SAILING THE SUN UP THROUGH THE ROCKS

An iconographic analysis of the ship motif in the Bronze Age rock-art of Southern Scandinavia

(Fragment of the Fossum rock panel Tanum-255:1, photo taken by the author in July 2019 during the international documentation seminar organised by Tanums Hällristningsmuseum Underslös)

by

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Abstract

The ship is the most common figurative depiction on the rock-art of Southern Scandinavia. The most comprehensive interpretation of their cosmological symbolism comes from Flemming Kaul's iconographic study of bronze razors. According to him the sailing direction of the ship motifs is a significant feature to understand their meaning and can be related to the existence of a cult based on the daily journey of the sun, wherein the ship acts as its symbolic vehicle. It is however difficult to observe such narrative on rock-art. According to Klavs Randsborg, who studied the rock carvings of the Kivik cist and the slabs of the Sagaholm Barrow in Smaland, the sailing direction of the ship carvings is irrelevant and rock-art symbolism can be better explained by its orientation with respect to the cardinal points and by the presence or absence of crew as an indication of a death cult. In the current dissertation, pictorial semiotics are employed to investigate the symbolism of the ship motifs at the sites of Aspeberget and Fossum by means of the statistical analysis of their sailing direction, their orientation and the presence of crew. The results confirm that all these three features are important. Based on the results I suggest a cosmology based on the yearly cycle of the sun, rather than the daily one, as a better explanation for the symbolism of the ship motifs.

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List of abbreviations

BA: Bronze Age (1700-500 BCE)

BCE: Before Current Era

E: East

EBA: Early Bronze Age (1700-1100 BCE)

LBA: Late Bronze Age (1100-500 BCE)

PRIA: Pre-Roman Iron Age (500-1 BCE)

N: North

NE: North-East

NW: North-West

RAA: Riksantikvarieämbetet (Swedish National Heritage Board)

S: South

SE: South-East

SHFA: Svenskt HällristningsForskningsArkiv (Swedish Rock Art Research Archives)

SW: South-West

THU: Tanums Hällristningsmuseum Underslös

W: West

Preface

Due to my background in naval engineering it is no surprise that I chose to write my dissertation on a topic related to ships. When I started thinking about a suitable topic it quickly became clear that I wanted to investigate their symbolic meaning, especially related to religious and cosmological beliefs. It is fascinating that so many cultures in the world from such distant areas and time periods have regarded the ship as the means of transport for the dead to the otherworld and likewise as the means of transport for the sun. Of course, covering all the periods and areas was impossible so I had to narrow down the topic little by little. It was not an easy task because at the beginning I did not have a preference for any given period or area. It was in June when I discovered by chance that the Tanums Hällristningsmuseum Underslös museum was organising a seminar on rock-art documentation in the World Heritage Site of Tanum in July. I immediately decided to join, and I am so happy that I did! The seminar was really educative and very valuable. Besides, the rock carvings are extremely fascinating and being able to visit the sites both by day and at night, to feel the rocks and to document them was an exceptionally enriching experience. It was during the seminar that I came with the idea of investigating the relationship between the sailing direction of the ship motifs and their orientation with the sun, with the idea at first that I would be able to identify day and night ships in accordance with the cosmology of Flemming Kaul. It was extremely useful to have access to the library of the museum as well as getting first-hand information from the museum's personnel and the seminar lecturers and participants.

After the seminar I started digging into the literature and working on the statistical analysis. It has not been an easy task since I work full time and study this Bachelor besides but I think it has been worth it. Despite the stress and the hard work, I have really enjoyed writing this dissertation.

Acknowledgements

First of all I would like to thank the Tanums Hällristningsmuseum Underslös for organising the seminar, for granting me access to their library and for sharing their knowledge with me, especially Gerhard Milstreu and Ellen Meijer, who suggested me to start my analysis with the site of Aspeberget and showed me how to access the data in the Swedish Rock Art Research Archives. I would like to thank as well all the lecturers and participants of the seminar for such a nice and interesting week in Tanum. Then I would like to thank David Edwards and Ian Armit from the University of Leicester for helping me out in narrowing the dissertation topic and Joanna Appleby for her valuable comments as my supervisor.

I thank as well the Rijksmuseum van Oudheden in Leiden for granting me access to their library.

I want to thank as well Maria Isabel, Ignacio and Nadia for their help with statistics, and my friends and family for their support and understanding as I had to cancel (too often) plans with them in order to work on my dissertation. Likewise, my colleagues and team leader at work for being understanding when I needed to take a day or a morning off to focus on the dissertation.

I. Introduction

I.1 The ship as a symbol

Ship imagery is found all-over Scandinavia on a variety of media such as rock-art, renderings on bronze artefacts, and ship-shaped artefacts and stone monuments, see Figure I-1. The fact that such large areas, despite the regional differences, shared a common ship iconography on such a great variety of contexts suggests that ships were not just depictions of real objects but that they had a symbolic meaning (Skoglund 2010:127-128).

The ship is definitely the most common depiction on the rock-art of southern Scandinavia and a general feature during Middle and Late BA, 1600–500 BCE, although ship carvings were already frequently made during the Late Mesolithic in northern Scandinavia as part of the so-called northern hunter-gatherer traditions (Gjerde 2017:114; Goldhahn *et al.* 2010:3-7). Therefore, the ship motif was first developed in the north and later transferred to the agrarian communities in the south, where it was however expressed in a different way (Cornell and Ling 2010:85; Melheim and Ling 2017:60).

The earliest ship depiction on a bronze occurs on a curved sword dating to 1600-1500 BCE, found at Rørby in Sjælland, Denmark, and its similarities with many rock-art depictions indicates that the ship was already an important symbol by that time and that rock-art was already a well-established southern tradition (Kaul 1998:74-75,80).

The strongly standardised and limited variety of rock-art iconography throughout the BA indicates that rock-art was a highly selective representation of society and demonstrates its symbolic component (Ling *et al.* 2018a:149). Indeed, as shown by the depiction of ships, footprints, animals, tools, weapons, and human figures seemingly involved in ritualistic activities, rock-art seems to exclusively emphasize socio-ritual practices whereas mundane activities that would have been represented by houses, daily-life objects, and people involved in productive or domestic activities seem to have been ignored (Cornell and Ling 2010:74; Ling and Cornell 2010:34).

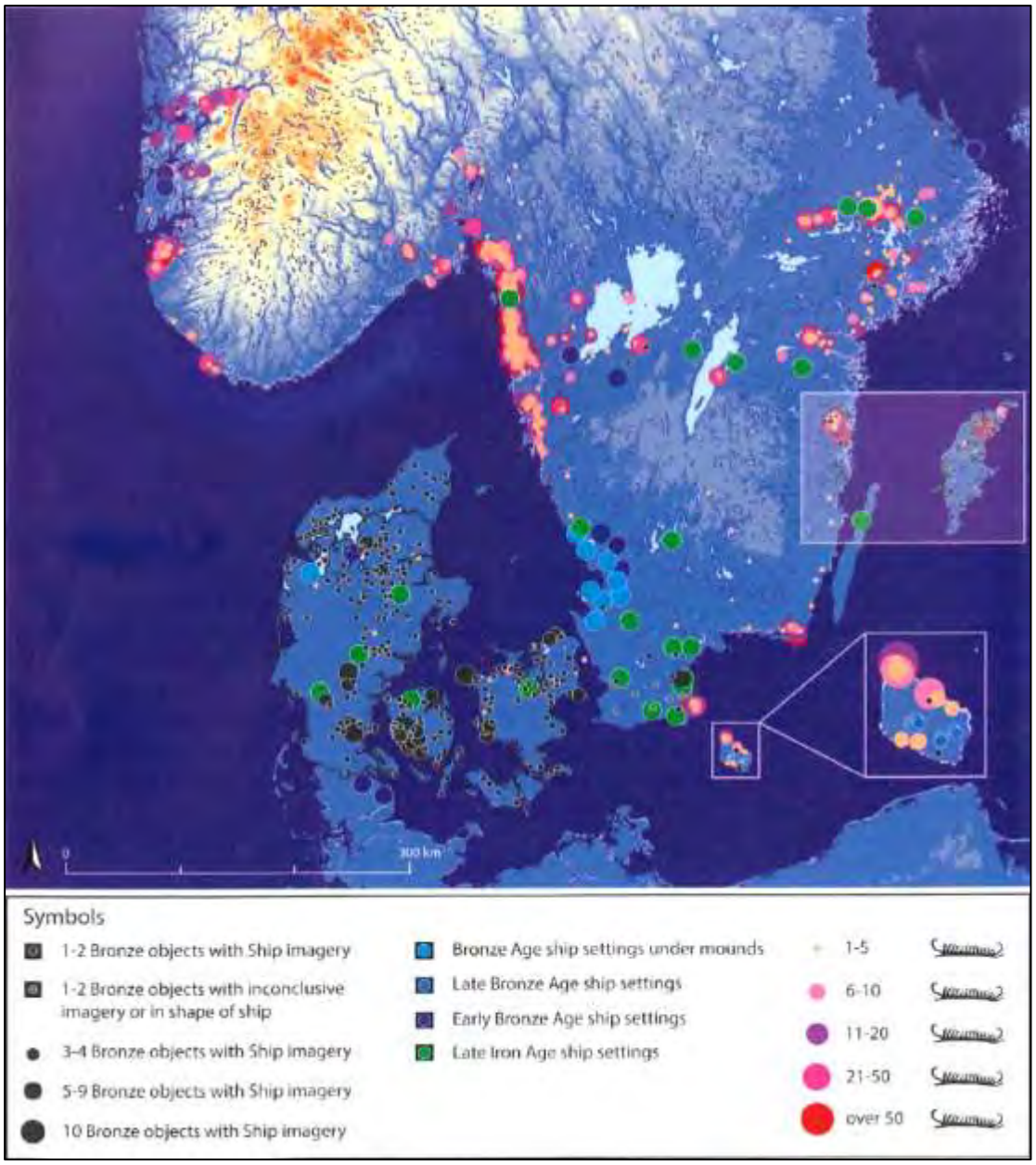


Figure I-1 Distribution of ship iconography in southern Scandinavia: ship imagery on bronzes, ship carvings in rock-art, and ship settings.
(Taken from Nimura 2016:16, Figure 1.7)

Since symbols do not lose their materiality and in many cases still fulfil technical-utilitarian functions, for instance swords or razors, it is sometimes difficult to identify them archaeologically, although the following two aspects are clear indications of symbolism: the alteration of the utilitarian functions of an artefact and its displacement in space and time (Kobylinski 1995:11). For instance, using a ship as a burial instead of as a means of transport and placing it on a hill rather than on water. Regarding the BA ship iconography, these two indicators are clearly present in the tradition of building ship-like monuments in connection with burial practices, the use

of ship imagery and ship-like forms on bronze artefacts, and the carving of ship motifs on open-air rock panels and on portable slabs incorporated in burial monuments in the form of barrows (Goldhahn and Ling 2013:271; Kobylinski 1995:11).

Carving a ship on a rock was a way of reaffirming the importance of that symbol in the skewed depiction of the social reality (Ling and Cornell 2010:34). Undoubtedly water and the landscape played a central role in this social reality since the majority of ship carvings, and also other figurative iconography, were located within 1 km of the coastline or an inland body of water (Nimura 2016:65,107,112). Moreover, ship carvings are often located where (rain) water naturally flows on the rock surface or along veins of quartz resembling the surface of the sea as if the ship would be actually sailing, which reinforces the idea that they must have had some kind of symbolic and/or ritualistic purpose (Ballard *et al.* 2003:389-390; Bradley 2009:134-135; Ling 2014:237). Additionally, several rock panels and ship carvings appear to have been modified and re-carved at different periods throughout the BA, which indicates that BA people respected and reused older carvings and rock-art sites, probably as a means to engage with their ancestors (Horn and Potter 2018:380; Ling 2005:16; Milstreu 2017:46).

While it is impossible to know the beliefs of BA people and consequently the actual symbolic meaning behind the ship motifs, it is possible for us to look at the social and cultural mechanisms that would explain the spread and maintenance of its use (Kobylinski 1995:17). The different interpretations that have been suggested regarding the symbolism of ships in BA Scandinavia are presented in chapter II. They are not in any way all-embracing nor mutually exclusive and since a symbol can embody many referents and meanings, a combination of all of them seems very likely.

I.2 Research question

The most comprehensive interpretation of BA ship symbolism is based on Kaul's (1998) study of decorated bronze razors (Skoglund 2010:128). According to Kaul (1998:186), the sailing direction of the ship renderings on the razors was a key feature in the characterisation of the ship as a religious means of communication. He argues that since the proportion of ships sailing either to the right or to the left does not

correspond to a random distribution, BA people must have deliberately chosen to explicitly depict the sailing direction of ships. He suggests that the significance of the sailing direction can be interpreted as evidence of the existence of a cult based on the daily journey of the sun, wherein the ship acted as the symbolic vehicle in which the sun travelled across the sky during the day and through the underworld at night. The main argument is that in the northern hemisphere, when someone is facing the sun, it moves across the sky from left to right. Consequently, BA people would have believed that the daily cycle of the sun involved a left to right journey (daytime) and a right to left journey (night-time). Kaul (2018:235) argues that sun symbolism represents the most crucial ideological change from the Neolithic to the BA in Scandinavia. He admits however that this left-right logic related to the daily cycle of the sun does not seem to fit well with the ship iconography on the rock-art, where relationships to the landscape and geographical directions seem more relevant (Kaul 1998:267; Kaul 2018:241).

Indeed, Randsborg (1993:89-97,117-122), who studied the rock carvings of the Kivik cist and the slabs of the Sagaholm Barrow in Smaland, argues that the sailing direction of the ship carvings is irrelevant and that rock-art symbolism can better be explained by looking at their orientation with respect to the cardinal points and therefore to their alignment with the sun throughout the day. Additionally, he argues that the presence or absence of crew strokes indicates whether ships represent the world of the living or the world of the dead respectively.

The objective of this dissertation is to perform an iconographic analysis of the ship motifs in two rock-art sites in the municipality of Tanum by examining their sailing direction, their orientation with respect to the cardinal points, and the presence or absence of crew. Is it true that the left-right logic is not applicable to rock-art? Is the orientation to the cardinal points, and therefore to the positon of the sun, a key feature in rock-art? How is the presence or absence of crew related to the sailing direction and to the orientation of the rock panels?

I.3 Methodology

One of the main problems when performing an iconographic interpretation of rock-art in open air sites is that these were used, modified and re-carved over several centuries and it is often impossible to know which motifs were originally contemporary (Skoglund 2010:128). Consequently, trying to identify narratives on specific panels becomes challenging and prone to speculative reasoning. This issue becomes less critical when focusing on the deep and social semiotic aspects of a single motif, which can be investigated by means of the statistical analysis of its repeated and common associations with other cultural phenomena (Kobylinski 1995:14; Skoglund 2010:128). In order to answer the research question I will thus make use of concepts derived from cognitive psychology and pictorial semiotics by treating the ship motifs as prototypical representations of cultural cognitive abstractions and by performing a comparative analysis to identify patterns between their sailing direction, the orientation of the rock panels, and the presence or absence of crew. A more detailed description of the methodology is presented in chapter III. The results from the comparative analysis are presented and discussed in chapters IV and V respectively.

Due to the limited extend of the current dissertation and the large amount of ship carvings in Scandinavia, I have chosen to focus on the sites of Aspeberget and Fossum for three reasons. First, the iconography of both sites has been documented by THU in two books (Milstreu and Prohl 1996 and 1999) and illustrations and rubbings of most of the panels are available at SHFA (2019). Second, both sites have a large and similar amount of ship carvings, about 300 ships each. Third, while the site of Aspeberget is close to the BA shoreline, the site of Fossum is located on higher ground, see Figure IV-1. This will allow to see if the patterns between sailing direction, orientation, and presence of crew are independent from the site location with respect to the sea.

II. Ship symbolism

II.1 Status and power

The importance of the ship as a symbol can be explained in practical terms. During the BA in Scandinavia it would have been easier to travel by boat than overland and since the region lacked raw resources such as copper and tin, it was completely dependent on maritime trade with continental Europe for the acquisition and production of bronze (Ballard *et al*. 2003:385-386; Ling and Uhnér 2014; Melheim *et al.* 2018:143).

