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Lithic Raw Material Diversities from Early and Middle Mesolithic northern Norway

A comparative study of sites in Nordland and southern Troms

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Photo: From Sætertinden, overlooking the Tjeldsundet strait in the border-areas of Nordland and Troms County. Photographer: Maciej Ehlert

(…) Men nye bølger skyllet fram fra syd
med solhvervs-rytme og i krappe skavler,
en brem av strålespyd og morgen-lyd
med brus av sol-skum over hvite gavler-
der nye slegter kravler, skravler, avler
og blir utallige til gudens pryd,
og bygger lag på lag av død og fødsel
og kvæler fjeldet med et bjerg av gjødsel.

-Lyngenfjeld, Peter Wessel Zapffe (1969)

Abstract

The lithic composition of 25 early and middle Mesolithic sites located in Nordland and southern Troms County are cross-examined in this thesis. In the course of the last few decades, multiple commercial/rescue excavations have enriched the archaeological empirical material of the Mesolithic Nordland and Troms County, Norway. During the 1980's and 1990's, multiple scholars gathered and conveyed important data of the Mesolithic northern Norway. Recent excavations of the Mesolithic necessitate archaeological inquiry, by reviewing the lithic trends and raw material diversity of these two counties during the early and middle Mesolithic these areas will be thoroughly mapped. In the mapping of these sites, the lithic distribution will be reviewed as well as the potential modes of mobility and raw material procurement.

The raw material flint was extensively utilized and constituted as the dominant raw material at 40% of the mapped sites. In order to contextualize how this valuable lithic ended up in these contexts, the temporal perspective must be widened. The geological and glacial preconditions determined which raw materials were available for procurement in the early and middle Mesolithic. The diverse preconditions facilitating flint availability in northern Norway are reviewed, while potential glacial deposits are investigated by cross-examining the lithic compositions of the 25 early and middle Mesolithic sites. Glacial preconditions played a crucial part in how the flint was ice-rafted, transported and deposited along the ice-free areas of the Norwegian shores. These causations will be thoroughly discussed and are reviewed as partaking in how the flint ended up on the early and middle Mesolithic sites of northern Norway. The preconditions determining how the flint ended up in these Mesolithic contexts have not been subject to extensive archaeological inquiry in northern Norway. This study aims to provide a new and thorough theory contextualizing these somewhat enigmatic processes.

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Throughout the past few years, I have worked with the Arctic University Museum of Norway and the Nordland County Authority, and I am thankful for the chance to gain experience out in the field. I was fortunate to be able to participate in the excavation of some of the material employed in this thesis. The compositions of lithics of the middle Mesolithic site Solli in Tjeldsundet, Troms County inspired segments of this thesis.

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1 Introduction

Northern Norway consists of a multitude of early and middle Mesolithic sites, and the aftermath of The Last Ice Age created a unique mode of research potential of Mesolithic Norway. The Mesolithic period was a time of fluctuating climate and varying subsistence access. The hunter-fishers of these regions prevailed in these landscapes, with a close connectedness to the seas. The raw materials of which they procured, used, and discarded form our perception of the Mesolithic ways of life.

This study outlines the lithic compositions and geographical location of 25 early and middle Mesolithic sites in northern Norway. These sites are located in Nordland and southern Troms County, which covers vast areas of climatic and geographical diversity. These sites were excavated between the years of 1974 to 2022. By reviewing the lithic compositions of the 25 sites, the lithic trends, potential modes of mobility and settlement patterns will be reviewed. The utilization and distribution of flint in the early and middle Mesolithic northern Norway is scrutinized in this thesis. The prevalence of flint was in part why I chose to review the lithics of this area, but also in an attempt to contextualize the preconditions determining how the flint ended up in these areas, far away from the nearest quarries of southern Scandinavia and the British Isles. A review of these preconditions will constitute as a large part of this thesis.

I chose to investigate the early and middle Mesolithic Nordland and southern Troms based on the adversity, grandiose climatic changes, and the ‘enigmatic’ circumstances surrounding the acquisition of perhaps especially the flint. The lithic tools and their debitage form a substantial part of the evidence of past human utilization of the Mesolithic landscapes. The lithics makes up the central material of which will be studied, in addition to the geographical location of the 25 sites.

The objective of this thesis is not to create a complete and updated review of the archaeological research of the early and middle Mesolithic Nordland and Troms County. It is rather an attempt to cross-examine some of the archaeological data of these regions, which has increased substantially during the last few decades.

1.1 Theme

This thesis will first and foremost identify the lithic trends of the EM and MM Nordland and southern Troms County with the goal of shedding light on the early and middle Mesolithic lithic trends and adaption to a multitude of different lithic resources. The theme of this thesis also scrutinizes the internal distribution of flint on the EM and MM sites of Nordland and Troms County. The area of inspection is large, and the geographical diversities will be thoroughly mapped.

1.2 Research objectives

The research objectives of this thesis are listed below:

1. Mapping and identifying the lithic trends of EM and MM Nordland and southern Troms County.
2. Did flint make up substantial amounts of the lithic compositions?
3. Which preconditions determined flint deposits in northern Norway?

The mapped research objectives were chosen to thoroughly examine the empirical material of these northern counties and create sort of an overview of the lithic trends. By mapping these trends, the Mesolithic mobility and raw material preferences will be scrutinized. The geographical location cross-examined with the lithic compositions will be employed to review if location patterns determined raw material preferences. The framework covers Nordland and southern Troms County, and this grasp allows a more comprehensive overview of the early and middle Mesolithic mobility and lithic raw material preferences.

The third objective is an ambitious one. By working my way through the research objectives, I aim to be able to determine some of the crucial and prerequisite factors determining how the flint ended up in these Mesolithic contexts, but also if any areas were particularly susceptible for flint beach deposits. The preconditions determining flint beach deposits have not been subject to extensive archaeological inquiry in northern Norway and I aim to contextualize this issue.

1.3 Chronological and geographical framework

The chronological framework employed in the following thesis will be based on the defined chronologies by Bjerck (2008: 82). I will consequently refer to datings as (cal) BP in ^{14}C

years. This because 17 out of 25 sites are dated by radiocarbon, but also because the preconditions determining availability of flint stretches back up to 17 000 years.

Table 1, Chronological terms after Bjerck (2008: 82) and Breivik (2014: 1479).

ARCHAEOLOGICAL PHASE	AGE BC	^{14}C YEARS
EARLY MESOLITHIC	9500 - 8000	10 000 - 9000
MIDDLE MESOLITHIC	8000 – 6500	9000 - 7700
LATE MESOLITHIC	6500 – 4000	7700 – 5200

The chronological and spatial framework for this thesis covers the early and middle Mesolithic (10 000-7700 BP) of Nordland and southern Troms County, with Tromsø municipality as the northern limit (Fig 1). When relevant, other regions of Norway will be mentioned, but these counties will serve as the primary areas of study. The aerial coastline of my geographical framework is measured to roughly 600km in a straight line from north to south, and consists of a wide variety of islands, islets, fjords, and ecosystems. The geographical framework for the following thesis is illustrated in the map shown in Fig. 1. Those who are familiar with Troms County's geography can identify that the six northernmost municipalities are excluded. The reason for this is in part because these municipalities do not embody a lot of EM and MM sites, but this limitation was also made to create a sort of 'buffer' to Finnmark county and its archaeological material.

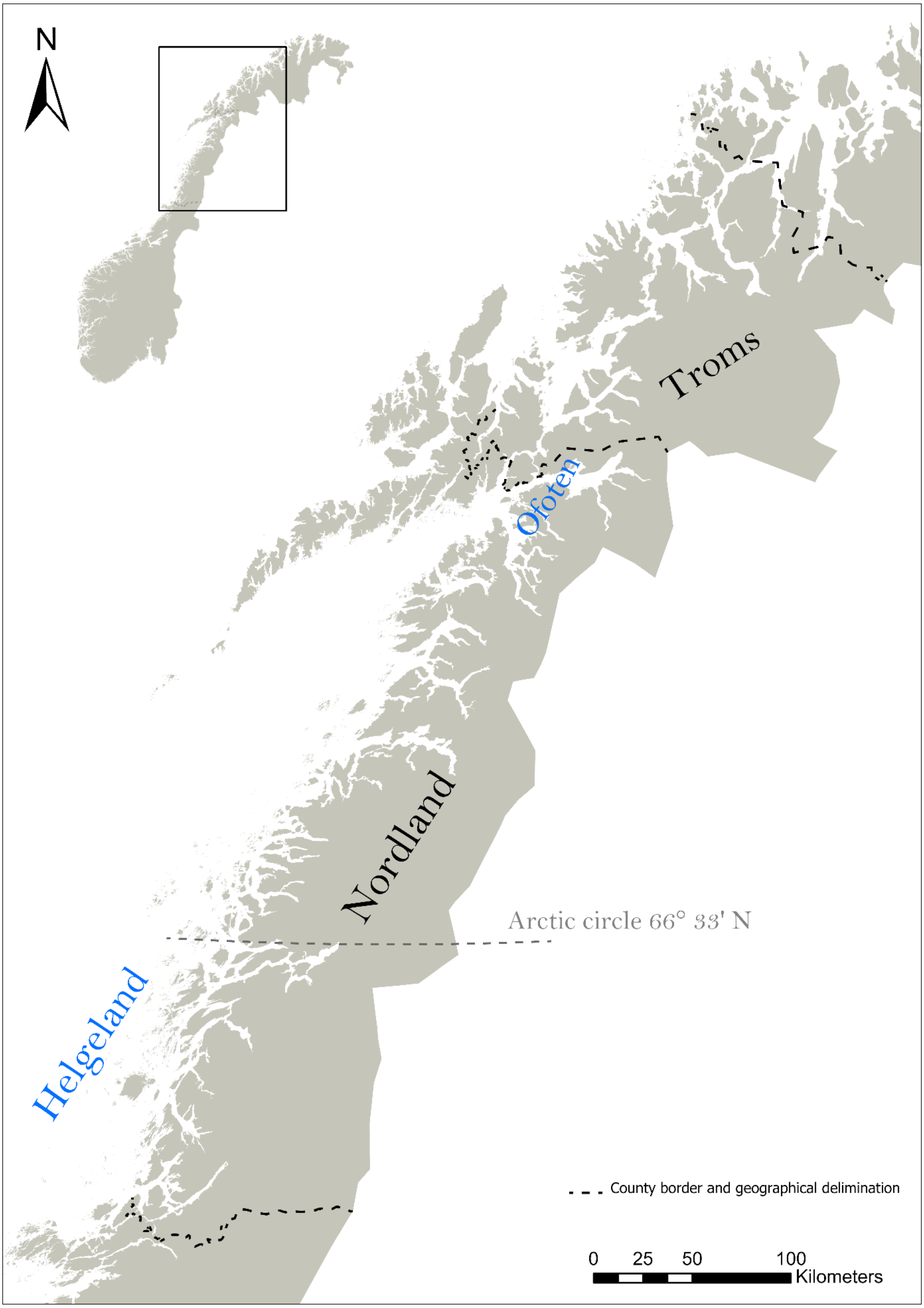

Figure 1, Map of Norway with areas of significance marked in blue colour, county borders and geographical delamination. "Troms" refers to Troms County with Tromsø municipality as the northern limit. Map data: Geonorge

1.4 List of terminology and abbreviations

Table 2; List of terminology and abbreviations.

Marine border	The highest border of the sea level during or after the Last Glacial Maximum.
Land upheaval	The isostacy which raised the landmasses after the ice melted from the inlands following The Last Ice Age.
Shoreline displacement	The fluctuating sea levels providing archaeology with a relative dating method.
EM, MM	Early Mesolithic, Middle Mesolithic.
Seascape	Productive marine areas. This does not solely include the oceanic environment, but also the shores and beaches.

The sea level program created by J. Møller and B. H Holmeslett (1998) http://geo.phys.uit.no/sealev/index.html is employed for reviewing shoreline displacements in areas which have not been thoroughly mapped. The generations are not ideal but are reviewed as sufficient for a general discussion for the areas which has not been sufficiently mapped.

ArcGIS Pro 3.1.1 © Esri 2023 is the main program for conveying maps. Map data was collected from the national database for maps in Norway, Geonorge which is operated by Kartverket. Maps are created by author unless otherwise specified.

1.5 Structure of the thesis

In order to map the Mesolithic northern Norway, the research history and central theories concerning the northern Norwegian Mesolithic will be mapped in the following chapter. This chapter is short as many of the works will be revisited throughout the beginning chapters of the thesis. Chapter 3 will serve as an introduction to the geological and climatic history of northern Norway. Because of the multifaceted preconditions dictating the forms of living in Mesolithic northern Norway, Chapter 3 is thorough and includes Holocene and Pleistocene conditions. Chapter 4 maps the archaeological interpretations concerning the raw material flint in northern Norway, in addition to the lithics attributes. This chapter also deals with a thorough review of the potential preconditions determining flint beach deposits within my geographical framework. In chapter 5 the primary material will be introduced in addition to its geographical and chronological distribution conveyed in charts. In chapter 6, the modes of mobility and resource use will be scrutinized by analysing the raw material compositions. The discussion of Mesolithic mobility in northern Norway is challenging to map without the implementation of marine vessels, which will be thoroughly outlined. Chapter 7 will serve as the discussion of this thesis before the conclusion follows in chapter 8.

2 Research history and central theories

This chapter will map out the central theories concerning the early and middle Mesolithic northern Norway. This is an important initial step in ‘mapping and identifying the lithic trends of EM and MM Nordland and Troms County’ as established in the first research objective. This chapter will be short and concise, as many of the following works of the past will be revisited in this thesis. A short introduction to the stone-age chronologies will be mapped, before presenting some very general lithic tendencies of the Mesolithic of the three northernmost counties of Norway. Material from Nordland and southern Troms County makes up the geographical framework of this thesis but cannot be mapped thoroughly without providing a general introduction to the lithics of Finnmark.

Until recently, the determinations of the Mesolithic ‘Komsa’ and ‘Fosna’ cultures have been employed to contextualise the characteristics of the northern and southern Norwegian Mesolithic cultures. The term ‘Komsaculture’ was coined by A. Nummedal in 1926, when he documented the first pre-neolithic sites in the northernmost county of Norway, Finnmark (Hauglid, 1993: 1). The ‘Fosnaculture’ was viewed as the southern counterpart. With the “flintplaces” of Møre and Romsdal, determined by K. Rygh in 1910 (Nummedal, 1926). The early 1900s comparative cultural doctrine had a significant impact on the formation of the ‘Fosna’ and ‘Komsa’ terminologies, which was an important step in building the theoretical groundwork for a still-emerging academic field in a country anxious to forge its own sense of national identity. The familiarity with the lithic technologies was at the time limited, and these determinations resulted in a field where the morphological similarities ruled and wide comparisons limited the research (Bjerck, 2010: 61). In the 1970’s, the chronologies of Mesolithic northern Norway was divided into three main groups (Simonsen, 1975). The ‘Komsa’ culture of Finnmark, the ‘flintplaces’ of the Helgeland coast and the ‘Brastadphase’ of Nordland (Sandmo, 1986: 100).

These terminologies were important in the archaeological research of the past, but these cultural determinations of ‘Komsa’ and ‘Fosna’ will not be employed in the following thesis, this because of the cultural deterministic biases these thoughts emphasised to some degree. A culture is more complex than its theoretical and typological ‘blueprint’ and the increase of research material has proven it challenging to review cultures as closed and homogenous based on their geographical location and lithic typology. These determinations have perhaps especially been proven problematic because of the geographical vastness of northern Norway.

New and alternative theories increased in numbers during the 1980's and 1990's post-processual movement. The authors in the following subchapter did not necessarily identify their work as a part of this or any dogma, but their works represent a field of theories where the previous deterministic and reductionistic ideal was challenged.

2. 1 The archaeology of Finnmark, Troms and Nordland County

Northern Norway is made up by three counties. These counties and the central research history and consensus regarding lithic trends will be mapped briefly. This will be conducted in order to map out the most common Mesolithic raw materials which makes up substantial parts of the archaeological data.

Finnmark

Bjørnar Olsen contextualised the chronological variation of Finnmark in his 1994 book concerning the settlements and cultures of Finnmark (Olsen, 1994). As a result of the out-phasing of the comparative culture dogmas, the use of 'phases' were incorporated in order to contextualise the chronologies of early stone age archaeology in the north (Olsen, 1994). The phases are defined by the lithic assemblages and was in Finnmark determined to be of three chronological phases. Phase I (10 000 – 9000 BP), phase II (9000 – 7500 BP) , phase III (7500/7000 - 5600 BP) (Olsen, 1994: 34). Relying rather heavily on Peter Woodmans attempt at a chronological division of the till then prevalent Komsa-culture spanning the entire Mesolithic (Woodman, 1993). Olsen also looked to Bjerk's (1986) chronology for western Norway and there are significant similarities in the periodization between the three chronologies. Although the scope of this thesis does not encompass Finnmark directly, its context is relevant to briefly map. The lithics of Mesolithic Finnmark varied substantially and the most frequently utilized were …"quartzites (…), different cherts(…), rock crystal and white quartz" (Olsen, 1994: 28). In some cases, flint was also utilized of the stone age peoples of Finnmark. Its procurement was examined by Bryan Hood which also defined the previously overlooked "chert" of Northern Norway (Hood, 1992). The settlements groups of Finnmark in the Mesolithic had the advantage of an availability to a microcrystalline lithic, chert. The chert was widely available from a variety of different quarries, with differentiating visual and qualitative attributes (Hood, 1992).

For further literature on Mesolithic Finnmark see (Schanche, 1988, Woodman, 1993, Hesjedal et al., 1996, Blankholm et al., 2017).

Troms

The geographical framework of Anne-Karine Sandmo's (1986) thesis covered the area of mid-and northern Troms County in the Mesolithic. She mentions the problematic aspect concerning her research area and the deviation of the material from the culture classifications of her time, and admits how reviewing cultures by their geographical location and technologies can be limiting …"in frustration over sitting with thousands of artefacts which did not "fit in" to any decided construct (…) (Sandmo, 1986: 15, direct translation). The lithics which were reviewed as characteristic for mid-and northern Troms are grey flint, black and white quartzite, black ultramylonite and some local lithics such as milk quartz and grey, white and black quartzites (Sandmo, 1986: 14). Ultramylonite has been acknowledged as a type of chert originating from Alta in later years (2021 Hood, personal communication). Different types of quartz and quartzites were the main lithics, with some elements of chert and flint (Blankholm, 2019). As the regions of Troms has been extensively excavated compared to Nordland, multiple theses have been conducted with varying themes (Barlindhaug, 1996, Thuestad, 2005).

Nordland

From 1985 to 1990, Martinus Hauglid carried out small scale excavations in the Salten area of Nordland (Hauglid, 1993). The use of rock crystal, quartz and quartzite dominates in the mid-Nordland Mesolithic, with some flint detected (Hauglid, 1993). The lack of the familiar flint seems to have led to the development of a technology of considerable exploitation of the lithic (Hauglid, 1993:162). Simonsen (1996) conducted some excavations in the southern parts of Nordland towards the end of his career. These were determined to be of the 'flintplaces' of Helgeland. It seems like the northernmost parts of Nordland/ the border-areas of Nordland and Troms County as well as the southernmost has been subject to the more comprehensive excavations and research during the last decades (Bjerck, 1990, Simonsen, 1996, Edvardsen, 2010, Spjelkavik, 2016, Bruun and Oppvang, 2021, Bruun and Oppvang, 2022, Bruun and Oppvang, in prep.). While the central areas of Nordland was subject to small-scale excavations by Hauglid (1993) some 30 years ago.

The general raw material procurement of Northern Norway during the Mesolithic is varied and there are seemingly substantial local and regional differences in the raw material preferences and procurement. Most of the later works of northern Norway has been conducted on commercial sites conducted as part of infrastructural works. The aim of these works has for the majority of the cases been concerned with few sites or a given geographical area. Finnmark county has been subject to greater levels of archaeological inquiry, compared to perhaps especially Nordland County (Fretheim, 2017: 18). Troms County has been subject to a multitude of excavations during the last decade which has enriched the archaeological record (Skandfer et al., 2010, Grydeland and Arntzen, 2014, Nergaard and Oppvang, 2014, Nergaard et al., 2016, Bruun and Oppvang, 2021, Bruun and Oppvang, 2022, Bruun and Oppvang, in prep.). And finally, the central areas of Nordland county was last mapped from a EM and MM perspective some 30 years ago (Hauglid, 1993).

No works has provided an overview or summary of the lithic compositions of the EM and MM excavations of the past few decades in Nordland and Troms County. This has to some extent been conducted for smaller regions within the separate counties (Stensrud, 2007, Edvardsen, 2010). These county borders are modern concepts and segregating these places in the hopes of reaching extensive conclusions is a futile operation. Therefore, it can be fruitful to include a more comprehensive overview including larger scopes of northern Norway.

In keeping with the overall objective of this thesis, a central issue to further assess is the climatic and geological preconditions. These causations determined which areas were habitable, which resources were available and perhaps most importantly, which raw materials were made accessible. The following chapter will further map these factors in order to view the Mesolithic contexts with a broad perspective.

3. Climate and Geology

The quaternary history of Nordland and Southern Troms County, as well as its landscapes and seascapes, are outlined in this chapter. This framework provides an overview of how the landscape changed over the course of the last 40 000 years and how this influenced the variety of raw materials that ultimately ended up in the early and middle Mesolithic contexts of Nordland and southern Troms. To further broaden the perspective of this wide-ranging and multifaceted area, a description of the climatic and environmental settings is provided. In addition, a mapping of the autochthonous lithics of northern Norway will be presented towards the end of this chapter. These mappings of climate, landscape and geology are outlined to provide an overview of the complex causations influencing lithic availability and comprehension of the landscape in EM and MM northern Norway.

The landscape of Nordland and Troms, as well as the rest of Norway were subject to substantial climatic variations during and after the Last Ice Age which shaped the landscape into what we now call Nordland and Troms. The landscape of Nordland and Troms consists of steep mountains, fjords, and marine seascapes which was substantially altered during the Last Ice Age. The Norwegian landscape cannot be understood as a result of the last 40 000 years as the quaternary phase is merely a second compared to the millions of years which shaped the land and pre-conditioned which rock-types were available for the peoples of the past (Nyland, 2017). These geological preconditions play a crucial part in how and when the land was utilized and how the cultural landscape was shaped (Gjelle et al., 1995). Many of the landscape features in northern Norway demonstrates the force of The Last Ice Age, such as eroded mountains, large glacial boulders, and terminal moraines.

Troms County consists of deep and narrow fjords surrounded by steep mountains. Along the coast of Troms, numerous mountainous islands form the marine seascape which lies on a shallow submarine shelf (Andersen, 1968). Some of the distinguishing features of Nordland's landscape are long valleys with some glaciers remaining in situ, the beach lowland of the coast, numerous islands, and a bedrock consisting of durable quartz-rich rock (Gjelle et al., 1995). In Lateglacial/Postglacial times, the landmass of Norway underwent a severe isostatic uplift which resulted in an uplift of the earliest coastal sites, now situated above present sea level (Breivik et al., 2018). This creates a unique mode of research-potential. The local and regional differences of the isostatic effects are substantial. In order to thoroughly map the factors determining flint availability, chapter 3.1 will concern the Pleistocene conditions as these causations were one of the first factors determining flint deposits. Section 3.2 maps the Late glacial ice extensions, here the warmer periods and the fluctuating ice extensions is reviewed. Subchapter 3.3 concerns the Holocene environment settings, as the climatic circumstances determined the Mesolithic milieus to substantial extents. Lastly, section 3.4 will map the native lithic raw materials of northern Norway in addition to a brief introduction of the flint.

