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Towards a refined understanding of the use of coastal zones in the Mesolithic: New investigations on human–environment interactions in Telemark, southeastern Norway

M. Wieckowska-Lüth[a,*], S. Solheim[b], A. Schülke[b], W. Kirleis[a]

[a] Institute for Prehistoric and Protohistoric Archaeology, University of Kiel, 24118 Kiel, Germany
[b] Museum of Cultural History, University of Oslo, 0130 Oslo, Norway

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ABSTRACT

The study of the effects of human presence on vegetation in the Mesolithic has been controversial. It is often assumed that hunter-gatherers did not change or affect their environment in a way that can be detected by means of pollen analysis. In this paper, we explore potential human impact on the vegetation during the Mesolithic by comparing pollen data from a high-resolution sediment core from Lake Skogstjern with archaeological data obtained through extensive excavation and survey in Bamble, in the county of Telemark, southeastern Norway. The aim of this interdisciplinary approach is to reach a better understanding of the development and use of Mesolithic woodlands with regard to the availability of different resources, but also to put the question of human impact on Mesolithic vegetation on the agenda. Mesolithic settlement in southeastern Norway was to a very large degree shore bound, and the pollen analysis from Lake Skogstjern, situated in the coastal hinterland, allows for new perspectives on and interpretations of the use of the coastal wider landscape.

1. Introduction

During the past two decades, more than a hundred Stone Age sites have been excavated prior to highway and railway construction in southeastern Norway. Most of the sites were situated in former coastal areas along today's Oslo fjord (e.g., Jaksland and Persson, 2014; Melvold and Persson, 2014; Solheim and Damlien, 2013; Solheim, 2017). These projects yielded large numbers of archaeological finds, which throw light on settlement in the coastal zone during the first part of the Holocene. Preservation of organic materials that could give insight into human–environment relations – such as bones, antler and macrofossils – is poor. The analysis of the Mesolithic sequence of a lake sediment core within the archaeological project E18 Rugtvedt-Dørdal is thus of special importance, as it illuminates vegetation development during this period and raises questions and possible answers about potential human–environment interactions.

The project E18 Rugtvedt-Dørdal was situated in the municipality of Bamble, in the county of Telemark. Thirty Mesolithic sites, ranging in date from c. 8700 to 4000 cal. BC, were excavated between 2013 and 2015, prior to the building of a new highway (Solheim, 2017) (Fig. 1). The objective of the project was to explore the use of the coastal landscape in the Mesolithic (Schülke, 2017). As a part of the project, Kiel University carried out palynological investigations on a sediment core from Lake Skogstjern (Wieckowska-Lüth et al., 2017). This lake is situated only a few hundred metres from the project area and the Mesolithic sites (Fig. 1), and it is thus very suitable for a discussion of human–environment interactions. The lake deposits revealed detailed information on the entire vegetation history of the coastal area in Bamble; here we place special emphasis on the Mesolithic period, c. 9000–4000 cal. BC. This paper compares the palynological and archaeological results from the project and addresses the question of how Mesolithic coastal foragers may have used and altered the landscape in what was then a coastal area.

For Stone Age archaeology, the study of the effects of human presence on the vegetation has mainly focused on the Neolithic period and on topics related to the introduction of farming and animal husbandry (e.g., Feeser et al., 2012; Kramer et al., 2014; Whitehouse and Kirleis, 2014; Whitehouse et al., 2014). For the Mesolithic, however, the evaluation of pollen diagrams in terms of anthropogenic impact on the vegetation is a controversial issue (Bishop et al., 2015). The critical assessment by Behre (2007) shows that there is no hard evidence for anything like a “Mesolithic agriculture”. The possibility of Mesolithic populations having modified the woodland and the composition of naturally occurring species is mostly neglected (Behling and Street,

* Corresponding author.
E-mail address: mwickowska@ufg.uni-kiel.de (M. Wieckowska-Lüth).

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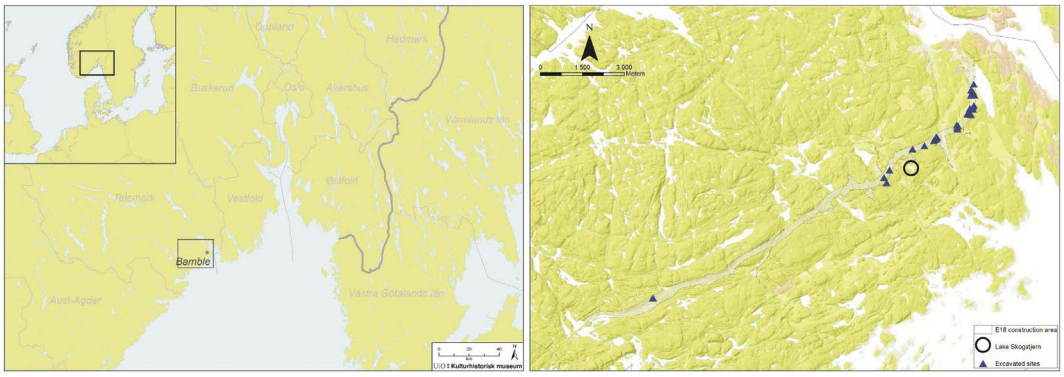

Fig. 1. Location of E18 Rugtvedt–Dørdal project area, excavated sites and Lake Skogstjern. Figure: Steinar Solheim.

