variability in rock types employed (cf. Bergsvik 2006:81f; Gjerland 1984:149ff; Olsen 1981:167; Olsen & Alsaker 1984:93). Even though it has not yet been discovered, geochemical analyses indicate that there was at least one more large adze quarry locally exploited, as well as several other smaller sources (see Bergsvik 2006; Gjerland 1984; Olsen 1981). Nevertheless, greenstone and diabase from Hespriholmen and Stakalleneset continued to be exploited, and continued to be widely distributed.

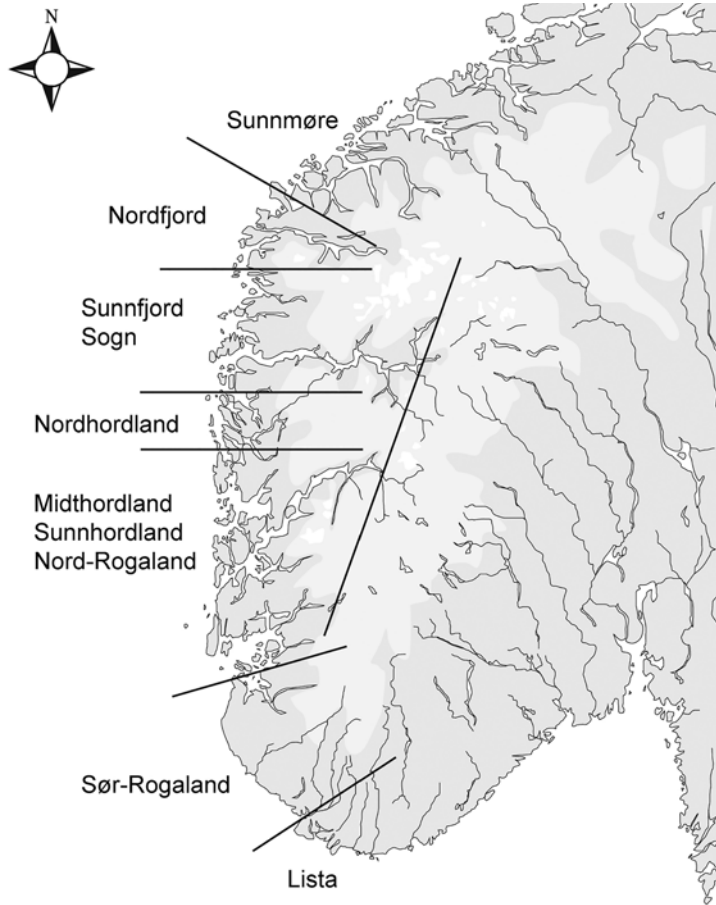


Figure 6. Smaller areas demarcated by the distribution of various rock types. Compiled and redrawn with permission from Bergsvik (2006) and Solheim (2007).

The scale of distribution of rock for blade and flake tools varies considerably for these rock sources as well. As mentioned, Siggjo rhyolite has been found at sites as far north as Sunnmøre, and as far southwest as Lista (Alsaker 1982, 1987; Bang-Andersen 1981). Although the main distribution is along the western coastline, later studies have shown dispersal of rhyolite into the mountainous plateaus between western and eastern Norway, as well as along the southernmost coast and interior of Telemark (see Bergsvik 2006; Gundersen 2013; Indrelid 1994; Nyland 2016; Reitan 2015; Solheim 2009). (Figure 5). However, the eastern dispersal is on a much smaller scale; only a few pieces of knapped rhyolite at each site have been found.

Furthermore, in the northern part of the main distribution area, other rock types such as mylonites, quartzites, quartz, and beach-flint were ac-

cessible and employed in blade and flake tool production. Some of these non-rhyolite rock types were repeatedly employed within demarcated areas (Bergsvik 2006:92; Solheim 2007) (Figure 6). The mountain regions held much fine-grained quartzite, making the long-distance transportation of rhyolite really superfluous. Hence, Siggjo rhyolite was distributed into areas already supplied with plenty of sources of suitable lithic raw material. One way of understanding this deliberate long-range dispersal is if rhyolite held qualities beyond its physical properties.