3.1 Pleistocene conditions

During different thousand-year intervals of the Last Ice Age, Scandinavia, the British Isles, Svalbard and parts of the Barents Sea were connected by substantial ice mass (Hughes et al., 2015). These dynamic interconnected ice masses are by Hughes et al., (2015) determined as the Eurasian Ice Sheet, and cannot be understood as synchronous in its ice-sheet margins (Hughes et al., 2015). Under the Last Glacial Maximum, the weight of the ice-sheets and the large amounts of water bound in the ice at both poles led to a sea level 125 meters lower than today in the World's Oceans (Dahl et al., 2022: 99). The technology of reconstructing former glaciers from the landforms and sediments they left behind have grown in its accessibility during the last 30 years, much because of satellite imagery and GIS technology (Bennett and Glasser, 2009: 347). By employing radiocarbon samples, combining the findings of previous publications and GIS technology, Hughes et al., (2015) created reconstructions visualising the ice-sheet margins of the Eurasian Ice Sheet from 40 000 BP to 10 000 BP, presented in thousand-year intervals. Based off the time-sheet reconstructions of Hughes et al., (2015) the Eurasian Ice Sheet reached its maximum at around 21 000 BP, and the first segments of Norwegian land became ice-free at approximately 16 000 to 15 000 BP in the Andøya, Lofoten and Vesterålen areas (Hughes et al., 2015: 14-21).

The transition of the geological phases Pleistocene (11 700 cal BP) and the Holocene (11 650 cal BP) is frequently described as a severe and sudden climatic event (Breivik et al., 2018: 259). The climatic transition affected substantial areas of The Northern Hemisphere, and melted the Eurasian Ice Sheet, transforming it into the Scandinavian Ice Sheet (Hughes et al., 2015, Breivik et al., 2018). In the following thousand-year intervals of the Early Holocene, what remained of the Scandinavian Ice Sheet 'rapidly' melted and made new land accessible.

The melting of the ice in combination with the substantial weight which submerged the land of Norway led to a high ‘marine border’ which is the determination of the highest sea level measured in the landscape. There are substantial regional variations, as the remaining ice in the inland varied. In the southern parts of Nordland, the marine border was measured to 120 meters above the sea level of today because of the excessive land upheaval (Gjelle et al., 1995: 23, Breivik, 2014). In the thousand-year intervals as the coast of Norway rapidly became ice free, the isostatic uplift was rapidly raising the shelf crust before gradually decreasing as the crust reached its equilibrium position (Andersen, 1968: 23). Some of the outer-coast areas of Nordland, notably Lofoten and Vesterålen, was covered by slimmer portions of ice and thus became ice-free early and was subject to minor isostatic-uplift compared to the mountainous or inland areas. Some EM and MM sites in these outer coastal areas are therefore considered to be under today’s sea level because of the transgression. This complicates the archaeological material concerning the earliest settlements in the Norwegian coasts, as many of the sites are considered lost under today’s sea-level (Andersen, 1968, Sandmo, 1986).

3.2 Late glacial and Quaternary Ice extension

The Last Ice Age created a unique framework for the archaeology of Scandinavia and especially what we today call the Norwegian land. After the maximum of The Last Ice Age at approximately 20 000BP, the climate became gradually warmer and the block of ice covering the Norwegian land churned down, calved and melted in a period of over 10 000 years (Dahl et al., 2022: 97-98). The first areas of the Norwegian land became ice-free at approximately 15 000 BP, these areas were the outer parts of Lofoten and Andøya in Nordland County (Hughes et al., 2015: 19). During the EM, the ice-mass was still covering substantial areas of the Norwegian land but retreated into the inlands. The geology of Nordland suggests that sea ice was still present around the shores of the Nordland coast, varying from region to region (Dahl et al., 2022: 117). At around 10 750 uncal BP, a climatic shift occurred which effected the Norwegian shores to a great extent. The Norwegian Atlantic Current stabilized and the remaining glaziers and sea-ice in the fjords withdrew (Fig. 2) (Breivik, 2014: 1486). The northernmost areas of Norway experienced seasonal sea-ice throughout the Preboreal (Breivik, 2014: 1486). As depicted, Nordland and Troms County have a complex topography over relatively short spatial scales, which makes local and accurate sea-fluctuations and sea-ice challenging to pinpoint on a local scale.

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Figure 2¸«Younger Dryas (11 000 – 10 000 BP) marginal moraines in Fennoscandia, illustrating the maximum extent of the Baltic Ice Sheet in the Late Glacial Period (Redrawn after Andersen 2000: 112)" (Bjerck, 2008: 67).

3.3 Holocene environmental settings

The climate of Northern Norway and the regions of Nordland and Troms varies greatly from the coast to the inlands and the mountainous areas. In an extension of The Gulf Stream, The Norwegian Atlantic Current encompasses the Norwegian coast and secures the fjords and seascapes from freezing in the winters and provides a relatively mild arctic seascape (Damm et al., 2020: 52). These systems of currents were most likely established during the Preboreal (Bjerck, 2008: 65). This also provides the coastal areas with rather perpetual available marine resources (with some seasonal variability) such as cod, harbour seal, pollock, halibut and to some extent seabirds (Damm et al., 2021, Bjerck, 2016, Dahl et al., 2022). These migratory fish and sea-mammals laid the groundwork for survival of the hunter-fishers in the north and the fish migrations are believed to have occurred in prehistory, with some variation of time (Helskog, 1980). Most of the studies conducted on prehistoric flora and fauna are concerned with the later phases of the Mesolithic and Neolithic.

The early Mesolithic sites of Norway are predominantly located in the proximities of the marine seascapes and show a reliance on the marine resources. (Breivik, 2014, Bjerck, 2016, Sjögren and Damm, 2019). Most Early Mesolithic sites have been detected in the prehistoric shorelines of Northern Norway. Breivik (2014) mapped 747 early Mesolithic sites in Norway and the compiled data showed that 96% of the registered EM sites were located in coastal areas (Breivik, 2014: 1481). These numbers may be slightly correlated with the fact that most excavations in Norway are a result of infrastructural-work, and in Norway this mostly takes place in the coastal areas to avoid mountainous areas. Sites with a proximity to the sea are also less complicated to register and give a relative dating based on the shoreline displacement. As mentioned, many Mesolithic sites are also located in the inlands (Helskog, 1980), but it is fair to accept that most early Mesolithic sites had a close connectedness to the marine seascapes. In northern Norway, most EM sites are located in fjords, channels, on isthmuses or sometimes on islets and headlands (Barlindhaug, 1996). Other than the heavy reliance on the marine resources, terrestrial animals such as reindeer and elk most likely had a more symbolic and ideological status based on the rock-carvings of northern Norway and did in all probability not make up substantial parts of the subsistence of the hunter-fishers (Sjögren and Damm, 2019).

The vegetation of northern Norway during the Mesolithic was subject to immense change during the earliest parts of the Holocene, in the millennia following the Last Ice Age. The organic remains and artefacts from EM and MM are unfortunately relatively sparce in Nordland and Troms County. Pollen records has however enriched the archaeological record. Wood was an important commodity for firewood, tools and building materials (Sjögren and Damm, 2019). In the early Mesolithic, shrub tundra and sparce birch forests, also including dwarf birch was some of the first floral settlers of the northern Norwegian land. In the middle Mesolithic, birch-fern forests followed as the arctic climate became warmer. The prevalence varied from the outer coast, to the fjords and inlands and from region to region (Sjögren and Damm, 2019).

3.4 The lithics of northern Norway

The geology of northern Norway is multi-faceted and complex. This subchapter will map out the central lithics which were utilized during the Mesolithic period. The geographical depictions will be general as a more comprehensive mapping of the microcrystalline lithic, flint follows in chapter 4.

Quartz is one of the more common minerals of the Norwegian bedrock. Its mineral crystals and characteristics vary from fine-grained to coarse-grained, which played a crucial part in its appeal. Just as the mineral crystals differ, its fracture-qualities vary and were seldom ideal for complex tool production (Hood, 1994: 66). This played a crucial part in how attractive the quartz was to the EM and MM groups of northern Norway. Quartz is one of the more common finds at stone-age sites in northern Norway and can be located in the mountainous areas of Nordland, Troms and Finnmark (Strand, 1953, Hood, 1994).

Rock-crystal is a type of quartz, also called quartz-crystal. Its visual attributes are most often transparent. The rock crystal rarely constituted as a heavily utilized lithic. It can be located and quarried in the rock crevices of Nordland and Troms in addition to Finnmark (Helskog, 1980, Bøe, 1999).

Quartzite is one of the most common lithics located at the Mesolithic sites of northern Norway, the quartzite is a local and easily available resource pretty much in all of northern Norway (Strand, 1953). Its visual attributes vary and can be in a variety of different qualities and colours.

Slate is a very general lithic terminology which covers a variety of siltstones and can be located in the mountain ranges in the east of northern Norway (Hood, 1992). Slate did not constitute as a widely used lithic in northern Norway in EM or MM, and its utilization became more widespread in the Neolithic.

Bryan Hood's PhD (1992) provided a substantial overview of the local lithics of northern Norway, while introducing the northern Norwegian archaeological milieu with a new lithic determination, chert. In the past, chert was often identified and catalogued as dolomite, a term coined by Povl Simonsen (1961). The bedrock of Finnmark embodies four types of chert, the quarries with closest proximity to my spatial framework is located south of Alta in Finnmark County, a chert determined as 'Kvenvik chert' (Hood, 1992: 92). Chert can also be in other areas of Finnmark, such as in Kvalsund, Porsanger and Pasvik (Bøe, 1999: 5). The chert is in many ways similar to flint, both in its visual attributes and microcrystalline qualities. Chert and flint are fine-grained lithics, this due to the motion of conchoidal fracture that its microcrystalline attributes endow. This means that when knapping chert or flint without major impurities, the motion of fracture do not follow any natural planes of separation (Encyclopaedia, 2023). The chert and flint terminologies are sometimes interchangeably employed in archaeological literature (Bradley, 2017: 102). In a northern American context, flint is often referred to as chert, whereas in Scandinavian and British context flint and chert are referred to as two different microcrystalline lithics.

It is indicated that flint is not a native lithic of Norway, as the geological formation processes have not developed the conditions necessary for the formation of flint in the bedrock of Norway. Flint is never-the-less often identified in archaeological contexts all over the country. Its visual attributes vary, but are most often in different variations of grey and brown and sometimes black (Högberg and Olausson, 2007, Grydeland and Arntzen, 2014). Its attributes in northern Norway are often weathered. This means that climatic and soil conditions have affected the visual attributes of the flint on a surface level (Thomsen, 2000: 27, Bradley, 2017). This can cause flint that originally was black or grey to have a yellow-ish, blue, white and brown surface (Högberg and Olausson, 2007: 67). Other surface alterations of flint which are common in Norwegian contexts are a glossy patina, making the flint an easy lithic to detect when wet sieving. Flint can often inhabit a white and chalky outline; this is called the cortex (Bradley, 2017). Further information will be provided about the visual and microcrystalline attributes of flint in the next chapter. A multitude of other lithics were also utilized in EM and MM of northern Norway, such as greenstone and jasper, but to a lesser extent. These will not be commented on further in this thesis because of their sporadic use and prevalence.

To summarize, quartzite, quartz, flint and different subclasses of quartz such as rock-crystal are the most common lithics of northern Norway during EM and MM. Its visual attributes and quality vary and may have contributed to the occasional wrong identification. Quartzite and quartz can be located over substantial areas, both in the rock crevices near the coast but also in the inlands near the mountainous areas. Chert is an autochthonous lithic of Finnmark, the nearest chert-quarries are located in Alta, roughly 100 kilometres away from the northernmost areas of my geographical framework. The inland of Nordland and Troms County, around the mountainous areas which separate Norway and Sweden, slate is more or less widely available in different colours and qualities. The bedrock of northern Norway holds multiple autochthonous lithics with different individual attributes depending on the usage. Some lithics such as the fine-grained microcrystalline flint and chert would be more agreeable to utilize when employing direct striking technique. Flint availability in the northern Norway is a result of extensive geological processes and climatic factors stretching over millennia. There are no known flint-tools uncovered from these regions that stems directly or seems to have been imported directly from the flint-quarries in southern Scandinavia or the British Isles. The flint of the Mesolithic sites in Norway, stemming from the bedrocks of flint in southern Scandinavia or British Isles was deposited as a final step in a comprehensive chain of events.

4 Sources and interpretations of flint in northern Norway

As introduced in the previous chapter, flint is not an autochthonous lithic of the Norwegian bedrock. The empirical material from archaeological excavations and surveys of northern Norway embodies substantial amounts of flint in varying quanta and quality. In order to review research objective number 2 ‘Did flint make up substantial amounts of the lithic compositions?’ and in part problem statement number 3 ‘Which preconditions determined flint deposits in northern Norway?’. This chapter will review the status quo regarding flint in northern Norwegian contexts. A central question of this thesis is why the flint was utilized in such high quantities on the EM and MM sites of northern Norway, located far away from the primary sources. This chapter will map the northern European sources of flint, before discussing provenance and different interpretations of flint in the Norwegian archaeological material. The quaternary processes introduced in the previous chapter will be important pillars for contextualizing how the foreign lithic ended up in northern Norway.

Subchapter 4.1 will introduce the closest geographical locations of autochthonous flint and its microcrystalline attributes. Section 4.2 concerns determining the areas of which the flint in Norway is thought to have stemmed from. This section includes both general suggestions by researchers, but also new scientific methods which has broadened the potential of determining the provenance of flint. Segment 4.3 maps the potential modes of transportation regarding flint. Multiple causations may have inflicted how the flint ended up in the Mesolithic contexts of northern Norway, and these causations will be thoroughly introduced in segment 4.3.1 and 4.3.2. Subchapter 4.4 introduces a new hypothesis regarding flint beach deposits in Nordland and southern Troms County. The mapped research objectives necessitate a thorough and comprehensive review of the potential factors determining flint beach deposits. Subchapter 4.5 will further map the regional and local variations effecting potential flint beach deposits.

4.1 Sources and formations of flint

Flint is a very hard siliceous mineral and originates from Cretaceous and Carboniferous quarries (Bradley, 2017). Its fine-grained and hard qualities make it particularly suiting for direct striking technique. Its robust qualities also extended how long and how many times the tools could be re-used because of the siliceous mineral’s hardness. Flint occurs as tabular layers in chalk formations and in nodules and stems from chalk formations embedded into the bedrock. In Europe, these flint outcrops are some of the remnants of the Late Cretaceous period and the Carboniferous period (Bradley, 2017: 94-95, Olofsson and Rodushkin, 2011). Even though flint was easily available over significant areas of the globe (Watson, 1968:23)…"there is no autochthonous flint in the Norwegian bedrock" … (Nyland, 2017:126). Southern Sweden, Denmark, and the British Isles, are the nearest locations where the bedrock embodies flint (Fig 3 and 4). A key question in the Norwegian Mesolithic archaeology is where the flint stemmed from. The next subchapter will review this question in order to contextualise the potential places of origin.

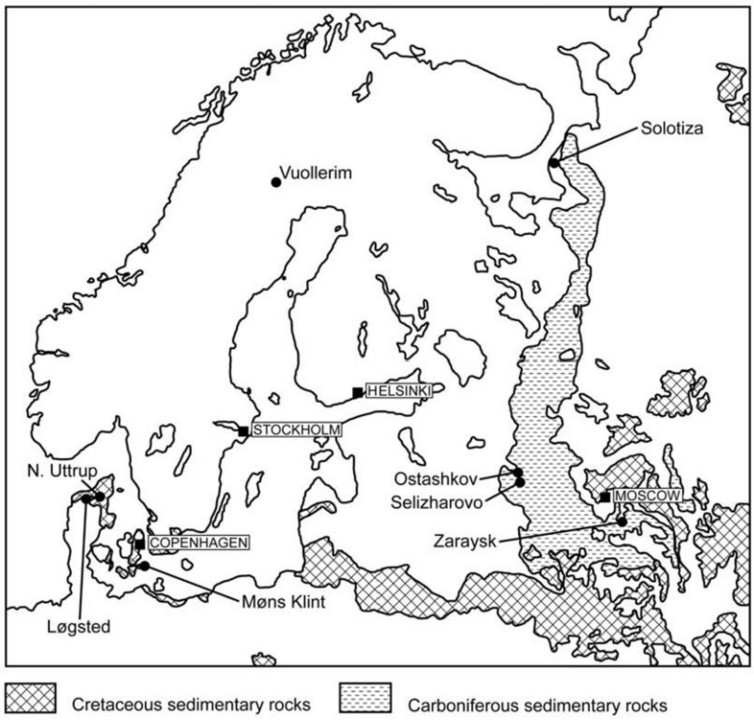

Figure 3, map depicting Cretaceous and Carboniferous sources of flint, northern Europe. From (Olofsson and Rodushkin, 2011: 1143).

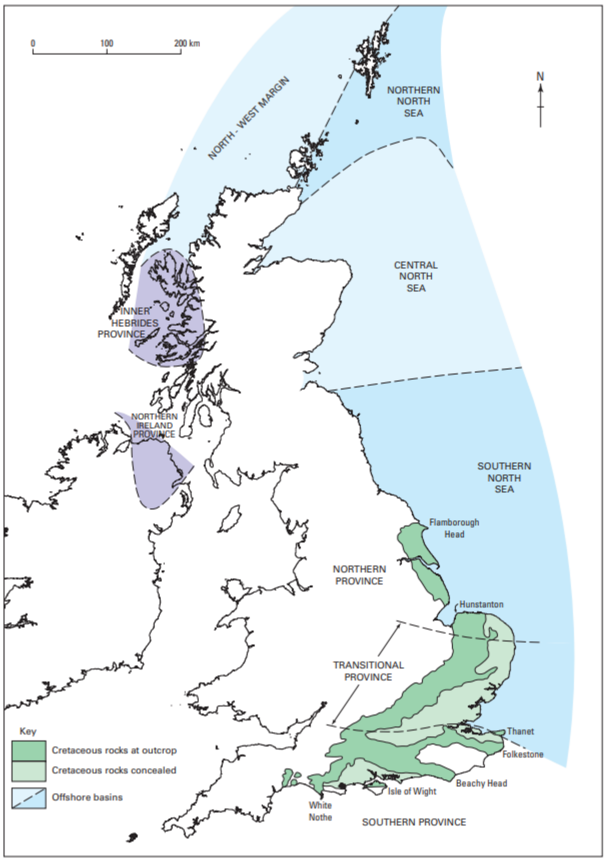

Figure 4, «Late Cretaceous chalk provinces of Britain and Ireland» (Bradley, 2017: 98). Map by the British Geological Survey, owned by Natural Environment Research Council, from:(Hopson, 2005: 2)

4.2 Flint provenance

"Because lithic raw materials *can* often be sourced, they provide robust information about circulation of stone, if not people, across the landscape" (Andrefsky, 2009: 75, cursive added). The attempt of lithic provenance is not a new research inquiry in Scandinavia, and varying methods of inspection has been attempted. Provenance studies are most often conducted with the hopes of pinpointing cultural connections. The lithics of inquiry are most often a result of human import. As this seems to not be the case with the flint of northern Norway, further inspection will follow.

A subcategory of flint commonly determined in northern Norway is the 'Helgelandsflint'. In 1961, Povl Simonsen (1961) coined this somewhat confusing subcategory of flint. Helgeland is a district in the southern parts of Nordland County, and like the rest of the Norwegian bedrock, it embodies no autochthonous flint. This subcategory was influenced by the Swedish terminology of 'Hälleflinta' and was described as "the grey unpure flint" (Simonsen, 1961: 16, direct translation). The characteristics of the Helgelandsflint are grey fossiliferous flint in varying qualities, but for the most part in a somewhat poor lithic quality with visible carbonate cortex (Fig. 5) (Hood, 1994). The lithic distinctions vary and some nodules are coarse-grained while others are more fine-grained (Hood, 2006). This subcategory of flint did not exclusively get deposited in the Helgeland district. It has however been noted that it occurs with a "particular frequency" on these southern shores of Nordland County (Hood, 1994: 69). Spjelkavik (2016) interprets Helgeland to have had higher quantities of these flint deposits compared to the rest of northern Norway (Spjelkavik, 2016: 103). A study of the microcrystalline attributes of the 'Helgelandsflint' concluded that it stemmed from Early Tertiary Danian sources (Hood, 1994: 69). Hood referred to personal communication with 'S. Floris' for this statement and no article or report supporting this statement could be found during the writing of this thesis. I am not opposing the proposition that the Helgelandsflint is of Danian provenance, but the potential methods for reaching this specific conclusion would be interesting to gain insight into. Apart from the beach deposits on the Helgeland-coast, these deposits of flint can be found along the Norwegian shores, sometimes stretching all the way north to Troms county (Bøe, 1999, Hood, 2006).

Scientific methods such as X-Ray Fluorescent analysis and inductively coupled plasma – mass spectrometry (ICP-MS) has showed promising potential, with some shortcomings as the field lacks sufficient comparative data from the source areas of Cretaceous and Carboniferous origin (Högberg and Olausson, 2007, Olofsson and Rodushkin, 2011, Olausson et al., 2012). Unfortunately, no studies have been conducted attempting to differentiate the flint material of the Norwegian Mesolithic as of southern Scandinavian or British provenance. It is however generally presumed that the flint that ended up on the Mesolithic sites of northern Norway, are of southern Scandinavian origin (Hood, 1994, Pettersen, 1986).

In 2016, Spjelkavik conducted optical microscopic analysis on flint, chert, and quartzite, in addition to XRF, LA-ICP-MS and SEM-CL on other lithics such as rock crystal and chert. The lithics from the contexts Mesolithic site Mohalsen I on the island of Vega in the southern parts of Nordland county was subject to analysis (Spjelkavik, 2016). The flint was determined as 'local beach-flint' with a possibility that some of the material could be a product of human import (Spjelkavik, 2016: 87-88). The chert was after geochemical analysis determined to stem from the chert quarries of Alta, indicating human import (Spjelkavik, 2016: 88). Spjelkavik (2016) touches upon ideas of human import which in turn can portray crucial information of Mesolithic mobility across vast areas.

When employing scientific methods such as XRF and ICP-MS, accessing sufficient comparative source material from the quarries of flint is crucial. Lithic weathering, and wrong calculations may corrupt the samples and thus create sources of errors. It is crucial to be aware of these potential errors when interpreting the results. These studies could further compliment research on Mesolithic mobility and could pinpoint mobility over vast areas. This angle of provenance could make for an interesting PhD or research project, but further follow-up had to be excluded from this thesis. These studies are primarily of research interest if the lithic in question is a product of human import. This is likely not the case with the flint of northern Norwegian EM and MM contexts.

