Things and Patterns – from Pyramiden to Patagonia

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Marine Mammals in Rock Art and Fossils in Flint

Regional Expressions of Being-Sea-Stone Relationships on the West Coast of Norway in the Mesolithic

Astrid J. Nyland

ABSTRACT

In the centuries around 6,200 BC, several aspects of coastal living were challenging: the Tapes transgression, the 8.2 ka climatic cold anomaly, and the Storegga tsunami all represent hazards that coastal dwellers faced. The unpredictability of the sea must surely have influenced peoples' understanding of their world, and their ideas of societal safety and wellbeing, but also their ontological considerations. Because the impacts and trajectories of the sea's behaviour vary locally and regionally, different coastal histories and social contexts must have developed. In this paper, I discuss identified regional and temporal variations in the distribution of Mesolithic rock art and fossilised sea creatures found at sites along the western coast of Norway, from Rogaland in the south to Finmark in the north. Encountered in different states of being (alive, dead, and petrified in stone), fossils and carved images could have been well suited to explain and tell the story of relations, or indeed transformations, between beings, the sea, and stone. The identified patterns are interpreted as expressions of local and regional preferences and traditions in worlding stories and practices. Although the societies along the coast shared means of subsistence, modes of mobility, and lithic technological traditions, I interpret the regionally shifting 'microstyles' (cf. Jordan 2014) in expressions of being–sea–stone relations as a direct result of regional variation in histories of coastal encounters. Distribution patterns of other archaeological material along the coast also reinforce the impression of growing regionalization in the Late Mesolithic.

Introduction

In 1830–32, the Japanese artist Katsushika Hokusai made a woodblock print called 'Under the Wave off Kanagawa' [*Kanagawa oki nami ura*]. The image is also known as 'The Great Wave' and is a well-known motif that has been shared across the world on various items from bags to shoes (Fig.1). The image is often used as an image of the horrors of a tsunami, but the most important element in the picture is in fact Mount Fuji, one of Japan's holy mountains, and the print was part of the series 'Thirty-six Views of Mount Fuji' [*Fugaku sanjūrokkei*]. The image is a demonstration of the interrelated way the wild and ever-changing sea contrasts with the stoic and enduring nature of rock. It can also demonstrate how stories change depending on where you focus your attention – an interpretative premise for the argument in this paper. Another premise for this paper is the acknowledgement of storytelling as an essential capacity for risk reduction and disaster pre-

Figure 1. The 'iconic' image of the great wave, encountered in alternativ ways. Photo: A. J. Nyland

vention. Through the worlding practices in non-literary, mobile societies, like those in the Mesolithic, ideas of how the world works and memories of sometimes traumatic and harsh experiences are woven together and become part of building strong communities and maintaining social relations (e.g. Rahman et al. 2016).

The Mesolithic coastal communities on the west coast of Norway were dependent on the sea, living by and off its resources. But people were also anchored in stone, depending on certain rock sources or pebble beaches for raw materials to make tools that, as well as their pragmatic uses, expressed social relations and affinities (Olsen and Alsaker 1984, Bergsvik 2006, Nyland 2017, 2021). In this paper, I will discuss how the sea, stone and beings are ontologically linked. I base my discussion on the distribution of two types of archaeological material from the Mesolithic: fossilised sea creatures that are sometimes exposed when knapping flint, and rock art, more specific marine mammals carved in stone. I perceive these material remains to express a felt relationship between 'beings', the 'sea', and 'stone' (Table I). I here intentionally refer to 'beings' not 'humans', recognizing the potential for other worldviews where the boundary of what is considered "human" is different than our modern one. I also consider the sea and known geological sea-related events to be active actors that influence the stories that in turn affect practices. That is, in the millennia leading up to c. 6,000 BC, the sea level rise (i.e. the Tapes transgression) steadily encroached on the land. From around 6,200 BC, there was a noticeable climatic deterioration lasting for centuries, influencing storms and other weather patterns, and approximately at the same time, people had a run-in with a massive tsunami. As I will return to, these geological events and hazards related to the sea could have, over time, become geo-mythology (Vitaliano 1976, Vansina 1985), with the Storegga tsunami representing a 'crucial event' (Cavalli 2006). In the following, the carved marine mammals and fossilised sea creatures are perceived as intertwined parts of collective memories and elements used in worlding practices (Haraway 1992, 2016), enabling people to live (well?) with natural hazards like the unpredictable sea.

Table I. Outline of Mesolithic and Neolithic chronology used for Western Norway, and potential challenges posed by the sea.

Time Periods (Ab.)	Mesolithic chronozones (Bjerck 1986)	Chronology	Potential challenges(?) posed by the sea
Early Mesolithic (EM)	EM1, 9500-9000 BC EM2, 9000-8500 BC EM3, 8500-8000 BC	9200-8300 BC	Predominantly sinking sealevel
Middle Mesolithic (MM)	MM1, 8000-7500 BC MM2, 7500-7000 BC MM3, 7000-6500 BC	8300-6300 BC	Ongoing Tapes transgression
Late Mesolithic (LM)	LM1,6500-6000 BC LM2,6000-5500 BC LM3,5500-5000 BC LM4,5000-4500 BC LM5,4500-4000 BC	6300-4000 BC	From c. 6200- BC 8.2 ka climatic cold event C. 6150 BC - the Storegga Tsunami C. 6000-5000 - Tapes maximum
Early Neolithic		4000-3300 BC	
Middle Neolithic		3300-2300 BC	
Late Neolithic		2300-1800 BC	

The sea – a fickle friend

The Mesolithic communities lived most of the year by and off the coast. The numerous recorded coastal sites hugging the shorelines show the strong marine orientation (Bjerck 2008, Bjerck et al. 2008, Nyland 2020b, Walker et al. 2023). People lived on islands, close to tidal currents, or in bays and headlands on the coast. As demonstrated by evidence in coastal caves and rock shelters, they collected limpets, periwinkles, or other resources on the beaches. At other sites, the material indicates people hunting seals, and fishing along the shorelines or in deeper water from boats (e.g. Bergsvik and Hufthammer 2009, Bjerck 2009,

2016, Åstveit and Tøssebro 2023). The sea was thus an omnipresent element and a rich provider of essential resources in the Mesolithic world. However, the sea was not a stable and predictable friend. In the centuries around 6,200 BC, several aspects of coastal living were especially challenging.

First, modelled sea level curves along the coast date the trajectories of the rising and falling sea. There is a long research history of estimating sea level changes along the west coast, which demonstrates that the speed and trajectory of the changes varied regionally (e.g. Fægri 1944, Prøsch-Danielsen 2006, Bjerck et al. 2008, Glørstad et al. 2020, Creel et al. 2022, Romundset 2022). By 6,200 BC, the Tapes transgression was almost at its peak. At the Middle to Late Mesolithic transition, the process had generally slowed down and the changes were only minor, and an individual may not have noticed it within his, her, or its lifetime. Nevertheless, if we assume that Middle and Late Mesolithic societies practiced storytelling as a worlding practice and as a strategy for knowledge transmission – as occurs in historically known hunter-gatherer based societies (e.g. Vansina 1985, McMillan and Hutchinson 2002, Nunn and Reid 2016, Budhwa 2021) – knowledge of the sea encroaching on land, or giving it back, would likely have been kept, and transmitted, over generations.

A second challenge for coastal living was a global climatic deterioration around the same time, the so-called 8.2 ka cold anomaly. This was caused by the North American ice lake Agassiz sudden draining into the Arctic Sea, cooling the large ocean currents in the North Atlantic. Northwestern Europe was affected through the Gulf Stream bringing less heat to our shores (Kleiven et al. 2008). Climate change is noticeable on a large scale, but it is normally slow, and rarely noticeable on a day-by-day basis. However, the sudden change in ocean temperature during the 8.2 ka event also affected the weather – something that is experienced every day. Although no dramatic temperature drop has been identified in Norway, the 8.2 ka cold anomaly still made winters longer and summers cooler (Bondevik et al. 2024). In the mountains, the glaciers advanced (Nesje and Dahl 1993), and along the coast, there was increased storminess (Clarke and Rendell 2009). This weather system lasted for centuries and had an impact along the coast (Bondevik et al. 2019). Both the Tapes transgression and the 8.2 ka event affected seashore life, making the sea a less predictable friend than, for example, stable stone sources and eternal mountains.

The third sea challenge was a dramatic geological event occurring at the start of the Late Mesolithic. Around 6,150 BC, a massive submarine landslide off the coast of Møre on the northwest coast triggered the Storegga tsunami, striking during what is considered the coldest phase of the 8.2 ka climatic cold anomaly (Bondevik et al. 2012). The severity of impact is evidenced by recurrent layers consisting of ripped up sand, turf, and gravel in lakes and bogs along the shores of Norway, Scotland, and Greenland (e.g. Bondevik et al. 1997, Bondevik et al. 2003, Bondevik et al. 2005, Bondevik et al. 2012, Dawson et al. 1990, Åstveit et al. 2016, Dawson et al. 2020, Romundset 2022). The heterogenous character of the documented widespread 'tsunami layers' demonstrates that the brutal force of the wave left large parts of the coastline in ruins. Based on studies of growth patterns of recovered stair-step moss (*Hylocomium splendens)* with intact chlorophyll in tsunami deposits, it seems the tsunami occurred in late fall, perhaps October–November (Rydgren and Bondevik 2015). Because of the colder and longer winters, mountain hunting seasons probably became shorter, resulting in people being back at the coast getting their winter camps prepared when the tsunami hit land. Although recent work with numeric simulation models has demonstrated that there were regional variations in the tsunami's environmental impacts (Walker et al. 2023, Sharrocks and Hill 2024), there is no question that the tsunami must have been catastrophic for parts of the coast. According to the models, the area east of the propagation centre, in other words the coast of Møre–Trøndelag, was hit the hardest, whereas Finnmark and Rogaland suffered less.