Conversely, quarrying and consumption could be immediate too, exemplified by the dispersal of jasper at settlement sites in the vicinities of Skjervika and Nautøya (Nyland 2016) (Figure 7). Moreover, patterns of relatively immediate consumption of extracted rock are also found in the mountainous regions, as demonstrated by the raw material vari-



Figure 7. Distribution of jasper surrounding the two quarries.

ation found at sites close to the quartzite quarries at Halsane, Kjølskarvet, and Stongeskaret, although there might also have been some transport of rock further into the mountain plateaus. This has not yet been properly examined.

3. *Deliberate targeting and repeated exploitation – engagement with nodal points*

In the Early Neolithic, the quarries at Stakalleneset, Hespriholmen, Kjølskarvet, and even Halsane, had been part of an established tradition of regular use dating back to the Middle Mesolithic (see Figure 2). At these places, past generations' activities had become large, tangible, and visible scars on the outcrops, surrounded by waste piles of considerable size. Hence, even before the Early Neolithic, the quarries may have been deeply entangled in symbolic relations and social structures (Nyland in press (2017)). Such a history can explain the continued use of the procurement sites. For example, even if the variation in raw material for adzes widened at the onset of the Early Neolithic (cf. Bergsvik 2006:81f; Gjerland 1984:149ff; Olsen & Alsaker 1984:93), it seems that rock from Stakalleneset and Hespriholmen was important to possess and have access to. Mobility had declined since the Mesolithic, but the distribution of adzes and rock from the two large adze quarries was as wide as ever, indicating that the sites had become nodal points in the landscape. Small-scale use of a rock type or a place does not necessarily imply less significance. Even if people had accessible rock in their vicinity, rock from certain sites was still desired. I suggest that the practices of employing rock and specific procurement sites must be understood in relation to their prehistory, in this situation, being part of traditions continuing from the Late Mesolithic. Quarrying at the large adze quarries, and possessing rock from such monumental sites, linked people with access to an experienced past, perhaps even an ancestral presence. Their continued use would thereby add to the procurement sites' social and perhaps symbolic significance and ensure their continued exploitation as long as old traditions and esoteric knowledge were maintained. In turn, access and knowledge may have sustained groups' position and sense of belonging to a district or region. Hence, demonstrating such sentiments through continued lithic procurement at certain sites seems to have been imperative on the west coast.

In the mountainous regions, the large quartzite quarries of Halsane and Kjølskarvet were probably nodal points entangled in social and symbolic traditions and landscapes too. However, their exploitation is of another character than that involving adze material from Hespriholmen and Stakalleneset. Indeed, varying exploitation and distribution

of multiple sites being used within the same period reflects quarry sites being part of different “taskscape” (cf. Ingold 1993), *lithic* or *social landscapes* in prehistoric societies. For instance, the mountain quarries are located in landscape zones covered in snow and ice for large parts of the year. If regarded as nodal points, annual revisits during seasonal reindeer hunting expeditions would have been required. Moreover, the distribution of quartzite from Kjølskarvet and Halsane is, as mentioned, limited compared to rock from Hespriholmen and Stakalleneset (see Table 1 and Figure 3). Only at the onset of the Middle Neolithic is rock from Kjølskarvet recorded at a handful of dated coastal sites in Sogn og Fjordane and Hordaland (Bergsvik 2006:83; Bjørgo 1981:42f, 162; Olsen 1992:78). Nevertheless, this demonstrates the range of mobility of the coastally located groups. The rhyolite quarry atop of Mt. Siggjo was probably a nodal point too, but being established at the onset of the Early Neolithic, its intense exploitation cannot be explained in relation to its prehistory, as I have suggested for the large adze quarries or mountain quarries. Instead, the intensity of the activity at the top of Mt. Siggjo, a place where nothing but quarrying would have been undertaken, together with the scale of distribution of the rhyolite, made this site monumental in the social landscape of western Norway.