4.3 Flint transportation

The flint was as mapped, not an autochthonous lithic of Norway. A central question that follows is how did this lithic end up in the Mesolithic contexts of northern Norway.

4.3.1 The 'beach flint' interpretation

Although the Norwegian bedrock do not embody any autochthonous flint, flint nodules in varying qualities and quantities can be located along the Norwegian shores (Berg-Hansen, 1999: 255) Flint nodules located in the existing and prehistoric shorelines stems from transportations from ice-sheets in the millennia's during and after the Last Ice Age (ca 40 000 BP – 8000 BP). When the ice-sheets covering Scandinavia gradually melted, it is believed that the force of the ice churned into the flint-bearing bedrock of Denmark and Southern Sweden before finally calving, drifting and being transported by the North Atlantic Current and the Continental Slope Current and deposited along the Norwegian shore (Pettersen, 1986, Wary et al., 2016, Nyland, 2017). This more or less widely accepted theory has not been subject to substantial research from a northern Norwegian archaeological perspective. But this problem has received some archaeological inquiry. In contemporary times, Lotte Eigeland (2015) conducted flint studies on the shores of southern Norway, in the same areas as Johansen (1956) some decades earlier. Hein Bjerck also conducted small-scale studies of beach-flint on the west-coast of Norway and in the Helgeland areas of southern Nordland (Bjerck, 1983: 101). Like Bjerck noted in his research (1983), flint nodules are sometimes located on raised marine terraces and in glacial deposits, indicating that they were deposited during the last glaciation (Hood, 1994: 69, Bjerck, 2008: 86). Other small-scale surveys include a short piece by Pettersen (1986) concerning searches for flint-nodules on the contemporary beaches of central Norway. My research suggested that this survey was not sufficiently documented, but concluded that many of the beaches retained flint nodules in sufficient size and quality for tool-production (Pettersen, 1986: 13). Hauglid (1993) also included a short segment regarding the flint deposits of Nordland in his thesis. He referred to the works of geologist E.J Havnø (1913) where it is presumed that the flint originally was deposited further south in Norway, before being transported to the shores of Nordland during the cold period of Younger Dryas, or early in the Preboreal (Havnø, 1913: 278, Hauglid, 1993: 18). And thus, resulting in what I term 'secondary deposits'.

The areas which initially became ice-free would constitute as ideal for flint beach deposits. The likelihood of flint getting deposited along the Norwegian shores decreases the further away from the primary bedrock the areas in question are located. These causations will be mapped more extensively in subchapter 4.4.

The deposited flint along the Norwegian shores weren't necessarily of poor quality compared to the primary *in situ* sources of flint from southern Scandinavia or the British Isles (Högberg and Olausson, 2007: 35). The Norwegian archaeologist Erling Johansen mediated on the 'flint-problem' in his 1956 article 'Access to local flint in eastern Norway during early stone-age. A new perspective on an old problem' (direct translation). The article conveyed the results from surveying for flint-nodules in the southern fjords of Norway, in and around the Oslo-fjord. After quantifying the material, the data showed that flint made up 1 to 6 percent of the rocks found. Some were fist-sized or larger. When reviewing his findings, Johansen (1956) hypothesised that the flint stemmed from Danish or Swedish sources and were deposited by sea ice in the postglacial period or by glacial movement (Johansen, 1956, Högberg and Olausson, 2007: 33-35).

Figure 5, Tested beach-flint nodule with visible cortex from the Mesolithic site Solli in Tjeldsund Municipality, Troms County. Photography: Erik Kjellmann, The Arctic University Museum of Norway.

4.3.2 The import interpretation

The Mesolithic material of southern Norway embodies substantial amounts of flint (Nyland, 2017). In south-eastern Norway, the flint uncovered at the early Mesolithic sites are often of high quality and the cores are of a substantial size (Fossum, 2015: 121). In some of the cases, the quality and size of the flint differs from the beach flint that was washed up on the southern Norwegian shores (Eigeland, 2015), and has therefore been viewed as imported goods (Fossum, 2015: 121). While the 'imported flint' interpretation cohere geographically in southern Norway with its proximity to the Cretaceous bedrock of Denmark and southern Sweden, the north of Norway does not have this geographical advantage.

Flint is neither an autochthonous lithic of Finland, where it has been proposed that flint uncovered at EM sites, located hundreds of kilometres away from the bedrocks of flint was a result of 'high mobility'(Hertell and Tallavaara, 2011: 15-16). This translates to a form strategic import of flint where the flint was …"procured, transported, used and discarded by the same individuals" (Hertell and Tallavaara, 2011: 16). As this theory portrays a high degree of mobility over vast distances, it may be applicable when the flint makes up lesser compositions of the lithic concentrations or appears in rare visual attributes.

Making use of small debitage, re-using composite-tools and in general utilizing every piece of material conveys how valuable the flint was to the Mesolithic peoples of northern Norway (Spjelkavik, 2016: 103). It was partly because of the observation of the thorough use of flint at the middle Mesolithic site Solli in Tjeldsundet that I decided to dedicate this thesis to research the preconditions and casualisations of flint in northern Norwegian Mesolithic contexts. The exhaustive use of the flint is also noted at the Tromsø sites Bergli 1 and 2 where the use of flint in 'good quality' was prioritized for the more complex tools and the high quantities of cortex in the flint material (Grydeland and Arntzen, 2014: 27-28). Thus, the quality, size, and the high proportions of cortex of the flint material in northern Norway in addition to the thorough exploitation of the lithic indicates that the majority of flint was not a product of import directly from the primary sources of southern Scandinavia. What this also indicates, is that the flint was a prioritized resource.

Therefore, it appears that the consensus concerning flint in northern Norwegian contexts is that it was transported and deposited along the coastlines. The preconditions determining flint deposits are complex and many causations played a part in these intricate processes.

4.4 Flint beach deposits

This subchapter will investigate the preconditions determining flint beach deposits and followingly whether certain areas were more susceptible to these deposits. Research objective no. 3 reads: 'which preconditions determined flint deposits in northern Norway'. In order to thoroughly inspect these preconditions, the following subchapter will review these causations carefully.

The last parts of the last glaciation are named the Weichselian Glaciation. At its disintegration at ca 15 000 BP large quantities of icebergs drifted to the Norwegian sea containing crystalline rocks from western Norway, the northwestern British isles and from Svalbard (Bischof, 1994: 35). These deposits left iceberg drift tracks which produced a sediment layer deep in the Norwegian and Barents Sea. Most of the ice-rafted material in the Norwegian sea stemmed from northern Norwegian and western Norwegian sources as the glaciers discharge was substantial (Bischof, 1994, Bennett and Glasser, 2009). Lesser amounts of ice-rafted materials in the Norwegian sea stemmed from southern Scandinavian or northwestern British origin (Bischof, 1994: 53). The sea-currents and other climatic factors influenced in great part which materials ended in and on the shores of the Norwegian sea …"ice in the Norwegian sea circulated counter-clockwise from 20 to 15 ka" (Bischof, 1994: 53). This process could enact the ice-drafted debris to land on the ice-free locations on the Norwegian shores at ca 16 000 to 14 000 BP. These areas of northern Norway which were ice free at the end of this period was potentially Lofoten, Andøya and some islands off the Helgeland coast (Hughes et al., 2015: 19).

I am suggesting that sedimentary flint nodules from the Danish and potentially British Isles *could* be transported by the Norwegian Atlantic current at this time. Followingly, a plausible scenario will be presented regarding the flint beach deposits.

When the flint came drifting with the calving icebergs of southern Scandinavia by The Norwegian Atlantic Current, the ideal places for the flint nodules to be dropped off would be the ice-free areas. In glacial geology the concept of debris transported by icebergs is called 'ice-rafting' (Bennett and Glasser, 2009: 369). On the Norwegian shores, the flint could be deposited from the drifting icebergs on the banks and underwater terraces near the coast in addition to deposits on the emerged land. One of the preconditions was that the deposits would take place at a time when the Danish, British or southern Swedish bedrock was presently glaciated (Bischof, 1994: 44).

The topographical susceptibility would play a crucial part in which places the flint could be deposited (Pettersen, 1986: 14). Ideally straits and fjords with a NE-SW placement, this way the trajectory of the calving ice containing flint could be 'trapped' as the Norwegian current deposited them here. But the orientation and angle of the Norwegian land did not alone constitute as ideal conditions for calving ice deposits. The partly emerged ridges could provide ideal landing conditions for the transported flint. Many of these ridges were relatively newly formed during the Last Ice Age and during Younger Dryas (Dahl et al., 2022: 107). When the trajectory of landmass was aimed in the right direction in addition to ideal ridge conditions, the melting ice sheets containing the transported flint nodules could be dropped off. The ideal drop-off locations would be funnel-shaped, much like many Norwegian fjords and straits. Perhaps the most indisputable one in Norwegian geography is the Lofoten 'arm'. Stretching from NE-SW into the 'Vestfjorden', the Lofoten archipelago could enable and trap the flint, hindering the rafted ice debris from drifting further. This archipelago penetrating the Norwegian sea was also one of the first areas to become ice free after The Last Ice Age (Hughes et al., 2015: 18-19).

An important aspect of this process was the land upheaval (Dahl et al., 2022: 114). This process would have played a crucial part in the deposits of flint. As the Norwegian land became ice-free the oceans received substantial meltwater, the land upheaval emerged new basins and beaches which could be grounds for the procurement of flint nodules. It is not probable that the flint would be solely deposited on these beaches which at a later interval emerged. The icebergs could melt and drop its contents anywhere from its originating quarries to their beach-deposits and moraines. The amounts of flint submerged on the Dogger Bank and other areas of The Great North Sea are likely grandiose (Bischof, 1994).

Multiple scenarios played a role in the deposition of flint nodules on the Norwegian shores and moraines. In order to portray these preconditions thoroughly and conceivably, these will be repeated as follows:

1. **1.** The Danish, British or southern Swedish flint-bearing districts had to be covered by ice while the first areas of the Norwegian land became ice free. According to Hughes et al, (2015) this could have been within 17 000 BP to 13 000 BP (Hughes et al., 2015: 18-20)
2. **2.** The newly emerged land areas of Norway would be ideal places for the drifting icebergs to deposit, these include (in my research area) Lofoten, Andøya, Vesterålen and some islands off the Helgeland coast (Hughes et al., 2015: 18-20). These areas will hereby be determined as potential 'cluster-zones'.
3. **3.** NE-SW or E-W directed land areas would in particular obtain the drifting ice as the circulation of the Norwegian sea engaged in a counterclockwise motion at ca 20 000 to 15 000 BP (Pettersen, 1986: 14, Bischof, 1994: 49).
4. **4.** The deposited flint on the Norwegian banks and drowned shorelines would emerge as the land was abruptly raised in the millennia after the last glaciers on the Norwegian inland dissolved. The isostatic depression and following land upheaval were at selected places of the coast of northern Norway substantial.
(Bjerck, 1990: 4-5).

The geologist E. J Havnø did ponder on the flint deposits some 100 years ago, suggesting that flint originally deposited on the southern Norwegian shores could have been re-deposited in the cold period Younger Dryas or in the early Preboreal (Havnø, 1913: 278, Hauglid, 1993: 18). In the cold period of Younger Dryas (ca 12 700 – 11 500 BP) the ice ridges grew along the Norwegian shores (Dahl et al., 2022: 99). This phase could potentially have contributed to flint beach deposits and term such deposits secondary.

In order to further assess this thesis' hypothesis, the following will aim to briefly contextualise Havnø's (1913) claim.

During the cold period Younger Dryas, the masses of ice grew substantially because of a temporary reverse of the gradual warming of the climate after the Last Glacial Maximum. As a consequence, these advanced masses led to a motion of ice churning down the Norwegian bedrock and calving into the sea (Dahl et al., 2022: 106-107). If the flint originally was deposited further south in Norway, the consequences of Younger Dryas could have led to new deposits of flint along the shoreline of Nordland and potentially southern Troms County. This process is perhaps even more complex to pinpoint in the archaeological material. It is somewhat probable that Havnø's (1913) proposition may have contributed to further flint deposits after the antecedent deposits of ca 16 000 – 14 000 BP. Such new deposits could have taken place at areas that had become ice-free after the initial deposits, which means that areas further east and on the northern Norwegian mainland may have been subject to flint deposits.

The presented hypothesis is a multifaceted one, and it is drafted with the acknowledgement that I am manoeuvring into a fields that stretches outside of the field of archaeology. But in order to thoroughly map the causations determining how the flint ended up in the EM and MM contexts of Nordland and southern Troms, this vast approach is essential. When seeking to pinpoint these processes determining flint availability it is unattainable to not step into the fields of glacial geology. These mappings are conducted with geological, glaciological, and archaeological research and data, and by compiling these overlapping fields a more comprehensive approach can be accomplished.

It is assumed that substantial amounts of the flint uncovered at the Mesolithic sites of northern Norway are of southern Scandinavian origin. As far as how it got deposited on the northern Norwegian shores, no comprehensive study of the complex processes has been subject to archaeological inquiry apart from the mentioned surveys of beach flint in south-west and southern Norway (Bjerck, 1983, Pettersen, 1986, Eigeland, 2015). By mapping this hypothesis, a new and thorough analysis is provided concerning one of the plausible ways of which the flint ended up at the northern Norwegian Mesolithic sites. In addition to this, particularly susceptible areas of flint deposits are scrutinized and are followingly determined as 'cluster-zones'.

4.5 Local and regional sea level fluctuations and land upheaval

This section will concern segment 2 of the mapped causations from the previous subchapter. The local and regional differences in the sea level fluctuations and land upheaval will be mapped from north to south in order to review if these potential 'cluster-zones' were in fact particularly susceptible to a higher frequency of flint deposits. The following areas are scrutinized on the basis of how soon they became ice-free after the Last Glacial Maximum. In order to thoroughly map the differences of shoreline displacements, snips from the sea level program developed by Møller (1998) is included.

As briefly mentioned in the introduction of this thesis, the sea level program created by J. Møller and B. Holmeslett (1998) is somewhat problematic. This is because the data employed has not been updated since 2002 and certain areas are unsatisfactory documented. It is not unknown that the program generates wrong calibrations, perhaps especially for the southern parts of Nordland County (Storvik, 2008: 46, Spjelkavik, 2016: 34-35). These deviations are problematic when individual archaeological sites are considered. The calibrations will be reviewed as sufficient when regions and areas are reviewed.

Vesterålen is the district of which Andøya is located within, located in the northernmost areas of Nordland County. Vesterålen consists of large islands in fjord-inlets. Andøya was as mentioned the first area of the Norwegian land to become ice-free after the Last Glacial Maximum at approximately 16 000 BP (Hughes et al., 2015). The marine border, which took place after Andøya beached out of the inland ice is 40 meters above today's sea level. The island is an attractive site for geologists because of the distinct eroded beach ridges with 20 meters above today's sea level as the most noticeable one. Here the washed up sediments have created beach ridges as tall as a couple of meters (Dahl et al., 2022: 102). The outer coastal areas of Vesterålen and Lofoten was severely affected by the rising sea levels during the Mesolithic. As the land upheaval was minimal because of small or no proportions of ice covering the outer coastal areas. The sea level heightened 30 meters at approximately 9500 to 6000 BP (Fig. 6) (Møller, 1996: 6).

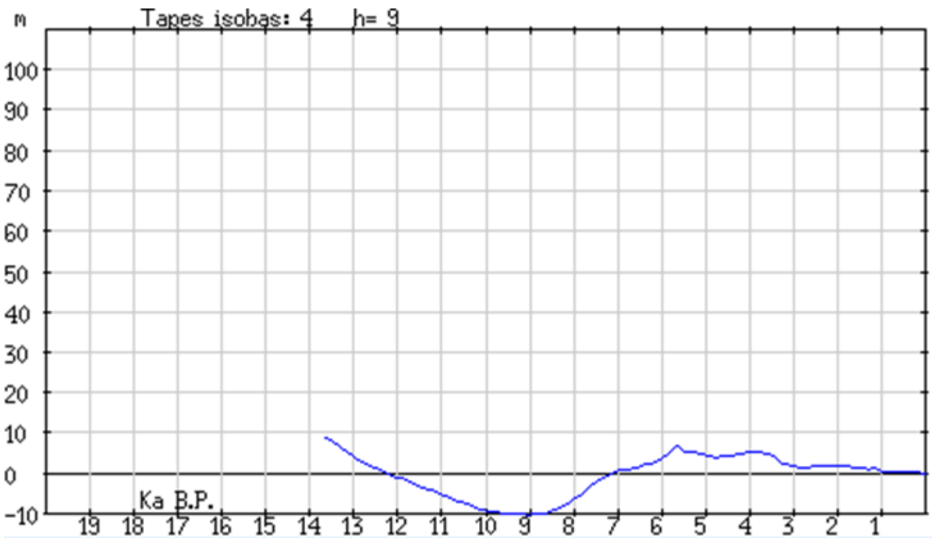

Figure 6, Shoreline displacement northern Andøya (Møller and Holmeslett, 1998).

As a consequence of this, the potential Mesolithic settlements located in proximity to the shorelines are submerged and not accessible for excavation in the western coastal areas of Vesterålen and Lofoten. However, there is a potential for early depositions of flint up to the present 40 meters above today's sea level.

Lofoten is located southwest of Vesterålen and Andøya and is an archipelago consisting of many large and small islands. One of its distinctive geographical traits are the NE-SW trajectory of the archipelago, infiltrating the Norwegian sea. Its topography with steep mountains created a fluctuating marine border. In the inlands this was as high as 60 meters above today's sea level, but in the coastal areas of Lofoten, it is at a mere 15 meters. These substantial differences in marine border is the combination with the land upheaval, which was vast in the mountainous areas which was covered by ice-mass (Dahl et al., 2022: 195). Areas of Lofoten was ice-free at approximately 16 000 – 15 000 BP (Hughes et al., 2015). Again, there is a potential cluster-zone for flint deposits at or below the marine border in this region.

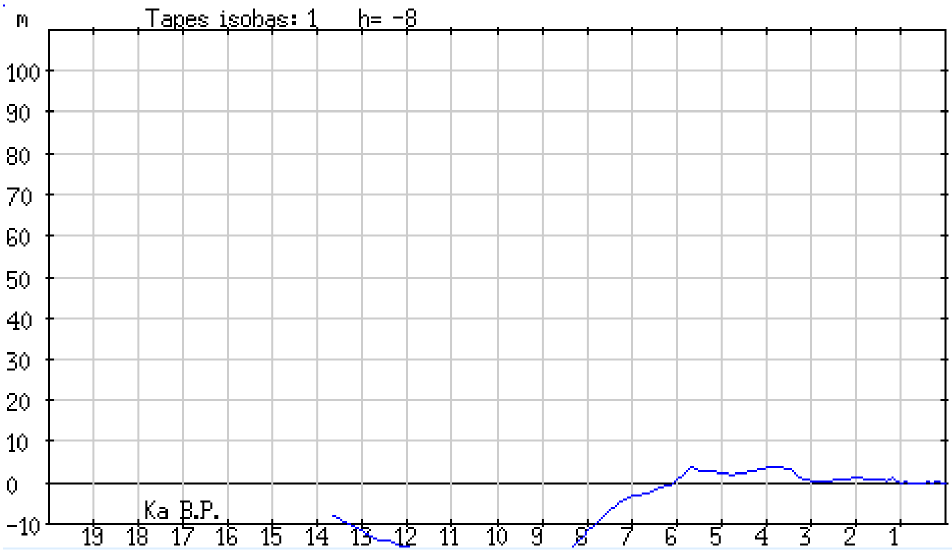

Figure 7, Shoreline displacement westernmost Lofoten (Møller and Holmeslett, 1998).

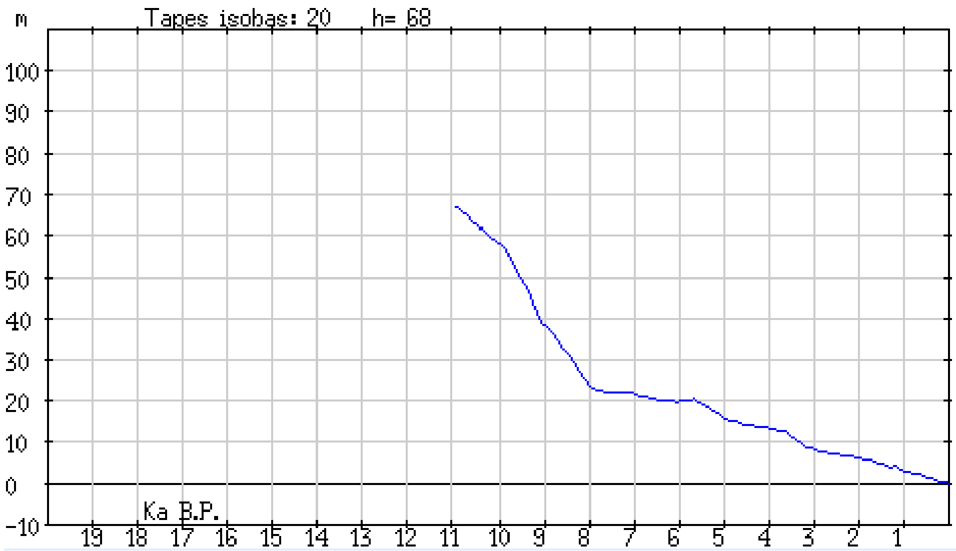

Figure 8, Shoreline displacement easternmost Lofoten (Møller and Holmeslett, 1998).

As depicted in Fig. 7 and 8, there are substantial differences of the shoreline displacements. This is because the tapes isobas varies from 1 in the westernmost areas of Lofoten to 20 in the east. These variations affected the local variations of the topographical susceptibility for flint beach deposits, as the inner areas/ eastern areas of the Lofoten archipelagos was subject to a higher extent of land upheaval.

Helgeland is the southernmost district of Nordland County. The district is characterized by its many islands and pointed mountains. The island of Vega in the southern parts of Helgeland became ice-free at around 14 000 – 12 000 cal BP (Spjelkavik, 2016: 40). This could also apply to the other islands in the south of the Helgeland district (Dahl et al., 2022: 104, Hughes et al., 2015). The marine border was in areas of Helgeland 100 to 140 meters above today's sea level (Dahl et al., 2022: 108). At 14 000 – 13 000 BP the sea level was at 96 meters before lowering to 70 – 60 meters at 9000 – 8000 BP (Bjerck, 1990: 5).