Figure II-1 Map showing the BA mining areas with copper (striped circles) and tin (white circle) ores matching the chemical and isotope analyses of Scandinavian artefacts, and the areas in which Baltic amber has been found (yellow circles).
(Taken from Ling et al. 2014:127, Fig. 19)

Metal was obtained in exchange for amber, which was naturally abundant in southern Scandinavia and in the Baltic and was a prestige resource in Europe and the Mediterranean during the BA (Ling *et al.* 2018b:502; Rowlands and Ling 2013:501). This is evinced by the discovery of Baltic amber in European and Mediterranean BA mine regions whose ores match the isotope and chemical analyses of Scandinavian

artefacts, see Figure II-1 (Ling *et al.* 2013; Ling *et al.* 2014; Ling *et al.* 2018b:502; Ling and Uhnér 2014:24; Murillo-Barroso and Martinón-Torres 2012:210). The strategic maritime position of Southern Scandinavia and especially Denmark, allowed the local elites to control the flow and distribution of metal into Scandinavia (Rowlands and Ling 2013:501).

Boat building undoubtedly required a big amount of material and labour resources (Ling *et al.* 2018b:499), and would have favoured the establishment of maritime institutions that, together with the development of metal trade routes and the improvement of the shipbuilding technology and maritime skills, fostered the emergence of regional chiefdoms (Earle and Kristiansen 2010:224-230; Earle *et al.* 2015:649; Ling *et al.* 2018b:488). Thus, boats could have had a strong symbolic association with political power and the ability to acquire bronze. The tradition of carving boats on the rocks, and rock-art more generally, might have aided the elite in reinforcing this maritime political ideology and its institutions (Goldhahn and Ling 2013:285; Rowlands and Ling 2013:500). For instance, the province of Bohuslän, with thousands of ship depictions and easy access to timber could have been a central area for the organisation of maritime activities such as shipbuilding (Ling *et al.* 2018b:497). Some have interpreted rock-art sites as a medium used by chiefs to display their involvement in maritime expeditions and shipbuilding activities and as places where negotiation of ties and redistribution of resources were performed by the social elite through ritualistic activities (Kristiansen 2004:113-116; Ling 2014:241). It is clear in any case that rock-art was strongly linked to the acquisition of bronze and consequently to status and political control over this resource since the production of rock-art correlates with the imports of copper and tin (Ling and Uhnér 2014:39-40).

II.2 Maritime networks and social organisation

Rock-art sites in northern Bohuslän could be interpreted as seasonal meeting places associated with maritime networks where social, economic and ritual interactions, including rock-art carving, were carried out (Goldhahn and Ling 2013:280; Kristiansen 2004:113-114; Ling 2014:221-230). Not surprisingly, rock-art sites are generally located in sheltered places on rocky islands or close to the shore (Goldhahn and Ling

2013:280). Moreover, many of the ship-dominated rock carvings, as well as the cairns of the same period, were located along the margins of important sea channels and would have been visible from the water, providing important aids to navigation (Ballard *et al.* 2003:388; Kristiansen 1987:74-75; Thedéen 2003:98-103).

It has been also suggested that the ship acted as a social institution and that the social hierarchies on board might have also been implemented on land (Nimura 2016:21). Consequently, ship depictions would have symbolised the cosmological and social order and might have been used to justify social norms and inequalities, as evinced by the depiction of violence and codes of rank such as enlarged armed figures in commanding positions together with smaller oarsmen (Ling and Cornell 2010:35-36). The images of crew kneeling, sitting, and performing actions such as raising paddles and weapons or blowing lures (e.g. Figure II-2, Figure II-3, Figure II-4) have been interpreted as depictions of maritime and martial initiation rites, and rituals of group cohesion (Ling 2014:208; Ling and Cornell 2010:38).

Figure II-2 Carving of a boat on the Lövåsen rock panel Tanum-325:1.
It shows an enlarged figure wearing a horned helmet in a commanding position and smaller oarsmen sitting and raising their paddles. (Photograph taken by the author in July 2019 during the international documentation seminar organised by THU).

Figure II-3 Carving of a boat on the Vitlycke rock panel Tanum-1:1.
It shows two enlarged figures raising weapons and schematic crew lines with heads, one of them raising a paddle. (Photograph taken by the author in July 2019 during the international documentation seminar organised by THU).

Figure II-4 Carving of a boat on the Fossum rock panel Tanum-255:1.
It shows two enlarged figures raising weapons and schematic crew lines, two of them blowing lures. (Photograph taken by the author in July 2019 during the international documentation seminar organised by THU).

Noteworthy is the fact that most of the carvings including war-related scenes belong to the two separate chronological BA phases, period II (circa 1500-1300 BCE) and period V (circa 900-700 BCE), in which the greatest amounts of metal were circulated throughout Scandinavia (Ling *et al*. 2018a:150). This might suggest that the

involvement in long-distance maritime trade of metals stimulated social inequality (Earle and Kristiansen 2010:226-230; Ling 2014:208,216).

Not everyone agrees however with the idea of an elite-controlled rock-art tradition. Some scholars argue that since rock-art sites are not monumental, are widely spread in the landscape and are easily accessible, they would not have been a suitable tool for the making of chiefs and thus it is more likely that they were used as gathering places for communal feasting and family initiation rites (Goldhahn and Ling 2013:285; Ling 2014:218).

II.3 Cosmology and religion

The practical importance of ships in BA society might have led to a spiritual meaning. Indeed, as supported by anthropological studies, power and authority are typically secured and accentuated by the engagement in religious rituals, which are a means of preserving social traditions (Bell 1992:218-223). The ritualization of similar everyday concerns in a maritime environment would have shaped the belief system that explains the ubiquity of the ship as a symbol and the remarkable similarities in imagery throughout the BA and across the whole Scandinavian region (Ballard *et al.* 2003:398). Despite all the similarities, the particularities in the imagery found on different media (i.e. rock-art, bronze objects, and graves) suggest that each medium served different communication purposes and targeted different audiences (Bradley 2015:41-43). While rock carvings seem to be depictions of real-life rituals, the imagery found on bronze objects would rather illustrate religious beliefs (Kaul 1998:21,258). Moreover, while open-air rock-art sites are numerous, easily accessible and contain varied imagery combinations, depictions on bronze objects and graves are scarce, found in restricted social domains and appear in rather limited compositions (Ling 2014:163-165).

II.3.1 Shamanism

Figure II-5 Bird-like anthropomorphic figures at the site of Kallsängen, rock panel Bottna-88:1. (Source: SHFA 2019. Id: 13137. Author: Almgren Bertil. Year: 1976)

Shamanic interpretations of Scandinavian rock-art are based on ethnographic studies from the arctic, anthropological studies from other parts of the world, and the neuropsychological model introduced by Lewis-Williams and Dowson in 1988 (Goldhahn 2008:22). According to these interpretations, the anthropomorphous figures with beaks, wings, and horns, on the rock carvings, e.g. Figure II-5, would depict altered states of consciousness as experienced by shamans during the performance of rituals in which they acted as intermediaries between the natural and the supernatural worlds (Aldhouse-Green and Aldhouse-Green 2005:97,212; Nimura 2016:19). The archaeological evidence suggests however that these images depict in fact human-beings wearing masks and costumes that might have been part of ritualistic performances. This is evinced by the pervasiveness of this feature throughout different media, the similarities with pre-existing representative traditions (Sapwell 2010:86-87), and the recovery of bronze artefacts such as helmets with horns and beaks, and figures wearing these (Kaul 1998:26-30), see Figure II-6.

The Lewis-Williams/Dowson model and the use of ethnographic studies have been heavily criticised (Goldhahn 2008:22; Ling 2014:167) and consequently also the shamanistic interpretations based on altered states of consciousness. However, some scholars still use the term shamanism to interpret the rock-art as being part of a tiered cosmology in which a shaman acts as a mediator between the different worlds: the sky, the land, and the sea. According to this interpretation, the shoreline would be the place in which the three cosmological worlds meet and the rock carving sites would act as a portal through which the shaman's soul could travel between the worlds by means of symbolic ships (Helskog 1999:79; Lahelma 2005:40-41).

Figure II-6 Bronze artefacts with horned helmets.

These prove the existence of helmets with horns and beaks that could have been used in ritualistic performances and might have been depicted in the rock carvings.

Top-left: The two horned helmets from Viksø Mose in Northern Sjælland, Denmark. Note the bird-like eyes and beak. This type of helmet can be recognised in the rock carving of Figure II-2.

Top-right: Male figurine wearing a horned helmet from the Grevensvænge hoard in Sjælland, Denmark, intended to be fixed on a base presumably made of wood (Kaul 1998:21).

Bottom-left: Ornament of a horse collar with two human heads wearing helmets with horns and a beak from the Fogdarp find in Skåne, Sweden.

Bottom-right: Figure with beak from Glasbacka in Halland, Sweden, intended to be fitted on a pole (Kaul 1998:26).

(Photos source: Nationalmuseet i København)

II.3.2 Solar cult

Figure II-7 The Chariot of the Sun from Trundholm in Sjælland, Denmark. Dated about 1400 BCE. Here shown travelling during the day pulling the Sun from left to right. When seen from the other direction the circle is not covered with gold foil and thus would represent the travel during the night. The sun and the horse are placed on wheels so that the direction of travel could be controlled during rituals (Kaul 2018:237). (Photo source: Nationalmuseet i København)

If we assume that BA people considered the earth to be flat, probably surrounded by water with the sky above and the underworld below, the sun would travel across the sky by day and continue its journey under the sea by night (Kaul 2018:238). Actually, in many places in Scandinavia the sun seems to rise and set from and into the sea and since in the Northern Hemisphere the sun is seen travelling across the sky from left to right, it makes sense that the direction left-right might have been related to the day and the direction right-left to the night (Bradley 2009:152-153). This is clearly illustrated by the Trundholm Charriot of the Sun, Figure II-7.

This left-right logic is also noticeable on the iconography found on BA razors. No ships sailing to the left are depicted together with a sun image while there are more than fifty ships sailing to the right with sun images, many of them accompanied by horses (Bradley 2009:153; Kaul 2018:239). Based on this observation Kaul (1998) proposed a cosmology revolving around the daily journey of the sun in which the ship acts as the most important means of transport, see Figure II-8.

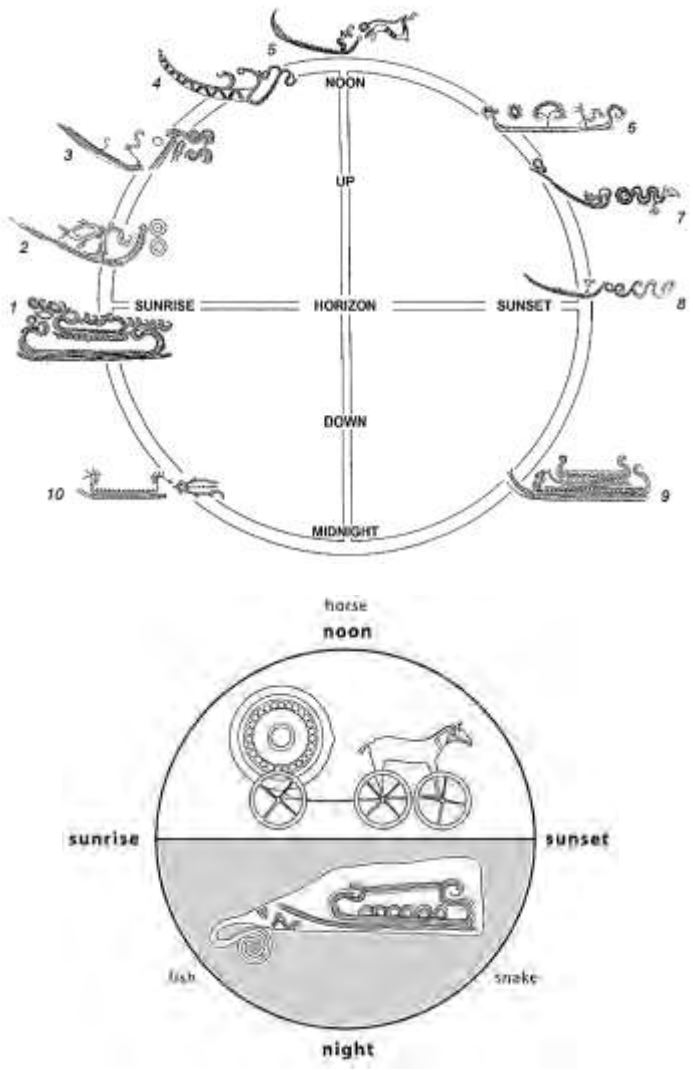


Figure II-8 The cyclical journey of the sun according to Kaul's interpretation.

Top: The different points of the cyclical journey of the sun illustrated by motifs from the BA Danish razors 1100-500 BCE. (Drawing: reproduced from Skalk (1999), taken from Kaul 2018:240, Figure 3.28)

Bottom: Outline of the solar cosmology postulated by Kaul with drawings of the Trundholm Sun Chariot and a decorated bronze razor from Denmark. (Taken from Bradley 2009:154, Figure 56)

The sun horse and the ship are actually frequently coupled in Scandinavian BA iconography, as illustrated by the use of horse-head prows on decorated ship-shaped bronze razors and on the ship motifs in many rock-art sites from 1400 BCE onwards (Bradley 2009:153,160; Kaul 2018:235-236). Some scholars have suggested that the link sun-horse-ship has its roots in the Indo-European myth of the sun maiden and her twin brothers, the morning and evening stars, who in disguise of ships and horses come to her help at sunrise and sunset (Kristiansen 2012:72-73,80).

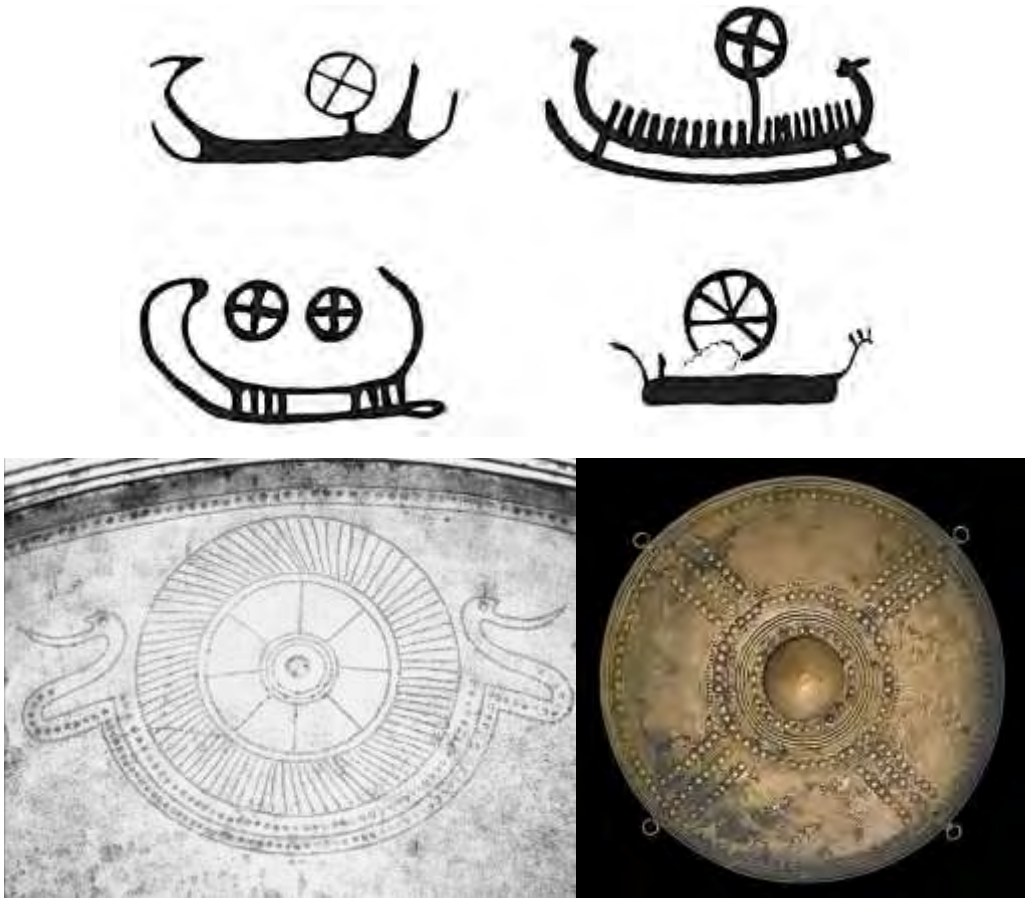


Figure II-9 The sun wheel or sun cross symbol.