Combining knowledge of the fluctuating sea levels, hazards and risks caused by storms and climate change with the occurrence of a large-scale freak event like the Storegga tsunami, you have the foundations for developing a rich mythology where the sea would be a highly potent actor and element. My aim in this paper is to explore the expressions of such stories in *stone* – another omnipresent and active element in Mesolithic peoples' lives. As suggested with the image of 'The Great Wave', the story that emerges depends on which element is given attention. In the following my emphasis is on the use of stone, including objects and practices, that potentially expresses prehistoric ontological relations between beings and the sea.

Beings-sea-stone

That coastal communities anchored their social affinity to land and people through the use of stone, stone

sources and the distribution of stone axes, has long been recognized (Olsen and Alsaker 1984, Bergsvik 2005, Nyland 2016). From the Middle Mesolithic onwards, at least two axe quarries were established on the west coast. A greenstone quarry is located on the islet Hespriholmen, just west of the island of Bømlo in Sunnhordland, and a diabase quarry is located on a protruding headland called Stakalleneset[1] in the outer part of a fjord system north of Sunnfjord. People utilized both quarries from the mid-eighth millennium BC to the mid-third millennium (Olsen 1981, Alsaker 1987). The distribution of their distinct rock types used for adze production has supported the definition of two social territories (Olsen and Alsaker 1984, Bergsvik and Olsen 2003). The quarries at Hespriholmen, being on an islet, and especially one of the quarries (Quarry I) located at the foot of a rocky wall at Stakalleneset, were primarily accessible by boat and required calm waters to safely transport people and rock across the sounds. Although a practical and necessary raw material for tool production, the use of stone from particular sources and the continuous engagement with specific rock sources indicate their significance went beyond pragmatic utilization (e.g. Nyland 2020a, 2020b, 2021). The continuous, enduring, and at times intense use of the rock quarries resulted in the most *monumental* structures known from the Norwegian Mesolithic. In this sense, perhaps one may speculate as to whether stone quarries took on a role similar to that of mount Fuji: as an eternal and stoic social or even mental anchor, contrasting with the unruly sea.

An equally enduring lithic procurement practice, but one which is the complete opposite in terms of its enduring visibility, is the collection of flint from beaches. In Norway, flint is normally called 'beach flint', as there are no known exploited deposits in Norwegian bedrock like those in southern Scandinavia and continental Europe. In the Mesolithic, the exploited flint had been carried by sea ice drifting from further south during the end of the last Ice Age. Accessing good flint pebbles thus requires active searching on beaches (Johansen 1969, Berg-Hansen 1999, Eigeland 2013). Lithic assemblages from both the Middle and Late Mesolithic demonstrate the use of varied rock types, yet collected beach flint of varying quality is still the dominant raw material (cf. Skjelstad 2003, Nyland and Damlien 2024). This is despite the practice of quarrying having already been established in the Middle Mesolithic. People knew how to quarry. They utilized fire, wedges, or hammerstones, enabling easy access to rock from the numerous veins and deposits of high-quality non-flint rock types (such as fine-grained mylonite, quartzites, quartz and rock crystals) that are scattered throughout the Norwegian coastal and montane landscapes (Nyland 2016). There is an insistent preference for flint, though, that seems to go beyond any pragmatic considerations, as flint was even brought into the mountains close to quarries (Nyland 2020a). Is one non-pragmatic explanation for this preference, the strong relationship between flint availability and the sea? Each storm would shift the beach deposits, potentially bringing buried pebbles to the surface. Hence, the stormy sea may have represented danger but was also 'the bringer of flint'. The flint pebbles' potential for containing petrified sea creatures – that is, fossils – emphasized flint's connection with the sea even further.

Petrified sea creatures in flint

A fossil is 'any sign of a past organism entombed in rock' (Rothery 1997:218–220), rapidly buried by muddy sediments in a low-energy environment. Fossils may be found in several rock types, including schist and sandstones, but in this paper, I am primarily referring to fossils in flint. One flint type in particular is specked with minute *bryozoa*, which are fossilised moss animals. This gives flint a freckled appearance, specked with often white/beige marks, which sometimes create flaws in the flint, but sometimes make beautiful patterns. My focus here, though, is on the embedded (more or less whole) recognizable fossils such as echinoids, molluscs, and crinoids, in other words sea creatures and plants that people in the Mesolithic could encounter as they were knapping, or imprints of them (Fig. 2).

I have compiled information about fossil finds from sites in regions along the Norwegian west coast from Rogaland to Finnmark (Table II). All finds are recorded in the databases of collections of archaeological finds (MUSIT) at the university museums of Stavanger, Bergen, Trondheim and Tromsø. Sites are shown in Table II, along with their finds, type, date, and what is known about their context. The site identification number from the national database Askeladden (where one exists) is also listed in the table, and hence information about the geographical location (but see also the map in Fig. 3). There is unfortunately very little information about the individual contexts for each find. Most were found together with other produc-

1 Stakalleneset is the name on the headland on modern maps, yet on older versions and texts one may find the name 'Stakaneset' or 'Stakaldeneset'. On the headland, the diabase dyke was quarried in several places (quarry I–X), but the most monumental ones are quarry I and III.

Figure 2. Examples of encountered fossils found at sites (number in brackets corresponds with Table II): From left: S13737.23 (9); S12542.3 (10); S5847 (17); T23525.141 (36); S5266.e (5). All photos: A.J. Nyland, except of T23525.141 which was taken by J. Kalseth, NTNU Vitenskapsmuseet

tion waste during archaeological excavations of settlement sites, many without cultural layers or particularly related structures. These sites are also normally mechanically excavated, meaning finds are discovered by sieving. Some of the fossils were found in material from test pits when surveying, and yet other fossils were part of assemblages collected over time by farmers on ploughed-out sites interpreted as 'settlements' due to their associated materials and topographical location. Only one fossil (S13224.42) has more contextual information, having been found in a pit with fire-cracked rocks.

Table II. All sites with fossils recorded in the national find databases of the university museums of Trondheim (Vitenskapsmuseet, NTNU), Bergen (Universitetsmuseet, UiB), and Stavanger (Arkeologisk museum, UiS). The numbers 1-36 correspond to mapped sites on Fig. 3.

ID	Askeladden Site ID	Mus. ID	Site/ Location/ Municipality	Type	No	Date	Comment
1	43989	S13693.21	Hovland, Eigersund, R	Bivalve mollusc	1	Early Neolithic?	Flint blade with fossil on dorsal side
2	221994	S13668.2	Bru, Hå, R	Bivalve mollusc	1	Late Mesolithic(?) (11 moh.)	Flint fragment with fossil imprint from sea urchin, stray find.
3	no site ID	S5266.e	Øvre Horpestad, Klepp, R	Echinoid	1	Early Neolithic?	Crested macro blade of flint with fossil
4	no site ID	S10674.23	Breivik-Hommershåkskogen, Hommershåk, Sandnes, R	Bivalve mollusc	1	Late Mesolithic?	Flint flake with fossil
5	157452	S13462.28	Tanangerveien, Sømme, Sola, R	Echinoid	1	Early Neolithic	Fossil imprint from sea urchin on flint fragment
		S13463.30		Bivalve mollusc	1		Not in flint
	157453	S13465.22	Tanangerveien, Sømme, Sola, R	Mollusc	2	Late Mesolithic-Early Neolithic?	Two pebbles with fossil imprint found close to each other (not flint), one bivalve mollusc, one snail shell(?)
6	225014	S13737.23	Lok 1. Ølbergveien, Sola, R	Echinoid	1	Late Mesolithic?	Sea urchin as part of beach pebble (flint)
7	155564	S13521.39	Ølberg, Sola, R	Crionid?	1	Late Mesolithic	Flint, fossil, look like ta fang, probabkly part of coral/plant?
8	114908	S12542.3/ ID203660	Tjora, Sola, R	Echinoid	1	Late Mesolithic-Early Neolithic	Macro flake of flint with embedded fossil sea urchin