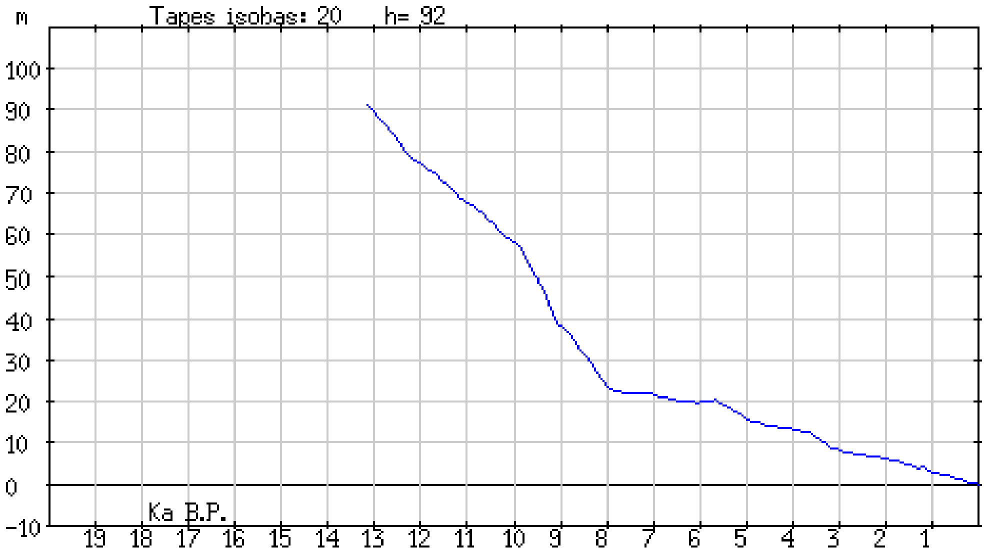

Figure 9, Shoreline displacement southwest Helgeland (Møller and Holmeslett, 1998)

By mapping out these first ice-free specs of Norwegian land from approximately 16 000 – 14 000 BP and their local sea-level fluctuations and land upheaval in the following millennia, an insight into the causations caused by the Last Ice Age is provided.

This framework demonstrates the diversity of regional as well as local features. Areas of Helgeland seems to have been severely impacted by isostatic depression and followingly had drastic falls of sea level. The coastal areas of Vesterålen and Lofoten which became ice free at approximately 16 000 – 14 000 BP and later became submerged because of minimal land upheaval could not have been subject to lithic procurement of substantial amounts of flint after MM.

A short summarization follows concerning the essential preconditions determining potential deposits of flint.

The evident areas of potential flint deposits, which is determined as cluster-zones, are the areas which initially became ice free. This also includes areas which at the time was submerged as the flint could have been deposited along the submerged banks before subsequently emerging as part of the land upheaval and became available at the EM and MM beaches. An indication of this are the 'water-rolled' flint nodules which are common to find at northern Norwegian contexts (Grydeland and Arntzen, 2014: 28). Because of the churning effects of the sea, the nodules were rolled on the shores and beaches making the cortex smaller and polishing the nodule before it was utilised for tool-production.

A considerate aspect which may have inflicted the susceptibility of flint beach deposits are the local and regional fluctuations of land upheaval. Areas of Helgeland, especially the islands off the Helgeland coast was subject to substantial land upheaval (Fig. 9) (Bjerck, 1989: 45, Bjerck, 1990: 4-5). This may have contributed to multiple locations ideal for lithic procurement of flint nodules which emerged as the sea level lowered. These nodules could be located on banks and could also have been washed up on the shores or collected in the low tides in EM, and possibly in MM (Spjelkavik, 2016: 49). The nearest mainland or other habitable islands were located 20 kilometres away from the island of Vega (Bjerck, 1989: 45), these distances make it logical to presume that the flint was utilized locally.

The marine preconditions of my three potential 'cluster-zones' are various. The coastal areas of Vesterålen and Andøya was in a higher degree submerged in the later parts of the Mesolithic (Fig. 6 and 7) (Møller, 1996). This complicates the empirical material for these areas. I view it as probable that the Lofoten archipelago and the Vesterålen district may have been ideal for lithic procurement of deposited flint in the early phases of the Mesolithic and possibly into early MM. This based on the trajectory of these islands which constitutes as Lofoten, hindering potential ice rafted debris to drift any further and being deposited along the shores of these areas. The preconditions of the Island of Vega are interpreted as ideal for flint procurement. The grave motion of land upheaval in addition with the coastal areas of Helgeland becoming ice-free early created ideal preconditions for potential procurement of flint.

As the central hypothesis of this thesis has been provided, the material of which the discussion will be based on will be introduced. The following chapter will map out the 25 early and middle Mesolithic sites which constitutes as my primary material.

5 Chronological and geographical framework

The distribution and variation of lithics on the early and middle Mesolithic sites of Nordland and southern Troms County will be discussed in this chapter. It is also my primary material for further analysis and discussion in chapter 7.

The study area and literature are mapped in section 5.1. Segment 5.2 will scrutinize the reliability of visual classification as most lithics are catalogued solely by visual inspection, this may be problematic as some lithics have similar visual characteristics. Subchapter 5.3 maps the chronological and geographical distribution of the 25 EM and MM sites. Followingly the lithics of the 25 introduced sites will be mapped as well and the geographical distributions in segment 5.4. Section 5.5 will concern the chronological distribution of the lithics as well as providing a summarisation of the chapter.

The mapping of the distribution will be in the form of an overview, as a method of pinpointing the geographical distribution, rather than the spatial distribution of the lithics on an intra-site level. By employing this data, I hope to pinpoint any anomalies in the archaeological material and review the geographical distribution of raw material use. 25 early Mesolithic and middle Mesolithic sites will be presented, which will constitute as the primary material of this thesis. These sites will be introduced and presented with graphs and tables, providing an overview of the internal distribution of lithics followed by the geographical and chronological distribution. To provide a more manageable angle, the excavation data from the early and middle Mesolithic sites in Nordland and southern Troms County was collected and organized. This overview will be used to map the use and function of the various lithic resources in an area and over time with unexplored research potential as the data from excavations has accumulated over the past few decades.

5.1 Study area and literature

Much of the early research on the earliest Mesolithic of northern Norway was conducted in Finnmark, the northernmost county of Norway (Nummedal, 1926, Odner, 1964, Simonsen, 1973). Later comprehensive and unifying works extended the research to Troms and Nordland County. The most comprehensive works of the regions pioneer settlements were by Anne Karine Sandmo (1986) and Martinus Hauglid (1993). Sandmo (1986) reviewed the area which now constitutes as Tromsø municipality and Hauglid (1993) mapped the 'Salten' areas of Nordland County. They conducted their own research through surface surveys, test-pitting and small-scale excavations. Most often, the dating basis was combined by the relative dating of shoreline displacements in combination with the chronological lithic material. Sandmo's (1986) studies of Tromsø Municipality was revisited a decade later by Stine Barlindhaug (1996). Following their publications, a large number of excavations in the region has uncovered new data which has not yet been analysed as a whole in a comparative study.

At the project "Arkeologi langs Hålogalandsvegen» I was able to gain experience with the lithics of the stone age in northern Norway during fieldwork from 2020 to 2022. This has in part inspired me to delve further into the Mesolithic material and choose to focus my thesis on the EM and MM material of Nordland and southern Troms. The mentioned project was to date the biggest archaeological fieldwork project conducted in northern Norway, and I chose to write my thesis on some of the many excavated Stone Age sites which were of my quantitative and qualitative requirements, although the final reports are yet to be published. Several other extensive excavations in Nordland and Troms produced valuable data for the early and middle Mesolithic (Barlindhaug, 1996, Blankholm, 2008, Grydeland and Arntzen, 2008, Grydeland and Arntzen, 2014, Nergaard et al., 2016).

In order to gather my material, I needed to examine the publications and reports from the Arctic University Museum of Norway, as well as articles by researchers, theses, and the overview publications. When the authors mentioned or referred to other Mesolithic sites in Nordland and southern Troms was mentioned I consulted the primary sources, often archaeological field reports, in order to gather information about the site. These reports create an essential framework for the mapping of Mesolithic northern Norway. Outputs from students of various educational institutions also inhabit crucial information as several of the thesis compiles more comprehensive lithic information from previous excavations while also including data from their individual surveys (Thuestad, 2005, Edvardsen, 2010, Spjelkavik, 2016).

In order for the respective sites to be a part of this study, the following conditions were of importance:

The premise of dating basis was the primary criteria in order for the sites to be included in this thesis. Gathering prospective radiocarbon datings and shoreline displacement data-, as well as chronological lithics to determine whether they matched EM, MM, or in-between datings- was the first stage in determining which sites that would be included. I decided to impose a quantitative minimum of 200 lithics on each of the sites. This includes all lithics such as debitage, flakes, blades, and tools. This was to ensure that the lithic compositions could be viewed as representative for the individual sites. As a result of this quantitative restraint, certain EM and MM sites that had merely been inspected through test pits and trenches were excluded. As a result, it was possible to assess the fully excavated sites and provide a standardized dataset. Obtaining sufficient qualitative data to understand the lithic compositions of the various sites was crucial, this requirement was imperative for my further analysis and discussion, and this necessitated reliable documentation.

While most of the material utilized in this thesis derive from excavations in the last few decades, some of the excavations from the 1980s and 1990s were inadequately documented compared to the regulated documentation standards of today. Fortunately, some aspects of the insufficiently documented sites have been revised and included in new studies (Simonsen, 1996, Manninen et al., 2021). The procedure of gathering my material has been a time-consuming process. In order to create an overview of the EM and MM sites of Nordland and southern Troms County, a selection 25 sites are viewed as representative. A selection of sites was excluded from this study and are mentioned in Appendix F. The general reason for the exclusion was a lack of information – that is, not having a basis of dating, poorly documented composition of lithics or poor cataloguing. I want to emphasize that the reports concerning the excluded sites weren't necessarily of poor academic quality, but the research focus of differed from my quantitative perspective of lithics. Some excluded sites were not catalogued by the time I was finishing this chapter.

To be clear: The material which constitutes as my primary data are the EM and MM sites located in Nordland and southern Troms County with a lithic composition containing more than 200 lithics. I am not claiming that I have been able to include all EM and MM sites of Nordland and southern Troms, but I have included a selection of 25 sites which is reviewed as representative deriving from the Arctic University Museum of Norway while supplementing with sites in central and southern Nordland (Hauglid, 1993, Simonsen, 1996, Edvardsen, 2010, Spjelkavik, 2016). In order to create a more comprehensive framework for the south of Nordland, sites excavated and documented by the Norwegian University of Science and Technology were added. The sites included aren't solely a product from excavations conducted by these two institutions, but most are as they were the ones which were accessible. The data available from the different sites varies in the archaeological reports. The fieldwork has been conducted during different eras and by fluctuating methods of inspection. Several Mesolithic sites in Nordland and Troms were in part or completely investigated through shovel-dug test pits or basic surface collection as the main method of excavation (Sandmo, 1986, Hauglid, 1993, Barlindhaug, 1996, Nergaard and Oppvang, 2014). This method of inspection commonly leads to few finds per site and can significantly alter the statistics of percentage. Some of the sites consist of several find-concentrations or in some cases, structures. In order to create a manageable dataset, the complete lithic compositions of the individual sites are reviewed in order not to venture off to far from my main objectives.

While collecting my material, I was obliged to include and exclude certain aspects of the respective sites. In some cases, the lithics was classified into sixteen or more subcategories (Blankholm, 2019). In some reports, an emphasis is added to the colour and quality of chert, quartz, and quartzite. During my material collection, the lithics were modified into six subcategories: flint, chert, quartz, quartzite, rock crystal, and 'other'. This change was made due to the diverse categorization of the different reports and articles, but also in order to present the data in a more consistent matter.

Table 3, Numerated table showing my primary material, sites organized from N to S.

Pointed decimals has been rounded up, see Fig. 6 for geographical location and appendix A to E for complete details. The MM site 'Solli' was by the time I was gathering my material approximately 70% catalogued. I view this percentage as representative for the lithic composition of the site. Minor differences may apply when the final report gets published (Bruun and Oppvang, in prep.).

	Site	Phase	Flint	Chert	Quartz	Quartzite	Rock crystal	Other	Total lithics
1	**Simavik**	**EM**	44 %	31 %	5 %	20 %	0 %	0 %	823
2	**Knausen**	**EM**	5 %	65 %	16 %	13 %	0 %	0 %	7640
3	**Svarvaren**	**EM**	5 %	86 %	4 %	5 %	0 %	0 %	566
4	**Tønsnes a**	**MM**	13 %	28 %	50 %	8 %	1 %	0 %	4337
5	**Tønsnes b**	**MM**	10 %	51 %	16 %	21 %	2 %	1 %	598
6	**Tønsnes c**	**MM/LM**	11 %	47 %	25 %	17 %	1 %	0 %	1785
7	**Bergli 1**	**MM**	68 %	21 %	0 %	3 %	4 %	3 %	2808
8	**Bergli 2**	**EM/MM**	52 %	1 %	0 %	46 %	0 %	1 %	372
9	**Sandvika**	**EM**	20 %	43 %	1 %	6 %	0 %	29 %	813
10	**Målsnes 1**	**EM**	0 %	9 %	1 %	89 %	1 %	0 %	9138
11	**Stangnes syd a**	**EM**	3 %	0 %	1 %	95 %	1 %	0 %	265
12	**Stangnes syd b**	**EM**	5 %	20 %	6 %	66 %	2 %	1 %	1599
13	**Stangnes syd c**	**EM**	30 %	25 %	2 %	41 %	2 %	0 %	2571
14	**Fauskevåg 1**	**MM**	74 %	1 %	9 %	16 %	0 %	0 %	3879
15	**Årbogen 1**	**EM/MM**	99 %	0 %	0 %	1 %	0 %	0 %	1779
16	**Solli**	**MM**	80 %	2 %	0 %	0 %	5 %	1 %	10354
17	**Ersvik 1**	**MM**	86 %	1 %	5 %	5 %	4 %	0 %	642
18	**Skålbunes, Eidet**	**MM**	28 %	0 %	19 %	36 %	16 %	2 %	3034
19	**Tuv 2**	**EM**	4 %	0 %	7 %	2 %	80 %	6 %	288
20	**Evjen 6**	**EM**	0 %	0 %	9 %	86 %	1 %	3 %	396
21	**Evjen 3**	**EM**	1 %	0 %	9 %	89 %	0 %	1 %	3046
22	**Skogveien**	**EM**	98 %	0 %	0 %	1 %	0 %	0 %	1252
23	**Åsgarden**	**MM**	81 %	0 %	7 %	8 %	2 %	2 %	3792
24	**Mohalsen I**	**EM**	81 %	1 %	4 %	4 %	10 %	0 %	7025
25	**Mohalsen II**	**EM**	14 %	0 %	57 %	27 %	1 %	0 %	341

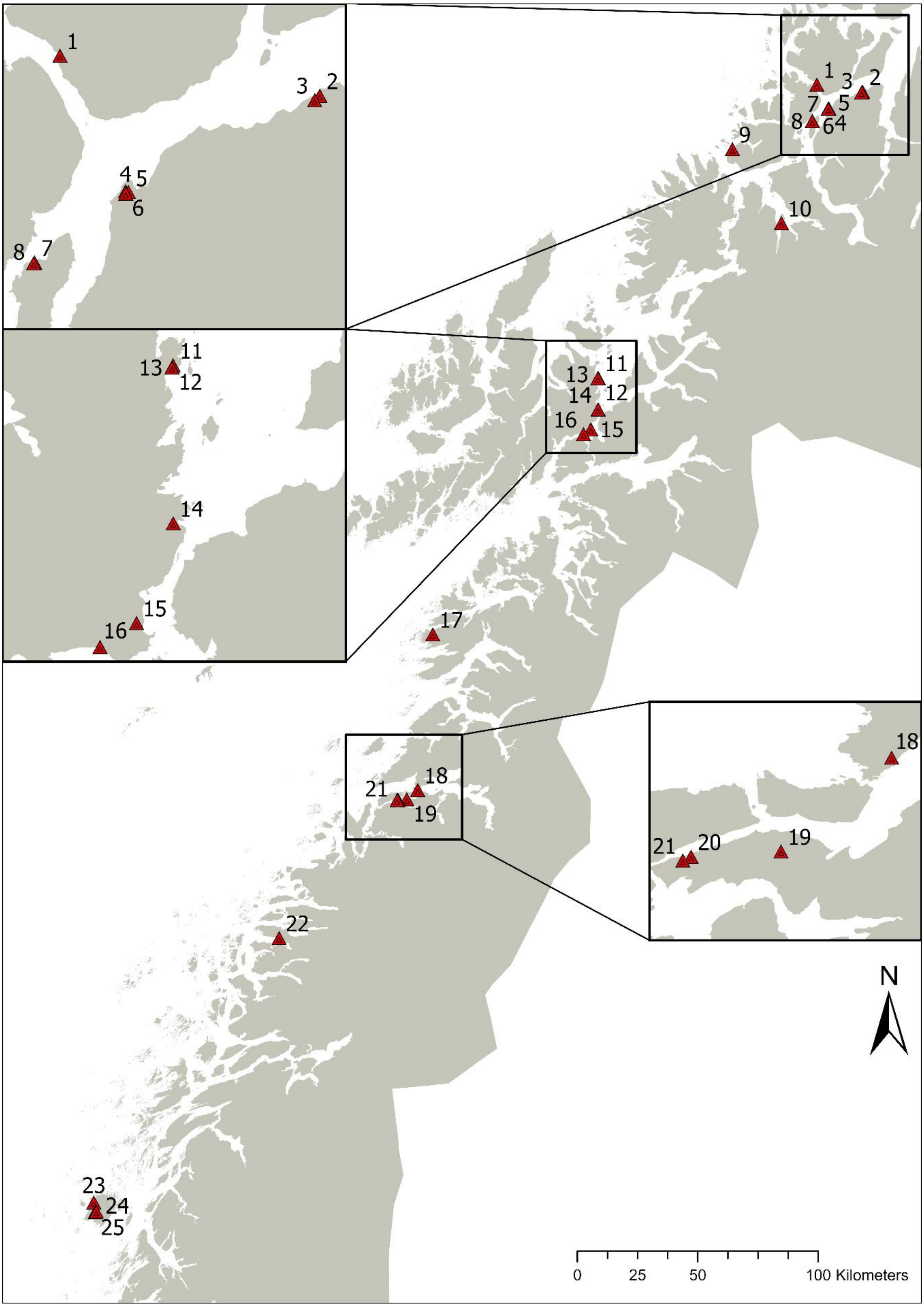

Figure 10, Map showing geographical localisation of sites 1 to 25. Map data: Geonorge

1.Simavik, 2. Knausen 3. Svarvaren 4. Tønsnes a 5. Tønsnes b 6. Tønsnes c 7. Bergli 1 8. Bergli 2 9. Sandvika 10. Målsnes 1 11. Stangnes syd a 12. Stangnes syd b 13. Stangnes syd c 14. Fauskevåg 1 15. Årbogen 1 16. Solli 17. Ersvik 1 18. Skålbunes 19. Tuv 2 20. Evjen 6 21. Evjen 3 22. Skogveien 23. Åsgarden 24. Mohalsen I 25. Mohalsen II.

5.2 Reliability of visual classification

When identifying and cataloguing the lithics of the Mesolithic, there are ways of documentation that can enable and support further research. The visual attributes of flint can give clues about its qualities for tool production, but the ways of documenting their visual attributes vary. This subchapter will concern the ways of which the lithics are identified and catalogued, but also the potential sources of errors posed by this somewhat subjective approach.

After conducting excavations, the material is catalogued by its visual attributes. This may entail the employment of a microscope in the process to pinpoint geological type, quality, colour, and transparency. Other attributes are pinpointed by touch, such as texture and hardness. (Frivoll, 2017: 1). The excavations in Norway are conducted by the museums and universities. The excavations are divided into individual projects, all of which may be driven by different research goals and objectives. But not that long ago, some excavations were conducted, catalogued and documented by one or few individuals (Simonsen, 1996). Just as the individual research objectives differ, the standards of identification and cataloguing has changed over time and to some extent from project to project (Frivoll, 2017).

In areas of southern Norway, the classification-systems employed when cataloguing and identifying flint is rather comprehensive. An example of this is from the 2017 reports of the excavations on European route 18, Rugtvedt - Dørdal in Telemark County (Rødsrud et al., 2017). The flint was organized into 17 types which are subordinated under the superior categories which consists of fine-grained, matte fine-grained, matte course-grained and ‘unknown’/’indefinite’ (Rødsrud et al., 2017: 88-89). The 17 flint types include: Senon, Bryozo and Danien flint, all originating from southern Scandinavia (Högberg and Olausson, 2007), but also includes burnt, patinated and ‘unknown’/’indefinite’. After organizing the flint into the mentioned types and subtypes, other visual attributes such as colour, internal geological variations and transparency are included.

By categorizing the flint and other lithics into a more comprehensive system like above, it is simpler to determine potential provenance, but this system also supports more comprehensive analyses. The quality and variation of the lithics can provide information of economic adaptations and the access to the said lithic (Eigeland, 2015). The potential provided by employing such systems is substantial and would if used nationally create a more efficient interconnected system where regional organizations wouldn't determine the course and effectiveness of data-gathering.

The cataloguing of lithics in northern Norway most often includes solely the geological type such as chert, flint, rock crystal, quartz etc. While sometimes including the general attributes of given percents of colour, transparency, cortex and occasionally determining the material as 'Helgelandsflint' (Nergaard et al., 2016, Nergaard and Oppvang, 2014, Grydeland and Arntzen, 2014, Skandfer et al., 2010). In some studies, quartz and quartzite are identified and catalogued in multiple different subcategories (Blankholm, 2008).

Frivoll (2017) conducted blind-tests with archaeologists residing in southern Norway with the goal of investigating whether the lithics were correctly identified. The results showed substantial deviations in their identifications. By gathering archaeologists with varying extents of lithic expertise the total calibrated preciseness of correctly identifying flint was 78,1%, with flint most often being wrongly identified as chert (Frivoll, 2017: 47). This study was conducted in southern Norway with archaeologists and students reviewing a southern Norwegian lithic material. In northern Norway multiple of the archaeologists who catalogued 'my' material stemmed from Denmark. The bedrock of and Mesolithic materials of Denmark consists of substantial amounts of flint, and it is safe to assume that these archaeologists correctly catalogued the flint (Pers. com. C. Damm, 2023). The practice and experience of the archaeologists are imperative for cataloguing the lithics correctly. Svein Erik Grydeland catalogued some or all the material from the Tønsnes and Bergli sites located in Tromsø Municipality (Pers. com C. Damm, 2023). The differences of the internal lithic compositions of the sites are therefore to be assumed as accurate. The material from the sites at 'Hålogalandsvegen' were and are being catalogued by archaeologists with significant knowledge of the Mesolithic lithics. Some with experience from southern Norway and Britain where the flint prevails in the Mesolithic material (Pers. com. C. Damm, 2023). Minor deviations are still to be expected as mapped by Frivoll (2017), but it is reasonable to assume that the majority of the lithics of Nordland and Troms County are correctly identified and catalogued based on the information provided.

But the knowledge concerning lithic identifications have changed over the course of time. In Sandmo's thesis (1986), a lithic defined as 'ultramylonite' was wrongly identified by geologists. The material in question was Kvenvik chert, originating from the Kvenvik greenstone formation with known quarries west of Alta in Finnmark (Pers. com. B. Hood, 2021). Other lithic confusions can be found in the identification of chert. Its crystalline attributes are fine-grained and may have been identified and catalogued as fine-grained quartzite because of their similar visual attributes.

