UBAS

University of Bergen Archaeological Series

The Stone Age Conference in Bergen 2017

Dag Erik Færø Olsen (ed.)

UNIVERSITY OF BERGEN

12

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Stone hatchet from the middle Mesolithic site Hovland 3, Larvik municipality, Vestfold and Telemark county (No.: Cf34100_617). Photo: Kirsten Helgeland, KHM.

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Preface

This anthology is based on contributions presented as part of *The Stone Age Conference in Bergen 2017 – Coast and Society, research and cultural heritage management*. The conference was co-organized by the Department of Archaeology, History, Cultural Studies and Religion (AHKR) at the University of Bergen and the Department of Cultural History at the University Museum of Bergen (UM). The organizing committee included Dag Erik Færø Olsen (leader) and Tina Jensen Granados from AHKR, together with Leif Inge Åstveit and Knut Andreas Bergsvik from UM.

The Stone Age Conference in Bergen 2017 was the third instalment of the "Stone Age Conference" series to be organized in Norway. The first conference was held in Bergen in 1993 (Bergsvik *et al.* 1995) and the second in Molde in 2003. The purpose for the 2017 conference in Bergen was to gather archaeologists with common interest in the Norwegian Stone Age and from all parts of the national Stone Age community. Several prominent research communities exist in Norway today and representatives from all University departments and from the majority of the County Municipalities was gathered to share current results and to discuss common issues and strategies for future research.

Since the last conference in 2003, the cultural heritage management in Norway has made large quantities of new archaeological data accessible for research. Such extensive new data has provided new methodological and theoretical challenges and opportunities which is reflected in the scope of research published within the last 20 years.

The Stone Age Conference in Bergen 2017 wanted to reflect the new empirical, theoretical and methodological diversity, and to highlight how these developments could be integrated into the cultural heritage management and within future research. The conference was structured by current themes and approaches and divided into five main sessions (including a poster session) and seven session themes (see Sessions and papers at the end of this volume).

An increasing association with the *natural scientific approaches* was one important theme of the conference focusing on research on climate change, aDNA and new and improved methods for analysis and dating. Related to this was the general theme *technology* were studies on raw material and technological studies are used in mobility- and network analysis.

Managing and utilizing the large quantities of data generated over the last two decades was the basis for the themes *demography* and *subsistence changes*. The theme *methodological developments* included increasing digitalization and how this is used in rescue archaeology, with challenges and new possibilities. The conference also wanted to explore aspects of *ritual communication* where various forms of expressions, such as rock art, could elaborate and increase our understanding of several of the other main themes mentioned.

During the three days of the conference a total of 46 15 minutes presentations addressed various topics and aspects within the seven session themes. All sessions were led by session leaders and three of the conference sessions were introduced by key note speakers.

After the conference, it was decided to publish an anthology, inviting all participants to contribute including the poster participants. The publication was to be in the University

of Bergen Archaeological Series, UBAS, and with Dag Erik Færø Olsen as editor of the anthology. Ten papers were submitted from all the sessions and is representative of the topics presented and discussed during the three-day conference. The papers included in this volume are organized mainly geographically starting with Northern Norway moving southwards.

Kenneth Webb Vollan focuses on housepit sites in Arctic Norway using radiocarbon dates for distinguishing reuse or occupational phases. He presents a method for analysing dates following the Bayesian approach and shows that the housepits were reused to a much larger degree than previous acknowledged.

Skule Spjelkavik and *Axel Müller* explores similar topics in their paper about quartz crystal provenance. By using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) they were able to compare debitage from the Early Mesolithic settlement site Mohalsen I at the island Vega with samples from 19 known sources in Norway. This is especially interesting since there are no known quartz crystal occurrences at Vega and was consequently brought from the main land or other areas. This study shows the potential for using this method, even though no clear parallel to the Mohalsen debitage could be identified in the analysed material.

Jan Mangerud and *John Inge Svendsen* explores colonization processes from a geological perspective. They document how an ice sheet margin presented a physical barrier across the Oslofjord preventing human immigration until the onset of the Holocene, providing an interesting backdrop for discussing aspects of colonization processes in the Early Mesolithic.

Arne Johan Nærøy discusses the use of tools and behaviour patterns based on use-wear analysis of quartz assemblage from the site 16 Budalen in Øygarden, Hordaland County. He is able to distinguish two individuals operating at the site suggesting spatially segregated work operations. Nærøy shows through this study the potential for functional analysis of lithic material from settlement sites.

Astrid Nyland, Kidane Fanta Gebremariam and *Ruben With*'s contribution represents both the new technological and methodological developments and the interdisciplinary nature of archaeology today. This paper explorers the potential for using pXRF for regional provenance analysis of greenstone adzes in western Norway. This study revisits an older interpretation of the division of this region into two social territories in the Middle and Late Mesolithic. The results show that the method is robust and well suited for studying green stone and the authors can also largely confirm the original interpretations based on distribution networks of Mesolithic adzes.

Birgitte Skar discusses the early postglacial migration into Scandinavia based on aDNA studies on two Early Mesolithic Norwegian skeletons. Skar's results confirms the recent interpretation of a second migration into Norway from the Northeast thus contributing to the overall narrative of the colonization of Norway.

Almut Schülke revisits the topic of Mesolithic burial practises in Norway based on new data from recent excavations. Schülke highlights that human remains are often found at settlement sites, opening for discussions of various relationships between the living and the dead and human-nature engagement.

Krister Eilertsen presents results from an excavation of an Early Neolithic hut in Rogaland, Southwestern Norway. He discusses classical interpretative challenges where the lithic material and ^{14}C-datings are not comparable. Eilertsen emphasise the importance of not dismissing difficult results but rather try to find an answer to the differences in light of a wider analysis of the area including various natural and cultural processes. He is thus able to explain the contrasting data and provide new insight into settlement patterns and economy at the start of the Neolithic.

Dag Erik Færø Olsen reviews the rock shelters in the mountain regions of Hardangervidda and Nordfjella. The previous interpretation of these settlement sites as primarily from the Late Neolithic and onwards is discussed based on a reclassification of archaeological material. The results show that rock shelters have been used from at least the Middle Mesolithic and in some cases with an intensification and stronger continuity after 2350 BC.

Gaute Reitan discusses the chronological division of the Mesolithic based on new data from excavations the last 20 years. Reitan presents a revised chronology for the Mesolithic in Southeast Norway dividing each of the three main phases into two sub-phases, adding two new phases to Egil Mikkelsen's original from 1975.