Top: Rock carvings from Bohuslän and Östergötland, Sweden, showing the sun wheel carried by ships. The fact that the sun is attached to a stand would indicate that these are depictions of real-life rituals (Kaul 1998:196). (Taken from Panchenko 2012:18, Figure 13)

Bottom left: Detail of the Hajdúböszörmény bucket found at Siem, North Jutland, Denmark. The sun wheel, also reminiscent of a shield, is carried by a symmetrical ship with aquatic bird heads on its prows. The bird's heads commonly appear on ships on LBA metalwork, which is a clear influence of the central European Urnfield culture where the aquatic bird was considered as a manifestation of the sun and its daily cyclical voyage (Kaul 2018:242-243; Kristiansen 2012:74) (Taken from Kaul 2018:244, Figure 3.31)

Bottom right: Shield with the sun wheel symbol found at a bog in Sørup, in the island of Falster, Denmark. (Source: Nationalmuseet i København)

Twin iconography is noticeable in the rock carvings and bronze artefacts through all the BA in Scandinavia from 1500 BCE with the depiction of ships in pairs, twins as in Figure II-3 and Figure II-4, and double-edged axes. It is also apparent in the deposition of axes and other double sets of ornaments in hoards, such as the Viksø helmets and

the Fogdarp ornament in Figure II-6 (Eikeland 2015:309,311; Vandkilde 2013). Moreover, in Indo-European texts the sun is often considered to be a wheel that rolls across the sky, often drawn by a horse, which is illuminated during the day and dark at night when it is either concealed under water or carried by a ship (Bradley 2008:224; West 2007:201-203). Sun wheels can be seen depicted in many BA rock carvings and objects, often carried by a ship, see Figure II-9.

Besides the daily cycle of the sun, it seems logical that the substantial differences between summer and winter regarding the dichotomies sunlight-darkness and warmth-cold, especially in northern Scandinavia, led to a cosmology related to the yearly rebirth of the sun (Bradley 2009:185, Kaul 1998:270). Some rock carving images appear indeed to be aligned with the sunrise and the sunset around the solstices. For instance at Järrestad in Simrishamn, SW Sweden, 75% of the footprints and 95% of the shoeprints are pointing to the SE, thus the sunrise in winter, and all the ships and the remaining footprints are pointing to the SW, the sunset in winter (Mörner 2012:3304). In Bohuslän and Uppland, Sweden, and in Østfold, Norway, the carvings of paired footprints face the direction of the sun at different times of the year, especially the sunrise and sunset in summertime, and are never found facing north (Bradley 2009:195-197).

Similarly to rock carvings, megalithic monuments also seem to have been aligned with the sun. On the island of Gotland ship settings seem to follow the journey of the sun along the coast of the island (Bradley *et al.* 2010:92), and most of them seem to point south, where the sun reaches its maximum point (Wehlin 2012:67).

The impact of the sun and the change of seasons on crops, animals and humans would have led to associate the sun with the concept of fertility (Bradley 2006:387). The evidence comes from the depiction on the rock-art of phallic males, see Figure II-2, Figure II-4 and Figure II-3, scenes of agricultural activity, and scenes of sexual intercourse between people and animals (Bradley 2009:151-152). This iconography is however never depicted on metalwork. A possible explanation is that metalwork depicts the relationships between the sky, the sea and the journey of the sun across them, while on the rock-art the land is also depicted (Bradley 2009:162-164; Bradley

and Nimura 2013:19-20), see Figure II-10. The shoreline, where most rock-art sites are located, would represent the place in which the three worlds meet (Bradley 2006:383).

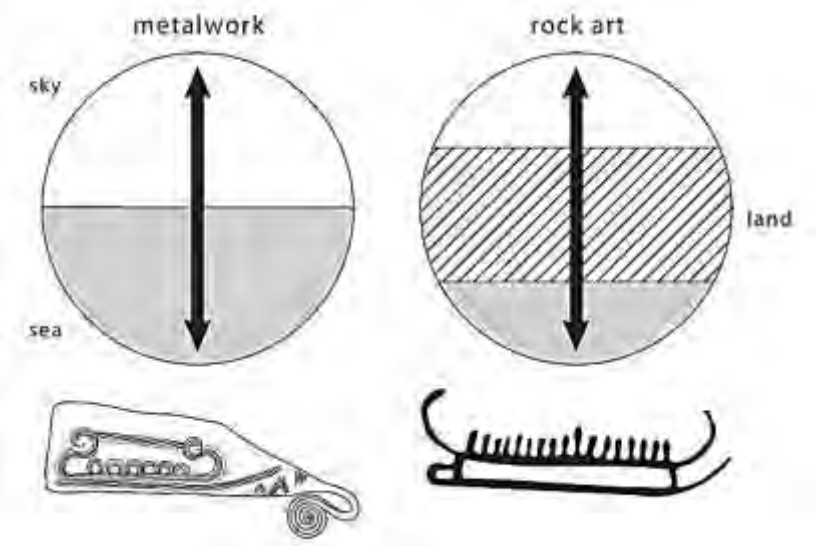


Figure II-10 Drawing showing the differences in imagery between decorated metalwork and rock-art. (Taken from Bradley 2009:163, Figure 63)

II.3.3 Death cult

The solar cult and its associations with fertility were certainly linked to the concepts of death and regeneration as evinced by the vast amount of decorated artefacts that were buried with the dead, the location of ship settings in cemeteries, and the presence of rock carvings in burial cists and burial mounds where feet, boats and cup-marks are the most common depictions (Bradley 2006:386-387; Bradley 2009:15,137; Goldhahn 2012:223-226). In Sweden, about 18% of the rock-art sites are located within 15 metres of grave structures and in Bohuslän around 77% of the feet carvings lead to the direction of burial sites (Bradley 1997:322; Goldhahn 2008:19). Cremation burials, often containing bronze razors taking the shape of boats or embellished with depictions of the sun carried by a boat, are also associated with ship settings and burial cairns (Bradley 2009:146,184-185; Bradley *et al.* 2010:93). These burial cairns and ship settings tend to follow the coast and some of the large ones are found on islands that due to their small size would have been uninhabited, which suggests that the deceased must have been carried by boat (Ballard *et al.* 2003:389; Bradley *et al.* 2010:93; Ling and Cornell 2010:31-32).

It is generally accepted that the ship was regarded as the symbolic means of transport to the otherworld (Bradley *et al.* 2010:94; Nimura 2016:18). This idea is supported by the large amount of EBA burials in ship-shaped graves beneath round barrows in Denmark and LBA cremation burials in stone ship settings mostly found on the island of Gotland, see Figure II-11 (Ballard *et al.* 2003:389).

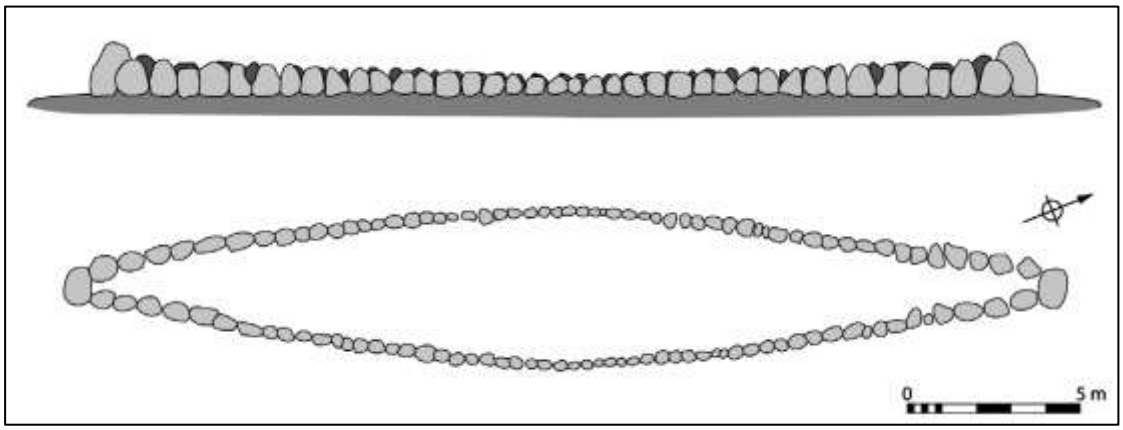


Figure II-11 Ship setting on the island of Gotland.
(Drawing: Aaron Watson after Joakim Wehlin and Peter Skoglund. Source: Nylén and Manneke 1961, taken from Bradley et al. 2010:83, Figure 3)

The role of the ship as a vehicle for the deceased is also manifest in the rock-art. The building sequence of the Sagaholm barrow, Figure II-12, in the central part of southern Sweden, dated 1500-1100 BCE, indicates that the rock-art, with mostly horses and ship depictions, was not created with the purpose of being admired by the living but rather to guide the deceased into the otherworld since it was created after the burial monument was complete and then sealed into the barrow never to be seen again (Goldhahn and Ling 2013:284-285). Furthermore, there seems to be a relation between the depiction of empty ships and the idea of death. At Sagaholm, the ships travelling to the right, thus in the direction of the sun at day, are depicted with people on board while the ships travelling to the left, night ships, are depicted empty (Goldhahn 1999:46). In many other cases the ship carvings that seem to sail away from the viewer, for instance the small and fragmented ships located on the edges of the composition, are often depicted empty, perhaps representing the transformation of the dead (Ballard *et al.* 2003:389; Bradley *et al.* 2010:94).

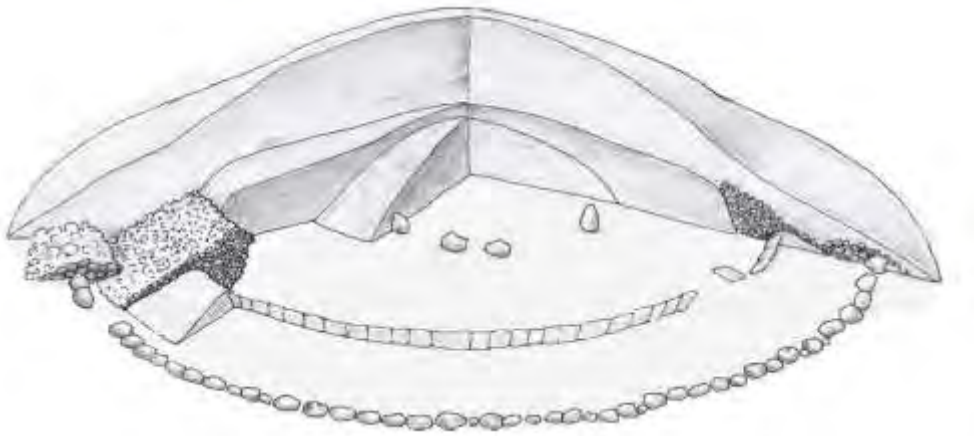


Figure II-12 The building sequence of the Sagaholm barrow.
(Taken from Goldhahn and Ling 2013:284, figure 15.5. Author: Joakim Goldhahn)

The worship of the dead and the worship of the sun appear to have been connected, as evinced by the alignment of the ship settings in Gotland and in Eastern Småland, where a considerable amount of them face east towards the sunrise and are located near the water (Bradley and Widholm 2007:46-47). Moreover, the iconography in the Kivik grave seems to be structured according to its orientation to the cardinal points and the 24-hour cycle of the sun (Randsborg 1993:118-119). Consequently, the ship might have been regarded as the only vehicle able to transport the sun and the souls of the deceased across the different realms, with the shore acting as the meeting point between the sky, the land, and the water as well as the liminal border between life and death (Helskog 1999:92).

III. Rock-art ship iconography

III.1 Theoretical background

Petroglyphs, like many other visual media, are mental representations of cognitive categories and abstractions shared by a large group of people. According to cognitive psychology, the conceptual categorisation of objects is driven by different levels of abstraction and the imagery found in petroglyphs is mainly built around basic and subordinate typicality levels (Ranta 2017:526). The characteristics of basic level categories include: their members have similar overall shapes and ways in which people interact with them; they represent the first categorisations made by children; their members are the most quickly identified as belonging to a category; and the categories can be identified from an averaged shape of their members (Rosch 1978:31-35). Subordinate typicality level categories result from the typification of basic level categories. For instance the depiction of a solar boat such as in Figure II-9, or a sun horse, would be subordinate categories of the basic categories of ships and horses respectively.

The typification and marked simplification of rock-art iconography indicates that the images are prototypical representations of cognitive categories. Indeed, research in cognitive psychology suggests that there is a privileged or canonical perspective in the recognition and imagination of objects and that therefore typical representations include the most representational view of objects, for instance ships, humans and horses are always depicted in profile (Ranta 2017:528). Thanks to these prototypical representations, it is relatively easy to identify many basic and subordinate categories.

Despite the risks of speculative reasoning, many scholars (e.g. Panofsky 1972) argue that the investigation of the meanings of works of art, i.e. iconographic interpretation, in opposition to the study of their formal aspects, i.e. typology, is possible, meaningful and even necessary. According to Panofsky (1972:3-17), three interpretative levels characterise an iconographical analysis. First, the pre-iconographic level consists basically in the identification of the basic and subordinate categories for which the recognition is straightforward and does not require specific knowledge, for instance

the identification of a ship or human figure. Second, the iconographical level would be the correct identification of the motifs, which requires prior knowledge in the subject. For instance the identification of a specific individual or an abstract concept, such as identifying the wheel motifs shown in Figure II-9 as sun symbols or the human figures in Figure II-4 as depictions of the mythical twins. Finally the iconological level of interpretation would regard the motifs as a result of a cultural worldview and would therefore develop socio-cultural narratives based on these motifs, for instance the interpretations of social organisation discussed in section II.2 or the cosmological interpretations discussed in section II.3.

The pre-iconographic interpretation of rock-art iconography is definitely the easiest due to the visual resemblance of most motifs to real-life objects. The iconographical and the iconological interpretations, which are the base of narratological interpretations, are however more challenging and prone to speculative reasoning. Especially since petroglyphs are seldom consistently arranged in a linear manner, have disparate dates of creation, and images are often superimposed, heterogeneous and ambiguous (Ranta 2017:524-525). Nevertheless, narrative interpretations of specific rock panels have been carried out. For instance, Skånberg (2014) makes use of parallels between aetiological myths about seasonal changes from the Mediterranean region (ancient Greece, ancient Egypt and Mesopotamia) to interpret the rock panel 255:1 in Fossum (Figure AII-10) as a ritualistic calendar meant to guide the gods through the seasons. The same panel is interpreted by Melheim (2013) as depicting a mythological narrative about the creation of the universe using analogies from Indo-European myths and themes found in Vedic and Norse poetry. These interpretations are however extremely speculative, not only because they use myths from cultures that are distant in time and space but also because they assume that the petroglyphs were all carved at the same time. Actually, the chronological analysis of the war-related motifs proves that the carvings were not made on a single occasion nor BA phase and thus the panel should not be interpreted as a depiction of a cosmological meta-narrative but rather as a mixture of stories that changed through time (Ling and Bertilsson 2016:69-70).

In order to minimise the risks of speculative reasoning in iconographical and iconological interpretations, the use of pictorial semiotics may prove valuable. Pictorial semiotics is a nomothetic science that focuses on the qualitative aspects of images based on generalities and regularities in opposition to idiographic sciences which focus on singular images, e.g. art history. It allows thus identifying patterns based on the categorisation of visual displays, such as petroglyphs, by means of comparative approaches (Sonesson 2009:267-270). The identification of patterns is crucial in order to understand the meaning of symbols because recurrent traits and associations are the manifestation of typical and common semantic relations between cultural phenomena and therefore, they embody the deep and universal semiotic aspects of these symbols (Kobylinski 1995:14).

III.2 Identification

The identification and categorisation of ships in the BA rock carving imagery represents the pre-iconographical level of interpretation. As prototypical representations of real-life objects, ship carvings display distinctive features in their overall shapes, as illustrated in Figure III-1, and can easily be identified by their visual resemblance to real-life ships, such as the Hjortspring boat, a real-life boat from prehistoric times found in a bog on the island of Als in Denmark.