Lithic expertise and judgement play a crucial role in how the Mesolithic sites and contexts are interpreted. In order to detect and pinpoint Mesolithic mobility, perhaps especially over substantial distances, these identifications of lithics must be exercised with precise conclusions. The primary material of this thesis and its cataloguing is reviewed as reliable.

5.3 Chronological and geographical distribution

The material which will be mapped in the following subchapters are all made up by more than 200 lithics and are dated to EM or MM. 17 of the 25 sites are dated by ^{14}C, the remaining sites are dated by sea level dating or typological material. The sum of lithics among the 25 sites varies from the lowest at 265 at the site Stangnes a (Nergaard and Oppvang, 2014) to 10 354 number of lithics at the site Solli (Pers. com. J. Oppvang, 2022)(Bruun and Oppvang, in prep.).

Initially, the 25 EM and MM sites will be presented in a stacked chart conveying the lithic percentages (Fig. 11). This will initially be presented in order to map out their geographical distribution. 16 of the 25 sites are located in Troms County, while 9 is located in Nordland County which will be further mapped in subchapter 5.5. Section 5.6 concerns the chronological and lithic distribution of the EM and MM sites. In the concluding parts of subchapter 5.6, the lithic distributions in a geographical and chronological context will be summarized.

See appendix A to E for complete composition of finds, datings and additional information.

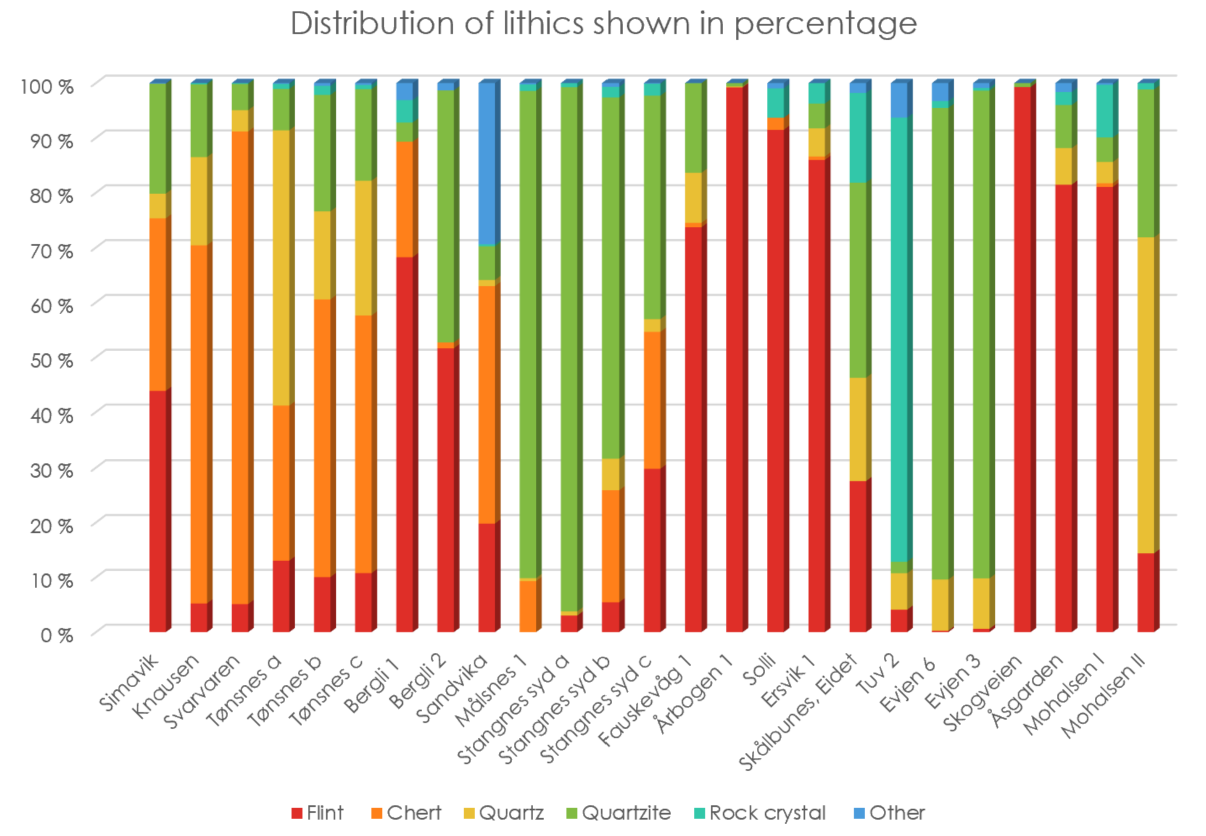

Figure 11, Complete overview of EM and MM sites with 200 or more lithics, categorized from north to south.

Fig. 11 presents a 'stacked chart' of the complete overview of the 25 primary sites that will be discussed in this and the following chapters with its quantitative components of lithics. The sites are categorised from north (Simavik) to south (Mohalsen II). 14 of the sites are dated within the phase of the early Mesolithic (10 000 – 9000 BP), 8 are dated to the middle Mesolithic (9000-7700 BP) and two sites are dated in the intermediates of EM and MM while one site (Tønsnes c) is dated to MM/LM (6980-6480 cal BC). Tønsnes C was included even though the dating may be slightly off my temporal theme. 16 sites are located within Troms County (Simavik to Solli), only 9 are located in Nordland County (Ersvik 1 to Mohalsen II). Nordland contains 3 MM sites and 5 EM sites. In Troms County, 5 sites are dated to MM, 8 to EM, 2 EM/MM and 1 MM/LM as mentioned above.

5.4 Lithics and geographical distribution

The primary utilization of flint appears in three ‘clusters’, these are located in Tromsø Municipality (Simavik, Bergli 1 and 2), Tjeldsundet (Fauskevåg 1, Årbogen 1 and Solli) and in Helgeland (Skogveien, Åsgarden and Mohalsen I) (see Fig. 11). By primary utilization I mean the sites where the flint constitutes as the lithic in the highest quantity. Even though the composition of flint at the Tromsø site Simavik makes up 44%, flint is the lithic in the highest percentage. The site Ersvik 1 deviates geographically from the mentioned ‘cluster’-areas, located in Steigen in Nordland County, 95 km away from the Tjeldsundet sites ‘as the crow flies’. The flint also seems to act as a supplementary lithic when other lithics such as quartz and quartzites are primarily used, making up from 1% to 30%.

Chert constitutes as the primary lithic of the north and was primarily utilized at the sites Knausen, Svarvaren, Tønsnes B, Tønsnes C and Sandvika. Its utilization abruptly stops in the Tjeldsundet area where the Stangnes sites utilized chert to some extent. Some minor deviations in Nordland County are the sites Ersvik 1 and Mohalsen 1 where the chert makes up 1% or less of the total lithic composition. Chert making up its highest quantities in the north comes as no surprise, these areas are located closer to the quarries of Finnmark. Its small percentages in the south are still worthy to make note of.

Quartz is a resource utilized in varying intensity all over the two counties. Two sites primarily utilized the quartz, these are the Tønsnes a site in Tromsø Municipality and the Helgeland site Mohalsen II. This gives the impression of no geographical trends for the utilization of the quartz. This corresponds with the availability of the resource, being available throughout these regions. The quartz is also exploited in lower percentages where other lithics are evidently preferred.

Quartzite is a commonly exploited lithic and the sites Målsnes 1, Stangnes syd a, Stangnes syd b, Skålbunes Eidet, Evjen 6 and Evjen 3 primarily utilized this lithic. The site Bergli 2 stands out with its lithic composition of 52% flint and 46% quartzite, where both resources seem to have been more or less equally pursued. The utilization of quartzite seems to have no geographical trends. All the sites utilized some quantities of quartzite, with the exception of the site MM site Solli. This wide-spread utilization mirrors the accessibility of the quartzite. Rock crystal, also known as ‘quartz-crystal’ can based on the material presented be viewed as a minorly utilized resource. The apparent exception is the Nordland site Tuv 2, where rock crystal makes up 80% of the lithic components. Its prevalence is varied and makes up anywhere from 0% to 16% at the remainder of the sites.

Some central geographical trends are as follows:

Flint is a resource primarily utilized in three apparent geographical ‘clusters’. The most evident of these cluster-zones are the sites located in Tjeldsundet and in the district of Helgeland where the percentages of flint are exceedingly high.

Chert was primarily used in the north with an abrupt stop in the utilization of the lithic in the Tjeldsundet areas, in the border-areas of Nordland and Troms County. Some small quantities (1% or less) can be located at the Mohalsen 1 site in Helgeland, the southernmost district of Nordland and at the Ersvik 1 site in Steigen Municipality. Quartz and quartzite were widely utilized and seems to inhabit no geographical trends. Quartzite seems to have been primarily utilized in the areas where the availability of flint was low. This can primarily be noticed in the areas of Salten in the middle of the County of Nordland. At the Nordland site Tuv 2 site rock crystal makes up 80% of the lithic composition, this is the only site where this lithic was primarily utilized. Rock crystal is utilized in varying extents, but seldomly makes up substantial quantities of the total lithic composition.

The following subchapter will map out the chronological distribution of raw material choice. This subchapter will also summarize the geographical and chronological distributions.

5.5 Chronological distribution

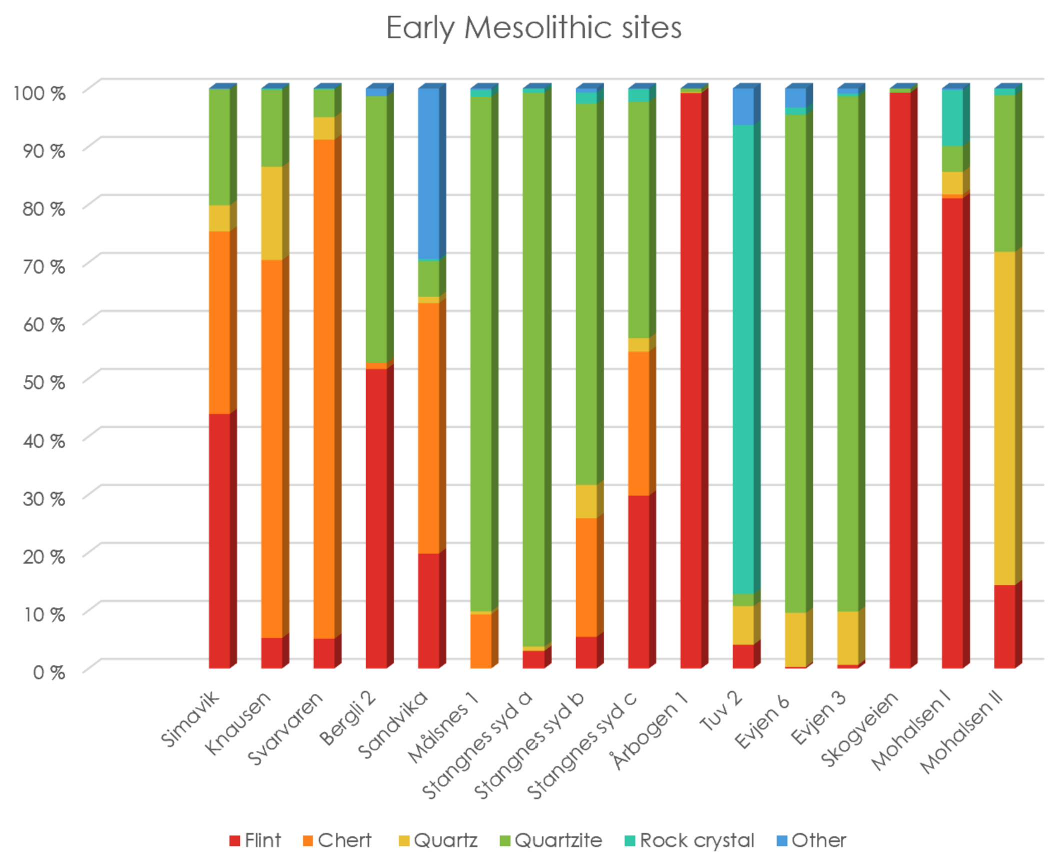

Figure 12, Stacked chart, early Mesolithic sites

Out of the 16 early Mesolithic sites, 13 has a distinct primary lithic resource, where the primary lithic makes up 50% or more of the total lithic composition. A multitude of lithics are employed in this early phase of the Mesolithic. 4 sites primarily utilized the flint (50%+) and the site Simavik contains 44% flint, making it the principal lithic. 2 EM sites contain 95%+ flint, Årbogen 1 located in Ofoten, the border-areas of Nordland and Troms, and Skogveien in the south of Nordland. The chert is widely used in this phase and is at some of the sites combined with the flint at Simavik, Knausen, Svarvaren, Bergli 2, Sandvika, Stangnes syd c, Stangnes syd c and to some extent at the Mohalsen I site. The quartz seems to be a supplementary lithic with the exception of the Mohalsen II site. These high proportions of quartzite is somewhat surprising because of the geographical location of the Mohalsen II site at Vega in southern Nordland, where flint was seemingly an easily obtainable resource (Spjelkavik, 2016). The sites prioritizing quartzite seems in general to be the sites where flint or chert was not available, with the exception of the Bergli 2 site in Tromsø Municipality. The

Salten site Tuv 2 stands out with its high quantities of rock crystal (80%), none of the other EM or MM sites contain anywhere near the same quantity. Mohalsen II is the only EM site with quartz as its primary lithic resource, somewhat surprisingly with its geographical location in the south of Nordland where flint was a more easily obtainable resource (Spjelkavik, 2016).

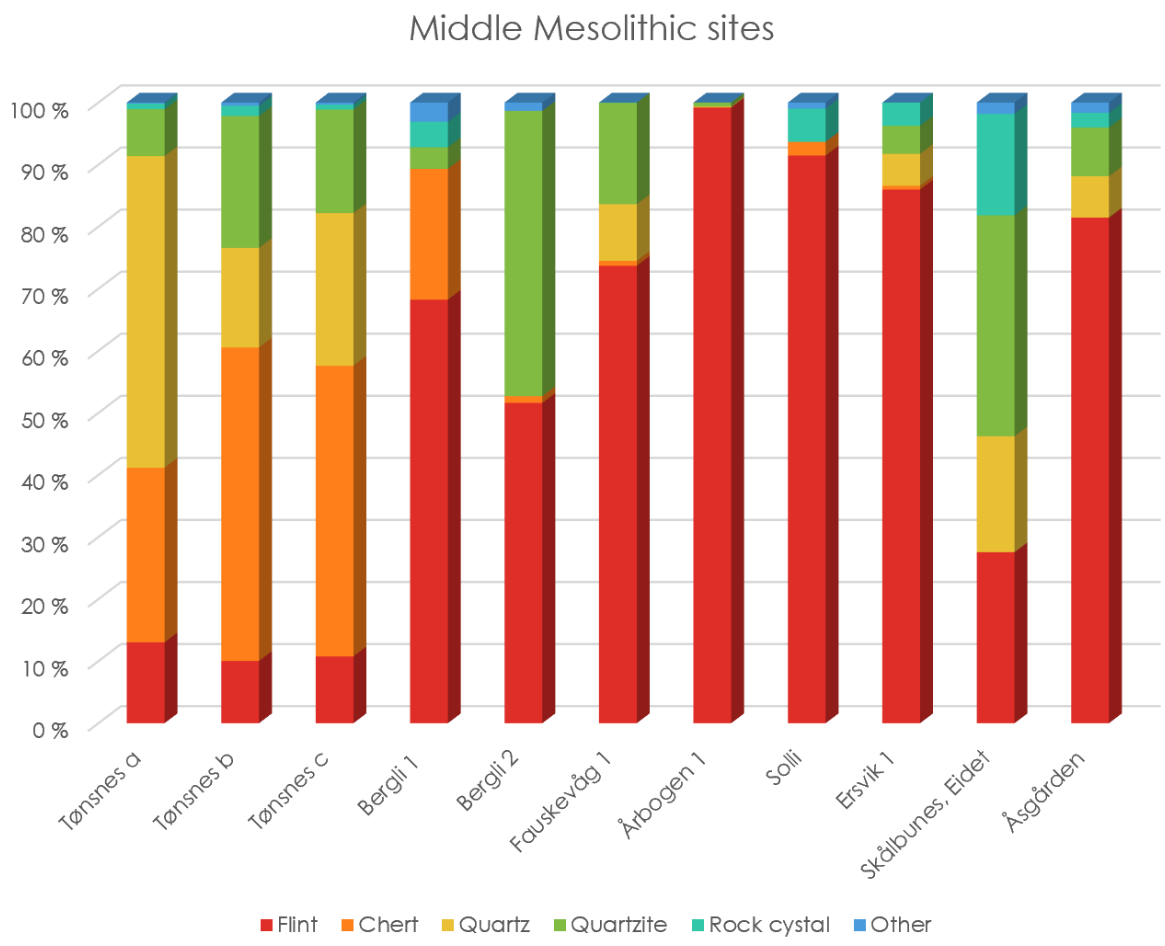

Figure 13, Stacked chart, middle Mesolithic sites

The sites Bergli 2 and Årbogen 1 both contain datings which falls within both EM and MM datings. As to not overlook any potential patterns, these sites are included in both the chronological charts. Located only 8 km away from each other 'as the crow flies', the Tønsnes and Bergli sites varies substantially from each other in their individual lithic compositions. The use of quartzite is nearly eradicated in MM compared to EM, while flint, chert and quartz has gained a larger status. As in the EM, the flint seems to accumulate somewhat towards the south in the MM. Bergli 1 in Tromsø municipality has a distinct increase in flint compared to its neighbours in the north. Out of the 11 MM sites, 7 contains more than 50% flint which is a clear distinction from the EM sites. Skålbunes is the only site in the south of Nordland which did not primarily utilize flint.

As a conclusion to the chronological distribution, some general observations regarding raw material distribution both chronologically and geographically are summarized.

Flint is a recourse which is used both in EM and in MM. There is however a shift in the utilization of the resource between EM and MM. The microcrystalline flint was during EM used more in a combination with other lithics, while in MM the resources are more definitive. By this I am suggesting that as the Mesolithic peoples got more familiar with the landscapes and the available commodities, clear lithic raw material preferences formed. This can be viewed from these stacked charts by the higher quantities of sites with distinct primary lithic resources. The Tønsnes sites in Tromsø Municipality and Bergli 2 in addition to Skålbunes, Eidet in Nordland County deviates from this having seemingly more varying raw material preferences. This is perhaps a result of the availability of the given lithic resources in the area.

Three areas where the flint is primarily used can be identified from reviewing this material, and this is apparent in Troms, concentrated in the areas surrounding the Tromsø island (Simavik, Bergli 1 and 2). The other 'cluster' which materialises while compiling this material is in the Ofoten/Tjeldsundet area, with especially high quantities of flint (Fauskevåg 1, Årbogen 1, Solli) all sites containing 70%+ of flint. The final area where the utilisation of flint is heightened is in the Helgeland area of southern Nordland County (Skogveien, Åsgarden, Mohalsen I). The better part of these sites located in the potential 'cluster' areas are dated to the MM. The sites Simavik, Bergli 2 and Årbogen 1 in Troms County, Skogveien and Mohalsen 1 in Nordland County are the EM sites where flint was primarily utilized.

Chert is a resource which is exclusively exploited in the north of my geographical framework with an abrupt stop in the Ofoten area, apart from 47 pieces of chert from the Mohalsen I site in southern Nordland County. Although this makes up a mere 0,67% of the total lithics, it is nonetheless noteworthy. The chert is principally utilized at the EM sites in Troms, it is still employed during the MM, but in smaller quanta compared to the EM lithic compositions.

Quartzite is in general the most used lithic resource where flint isn't utilized, with the exception of Bergli 2. Quartz is utilised more or less in all the regions to varying extents with only one site employing quartz as its primary resource, Mohalsen II. While rock crystal is mostly used in the south, it does not constitute as a primary lithic with the exception of the EM site Tuv 2. Distinct lithic variations within sites located adjacent to one another is evident, such as the lithic variations at the Tønsnes and Bergli sites in Tromsø municipality. This implies that spatial patterns should be carefully examined and that lithic tendencies cannot solely be reviewed on the basis of geographical adjacency.

Having mapped the lithic compositions of the 25 EM and MM sites which constitutes as the main data of this thesis, the following chapter will map out what these lithic diversities may convey, in terms of mobility and raw material preferences.

6 Resource-use and modes of mobility

The lithics of the Mesolithic constitutes by far the majority of the archaeological empirical material. Perhaps the most important question of this chapter is why the lithic compositions of the Mesolithic sites in Nordland and southern Troms County varied to such substantial extents. Numerous factors determined which raw materials ended up in the Mesolithic contexts of Nordland and southern Troms and the scope of the following chapter will be directed towards the human factors. As chapter 3 mapped the Pleistocene, Holocene, climatic and geological preconditions, this chapter will be dedicated to review the social and geographical factors determining mobility and raw material choice.

Subchapter 6.1 will map the consensus regarding mobility in the EM and MM Norway. Followingly, section 6.2 will review the settlement patterns and lithic compositions in order to determine any potential patterns in a larger geographical sense. In order to fully investigate the potential causations determining raw material choice and mobility, subchapter 6.3 will thoroughly map the issue of Mesolithic boats.

6.1 Mobility trends in EM and MM northern Norway

The 25 sites which are discussed in this thesis are exclusively coastal sites with a proximity to the marine landscape, or seascapes. This does not mean that the peoples of the individual sites weren't making use of the inland or terrestrial resources, but that the majority of their resources most likely stemmed from the productive coastal areas. These resources would both include subsistence food materials but could also be lithic raw materials. The research of mobility of the Mesolithic peoples of northern Norway is closely tied to studies on human responses to climatic fluctuations and has been subject to archaeological inquiry (Bjerck, 1990, Breivik et al., 2018, Gjerde and Skandfer, 2018, Damm et al., 2020, Damm et al., 2021, Manninen et al., 2021, Damm, 2022). It is challenging to pinpoint precise Mesolithic cultural developments of Nordland and southern Troms, as these areas are multifaceted. Some general mobility trends were as follows.

The Mesolithic period of northern Europe was a time of sociocultural change …"involving migrations and pioneer settlements, the use of broader resource spectra (…)" (Fretheim, 2023: 2). The settlement patterns of the Mesolithic were deeply connected with environmental changes, subsistence access and strategies (Breivik, 2014: 1485). Access to productive marine areas determined settlement locations, these changed over time and settlement locations changed thereafter. Research on Mesolithic settlements in Norway has traditionally been conducted on material and structures on an intra-site level, for pinpointing site-mobility, social organisation and to some extent ideology and cosmology (Bjerck, 2008: 64). Most studies on mobility ranges have been focused on hunter-gatherer groups with terrestrial diets (Hertell and Tallavaara, 2011, Brouwer Burg, 2013, Byrd et al., 2015). These ranges of residential mobility are not applicable to apply on the Mesolithic hunter-fishers of northern Norway. This is based on a substantial difference between these groups, the accessibility and changes of subsistence gathering. The ranges of mobility will be revisited in section 6.3 in order to contextualize marine modes of mobility.

