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Coast Concepts in Norwegian Stone Age Archaeology

Les modèles conceptuels du littoral dans l'archéologie paléolithique norvégienne

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Abstract: The sea and coast have always been central to Norwegian Stone Age research, and most of the archaeological sites we know from the period are located along the coast. Natural conditions associated with the land uplift after the last Ice Age have provided unique opportunities for exploring the coastal settlement of the Stone Age. The general sentiment in the literature is that the Stone Age hunter-gatherers on the Scandinavian Peninsula mainly hunted, moved and settled along the coastline. Less attention has been paid to the areas behind the coast – the coastal hinterland –, although a number of sites are also known further inland and in mountain areas. Central to this perception is the 'shoreline model', which has developed gradually over a century of research. While this model has resulted in the identification of thousands of sites, it does have a simplistic eco-functional foundation. Is it possible that such a conceptual starting point in some ways limits our opportunities to explore the coastal landscape from other perspectives, or even prevents us from discovering archaeological material in other landscape settings?
To explore this possibility, we ask whether there are conditions in our research, or circumstances in its underlying framework that have contributed to the strong coastal focus. How did today's concepts and knowledge of the Stone Age coastal settlement come about, and what roles have been played by the natural environment and topographical character of the landscape? How has this influenced our perception of Stone Age settlement, and what other factors have been important?
We identify five main factors that each work toward strengthening the coastal focus in different ways. Furthermore, we examine strengths and challenges of the coastal concepts employed in present research and suggest possible future exploration of Stone Age coasts within a broader perspective of a 'landscape of practice'. Although the coast was central to the people of the Stone Age, this article argues that a one-sided focus on the coast and coastline may hinder a broader knowledge of Stone Age society and human life.
Keywords: Stone Age, Mesolithic, shoreline displacement, coastal adaption, archipelago landscape, hinterland, site location, archaeological survey methods, site concepts, Norway.

Résumé : La mer et la côte ont toujours été au centre des recherches sur la Préhistoire récente en Norvège, et la plupart des sites archéologiques de cette période que nous connaissons sont situés le long de la côte. Les conditions naturelles associées au soulèvement des terres après la dernière période glaciaire ont fourni des occasions uniques pour explorer les habitats côtiers mésolithiques. La vision générale que l'on peut se faire à travers la littérature est que les chasseurs-cueilleurs du Mésolithique de la péninsule scandinave chassaient, se déplaçaient et s'installaient principalement sur le littoral, et qu'une moindre attention a été accordée aux zones situées dans l'arrière-pays côtier, bien qu'un certain nombre de sites soient également connus plus à l'intérieur des terres et dans les zones montagneuses. Au cœur de cette perception se trouve « le modèle de la ligne de rivage », qui s'est développé progressivement pendant un siècle de recherche. Bien que ce modèle ait permis d'identifier des milliers de sites, il repose sur un fondement éco-fonctionnel simpliste. Est-il possible qu'un tel modèle conceptuel limite d'une certaine manière nos possibilités d'explorer le paysage côtier à partir d'autres perspectives, ou même nous empêche de découvrir du matériel archéologique dans d'autres paysages ?
Pour explorer cette question, nous nous demandons s'il existe des conditions dans notre recherche, ou des circonstances dans le cadre de la recherche, qui ont contribué à la forte concentration de sites sur le littoral. Comment sont nés les concepts et les connaissances actuelles sur les établissements côtiers de la Préhistoire récente, et quel rôle a joué l'environnement naturel dans cette région, le caractère topographique du paysage ? Comment ce dernier a-t-il influencé notre perception du peuplement ancien, et quels autres facteurs ont été importants ?

Nous identifions cinq facteurs principaux, chacun contribuant à renforcer de différentes manières l'accent mis sur la côte. En outre, nous examinons les forces et les défis des concepts côtiers utilisés dans la recherche actuelle, et nous suggérons une exploration future possible des côtes passées dans une perspective plus large de « paysage de la pratique ». Bien que la côte ait été centrale pour les peuples mésolithiques et néolithiques, cet article soutient qu'une focalisation unilatérale sur la côte et le littoral peut entraver une connaissance plus large de la société et de la vie humaine à cette période.
Mots-clés : Préhistoire récente, Mésolithique, déplacement du littoral, adaptation côtière, paysage d'archipel, arrière-pays, localisation du site : méthodes d'enquête archéologique, concepts de site, Norvège.

INTRODUCTION

The coast plays a major role in Norwegian Stone Age archaeology. Thousands of sites dated to the Mesolithic and Early/Middle Neolithic (9300-2350 cal. BC) are situated close to or directly at the shoreline (fig. 1), testifying to the economic, social and ritual significance of the coastal zone during these periods (Schülke et al., in this volume). However, this 'normality' of the coastal site seems to have prevented further reflections around concepts used in studies of settlement patterns in these regions. This is prominent when Norwegian coastal Stone Age sites are brought into discussions of marine adaptations or settlement in coastal areas in a wider European context. It becomes clear that the prevailing concept of the coastal settlement is often vaguely defined, and that the focus on settlements along the shoreline has drawn attention away from the past complexity and variation in human–landscape relations. The concept also poses a problem related to finding Stone Age sites in other locations and, while this is specific to each geographical region and often reflects an opposite situation – with the focus on inland sites –, we believe the challenges faced are not unique to Norwegian archaeology.