ID	Askeladden Site ID	Mus. ID	Site/ Location/ Municipality	Type	No	Date	Comment
9	150777	S13224.42	Lok.10, Sømme, Sola, R	Echinoid	1	Late Mesolithic-Early Neolithic	Pin pit with fire cracked rocks (S32; Layer 3; (100-101x/500y).
10	150779	S14040.31	A3, Sola sentrum, Sola, R	Echinoid	1	Middle-Late Mesolithic	Fossil sea urchin
		S14040.44	A3, Sola sentrum, Sola, R	Bivalve mollusc	1		Piece of flint with fossil imprint
11	no site ID	S3744.ai	Kvernevik, Hålandsvannet, Stavanger, R	Echinoid	2	Late Mesolithic-Early Neolithic	One of the fossil sea urchins are still embedded in flint nodule
12	no site ID	S10301.br og bs	Austbø lok.4, Hundvåg, Stavanger, R	Echinoid	2	Early-Middle Mesolithic?	One secure sea urchin, one water rolled
13	180670	S13872.46	Site 3, layer 301. Vågshaug, Laupland, Bokn, R	Undefined	1	Late Mesolithic-Early Neolithic	Flake of flint with fossils
14	54541	S5847	Nedre Førland, Tysvær, R	Crinoid?	1	Late Mesolithic	Conical flint core with flowershaped fossil near platform
15	216308	S12176.ar	Hellevik 3a, Fosen, Karmøy, R	Echinoid	1	Early Mesolithic	Fossil imprint on flint core fragments, refitted to outline a sea Urchin
		S12176.ax				Early Mesolithic	Fossil imprint on flint fragment, part of refit that outline a sea Urchin
16	118523/ 118524	S12792.113	Helganes, Karmøy, R	Echinoid	1	Middle Neolithic	Sea urchin in midden context
17	237092	B18215	Toretangen, Hovland Midtre, Bømlo, V	Crinoid	1	Mesolithic?	Fossil sea lily in largest flake
18	115590	B16800.34	Askevatnet lok.4, Seterstølen, Askøy, V	Echinoid	1	Late Mesolithic	Sea urchin embedded in/ part of core
19	174695	B17881.54	Bildøy, Øygarden, V	Crinoid	1	Late Mesolithic/ Early-Middle Neolithic	Starshaped fossil in flake
		B17881.29		Crinoid	1	Late Mesolithic/ Early-Middle Neolithic	Fossil sea lily in flake
20	95741	B16020.8	Skorbreivik, Ålesund, M&R	Crinoid?	1	Early Neolithic	Imprint (looks like fishskin?) on flake
21	147364	B17281.32	Longva, Ålesund M&R	Crinoid?	1	Late Mesolithic/ Early-Middle Neolithic	Flake with impression (fossil?) in one end
22	97173	T22733.6081	Lok.29, Sporsem, Aukra, M&R	Echinoid	1	Middle-Late Mesolithic/Early Neolithic	Flake that is part fossil sea urchin
		T22733.9726		Crinoid	1		Flake with embedded fossil sea lily
		T22733.1536		Crinoid	1		Flake with embedded fossil (described as Cool)
		T22733.7364		Echinoid	1		Flake that is part fossil sea urchin
		T22733.801		Belemitt/ octopus?	1		Bipolar core fragment, part of belemitt? (fossil octopus?)
		T22733.9394		Echinoid	1		Flake that is part fossil sea urchin
		T22733.2863		Echinoid	1		Well preserved fossil sea urchin, even pins preserved

ID	Askeladden Site ID	Mus. ID	Site/ Location/ Municipality	Type	No	Date	Comment
23	97174	T22734.23532	Lok.30, Sporsem, Aukra, M&R	Crinoid	1	Late Mesolithic-Early Neolithic	Fossil of sea lily embedded in flake (described as Fine!)
		T22734.17532		Echinoid?	1		Large irregular core with embedded large fossil (disrupted further use?)
24	97176	T22752.5789	Lok.48, Eikrem, Aukra, M&R	Echinoid	1	Early Mesolithic	Core fragment with embedded sea urchin with three scars from flaking (can be refitted with .8186)
		T22752.8186		Echinoid	1		Flake that is part sea urchin (can be refitted with .5789).
25	223754	T22768.6022	Lok.68, Eikrem, Aukra, M&R	Echinoid	1	Late Mesolithic	Bipolar core fragment with impression of fossil sea urchin
26	98430	T28563.356	Blautvika, Eikrem, Aukra, M&R	Bivalve mollusc?	1	Stone Age	Flake with fossil imprint on one side
27	271876	T28730.82	Lok.3, Rakvåg, Molde, M&R	Bivalve mollusc	1	Middle-Late Mesolithic	Bipolar core where a part is fossil mollusc
28	no site ID	T17756.d	Lyngbø, Midsund indre, Molde, M&R	Echinoid	1	Early Mesolithic	Large fragment with embedded sea urchin
29	92322	T23435.236	Lok.1, Hestvik, Averøy, M&R	Crinoid?	1	(Early and Late) Mesolithic	Bipolar core fragment with embedded fossil plant? (described as Adorable)
30	99827	T23525.141	Lok.24, Kvernberget, Skaret/Omsund, Kristiansund, M&R	Echinoid	1	Early Mesolithic	Large fossil of sea urchin embedded centrally in flake adze, resigned thinning due to the discovery of the fossil (sea urchin?)
31	104300	T21137.20	Lok.15/omr.25, Grisvågøy, Aure, M&R	Echinoid	1	Early Mesolithic	Flake with part of fossil sea urchin
32	130358	T21626.1164	Kalvheiane 2a og b, Tjeldbergodden,	Crinoid	11	Early Mesolithic	Fossil of sea lily embedded in flake (described as Fine!)
		T21626.9177	Buhaug ytre/ Sagmestervik, Aure, M&R	Undefined			Core with embedded fossil in coretex (not found)
		T21626.187		Crinoid?			Flake with embedded fossil (described as Fine!)
		T21626.7295		Crinoid?			Large flake with embedded fossil (described as Fine and 'very special') Intricate circular patterns
		T21626.2480		Echinoid			Flake with part of embedded sea urchin
		T21626.3867		Crinoid?			Flake with embedded fossil
		T21626.4644		Crinoid			Flake with embedded fossil of sea lily (described as Fine)
		T21626.3025		Bivalve mollusc?			Flake with embedded fossil (described as Fine)
		T21626.1095		Bivalve mollusc			Flake with embedded fossil in coretex
		T21626.9872		Crinoid?			Flake with embedded fossil (described as Fine) in coretex
		T21626.2285		Echinoid			1/4th of sea urchin is missing
33	no site ID	T15264	Melkestad, Andersskog, Hitra, T	Echinoid	1	Mesolithic? C. 20 moh.?	Whole fossil of sea urchin

ID	Askeladden Site ID	Mus. ID	Site/ Location/ Municipality	Type	No	Date	Comment
34	105257	T22360.3	Lok.256, Meland, Hitra, T	Echinoid	1	Mesolithic? 20-25 moh.	Whole fossil
35	115503	T26085.3	Olsvika, Hitra, T	Echinoid	1	Mesolithic? 30-40 moh.	Flake that for the most part is a fossil sea urchin
36	108772	T26236.674	Vikansvingen, Honnes (Vikan & Balevåg), Hitra, T	Bivalve mollusc	1	Late Mesolithic	Five fragment of core that together makes one core with embedded bivalve mollusc (not imprint, but fossil itself)
		T26237.903	Vikansvingen, Honnes (Vikan & Balevåg), Hitra, T	Echinoid	1	Early-Middle Mesolithic	Whole fossil of sea urchin
37	88470	T27682.1528	Hitra helsetun, Vikan, Hitra, T	Bivalve mollusc	1	Middle-Late Mesolithic	Whole fossil

The relative low number of collected fossils may be due to them not being collected by diggers. However, their aura of 'being special' is also what would have secured them a spot in the diggers' find bags and museum storage.[2] There are concerns regarding whether the number of finds collected and recorded is representative, yet the distribution study still shows some remarkable regional clusters and temporal variations (Table III, Fig. 3). There are, for example, no finds of fossils in the region of Sogn og Fjordane, and none north of the island of Hitra located at the mouth of Trondheimsfjorden, Central Norway (Table II). There are also more fossils at Early to Middle Mesolithic sites in the Møre–Trøndelag region than at sites in the Rogaland–South Hordaland region.

Table III. Varied temporal and regional distribution of fossil finds, and comments on context.

TYPE	EM	EM-MM	MM	MM-LM	LM	LM-EN	EN-MN	undefined Meso	sum
Rogaland-South Hordaland	1	2		2	6	9	5	2	27
Sogn og Fjordane	0	0	0	0	0	0	0	0	0
Møre-Sør-Trøndelag	16	1		9	2	4	1	5	38
Northern Norway	0	0	0	0	0	0	0	0	0
SUM	17	3		11	8	13	6	7	65

The number of finds is low throughout, as this was by no means a common artefact. If taken at face value, the compilation of finds demonstrates that there are temporal and geographical variations in the distribution of fossils. For one, the clusters in the regions of Rogaland and Møre–Trøndelag are apparent compared to the conspicuous lack of preserved fossils on sites in Sogn og Fjordane, which is part of Vestland County. There seems to be an increase in keeping fossils or indeed the recognition of beings revealed in stone by groups living in the southern part of the coast in the Late Mesolithic, whereas this practice dominates in the Møre–Trøndelag region in the first half of the Mesolithic.

That the fossils are predominantly from mundane contexts, having been found together with production waste on settlement sites (Table II), does not disqualify the artefacts from having ontological signi-

2 In the museum databases, archaeologists have been less inclined to identify the type of fossil than to describe their impression of the finds as 'great', 'fine', 'adorable', or 'special'. This stands in contrast to how all lithic tools and production waste are meticulously measured and 'objectively' characterised. It also speaks volumes as to how differently these finds may have been, and still are, perceived from mundane tools.