Early Mesolithic dwellings and mobility

The dwellings of the early Mesolithic period is in general defined by stone-cleared areas, tentrings or aggregations of lithic scatters (Breivik, 2014: 1479). A new quantitative study quantified 150 Mesolithic dwelling units of Norway, and the ranges of floor sizes were scrutinized (Fretheim, 2023). In the EM, the floor sizes were relatively small throughout Norway with a size of $10m^2$ or smaller (Fretheim, 2023: 8). Generally speaking, round or oval stone cleared areas and tentrings represents the dwellings of the EM (Fretheim, 2023). These temporary dwellings and the lack of permanent structures were most likely a result of a lifestyle of high mobility and adaptation to a fluctuating climate (Breivik, 2014). By utilizing tents and potentially marine vessels, the Mesolithic peoples engaged with portable, easily assembled and disassembled kits and thus enabling high residential mobility (Fretheim et al., 2017: 208, Bjerck, 2014: 80). Even though the dwellings of the EM were small, significant artefact assembles and distributions could spread up to hundreds of square feet around the dwellings. It is likely that the hunter-fishers of EM of northern Norway were making use of large landscapes and seascapes. The ranges of mobility would likely vary from group to group or individual to individual. Population densities of the EM was likely low, this is interpreted from the small sizes of the dwellings. In the EM to MM transition, between Preboreal and Boreal the climate gradually became more habitable for the terrestrial flora (Bjerck, 2014). This climatic shift could enable a more sedentary lifestyle.

Middle Mesolithic dwellings and mobility

In the MM, the floor sizes documented by Fretheim (2023) increased in size. From $10m^2$ or less in EM, to anywhere between $3m^2$ to $40m^2$ in the MM (Fretheim, 2023: 14). The increase in dwelling size was not the only difference between these phases. In the MM, wall mounds increased as well as the appearance of sunken floors. This gives the impression that the tent tradition of the EM was replaced with more permanent house-pit structures. It was not uncommon for house-pits to overlap, these may be traces of multiple re-visiting's of the site over many years. The re-use of dwellings does however seem to increase during the MM and especially during the LM (Fretheim, 2023: 11,15). The house-pits weren't solely indicators of the MM period, these existed during EM as well but grew in size on an intra-site level, but also in numbers, especially during the late Mesolithic and into the Neolithic periods (Gjerde and Skandfer, 2018). From Mesolithic material at the island of Vega, Bjerck (1990) defined the respectful sites with three different intended modes of purpose. These were 'the residential base' with substantial scattered debitage and lower proportions of tools. 'The field camps' with smaller structures and slightly higher proportions of tools than the 'residential base'. And 'boat stations and stops' with even lower quantities of debitage, but higher amounts of tools than the two preceding (Bjerck, 1990: 8-9). The sites are often located at exposed locations, but sheltered and with direct access to the open sea (Bjerck, 1990). This way of organizing the settlements could be correlated with the access to both the productive marine areas for subsistence gathering (Breivik, 2014), but also to facilitate mobility along the coast.

The increase of house-pits, in addition to a heightened degree of house-pit re-use may convey societies of a more sedentary tradition. As the EM and MM are the phases of inspection of this thesis, the changes are perhaps exaggerated to some extent. Be that as it may the changes of dwelling traditions may convey different modes of mobility. As the tent tradition of the EM conveyed heightened mobility, the house-pits in varying sizes of the MM gives the impression of a heightened sedentarism. This is interpreted as the structures became larger and more durable (Francisco et al., 2016: 133). This can be understood as the familiarity with the landscapes developed as well as economic specialisation, leading to the increase in the presence of house-pits (Olsen, 1994, Gjerde and Skandfer, 2018). The re-use of dwellings can be seen as a result of a growing attachment to the landscapes or a local areas (Bjerck, 2014).

Mesolithic forms of adaptation can generally be the reasoning precondition leading to Mesolithic changes in settlement and settlement patterns. This translates to that climatic circumstances determined the modes of Mesolithic mobility. This could be in the form of changes in subsistence patterns. If the pinnipeds of the early Mesolithic thrived on the winter and spring sea ice, this would engage the EM peoples to reside in proximity to the coastal areas where said subsistence was accessible (Bjerck, 2016). This correlates with the general consensus concerning the pioneer-settlements of Troms (Blankholm, 2019). The settlement patterns are concentrated in the coastal areas and it is proposed that the settlements moved into the inner-fjord systems in the summers and circling back to the coastal areas autumn come (Blankholm, 2019: 25-26). The relatively small sizes of the settlements in the early Mesolithic are interpreted as parts of highly mobile units …"with relatively uniform subsistence strategies" (Francisco et al., 2016: 128).

Mesolithic mobility on the account of raw material choice and lithic technologies

Reviewing these settlement strategies with the use and prevalence of flint, it is apparent that from the EM to MM there is a higher number of sites with a preference for one particular type of raw material, as presented in chapter 5. This can be interpreted as a growing familiarity with the accessible lithics and the development of distinct lithic raw material preferences. The utilization of flint was not chronologically dependent, meaning that the raw material was widely used in both the EM and the MM. The highest proportions of sites which primarily utilized flint is dated to the MM. As the mobility was high during the EM, it is logical to presume that the raw material procurement took place over large areas, utilizing the beach flint in a variety of different shores. Sites located adjacent to each other, but with autonomous lithic raw material preferences can also provide resourceful intel about varying modes of mobility or spatial connectedness. The use of certain lithics can also convey important information about the EM and MM peoples of Nordland and Troms County. Lithic raw material choice conveying geographical affiliation will be reviewed further in the following subchapter. The lithic composition of the EM sites was most often compiled of multiple raw materials. This supports the general consensus concerning (late) EM site dynamics, where missing steps in the operational sequence indicates high mobility between sites (Fossum, 2015: 121, Fuglestvedt, 2013). The Mesolithic chronologies are largely based on typology and pressure-blade-techniques (Damlien, 2016, Manninen et al., 2021). These technologies were stable over long periods before the EM to MM transition. Mapping the expansion of lithic technologies may also provide us with a comprehension of high mobility in the EM (Manninen et al., 2021). This translates to similar lithic technologies over vast areas inhabited by pioneering settlements. These lithic technologies spread over vast areas within relatively short amounts of time during the EM and conveys mobility and landscape use over large areas (Hertell and Tallavaara, 2011: 17). The notion of high mobility was not solely the case for the EM settlements. During the MM, the rapid spread of pressure blade technologies conveys far stretching contacts and mobility over vast areas (Manninen et al., 2021). Because of the framework of the material presented in this thesis does not encompass lithic technologies, the origins and developments of lithic technologies will not be subject to discussion. These notions of lithic technologies are employed to contextualise high degrees of mobility. The technologies were determined by preconditioned factors such as the accessibility of lithics, but also by socioideological concerns (Sandmo, 1986, Hood, 1994).

The mobility of the EM was high, based on the strategic use of tents, rapid changes in climate and likely fluctuations of subsistence access. This leads to the assumption that the mobility was indeed high, and the hunter-fishers were making use of large seascapes. As the familiarity with the landscapes and seascapes increased during the MM, dwellings became larger and more permanent. The larger dwellings did not necessarily result in sedentary lifestyles, as the rapid spread of lithic technologies during the MM conveys high mobility. The economic specialization also leads to the assumption that the residentiary dwellings and the local areas were exploited more logistically during the MM. Over the course of the Mesolithic, it is interpreted that the primary subsistence changed. From the exploitation of pinnipeds during the EM, to different fishes, and perhaps most importantly the cod in the later phases of the Mesolithic (Bjerck, 2014: 91). This is interpreted from the changes in settlement patterns, from the outer coastal areas to the mouth of fjords and in sounds, potentially depicting the primary subsistence.

The mapped Mesolithic dwellings and modes of mobility are general. Differences in dwellings and degrees of mobility within the chronologies occur and it is important to not review a site or settlement as solely a product of its chronological phase or dwelling. Some general mappings are provided, and the mapped tendencies are reviewed as applicable for my material.

6.2 Settlement patterns and accessibility of lithics

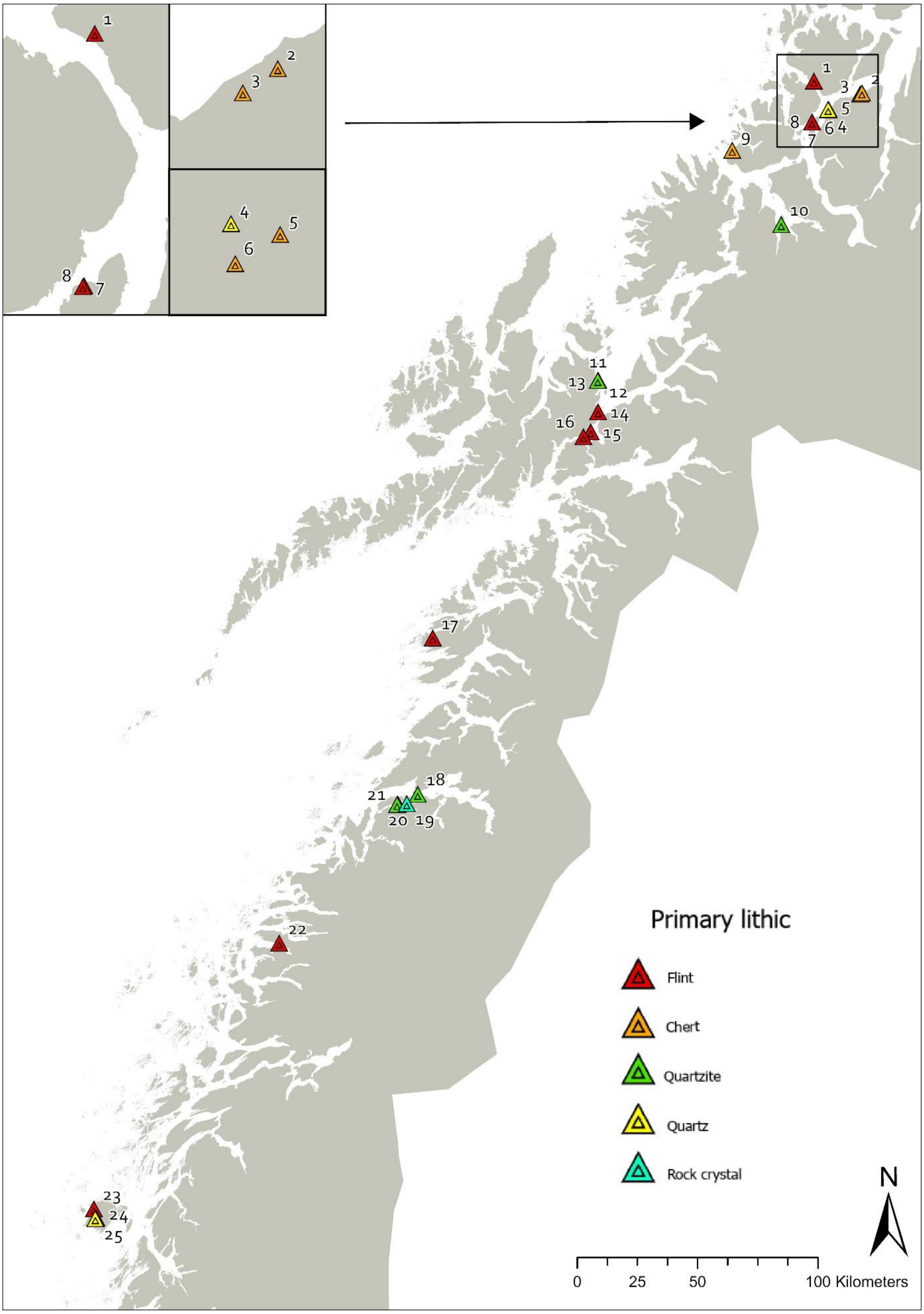

Figure 14, Spatial overview of primary lithics, sites 1 to 25. Map data: Geonorge

1.Simavik, 2. Knausen 3. Svarvaren 4. Tønsnes a 5. Tønsnes b 6. Tønsnes c 7. Bergli 1 8. Bergli 2 9. Sandvika 10. Målsnes 1 11. Stangnes syd a 12. Stangnes syd b 13. Stangnes syd C 14. Fauskevåg 1 15. Årbogen 1 16. Solli 17. Ersvik 1 18. Skålbunes 19. Tuv 2 20. Evjen 6 21. Evjen 3 22. Skogveien 23. Åsgarden 24. Mohalsen I 25. Mohalsen II.

See appendix A to E for complete information of lithic compositions.

Table 4, Primary lithics sites 1 to 25.

	Site	***Primary lithic***	*Percentage*
1	Simavik	**Flint**	44%
2	Knausen	**Chert**	65%
3	Svarvaren	**Chert**	86%
4	Tønsnes a	**Quartz**	50%
5	Tønsnes b	**Chert**	50%
6	Tønsnes c	**Chert**	47%
7	Bergli 1	**Flint**	68%
8	Bergli 2	**Flint**	52%
9	Sandvika	**Chert**	43%
10	Målsnes 1	**Quartzite**	89%
11	Stangnes syd a	**Quartzite**	95%
12	Stangnes syd b	**Quartzite**	66%
13	Stangnes syd c	**Quartzite**	41%
14	Fauskevåg 1	**Flint**	74%
15	Årbogen 1	**Flint**	99%
16	Solli	**Flint**	80%
17	Ersvik 1	**Flint**	86%
18	Skålbunes	**Quartzite**	36%
19	Tuv 2	**Rock crystal**	80%
20	Evjen 6	**Quartzite**	86%

21	Evjen 3	**Quartzite**	89%
22	Skogveien	**Flint**	98%
23	Åsgarden	**Flint**	81%
24	Mohalsen I	**Flint**	81%
25	Mohalsen II	**Quartz**	57%

The quantitative narrative of this thesis must be mentioned. When the term “primary raw material” is used, this is based on the quantitative composition of finds. Primary lithic thus constitutes as the lithic in the highest quantity.

Did geographical location patterns determine raw material preference?

The proposed cluster-zones of flint beach deposits are the areas of Helgeland, Lofoten and Vesterålen. The reliability of this hypothesis will be reviewed further in the discussion chapter 7. These areas, especially the ones with higher topographical susceptibility, could have created productive areas of flint beach procurement. Followingly, the potential lithic availability of the areas of Nordland and southern Troms County will be reviewed in the perspective of settlement patterns.

A wide variety of lithics was procured during EM and MM in Nordland and southern Troms County. The availability of these lithics varied from area to area. The internal lithic distributions and raw material preferences can be viewed somewhat as a result of the geographical availability of the said lithic. I am not suggesting that substantial amounts of time and effort wasn’t undertaken to procure these lithics, but one wouldn’t primarily be dependent on a resource located hundreds of kilometres away.

The previous subchapter mapped the general consensus regarding Mesolithic mobility. As the modes of mobility likely transpired over vast distances, it is logical to review the notion of Mesolithic seafaring and settlement patterns. The shores of the northern Norwegian coasts are compiled of a multitude of islands, archipelagos as well as straits creating natural marine routes which would have been favoured during seafaring. This is due to the risks associated with venturing the outer sea as well as the fact that these inner sea channels produced efficient travel routes that were a little more protected from the risks of greater waves and stronger winds. It is therefore logical to presume that along these straits, the voyagers would stop for shorter or longer stops for …"sharing material resources, ideas and knowledge" (Gjerde and Skandfer, 2018: 74). By settling in these straits, with access to good harbours and an overview of the sea, fruitful contacts could be meddled. It is logical that these natural marine routes were preferred when seafaring, and this may be traced in the archaeological material. The Tønsnes sites were located in the strait of Grøtsundet, a natural marine route to follow when traveling north or south, and thus the lithic compositions consist of a wide variety of lithic raw materials (Gjerde and Skandfer, 2018). If the notion of settlement location in straits with good harbours are to be associated with ideal locations for social encounters and possible lithic abundance this could also be affiliated with the sites of Tjeldsundet in the border-areas of Nordland and Troms County. The Tjeldsundet strait separates the Lofoten and Vesterålen archipelago in the west and the mainland, creating a natural marine route of communication. This makes the Tjeldsundet strait the indisputable marine route for northwards or southwards voyage. This prompts the return to the potential 'cluster-zones' as introduced in chapter 4. The areas of which the flint is primarily used includes for the most part sites located in a proximity to the open seas (Ersvik 1, Skogveien, Åsgarden and Mohalsen I). The remainder of the 'flint-sites' are located somewhat more sheltered, in sounds and straits. All the 'flint-sites' are located along the natural marine routes of communication with the most distinct clusters in Tjeldsundet and at the island of Vega (Fig. 15).

I am suggesting that these cluster-zones of flint utilization were first and foremost a result of the glacial preconditions, but the adjacency to the natural marine routes may also have impacted which raw materials ended up at these sites. At the island of Vega in southern Nordland county, the material from the site Mohalsen I indicates both a thorough utilization of flint, and a lithic specialization of certain subclasses of flint (Spjelkavik, 2016: 105). This raw material preference may demonstrate that flint was a widely available lithic on this island. Because of its location 20 kilometres from the nearest habitable island or mainland, it is challenging to determine these high quantities of flint as a result of primarily human import.

For the areas of Tjeldsundet, the glaciological preconditions complicate the 'cluster-zones' hypothesis to some extent. As mapped, the Ofoten area which Tjeldsundet is located within, was still covered by ice until approximately 12,000 – 11,000 BP (Hughes et al., 2015: 20-21).

At this time the Danish bedrock was ice-free and at the British Isles, only small specs of ice were left. The flint could not have been ice-rafted from these sources at this time.

The sites located somewhat more off the potential sea-faring routes were primarily making use of the local lithics (Fig. 14) (Målsnes 1, Skålbunes, Tuv 2, Evjen 6, Evjen 3). The Tønsnes sites in Tromsø municipality depicts both a familiarity with the local available resources such as quartz, but its high quantities of the Finnmark lithic chert also mirrors a connectedness to the northernmost areas of Norway. The localisation of the Tønsnes sites were seemingly ideal for communication with both natural marine routes, but also terrestrial routes (Gjerde and Skandfer, 2018: 70-71). It is suggested that Tønsnes was during the Early Stone Age, a central meeting place based on the adjacency to these marine and terrestrial routes as …"an ideal location for sharing material resources, ideas and knowledge" (Gjerde and Skandfer, 2018: 74). The lithic compositions of the Tønsnes sites included in this thesis are multifaceted. The three sites included in this thesis consist of 10% or more flint, 28% or more chert, 16% or more quartz and 7% or more quartzite. The relatively high proportion of chert indicates an accessibility to the microcrystalline lithic of Finnmark. The utilization of flint seems to be of a more fortuitous character. The general notion of lithic and landscape familiarity in the MM does not seem to apply to the Tønsnes sites. I am proposing that the localisation in this strait facilitated the access to a wider variety of lithics which was employed in addition to the 'local' lithics such as quartz, quartzite, and rock crystal.

All 25 sites are located in proximity to the productive marine environments. In order to fully review the case of Mesolithic mobility, the notions of marine vessels will be reviewed in the following subchapter.

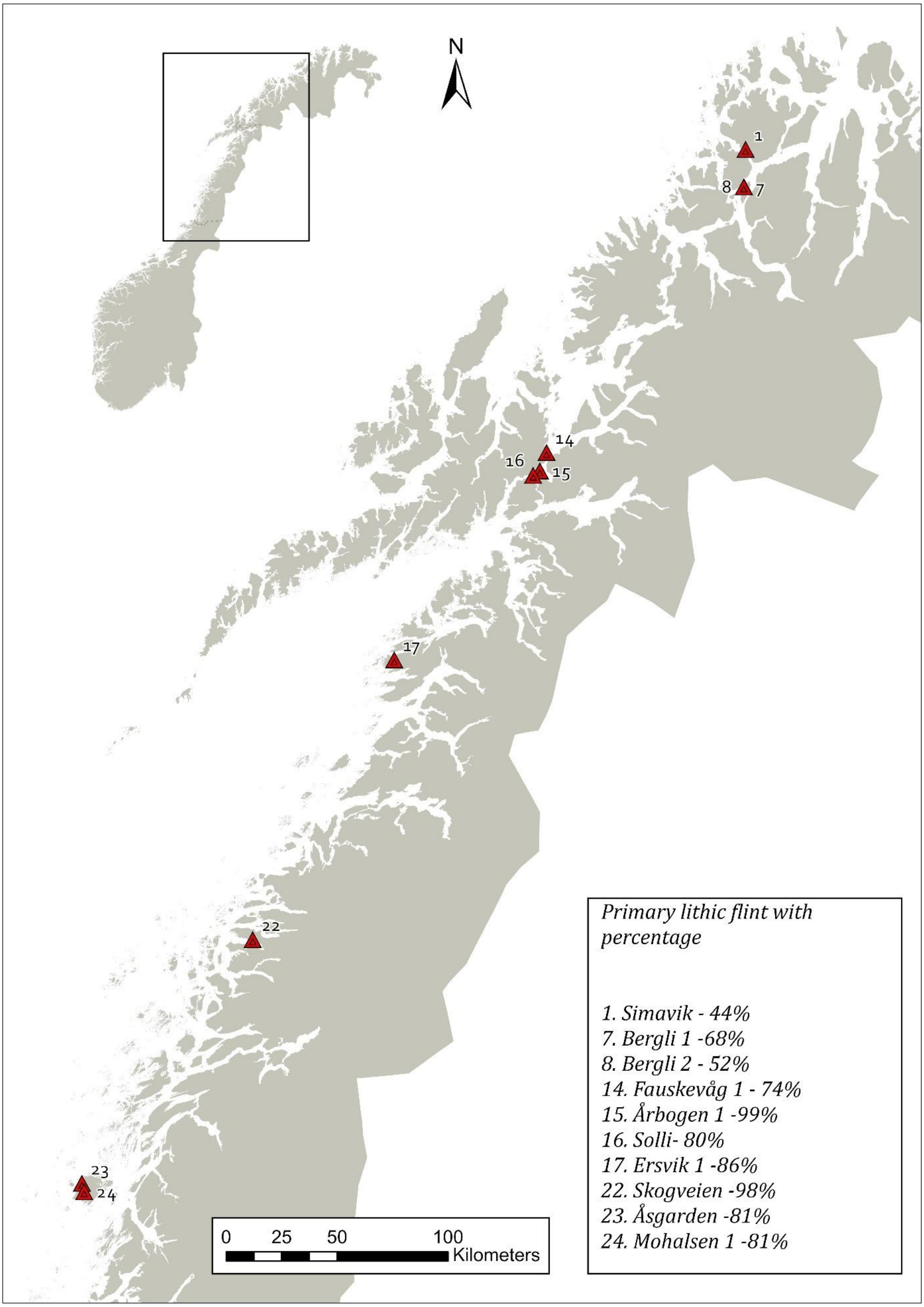

Figure 15, The 10 EM and MM sites with flint as primary lithic

6.3 Marine mobility

Prehistoric mobility can be demanding to map, as the empirical material is dictated by the remaining remnants which does not encompass the organic materials such as animal skins or wood. Archaeology has therefore been dependent on ethnographic sources for supplementing these somewhat enigmatic issues (Boethius et al., 2022). While these heuristic manoeuvres can provide insight into the prehistoric modes of mobility, they must also be reviewed with caution. The modes of mobility of hunter-fisher groups have not been subject to substantial archaeological inquiry, especially not from a northern Norwegian perspective. I will therefore be supplementing with Scandinavian and American research on the matter.