While there are several significant nodal points in the west, there are no known quarries of similar size and scale in coastal eastern Norway. The only large-scale and repeatedly exploited quarry is the jasper quarry in Flendalen, Hedmark, but this site was abandoned by the Early Neolithic (see Nyland 2016:152). It should be noted that apart from the geologist Waldemar C. Brøgger’s (1906) identification of rock types in Stone Age adzes in the early 1900s, no large-scale sourcing study has been undertaken in the eastern region. Nevertheless, Brøgger’s work on Neolithic axes still demonstrates a general tendency in procurement practices. Instead of selecting sources to quarry repeatedly, continually, or intensely, the eastern practice involved employment of several local sources of rock (see e.g. Reitan & Persson 2014). Even if a source was repeatedly exploited, the character of use is not comparable to the quarries in western Norway. For example, from a small autochthonous deposit of green *grorudite* located directly north of the City of Oslo, only 15 Early Neolithic axes are known. These were geologically identified by W. C. Brøgger in 1906, and their dispersal is wide. However, the scale of exploitation is small, and no quarry has yet been discovered (Nyland 2013).

Hence, no procurement practice similar to the intense exploitation of Siggjo has been discovered in eastern Norway, nor any continual exploitation of adze and quartzite quarries similar to the ones on the west coast, and no sources with the character of use as nodal point in east-

ern Norway in the Early Neolithic. There might well have been significant places where rocks for adzes were collected and quarried in eastern Norway too, but the impact and visibility of these practices are, if nothing else, very different from the western patterns.

ROCK AND PLACE AS SIGNIFICANT BEYOND PRAGMATIC REASONS

That rock from certain places, or tools made of rock from specific rock types, can embed a group's history and ancestral relations, has been recorded in anthropologic and ethnographic records (e.g. Gould *et al.* 1971; Pétrequin & Pétrequin 2011; Taçon 1991; Taçon & Ouzman 2004). These examples also illustrate how practices can contribute to realize experienced relations residing in specific rock types, or sometimes in rock from particular places. Hence, the performance of certain activities can be significant in itself too. This means that for a group of people, exploiting a specific rock outcrop is a way of anchoring a group's identity to the land, territory, or an ancestral presence (Taçon 1991:194). Nicole Boivin (2004:2) summarized sentiments well, writing how rock can be "symbolically meaningful, ritually powerful, and deeply interwoven into not just economic and material, but also social, cosmological, mythical, spiritual, and philosophical aspects of life". I believe similar sentiments are manifest in the differentiated nature of lithic procurement and the engagement with procurement sites in the Early Neolithic.

Specific ways of doing things tacitly maintain, reaffirm, and transfer the memories, knowledge, and know-how of a social collective (Bourdieu 1990:56; Mauss 1979:101). That is, a person's *habitus* refers to the way past and repeated practices become sediment in bodies. Both consciously and unconsciously, this can influence people's practices and, through social acceptance or corrections, guide conduct within a social group. These repeated and shared practices also express familiarity with physical or social settings. Consequently, because practices are expressions of social norms and traditions, practices vary from one socially-constituted, culturally and historically-situated group, to another (Lemonnier 1993:3; Mauss 1979). The reproduction of these structures was practised in accordance with the accepted norm, *doxa*, *habitus* or even *modus operandi* of the group (Bourdieu 1990:25). Building on this, archaeologically identified practices, consistent within confined areas, can represent the norms and cultural concepts of a distinguishable social group.

Lithic procurement practices are essentially social in nature, representing cognitive structures within a group having become tangible too.

In southern Norway, there are spatial and temporal differences in the phenomenon of lithic procurement. Not only are the quarries located in different landscape zones, indicating differences in relation to annual or seasonal mobility, and various resource exploitation, but as shown, the character of exploitation of contemporary sites varies between sites located within the same landscape zones too. Furthermore, studies of raw material variation in lithic assemblages in settlement contexts also indicate varying preferences in raw materials (e.g. Bergsvik 2006; Stene 2010). Large variation in raw material at sites has been interpreted as implying opportunistic or random procurement undertaken while already moving around the landscape (cf. Binford 1979:260–261). Other sources have been recorded in the midst of a settlement site, so-called “household quarries”, or on-site sources, demonstrating that quarrying in some situations was part of the household sphere (Nyland 2016:231).