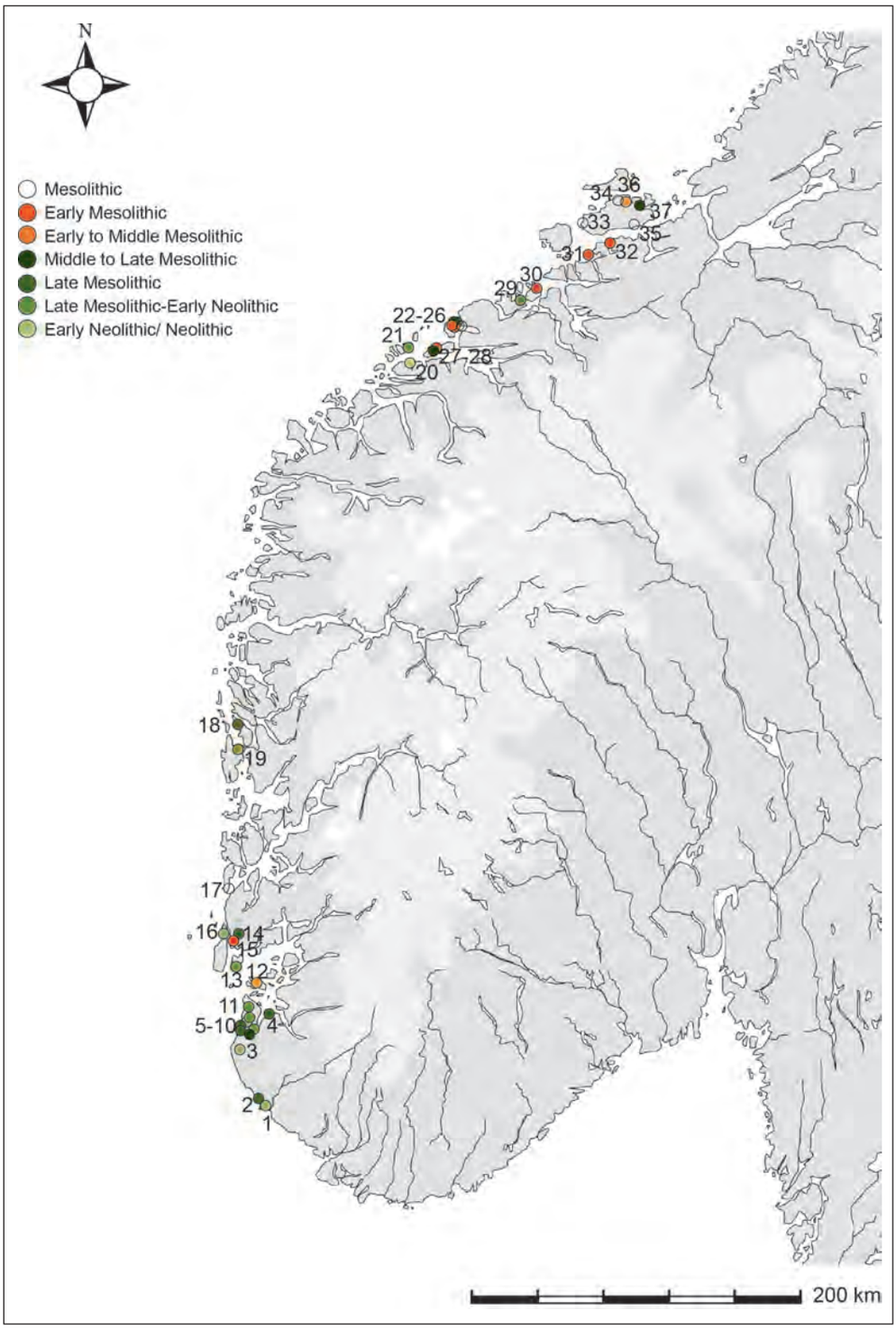

Figure 3. Mapped sites with fossils along the Norwegian coast. Areas shaded orange are the Early and Early to Middle Mesolithic sites, while areas shaded green are sites dated to the Middle to Late Mesolithic and Neolithic. Blank circles are sites where finds are dated to the Mesolithic in general only (more details in Table II)

ficance. Contexts are of course indicative of certain practices, but there are also mundane contexts which demonstrate that exceptional contexts are not necessarily required for a deposit to be 'extraordinary'. For example, axes have been deposited on 'non-ritual' settlement sites (e.g. three axes in different stages of production deposited together; cf. Lindell et al. 2018), and at sites where preservation has been good, human remains have been found in midden contexts (e.g. Meling et al 2020). Hence, certain practices or finds may be easier to explain if imagined as being part of practices within different ontologies. Returning to the fossils, just by disrupting a straightforward knapping process for tool production, the fossils' agency was

awoken. The petrified creatures demanded attention. In a community intimately connected with the sea and shoreline, I think we can assume that fossilised sea urchins must have been recognized as another version of the spikey creatures living in the sea. Even if they were just perceived as decorative elements, like the sea lily centered on the platform of the conical microblade core in S5847 (Fig. 2), the fossils were engaged with. Several of the collected finds are complete fossils (like S14040.31 or T22360.3, Table II). They may have been amulets, toys or figurines. Some are still embedded in flint, like the one inside the Early Mesolithic flake axe (T23525.141, Table II). Indeed, in some nodules, it seems the knapping process stopped when a fossil was encountered. The fossil was left in the artefact, like in the flake axe (T23525.141). Similar sentiments and engagement with fossils have been discussed from the Palaeolithic (Conneller 2011, 2013) to the Bronze Age (Brück and Jones 2018). I will return to a discussion about their potential social or ontological significance soon, but whereas fossilized sea creatures residing in rock were revealed as pebbles collected at beaches were knapped, a different action connecting beings, sea, and stone is the rock art tradition.[3]

Regionality in rock art traditions

Rock art sites have previously been hard to incorporate into cultural-historical contexts, especially due to their relative and often imprecise dating. Their connection to the sea is, however, unquestionable. Most sites are near ancient seashores, and some are so close to the shore that there are signs of wave action having faded or even covered some of the images with beach sediments (Bakka and Gaustad 1975, Sognnes 1981, Gjerde, 2010). Although debated, researchers generally agree that one may date rock art relatively based on style or by relating rock panels to their height above ancient shorelines (e.g. Bakka 1979, Hesjedal 1994, 2003, Sognnes 2003, Kleiva 2006, Gjerde 2010, 2024). Together with results from more recent excavations (Lødøen 2003, 2010, 2013, 2014), a relative chronology for the different types of rock art has been established. Compiling dated sites and looking at their distribution (Table IV, Fig. 4), working both terrestrial and marine beings into stone was clearly a long-lived and widespread practice or tradition for anchoring them. Nevertheless, there were evidently also regional differences and stylistic changes over time.

Table IV. All polished, cut and carved rock art sites from the Mesolithic and Neolithic considered to be part of the hunter-gatherer tradition (sometimes called Arctic tradition). The numbers correspond to sites mapped in Fig. 4. (* Computer program for calculating sea level displacement curves, developed by Øystein S. Lohne (SeaCurve_v1 – Theoretical calculation of sea level displacement curve in Hordaland from UTM-coordinates. MS Excel spreadsheet) (see also Simpson 2009))

NO	Askeladden ID.no	Site name	No. of figures	Identified Motifs	Carved (C)/ Polished (P)	Time period	Uncal. BP/ BC	Reference:
1	8631, 18427, 28486, 57415, 57750, 68067, 28484, 48028	Hjemmeluft Phase I-V, F	Ca. 2500	Sea mammals, fish, game (reindeer, elk, bear), boats, humans, geometrical patterns and more.	C	LM3-EIA	5200-2000 BC	Gjerde 2024
2	8633	Storsteinen (Phase I-III), Alta, F	Ca. 700	Whale, fish, game (reindeer, elk, bear), boats, humans, geometrical figures	C	LM3-LN	5200-2000 BC	Gjerde 2010; 2024
3	8163	Kåfjord Phase I-II, Alta, F	Ca. 1600	Sea mammals, fish, game (reindeer, elk, bear), boats, humans, geometrical patterns	C	LM3-MN	5200-3000 BC	Gjerde 2010, 2024

3 In this paper I am not including painted images on rock, as the point of working images into rock is the focus of this paper.