1999; Bos et al., 2005; Edwards, 2009; Hicks, 1993; Kolstrup, 1990; Kuneš et al., 2008; Poska et al., 2004). And even when the possibility is considered, it is often assumed that coastal foragers did not change or affect their environment in a way that can be detected by means of pollen analysis. Pollen-stratigraphical signs of what may represent anthropogenic activities within the Mesolithic forest are therefore often given little attention. Some palynological studies, however, are concerned with the recognition of human impact in early and mid-Holocene woodlands. Based upon pollen-stratigraphical evidence, they show temporary phases of small-scale forest openings. These woodland disturbances are indicated by short-term fluctuations in arboreal pollen, abrupt changes in tree pollen curves, and increases in palynological diversity within the light-demanding and/or nitrophilous taxa (Bishop et al., 2015; Bos et al., 2005; Boyd and Dickson, 1986; Brown, 1997; Edwards, 2004; Gumiński and Michniewicz, 2002; Hörnberg et al., 2005; Huntley, 1993; Iversen, 1973; Kuneš et al., 2008; Latalowa, 1992; Poska et al., 2004; Wacnik, 2005). Furthermore, the presence of microscopic charcoal particles (Edwards, 1990; Edwards et al., 2007; Innes et al., 2010; Mason, 2000; Mighall et al., 2008; Wieckowska et al., 2012) and the occurrence of certain non-pollen-palynomorphs (NPP) indicative of grazing, local burning, soil erosion or accumulation of dead organic material provide additional evidence of disturbance within the vegetation (Edwards, 1990; Innes et al., 2010; Mason, 2000; Mighall et al., 2008; Wieckowska et al., 2012).

Plants played an important role in the subsistence of Mesolithic people because they provided food, construction materials for dwellings, fuel for cooking and heating, fibres for clothing and organic material for tools and other objects, to mention just a few. We therefore assume that, starting as early as the early Holocene, environmental and climatic changes were not the only factors that influenced vegetation composition and facilitated the presence of certain plant resources – and that thus made people adapt or modify their land-use strategies. In addition, intentional or unintentional activities of coastal foragers and their impact on the natural abundance and distribution of certain plant species should be considered when discussing Mesolithic vegetation dynamics. The utilisation of a permanent or a seasonally but recurrently used Mesolithic dwelling site would certainly have influenced the surrounding vegetation. For example, the use of the adjacent woodlands to collect timber as construction material and wood for tool production and fuel would have further disturbed the natural vegetation succession (Klooß, 2015). Furthermore, refuse deposition created favourable conditions for the flourishing and spreading of nitrophilous herbs and grasses, as well as light-demanding shrubs. Thus, the question is not 'Did coastal foragers affect the environment?', but 'How and on what scale?' (Behre, 1981; Dincauze, 2000) – and how we can trace these minor interferences during the early Holocene, before the onset of farming.

2. Material and methods

2.1. Archaeological data

The municipality of Bamble is today part of the coastal Skagerrak region (Puschmann, 2005), which is characterised by islands, skerries and fjords stretching from the coast to areas inland. The geological development of the Oslo fjord region has resulted in a special situation for Stone Age archaeology. After the retreat of the Scandinavian Ice Sheet, c. 12,500 cal. BP, there has been continuous land uplift, and the glacio-isostatic rebound has caused dramatic changes in the region's landscape (Bergstrøm, 1999; Sørensen et al., 2014). Consequently, Mesolithic sites are located at different heights above the present-day sea level (Fig. 2). The shoreline displacement curves developed by geologists are used by archaeologists to a) date Mesolithic coastal sites (a process known as shoreline dating) and b) reconstruct the coastal landscape and shoreline. The combination of shoreline displacement curves and technological and typological studies of the sites' lithic assemblages, as well as ^{14}C dates, makes it possible to establish a relative site chronology and assign Mesolithic sites to different archaeological phases, provided that the site in question was situated close to the shoreline at the time (e.g. Glørstad, 2004: 97–98; Bjerck, 2008: 68; Breivik et al., 2017: 11).

Studies show that most of the known Mesolithic sites in the Oslo fjord region were originally situated in sheltered positions close to the contemporary shoreline. The close correlation between ^{14}C-dated archaeological contexts and the shoreline displacement curves further indicates that Mesolithic people moved their sites according to changing sea levels (Breivik et al., 2017). This reflects the importance of the coast as a dwelling and resource zone for Mesolithic groups. However, as Berg-Hansen (2009) noted, the preponderance of coastal sites may be the result of bias due to surveying procedures in today's forest zones, which can reinforce the coastal location of Mesolithic sites. Therefore, our knowledge of the possible use of the direct coastal hinterland is thus far limited. This is also the case for Bamble.

For a long time, only one Mesolithic site had been excavated in Bamble (Mikkelsen, 1989; Odgaard, 1993). During the past decade, more than 200 sites dating to the Mesolithic and the Neolithic have been documented through test pitting (50 × 50 cm) in this area as part of different construction projects (Fig. 2). Furthermore, 30 Mesolithic sites have been excavated as part of the E18 Rugtvedt–Dørdal project (2013–2015), all of them former coastal sites (Table 1). Within the area surveyed for this project, the density of sites is 14 sites per km^2. Most of the surveyed sites are located within c. 5 km of the shore of Lake Skogstjern, while the excavated sites are situated at a distance of between 1 and 10 km from this lake, with the majority between 1 and 3.5 km (Table 1). The sites that are located within a kilometre of the