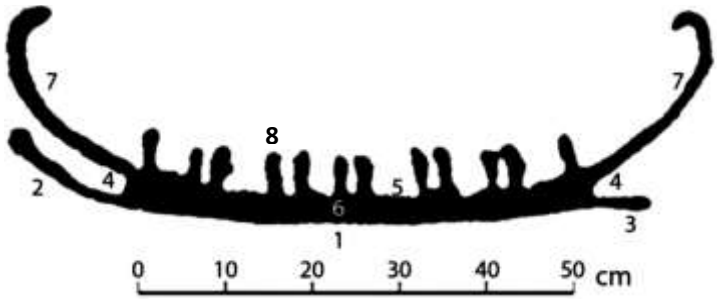


Figure III-1 EBA ship carving from the rock panel Tanum 311:1.
It shows the characteristic features of BA rock-art ship iconography.
1: keel line, 2: fore keel extension, 3: aft keel stabiliser, 4: fore and aft stems, 5: gunwale, 6: hull, 7: fore and aft prows, 8: crew strokes.
(Adapted from: Ling 2012:472, figure 5. Copyright: THU)

Noteworthy is the resemblance between the crew strokes on the rock carving and the position of the people on board when looking at the profile of the reconstruction of the Hjortspring at sea, see Figure III-2. The crew strokes in the rock carving appear to be arranged in pairs and two single strokes are shown in elevated positions in the fore and aft sides, possibly representing the helmsman and the stemsman (Ling 2012:472).

Figure III-2 Photograph of the reconstruction of the Hjortspring boat, at sea.
(Taken from Ling 2012:472, figure 6. Copyright: M. Johansen, 2003)

Not all the ship carvings in the rock-art display all the features, whether because of damage due to weathering, because they were not completely carved or because some features were deliberately omitted, e.g. crew strokes or keel extensions. The minimal definition for an image to be considered a ship is thus the presence of a keel line and at least one of the prows.

The hull can either be completely carved like in Figure III-1 or hollow like in Figure II-10. In some cases vertical lines connect the keel with the gunwale like in Figure AI-3 or horizontal lines appear along the hull like in Figure AI-12.

The fore highly-raised keel extension is a characteristic feature of the LBA Scandinavian ship iconography that is not found in the Mediterranean area and its practical function is difficult to understand (Kaul 1998:180-181). The keel extension on the earliest ship depictions were perfectly horizontal and it is in the course of the EBA that they start turning upwards until they become massive in the LBA, see Figure III-3. The extension in the aft is usually short and horizontal. Often boldly depicted and hardly ever pointy, it generally does not extend further than the aft prow and it is reasonable to consider it to be some sort of stabiliser (Kaul 1998:183).

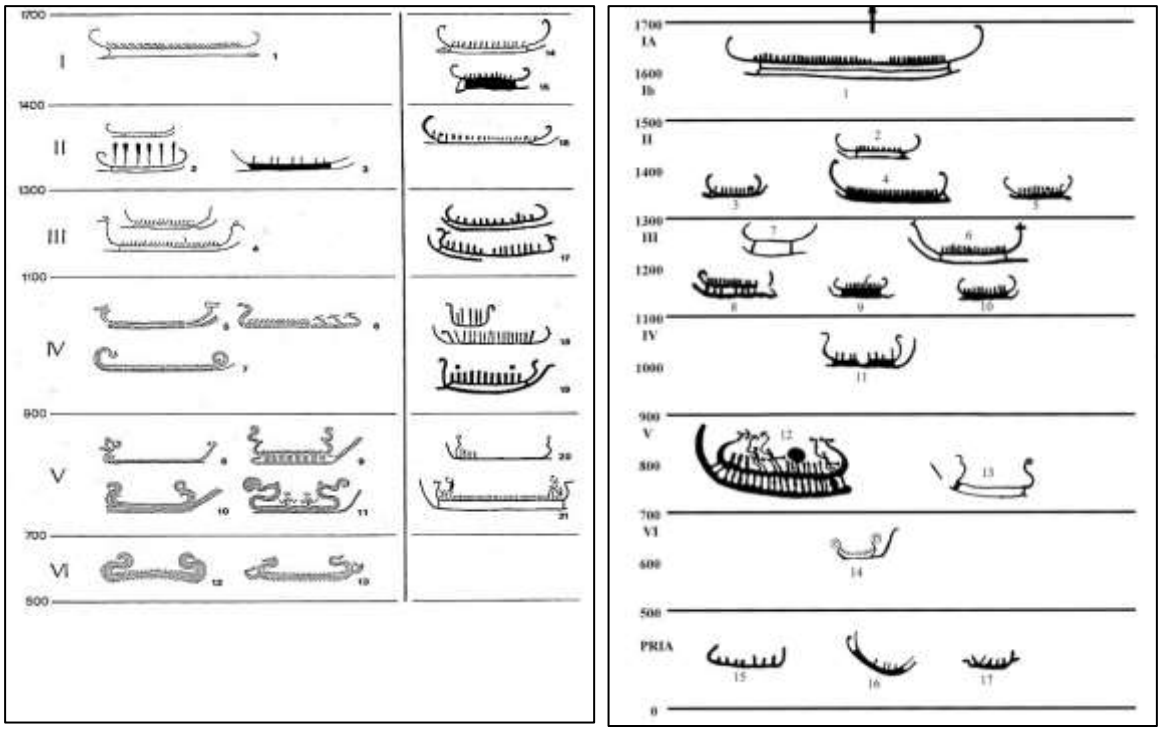


Figure III-3 Diagrams showing the chronology of BA ship iconography.
EBA about 1700-1100 BCE, LBA about 1100-500 BCE, PRIA about 500-200 BCE.

Left: Chronological typological development of BA ship renderings. The left column shows ship renderings on datable bronze objects and the right column shows ship carvings datable by analogy with the renderings on the bronze objects. (Taken from Kaul 1998:88, figure 53)

Right: Measured ship depictions on rock-art in relation to shore displacement. (Taken from Ling 2014:105, figure 7.35)

The prows show a great variation as they can display disparate lengths, curvatures and decorations. The ship depictions in the EBA are characterised by high prows turning inwards while in the LBA the prows appear turned outwards and often decorated with horse heads (Kaul 2018:235, Ling 2012:470), see Figure III-3. The horse heads are in many cases hard to identify as they are depicted by just a pair of small curved lines on top of the prow and can be in many cases very faint (Kaul 1998:175).

Prows and keel extensions define the level of asymmetry of the ship. From the earliest periods the ships were already asymmetric and this aspect was further accentuated with time until the LBA when this trend becomes less pronounced due to the increasing length and vertical curvature of the aft keel extensions. Nevertheless, symmetry is the major trait that chronologically distinguishes BA from PRIA ship depictions as the latter are completely symmetrical (Ling 2012:470).

Prows and keel extensions are the most useful feature for typological dating purposes. Kaul (1998) used a stylistic comparison between ship depictions on datable bronze objects and ship depictions on rock carvings to produce a typological series of ship iconography throughout the BA, see Figure III-3 (left). Based on a detailed study of the BA shoreline and the relative location of the rock carvings, Ling (2014) created a rock-art ship chronology, Figure III-3 (right), that supports and complements Kaul's chronological typology. Despite the two different approaches, the chronologies present only minor differences (Milstreu 2017:40).

Figure III-4 The chronological development of panel 12 in Aspeberget. Different colours represents different phases. Green: Montelius period I, 1700–1500 BCE; Dark blue: Montelius period II, 1500–1300 BCE; Light blue: Montelius period III-IV, 1300–900 BCE; Brown: Montelius period VI and the earliest Iron Age, 700–200 BCE; Red: Images not possible to date. (Source: Rédei *et al*., 2019:545, figure 1. Image: Tomas Persson based on orthophoto (SfM) made by SHFA 2019 Id: 14185).

As already mentioned in section I.1, many rock-art panels were updated and modified at different times throughout the BA, for instance Figure III-4. This phenomenon challenges the narrative interpretations of specific rock panels that attempt to identify myths, as shown in the example of the Fossum panel. Since the main goal of the current study is to gain knowledge about the universal semiotic aspects of the ship as a symbol rather than to develop a narrative interpretation of specific scenes, and due

to the extension limitations of this dissertation, the chronological features of ships will not be evaluated. Investigating if the ship symbolism changed through time could, however, be a valuable topic for further research. I have chosen to focus on two iconographic features, the presence or absence of crew and the sailing direction of ships, because these two aspects have been commonly used to interpret the symbolism of ships in BA society, especially the religious symbolism related to solar and death cults, see section II.3.

III.3 Sailing direction

The fact that the raised keel extension indicates the fore of the ship and therefore its sailing direction is confirmed by several depictions on the bronze renderings. Although most strokes are depicted vertically, the ones that are depicted slanting, which would represent the natural inclination of people while rowing or paddling, see Figure III-2, are always inclined in the direction of the keel extension (Kaul 1998:181,182). In many cases this is further confirmed in rock-art depictions were crew strokes are depicted with circles representing heads and even clear human figures appear sited holding oars, all of them facing the direction of the keel extension, e.g. Figure II-2, Figure II-3, Figure AII-25. Moreover, all the ship renderings in the bronze objects that are associated with sun images appear to be sailing to the right, being left-right the direction in which the sun moves across the sky during the day (Kaul 1998:186).

The sailing direction of the identified ships is thus determined by the presence of a fore keel extension, and further confirmed by the presence of the aft stabiliser in the cases where both features are present. In the current iconographical analysis the ships were categorised into five groups regarding their sailing direction: right, left, unknown, right?, and left?. That is, the ships clearly sailing to the right or to the left, the ships for which it was impossible to identify the direction and the ships for which the identification of the sailing direction was not clear. The ships for which the sailing direction is unknown are ships for which the keel extensions are not carved, are weathered or display insignificant fore and aft differences. The ships for which the sailing direction is unclear are generally ships that display a keel extension but it is not

100% certain whether it is the aft or the fore one because one side of the ship is weathered.

III.4 Crew

The ships were categorised into manned or unmanned ships. In this respect ships with either human figures on board or crew strokes are considered as manned. The purpose of such basic conceptual categorisation is to check whether the presence or absence of people on board can be linked to the orientation of the rock panels and the sailing direction of the ships and, consequently, to the movement of the sun and the existence of a death cult, see section II.3.3. Of course, other categorisations could provide valuable information on other topics. For instance, Ling (2012 and 2014:185-208) looked at the number and positioning of crew strokes and the presence of human figures to investigate the social and military organisation of BA society by looking at signs of social inequality and maritime initiation rites. He found that while the crew in EBA ships is mainly depicted in an anonymous and collective manner by means of crew strokes, in LBA ships enlarged human figures in commanding positions and staged representations of crew are more common, suggesting an increasing social stratification (Ling 2012:481; Ling 2014:208).

IV. Analysis of the ship motifs

IV.1 The sites

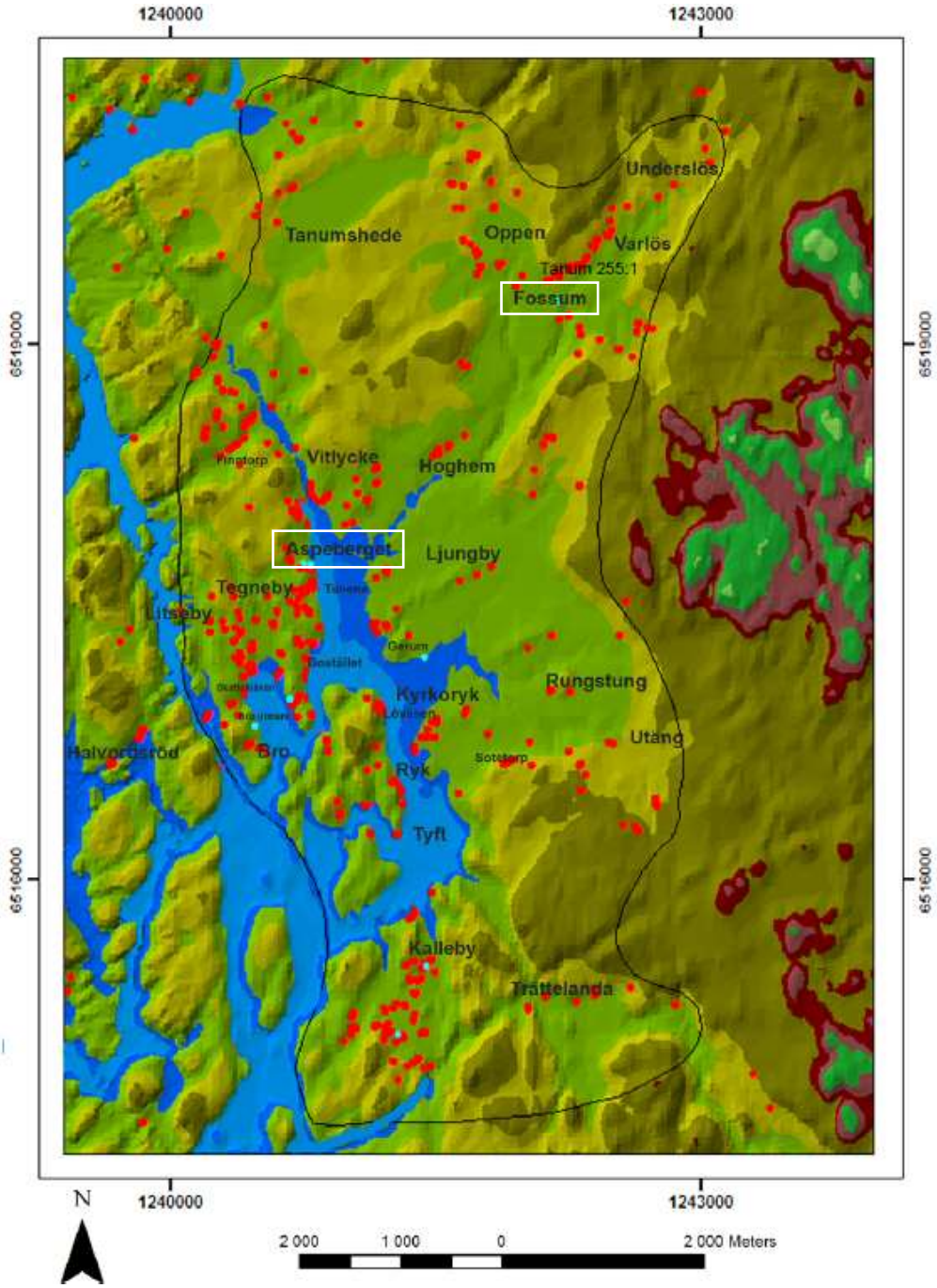


Figure IV-1 Map of the rock-art in the World Heritage area of Tanum during the BA. The red dots indicate the distribution of rock-art sites. The black line indicates the extend of the World Heritage area. The dark blue area indicates the sea level in 1500 BCE (about 15 meters above current sea level). The light blue area indicates the sea level in 900 BCE (about 12 meters above current sea level). The Aspeberget and Fossum sites are highlighted. (Taken from Ling and Bertilsson 2016:59, Figure 2)

The municipality of Tanum in the province of Bohuslän, South-West Sweden, has the highest concentration of BA rock-art in Europe and, from the approximately 10,000 ship images documented in Bohuslän, nearly 2000 are found in Tanum (Ling and Cornell 2010:26; Ling *et al.* 2018b:499). In Bohuslän, rock-art is either found at locations close to the BA shoreline or on higher grounds close to old roads or natural passages in the landscape (Ling 2014:101). In the World Heritage area of Tanum, about 70% of the sites are located near the BA shoreline (Ling 2014:107,148,149), Figure IV-1.

Figure IV-2 Map of the Bohuslän province (left) and present-day location of the sites of Aspeberget and Fossum (right).
(Adapted from: Hedberg 2016 (left) and Google 2019 (right))

The Aspeberget hill contains 20 rock-art panels. Due to the shore displacement process caused by post-glacial isostatic land uplift, the site is nowadays located in an agricultural landscape about 5 km from the coastline, see Figure IV-2, but during the BA the eastern side of the hill was surrounded by the sea (Rédei et al. 2019:544), see Figure IV-3. Therefore, the rock panels faced the sea during the BA and it appears that while new panels were created following the regression of the shoreline, older panels on higher ground were also being modified at the same time (Ling 2014:121-123).