The repeated and deliberate exploitation of the same site for centuries, or millennia, where no other activity appears to have been undertaken, displays yet another kind of engagement with lithic procurement. These places gradually developed into the most monumental of human-made structures in the Early Neolithic of southern Norway. Indeed, by the Early Neolithic, the adze quarries in particular would have evoked time depth and past generations to the inhabitants of the west coast. Their exploitation continued regardless of whether or not other sources of raw material were available elsewhere. That is, greenstone could have been obtained at the quarry Stegahaugen, but this site never became as heavily exploited as the Hespriholmen quarry, even though it is more accessible. Similarly, the many diabase dykes located close to settlement sites in the vicinity of the massive diabase quarry at Stakalleneset were not exploited, at least not on the same scale (see Olsen 1981:31–32). Conversely, the quarry atop Mt. Siggjo was exploited intensively from its sudden establishment at the onset of the Early Neolithic, with the quarried material distributed widely into areas where other types of rock were readily available.

Furthermore, in some areas it was not really necessary to quarry at all. Naturally, loosened rocks from either outcrops, beaches, or moraines appear to have covered much of the raw materials required for tool production. That people still chose to quarry may indicate that the act of *quarrying* was in itself significant, in particular from certain places. Moreover, to possess rock from such quarried places of importance appears to have been appreciated. For example, in the Bømlo area, the small-scale quarrying for local consumption at the jasper quarries may have echoed the social importance given quarrying displayed atop Mt. Siggjo, or at the monumental sites displaying ancestral presence at Hespriholmen and Stakalleneset. That is, quarrying had become a *mo-*

dus operandi for those inhabiting the west coast in the Early Neolithic. The way of engaging with quarries, to quarry and to possess rhyolite, displayed the collective social identity of the west coast.

Spatial and temporal differences are found in practices involving lithic procurement. Within demarcated regions there are similarities implying shared socially significant cognitive structures. These observed variations are interpreted in the light of the eastern and western regions' incipient interaction with farming societies from southern Scandinavia that is, Denmark and southern Sweden.

THE SIGNIFICANCE OF SIGGJO RHYOLITE IN WESTERN NORWAY

In western Norway, the new practice of quarrying rhyolite at the top of Mt. Siggjo marks the onset of the Early Neolithic. Rhyolite was mainly used in blade production for making tanged points, but was also used to make scrapers or other smaller tools. Figure 5 shows the extent of the main distribution area, as well as a northern and southern "fall-off area". Moreover, rhyolite was also transported inland to mountainous regions, and is found as far east as Sande in Vestfold. However, these finds comprise fewer than five flakes, fragments, blades, and one A-type point (Nyland 2016:271). In the eastern region, rhyolite does not seem to have been part of any regular or extensive tool production. Instead, the significance of these few finds could have been rooted in their known association with Mt. Siggjo, relating the owner to the group of people living in the Siggjo area. Through possession, the owner of the flakes or blades was related to the rock's source of origin, or to the group of people controlling or regulating rhyolite distribution.

However, identified distribution patterns of a particular local rock type in a specific area do not necessarily represent a cultural preference of the inhabitants of that area. Patterns may occur because of natural geological conditions. There is, for example, a partial overlap between areas of geological variance, that is, which rock types were available, and the suggested social units living along the coast, demarcated by the distribution of local rock (Bergsvik 2006, 2011; Solheim 2007) (see Figure 6). Still, the distribution area of rhyolite covers all these smaller units, including the suggested social territories demarcated by greenstone and diabase (compare Figures 4, 5 and 6). The distribution of Siggjo rhyolite, along with its intense exploitation, emphasizes how extraordinary it was. It signals that there was more to obtaining rhyolite atop Mt. Siggjo than the physical properties of this rock. Hence, besides rhyolite,

the shared practices involving rock procurement and engagement with places of ancestral presence in western Norway transcend the type of rock exploited. Coherent procurement practices within a defined area, here a region, can be a manifestation of the kind of shared *conceptual schema* discussed in theories of *chaîne opératoire* analysis (e.g. Lemonnier 1993; Soressi & Geneste 2011, see also Nyland 2016). The skills and traditions, the esoteric knowledge of required and socially accepted practice, were maintained through participation and social learning (cf. Wenger 1998). In turn, this ensured the continuation and significance of the social practices. Indeed, this specific engagement with lithic procurement and procurement sites expresses a pragmatic and social practice shared on the west coast and suggests a social group overarching the smaller entities (Figure 8).