This article identifies the dominant coastal concept in Norwegian Mesolithic archaeology and its historical and epistemological background, providing perspectives on how researchers have perceived patterns of coastal sites. This extends from early geoarchaeological studies focusing on the Holocene land uplift and the 'shoreline model', to more processually oriented divisions of landscapes and their environmental characteristics. We also discuss the main factors working to strengthen the dominant coast and shoreline concept at the expense of other approaches and identify future perspectives involving a coastal 'landscape of practice'.

1. COAST CONCEPTS – THE NATURAL GEOGRAPHICAL BACKGROUND

The western and northern coasts of the Scandinavian Peninsula are characterized by a diversified archipelago landscape with an exposed outer coastal zone, an inner coast protected by islands, and deep fjords offering easy access to inland areas with forests and mountain terrain. This coastal zone forms a nearly continuous 5-50 km broad strip that stretches from Gothenburg, Sweden, in the south, all the way to the North Cape: a journey of about 2500-3000 km by boat (fig. 1). While the distances between islands in the archipelago are often small, there are areas with long stretches of open sea (>20 km) between islands or the mainland and islands. The coastal mainland of south-eastern Norway is relatively flat, with mountain areas up to an altitude of around 2000 m a.s.l. further inland (Puschmann, 2005). Flat areas also exist along the coast of western and northern Norway, although often only comprising a narrow strip, with fjords and high coastal mountains more dominant in these regions. In total, these landscapes have offered countless places with good natural harbours and suitable places for settlements, well protected from wind and waves (fig. 2). The Norwegian coastal zone is, and has been since the Ice Age, rich in marine and terrestrial resources, such as fish, shellfish, birds, marine and land mammals, as well as a diverse flora with edible nuts and berries (Hufthammer, 2006; Jonsson, 2018). There is no doubt that boat transport was a necessity for movement between sites, resource exploitation, transport of goods and social integration (Bjerck, 2009; Berg-Hansen 2018, p. 82-86; Gjerde, 2021).

In this paper, we focus particularly on the coast of south-eastern Norway, which is centrally located in this archipelago landscape, but the discussion is relevant to Norway as a whole. In the coastal areas of southern Norway, large nemoral and coniferous forest areas replaced a tundra vegetation during the Early Mesolithic (Sørensen et al., 2014b), while a maritime forest of birch expanded in the north (Sjögren and Damm, 2019). Around c. 4000 cal. BC, a process of gradual degeneration of the forests towards more open birch woodland started along parts of the Atlantic facade, which eventually led to an open coastal heathland (Hjelle et al., 2018; Sjögren and Damm, 2019). In recent times, farming and fishing have been closely integrated along the coast, and fisher-farmers settled close to the shores (Gjerdåker, 2002, p. 120-123). When the idea of Stone Age settlement patterns was formed in the early 20th century, the importance of marine resources was clearly visible to the researchers in the regions they studied, and the shorelines themselves stood out as the optimal location for exploiting the resources offered by the sea.

Another factor in the understanding of Stone Age settlement patterns is the tidal range. In south-eastern Norway this range has always been small, less than 0.5 m at spring tide since c. 8000 cal. BC (Uehara et al., 2006), but varying more along the Norwegian Atlantic west

Fig. 1 – A nearly continuous archipelago landscape stretching from Gothenburg to the North Cape, approximately 2500-3000 km by boat along the west coast of the Scandinavian Peninsula. The main map shows only the southern parts of this area (map by A. Mjærum, Museum of Cultural History [MCH], University of Oslo [UiO]; distribution of sites from Askeladden, 2022; imagery reproduced from© Service Copyright EEA Copenhagen/the GEBCO_2020 Grid, GEBCO Compilation Group [2020] GEBCO, 2020 Grid [doi:10.5285/a29c5465-b138-234d-e053-6c86abc040b9]).

***Fig. 1** – Un paysage d'archipel presque continu s'étend de Göteborg au Cap Nord, soit une distance d'environ 2 500 à 3 000 km en bateau le long de la côte ouest de la péninsule scandinave. La carte principale ne montre que les parties sud de cette zone (carte A. Mjærum, musée d'Histoire culturelle d'Oslo [MCH], université d'Oslo [UiO]; ; distribution des sites d'après Askeladden, 2022 ; images reproduites à partir de© Service Copyright EEA Copenhagen/the GEBCO_2020 Grid, GEBCO Compilation Group [2020] GEBCO 2020 Grid [doi:10.5285/a29c5465-b138-234d-e053-6c86abc040b9]).*

Fig. 2 – Many coastal shores in Norway are easily accessible by boat and well protected from waves and wind (photo T. Ingebrigtsen).
***Fig. 2** – De nombreux rivages norvégiens sont facilement accessibles par bateau, bien protégés des vagues et du vent (cliché T. Ingebrigtsen).*

coast. However, combined with relatively steep shores, the tidal zones are generally small, which provided great possibilities for settling close to the low water mark. Furthermore, activities such as fishing are possible at various depths, either from dry land, by standing on rocky outcrops along the shore, or from boats close to the shore as well as further from land.

Apart from general topographical characteristics, isostatic uplift has continuously formed and reshaped the archipelago landscape during the Holocene. This process of land uplift has played a crucial role in the formation of the idea of the importance of former coastlines for Stone Age settlement patterns.