The Mesolithic peoples of Nordland and Troms were completely dependent on marine resources. 96% of mapped EM sites (Breivik, 2014 :1481) were located in marine environments, often as outer coastal sites on islands, islets, in sounds and fjords. It is safe to presume that the hunter-fishers of the 25 EM and MM sites of this thesis were closely connected to the prehistoric seascapes. This relationship to the North Atlantic seascapes would in all probability reap productive goods, with the availability to high protein meats and other byproducts such as blubber and skin from pinnipeds (Bjerck, 2016). These resources varied from season to season, but their migration in prehistoric times may have been somewhat similar to contemporary times, with some deviation depending on sea temperatures and nourishment (Helskog, 1980: 21). The …"meltwater discharge would create phytoplankton blooms in the wake of islands" (Breivik, 2014: 1483) and could potentially have created profoundly productive marine environments. These seascapes were profitable to exploit, and it is difficult to attempt to map Mesolithic mobility of northern Norway without reviewing marine vessels as partaking in these environments.

Just as the soil-conditions of this region has showed inhabitable for the preservation of Mesolithic bone materials, the same goes for other organic materials such as tree-materials and animal products such as leather and skins (Breivik, 2014). This complicates the 'boat-debate' to some degree, and the missing empirical material has been subject to academic inquiry on a national basis (Bang-Andersen, 2013, Fuglestvedt, 2013, Bjerck, 2016). Another reoccurring trait of EM sites in northern Norway, are the adjacency to natural harbours often sheltered from the harshest winds from the open sea (Barlindhaug, 1996, Bjerck, 2016: 5). These location-patterns with natural harbours, in addition to sites located in fjords, islets, sounds and straits correlates with the EM and MM sites presented in this thesis. As introduced in the climate and geology chapter, the coastal vegetation of Northern Norway during the EM was relatively sparce and was defined by different species of birch (Damm et al., 2021). The lack of access to larger types of wood in this period has led to the assumption that skin canoes were the vehicles of marine seafaring (Bang-Andersen, 2013). Ethnographical inquiry of North American Arctic groups has provided insight into the skin boats which may be adjacent to the marine vessels of the Mesolithic northern Norway (Ames, 2002). These goes by the names of umiaks and kayaks and were encompassed by pinniped hides for reaching seaworthy mobility. These sea-vessels with the name of umiaks were most often around nine meters long and two meters wide, thus providing a vessel for 10 to 20 people with gear in an easily manoeuvred vehicle (Ames, 2002: 26). Kayaks are neighbouring to the modern definition and had room for one to two people, with the potential of swifter movement in the seascapes. These were practical for hunting marine game, but were also productive vessels in lakes and rivers (Ames, 2002: 26).

Delving a bit further into the marine modes of mobility, some questions need to be asked. Why choosing boats as vessels of mobility, how far would one travel and for what purpose?

The first question has already been answered to some extent. The EM peoples of Nordland and Troms were deeply intertwined with the marine seascapes, often surrounding them as their sites were located on islands (Bergli 1 and 2, Åsgarden, Mohalsen I and II). These marine vessels like umiaks or kayaks would provide a security of reaching both subsistence and lithic procurement, saving time, conserving energy while also increasing the capacities of freight.

The Mesolithic groups of northern Norway were engaging with a productive but dynamic marine environment. Access to marine foraging, in addition to a connectedness to a lithic resource with seemingly no distinct geographical quarry required the Mesolithic peoples of northern Norway to adapt and access said commodities. Without some type of marine vessel, this would be a futile operation, especially if one were part of a settlement with more than a handful of people.

Most studies on foraging ranges has been conducted on terrestrial groups, with the aim on determining foraging-ranges while most often operating on the notion of optimal foraging theory (Aubry et al., 2012, Byrd et al., 2015). Optimal foraging theory can be viewed as somewhat deterministic and do not necessarily mirror how the prehistoric peoples moved and interacted with the landscape. I am suggesting that the activities in question would determine how long these travels would be. Either raw material procurement, hunting or gathering would necessitate different resources and would probably be conducted by different people or internal groups in a given settlement.

Hunting and gathering for foodstuffs were imperative tasks which in these areas would have been frequently performed. As the EM and MM settlements were located in the proximities of the productive seascapes, these journeys could if needed, be carried out on a daily basis in relatively short distances from the settlements. The calorie-rich pinnipeds could be accessed near the seasonal sea-ice, and did not necessarily necessitate access to a marine vessel (Bjerck, 2016: 3). Other resources such as shells and seabirds could also be accessible without a marine vessel. The process of hunting pinnipeds near the seasonal sea ice could be facilitated by accessing marine vessels for swifter hunting.

Other activities such as lithic procurement, could benefit through having access to a marine vessel. This would especially be fitting to presume for the procurement of deposited flint. As mapped in chapter 4, this valuable commodity could be procured in proximity to the seascapes. The flint could be located on these Mesolithic shores, on beaches, moraines, skerries etc. By having access to skin canoes, large seascapes could be ventured in relatively short amounts of time.

I want to emphasize that the assumptions provided are very general. Mesolithic seafaring is not the main theme of this thesis. With the empirical material absent, reaching absolute conclusions regarding Mesolithic seafaring is troublesome. But suggesting that no seaworthy vessels were of use during the northern Norwegian Mesolithic is perhaps just as problematic. The Mesolithic hunter-fishers of Nordland and southern Troms were in interconnected relationships with the seascapes, and activities such as traveling, subsistence acquisition and lithic procurement could be viewed as inconceivable without exploiting some form of marine vessel.

7 Discussion

The sites presented in this thesis were making use of a multitude of varying lithics. The variations are large, also at sites located in the proximities of one another. This prompts the discussion of how these variations came to be. This segment of the thesis will discuss the potential causations determining raw material diversity. Initially, the potential accounts for raw material differences will be discussed (1). In section 2 of the discussion the potential ranges of raw material procurement will be presented in addition to an implementation of three modes of raw material procurement. A short segment on the motivations determining raw material preference follows. Subchapter 7.1 is dedicated to scrutinizing the 'cluster-zones' introduced in chapter 4. In this chapter the reliability of this hypothesis is reviewed while the local and regional differences in sea level fluctuations and land upheaval are examined.

1. Factors determining lithic diversity in the Mesolithic contexts of northern Norway

The familiarity with the landscape and bedrock may have determined which materials became utilized. In the EM, the chert was seemingly the preferred resource in the Tromsø region. This indicates that the settlements were connected to the northernmost areas of Norway, Finnmark. The distances between Tromsø and Alta is substantial, at 166 kilometres 'as the crow flies'. If this journey was to be conducted by boat, substantial areas of open sea would have to be undertaken to reach the quarries of chert in the Alta-area. As Gjerde and Skandfer (2018) suggests, the Tønsnes sites inhabited a strategic area which also connected land routes. The other sites in the Tromsø region inhabited more or less the same strategic locations in the Tromsø-strait, with the exception of the Simavik site, located somewhat off the natural marine route for northwards or southwards voyage. Even though the Mesolithic peoples were deeply connected to the seascapes, I do not wish to rule out a connection to the terrestrial landscapes. In this early phase of the Mesolithic, the general consensus regarding the mobility is acknowledged as fairly high (Grydeland, 2000). This leads to the suggestion that in the EM, few sites or quarries with acknowledged lithic abundance was exploited regularly. The lithic tradition may have led the EM peoples to bring the lithics that they were familiar with, rather than depending on local resources in unfamiliar landscapes.

The preference of flint and chert can provide insight into the said lithic traditions. The prevalence of chert conveys a distinct connection to the landscapes of Finnmark in the EM phase in the Tromsø-region. The passing peoples may have brought the familiar lithics and in the MM the resources were to a higher extent quarried locally. The flint is however a resource exploited extensively in both the EM and in the MM. This prompts the question of how far the lithics were transported by humans.

2. How far were the lithics transported?

In order to thoroughly mediate on Mesolithic mobility and lithic procurement, task groups are incorporated. The notion of task groups in Norwegian Mesolithic contexts is a form of social organisation (Bergsvik, 2002). This terminology stems from anthropological research (Helm, 1965) and these groups were assembled to conduct varying tasks. In this chapter I will solely introduce these task groups in a perspective of lithic procurement and to some extent subsistence gathering.

The employment of specialized task groups are interpreted by the empirical material of smaller structures, indicating heightened mobility and shorter time spent at these smaller structures or stone-cleared areas (Fretheim, 2017). The waste-assemblage and tool compositions of the sites can also give an impression of which way the individual sites were used and for what purpose (Bjerck, 1990). It is believed that at the temporary field camps, resources such as lithics or specific subsistence were more accessible than at the residential base (Bergsvik, 2002). These temporary field camps could be at various distances away from the residential base and could be reached by expeditions from one night or up to several weeks (Bergsvik, 2002: 2).

It is logical to presume that when the objective of the task groups was to gather subsistence such as aquatic resources such as pinnipeds, fish, or other animals these trips would be conducted on a regularly frequent basis in proximity to the residential base. With the objective of flint procurement, these journeys would likely not be necessary to conduct on a weekly or perhaps monthly basis. This lithic resource was valuable, but the microcrystalline attributes of the flint were enduring. I am suggesting that the objective and execution of lithic procurement in the form of task groups could be conducted semi-regularly, but over vast areas, especially if some sort of marine vessel was employed.

I propose dividing the modes of lithic procurement into three systems in order to review what these practices can convey regarding Mesolithic mobility.

1. Systematic procurement. This translates to raw material procurement consummated purely for gathering raw materials. Systematic procurement was likely conducted by task groups. These groups could be organized with anywhere between one individual to an entire group.
2. Fortuitous procurement. This can be viewed as a somewhat more opportunistic endeavour, combined with other activities such as subsistence gathering or traveling. When traveling, the raw material sources could be utilized on the move. This form of procurement mirrors Binford's (1979) perspective on raw material procurement as a rather opportunistic endeavour, claiming that exclusive trips to stone age quarries were seldomly practiced (Binford, 1979: 259). The procurement was claimed to have been conducted in combination with other activities or randomly if one were in the area of the raw material sources (Garvey, 2015: 157).
3. Social procurement. Human transport of lithics, often depicting high degree of mobility. This form of procurement could materialise in the form of trade. Other than identifying 'exotic' resources far away from its raw material sources or specialized tools, this form of procurement can be difficult to pinpoint.

Specialized procurement practices will be reviewed initially, before I will review the notion of fortuitous procurement. Lastly, social procurement will be reviewed in order to thoroughly inspect how these varying practices may have affected Mesolithic mobility.

Binford's (1979) determination of the raw material procurement practices as an opportunistic endeavour might have be applicable to settlements who utilized a wide variety of raw materials or were located near quarries for procurement. But this opportunistic determination of a practice does not apply to the 'flintsites' of Nordland and southern Troms County. Raw material procurement was likely a time-consuming practice, as well as an important one. " Hunter-gatherers are assumed to have been primarily concerned with subsistence resource procurement and only secondarily with stone procurement (…)" (Garvey, 2015: 158) As the hunter-fishers of northern Norway mediated in productive seascapes, it is logical to presume that subsistence gathering was to a lesser extent a time consuming endeavour, compared to the terrestrial hunter-gatherers. This suggestion is both based on the mapped productive marine environments (Breivik, 2014), but also on the notion of employing marine vessels for swift subsistence gathering, both around the shores and in the low-tide zones. By residing in these areas, with varying access to marine subsistence such as sea-mammals, seabirds, shells, and fish while accessing some sort or marine vessel, raw material procurement could be prioritized. By using a marine vessel, the freight capacity could be substantial with the potential of bringing large amounts of flint-nodules at once. By organizing these task groups, one could settle at the ideal residential locations, while still accessing valuable commodities located at varying distances away. It is important to note that the contemporary comprehension of landscape and the different ranges of distance may corrupt how we view Mesolithic mobility. It is fitting to apply this form of systematic raw material procurement practice to the EM hunter-fishers of northern Norway. Both as the dwellings were small, temporary and seemingly easy to transport with the use of marine vessels (Fretheim, 2023), but also because the EM peoples of these areas were seemingly close-knit with their preferred lithic raw material. The preferred lithic could potentially have been brought during traveling, or procured by investing time and energy in order to gather the raw material from known sources such as areas with flint beach deposits.

The fortuitous raw material procurement is perhaps the most employed notion of raw material practice. This perspective can be seen as a result of Binford's (1979) work, determining raw material procurement as an embedded practice, in combination with other activities such as hunting. While this notion of procurement practice has determined hunter-gatherers as somewhat opportunistic beings, it may be appropriate to apply to some extent. As stated, the EM peoples of northern Norway were highly mobile actors in their environments. Being on the move, travelling from A to B, this form of fortuitous raw material procurement was likely performed. In the MM, as the familiarity with the landscapes and economic specialization grew it is logical to presume that the trips to the local quarries were practiced in combination with subsistence gathering.

Social raw material procurement is as noted in the overview, a practice most distinct to detect with 'exotic' raw materials. Exotic raw materials may be a raw material which stems from distant areas. As Hertell and Tallavaara (2011) maps, these can have gotten to their archaeological contexts by two ways. An individual could have travelled over the vast distances and brought the lithics back, this practice would be determined to be of a specialized procurement endeavour. The other scenario would be gift exchange. This scenario is contested by Hertell and Tallavaara (2011: 32) by notions of evolutionary biological claims such as sexual selection, making bonds with other peoples and securing new kins. This evolutionary perspective on social factors motivating long travels, securing, and exchanging lithics is a precautious one. As these social phenomena are tricky to pinpoint, especially in the perspective of Mesolithic northern Norwegian hunter-fishers, the geographical location of the sites will be applied to review the reliability of gift-exchange.

The sites located in proximity to the natural marine routes, such as the Tønsnes and Tjeldsundet sites were strategically located and made social gatherings or gift-exchanges more likely to have transpired. As these areas were located with an overview of the natural marine routes, it may have been more likely for social gatherings to take place. It is logical to presume that these meetings transpired to higher extents during the MM, as the dwellings became larger and more permanent.

The Mesolithic peoples were engaging with large landscapes and seascapes and likely making use of multiple resources. Gathering flint from the beaches would at the sites where the primary lithic constitutes as flint would in all probability be a product of strategic lithic procurement. I am not excluding the more fortuitous gathering of flint which could have been combined with subsistence gathering or hunting in the productive seascapes. But the substantial quanta of flint at many of the EM and MM sites of Nordland and Troms county was a product of strategic and deliberate lithic procurement, and most likely a time consuming endeavour (Pettersen, 1986: 15).

We can assume that sites with highest percentages of flint may have been located in the proximities of the nearest hypothetical sources. I am not suggesting that all the sites with flint as their primary lithic were places of flint abundance, but I am implying that the flint may have been accessible in the shores or marine terraces in a given radius of some of the 'flint-sites'. Although natural preconditions to some extent facilitated raw material access, the lithic raw material preferences of the Mesolithic settlements weren't necessarily determined by accessibility.

At the EM site Mohalsen I on the island of Vega in southern Nordland County, the chert makes up 0,67% of the total lithic composition (Spjelkavik, 2016). A lithic composition of such low quantities does not mean that it was a prioritized or ‘important’ resource, but the provenance of the chert conveys far stretching contacts and the potential of ‘social procurement’ as suggested above. This could potentially demonstrate a high degree of mobility, but also contacts with groups in northern Norway (Spjelkavik, 2016: 106). There seems to be no clear indications that raw-material availability determined the material which ended up on the EM sites (Sandmo, 1986: 142). The EM and MM sites of Nordland and southern Troms were located in the productive seascapes, and I am suggesting that the combination of access to marine vessels in addition to organisations of task groups were fundamental elements in the procurement of flint.

In order to determine the potential radiuses of flint procurement, the potential cluster-zones of flint will be revisited.

The Tjeldsundet sites (Årbogen 1, Fauskevåg 1 and Solli) have high quantities of flint, and it is logical to presume that this resource was available. But in what distances away from the sites. The localisation of this strait, at the root of the Lofoten archipelagos may have constituted as a logical post for further lithic procurement. The archipelagos could be viewed as easily accessible by boat from the Tjeldsundet strait. These areas could have been subject to systematic procurement, likely exploiting well-known areas of flint beach deposits. Claiming to pinpoint the exact ranges of marine mobility would be a futile operation. With the notion of high degrees of mobility in mind, especially during the EM it is fitting to presume that large areas may have been scoped for flint beach deposits.

It is logical to presume that the southern parts of the eastern Lofoten islands and skerries could have been subject for lithic procurement. This because these areas became ice-free already at approximately 16 000 – 15 000 BP (Hughes et al., 2015: 19). The trajectory of the Lofoten archipelago stretching NE-SW into the Norwegian current could also lead to higher frequencies of rafted ice debris to be deposited along these shores. The potential EM and MM sites located on the shores of Andøya and Vesterålen are under today’s sea level (Møller, 1996). As depicted in chapter 4.5, the fluctuations of sea level and land upheaval of Lofoten and Vesterålen varied (Fig. 6, 7, 8). This led to the submersion of the potential EM and MM sites located in the outer areas of Lofoten and Vesterålen.

This complicates the empirical material and makes it challenging to determine the Vesterålen areas as places of which the flint was procured. The outer areas of the western Lofoten archipelagos and Vesterålen district became submerged approximately 9500 to 6000 years ago (Møller, 1996: 6), the areas could have been subject to specialized flint beach procurement during the early phases of the Mesolithic. This is however challenging to claim, and the possibility of lithic procurement in these areas are noted, but not reviewed as definitive. The eastern areas of the Lofoten archipelagos were to a higher extent effected by the land upheaval and was not submerged by the sea (Fig. 8)(Møller and Holmeslett, 1998).

The empirical material of Helgeland district of southern Nordland County depicts the flint as an important resource. Two of the 'flintsites' are located on Vega, an island located 20 kilometres away from the nearest habitable mainland or island (Bjerck, 1990). As Spjelkavik (2016) noted in his research of the provenance of the lithics of the site Mohalsen I, the flint was seemingly a 'local' resource. Local in the sense that the flint was deposited and procured in the shores of the island (Spjelkavik, 2016: 106). This leads to the assumption that on Vega, the radius for flint procurement was relatively short and the lithic was widely available for systematic procurement. The site Skogveien was located in a fjord the mainland, further north from the island of Vega. Skogveien is the only documented site located in these areas included in this thesis, it is therefore challenging to reach absolute conclusions regarding the ranges of flint procurement. Its high percentages of 98% flint could be a result of both local access nearby the site and the lithics could have been brought from the western islands further out in the sea. These islands became ice-free first and were subject of substantial land upheaval and this could have in turn facilitated raw material access.

3. Motivations impacting raw material preferences towards the microcrystalline lithics.

We cannot interpret all the hunter-fisher groups of Nordland and Troms as deeply opportunistic beings making use of solely the most easily obtainable resources. As 40% of the 25 EM and MM sites of Nordland and southern Troms County in this thesis utilized flint as their primary lithic, its acquisition was anything but an opportunistic endeavour. The procurement of flint seems to have been of a strategic character. The motivations behind raw material choice were a construct of a multitude of factors, some of which will be discussed followingly.

The motivations determining raw material choice is challenging to define as entirely a technological or socioideological matter (Sandmo, 1986). While the technical and functional attributes of the microcrystalline lithics flint and chert were indisputable, substantial amounts of time and effort was likely undertaken to procure these lithics. The choice of raw material seems to be determined by non-deterministic principles (Sandmo, 1986: 143). This translates to that the raw material access did not necessarily determine the preference. If access did not determine the preference, what motivated the choice of raw material?

The organization of lithic technology in the Mesolithic north was be motivated …"by both functional and socioideological concerns" (Hood, 1994: 65). This translates to that the material acquisition was motivated by the technological qualities of the lithics in addition to the election of lithics based on social, cosmological and/or ideological concerns. From Sandmo's 1986 material, the visual attributes of the preferred lithics of the Tromsø-region was remarked as a potential symbolic factor determining raw material preference. The colours of the lithics were interpreted as symbols in social communication (Sandmo, 1986: 146). This is an intriguing study, opening up for more comprehensive ways of understanding the symbolic and cosmological worlds of the early Mesolithic peoples. This is however not applicable to impose on the flint material of the northern Norwegian Mesolithic.

The visual attributes of flint uncovered at Mesolithic contexts in northern Norway can be reviewed as somewhat homogenous. As mapped in chapter 4, it appears in sets of different characteristics of grey, brown, and occasionally in black with a multitude of different patinas as a result of weathering. The visual attributes may have influenced raw material choice to some extent, but I do not see this as a substantial motivator in the choice of flint, especially for a material which was non-renewable. From the Mohalsen I material, it was noticed a preference for particular subclasses of flint, however this appears to have been due to functional considerations (Spjelkavik, 2016: 105).

It is difficult to determine if functional and technical attributes ruled the preference, or if socioideological concerns played a part. I suppose both played an intrinsic part in why they were chosen. The microcrystalline attributes of flint created a robust lithic, and their preference of it may have been motivated by their knowledge and tradition connected to the lithic. The materials which we are familiar with inhabit great value and may exhibit a sense of association and relation.

This discussion has contextualised the motivators behind raw material procurement and potential modes of mobility. In regard to the motivations determining raw material choice, the technological attributes may be easiest to pinpoint, as the technical qualities of the flint and chert were impeccable. The socioideological concerns are to some extent non-tangible, and thus challenging to determine. Very general geographical connections can be interpreted, nonetheless. A raw material preference towards chert may have indicated a connection to the northern areas of Norway, while preference towards flint indicated a connection to the southern areas of Nordland and Norway in the EM.

In order to fully review and contextualise how the flint ended up in the Mesolithic contexts of northern Norway, the suggested modes of transportation needs to be revisited. The following subchapter scrutinizes the problem statement of this thesis: Which preconditions determined flint deposits in northern Norway?

7.1 Continued discussion, concluding remarks

My hypothesis is that the calved ice containing southern Scandinavian or British sediments could have been deposited in a higher frequency the cluster-zones defined in the end of chapter 4. No committed research towards this problem has been conducted from an archaeological perspective of northern Norway. By contextualising and reviewing these preconditions in addition to matching the cluster-zones to the EM and MM sites of Nordland and Troms, I will review the credibility of this theory by discussing it in this subchapter.

The cluster zones within my research area were as follows: The Lofoten islands, Vesterålen and on the islands off the Helgeland coast. These areas were the first specs of Norwegian land that became ice-free after The Last Glacial Maximum (Hughes et al., 2015). An important factor to include that may provide supplementary testimony are the local and regional sea-level fluctuations in addition to the land upheaval. These varied greatly from region to region.