Acknowledgements

On the behalf of the organizing committee, we would like to thank all participants of *Steinalderkonferansen i Bergen 2017* for sharing their knowledge and for the discussions that followed at the conference. We also want to express our gratitude to the conference key note speakers, Prof. Kjel Knutsson (Dep. of Archaeology and Ancient History, Uppsala University), Assoc. Prof. Per Persson (Dep. of Archaeology, Museum of Cultural History, University of Oslo) and Prof. Charlotte Damm (Dep. of Archaeology, History, Religious Studies and Theology, The Arctic University of Norway) for introducing three of the conference sessions. This gratitude is also extended to five session leaders, Assoc. Prof. Arne Johan Nærøy (Museum of Archaeology, University of Stavanger), Prof. Marianne Skandfer (The Arctic University Museum of Norway), Assoc. Prof. Birgitte Skar (Dep. of Archaeology and Cultural History, NTNU University Museum), Prof. Hans Peter Blankholm (Dep. of Archaeology, History, Religious Studies and Theology, The Arctic University of Norway) and Prof. Almut Schülke (Dep. of Archaeology, Museum of Cultural History, University of Oslo).

During the three-day conference the committee received assistance from voluntary students from The University of Bergen and they provided valuable help during the conference.

We would also like to thank the following institutions for their generous funding:

Bergen University fund (UiB), University Museum of Bergen (UiB), Museum of Cultural History (UiO), Museum of archaeology, University of Stavanger (UiS), The Arctic University of Norway (UiT), NTNU University Museum, Department of Archaeology, History, Cultural Studies and Religion (UiB), and the Directorate for Cultural Heritage (Riksantikvaren). Without this support it would not have been possible to organize the conference. The Museum of Cultural History also contributed generously towards the production of the book.

The editor of this anthology would further like to express gratitude to all the anonymous peer reviewers whose valuable comments and insights has made this publication possible.

Last, but not least, thank you to the authors of this anthology for the patience and work on the papers that make out this volume.

Dag Erik Færø Olsen and Tina Jensen Granados – Oslo 2021

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Arne Johan Nærøy

The Spatial Context of Technology in the Middle Neolithic – a use-wear study on quartz

Prehistoric hunter-gatherer settlement sites were arenas for technological practices as the daily and physical context where technological processes took place. In this perspective, archaeological analyses of site contexts are directed towards understanding technological processes, the use of tools and where these activities were performed at the sites.

Middle Neolithic sites in western Norway exhibit a varied used of raw materials for lithic tools, particularly with quartz and quartzite knapped using bipolar technique. The paper discusses a site from Øygarden, Hordaland County, western Norway, dated to the Middle Neolithic, with a use-wear analysis of the quartz assemblage as a point of departure. The focus is directed at understanding functional properties of the tool assemblage and the spatial context of technological practices reflected by the distribution of the artefact assemblage.

The use-wear analysis extends the understanding of the behavioural pattern of the site where two individuals performed both similar and different work operations. Quartz tools are associated with one of the individuals. The distribution of the tools suggests several spatially segregated work operations linked in a continuous process. The study directs attention to the lack of, and potential for, functional studies on Norwegian site assemblages.

Introduction

In our effort to analyse and interpret spatial activity patterns of prehistoric hunter-gatherer sites, we try to understand technological processes in a broad sense as the procurement and processing of raw materials, the production and use of tools and how these features change through time. Furthermore, the spatial context in which these processes takes place is important for our understanding of the hunter-gatherer way of life and the interplay between members of social groups. In hunter-gatherer societies, technology and technological processes are interwoven and integrated with many facets of social, cultural and ideological life. In this context, the settlement site was a central arena for processes of technological change or stability; it was the daily and physical scene where technological processes occurred in an interplay between the inhabitants.

The sites with their archaeologically visible features, are spaces that were organised according to specific sets of rules pertaining to both ideological and cultural aspects such as world view (the dwelling as a reflection of and organised as cosmos, Grøn 2000) and gendered activity patterns

(Nærøy 2000, Jarvenpa and Brumbach 2006). These spaces were also social, cultural and ideological spaces open for social negotiation and change through the manipulation of material objects such as lithic tools, their production, use and discard. A detailed understanding of the relation between the technological processes and the structural features of a site is therefore important in order to understand prehistoric hunter-gatherer lifeways. In the present context, a use-wear analysis of lithic tools combined with spatial patterns of the lithic assemblage was seen as useful for such an analysis.

The point of departure for a discussion of these issues is a spatial and use-wear analysis performed twenty years ago on the lithic assemblage from a coastal site from the Middle Neolithic (Nærøy 2000). This was an analysis of the complete assemblage of quartz, which was the dominant raw material at the site. It is important to bear in mind that the term Neolithic as far as western Norway is concerned, is to a large extent a chronological term. The Early and Middle Neolithic A and B (4000–3400 cal. BC and 3400–2350 cal. BC, Bergsvik 2012, Prescott 2012) were characterised by sedentary/semi-sedentary hunter-gatherer populations with a knowledge of, but with no substantial practice of husbandry and agriculture (Hjelle *et al*. 2006, Prescott 2012).

Use-wear analysis of tools is an important method for understanding and interpreting the lithic assemblages at prehistoric hunter-gatherer sites. The method is, however, a time-consuming process and, in Norwegian archaeology, few studies have been performed on non-flint raw materials. The question is why this is so and how functional studies can improve possibilities for interpreting prehistoric hunter-gatherer sites. The present paper is, however, primarily a case study of a specific prehistoric hunter-gatherer space discussing processes of spatial and social patterning.

Site 16 Budalen, Øygarden, Hordaland, Western Norway

Site description

Site 16 Budalen was situated in a protected bay on the island of Oni in Øygarden municipality, on the outer coast of Hordaland County (Nærøy 1994, 2000) (Fig. 1a and b). The area was surveyed, and the site was excavated as part of a rescue excavation project. The finds were deposited on an irregular surface with coarse sand, stones and boulders on top of the bedrock. The lack of structural features makes it impossible to determine whether this was an open-air site or if there had been some form of dwelling. The central site area, however, was cleared for larger stones.

The distribution of artefacts covered approximately 60 square metres (Figures 2 and 3). The site was covered by 25 cm turf covering a 15 cm layer of lighter sand mixed with decomposed organic plant material, small stones, charcoal and artefacts. Below this was brownish sand mixed with gravel, charcoal and artefacts. These two artefact-bearing layers were excavated in three 5 cm spits in squares of 50 x 50 cm. The soil was water-sieved with a mesh size of 4 x 4 mm. However, excavation spit 2 was sieved through a 2 x 2 mm mesh due to the presence of large amounts of microdebitage.