2. THE FORMATION OF THE 'SHORELINE MODEL' IN NORWEGIAN STONE AGE RESEARCH

In Norwegian Stone Age studies, researchers' perception of the coast and its characteristics has been essential for establishing a basic location model that connects settlement sites to the seashore. This so-called 'shoreline model' is based on the notion that settlement sites in general were situated very close to or at the shoreline (here: fig. 3; Berg-Hansen, 2009). This model has played a major role since the early 20th century, especially in the survey of Stone Age sites. It has also been important in the interpretation of the sites and for indirect dating of the settlements. While research the last decades has concentrated on developing the model by specifying topographical attributes, it has seldom been subject to critical discussion (see however Bjørgo, 1988; Bjerck, 1990; Bergsvik, 1991; Bjørgo et al., 1992; Barlindhaug, 1996; Berg-Hansen, 2009; Mjærum 2019; Schülke 2020a and 2020b).

In early 20th century research, an important task was to identify Stone Age sites in the landscape and obtain relative dates of when they were in use. Along the coast, the sites were mainly found in forested areas, located way above the present-day shorelines (fig. 4). By assuming that Stone Age sites were located on the shores when they were in use, a link between geological and archaeological studies of past coastlines was established by using the site locations to date Stone Age sea levels (A.W. Brøgger, 1905; W.C. Brøgger, 1905; Berg-Hansen, 2009, p. 37-42). At the same time, these levels were applied as guides to

identify suitable site locations, hence inevitably confirming the model in a circular argument. The significance of the practical application of this framework in the efforts to locate Stone Age sites was emphasised through the systematic surveys carried out in the first half of the 20th century. These surveys succeeded in identifying several hundred Stone Age sites in different parts of Norway, all situated along raised shorelines. Additionally, the knowledge of Holocene shoreline displacements was used for an approximate dating of sites (Nummedal, 1924 and 1933; Petersen, 1944). Many researchers contributed to the consolidation of the shoreline model during this time, and by the 1950s the model had obtained an axiomatic status (Berg-Hansen, 2009, p. 35-51 and p. 73-82).

During the second half of the 20th century, the consolidation and development of the shoreline model continued through extensive archaeological rescue projects in coastal areas on the Norwegian west coast, where site features and environmental factors that would possibly have affected the choice of site location in the Stone Age were also debated (e.g. Bruen Olsen, 1992; Simpson, 1992; Nærøy, 2000; Bergsvik, 2002). Rescue projects were also undertaken in the inland and mountain areas of southern Norway, where similar perspectives on shoreline-based location were transferred to lakes and riverbanks (e.g. Hagen, 1959; Martens and Hagen, 1961; Johansen, 1979; Indrelid, 1994; Boaz, 1998; here: fig. 3). During this time, the model was rationalised through a series of economic and functional arguments, connecting site location to economically favourable spots where certain resources could be easily exploited, or to topographically suitable places that would provide good natural harbours for small kayaks or canoes (e.g. Martens and Hagen, 1961; Bjerck, 1990; Bergsvik, 1991). On the coast, the sites were associated with the importance of marine resources and boat transport, while in the mountains large game drift hunt and fishing were viewed as essential locating factors (Berg-Hansen, 2009, p. 42-65).

Over the last two decades, the model has remained highly relevant, and is to a large degree supported by

Fig. 3 – The 'shoreline model' is based on the notion that settlement sites in general were situated very close to or at the shoreline, both at the coast and by watercourses inland. The photo, showing the excavated area of a small inland lake Stone Age site, Søndre Oddenvika in Stange, Hedmark County, illustrates how these sites were situated relative to the shoreline (photo MCH, UiO).

***Fig. 3** – Le* shoreline model *s'appuie sur l'idée selon laquelle les sites de peuplement étaient généralement situés très près du littoral ou sur le littoral, à la fois sur la côte et le long des cours d'eau à l'intérieur des terres. La photo, qui montre la zone fouillée d'un petit lac de l'intérieur du pays, Søndre Oddenvika, à Stange, dans le comté de Hedmark, illustre la façon dont ces sites étaient situés par rapport au rivage (cliché MCH, UiO).*