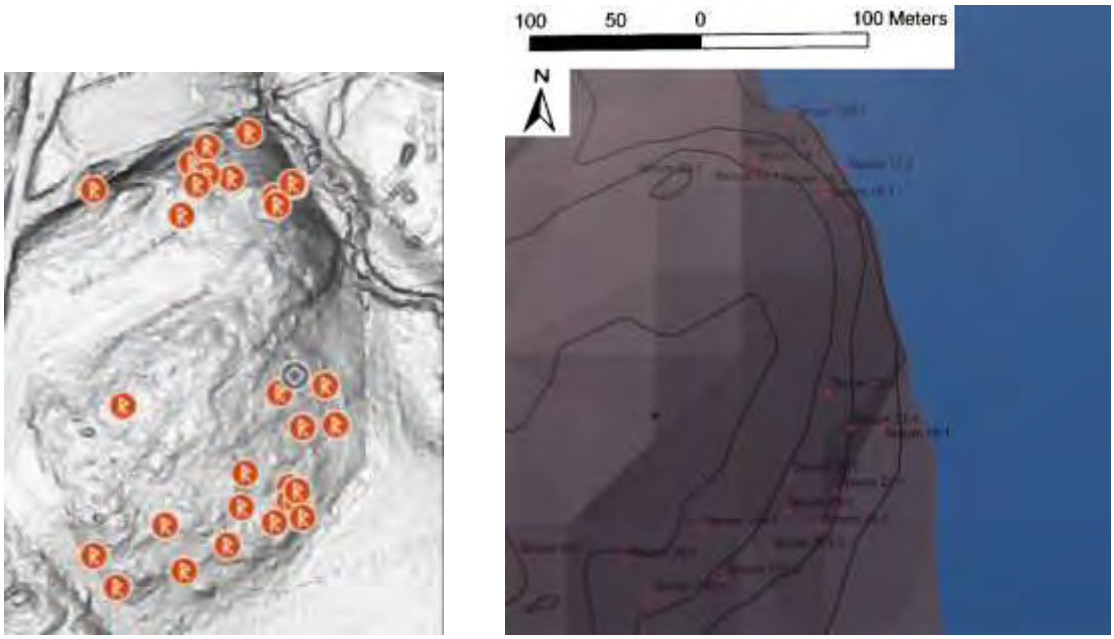


Figure IV-3 Topography of the Aspeberget hill.
Left: Present day topography and location of archaeological sites.
(Taken from RAA 2019).
Right: Reconstruction of the Aspeberget hill during the beginning of the LBA around 1000 BCE when the shoreline was about 12-13 metres above today's sea level.
(Taken from Ling 2014:122, Figure 8.12)

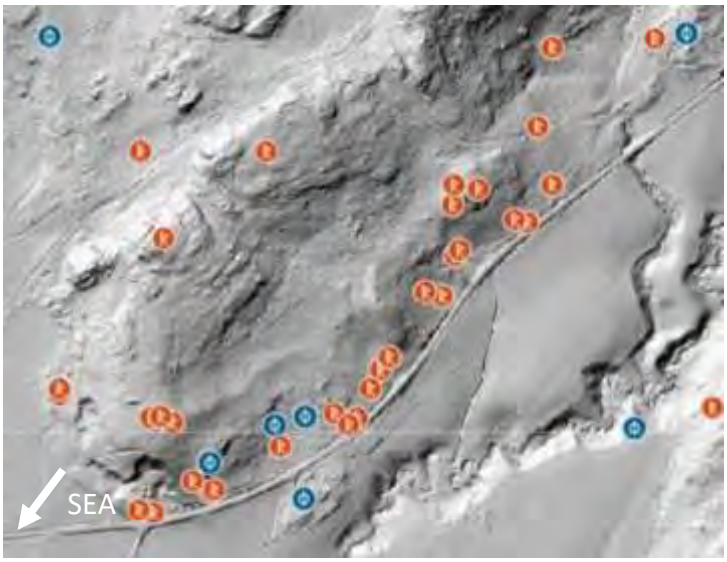


Figure IV-4 Topography of the Fossum site.
The circles indicate the location of archaeological sites. The white arrow indicates the direction to the BA coast, see also Figure IV-1. (Adapted from: RAA 2019)

The site of Fossum is located on high ground far from the BA shoreline. The rock-art panels are mostly located on the southern and south-eastern slopes of the landscape and none of them was facing the sea during the BA (Ling and Bertilsson 2016:58-59), Figure IV-4.

IV.2 Data collection

In order to carry out the iconographic analysis, a large amount of data was collected. Not all the required information is available in a single source so different sources were employed. The list of rock panels documented at the sites of Aspeberget and Fossum were obtained from Milstreu and Prohl 1996 and 1999, respectively.

The information about the orientation of these panels was obtained from the Swedish National Heritage Board site (RAA 2019). The information in RAA (2019) regarding the orientation of the panels is basic. The orientation of the slope from higher to lower altitude is given in qualitative terms such as N, NE, S-SE. A slope oriented NE means that the rock surface is facing the NE direction and thus a person observing the rock would be facing the opposite direction, i.e. SW. For my analysis the data regarding the orientation of the panels has been clustered in 8 panel orientations: N, NE, E, SE, S, SW, W, NW.

A short description, in Swedish, of the iconography on each panel can also be found in RAA (2019). The amount of ships and other image types is specified. However, no illustrations nor rubbings of the panels are available in this site so the identification of the ship carvings, as well as their sailing direction and the presence of crew, was done using the illustrations and rubbings from SHFA (2019) and the illustrations from Milstreu and Prohl (1996 and 1999). In some cases, neither illustrations nor rubbings were available so photographs and documentation diaries from either SHFA (2019) or RAA (2019) were employed. The ships, as well as their sailing direction and the presence of crew, were identified by looking at the features described in Chapter III. Due to the vast amount of imagery and since the focus of the current analysis is the ship motif, the information regarding the quantity of other image types was taken directly from Milstreu and Prohl (1996 and 1999) and I did not attempt to identify them from rubbings and illustrations, as I did for the ship motifs.

The list and illustrations of the rock panels used in the current analysis can be found in Appendices I and II. I have chosen to use illustrations rather than rubbings because figures are more easily labelled and quickly recognised, especially when the images are printed to fit an A4 paper. Only in some cases in which information is missing in the illustrations, detailed parts of the rubbings or photographs are shown. For each

panel a table is provided with the orientation of the panel and the list of identified ships, including sailing direction and presence of crew.

IV.3 Results: Aspeberget

IV.3.1 Orientation

Almost all the rock panels (90%) at Aspeberget are oriented towards the sea and also towards the direction of the sunrise: 35% facing NE (sunrise in summer), 25% facing SE (sunrise in winter), and 30% facing E (sunrise the rest of the year) , see Figure IV-5. This indicates that BA people deliberately chose to create rock-art on specific sides of the hill either because of the sea, the sunrise or both.

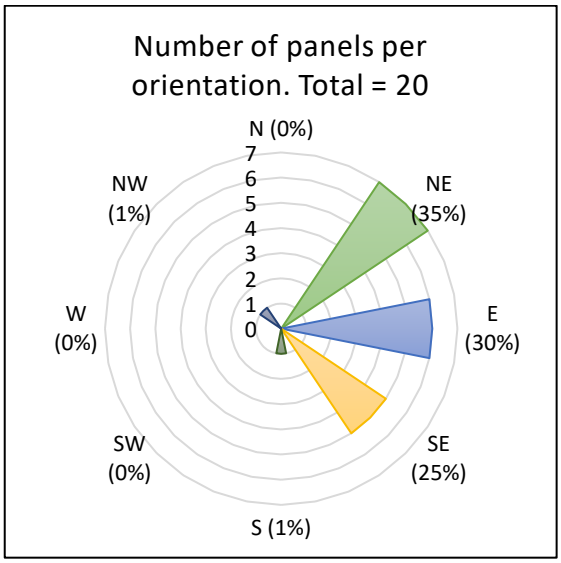


Figure IV-5 Number of panels per orientation at the Aspeberget site. Between brackets percentages per category are given.

Ship motifs are exclusively found facing the sunrise and more noticeably facing the sunrise around the winter and summer solstices. 39% of the ships are located in panels facing NE and another 39% of the ships are located in panels facing SE while the remaining 22% are located in panels facing E, see Figure IV-6. The difference between identified ships and ships as reported in the Fornsök site (22 ships) has little effect in the obtained results as the percentages for each orientation category remain essentially the same.

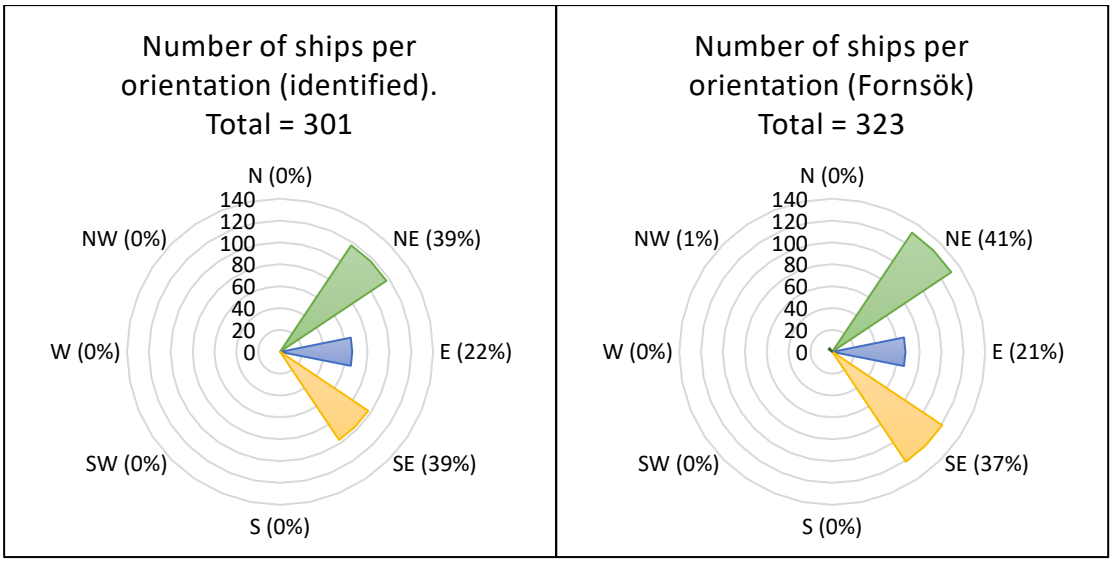


Figure IV-6 Number of ships per orientation of their rock panel at the Aspeberget site. Left: identified ships. Right: number of ships as stated in RAA 2019.

The same preference for summer and winter sunrise also applies to the other motifs. 43% of the figures are found in panels facing NE, 35% in panels facing SE and 21% in panels facing E, see Figure IV-7. For all three directions most of the figures are concentrated in a couple of panels, see Figure IV-8. In fact, there is one main panel in each direction that contains most of the figures in this direction: 76% of the figures and 80% of the ships for SE, 77% of the figures and 85% of the ships for E, and 55% of the figures and 79% of the ships for NE.

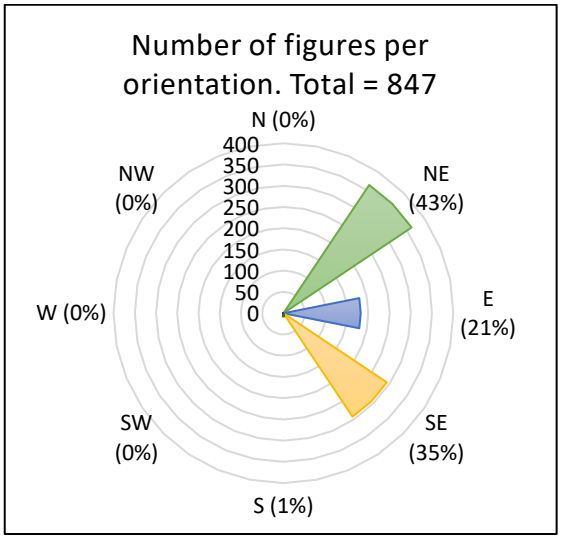


Figure IV-7 Number of figures per orientation at Aspeberget.

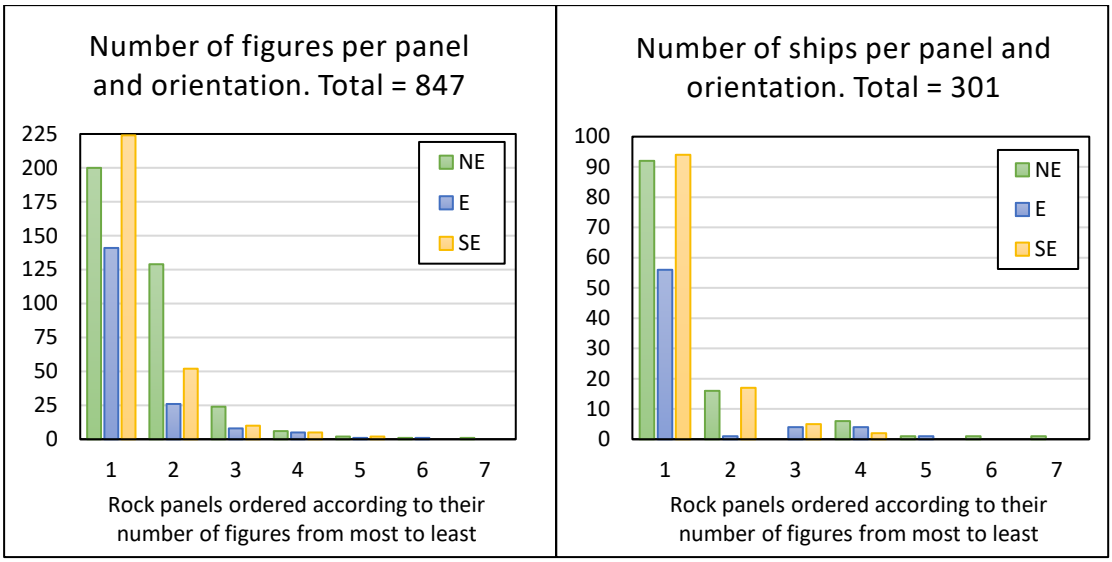


Figure IV-8 Number of the figures and ships per panel and orientation at Aspeberget.

The proportion of ships with respect to other motifs is somewhat higher in panels facing SE, although the proportions between different types of motifs seem to be independent from the orientation of the panel, see Figure IV-9. It is remarkable that the panels facing NE, E, and SE, which contain 99% of the figures, have all more or less the same relative amount of ships, cup-marks, human figures, animals and other imagery types. Figure IV-9 reveals other remarkable patterns. First, in panels facing NE, therefore summer sunrise, there is a noteworthy amount (9%) of weapon imagery while in the panels facing SE, winter sunrise, weapons represent just 2%. Second, panels facing SE are the ones with a smaller variety of image types: ships, cup-marks, animals and humans represent 95% of the figures while in other orientations this percentage reduces to 85% (NE) and 89% (E) as they contain more weapons, circles, tools and footprints. Third, when looking at the overall picture the number of ships per orientation seems to be related to the number of cup-marks. When looking at individual panels, a high linear correlation is however only found on panels facing E and SE, for which the Pearson correlation coefficients r are 0.90 and 0.98 respectively. For panels facing NE no correlation is found (r of 0.46), see Figure IV-10. The correlation coefficient for the whole data set independently from the orientation is 0.76.