NO	Askelad-den ID.no	Site name	No. of figures	Identified Motifs	Carved (C)/ Polished (P)	Time period	Uncal. BP/ BC	Reference:
4	38000	Amtmannsnes, Phase III, F	Ca. 430	Game (reindeer), human, whale, geometrical patterns	C	MN-LN	3000-2000 BC	Gjerde 2024; https://altarockart.no/map
5	289874/ 291027/ 294182	Doarrás 1-3, Alta, F	11	Game (reindeer)	C	LM5-MN	4000-2600 BC	Gjerde og Tansem 2023
6	68064	Isnestoften 2 in Alta, F	Ca. 20(?)	Game (bear, reindeer), boats, human, undefined patterns	C	EN-MN-LN	4000-2000 BC	Gjerde og Tansem 2023; https://altarockart.no/map
7	101682	Slettnes 1-4, Hammerfest, F	57	Game (reindeer, bear, elk, hare), humans, sea mammals (whale), boats, humans, feet, bird	C	LM3	5400 BC	Hesjedal et al. 1993; Gjerde 2010
8	18987	Lillestraumen, Kvænangsbotn, T	2	Game (bear)	C	-	Neolithic?	Gjerde 2010; Mandt og Lødøen 2005
9	9065	Kirkely, Ballangen, T	c.40	Boats, sea mammals (whales), game (type deer)	C	LM3-LM5	5500-4200 BC	Gjerde 2010; 2017
10	28894/ 77110	Tennes I & II, Bukkhammaren, Gråbergan, Ballangen, T	c. 25	Game (elk), Humans	C	Neo?	Neolithic-Bronze Age?	Hesjedal 1990; Gjerde 2010: Mandt og Lødøen 2005
11	9066	Åsli, Ballangen, T	c.15	Game (elk, reindeer), sea mammals (whale), boat	C	-	Neolithic?	Hesjedal 1990; Mandt og Lødøen 2005
12	37663	Skavberg 1-2, Kvaløya, T	c.30	Game (reindeer, bear), sea mammals (seal, whale), artefacts?	C	MM-LM	8500-5400 BP	Gjerde 2017; Mandt og Lødøen 2005: Hesjedal 1990
13	27189	Vik 1, Ibestad, Rolla, T	6	Game (elk), geometric pattern, boat?	C	LM5	4330-4240 BC	Gjerde 2010; Hesjedal 1990; Mandt og Lødøen 2005
14	47016, 67268	Sletjord 1- 3, Herjangen I-II, Narvik, T	c. 100	Game (elk, reindeer), sea mammal (whale), humans? Water bird, geometric pattern?	C	LM4, LM5-EN,	5485-5470 BC, c.4000 BC, c. 3500 BC	Gjerde 2010
15	56314	Brennholtet, Narvik, T	1	Game (elk)	C	LM5-EN	4040-3970 BC	Gjerde 2010
16	36946	Forså/ Forselv, Narvik, Ofoten, T	>100	Game (reindeer, bear), fish (halibut), boats, sea mammals, geometric patterns	C	LM 4-5	4700-4600 BC	Gjerde 2010; 2017

NO	Askelad-den ID.no	Site name	No. of figures	Identified Motifs	Carved (C)/ Polished (P)	Time period	Uncal. BP/ BC	Reference:
17	18968, 101279, 101282, 8828	Nes (incl. Jo Sarsaklubben, Fort øst & Vest; Fjellvika), Tjellsundet, Ofoten, N	8	Game (reindeer, elk, bear), sea mammal, fish?	P	EM1-2	9370-8630 BC	Gjerde 2010; Hesjedal 1990
18	63396, 16940, 246943, 246945	Valle (1-4), Narvik, Ofoten, N	7-8	Game (reindeer, bear), sea mammals (whale/ seal), boat	P	EM-MM1	9200BC-7600BC	Gjerde 2010; Gjerde 2021
19	16929	Leiknes 1, Ofoten, N	c. 35	Game (reindeer, elk, bear, hare), sea mammals (whale), water birds	P	EM-MM2	8300-6830 BC	Gjerde 2010
20	60099	Leiknes 2, Ofoten, N	4	Water birds	P	MM3	7050-6830 BC	Gjerde 2010
21	27030	Sagelva, Hamarøy, Ofoten, N	2	Game (reindeer)	P	MM2	7310-7080 BC	Gjerde 2010
22	48649	Vågan, Bodø, N	1	Game (elk)	P	MM2	7500-7400 BC	Hesjedal 1990
23	36915	Fykanvatn 1-2, Glomfjorden, N	28	Game (elk/reindeer, bear), fish (halibut)	P	EM	9000-8700 BC	Hesjedal 1990, 1992; Gjerde 2010
24	17167	Klubba, Åmøy, N	20	Game (elk/reindeer, bear), sea mammals (whale)	P	EM2-MM1	8600-7600 BC	Gjerde 2010
25	36158	Vistnesdalen, Vevelstad, Nordland	23	Game, fish (halibut), geometric patterns, human, artefacts (sinkers)	C	-	-	Hesjedal 1990: Askeladden
26	23756	Reppa, Salsneset, Namdalen, Tr	9	Game (elk), sea mammals (whale), Fish	C	LM5	4500 BC	Sognnes 1981
27	101920	Horjem 1-2, Snåsa, Tr	c.11	Water birds	C	-	-	Askeladden
28	45129	Strand/ Høvikskaret, c.30 moh., Osen, Tr	8	Sea mammal (whale), geometric figure	C	-	LM5?	Gjessing 1936; Gjerde 2010; Askeladden
29	97696, 97697, 103998	Bøla, Strinde og Bøle almenning, N-Tr	5	Game (reindeer, elk, bear)	C	LM5-EN	4000 BC	Sognnes 2003: 198
30	73347	Bardal (oldest), Steinkjer, N-Tr	70+	Game (elk), geometrical patterns	C	LM1-LM3	7600-6300 uncl BP	Sognnes 2003: 197
31	7122	Hammer V, VII, X + Hammer XIII, XIV, XV, Steinkjer, N-Tr	13+	Whale, water birds, boats	C	LM5 and EN	4300-3400 BC	Sognnes 2003; Gjerde 2017
32	97793	Helge med By, Steinkjer, Tr	c.10	Geometric figures	C	LM5-EN	4000 BC	Askeladden

NO	Askelad-den ID.no	Site name	No. of figures	Identified Motifs	Carved (C)/ Polished (P)	Time period	Uncal. BP/ BC	Reference:
33	107123	Skjevik I, Buavika 30 moh. Beitstad, Steinkjer, Tr	3	Sea mammals (whale)	C	LM4-5?	4500 BC?	Askeladden (site covered by Tapes)
34	55713	Kvennavika, Selset I/ Kvernvika 1, Innerøy, N-Tr	14	Fish (halibut)	C	EN-MN	3000 BC	Sognnes 2003; Askeladden
35	63778	Evenhus, Frosta, N-Tr	30+	Game (elk), sea mammal (whales), boats, human figures, ring and cup marks	C	LN	2100 BC	Sognnes 2003; Gjerde 2017
36	101976	Stykket, Rissa, S-Tr	6	Game (elk, hare(?))	C	EN	3500 BC	Sognnes 1981; Askeladden
37	37071	Hell, Stjørdal, N-Tr	11	Game (reindeer), geometrical pattern	C	EN	3800 BC	Sognnes 2003
38	102138	Lånke, Stjørdal, N-Tr	12?	Game (elk, beaver), Sea mammal (whale), water birds, human	C	EN-	4000- BC	Sognnes 2003
39	64203, 212032	Hommelvik I-II, Smedberget, 29-31 moh. Malvik, N-Tr	17	Game (deer) boats, birds, fish (halibut), geometric figure	C	LM5-EN?	4500-3500 BC?	Stuedal og Henriksen 2016; Sognnes 2003
40	103245	Søbstad, Averøy, M-T	12	Sea mammals (whales), geometrical pattern, circular figure	C	EN	5000-3000 BC	Ramstad 2000; Kleiva 2006
41	103244	Røsand, Averøy, M-T	17	Game (elk/ deer), sea mammals (whale), geometrical patterns	C	LM4/ LM5	5000-3000 BC	Ramstad 2000; Kleiva 2006
42	73063	Bogge 1 and 2, Nesset, M-T	App. 50	Elk/ deer, sea mammals (whale)	C	LM5-MN	4500-3500 BC	Kleiva 2006
43	67092	Bjørset, Molde, M-T	2-3	Sea mammals (whales), geometrical patterns, cup marks	C	LM5-EN	4500-3000 BC?	Kleiva 2006
44	99539	Reitaneset, Midsund, M-T	2	Fish/ seabird/ geometrical pattern	C	LM4-EN	5000-3000 BC?	Kleiva 2006
45	87369	Vingen, Bremanger, S&F	2000+	Game (deer), human figures, hook figures, sea mammal, geometrical patterns	C	LM4-LM5	5000-4200 BC	Lødøen 2010
46	72892	Brandsøy, Flora, S&F	6-7	Game (deer)	C	LM3	5500-5000 BC?	Nyland 2002
47	25845	Ausevik, Flora, S&F	364+	Game (deer), human figures, geometrical pattern	C	LM3	5500-5000 BC	Lødøen 2014

NO	Askeladden ID.no	Site name	No. of figures	Identified Motifs	Carved (C)/ Polished (P)	Time period	Uncal. BP/ BC	Reference:
48	97498	Rykkje, Kvam, H	1	Game (deer)	C	LM3/ LM4	5500-4500 BC	Sea level program*
49	97522	Vangdal, Kvam, H	7	Game (deer), human figure	C	LM3/ LM4	5500-4500 BC	Sea level program*
50	34943-1	Meling, Åmøy I, R	4	Fish (halibut)	C	Meso/ Neo/ BA	4-5 m.a.s.l.	Høgestøl et al. 1999
51	No ID	Ølberg, Sola, R	1	Deer	C	LM	6000-4000 BC	S9783

First, there is only one geographical region with polished carvings, all made during the Early and Middle Mesolithic (Hesjedal 1994, Gjerde 2010, 2017). There are not many sites, nor many images polished at each site, but all of them are found in the region of Ofoten, which is the area cutting across the administrative border between the counties of Nordland and Troms (Fig. 4). Figures include large images of game (elk, reindeer, and bears), marine mammals (whales/ porpoises), fish (halibut), waterbirds (swans) and even a boat. This tradition of polishing figures into the rock apparently did not spread to neighbouring regions.