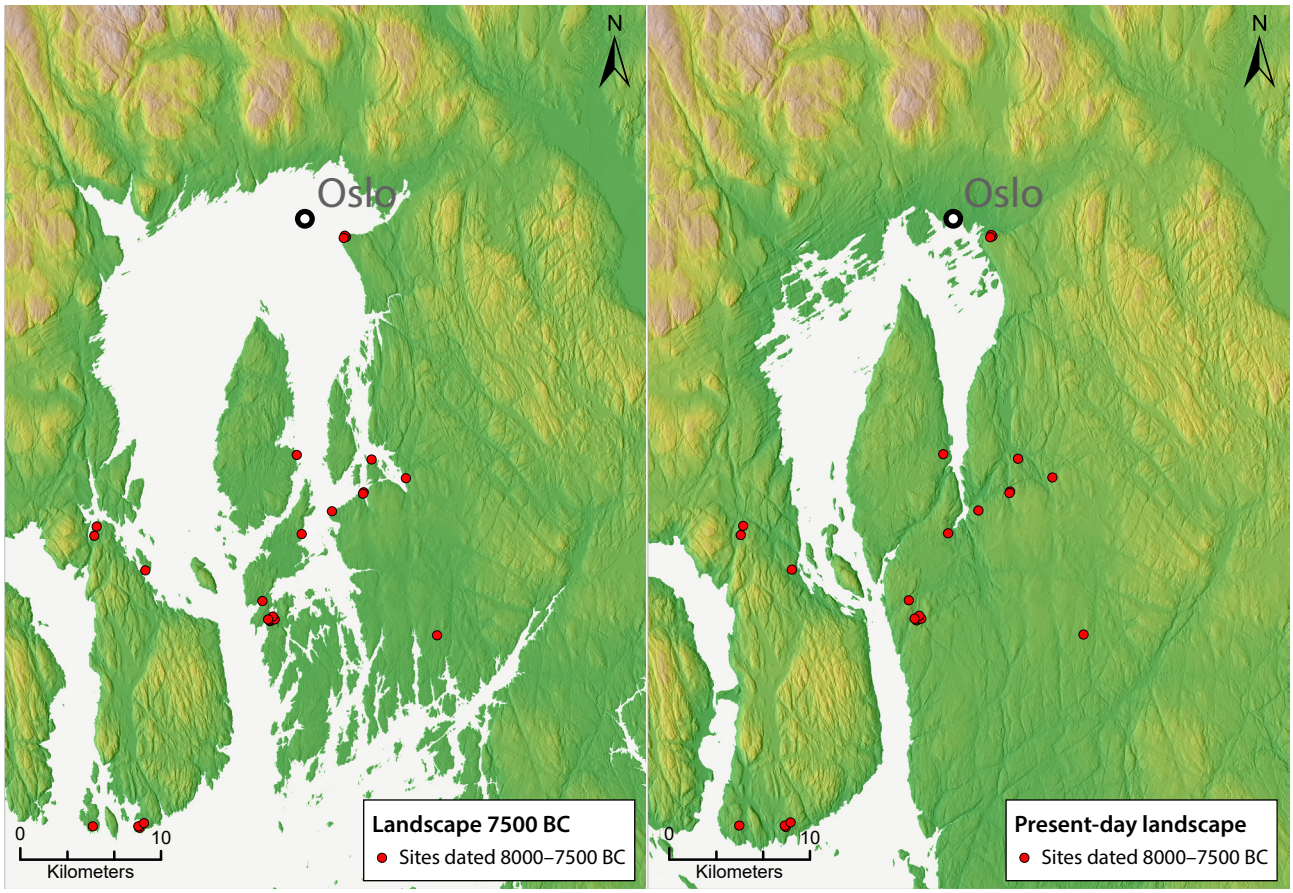

Fig. 4 – Due to the Holocene land uplift, the coast of the inner part of the Oslo fjord changed significantly during the Mesolithic. Therefore, we find Mesolithic coastal sites, which originally were situated by the shore, far from today's coast. Red dots indicate sites that are interpreted as shore-bound around 8000-7500 cal. BC. The black circle indicates the position of the present-day city centre of Oslo (map by I. Roalkvam, DACH, and A. Mjærum, MCH, UiO).

***Fig. 4** – La côte de la partie intérieure du fjord d'Oslo a considérablement changé au cours du Mésolithique en raison du soulèvement des terres à l'Holocène. Les points rouges marquent les sites qui sont interprétés comme étant liés à la côte, vers 8500 cal. BC, 7500 cal. BC et 4000 cal. BC. Le cercle noir indique la position de l'actuel centre-ville d'Oslo (carte I. Roalkvam, DACH, et A. Mjærum, MCH, UiO).*

close correspondence between the results of independent dating methods such as radiocarbon dating and typological indicators, and the dates indicated by reference to relative sea-level change (Bjerck, 2008a; Bjerck et al., 2008; Simpson, 2009; Breivik et al. 2018; Solheim and Persson, 2018; Fossum, 2020; Jørgensen et al., 2020; Solheim, 2020; Tallavaara and Pesonen, 2020; Damlien et al., 2021; Mjærum, 2022; Roalkvam, 2022). At the same time, increased attention has been paid to other approaches than site location, focusing on holistic and long-term perspectives on landscape use and revisiting of sites (e.g. Bjerck 1990; Koxvold, 2013; Mansrud and Eymundsson, 2016; Dugstad 2020; Schülke, 2020b; Berg-Hansen et al. 2022). Large development projects along the coast do however continue to produce overwhelming evidence for the significance of the coast for Stone Age settlement, economic activities and transport (e.g. Bergsvik, 2002; Glørstad, 2004; Bjerck, 2008b; Hesjedal et al., 2009; Skandfer et al., 2010; Solheim and Damlien, 2013; Jaksland and Persson, 2014; Nergaard et al., 2016; Solheim, 2017; Reitan and Sundström, 2018; Bondevik et al., 2019; Bergsvik et al., 2020; Damlien et al., 2021). Although no remnants of boats have been found (however, see Gjerde, 2021), the central role that watercraft must have had for communication and for traversing the archipelago has been stressed. It has also been suggested that the boat was an important structural element for the social organisation of coastal hunter-gatherers, which must have brought with it a specific mentality and way of living (Bjerck, 2008c and 2009; Glørstad, 2013). The significance for people's worldview and relations with their environment has also been emphasized (Svendsen, 2018; Schülke, 2020b). The use of boats is further considered to have been decisive during the first colonisation of the Scandinavian Peninsula (Bang-Andersen, 2003; Bjerck, 2009; Fuglestvedt, 2009; Nyland, 2012; Breivik, 2014; Berg-Hansen, 2017 and 2018).