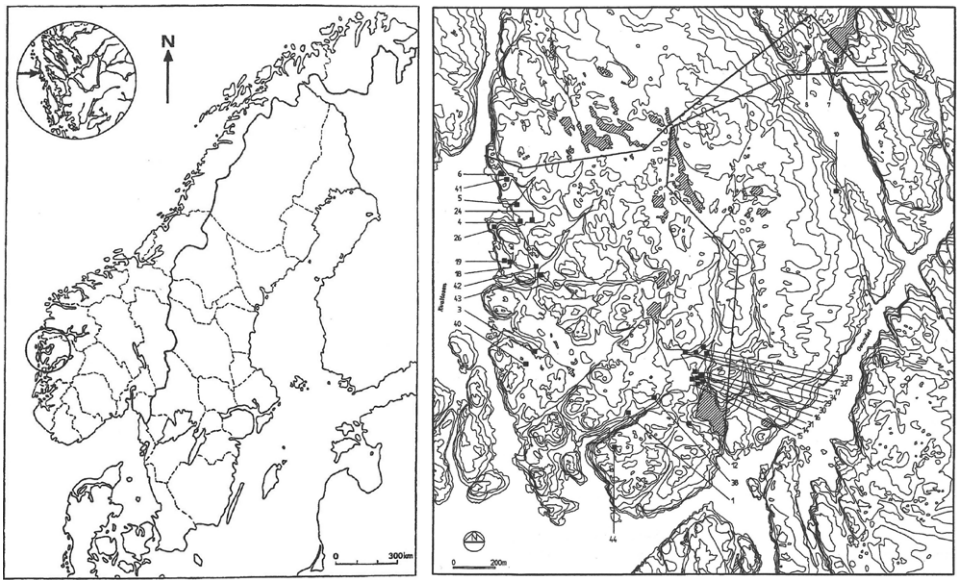

***Figure 1**: Map of Kollsnes, Øygarden, Hordaland, Western Norway.*

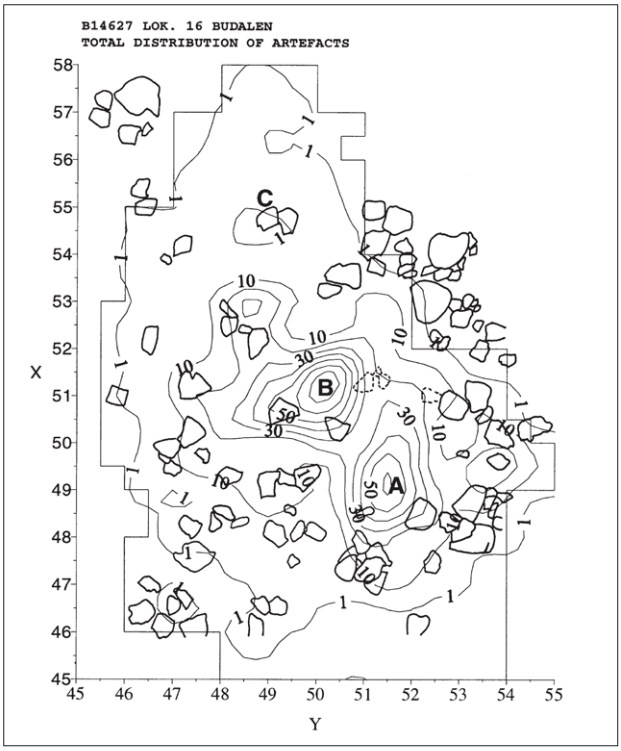

***Figure 2**: Site 16 Budalen, Øygarden, Hordaland, Western Norway – artefact distribution on site plan (Elevated stones above the excavated surface are indicated, cf. photo on Fig. 2. Contoured distribution with intervals 1, 10, 20, 30 etc.).*

***Figure 3**: Site 16 Budalen, Øygarden, Hordaland, Western Norway – photo of excavated site surface (scale 1 m) (photo: Arne Johan Nærøy).*

A contextual assessment of the site concluded that the site represented an in-situ situation with primary deposited lithic debris. The site is seen as evidence of the remains of a single-phased, isolated functional and technological activity.

Lithic assemblage and typological dating

The recovered lithic assemblage consists of 3369 artefacts, Figure 4. Notable is the low number of formal tool types: a few projectile points in the form of four fragmented slate points, two pressure-flaked points and one tanged arrowhead. The morphologically defined small tools (26 pieces) only counts for 0.8 per cent of the total lithic inventory. An important issue as far as the technology is concerned, is the dominant use of quartz, which accounted for almost 80 per cent of the lithic waste. The quartz is predominantly reduced using a bipolar technology. However, we must bear in mind that the initial reduction of larger pieces of quartz may have been platform reduction. The quartz is highly likely from local sources as the bedrock contains many quartz ores (Nærøy 1994).

There are no traces of the Early Neolithic cylindrical core technology performed on rhyolite. Only four fragments of rhyolite were recovered at the site. This underlines the change in reduction technique that took place from the Early to the Middle Neolithic. The cylindrical technique was used to a large extent in the production of tanged arrowheads and small tools. The slate points and a tanged flint arrowhead may well be typologically dated to the Middle Neolithic. Their spatial location at the site may, however, indicate a deposition prior to the main activity phase in the Middle Neolithic. The pressure-flaked points are of a later date in

B-14627 SITE 16 BUDALEN	
Morphological type	**Number**
Blade	7
Flake	3291
Misc. core with one platform	1
Bipolar core	11
Other core	2
Tanged arrowhead, A-type	1
Pressure-flaked point, preform	1
Pressure-flaked point, triangular	1
Slate point, fragment	1
Slate point, pointed-oval section	2
Slate point, triangular section	1
Retouched flake	20
Retouched blade	2
Grinding stone, fragment	1
Hammer stone for knapping	4
Pumice with abrading traces	7
Flint nodule	4
Water-rolled flint flake	7
	3369

B-14627 SITE 16 BUDALEN	
Raw material	**Number**
Other	15
Rock crystal	2
Flint	516
Gneiss	1
Quartzite	41
Quartz	2779
Pumice	7
Rhyolite	4
Slate	5
	3369

***Figure 4**: Site 16 Budalen, Øygarden, Hordaland, Western Norway – artefact catalogue and distribution of raw materials (Nærøy 1994, 140).*

the Late Neolithic or Bronze Age and secondary intrusions. Water sieving of the excavated soil through a 2 x 2 mm mesh did not document the presence of small, pressure-flaked lithic debris from the production of pressure-flaked projectile points.

The composition of the tool inventory, the technology employed and the raw material composition date the assemblage to the Middle Neolithic (Nærøy 1994, 2000). A closer dating to Middle Neolithic A or B is however, difficult to establish. The local sea-level displacement curve (Krzwinsky & Stabell 1984) does not contradict this; the site is located at 9–9.5 m.a.s.l. indicating an age later than 4400 cal. BC.