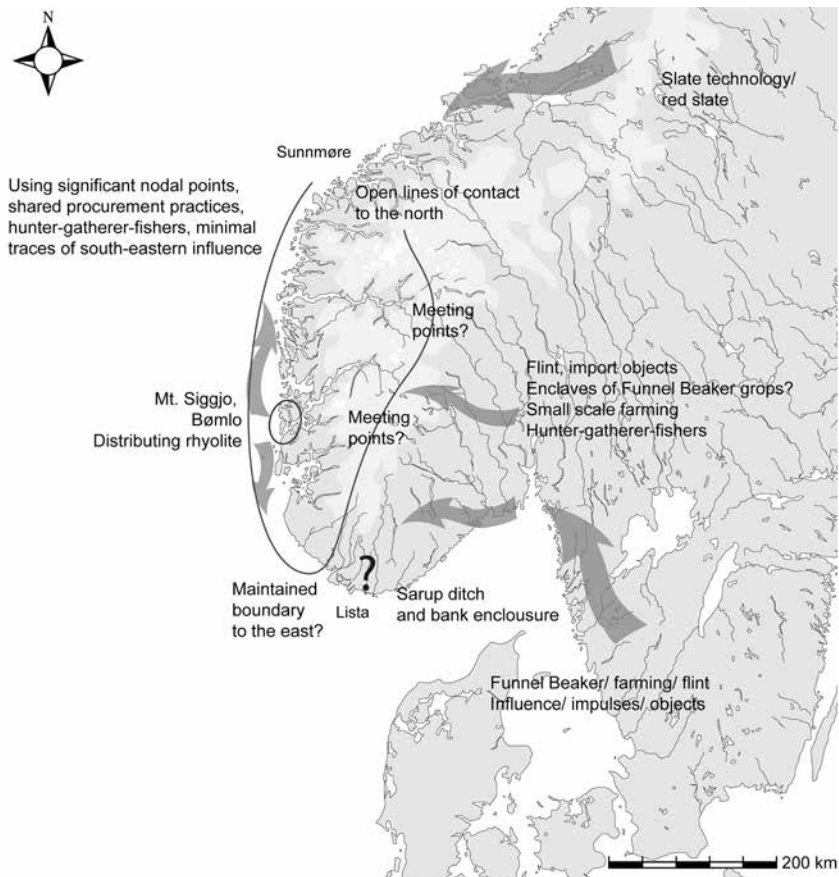


Figure 8. Demarcated areas in western and eastern Norway where the inhabitants considered themselves as belonging to the same social groups, based on similarities in procurement and other social practices. Arrows marks lines of contact and interaction.

THE SIGNIFICANCE OF FLINT IN EASTERN NORWAY

In eastern Norway, procurement practices at the Neolithic transition differ from those in the western region. Exploiting several local sources of rock, repeatedly and opportunistically, appears to have been the most common practice. However, already from around 4500 BC, the significance of flint seems to rise. From this time onwards, flint objects normally associated with the Funnel Beaker culture (FBC) in southern Scandinavia, as well as flint nodules, were imported. Flint is a commonly found rock type at Stone Age sites across southern Norway, but flint is not found in geological deposits in Norway. Instead, it can be collected as beach-nodules that drifted with icebergs to the coast of Norway in the Late Glacial period. It is important to note that the size of flint blanks needed in axe production cannot be found at the beaches of Norway. Large, four-sided, polished flint axes originated instead in flint-rich areas in Denmark and Scania, southern Sweden. From the onset of the Early Neolithic, such axes, as well as nodules, were imported and many of them were intentionally deposited in hoards or graves (e.g. Glørstad 2012:45; Hinsch 1955). The quality of flint used for small tools seems to improve at settlement sites on the coast of Østfold as well (Glørstad 2006:68). Together, this signals a growing importance of access to flint of high quality. The flint preference is also evident at sites in the coastal hinterland, inland, and mountainous regions (see Boaz 1997:135; Gundersen 2013; Gustafson 1978:80; Mikelsen 1989; Stene 2010:37, 502). In the interior, several types of locally procured fine-grained rock had been exploited during the Mesolithic, but come the Early Neolithic, more flint appears to have been brought along to the interior regions for blade and flake tool production. A plausible explanation is that flint had at this point in time, and within this region, been assigned qualities beyond its physical properties, based on its associations with southern FBC-related cultures (Nyland 2016:286).