The evidence for the significance of the coast for Stone Age settlement in Norway is not in dispute. We will argue, however, that the strong focus on the coastline, and the almost automatic linking of sites to this line and exploitation of aquatic resources, has prevented the exploration of alternative site locations in coastal areas, the significance of other aspects of the sites, and the broader use of coastal landscapes.

3. CAUSE AND EFFECT OF THE SHORELINE MODEL

Over time, we have seen development in the coast concepts and shoreline model, resulting in the identification of a very high number of Stone Age sites (c. 10 400 in south-eastern Norway by 2022, Askeladden database, 2022; here: fig. 1), although these concepts have only been subject to a limited degree of systematic scrutiny or critical discussion. The shoreline model is still prevalent as the main concept for the Stone Age coastal settlement and strongly influences our perception of the period. It also functions as a main guide in the search for new sites, and no comprehensive alternative models for locating sites have been developed. This poses a challenge to, and most likely biases, our understanding of Stone Age landscape use as it leads to difficulties in finding sites in other locations and, possibly, with other functions. The reasons underlying the persistence of the concept are diverse and are linked to theoretical and methodological challenges, natural conditions, and the administrative frames of archaeology. In the following, we identify five main factors that have influenced the Norwegian Stone Age coast concepts and shoreline model, factors that at the same time have prevented the exploration of alternative models for site location and landscape use:

- production of archaeological data – theoretical considerations,
- shoreline displacement,
- Stone Age surveys – methodological premises,
- the site concept,
- modern development activity.

3.1 Archaeological data production

An important factor that has enabled the success of the shoreline model is the general lack of critical theoretical approaches to archaeological data production, particularly field methods and practices. Naive positivist approaches have mainly focused on how to scientifically control the processing of already excavated and collected material (e.g. cataloguing, measuring, sampling and scientific analysis), failing to consider the highly subjective and experience-based observations and selection processes involved in archaeological data production (Wylie, 1992; Solli, 1996; Hodder, 1999; Berg-Hansen, 2009). This lack of critical awareness of the researcher's creative influence on the archaeological record or the historicity of scientific knowledge (Gadamer, 1997[1960]; Olsen, 1997, p. 112), has contributed significantly to the confirmation and reproduction of our knowledge about the Norwegian coastal Stone Age. It has also promoted the creation of an axiomatic model that has served as the basis for both data production and interpretation for more than a century. Its combination with simplistic eco-functional explanations has operated as a natural extension of the model, linking the placement of sites directly to the exploitation of marine resources. To avoid this situation in future research, an enhanced focus on, and critical awareness of, the role of preconceptions in data production and interpretations would be advantageous and help to open up the field to alternative approaches.

3.2 The Holocene shoreline displacement

Across large areas of Europe, Stone Age coastlines are submerged and mostly inaccessible to archaeological investigation, strongly affecting our understanding of the exploitation of the Stone Age coast (Gaffney et al., 2007; Astrup, 2018; Schülke, 2020a and refs therein). Although the Holocene shoreline displacement along the coast of Norway represents the opposite situation, it has similarly had a great impact on our perception of coastal settlement, serving as an important element in the success of the shoreline model.

Due to the land uplift after the Ice Age, the relative sea level has changed significantly in most areas. On the Norwegian Atlantic coast, developments are varied with periods of both regressions and transgressions, while in south-eastern Norway the shoreline has continuously regressed since the start of the Holocene. This has left the coastal Stone Age sites situated at different heights above current sea level. Today these sites are situated up to almost 200 m a.s.l., and are commonly located in landscapes far away from the present coastlines (fig. 4). Over past decades, large resources has been invested in developing precise shoreline displacement curves for several regions of Norway (e.g. Møller, 1989; Prøsch-Danielsen, 2006; Romundset et al. 2010, 2011 and 2018; Sørensen et al., 2014a; Romundset, 2021; here: fig. 5). By determining what elevation the sea level would have had at any given time, the displacement curves provide valuable guides for coastal surveys to identify potential areas of Stone Age sites in relation to prehistoric shores (Bjerck, 1990; Bergsvik, 1991; Berg-Hansen, 2009; Simpson 2009; Solheim and Persson 2018).

Within the same frame of thinking, the detailed knowledge of shoreline displacement offered by these curves is used as a strong argument in the dating of sites, independent of C14-dating of organic material or technological/typological dating of artefacts. The combination of the shoreline model – the assumption that the sites were shore-bound – and the displacement curves is thereby used as a method for indirectly dating the activities on the sites. This works especially well in south-eastern Norway, where there has been a continuous drop in sea level since the Ice Age (fig. 4 and 5). Based on the point in time when the sea retracted from the position of an archaeological site, we can determine the earliest possible date (terminus post quem) of that site (Solheim and Persson, 2018; Damlien et al., 2021).