The next wave of rock art seems to start during the Late Mesolithic (Sognnes 1981, 1999, 2003, Ramstad 2000, Kleiva 2006, Gjerde 2010, 2017, 2024, Lødøen 2013, 2014) (Table V).[4]

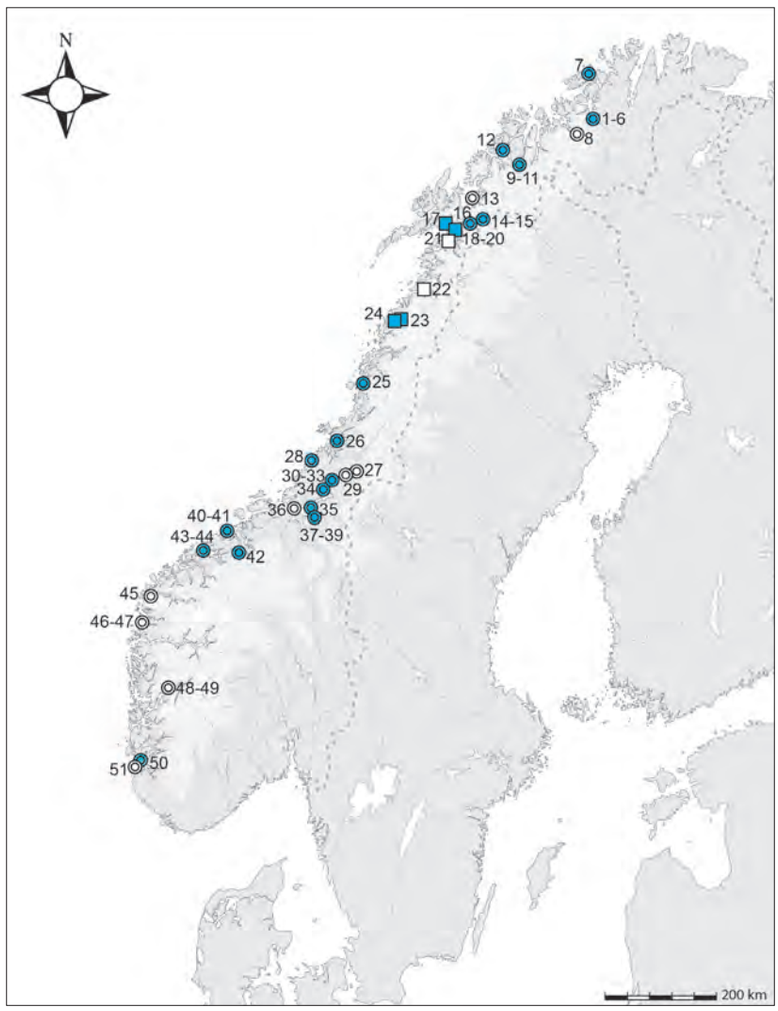

Figure 4. Mapped sites of polished and carved Mesolithic-Neolithic rock art. Squares mark polished figures, circles mark carved sites. If blue, there are figures showing marine mammals or fish.

4 Although there are some suggested dates stretching back to the start of the Late Mesolithic, Table V reflects that most sites should perhaps be considered as having been created from the LM3 onwards.

Table V. Overview of sites and suggested dates (references for each site in Table IV). Blue marks polished sites, green marks the carved ones.

	Periods	EM			MM			LM					NEO	
	Chronozones	1	2	3	1	2	3	1	2	3	4	5	EN	MN-LN-BA
NO	Site name	9500-9000	9000-8500	8500-8000	8000-7500	7500-7000	7000-6500	6500-6000	6000-5500	5500-5000	5000-4500	4500-4000	4000-3300	3300-1800
1	Hjemmeluft Phase I-V,													
2	Storsteinen (Phase I-III), Alta													
3	Kåfjord Phase I-II, Alta													
4	Amtmannsnes, Phase III, Alta													
5	Doarrás 1-3, Alta													
6	Isnestoften 2 in Alta													
7	Slettnes 1-4, Hammerfest													
8	Lillestraumen, Kvænangsbotn													
9	Kirkely, Ballangen													
10	Tennes I-II, Ballangen													
11	Åsli, Ballangen													
12	Skavberg 1-2, Kvaløya													
13	Vik 1, Ibestad, Rolla													
14	Sletjord 1- 3, Herjangen I-II, Narvik													
15	Brennholtet, Narvik													
16	Forså/ Forselv, Narvik													
17	Nes, Tjellsundet													
18	Valle (1-4), Narvik													
19	Leiknes 1, Ofoten													
20	Leiknes 2, Ofoten													
21	Sagelva, Hamarøy													
22	Vågan, Bodø													
23	Fykanvatn 1-2, Glomfjorden													
24	Klubba, Åmøy													
25	Vistnesdalen, Vevelstad													
26	Reppa, Salsneset, Namdalen													
27	Horjem 1-2, Snåsa													
28	Strand/ Høvikskaret, Osen													

	Periods	EM			MM			LM					NEO	
	Chronozones	1	2	3	1	2	3	1	2	3	4	5	EN	MN-LN-BA
NO	Site name	9500-9000	9000-8500	8500-8000	8000-7500	7500-7000	7000-6500	6500-6000	6000-5500	5500-5000	5000-4500	4500-4000	4000-3300	3300-1800
29	Bøla, Strinde og Bøle almenning													
30	Bardal (1st phase), Steinkjer													
31	Hammer V, VII, X, XIII, XIV, XV, Steinkjer													
32	Helge med By, Steinkjer													
33	Skjevik I, Buavika, Beitstad, Steinkjer													
34	Kvennavika, Innerøy													
35	Evenhus, Frosta													
36	Stykket, Rissa													
37	Hell, Stjørdal													
38	Lånke, Stjørdal													
39	Hommelvik I-II, Smedberget, Malvik													
40	Søbstad, Averøy													
41	Røsand, Averøy													
42	Bogge 1 and 2, Nesset													
43	Bjørset, Molde													
44	Reitaneset, Midsund													
45	Vingen, Bremanger													
46	Brandsøy, «Neset», Flora													
47	Ausevik, Flora													
48	Rykkje, Kvam													
49	Vangdal, Kvam													
50	Åmøy, Rogaland													

The practice and tradition apparently spread along the coast and intensified in some regions. In this phase, a new technique was utilized: the figures were carved by pecking or cutting into the panels. The practice of carving game (elk, reindeer, deer, and bears) is found in all regions, but images of marine mammals and fish are lacking from the geographical regions of Sogn og Fjordane and Hordaland (Vestland County). In Rogaland there is one site with images of halibut (site 50), but it is still debated whether this site is connected to the Mesolithic/Neolithic tradition, or the Bronze Age. The halibut figure is located 4–5 m. asl and covered by many small carvings of boats dated to the Bronze Age (Høgestøl et al. 1999:24). There is a carved image of a deer on a loose stone (S9783) at Ølberg, Sola (site 51), but contextual information is lacking. However, its existence vouches for there being a tradition of carving images into rock in Rogaland prior to the Bronze Age too. The conspicuous lack of carved marine mammals or fish in Vestland County is therefore probably not a question of representativeness. On the contrary, the number of figures at Vingen (site 45) in Sogn and

Fjordane, more than 2,000, is exceeded only by Hjemmeluft (site 1) in Alta, Finnmark (sites 1–5). Instead, it can be argued that there is a conscious variation in the choice of motifs, indicating local preferences, social conventions, or traditions as to how to express knowledge about the world, mythology, and stories.

A relational world of beings, stone, and stories about the sea

Although there are numerous *figures*, there are relatively few rock art *sites* in Vestland and Rogaland County compared with the Møre–Trøndelag region, where several small and medium-sized sites are scattered across the land and fjords. This is also true for the area from Lofoten to Alta. Alta is the largest known rock art site in Norway. Although the size and numbers of figures vary, in Central and Northern Norway, the tradition of carving figures into panels is maintained well into the Late Neolithic. In Rogaland and Vestland, it seems to decrease in the Early Neolithic before recovering at the Late Neolithic to Bronze Age transition. In the Late Neolithic–Bronze Age tradition, the choice of motifs indicates a radical ontological change in peoples' lives and connections, yet the boat figures indicate that a connection to the sea and the practice of anchoring stories in rock both endure.