Use-wear analysis on quartz debris

The use-wear analysis performed on the site assemblage was based on the methodology and definitions of use-wear patterns developed by Knutsson (1988a, 1988b). In addition to experimentally testing the formation of these patterns of use-wear on quartz, the lithic assemblage from site 16 Budalen was analysed searching for similar use-wear formations (Nærøy 2000). Figures 5.1–5.5 illustrate use-wear patterns identified on quartz tools from site 16 Budalen conforming to use-wear patterns defined by Knutsson.

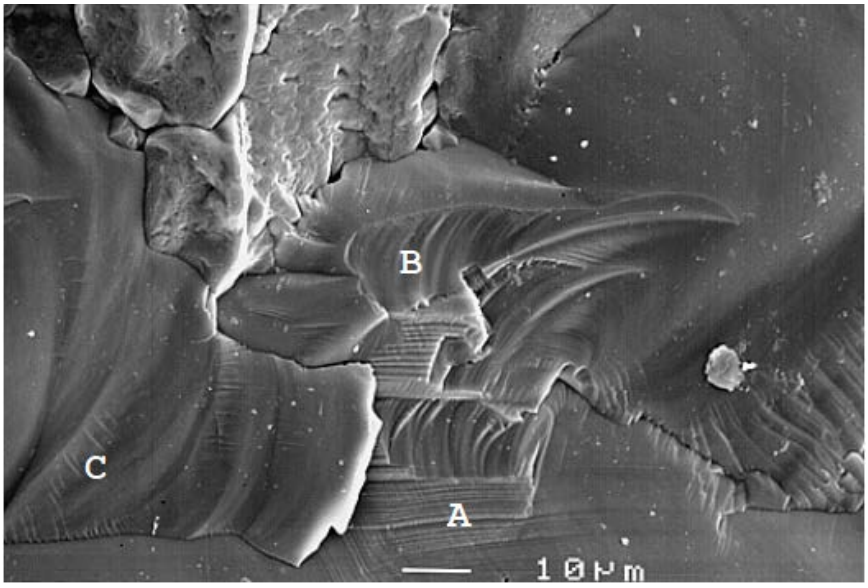

***Figure 5.1**: Fracture plane features on freshly knapped quartz: A/ flat and vertical cleavage planes, B/ conchoidal breakage and C/ ripples.*

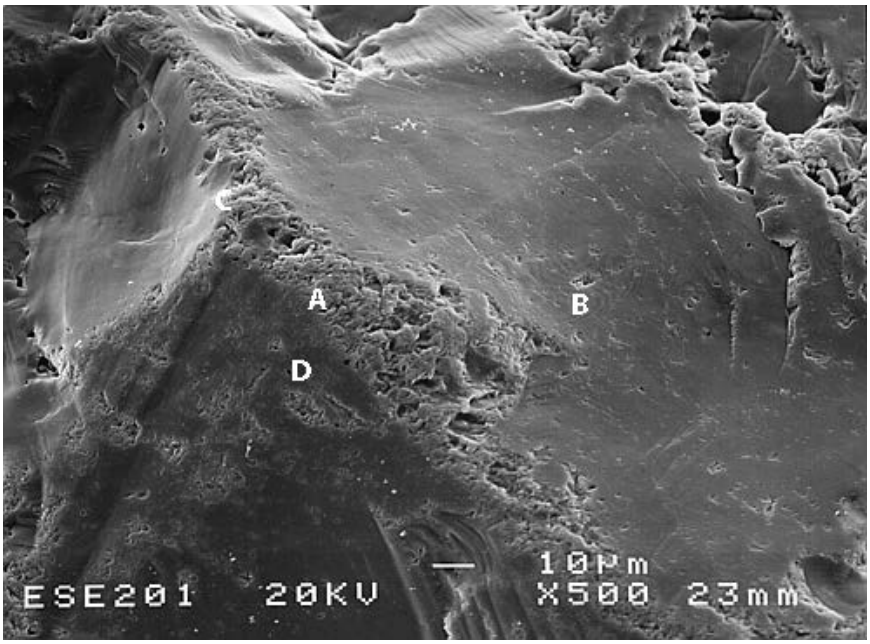

***Figure 5.2**: Use-wear formation on tool B14627/55.2: A/ broken-up ridges, B/ impact pits, C/ smoothing and D/ striations.*

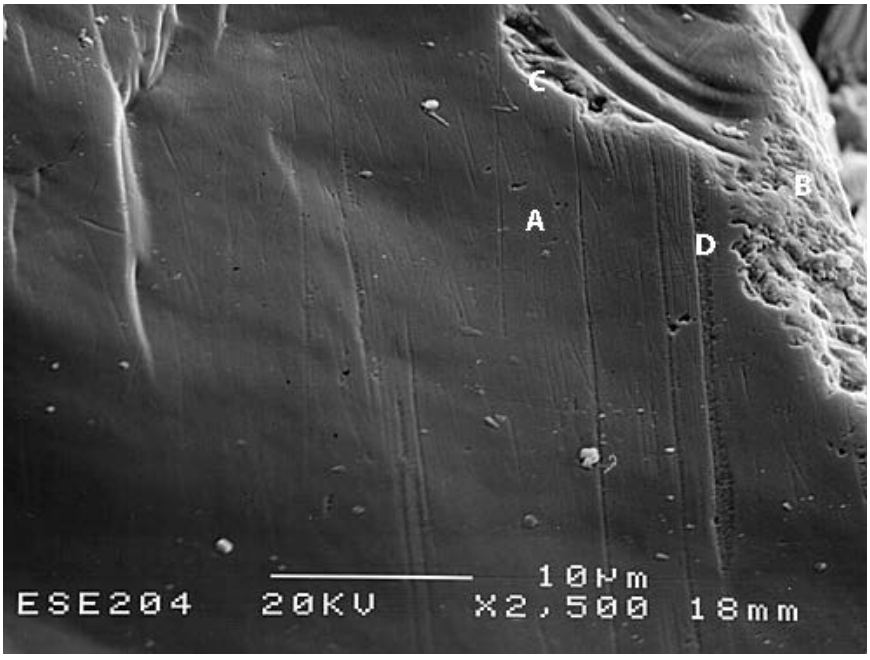

***Figure 5.3**: Use-wear formation on tool B14627/55.2: A/ narrow plastic deformations, B/ edge rounding, C/ smoothing, D/ abrasion area.*