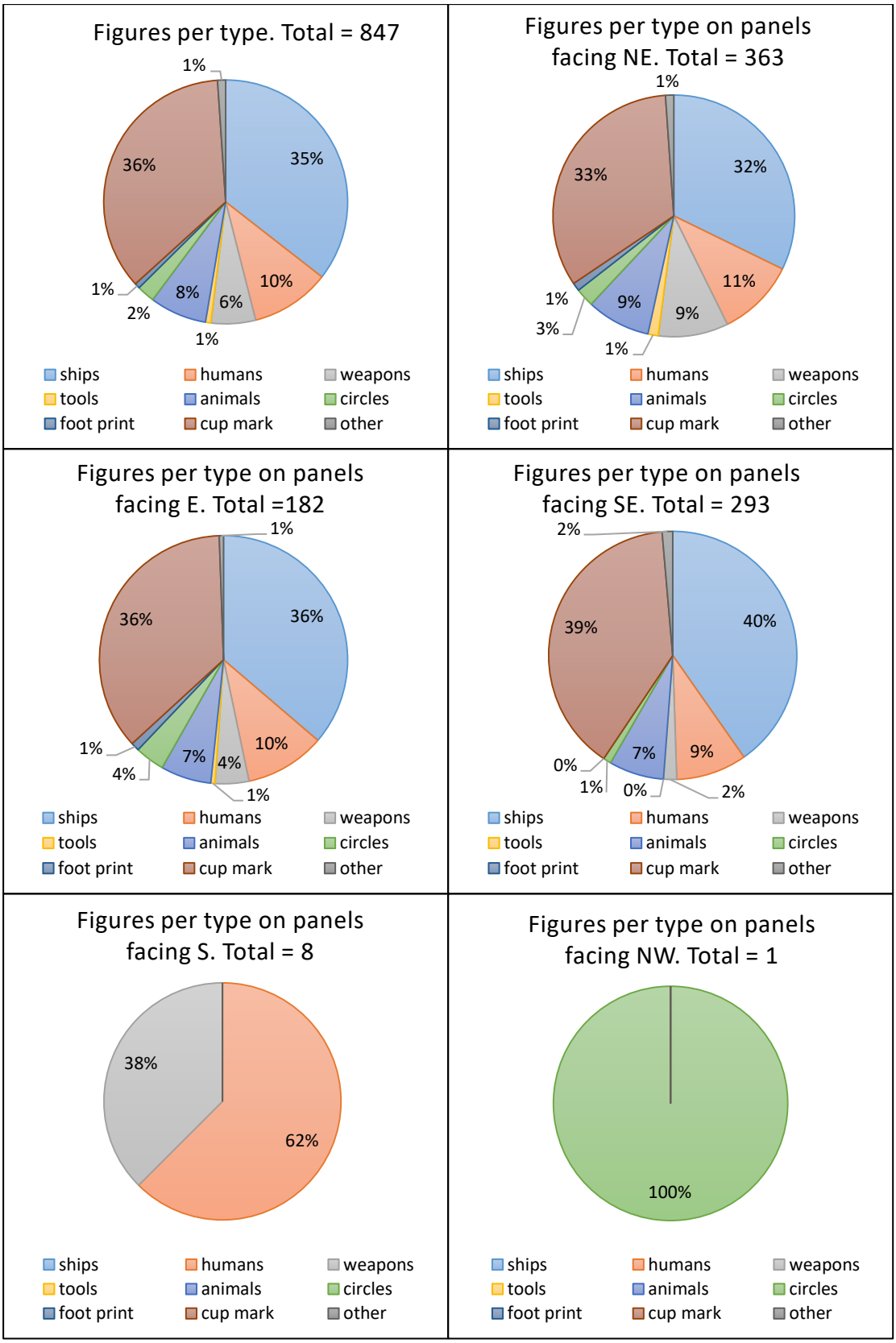


Figure IV-9 Distribution of the figure types per orientation at Aspeberget.

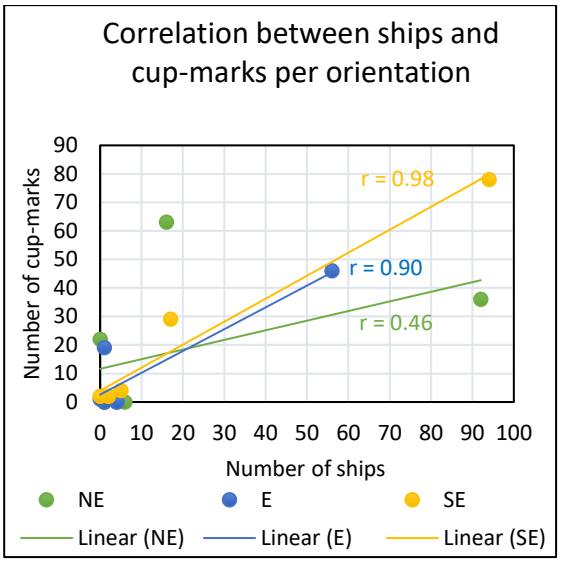


Figure IV-10 Correlation between ships and cup-marks at Aspeberget.

IV.3.2 Sailing direction

It has been possible to identify with certainty the sailing direction of 49% of the ship carvings at Aspeberget. Another 9% of the ships present features that suggest a sailing direction but are not very clear. For 42% of the ships the sailing direction was impossible to identify, either because of damage such as weathering or because the keel extension and stabiliser are not carved or could not be identified. The analysis of the sailing direction shows that the number of ships sailing to the right is equal to the number of ships sailing to the left (29% each), see Figure IV-11. The proportion however differs when the orientation of the panels is considered. In the panels facing NE, most of the ships (51%) sail to the right, while just 17% sail to the left. On the contrary, in the panels facing SE, most of the ships (47%) sail to the left and only 12% sail to the right. In the panels facing E the sailing direction appears to be less relevant as most of the ships (62%) show no clear sailing direction and the ones that do are roughly equally sailing either to the right (20%) or to the left (18%), see Figure IV-12.

In order to check whether the differences between sailing direction and orientation of the panels are significant a χ^2 test of homogeneity is performed. For convenience clear and unclear sailing directions are clumped together. The results show that the differences are significant, thus the distributions of sailing direction per orientation are not a result from chance, see Table IV-1.

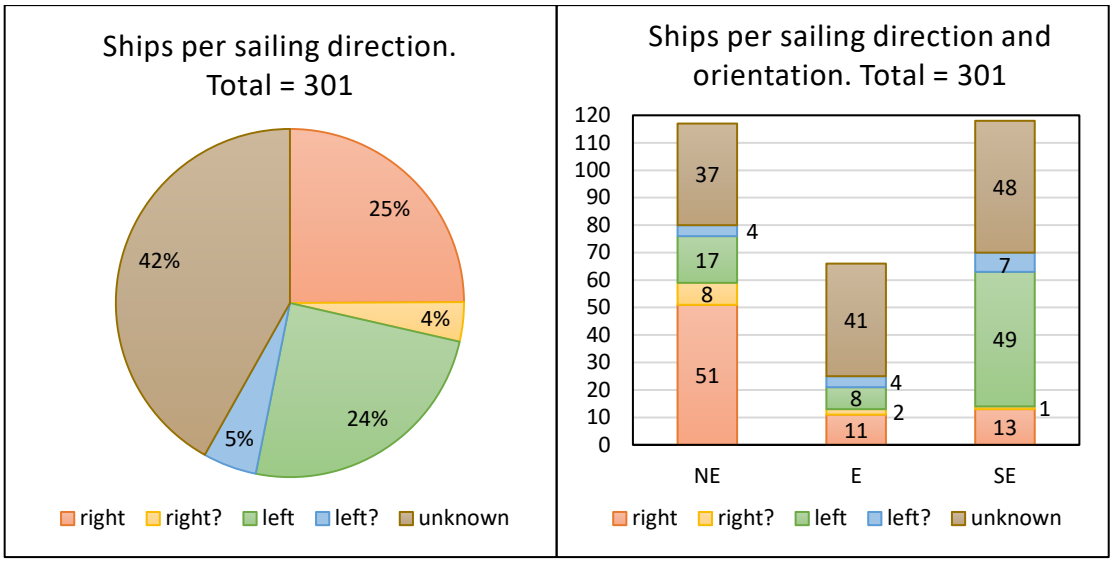


Figure IV-11 Distribution of the sailing direction of the ship carvings at Aspeberget.

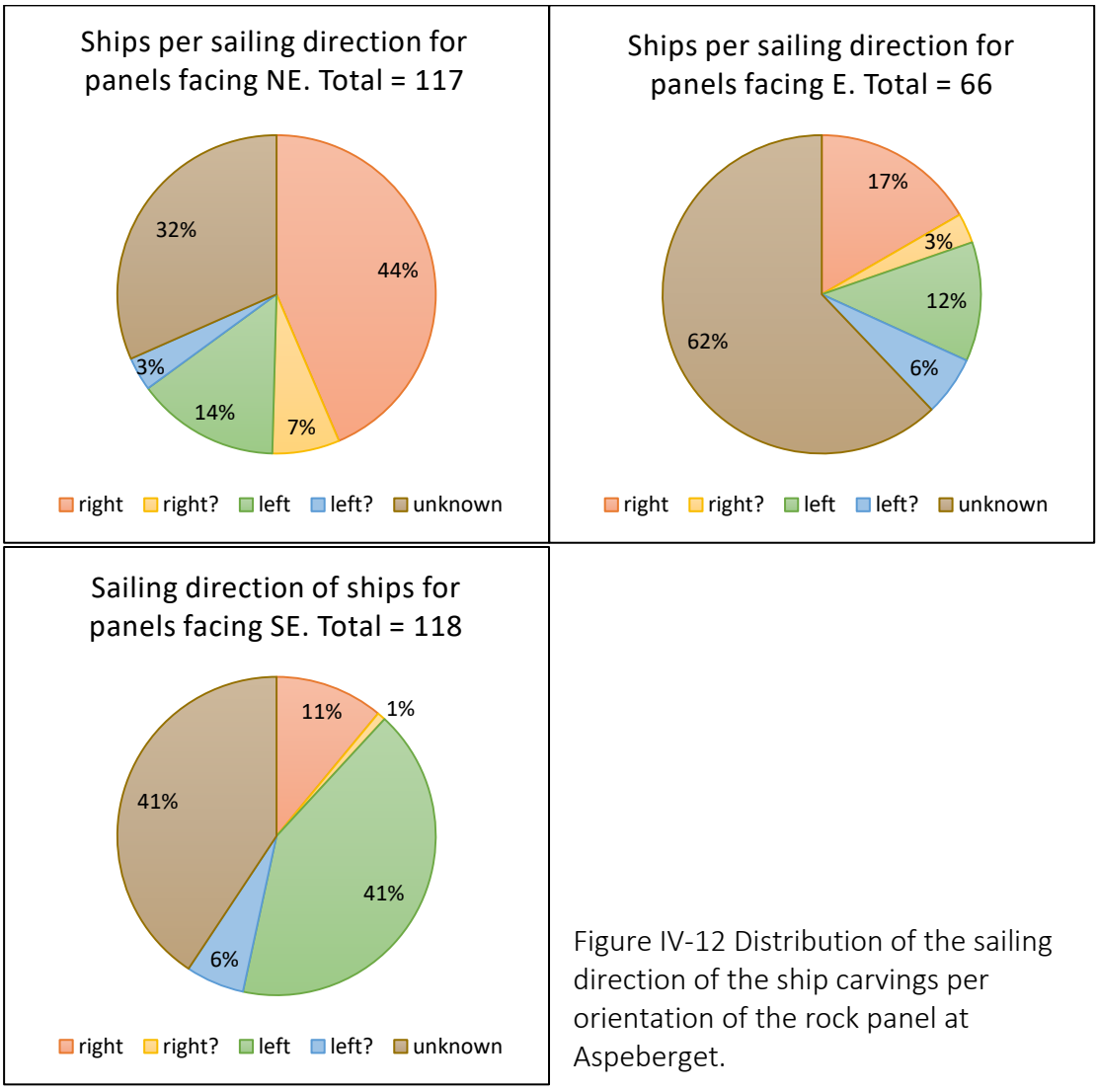


Figure IV-12 Distribution of the sailing direction of the ship carvings per orientation of the rock panel at Aspeberget.

			Category			
Measured			NE	E	SE	Total
	Group	right	59	13	14	86
		left	21	12	56	89
		unknown	37	41	48	126
		Total	117	66	118	301
Expected	Expected		Category			
			NE	E	SE	Total
	Group	right	33.42857	18.85714	33.71429	86
		left	34.59468	19.51495	34.89037	89
		unknown	48.97674	27.62791	49.39535	126
		Total	117	66	118	301
χ2-test results			Category			
			NE	E	SE	
	Group	right	**19.56105**	1.819264	11.52785	
		left	5.342308	2.893908	**12.77191**	
		unknown	2.928786	**6.472183**	0.039417	
	χ2 total		63.356672			
	p-value		**5.71E-13**			

Table IV-1 χ2-test results for sailing direction and orientation in Aspeberget. The highest χ2 values for each category are highlighted, indicating where the significant differences are.

To know where the significant differences are, one can look at the χ2 values of each cell or perform a post hoc Scheffé comparison procedure (Franke et al. 2012:454-457; McHugh 2013:146). Comparisons are done between left and right, unknown and right, unknown and left, and unknown and a combination right+left. With a critical p-value of 0.05, the Scheffé procedure confirms that there is a significant preference for ships sailing to the right in panels facing NE and for ships sailing to the left in panels facing SE, while there is a significant preference for unknown direction in panels facing E, see Table IV-2.

Scheffé critical value = 3.080		Category		
		NE	E	SE
Scheffé statistic	right/left	**6.687227**	0.308484	**7.19179**
	right/unknown	6.090659	3.063733	3.710783
	left/unknown	0.952146	3.448974	3.703723
	known/unknown	3.103625	**3.694272**	0.351747

Table IV-2 Post hoc Scheffé procedure results for sailing direction and orientation in Aspeberget. A statistic value higher than the critical value means that the differences are significant.

IV.3.3 Crew

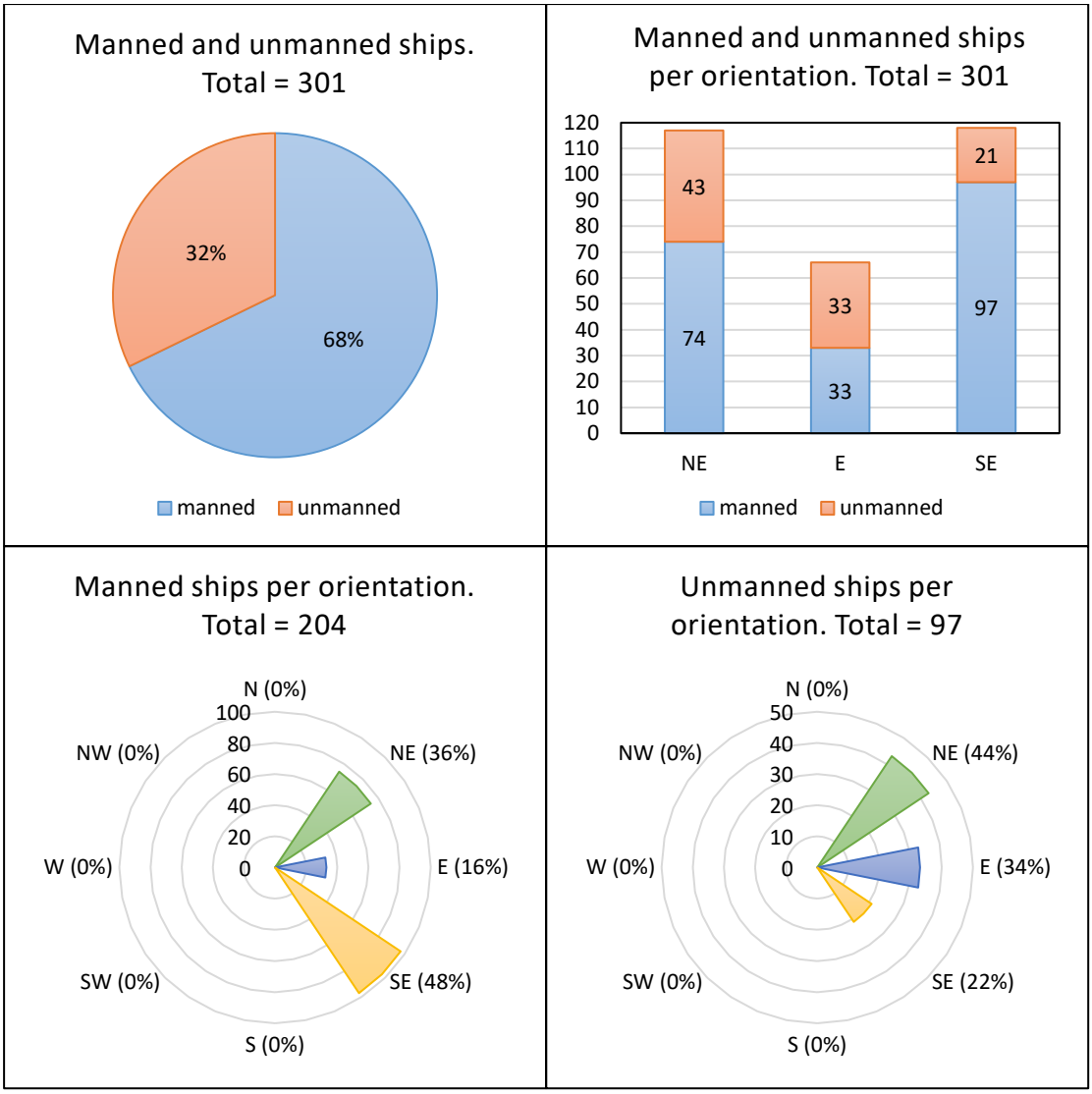


Figure IV-13 Distribution of the manned and unmanned ships per orientation of the rock panels at Aspeberget.