During the Mesolithic, similarities in lithic technology and artefact types signal a widespread network of communication and shared traditions on the coast of especially Western and Central Norway (Bjerck 2008). Nevertheless, the abovementioned quarrying of greenstone at Hespriholmen and diabase at Stakallenes et, and subsequent regional adze distribution, have also long supported theories that the west coast was separated into two major Mesolithic social territories (Olsen and Alsaker 1984, Bergsvik and Olsen 2003, Bergsvik 2005, Bjerck 2008). Furthermore, although cross-regional patterns exist, evidence of shifting local traditions, or microstyle variations (cf. Jordan 2014), within and between these territories are also observed. There are, for example, variations in the use of specific raw materials (e.g. jasper, mylonites and quartzites) and particular artefact types like soapstone line sinkers and sandstone knives (Bergsvik 2002, 2006, Nyland 2016, Skjelstad 2003, 2011). Results from a recent technological study of core types and microblade production from sites located from Rogaland to Nordmøre and dated between 7,500 and 5,000 BC also suggest growing variation in the occurrence of production concepts between regions (Damlien et al. 2024, Nyland and Damlien 2024). Within the 'Early and Late Microblade tradition' that characterises the period's general technological developments (cf. Bjerck 2008), five production concepts were distinguished (Damlien et al. 2024). For instance, by 5,000 BC, regionally or locally distinct patterns of use of particular raw materials and production concepts had been established in Central Norway, which were somewhat different to those in Rogaland. For example, modifications to core preparation and use imply a new form of 'economic' bipolar core concept becoming dominant, especially north of Stadt, while in Rogaland, a 'pebble core concept' developed (Damlien et al. 2024).

The identified variations in deliberate engagement with beings in stone, including the distribution of both fossils and carved images, split the long coast into demarcated areas or communities of similar practices. Overall, all the discussed patterns of variation signal local or regional communities keeping to the mundane and ritual conventions of their area, and expressing local knowledge, perceived relations and stories in multiple ways. Whether fossils were revealed and then kept as flint was knapped, or marine mammals were deliberately polished and carved into the rock, there seem to be specific traditions among demarcated social groups who adhere to their local coastal histories.

As rock art images are always more than their identified form, and more than representations of any meaning given by the carved figures – then and now – they are and were always 'in-the-making' (Danielsson and Jones, 2020:2–3): the composition and choice of figures matter. Each rock art panel is an assemblage, a knot in a web pulling together the maker, the making, and the observer or user experiencing the rock art. That is, its meaning depends on the cultural-historically or socio-politically situated person(s) making or engaging with images or panels, as well as on the agency of elements such as light and weather (Nyland and Stebergløkken 2021). When the ephemeral character of rock art's meanings is emphasised, the intention and meaning of any figure becomes as relative and dynamic as its visibility, with the original meaning always being outside our grasp. This flexibility does not, however, make rock art less valuable to cultural-historical interpretations. On the contrary, identified regional variations in figures or the intensity of practice, such as the varying numbers of sites or images on panels, show that practices of making rock art can express group identity. No choice is random, as choices are always taken by specific community members and are related to the group's ideas or stories about the world and its workings, and of shared relations.

A pragmatic reason for the lack of fossil finds in the regions of Sogn og Fjordane, Nordland, Troms and Finnmark may perhaps be rooted in differences in the availability of raw materials in these regions. Having performed a broad-spectrum analysis on several types of raw material and tool types found at Middle and Late Mesolithic sites along the west coast, Guro Skjelstad (2003:119) demonstrated that much of the variation seems to have been caused by geological availability as opposed to conscious strategies. There is indeed a much lower percentage of flint used at these sites, especially in the Mesolithic. Instead, local sources of quartz, quartzite and mylonites, which are rock types that do not contain fossils in the same way as flint, are more prevalent. Availability of rock will affect lithic procurement practices (Damlien et al. 2024) and identified variation in the intensity of use of certain stone deposits confirms that some sources of stone were significant beyond their practical use (Nyland 2020a). There is thus a deep connection between rock art and rock procurement, which has also earlier been linked to cosmological, ritual, and even mortuary practices (cf. Lødøen 2012, Nyland 2016).

The fact that there is less flint in certain areas does not make the pattern any less conspicuous. Fossils may have been considered special if they were infrequently found: being rare could even have increased their value. On the other hand, rarity may also have caused the fossils to be discarded, thrown away or hidden – in other words, consciously *not* saved or kept. The distribution patterns identified for both fossils and rock art indicate that the fossils were apparently engaged with, in some regions more than others, but not necessarily during the same time periods. For example, compared to Møre, Rogaland has more finds at the end of the Late Mesolithic and into the Neolithic. The conspicuously preserved sea lily on the core platform of S5847 (Fig. 2) shows a clear recognition of, and conscious engagement with, fossils in Rogaland. Whereas in Møre, the many finds at Early Mesolithic sites gradually decline[5] into the Late Mesolithic (Table III). At the head of Trondheimsfjorden, where there are many rock art sites featuring marine mammals, there is a curious lack of fossils in both periods.

Based on the distribution of fossils and carved marine mammals, both seem to be of interest to the people living in the Mesolithic. The varying frequency of fossil finds and rock art distribution demonstrates that even if there are general similarities in ways of life,

Figure 5. A sea urchin in different states of being. Photos (from top): H. Hammarstedt, L. Hauge, A. J. Nyland

5 Based on recent research of variations in Mesolithic site distribution on the coast of Møre and Trøndelag, related to the Storegga tsunami, and the fact that this region was heavily impacted by the tsunami, there are strong reasons to believe that many Middle Mesolithic sites are missing (Kilhavn, 2025), explaining the gap in Middle Mesolithic finds seen in Table III.

people living along the coast also linked the creatures at sea and stones in different ways. In some regions, people deliberately carved or polished images of marine mammals, while in other regions, like Sogn og Fjordane, they chose different images, potentially expressing being–sea–stone relations in other ways.

In Sogn og Fjordane, it seems other relationships, or aspects of relationships, were stressed than in Southwestern, Central and Northern Norway. Fossils were not kept, and nor were marine mammals or fish carved in stone. The marine oriented hunter-gatherer-fisher based communities still lived and worked in a similar manner to neighbouring communities, but within this 'social territory' they 'worlded' their world slightly different than the neighbouring groups. In Sogn og Fjordane, stones were to a larger degree quarried from deposits scattered about the surrounding landscape. Some flints were found on the beaches, but the flint pebbles were perhaps not as generously offered by the sea as further south and north, affecting their role in worlding practices. The few large rock art sites show that rock was used to anchor beings or stories in stone, but even if marine resources would have been equally essential, people expressed their relationships through other means, marking their difference with their neighbours, especially to the north.

The link between living animals or fish and their depictions in rock art, and the transformation that takes place, is perhaps apparent. But echinoids (especially sea urchins), crinoids (plants), and molluscs (shell) were also encountered in different states of being. Plants, shells, and sea urchins can be encountered on a regular basis as colourful beings, alive underwater on the shore, their spikes sometimes used as tools (e.g. Melsæter 2011). Sea urchins were found as empty, fading shells along the same shores and finally, inside beach-collected flint pebbles. In a world not yet de-mystified by science, such as ours is, the petrified, stony – eternal and fixed – states of being must have been puzzling (Fig. 5). In this way, both rock art and fossils may have materialised ideas about the abilities of beings, matter or substances to transform (cf. Conneller 2011). Such beliefs are not unheard of: for example, Pre-Columbian or Amerindian communities believed that the same spiritual essence could live and move through materials ranging from metals, stones, and plants, and even in the light, shimmering sun or water (Saunders 2004:136). Furthermore, as Andy Jones (2020:547) states: 'the material properties of things have a vital role to play in our understanding of visual forms. Rather than materials being passive conduits for human agency, the interaction (or the intra-action) of materials with artists during making produces certain affects and effects'. Transformation of both form and matter is also expressed in rock art in Central Norway. The idea, substance or essence of the marine mammal may have been seen as being transformed when the image was transferred onto stone. Whether they were considered animated by this process we can only speculate, but some rock art sites clearly indicate ideas of figures transforming. There are sites where land animals (bear and elk) become whales – or the other way around: a bear-whale at the Hammer V site in Trøndelag (Bakka and Gaustad 1975, Bakka 1988) and an elk-whale head at Hammer IX (Kirkhus and Stebergløkken 2019) (site 31). Both this rock art tradition and the acknowledgment of fossils reflect a particular Mesolithic (and Neolithic) ontology, where life could be stone and be in stone, and where stone could be animated or at least considered as much alive as any other living creature (cf. Nyland 2020c). Moreover, with respect to whether fossils or rock art should be perceived as expressing substantial transformations, or something else, when discussing societies other than ours we must allow for the existence of alternative perspectives, ontologies and beliefs (cf. Viveiro de Castro 1998).

Societal resilience ensured through worlding practices

In Mesolithic research, 'the environment', geohazards, and climate fluctuations, often lumped together as 'environmental proxies', are frequently presented as predominantly impacting resources, making societies react and adapt (e.g. Alley and Ágústsdóttir 2005, Breivik et al. 2018, Solheim et al. 2020, Lundström 2023). The environmental proxies may also have a broader role and agency, deeply influencing the ontology of the coastal societies on a local scale. In the centuries around 6,200 BC, the sea presented challenges to the coastal population that had to be dealt with in order to cope effectively with the hazards it represented. Different impacts and coastal histories would have created different social contexts that the communities' practices developed in tune with.

Yet, as mentioned, lithic technological traditions change very little from the Middle Mesolithic to the end of the Late Mesolithic. The tradition of living close to the shore is maintained throughout the Mesolithic and beyond too (cf. Bergsvik 2001, Bjerck 2008, Walker et al. 2023) (Table II). Indeed, no 'smoking gun' has been found that directly or conclusively links

the 8.2 ka cold anomaly or the Storegga tsunami to abrupt or large-scale changes in material culture (Damlien et al. 2024, Nyland and Damlien 2024, Nyland et al. 2021). Apparently, then, despite continuously changing sea levels and increased storminess, the material and archaeological record of Mesolithic life after the encounter with the tsunami, and the relationship between coastal inhabitants and the sea, did not waver. This does not, however, mean that environmental challenges had no impact. Is it perhaps our expectancy of large-scale change that needs to be addressed?