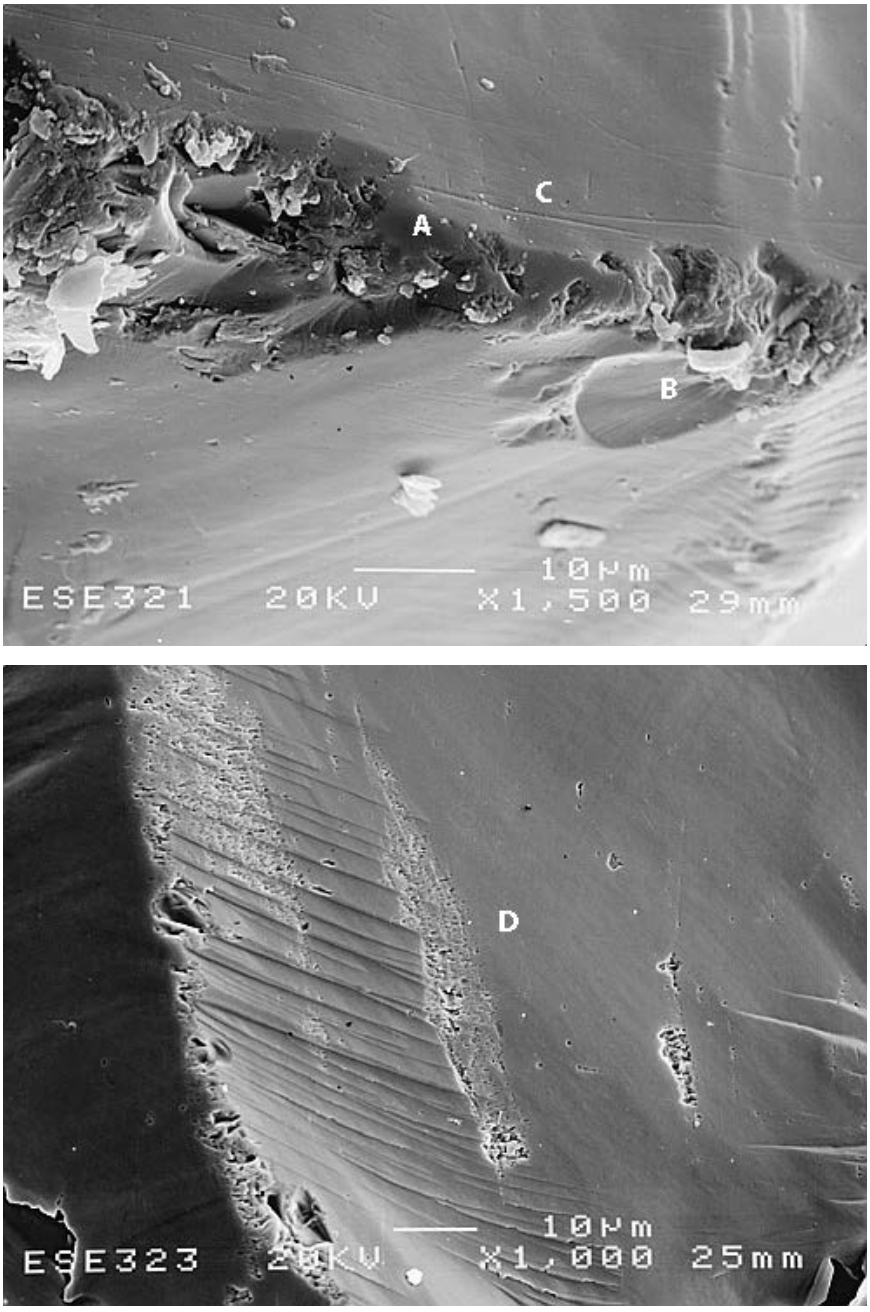

***Figure 5.4**: Use-wear formation on tool. B14627/78.1 A/ flake scars, B/ slight edge rounding, C/ straight-sided striations, impact pits.*

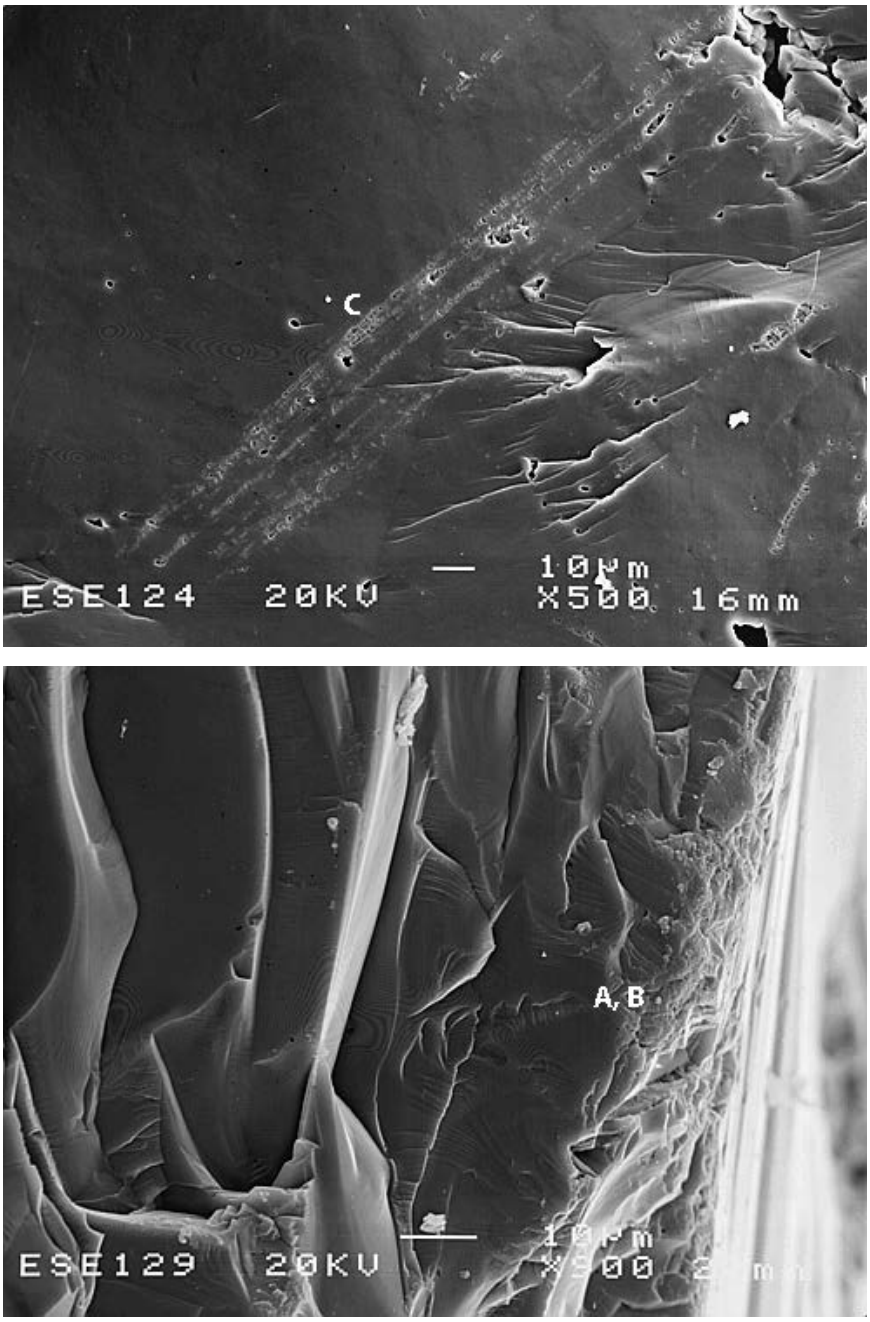

***Figure 5.5**: Use-wear formation on tool. B14627/78.1 A/ flake scars, B/ broken up ridges, C/ straight-sided striations, impact pits and D/ slight edge rounding.*