Figure IV-13 shows that most of the ships at Aspeberget are manned (68%) and that the panels facing SE have the highest amount (48%) of manned ships while the panels facing NE have the highest amount (44%) of unmanned ships. The proportion of manned ships in panels facing SE is higher than for the rest of the orientations: 82% of the ships in panels facing SE are manned, while this percentage is 63% for panels facing NE and 50% for panels facing E, see Figure IV-14.

Performing a χ^2 test of homogeneity for the manned and unmanned ships proves that the differences between the groups are significant since the probability that the deviations are due to chance alone is less than 0.02%, see Table IV-3. Thus, crew and orientation are dependent variables. The Scheffé procedure confirms that there is a significant preference for manned ships in panels facing SE and unmanned ships in panels facing E, while the differences in panels facing NE are not significant, see Table IV-4.

Measured			Category			
			NE	E	SE	Total
	Group	Manned	74	33	97	204
		Unmanned	43	33	21	97
		Total	117	66	118	301
Expected			Category			
			NE	E	SE	Total
	Group	Manned	79.29568	44.7309	79.97342	204
		Unmanned	37.70432	21.2691	38.02658	97
		Total	117	66	118	301
χ2-test results			Category			
			NE	E	SE	
	Group	Manned	0.353667	3.076485	3.625009	
		Unmanned	0.743794	**6.470134**	**7.62373**	
	χ2 total		21.892818			
	p-value		**0.000018**			

Table IV-3 χ2-test results for manned and unmanned ships and orientation in Aspeberget. The highest χ2 values are highlighted, indicating where the significant differences are. In this case the significant small amount of unmanned ships in panels facing SE (21 against the expected 38) indicates a preference for manned ships in this orientation.

Scheffé critical value = 2.448	Category		
	NE	E	SE
Scheffé statistic	1.328375	**3.269468**	**4.751405**

Table IV-4 Post hoc Scheffé procedure results for manned and unmanned ships and orientation in Aspeberget. A statistic value higher than the critical value means that the differences are significant.

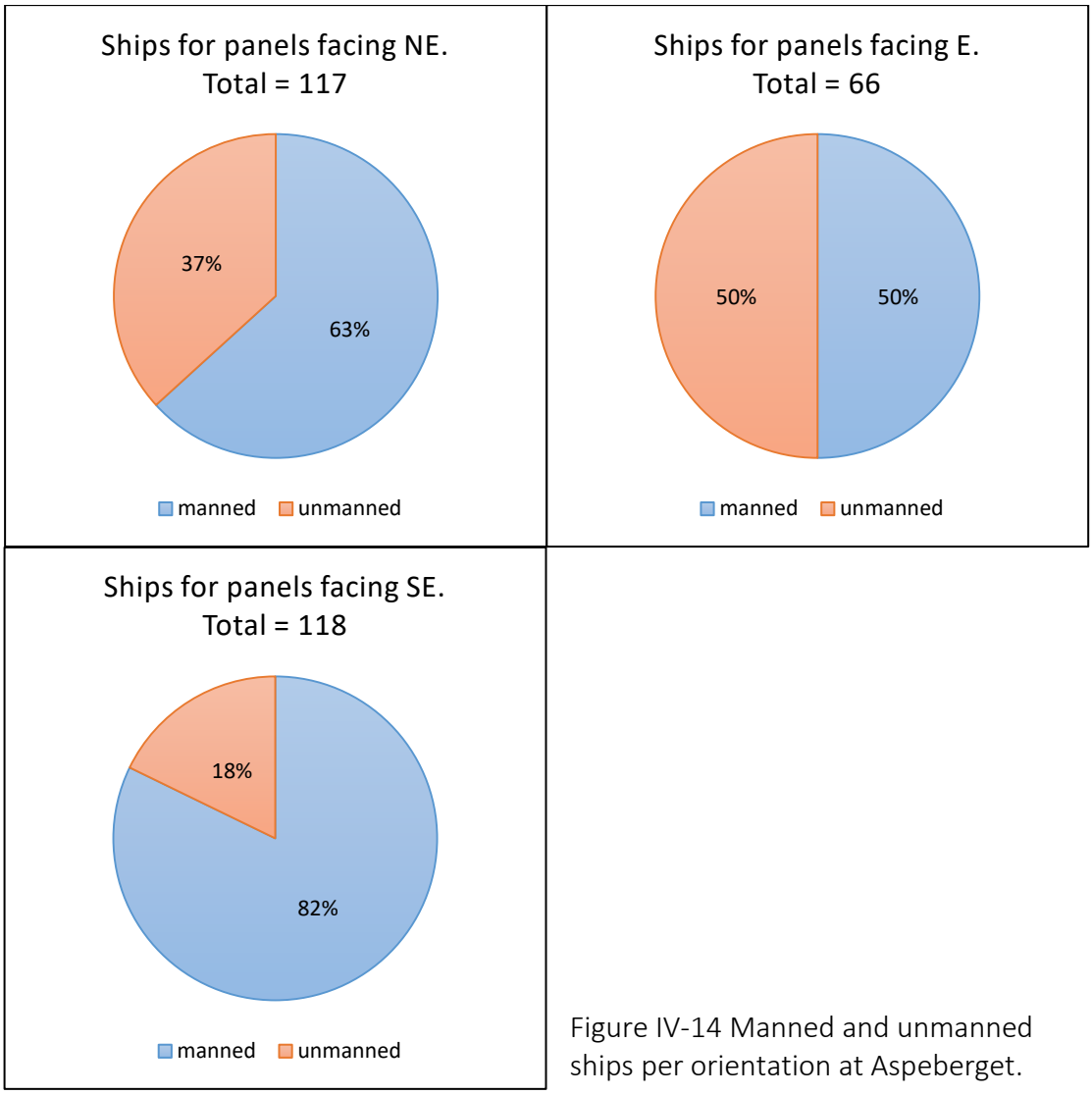


Figure IV-14 Manned and unmanned ships per orientation at Aspeberget.

Regarding the relation between crew and sailing direction, Figure IV-15 shows that for manned ships 37% sail to the left, 33% to the right and 30% have an unknown sailing direction. For unmanned ships the majority has an unknown sailing direction (66%), while 21% sail to the right and 13% to the left. We should however keep in mind that some unmanned ships could correspond to unfinished ship carvings for which neither the crew lines nor the keel extension were completed and that for some ships the direction cannot be identified due to weathering. However, it is clear that the preference was to indicate the sailing direction on manned ships and this is confirmed by the χ^2 and Scheffé tests: there is a significant preference for manned ships sailing left while for ships sailing right the presence or absence of crew is less relevant, see Table IV-5 and Table IV-6.

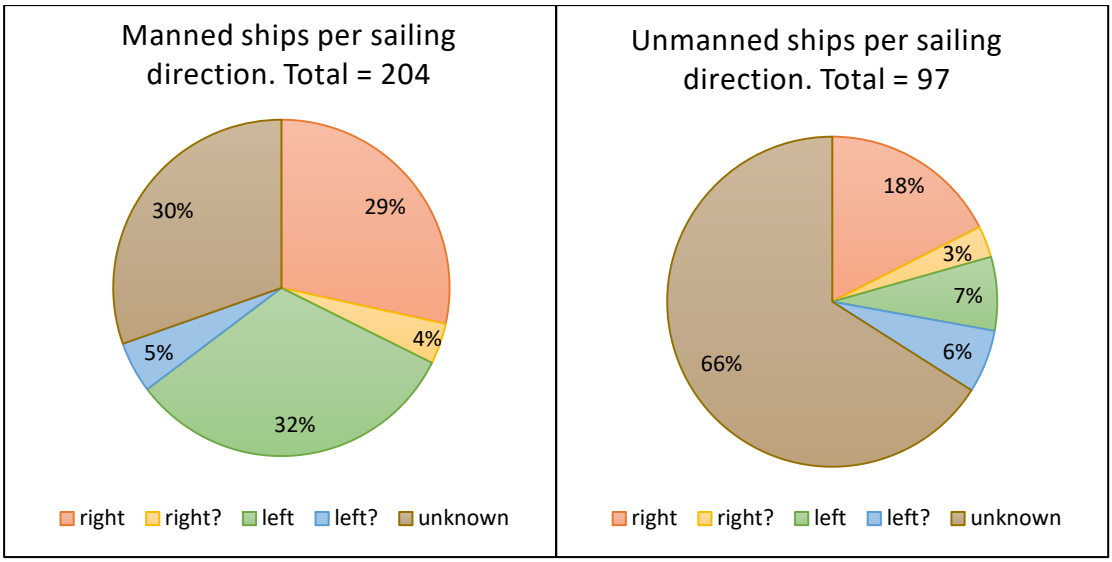


Figure IV-15 Manned and unmanned ships per sailing direction at Aspeberget.

Measured			Category			
			right	left	unknown	Total
	Group	Manned	66	76	62	204
		Unmanned	20	13	64	97
		Total	86	89	126	301
Expected	Expected		Category			
			right	left	unknown	Total
	Group	Manned	58.28571	60.31894	85.39535	204
		Unmanned	27.71429	28.68106	40.60465	97
		Total	86	89	126	301
χ2-test results			Category			
			right	left	unknown	
	Group	Manned	1.021008	4.076593	6.40951	
		Unmanned	2.147275	**8.573453**	**13.47979**	
	χ2 total		35.707634			
	p-value		**1.76E-08**			

Table IV-5 χ2-test results for manned and unmanned ships and sailing direction in Aspeberget. The highest χ2 values are highlighted, indicating where the significant differences are. In this case the significant small amount of unmanned ships sailing to the left (13 against the expected 28.7) indicates that manned ships sailing to the left are favoured.

Scheffé critical value = 2.448	Category		
	right	left	unknown
Scheffé statistic	2.233527	**4.928494**	**6.14752**

Table IV-6 Post hoc Scheffé procedure results for manned and unmanned ships and sailing direction in Aspeberget. A statistic value higher than the critical value means that the differences are significant.

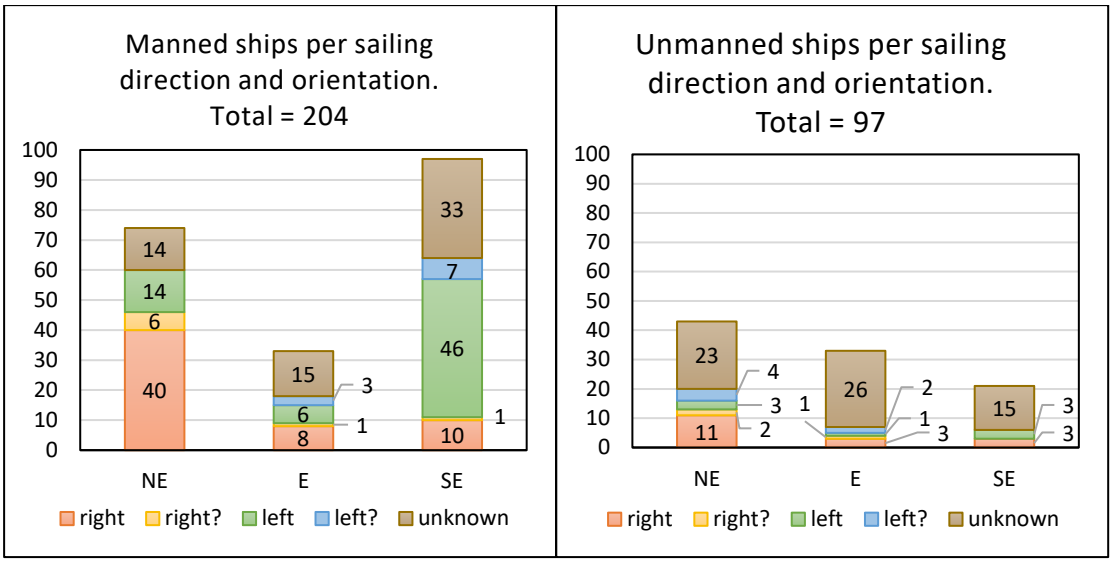


Figure IV-16 Manned and unmanned ships per sailing direction and orientation at Aspeberget.

Figure IV-16 shows that for panels facing SE the predominant images are manned ships sailing to the left (53 out of 118, so 45%). For panels facing NE the predominant images are manned ships sailing to the right (46 out of 117, so 39%) and there is also a noteworthy amount of unmanned ships sailing to the right (13 out of 117, so 11%). For panels facing E there is an equal amount of manned and unmanned ships and the manned ships, for which the sailing direction appears to be more relevant, sail roughly equally either to the left and to the right.

IV.4 Results: Fossum

IV.4.1 Orientation

At Fossum there is a bigger variety in the orientation of the panels although the majority of them are facing SE (53%), see Figure IV-17. Contrarily to Aspeberget just 5% of the panels face NE. 4% of the panels face E and there is a noteworthy amount of panels facing S (6%), which would correspond to the highest position of the sun in the sky at mid-day, and facing the sunset: 6% of the panels facing SW (sunset in winter) and 6% facing NW (sunset in summer). Noteworthy is the number of panels that have no slope and therefore are not facing any direction (9%) since horizontal panels are uncommon (Milstreu and Prohl 1999:58).

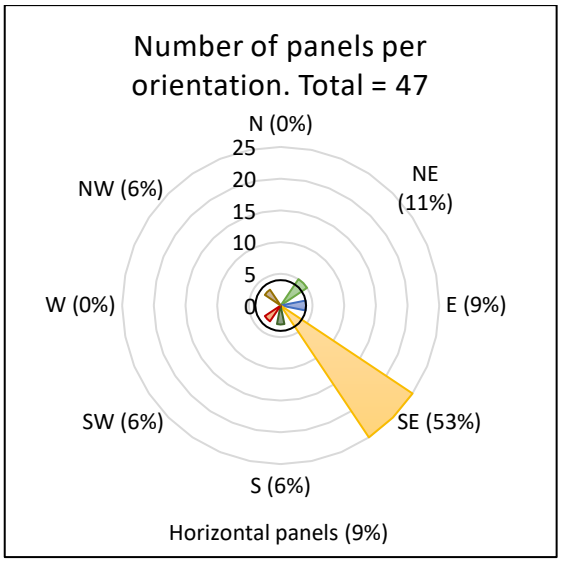


Figure IV-17 Orientation of the panels at the Fossum site.
The black circle indicates the number of horizontal panels.

As in Aspeberget, the connection between ships and the sunrise is manifest since 91% of them are located in panels facing SE (58%), E (17%) and NE (16%), see Figure IV-18. The remaining ships are mainly found in horizontal panels.

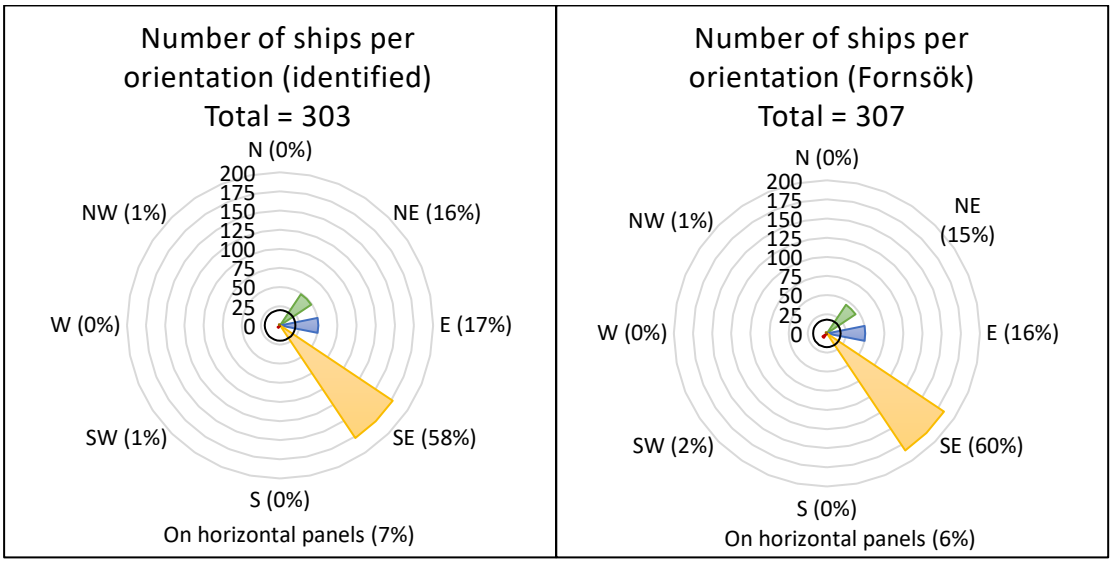


Figure IV-18 Number of ships per orientation of their rock panel at the Fossum site.
Left: identified ships. Right: number of ships as stated in RAA 2019.
The black circle indicates the number of horizontal panels.