The islands off the Helgeland coast were especially affected by the isostatic depression during the last ice age, this led to a substantial crustal rebound. At the island of Vega where three of the sites discussed in this thesis were (Åsgarden 1, Mohalsen I and II), the shorelines during the last part of the Ice Age (13 000 – 14 000 BP) were situated 96 meters above today's sea level. In the Boreal Period at 8000 – 9000 BP the shoreline had lowered to 60 – 70 meters above todays sea level (Bjerck, 1990: 4-5). As the submerged skerries and islands emerged, I am suggesting that these places could be ideal for flint procurement. The topographical susceptibility of the western islands of Helgeland and perhaps especially Vega are reviewed as optimal for three reasons. 1) The areas were ice-free as the glaciated areas of southern Scandinavia and the British Isles begun to calve. 2) The Islands geographical location could provide as entrapments for the ice-rafted flint. 3) The following excessive land upheaval created ideal deposits for flint procurement as the earlier submerged banks, beaches and shores emerged.

The empirical material from the Vega islands (Bjerck, 1990, Spjelkavik, 2016) and in the Helgeland district (Simonsen, 1992, Simonsen, 1996) demonstrates a distinct abundance of flint. Flint was a prioritized resource, and it appears to have been an abundance of, compared to other areas of northern Norway. At the site Mohalsen I, flint-types of a high quality was preferred for tool production, rather than making use of the flint of poorer quality (Spjelkavik, 2016: 105). It is safe to presume that the flint was a widely accessible lithic in this area.

At the Lofoten islands and in the Vesterålen district the preconditions were of a different character. These areas quickly became ice-free in at ca 16 000 – 14 000 BP (Hughes et al., 2015). The topographical susceptibility was however poorer. This because the land upheaval isostatic dynamics impacted these archipelagos differently (Møller, 1996). At ca 9500 – 6000 BP, the shores of the outer areas of Lofoten and Vesterålen were submerged by ca 30 metres of sea (Møller, 1996: 6). The potential ice-rafted flint which has become deposited on these shores, as well as the EM settlements, were subsequently submerged. The shore-near areas of these archipelagos were thus not ideal places for flint procurement, as the potential areas for utilization were likely submerged. The inner eastern areas of the Lofoten archipelagos were however subject to land upheaval (Fig. 8) and subsequently not submerged by the seas.

What accounts for the substantial quantities of flint observed at the Tjeldsundet-sites?

The wide Tjeldsundet strait separating the mainland and the Lofoten and Vesterålen archipelagos was an indisputable natural marine route. By settling in these straits, one would have an ideal overview of the sea, but also over the marine route and the passing peoples. I propose that the outer Lofoten islands and the Vesterålen archipelagos did not constitute as ideal places for raw material procurement. Both because preconditions determined by the rising sea levels, but also because of the vast distances involved. I suspect that potential locations for flint procurement were located at the inner areas of the Lofoten islands, potentially on islands and wide skerries which weren't submerged after The Last Ice Age (Møller and Holmeslett, 1998). The substantial quantities of flint at the Tjeldsundet-sites accounts for lithic procurement executed extensively. This brings up the notion of marine vessels.

The modes of mobility of the Mesolithic peoples of northern Norway are challenging to discuss without accepting the presence of marine vessels. The missing empirical evidence is however definitive. The location patterns and the mapped productive marine seascapes makes an evident case for the employment of marine vessels to some extent. I am not proposing that all the settlements of the northern Norwegian Mesolithic would engage with marine vessels. But it is challenging to contextualise Mesolithic mobility and perhaps especially flint procurement being conceivable without marine vessels. Even if the EM and MM peoples utilized known sources for flint procurement, these sources would run empty and new shores would have been necessary to roam to facilitate stable access to the valuable resource. If this activity were to be conducted by land, it would have been an even more time-consuming endeavour.

I view it as probable that the inner/eastern areas of the Lofoten islands were subject to strategic flint procurement directly from the Tjeldsundet sites. This could have taken place both in the early and in the middle phases of the Mesolithic as these areas were not affected by the rising sea levels in the same extent as the outer areas of the Lofoten islands (Møller and Holmeslett, 1998). The strategic placement of the Tjeldsundet sites could also have inflicted which materials ended up here. This strait could constitute as an ideal location for shorter and longer stops and the lithic compositions indicate that the passing peoples came from the south. The areas of southern Nordland could also have been roamed for flint beach deposits on longer journeys. The flint could also have been brought from locations susceptible for flint beach deposits to the Tjeldsundet and Tromsø sites, as the final step in the process of lithic procurement. By this it is meant that all lithic procurement was not initiated from the respective flint-sites, but rather ended up there as the hunter-fishers were highly mobile groups. It is important to note that even though three geographically specific areas are coined in this thesis as cluster zones for flint beach deposits, other areas may have also been subject to these deposits, but likely to a lesser extent.

Havnø's (1913) proposition suggested that the flint may have primarily been deposited on the shores of southern Norway before subsequently being pushed into the sea-currents by the ice in the cold period of Younger Dryas. This is an intriguing theory. But this makes up a theory which will be even more challenging to determine. The primary 'wave' of rafted ice from the southern Scandinavian and British bedrock may have acted interchangeably with Havnø's (1913) theory. But this is not a view I have included in my research, and its potential contribution to secondary flint deposits are noted.

The mapped casualisations show that manoeuvring into other fields of expertise is imperative in order to attempt to contextualize the geological and glaciological preconditions determining flint deposits in northern Norway. I am, as already stated not formally educated in these fields, and my discussion operated on by the notion of very general constructs.

This chapter will be followingly summarized.

Geographical location patterns determined in part which raw materials ended up there. The flint sites are exclusively located in the outer coast or perhaps most importantly along the natural marine routes. The sites which primarily exploited the local raw materials such as quartz, quartzite and rock crystal were to a greater extent located in the inner fjords or somewhat off the natural marine routes. This gives the impression that the flint sites of EM and potentially MM northern Norway were highly mobile and likely involved with other groups and the localization along the natural marine routes could have facilitated raw material abundance. The location of the flint sites in the outer coast or on islands gives the impression that marine vessels were important, both for subsistence and lithic procurement. The high quantities of flint were likely a result of specialized procurement by employing task groups, the lithic procurement was likely to have been conducted semi regularly. The lithic procurement ranges were as follows: The Tjeldsundet sites gathered material in a form of specialized procurement, but some social procurement is also likely due to the localisation in proximity to the natural marine routes. The flint sites of Vega and Skogveien in the district of Helgeland likely procured the flint locally, in the beaches and shores of the Mesolithic in a specialised and fortuitous manner. The flint sites of Tromsø gathered their flint by specialized and social procurement, these areas were also located along the natural marine route for northwards or southwards voyage. The motivations for exploiting the flint were likely a result of both functional and traditional considerations. The socioideological motivations are non-tangible, and thus more challenging to pinpoint within my material.

8 Conclusion

The research objectives of this study opted for a broad approach in order to contextualise the vast preconditions determining the lithic diversities of early and middle Mesolithic Nordland and southern Troms County. The mapped preconditions determining lithic availability and varies and includes Holocene, Pleistocene, geological, glaciological, geographical, social and socioideological conditions. The preconditions determining flint availability was particularly scrutinized in order to provide a new perspective on flint availability in these regions.

After mapping and identifying the lithic trends of EM and MM Nordland and southern Troms County which was research objective number 1 it was evident that the raw material flint made up substantial amounts of the lithic compositions and thus answering research objective number 2. Research objective number 3 opted for a wide approach in order to contextualise which preconditions determined flint availability in Nordland and southern Troms County.

8.1 Raw material diversity and reliability of the 'cluster-zones'

The lithic raw materials quartz, quartzite, flint, chert and to some extent rock crystal were the primarily exploited lithics of the early and middle Mesolithic northern Norway. The microcrystalline high quality lithics, flint and chert were preferred at 15 out of the 25 EM and MM sites presented in this thesis. This makes up 60% of the total sites. The sites primarily making use of flint made up 40% of the sites. The chert sites of the Tromsø region and the flint sites in Tjeldsundet were in all probability sacrificing substantial amounts of time in order to procure these materials. These lithic preferences may also be a product of high mobility and contact with other groups.

The research objectives concerning the Mesolithic northern Norway has most often been revolved around one or few sites on an intra-site level. By mapping the lithic compositions of 25 EM and MM sites located over a vast areas a more comprehensive overview of these regions has been provided.

Settlement patterns could have been impacted by raw material accessibility. Sites which prioritised flint did not locate themselves in areas far away from the outer coast. Most of the sites where the flint was utilized as the primary material were located in the areas of natural marine routes. It is therefore logical to presume that the high quantities of flint were a result of a specialized exploitation of known areas of flint beach deposits, and perhaps social procurement as the sites were located in adjacency to the natural marine routes.

The central conclusions are as follows:

- The ‘cluster-zones’ are reviewed as a plausible contribution for the high quantities of flint in selected areas along the coast of Nordland and southern Troms County.
- The flint procurement was at the same time a time-consuming activity and was likely conducted semi-regularly in a specialized endeavour.
- These sources of beach flint constituted as important areas for lithic procurement throughout the EM and MM
- These flint deposits made the flint a local resource, especially in the western areas of the Helgeland coast.
- Geographical location patterns determined raw material access and preference to some extent. This is interpreted from the location patterns of the sites where the local materials were utilized, located in the inner fjords, at distances away from the natural marine routes, and the flint sites which was located in the outer shores and along the natural marine routes.

8.2 Further research potential

Further and extensive systematic surveying could further contextualise my hypothesis of the cluster-zones. This would be a time-consuming endeavour but could potentially help narrow down the potential radius of flint procurement during the Mesolithic. For the Tjeldsundet areas, these surveys could take place on the south-eastern parts of the Lofoten archipelagos, preferably in the areas of the ‘Svellingflaket’ which is made up by numerous skerries. For the Helgeland district these could be focused on the western islands in order to map out if any particular island or area were subject to higher frequencies of flint deposits.

Hauglid (1993: 17) mapped the flint nodules which had been sent to the geological department of the Museum of Tromsø. Ideally, these could be updated and digitalized in ArcGIS. If these were discovered in non-archaeological contexts, it would provide more context for this theory and give an overview of the possible areas where the flint could have been predominantly deposited.

Employing methods such as XRF and ICP-MS to determine provenance could further pinpoint the origin on the flint. These methods demand access to samples from the bedrocks of flint in order to have an available comparative material. These methods may be tempting to review as finite but must be approached with caution as many factors may corrupt the results. Differentiating the provenance of flint as of southern Scandinavian or British origin with Norwegian sample material is unprecedented. This could provide the field of northern Norwegian archaeology with a more comprehensive understanding of the glaciological processes determining flint beach deposits.

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Appendix A

Site statistics including county, municipality, dating and basis of dating.

Site	County, Municipality	Dating	*
Simavik	Troms, Tromsø	10700-10200 BP (≈), 9200 +- 200 BP (14C)	**≈, 14C**
Knausen	Troms, Tromsø	8500-8300 BC (combined), 9500-8000 BC	**≈, M, 14C**
Svarvaren	Troms, Tromsø	9900 BP	**≈**
Tønsnes a	Troms, Tromsø	7060-6650 cal BC (14C), 7030-6600 cal BC (14C), 7171-6872 cal CB (14C)	**14C**
Tønsnes b	Troms, Tromsø	(600-400 AD, 560-390 AD) (Phase II)	**(≈*) 14C**
Tønsnes c	Troms, Tromsø	6980-6480 cal BC	**14C**
Bergli 1	Troms, Tromsø	8500-7600 cal BC	**14C**
Bergli 2	Troms, Tromsø	9300-8000 cal BC, 7000-5500 cal BC	**14C**
Sandvika	Troms, Tromsø	9400 BP (400 BC-540 AD)	**≈ (14C)**
Målsnes 1	Troms, Målselv	9500 BP	**≈**
Stangnes syd a	Troms, Harstad	8300 – 8200 BC	**14C**
Stangnes syd b	Troms, Harstad	9900 uncal BP	**14C**
Stangnes syd c	Troms, Harstad	9800-9600 BC	**≈**
Fauskevåg 1	Troms, Tjeldsund	8877 +24/-24 BP	**14C**
Årbogen 1	Troms, Tjeldsund	8285-8205 BC, 7940-7607 BC, 7025-6644 BC	**14C**
Solli	Troms, Tjeldsund	7172 BC - 532 AD (6800-6500 BC, 4800-4700 BC, 365-430 AD)	**14C**
Ersvik 1	Nordland, Steigen	8500 BP	**≈**
Skålbunes, Eidet	Nordland, Bodø	8500 BP	**≈**
Tuv 2	Nordland, Bodø	9500-9800 BP	**≈**
Evjen 6	Nordland, Bodø	9500-9800 BP	**≈**
Evjen 3	Nordland, Bodø	9580 +/- 90 uncal BP	**14C**
Skogveien	Nordland, Rødøy	7000 BC (14C), 8300-8200 cal BC (M), 9400 BP (≈)	**M**
Åsgarden	Nordland, Vega	8330 +- 90 BP uncal BP	**14C**
Mohalsen I	Nordland, Vega	10700-10500 cal BP	**14C**
Mohalsen II	Nordland, Vega	9100 BP	**14C**

*= Basis of dating. ≈ =Dated on the basis of shoreline displacement, concluded by the authors of reports.

M=Typological material, ^{14}C= Dated by radiocarbon

Appendix B

Site statistics including phase, Askeladden ID, total lithic composition and site coordinates.

Site	Phase	Askeladden ID	Total lithics	Coordinates
Simavik	**EM**	**119953**	**823**	69°49'52.8"N 19°01'08.0"E
Knausen	**EM**	**37980**	**7640**	69°47'35.8"N 19°30'16.8"E
Svarvaren	**EM**	117995-1	**566**	69°47'26.2"N 19°29'39.7"E
Tønsnes a	**MM**	**104380**	**4337**	69°44'23.6"N 19°07'32.0"E
Tønsnes b	**MM**	**104355**	**598**	69°44'21.7"N 19°07'50.8"E
Tønsnes c	**MM/LM**	**104342**	**1785**	69°44'18.2"N 19°07'32.6"E
Bergli 1	**MM**	**116462**	**2808**	69°41'50.4"N 18°56'44.1"E
Bergli 2	**EM/MM**	**116463**	**372**	69°41'48.4"N 18°56'36.2"E
Sandvika	**EM**	**150686**	**813**	69°36'35.4"N 18°04'26.5"E
Målsnes 1	**EM**	150871-1	**9138**	69°19'30.1"N 18°33'02.1"E
Stangnes syd a	**EM**	**119808**	**265**	68°46'39.9"N 16°34'38.9"E
Stangnes syd b	**EM**	**130428**	**1599**	68°46'33.7"N 16°34'31.7"E
Stangnes syd c	**EM**	**119809**	**2571**	68°46'33.4"N 16°34'29.7"E
Fauskevåg 1	**MM**	**214628**	**3879**	68°39'36.2"N 16°34'10.2"E
Årbogen 1	**EM/MM**	214635-1	**1779**	68°35'11.3"N 16°29'22.7"E
Solli	**MM**	**221154**	**10354**	68°34'09.4"N 16°24'50.8"E
Ersvik 1	**MM**	**?**	**642**	67°49'44.8"N 14°52'59.1"E
Skålbunes, Eidet	**MM**	**?**	**3034**	67°14'57.0"N 14°44'27.3"E
Tuv 2	**EM**	68323-1	**288**	67°12'51.8"N 14°38'10.0"E
Evjen 6	**EM**	57935-1	**396**	67°12'44.0"N 14°33'02.3"E
Evjen 3	**EM**	57934-1	**3046**	67°12'38.8"N 14°32'34.0"E
Skogveien	**EM**	**?***	**1252**	66°41'24.6"N 13°26'36.2"E
Åsgarden	**MM**	67165	**3792**	65°40'46.1"N 11°49'42.9"E
Mohalsen I	**EM**	**?**	**7025**	65°38'37.4"N 11°50'44.2"E
Mohalsen II	**EM**	**?**	**341**	65°38'44.9"N 11°51'17.8"E

*= Skogveien coordinates are approximate and based off the Simonsen (1992) report.

Appendix C

Site statistics including composition of lithics.

Site	Flint	Chert	Quartz	Quartzite	Rock crystal	Other
Simavik	361	259	37	165	x	1
Knausen	400	4979	1229	1013	19	x
Svarvaren	29	487	22	27	1	x
Tønsnes a	565	1220	2178	327	40	7
Tønsnes b	60	302	96	127	10	3
Tønsnes c	192	836	439	298	14	6
Bergli 1	1916	592	x	98	115	87
Bergli 2	192	4	x	171	x	5
Sandvika	161	351	9	50	3	239
Målsnes 1	x	851	49	8106	109	23
Stangnes syd a	8	x	2	253	2	x
Stangnes syd b	87	327	92	1051	31	11
Stangnes syd c	766	638	60	1048	56	3
Fauskevåg 1	2859	31	354	634	1	x
Årbogen 1	1765	x	3	11	x	x
Solli	8242	199	x	x	485	86
Ersvik 1	552	4	33	29	24	x
Skålbunes, Eidet	836	x	567	1080	496	55
Tuv 2	14	x	19	6	231	18
Evjen 6	1	x	37	340	5	13
Evjen 3	18	1	280	2705	15	27
Skogveien	1231	x	x	9	x	x
Åsgarden	3089	x	253	298	90	62
Mohalsen I	5694	47	273	313	676	22
Mohalsen II	49	x	196	92	4	x

X=0 lithics

Appendix D

Site statistics including percentages of lithic compositions in double decimals.

Site	Flint	Chert	Quartz	Quartzite	Rock crystal	Other
Simavik	43,86 %	31,47 %	4,50 %	20,05 %	0,00 %	0,12 %
Knausen	5,24 %	65,17&	16,09 %	13,26 %	0,25 %	0,00 %
Svarvaren	5,12 %	86,04 %	3,89 %	4,77 %	0,18 %	0,00 %
Tønsnes a	13,03 %	28,13 %	50,22 %	7,54 %	0,92 %	0,16 %
Tønsnes b	10,03 %	50,50 %	16,05 %	21,24 %	1,67 %	0,50 %
Tønsnes c	10,76 %	46,83 %	24,59 %	16,69 %	0,78 %	0,34 %
Bergli 1	68,23 %	21,08	0,00 %	3,49 %	4,10 %	3,10 %
Bergli 2	51,61 %	1,08	0,00 %	45,97 %	0,00 %	1,34 %
Sandvika	19,80 %	43,17 %	1,11 %	6,15 %	0,37 %	29,40 %
Målsnes 1	0,00 %	9,31 %	0,54 %	88,71 %	1,19 %	0,25 %
Stangnes syd a	3,02 %	0,00 %	0,75 %	95,47 %	0,75 %	0,00 %
Stangnes syd b	5,44 %	20,45 %	5,75 %	65,73 %	1,94 %	0,69 %
Stangnes syd c	29,79 %	24,82 %	2,33 %	40,76 %	2,18 %	0,12 %
Fauskevåg 1	73,70 %	0,80 %	9,13 %	16,34 %	0,03 %	0,00 %
Årbogen 1	99,21 %	0,00 %	0,17 %	0,62 %	0,00 %	0,00 %
Solli	79,60 %	1,92 %	0,00 %	0,00 %	4,68 %	0,83 %
Ersvik 1	85,98 %	0,62 %	5,14 %	4,52 %	3,74 %	0,00 %
Skålbunes, Eidet	27,55 %	0,00 %	18,69 %	35,60 %	16,35 %	1,81 %
Tuv 2	4,86 %	0,00 %	6,60 %	2,08 %	80,21 %	6,25 %
Evjen 6	0,25 %	0,00 %	9,34 %	85,86 %	1,26 %	3,28 %
Evjen 3	0,59 %	0,03 %	9,19 %	88,80 %	0,49 %	0,89 %
Skogveien	98,32 %	0,00 %	0,00 %	0,72 %	0,00 %	0,00 %
Åsgarden	81,46 %	0,00 %	6,67 %	7,86 %	2,37 %	1,64 %
Mohalsen I	81,05 %	0,67 %	3,89 %	4,46 %	9,62 %	0,31 %
Mohalsen II	14,37 %	0,00 %	57,48 %	26,98 %	1,17 %	0,00 %

Appendix E

Site statistics including reports and works sourced.

Site	Source	
Simavik	(Barlindhaug, 1996)	ts7983
Knausen	(Niemi and Oppvang, 2019)	
Svarvaren	(Barlindhaug, 1996)	ts 7982
Tønsnes a	(Skandfer et al., 2010, Gjerde and Skandfer, 2018)	
Tønsnes b	(Skandfer et al., 2010)	
Tønsnes c	(Skandfer et al., 2010)	
Bergli 1	(Grydeland and Arntzen, 2014)	
Bergli 2	(Grydeland and Arntzen, 2014)	
Sandvika	(Barlindhaug, 1996, Thuestad, 2005)	
Målsnes 1	(Thuestad, 2005, Blankholm, 2008)	
Stangnes syd a	(Nergaard and Oppvang, 2014)	
Stangnes syd b	(Nergaard and Oppvang, 2014)	
Stangnes syd c	(Nergaard and Oppvang, 2014)	
Fauskevåg 1	(Pers. com. A. Kvalheim, 2023) (Pers. com. I. Bruun, 2023)	
Årbogen 1	(Pers. com. S. Terkelsen, 2023)	
Solli	(Bruun and Oppvang, 2021, Bruun and Oppvang, 2022)(Pers. com, J. Oppvang, 2022)	
Ersvik 1	(Hauglid, 1993, Edvardsen, 2010)	
Skålbunes, Eidet	(Grydeland and Arntzen, 2008, Edvardsen, 2010)	
Tuv 2	(Hauglid, 1993)	
Evjen 6	(Hauglid, 1993)	
Evjen 3	(Hauglid, 1993)	
Skogveien	(Simonsen, 1996: 37-38), (Manninen et al., 2021), (Hauglid 1993)	
Åsgarden	(Bjerck, 1989, Edvardsen, 2010)	
Mohalsen I	(Spjelkavik, 2016)	
Mohalsen II	(Bjerck et al., 2016, Fretheim et al., 2017)	

Ts7983, ts7982 accessed through MUSIT-database, The Arctic University Museum.

See literature-list for complete source info.

Appendix F

Supporting information

Skogveien, Nordland County, (Simonsen, 1992)

The coordinates for Skogveien used in my maps are approximate and based off the drawings of Simonsen (1992). The site was never formally documented in the official database by the Directorate of cultural heritage "Askeladden" (Askeladden.ra.no).

Some sites did not encompass sufficient information to be included in this thesis. Some of these are:

Røsnes ytre, Finnes søndre, Lanes, Tønsnes A3100 (Datings not corresponding to EM or MM), Almenningen 1 (Components of lithics not found). Ørnfløya 1 (Dating's not corresponding to EM or MM).

I am not opposing that any of these are in fact not EM or MM sites, but I had to exclude some sites with no or deviant ^{14}C datings in order to create a representative data material for the region.

Information regarding the project 'Arkeologi langs Hålogalandsvegen'

70% of the lithics from the MM site 'Solli' was catalogued by the time I was gathering the material for this thesis. This composition is viewed as representative for its complete lithic compositions (Pers. com. J. Oppvang, 2022).

Some sites from the project were not catalogued by the time I was writing this thesis and were excluded. These include Årbogen 2 and Fauskevåg 2. When the ^{14}C samples are analysed, more sites from this project are likely to be dated to EM or MM.

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