In the analysis, the following steps were taken (Nærøy 2000). Initially, all the flakes from excavation spits 1 and 2 with dimensions larger than 1 cm were investigated for edges, which could have been used. This was a subjective operation but had to be weighed against scanning all the material in light microscope, which was not possible. Small fragments are difficult to handle and were excluded from analysis. This resulted in 308 artefacts, representing 9 per cent of all finds and 11 per cent of the quartz, being selected and subsequently scanned in a light microscope, Figure 6. The scanning indicated that 24 artefacts were used and seven possibly used. Light microscopy was used to perform use-wear analysis on these 31 artefacts. Furthermore, a scanning electron microscope was used to document use-wear features on some of these tools. The use-wear analysis in the light microscope resulted in the identification of 14 used tools of quartz whereas secure identification of use could not be identified on 17 of the artefacts. This almost doubled the number of lithic tools from the site. The types of use-wear on the tools indicate work primarily on wood and bone, but also hide.

Use-wear analysis site 16 Budalen – scanning light microscope		
Indication	**No. artefacts**	**Percentage**
Used	20	6.5
Used/eroded	4	1.3
Used?	6	1.9
Used?/eroded	1	0.3
Not used	96	31.2
Not used/eroded	176	57.1
Unknown	5	1.6
SUM	308	99.9

***Figure 6**: Site 16 Budalen, Øygarden, Hordaland, Western Norway – results from initial scanning of quartz artefacts in light microscope.*

Site interpretation

Formation processes

What consequences does the use-wear analysis on the quartz debris seen in context of the spatial distribution of the lithic debris, have for the interpretation of the site activities and the site as a whole? Based on the contextual evaluation, a close relation between the work activities taking place at the site and the place of deposition of the lithic debris was initially suggested for the site. To reach this conclusion, the analysis of the lithic debris was based on the model of primary and secondary refuse patterns (Schiffer 1976) using size sorting of the debitage from the lithic knapping process as an archaeological parameter. Additionally, a visual comparison of distributional patterns based on experimental but also archaeological spatial patterns from single lithic reduction locations, was made (Nærøy 2000). The lithic debris was sorted in three size classes (<10 mm, 10–40 mm, >40 mm). The spatial co-occurrence and location in similar concentrations of all three-size classes argued for the preservation of complete reduction processes in primary deposited contexts at the site. Traceable refuse disposal patterns of the lithic debris such as distinct distribution or concentration of larger pieces of lithic waste, dense

concentrations of debris in peripheral parts of the site or associated with dwelling structures ("wall effect") were not identified. It was concluded that the lithic waste including both waste products and tools, was discarded at the location of use in primary contexts.

The distribution of the lithic debris at the site may be given a "classical" interpretation in terms of a small prehistoric hunter-gatherer location with the preserved remains of two primary knapping and work areas. A slight horizontal variation in the composition of tools used and discarded suggests differences in the activities being performed in the two work areas. Furthermore, the quartz debris was distributed evenly between the two main concentrations of finds, but the individual pieces identified as being used through the use-wear analysis were located in one of these. This implies that the quartz analysis expanded the interpretation further, indicating a differentiation in activities between these two work areas and the individuals performing these activities.

Tool use and space

The use-wear analysis of the quartz and a macroscopic evaluation of fracture patterns in terms of fracture type and direction on tools (Andrefsky 2005) from other raw materials linked to the distributional analysis showed several significant features (Nærøy 2000). The number of tools increased through the use-wear analysis compared to the morphologically defined classification. This was no surprise since use-wear on quartz tools does not have to be visible to the naked eye or even at low magnifications in a light microscope. The identified tools are also a minimum number of tools. This is among other factors due to surface features on the quartz which were believed to be the result of soil erosional processes, which may have destroyed use wear features on the objects (Knutsson 1988b: fig. 85a, Nærøy 2000: fig. 4.23). These added tools underlined the importance of the reduction of quartz as a tool-producing activity.

USE-WEAR ANALYSIS OF ARTEFACTS OF QUARTZ FROM SITE 16 BUDALEN			
ARTEFACT B14627/	**MOVEMENT**	**HARDNESS**	**MATERIAL**
55.2	CUT	MEDIUM	WOOD
60.1	CUT	MEDIUM	WOOD
105.1	CUT	MEDIUM	WOOD–BONE
216.5	CUT	MEDIUM?	WOOD<–>SHELL
749.1	CUT–PLANE	MEDIUM	WOOD
85.3	INCISE (CUT?)	MEDIUM	WOOD–BONE
138.1	INCISE	MEDIUM–HARD	WOOD–BONE
491.1	INCISE	MEDIUM	WOOD
1102	INCISE	MEDIUM–HARD	WOOD–BONE
1199	INCISE	MEDIUM	WOOD–BONE/ANTLER
78.1	SHAVE–PLANE	MEDIUM–SOFT	WOOD
106.1	SHAVE–PLANE	MEDIUM	WOOD–BONE
413.3	PLANE–SCRAPE	MEDIUM	WOOD–BONE
200.1	SCRAPE	SOFT	WOOD–BONE

***Figure 7**: Site 16 Budalen, Øygarden, Hordaland, Western Norway – results from use-wear analysis of quartz tools based on light microscopy and scanning electron microscopy.*

The use-wear analysis identified the raw materials being worked by the quartz tools as primarily being in a range between wood and bone for eight tools with four tools being used on wood, Figure 7. One tool had indications of being used on shell and one on antler. The patterns of use-wear features were consistent and might be interpreted within the framework of production and maintenance of equipment with constituent parts of wood and/or bone. Furthermore, tool motions on tools where it was possible to identify, formed a varied picture with identification of tools for cutting and incising but also occurrences of shaving/planing and scraping. The spatial distribution also suggested differentiated locations of the tool used, Figures 8 and 9. Incising tools were primarily located in the central area B, which also was true for a few shaving/planing tools. The cutting tools were, however, located in a small area to the west, outside the central lithic depositional area. Scraping tools were distributed evenly across the site. On a hypothetical level, if these tools were bound together in a continuous work process, then cutting raw material was performed outside the central area of work, whereas further processing occurred in the central work area. This could indicate a dynamic work process where single work operations linked together in a work process were performed on different places at the site.