Engaging with crucial events and hazards

The Storegga tsunami and the 8.2 ka climatic event are often presented as disasters, causing a demographic collapse or at least a societal downturn around 6,200 BC based on modelled C14 dates (Wicks and Mithen 2014, Waddington and Wicks 2017, Breivik et al. 2018, Solheim et al. 2020, Bergsvik et al. 2021, Lundström 2023). A disaster can mark 'the interface between an extreme physical phenomenon and a vulnerable human population' (O'Keefe et al. 1976:566). Yet there is another way to integrate the Storegga tsunami as a phenomenon into the story of social impacts on Mesolithic coastal life. Although a crisis or disaster can be the result of a long and socio-culturally dependent process, the impacts of a tsunami can also be seen as *an event*, in other words 'a mental construct, that enables us to designate a plurality of micro-events combined together in a conceptual synthesis with a single word' (Cavalli 2006:171). Large-scale collective events, such as a catastrophe localized in time and space, like the Storegga tsunami, will in one way or another interfere with people's everyday lives. Even if the physical impact is moderate, they can become a 'zero point': a crucial event that sorts time into 'before' and 'after', severing the historical contingency (Cavalli 2006:172). According to Alessandro Cavalli (2006:173), memories or stories of such crucial events influence future practices in several ways: in collective 'archives', the event may be 'monumentalized', becoming a point of departure from which one only looks ahead. Alternatively, one may reestablish or reconstruct practices and stories from a time prior to the crucial event. Independently of the Storegga tsunami becoming a story of an adventure or a traumatic experience, one may choose to act as if the event never happened, as one way to demonstrate one's strength or resilience. Memories of such events may become insulated and be kept apart from everyday life or, according to a final strategy presented by Cavalli (2006:174), people may embrace the memory of an event and elaborate on it. The memories of an event like a tsunami are actively engaged with so they become a vital part of public memory and hence identity. Over time, memories and experiences are woven into the society's marrow, in turn affecting everyday life.

In view of this, it is clear that the reactions to, or engagement with, an imposing hazard or a crucial event may not necessarily be major, nor noticeable from one day to another. The previously mentioned small regional changes within the overall, cross-regional lithic technological traditions, are indications of social relations and orientations being pushed in different directions by the varying degrees of environmental impact along the Norwegian coast (Damlien et al. 2024, Nyland and Damlien 2024, Walker et al. 2023). Minor regional variations in societal reactions, strategies, and expressed relations with the sea and everything in it are therefore to be expected.

Of all regions along the coast, Central Norway, east of the tsunami propagation centre, was hit the hardest. In this region, the being–sea–stone relations are also strongly expressed. While not necessarily large and dramatic, the regional expressions differed from those further North and South. In the Late Mesolithic along the Norwegian coast, there are some regional developments in lithic technology that were noticed along the coast from around 6,300 BC, which is the Middle to Late Mesolithic transition (Bjerck 1986, 2008). Yet it is not until around 5,500–5,000 BC that a broad spectrum change observable in the archaeological record during the Late Mesolithic marks the end of the relatively synchronous developments and shared features in the archaeological record in the Early and Middle Mesolithic across southern Norway. There is a shift in mobility patterns, argued as reflecting changes in the type of sedentism (Åstveit and Tøssebro 2023), spatial variability in procurement practices and dependency on nodal points in the landscape (Nyland 2017, 2020b), and as mentioned, regionally specific lithic technological concepts develop (Damlien et al. 2024, Nyland and Damlien 2024). It has also been suggested there is a shift in ritual or cosmological practices (Lødøen 2012, 2014, Fuglestvedt 2017). To this, one can now add varied expressions of being–sea–stone relations as found in fossil distribution and rock carving practices. Hence, the identified variations and changes, alongside some continuing traditions, indicate that the people living through rising sea levels, stormy centuries, and geo-events happening c.6,200 BC, had strategies for

living well with sea-related hazards. When investigating the impact of a possible crisis or disaster, the local variations make the question of scale of analysis, relevant. It is not clearcut where expressions of a crisis will manifest themselves, nor which material was used to express endeavours to regain ontological security. This means that we also need to scrutinize our prior expectations as to how small-scale or hunter-gatherer societies react to crisis materially (Nyland and Damlien 2024, Kilhavn (in prep.), Nyland 2025).

Ontologically, Levi Bryant (2014, 2018) explains how units that should act in a similar manner may still follow different paths. His example is that of the outcome of two identical machines, where even the slightest change in conditions or parts of one machine may affect its rhythm and move it along a different path than its brother (Bryant 2014, 2018). It is plausible, then, that the shifting traditions, or indeed 'microstyle' variations (cf. Jordan 2014) in the materials discussed in this paper found in communities along the west coast, came about because of different environmental circumstances (the varying experiences with the tsunami, sea level changes or storms) that also affected social contexts or orientations. In the example of the west coast, memories of a 'crucial event' – that is, the tsunami encounter – may have been the trigger to start anew, or cling onto past traditions. Despite neighbouring communities being similar in things like subsistence and living patterns, traditions signalling regional or local identities may have developed in ritual conventions, stories and knowledge related to the spiritual world. An ethnographic case of such minor differences in practices is seen among the East Khanty groups in Siberia (Jordan 2014:149–150). To some East Khanty groups, the building of shrines for deities was more prone to local social sanctions and inherited traditions than pragmatic tasks, like building storage facilities for food. Acknowledging small variations in, for example, the frequency of recovered fossils or the carving of marine mammals, is thus also a reminder to be aware of which materials one considers relevant as indicators of social boundaries. Variation in tool production and technology is not the only way to express social affinities.

Many known historical societies have stories that explain why things are happening, and they develop strategies to deal with what they perceive as the reasons behind their misfortune (e.g. Vitaliano 1976, Vansina 1985, McIntosh et al. 2000). However, any societal responses depend on ontological perspective and acknowledged relations. As I have argued in this paper, the unpredictable yet omnipresent sea – friend and sometimes foe – affected communities to varying degrees. As a result, local or regional corpuses of stories and knowledge of relations would have developed, requiring actors in the stories, whether they be monsters, deities or perceived animate objects. Sometimes stories are expressed through dancing or rituals, and sometimes images or objects function as mnemonic pegs or expressions of the associated stories (e.g. Archibald 2008, Kovach 2009, Cruikshank 2012, Rahman et al. 2016, Budhwa 2021). There is also a material side of stories and storytelling that is visible archaeologically, although perhaps it requires a fresh look at how archaeological research, including excavations, is designed to facilitate discovery of the subtle, less tangible or perhaps odd finds, like fossils and carved marine mammals, needed to inform our theories. It may not be possible to retell the Mesolithic stories of crucial events like a potential monstrous sea. Nevertheless, the cross-regional variations in the distribution of fossils and marine mammals in rock art imply that expressions of sea-stone-being relations were indeed part of worlding practices and that storying enabled people to make sense of the world they lived in. Although the coastal communities were marine oriented hunter-gatherer-fishers well into the Neolithic, their everyday lives and storied pasts varied. The coast of Møre was the hardest hit by the tsunami, which may well explain the development of a mythology accentuating coastal creatures involving both fossils and marine mammals. Whereas further south and north, coastal relations took on slightly different expressions.

Final remarks

For a maritime oriented population, the omnipresent sea is an active agent in everyday life. It is part of a community's ontology, and of explanations of relations and the positions of all beings-in-the-world. For people in the Mesolithic, the contrast between the sea as provider of varied resources that sustained life and offered possibilities for movement, transportation, and contact, and its unpredictability – the risks and dangers the sea represented – must have been a fundamental element to be negotiated and engaged with.

Hein Bjerck (2009:121) has earlier emphasised that maritime *relations* capture 'the multitude of components, factors, and circumstances that are the building blocks in "real life" holistic and complex adaptation'. A variety of archaeological materials demonstrate the maritime relations: settlement practices (at or close to shores); and traces of marine resource exploitation

involving fishing, hunting marine mammals, and collecting shells and snails on beaches. Boats may have been what people thought of as homes in the Mesolithic (Bjerck 2016:7), and objects like fishhooks could connect spheres (land and sea) through their materiality and use (Mansrud 2017:43). Added to this are the elements discussed above – fossils and rock procurement practices that caught or fixed creatures in stone. Flint found at pebble beaches, being a gift from the sea, contained petrified sea creatures revealed while making tools. Images, sites, or objects are not necessarily representations of the things they resonate with but can instead be considered referential mnemonic pegs for the stories or relations they recall (Lemonnier 2016:129). Specific meanings may only have been evoked or conveyed if performed, and some may have required specific items or imagery (Tuzin 2002:2). Because of the shifting contexts and interconnectedness, all objects or categories are reminders of, or resonate with, social relations, world views, or indeed ontological perspectives (Lemonnier 2016:120). To me, the material categories discussed, and the variety in their distributions, demonstrate the strong position the sea and its creatures occupied in the coastal communities' ontologies in the Norwegian Stone Age.

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