3.3 Survey methods

Although several survey methods are used, test-pitting by shovel in combination with landscape reading is by far the most common and has, since the 1960s, been the

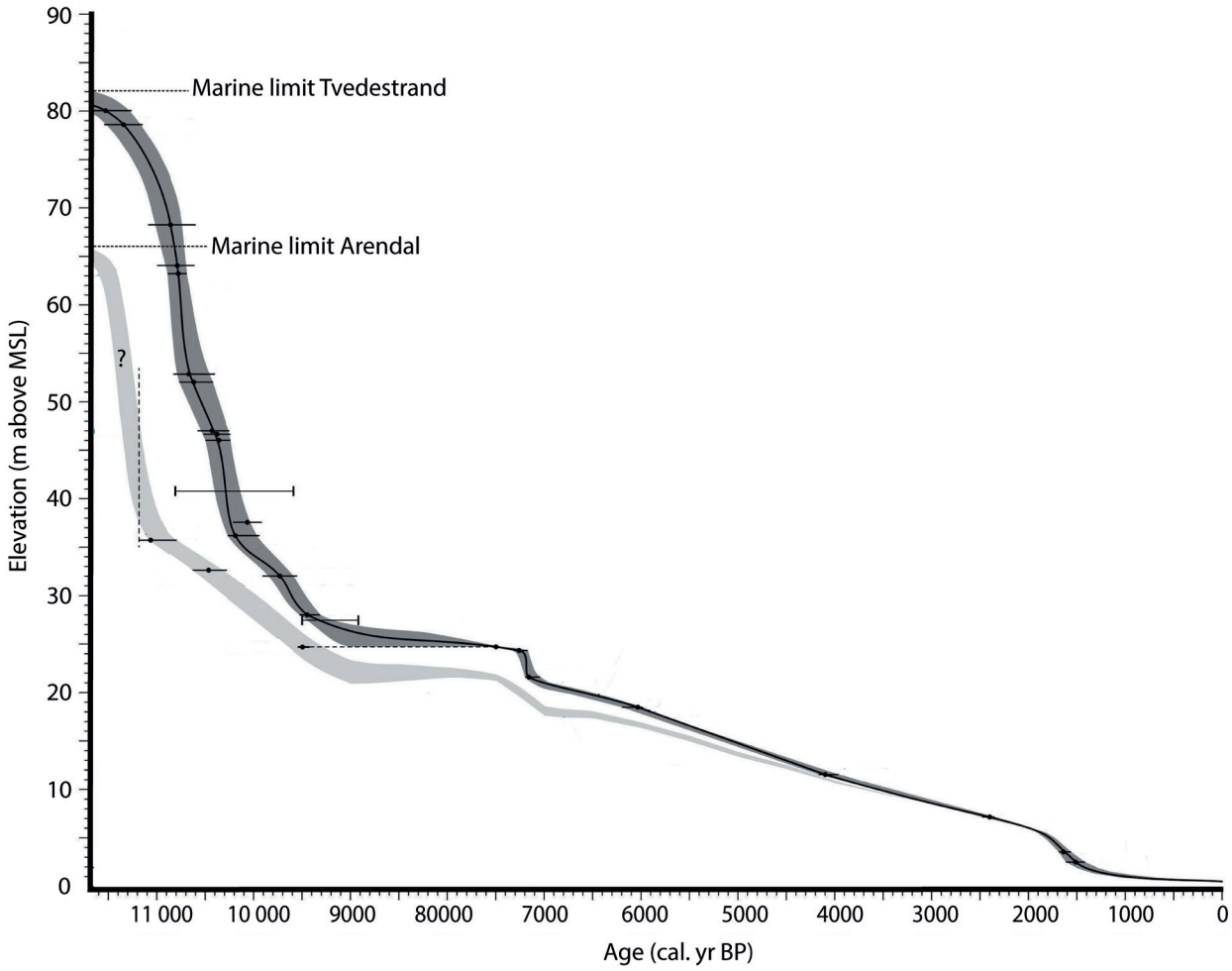

Fig. 5 – Curves displaying relative sea-level change during the Holocene are crucial in studies of Stone Age settlements along the Norwegian coast. Tvedestrand (light grey) and Arendal (dark grey) municipalities along the southernmost coast are among the best mapped stretches along the coast (see map figure 1), due to Quaternary geological studies performed as part of large-scale cultural heritage management excavations in the area (Reitan and Sundström, 2018; curves by A. Romundset [Romundset, 2018], simplified by A. Mjærum, MCH, UiO; CC BY-NC 4.0.).

***Fig. 5** – Les courbes montrant le changement relatif du niveau de la mer pendant l'Holocène sont cruciales dans les études sur les établissements de la Préhistoire récente le long de la côte norvégienne. Tvedestrand (gris clair) et Arendal (gris foncé) font partie des étendues les mieux cartographiées le long de la côte (voir carte figure 1), en raison des études géologiques du Quaternaire réalisées dans le cadre de fouilles de gestion du patrimoine culturel à grande échelle dans la région (Reitan et Sundström, 2018 ; courbes réalisées par A. Romundset [Romundset, 2018], simplifiées par A. Mjærum, MCH, UIO ; CC BY-NC 4.0.).*

standard method for mapping Stone Age activity in Norway (Bjerck, 1990; Bergsvik, 1991; Åstveit, 2005; Berg-Hansen, 2009; Damlien et al., 2021, p. 165-67). Most lowland areas are covered with forest and a thin turf layer, which makes other survey methods less applicable. Due to acidic soils, the preservation of organic material is limited, leaving lithic artefacts as the main trace of activity.