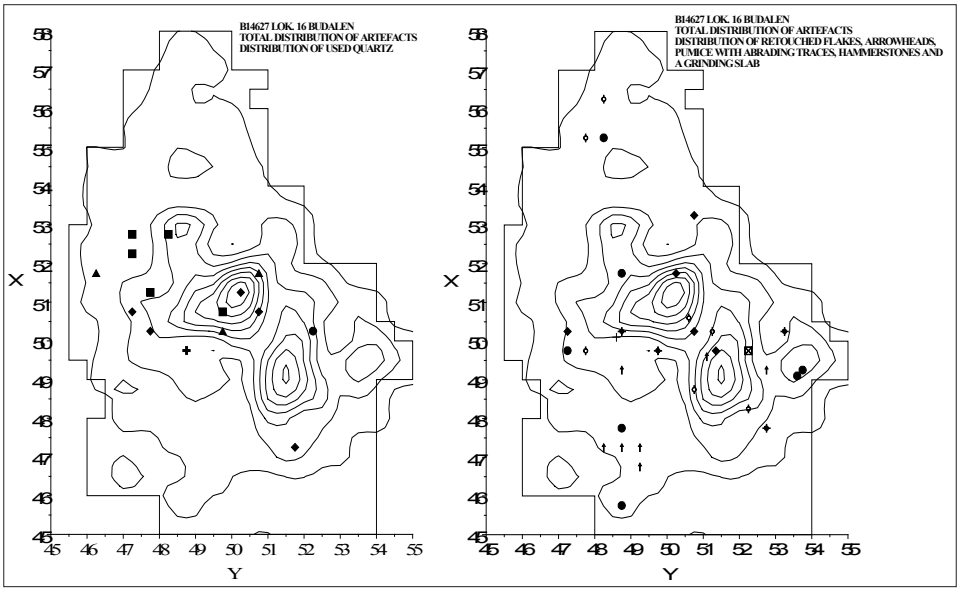

***Figure 8**: Site 16 Budalen, Øygarden, Hordaland, Western Norway – distribution of typologically defined tools (right) and tools defined through use-wear analysis of quarts (left).*

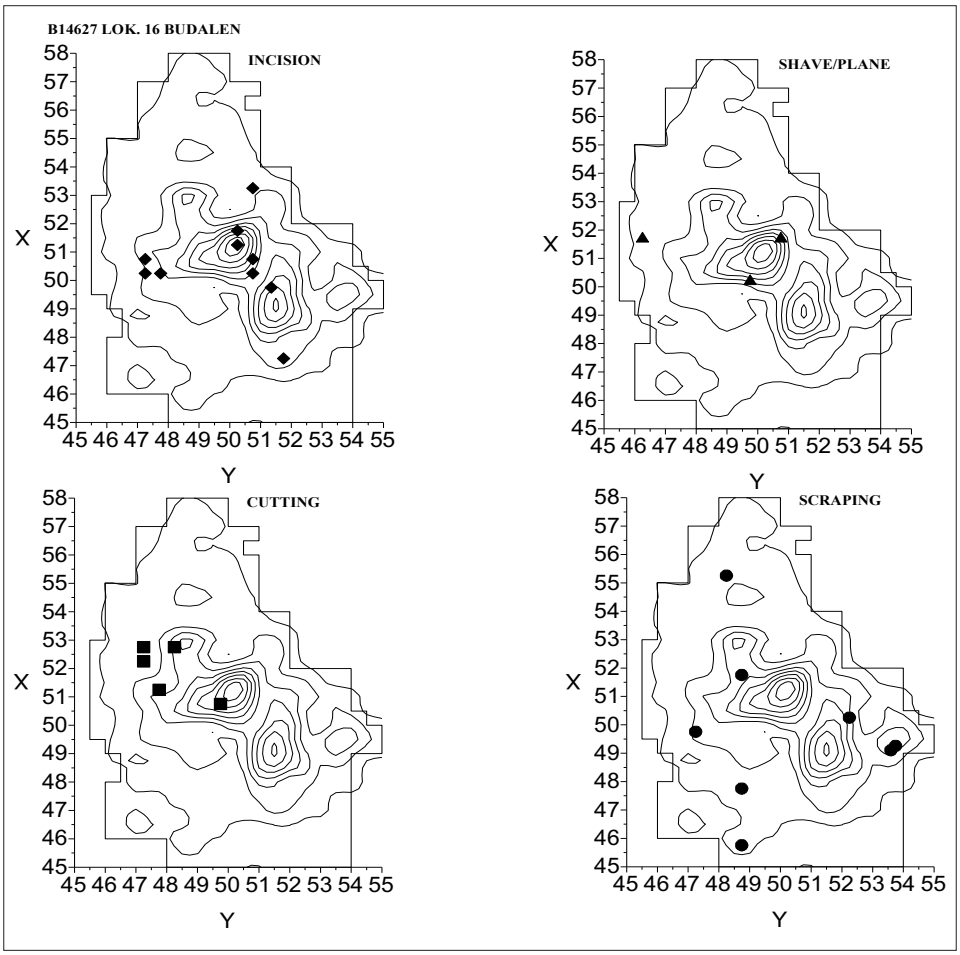

***Figure 9**: Site 16 Budalen, Øygarden, Hordaland, Western Norway – distribution of tool movements for tools of quartz and flint with identifiable tool motions.*

The added tools from the quartz analysis resulted in a greater differentiation of the work processes at the site than could be seen by the morphological classification of the lithic tool inventory. This differentiation was present both in terms of tool types and in relation to the spatial distribution of the activities at the site. This composition and use of tools at the site were governed by several factors. The site was a specific resource utilization event within a larger settlement pattern. The subsistence objective and group mobility conditioned the composition and organization of the group and their activities. This concerned features such as the structuring of the site, the activities performed on the site and the technology employed, i.e. production, use, maintenance and selection of tools and raw materials. In this context, it is of interest to evaluate if the selection of tools discarded on the site represent specific types of tools adapted to the situation or a general set of tools (tool kit; Andrefsky 2005).