The impression of a growing dependence on high-quality flint is reflected in the reuse of the imported flint axes. The reuse of axes as cores for blade and flake production started already at the onset of the Early Neolithic, and had become common by the transition to the Middle Neolithic (Ballin 1999:301f; Skjølsvold 1977:64f). Debris indicating this practice is known from coastal sites ranging from Østfold to south of Boknafjorden in Rogaland, and on a few mountain sites at Hardangervidda (Bergsvik 2006; Glørstad 2005; Indrelid 1994; Mikelsen 1989; Mjærum 2004; Skjølsvold 1977; Solheim 2012). This kind of intentional recycling of imported flint axes is encapsulated by the term *upcycling*. The term draws on the cached meaning of things. That

is, an object can achieve added status based on what the item used to be, or who it is associated with. As pertains to my argument, the blades and arrows made from an imported flint axe may therefore have embedded extra layers of meaning rooted in the axes' associated biographies. Whether imported through exchange networks, or used by its original owner, upcycled flint, and perhaps flint in general by association, could have been a subtle way of expressing social relations with the south Scandinavian based FBC. In Denmark, there is a noticeable increase in the production of polished, four-sided flint axes from 4000 BC onwards. This increase has been linked to the establishment of flint mines (Sørensen & Karg 2014:107). Furthermore, having access to or control over flint axe production and flint sources has been regarded as a valuable asset of the FBC (Sørensen 2012:19). Access to flint may similarly have resulted in the growing emphasis on flint in eastern Norway too.

The eastern Neolithization process is expressed as an ongoing process of integration of FBC-associated material culture into previously established networks. Through these networks, the local inhabitants gained access to specific material culture, ideas, and knowledge of alternative subsistence practices (Bergsvik 2012:152; Glørstad 2009:156f). If social structures and prestige depended on access to southern networks and material culture, it would have been imperative to display these relations. Considering fragments from objects or places as *pieces of those places* is not uncommon (cf. Bradley 2000:90). In historic times, religious relics are often fragments of a symbolically saturated object. Hence, an object's connotations are often indifferent to whether it is complete or in fragments. While not claiming that the flint flakes were religious relics, an axe in small pieces scattered across a site could still have had transcendent associations. Flakes and blades made from polished flint axes may have been as symbolically meaningful as a complete axe. Hence, because of the biography of polished flint axes, high-quality flint may have disseminated a particular social and cultural affinity. Flint could therefore in the same way as rhyolite have been appreciated because of its physical properties, but more importantly, because of its qualities as a symbol of alliances, or of home.

THE TWO DIFFERENT WAYS OF BECOMING "NEOLITHIC" IN SOUTHERN NORWAY

Comparing the character of the processes of Neolithization in western and eastern Norway, they come across as following different paths. There seem to have been different socio-political strategies in play in handling external impulses. In eastern Norway, in addition to flint be-