Landscape reading, which is an integral part of this method, builds on a mixture of general knowledge, preconceptions and the personal experience of the surveyor concerning where Stone Age sites are typically situated in different environments, i.e. what topographic features generally characterise a suitable site location, with reference to a reconstruction of the prehistoric shoreline. These features include, for example, easy access to the sea and marine resources, good harbours, an overview of the surroundings, wind shelter, flatness and dryness of the site, and so on, hence binding the site location to the coast based on functional and economic criteria (Berg-Hansen, 2009; Breivik, 2014; Bjerck et al., 2016; Ritchie et al., 2016; Roalkvam, 2020). Although these features might be relevant to Stone Age settlement, they also describe a modern western perception of what characterises a good camp site. Today, this perspective still largely dominates the field practice of Stone Age surveys, while excavations and current research generally have a broader approach including topics such as movement in the coastal zone, enculturation of landscapes, and interaction with surroundings, taskscapes and nature, as well as dynamic perspectives on the coast-hinterland relation (see below).

This difference in approaches springs from the plurality of theoretical frameworks and questions that have

developed in Stone Age research (see Schülke et al., this volume) rather than from methodological advances in field archaeology. The established survey method still constitutes a possible source of bias, and methodological developments are needed. One possible way forward could be the application of probability sampling to achieve a statistically representative sample of the distribution of sites and artefacts, a methodological survey framework that has so far received limited attention in Norwegian archaeology (but see Bjerck, 1989; Bergsvik, 1991 for modified approaches). With probability sampling, the aim is that only chance and the nature of the archaeological distributions dictate the results of the survey (e.g. Binford, 1964; Shennan, 1997, p. 361-398). Such a framework would offer a clear way to test previously proposed settlement models, while also providing an estimate of the confidence we should have in any observed pattern. The nature of the archaeological record, topographical character of the environments, and practical realities of archaeological fieldwork all pose challenges to obtaining such a sample. It should be possible to overcome these hurdles, however, through methodological developments involving rigorous planning and the adoption of comparable frameworks from other settings (e.g. Orton, 2000, p. 67-111). One proposition is to have parts of a future survey project conducted in a probabilistic manner to evaluate its merits and to obtain a better grasp of the challenges associated with such approaches in a Norwegian setting.

3.4 Site concept

Our site concept is essential for how we perceive the traces of the Stone Age. The site constitutes the basic unit and the analytical starting point for most studies (e.g. Dunnell, 1992; Fretheim, 2017; Nærøy, 2018; Schülke et al., this volume). The concept of what a site is, and how it can be recognized, influences our survey and excavation strategies. Sites are generally perceived as strictly delimited areas, or as points or nodes in the landscape, between which Stone Age people moved. Combined with the rugged topography of the Norwegian coast, with rocky outcrops and pockets of soils in between that have escaped most forms of agricultural activity and modern development, this site concept enables the discernment of places in the landscape suitable for test-pitting. However, while partly related to what we are able to recognize as physical traces of prehistoric activity (i.e. artefacts and structures) and partly to the need for operational units in practical and legal administration, this concept fails to consider the area surrounding the sites, demonstrating the need for theoretical and methodological developments (Dugstad, 2020; Schülke, 2020b; Berg-Hansen et al., 2022). By neglecting the activities that were performed outside the immediate limits of the settlements, whose traces are possibly less visible today, and prehistoric people's relations with their wider surroundings, including the hinterlands (Foley, 1981; Schülke, 2020a and 2020b), the prevailing site concept has added to the apparent success of the shoreline model.

3.5 Modern development

Finally, modern development areas, which are concentrated mainly in the lowlands along the coast, or along waterways inland, present a decisive factor. Building activity has caused an immense production of archaeological data during the last 20 years, resulting in unprecedented research opportunities. Even so, this represents a problem that is often overlooked. In Norway, virtually all excavations are carried out as rescue excavations, i.e. as part of the governmental heritage management through legislation. Hence, the areas where archaeological investigations take place and the geographical limits for the excavations are being dictated by what areas that are desirable for modern land development. Although we have seen an increased awareness of this problem in the last two decades, it has resulted in a bias concerning the type of landscapes in which the surveys and excavations have been conducted, and while coastal areas are over-represented, large parts of the hinterlands remain underexplored.

To conclude, most known sites in Norway are situated along or near prehistoric shorelines. However, as we have pointed out, there is a bias in the data that has influenced our understanding and led to an insufficient concept of Stone Age coastal societies. Culture heritage management as well as research have mainly focused on sites connected to shorelines and inland watercourses, while limited knowledge has been developed concerning the activities in the areas between large waterbodies (Mjærum, 2019; Damlien et al., 2021). Site location along shorelines is easy to explain within eco-functionalistic frames of thought, especially linking the choice of location to the exploitation of food resources. We argue that this way of connecting coastal settlements with a marine economy has resulted in less interest in exploitation and management of terrestrial resources. Furthermore, the dominant site concept has for more than a century influenced our perception of settlements as delimited areas or points in the landscape that were interconnected by the means of boats travelling along the coastline. However, in recent years several studies have presented new perspectives on landscape use, site location and distribution, challenging the established concepts of the coastal Mesolithic (e.g. Berg-Hansen 2009; Fuglestvedt, 2017; Svendsen, 2018; Mjærum, 2019; Nyland, 2020; Roalkvam, 2020; Schülke, 2020b). The historical development and maintenance of the shoreline model, as well as recent results questioning the established views, call for a review of existing coast concepts.