To evaluate this in a comparative perspective, Figure 10 presents the distribution of morphologically defined tools from a series of Middle Neolithic sites from coastal Hordaland. These are sites dated within the Middle Neolithic A/B (4000–2200 cal. BC). They are not directly comparable in terms of representing parts of a specific settlement system. However, they are a selection of sites in a coastal area presumably of different types, characters and functions. Figure 10 illustrate that site 16 differs significantly from all the other sites with a low percentage of tools in relation to the total number of artefacts. It is important also to bear in mind that close to 50 per cent of the tools on site 16 have been detected by use wear analysis. This makes the number of tools relatively higher than for the other sites. These differences between the sites may be chronological features but the figure still represent a comparison of a variation of tool sets between coastal sites. The inclusion of artefact classes such as pottery, grinding tools and hammer stones are not directly comparable to the lithic assemblage. They are, however, an important group of artefacts to note on a presence /absence dimension and insignificant in number and percentage.

Site	Budalen 16	Kotedalen 14	Kotedalen 15	Bjorøy 4 str. 20	Bjorøy 4 str. 19	Bjorøy 4 str. 30	Bjorøy 4 str. 34	Austvik IV
Ret. flake/blade	0,65	2,0	2,3	1,9	2,6	3,4	1,9	8,2
Arrowhead	0,1	0,9	1,1	0,4	1,2	1,1	0,7	0,9
Grind. stone, frg.	0,02	0,5	0,4	0,3	0,4	0,3	0,5	0,6
Adze/chisel		0,03	0,08	0,2	0,3	0,08	0,2	0,4
Borer		0,01		0,2	0,2	0,04	0,06	
Hammer stone	0,01			0,2		0,3	0,2	0,5
Grinder						0,04		
Net sinker		0,006					0,3	
Pumice, abrading	0,2			0,2	0,1	0,6	0,3	1,2
Pottery, frg.		0,1	0,1	1	0,06	0,08	2,4	
Sum % tools	0,98	3,07	3,9	4,4	4,86	5,94	6,56	11,8
Sum no. tools	39	115	125	128	139	188	300	536
Sum artefacts	3350	960	3909	3241	2360	3277	7781	15671

***Figure 10**: Percentage distribution of tools on coastal Middle Neolithic sites, Hordaland, Western Norway. Numbers collected from Nærøy 2000, tab. 4.2.1, Kotedalen (Olsen 1992), Bjorøy (Kristoffersen, K. 1994), Austvik (Kristoffersen, S. 1990).*

The low number and variation of tools on site 16 strengthens the impression of a specific kind of resource utilization episode. The technology used to solve tasks performed at the site is by the utilization of locally extracted and used quartz. In a technological perspective and related to the subsistence and settlement pattern, it would be important to evaluate whether these tools where of an expedient or curated character, i.e. the degree of mobility involved in the procurement of raw materials as well as the production, use and maintenance of the tools (Rasic and Andrefsky 2001).

Curated vs expedient assemblages

Technologically, the transition from the Early to the Middle Neolithic in western Norway represents the final phase in the use of platform cores to produce regular blades (Olsen 1992, Nærøy 1993, Bergsvik 2012). The Early Neolithic use of rhyolite using cylindrical technique to produce blades for tools such as projectile points and scrapers disappears at the transition to the Middle Neolithic. This was an important technological change in the lithic assemblages and was related to processes of change in terms of subsistence and social and cultural patterns. Analytically and methodologically, the change in raw materials and percussion technique from the Early to the Middle Neolithic is demanding. This concerns both understanding differences in morphological and technological traits and in terms of tool functions identifiable on the different types of raw materials. The technology in its broadest sense, as the sum of interrelated work activities at site 16 Budalen, was different from previous Neolithic and Mesolithic site assemblages in the area. The character and intention of the lithic reduction as an aspect of this had moved away from the blade-producing, single and double platform reduction directed at producing specific tools such as projectile points. Specific retooling activities such as replacing lithic edges on projectiles, characteristic of both Mesolithic and Early Neolithic sites are not evident in the lithic material. In this context, it is suggested that the reduction of quartz at site 16 Budalen was of a more expedient character than the more technically precise reduction of blades on cylindrical platform cores on rhyolite. Expedient technologies implies manufacture of tools on the spot for imminent use and with less formal technological and technical precision utilising local raw materials. This is opposed to a curated technology where tools involving more complex technologies and techniques are manufactured in anticipation of future use, transport and maintenance in time and space (Binford 1973, Bamforth 1986). This is despite the fact that blanks and tools from platform/bipolar reduction of quartz as other types of raw materials have been transported between sites in technological and adaptive strategies including movement of people, raw materials and tool blanks between sites (Knutsson *et al*. 2016). The feature of expediency in the lithic assemblage and technology is underlined by the fact that these tools were produced using locally available quartz as opposed to the regional character of the rhyolite transported to Øygarden from Bømlo in the southern part of Hordaland County (Alsaker 1987). These features stand out as important in terms of the activities performed and the purpose of the site in a larger settlement system.

The need for use-wear analyses

The present small-scale study of quartz implements from site 16 Budalen is one of few use-wear studies of Norwegian Stone Age assemblages. It was intended to illustrate the possibilities for such studies on Norwegian Stone Age material. The difficulty in performing use-wear studies on quartz is reflected by the few studies summarised by Clemente Conte *et al*. (2015, p. 62) in a publication discussing the general status of use-wear studies (Marreiros *et al*. 2015). The lack of use-wear studies may be due to a number of reasons. It is a time-consuming method based on a long period of individual training to develop experience-based knowledge. It is based on costly equipment. Furthermore, Norway does not have a tradition of performing functional studies of this type. Additionally, due to cultural heritage management legislation, studies on lithic material cannot be financed through excavation projects. Use-wear studies are primarily defined as research, which must be financed through research grants difficult to obtain. Functional studies should however be prioritised. This is due to the number

and contextual qualities of Mesolithic and Neolithic lithic material available for study and that lithic artefacts in most cases are the only artefactual evidence at our disposal for the interpretation of prehistoric hunter-gatherer sites.

Conclusion

The use-wear analysis of the quartz assemblage from site 16 Budalen resulted in an increased in-depth understanding of site activities and structure through the identification of 14 tools in the quartz assemblage. This is a low number of tools but on a relative scale in terms of the size of the lithic assemblage and the site activity pattern, important, especially considering the spatial distribution.

The structural and functional characteristics of site 16 Budalen fit with a model of the Middle Neolithic in terms of being a logistically-based seasonal camp for a semi-sedentary population located in inner coastal areas. Logistic movements took place and site 16 Budalen can be seen as evidence of utilisation of outer coastal resources. Site distributional patterns and functional evidence suggests the presence of two individuals. A continuous and spatially diversified work process was hypothesised where tools of different function were used on different parts of the site. Site 16 Budalen is, in such a context, evidence of the range and use of sites on the coast in the Middle Neolithic, from large settlement sites to small utility sites.

Furthermore, at the time the use-wear analysis was performed, use-wear patterns identified both on experimental and original artefacts argued for the general applicability of the method and the validity of its criteria and definitions of use-wear patterns on western Norwegian Stone Age material.

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