ing important and increasingly depended upon in traditional hunter-gatherer site contexts, local tool traditions are also represented in contexts regarded as FBC in origin. A good example of this is the assemblage found in one of the few excavated dolmens in southern Norway. There are only five of them, all of them around the Oslofjord. In one of these, a slate arrowhead was found together with amber pearls, tanged A-points of flint, and a polished flint axe (Østmo 1984:74f). Slate tool technology is generally seen as being part of local traditions anchored in areas further north. Another example in south-eastern Norway is the onset of pottery production in the Early Neolithic (e.g. Glørstad 2005; 2012; Reitan 2014). Pottery production requires technological knowledge and practical know-how. In eastern Norway, sites with pottery are more common than in the west. Although it resembles FBC types in style and decoration, it is presumed to have been locally made (Glørstad & Solheim 2015; Hallgren 2008). The presence of pottery signals contact between people who knew how to make pottery and people who did not. Most likely, these influences and knowledge came through contact between hunter-gatherers and southern FBC-associated groups. From about 3800 BC, pollen from *Cerealia* and cultivation indicators (*Plantago lanceolata*) demonstrate limited pastoralism and crop growing in eastern Norway (see Glørstad 2004:39; Høeg 1982; Solheim 2012:86; but see Sørensen 2013:128–129 for a discussion of this evidence). The palaeobotanical evidence, together with a shift in climate, have been the main reasons for the Late Mesolithic-Early Neolithic transition being placed at 3800 BC. From 3700 BC onwards, there is more evidence of the landscape opening, and reliance on agricultural practices gradually grew in strength. Furthermore, material culture associated with the FBC is found with increasing frequency. Together with the argued social significance given to flint tools, the Neolithization process in the east appears to have been characterized by integration and frequent interaction.

Despite the growing reliance on agriculture-related practices, east Norwegian social organization in the Early Neolithic has been described as comprising task groups with “charismatic authorities” based on the importance of inland hunting (Glørstad 2010:288). However, power is arguably consolidated through established contact networks relating to and integrating local inhabitants with people associated with FBC. Already in the Late Mesolithic, networks demonstrating contact between eastern Norway and south-western Sweden have been argued based on similarities in the archaeological record (Bengtsson 1993:138; Glørstad 2004:66; 2010:282; Larsson *et al.* 1997:48). This previous contact might have contributed to low friction in meetings between hunter-gatherers and people from an agriculturally based society approaching from the

south. Perhaps owing to geographic proximity, stress from oncoming impulses was felt less acutely (cf. Barth 1969)? This is essentially different from the character of the Neolithization process and socio-political strategies chosen in western Norway.

On the west coast, the society has been described as comprising multiple hierarchies with “big-men” leaders, and task groups (Bergsvik 2002:23; 2006:170). These were predominantly oriented towards harvesting marine resources, and there is no conclusive evidence of domesticated animals and crop growing (pollen from *Cerealia* and cultivation indicators) from Early Neolithic contexts along most of the west coast (cf. Hjelle *et al.* 2006; Hjelle 2012; Høgestøl & Prøsch-Danielsen 2006; Mehl *et al.* 2015; Sørensen 2013). An exception may be found in the south-western landscapes, where a small-scale clearance phase, probably due to some pastoralism, is suggested (Prøsch-Danielsen 2012:117). Still, along most of the west coast and fjord landscape, hunting-gathering-fishing appears to have been the norm. Furthermore, imported flint axes are rare, and point- and thin-butted polished axes made of other rock types than flint, but also associated with southern FBC, are only slightly more frequent (Bergsvik 2006:108; Hinsch 1955:52). The regional and commonly produced adze types are the small four-sided adzes made of local rock, the so-called Vespstad and Vestland adzes. These are found all along the west coast, and were not produced in eastern Norway.

In western Norway, pottery production did not commence before the onset of the Middle Neolithic A. However, at a few Early Neolithic sites, locally made pottery, similar to Funnel Beakers in type and decoration, has been found (cf. Hallgren 2008:244–250). Hence, the material record indicates that there was contact between groups with diametrically opposed systems of knowledge in the western region too. The frequency of material culture associated with FBC is noticeably lower in this region than in the east. It is therefore interpreted as resulting from either sporadically visiting individuals from other regions, returned task groups, or perhaps even exchange undertaken in “boundary areas” (cf. Barth 1969). There is no sign of the same integration of material culture and impulses as seen in the east. If, as Fredrik Hallgren (2008:196) suggests, pottery production within the FBC was a female activity, perhaps one sees here evidence of inter-marriage? If so, these women did not apparently alter the west coast’s society dramatically. In the west, traditions signifying relations to the past, the land, and the ancient traditions of their ancestors are still emphasized and sustained.