4. COASTAL SITE CONCEPTS REVISITED – FROM COASTLINE TO LANDSCAPES OF PRACTICE

An increasing number of Stone Age excavations and surveys in Norway over the last couple of decades (Indrelid 2009; Bergsvik et al., 2020; Henriksen et al.,

2020; Skogstrand 2020; Damlien et al. 2021), combined with improvement of excavation methods, has expanded our possibilities for conducting empirically based studies of site location and settlement patterns. Simultaneously, the capability to date sites has been significantly improved by an increased availability of precise C14 data, more detailed shore-level displacement curves (see above), and as a result of refinement of chronological schemes. These developments, along with the application of statistical methods, a gradually increased plurality of theoretical approaches and a growth in research resources, have to some extent improved our ability to test, nuance and challenge the shoreline model.

In many studies, shoreline displacement curves have been compared with radiocarbon dates from Stone Age sites. Such tests have generally proved a strong vertical affinity between known Mesolithic sites and former coastlines (e.g. Breivik et al., 2018; Solheim and Persson, 2018; Fossum, 2020; Solheim, 2020; Bergsvik et al., 2021; Mjærum, 2022; Roalkvam, 2023), while less is known about the horizontal distance from the settlements to the littoral zone. These studies thereby strengthen a key premise in the shoreline model: that the main parts of settlements were located only a few meters above the mean sea level in the former archipelago landscape. At the same time, the increased amount of data and research have made the outliers in the coastal model more numerous and easier to detect. Today, we know that house structures and hearths were established and lithic scatters and cremated bones left behind in the coastal hinterland at varying distances (some hundred meters to several kilometres) from the Mesolithic seashores (e.g. Eigeland et al., 2016; Mjærum, 2019; Schülke, 2020b).

We also see that some of these sites were re-visited over a long period, starting when they were closely related to the seashore. During their time of use, they underwent a transformation due to the land uplift and ended up as completely disconnected from the shore in their last stage of usage (e.g. Mjærum and Mansrud, 2020, p. 286-288). A conceptual challenge is whether these sites mirror regular inland activity, or if they would mainly have been associated with coastal activity. While our perception of such sites will be closely related to interpretations of the specific site's function in settlement systems and their organisation, there will always be an ambiguity in the definition of where the coast ends and the inland area starts. Still, the finds indicate that the coastal hinterland played a more important role for the groups frequenting the coastal areas of Norway than hitherto assumed. These finds have opened up a new empirically based debate about the nuances in the shoreline model and calls for a review of our concepts of Stone Age settlement, movement and landscape use (Mjærum, 2019; Schülke, 2020b, p. 387). The evidence of hinterland visits has been interpreted as places where the coastal population could find supplementary inland resources (Bergsvik, 2009; Blankholm, 2011; Nyland 2016; Mjærum, 2019), such as observation posts on high terrain (Schülke, 2020b) and transit sites used by people traveling between watercourses or to places further inland (Gundersen, 2013). However, research has also emphasized that inland activities fulfil more than material needs. By revisiting places that were once located on shores, they also went back to their ancestors' sites and their former world (Glørstad, 2010; Mansrud and Eymundsson, 2016; Schülke, 2020b).

Outward perspectives are needed to supplement this inward view, however. Recent publications have addressed this critique by widening the perspectives from the littoral zone itself to broader economic, social and cultural taskscapes, including inland waterways and forested hinterland areas. The shoreline sites were also a vantage point for marine activities related to the outer coast, such as deep-water fishing and sea mammal hunting (Bjerck, 2009 and 2021; Skar et al., 2016; Bergsvik, 2017, p. 84; Mjærum and Mansrud, 2020; Mansrud and Berg-Hansen, 2021). Areas along the coast and watercourses represent specific ecotones or the border or transition between two ecotones, comprising certain biological recourses. Such zones often represent fertile areas containing a variety of species, and hinterland watercourses provide easy access to fresh water.

Waterbodies, both coastal and inland, also represented important transport opportunities, either by boat or on ice in the winter, enabling the maintenance of social networks and indispensable knowledge exchange (Solheim 2012; Damlien, 2016; Berg-Hansen, 2017). Our conclusion is, therefore, that Stone Age sites situated in the littoral zone should not be viewed as a string of pearls along a narrow coastline. Rather, we advocate a more holistic perspective on spatial movement, where the coast should be viewed as a wider 'landscape space of practice' where land and sea met, with special meanings and ways of living (Schülke et al., this volume). The coast was a good place for people; however, their world was surely extended not only by voyages on the water but also through an active use of the hinterland.

5. FINAL REMARKS

The questions we ask and the methods we employ are governed by our analytical terms and concepts. Hence, our general perceptions of the significance of the coast to Stone Age societies, which in principle have prevailed for a century, affect how and where we look for sites and how we interpret our findings. While this emphasises the need for self-critical awareness in our scientific practice, our concepts nevertheless make us able to recognise the traces from these societies along the Stone Age coasts. The shoreline model has resulted in the discovery of a high number of relatively undisturbed sites, which together stand out in an international setting and offer excellent opportunities for further research. However, our discussion has pointed out some of the challenges in the existing concepts and approaches. We can, therefore, say that our concept of the site and the coast, with the strong emphasis on the proximity of the Stone Age sites to the

shore, both helps and limits our understanding of Stone Age coastal societies. The question remains, however, of what part of prehistoric reality we are able to capture within this frame of thinking, and how we can move beyond this.

While the geographical limits for archaeological investigations are generally set by administrative factors outside the control of the research community, the survey methods, location models and site concept are ours to define. In searching for a broader, more holistic perspective on Stone Age life and societies, we would benefit from addressing these concepts critically, acknowledging the variety of individual and societal practices in coastal landscapes.

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