In a world of hunter-gatherer-fishers, “exotic” objects and stories must have been fascinating, but could also have been disturbing. The unfamiliar, such as external cultural impulses, can be perceived as threatening an

existing collective social reality. This can lead communities to intensify traditional practices and activities, or introduce new ones, to prevent assimilation of ones' own group and sustain the existing way of life (Berger & Luckmann 2011:158). Specific areas or places can also be postulated as being "one's own", and because of this control over them can be regarded as imperative (De Certeau 1984:36). Accordingly, I argue that the encounters with the unfamiliar, represented by FBC impulses, were the incentive for the sudden and intense use and distribution of rock from atop Mt. Siggjo, as well as the continued engagement with nodal points of ancestral presence. The social practices involving rock and place anchored the groups' senses of belonging to the land, and to each other.

Measures taken to demarcate and strengthen group affinity and identity are not uncommon in contact or boundary zones. The quartzite quarries at Halsane and Kjølskarvet are located at the watershed and in an important boundary zone between the eastern inland and western fjord and coastal regions. Indeed, the mountainous region appears to have been a boundary zone in itself (see Figures 5, 6, and 8). Lithics found at sites across the mountain plateaus imply that people arrived at the plateaus from both the eastern and the western part of southern Norway, and probably the southern coast too (Indrelid 1973; 1994; Mikkelsen 1989). While the apparent preference for flint in Rogaland can be explained by greater availability of flint in the moraines and beaches in the Jæren-Lista area (cf. Berg-Hansen 1999), it can also express a boundary area between social groups defining themselves as different from each other. Moreover, it is perhaps not coincidental that the only known "Sarup bank and ditch enclosure" in Norway was made at Hamremoén on the southernmost coast in Vest-Agder (Figure 8). The site is radiocarbon-dated to between 4000 and 3500 BC (Glørstad & Solheim 2015:145). The location of this explicitly FBC and southern Scandinavian structure is puzzling. The approximately 10 kg of pottery found at the site is assumed to have been locally made, similar to pottery found in Central Sweden where the type is thought to be related to the FBC complex (Glørstad & Solheim 2015:145; see Hallgren 2008). The Sarup structure could be a demonstrative expression of a group of FCB-related inhabitants, perceiving themselves as different from the surrounding hunter-gatherers and western region, and thereby displaying a south-eastern social affinity.

CONCLUDING REMARKS

Approaching the phenomenon of lithic procurement comparatively, several ways of organizing the task and engagement with the quarry

sites and rock from specific sites can be defined. Obviously, not all extraction sites and rock types were part of socio-political strategies. Nevertheless, the character of use of some quarry sites and rock types indicates their inherent significance beyond apparent pragmatic and functional properties. As demonstrated, there is significant spatial difference in practice between the two main regions of southern Norway: the east and the west.

Together with the maintained older traditions involving lithic procurement sites, access to rhyolite defines and categorizes the overarching social group on the west coast. Types and technological developments in western Norway, such as blade production on cylindrical cores, and the Vespestad and Vestland adzes, were kept within the western region. Indeed, the cylindrical technique is not found in eastern Norway until nearly 700 years after the west (Glørstad 2004:38; Solheim 2012:115). Moreover, since rhyolite is not necessarily visibly veined when quarried, it is the knowledge of its association that may have constituted its significance. From this perspective, rhyolite became a symbol of belonging to a residing community. The coherent procurement practices along the west coast, despite different rock types being exploited, and quarrying specific and selected outcrops, express a particular cultural tradition. The western region comes across as being inhabited by relatively protectionist hunter-gatherer-fishers, who used rock and relations to places of ancestral presence as part of their socio-political strategies of maintaining the status quo in the Early Neolithic. Their approach to external impulses enabled them to maintain their autonomy and social relations within the group, while keeping the unfamiliar at bay. Parallel to this, in eastern Norway, the archaeological record points to another historical trajectory of the Neolithization process. Here, it involved integration and interaction with FBC-related people to a larger degree than in the west. Hence, the differences in the practices of engaging with rock and place enhance the impression of there being two contemporary and essentially different processes of “becoming Neolithic” in southern Norway. In order to sustain existing social relations, and create new ones, different strategies involving rock and places of rock procurement were executed in eastern and in western Norway.

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