Figure IV-19 shows that 83% of all the figures face the sunrise and, as with ships, most are facing SE (54%). There are, however, a noteworthy amount of figures in panels facing SW, although almost no ships.

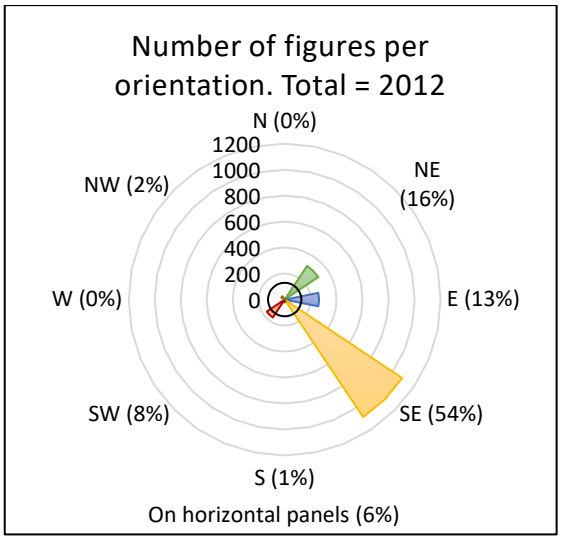


Figure IV-19 Number of figures per orientation at Fossum.
The black circle indicates the number of horizontal panels.

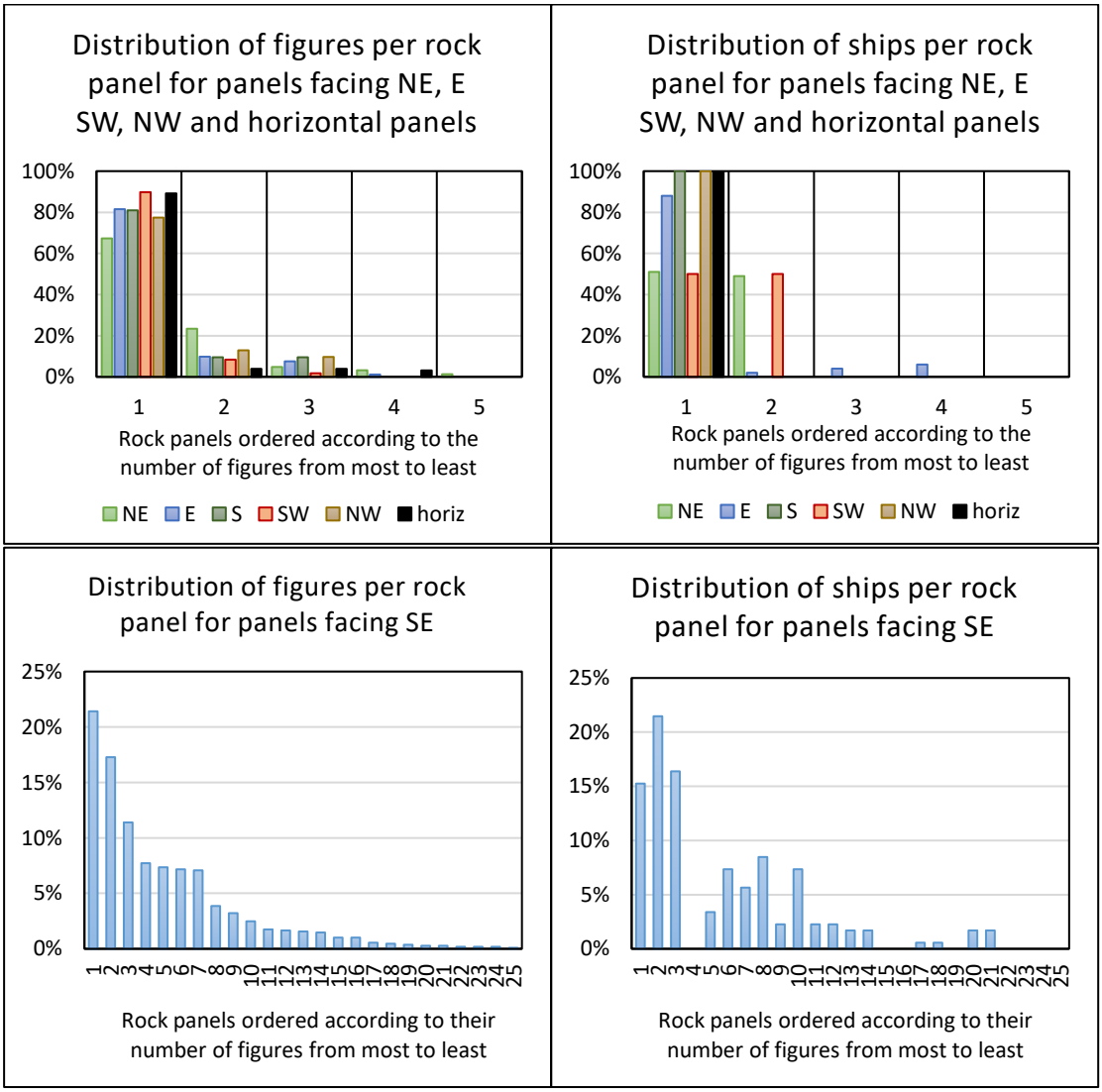


Figure IV-20 Distribution of the figures and ships per rock panel for each orientation at Fossum. The values are given in percentage of the total for each orientation.

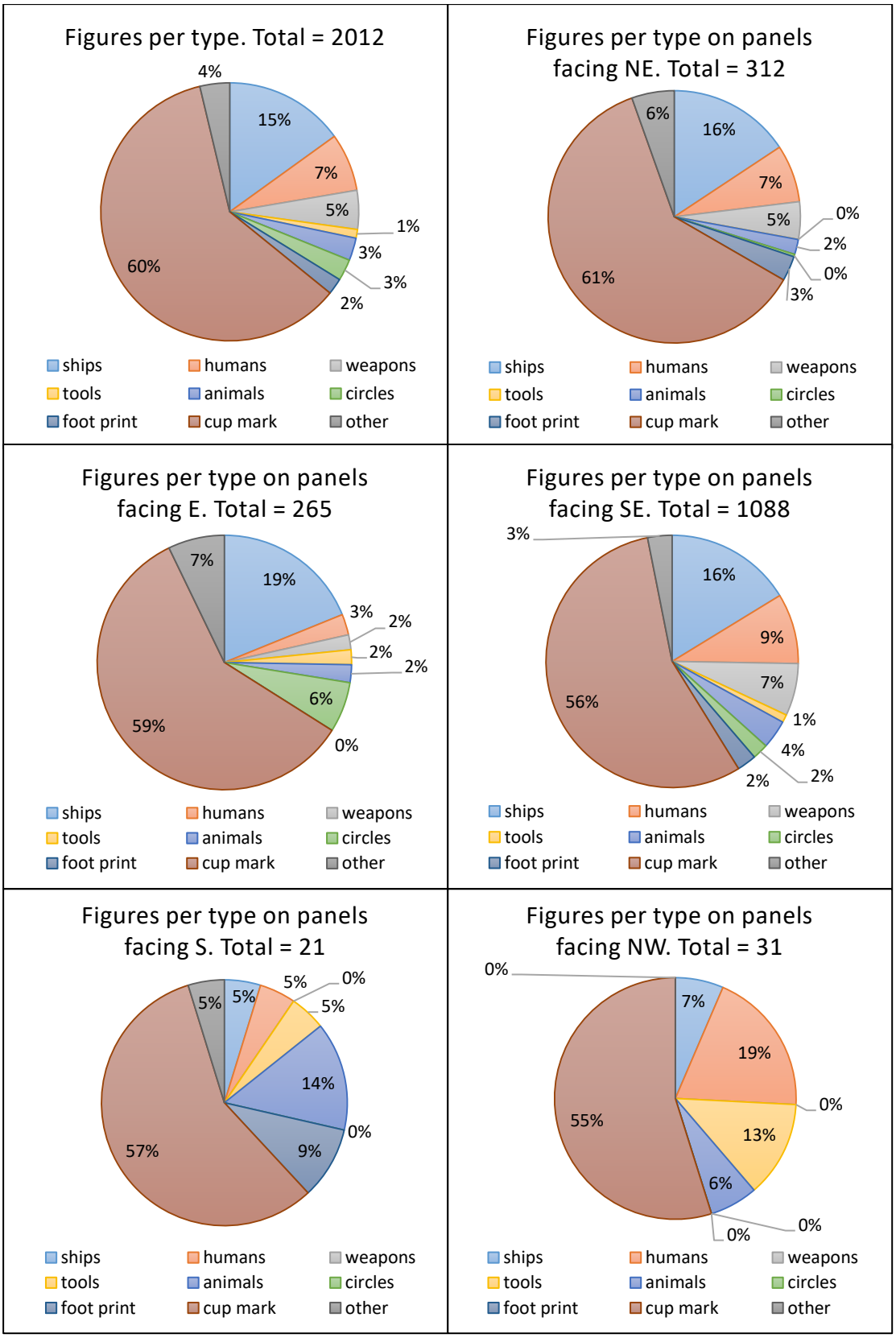
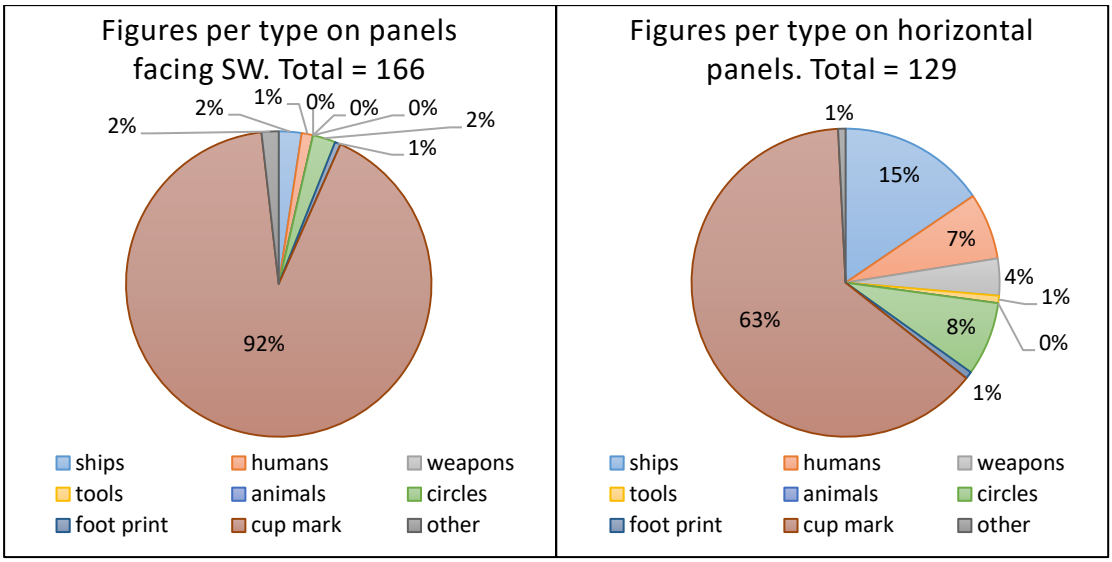


Figure IV-21 Distribution of the figure types per orientation at Fossum (continues on next page).



Distribution of the figure types per orientation at Fossum. (Continuation of Figure IV-21 on previous page)

Most of the figures in rocks facing NE, E, SW, NW and on horizontal panels are concentrated in one main panel as in Aspeberget, see Figure IV-20. However, for panels facing SE, the figures and ships are more spread. The panel with more figures contains just 21 % of the total. In Asperget 76% of the figures for panels facing SE were found in one panel, while in Fossum a similar proportion (78%) is found in 7 panels. In Aspeberget 80% of ships were found in one panel while in Fossum this proportion is found in seven panels.

As shown in Figure IV-21, the most common figure at Fossum is the cup-mark which represents 60% of the figures. Contrarily to Aspeberget the number of cup-marks does not seem to be related to the number of ships, which represent just 15% of the figures. The Pearson correlation coefficient is 0.71 for the whole dataset and 0.72 for panels facing SE. The only strong correlation coefficients are found in panels facing E (0.98) and in horizontal panels (1.00), see Figure IV-22.

In panels facing NE, SE and E the ship is the most common image besides the cup-mark. In panels facing NE and SE human figures and weapons are common but they are not in panels facing E, where circles become more plentiful. In panels facing S animals and footprints are the most common images besides cup-marks while it is humans and tools in panels facing NW. In panels facing SW almost all figures are cup-marks. In

horizontal panels, as in panels facing NE, SE and E, ships are the most common image besides cup-marks, followed by humans and circles.

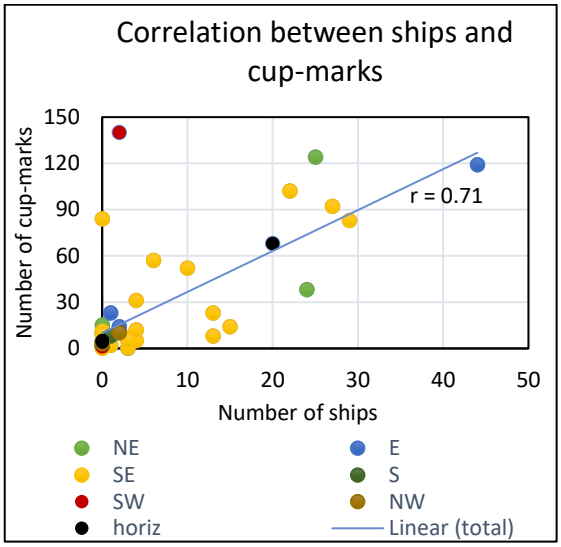


Figure IV-22 Correlation between ships and cup-marks at Fossum.

IV.4.2 Sailing direction

At Fossum, the sailing direction appears to have been more relevant than in Aspeberget since just 28% of the ships have an unknown direction, the percentage was 42% at Aspeberget. Most of the ships at Fossum sail to the left (46%) and as in Aspeberget most of these are found in panels facing SE, see Figure IV-23.

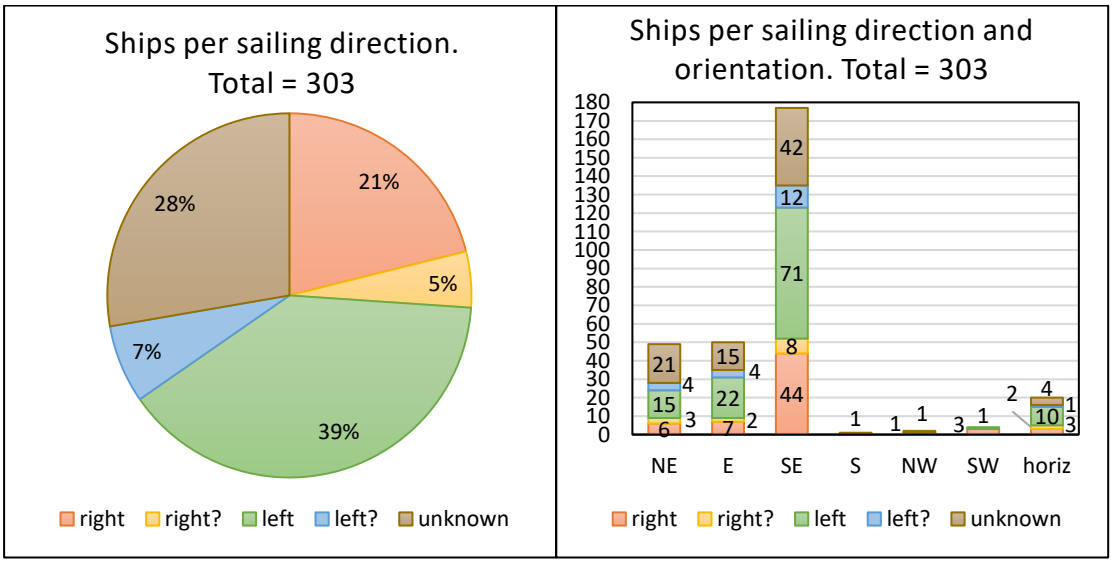


Figure IV-23 Distribution of the sailing direction of the ship carvings at Fossum.

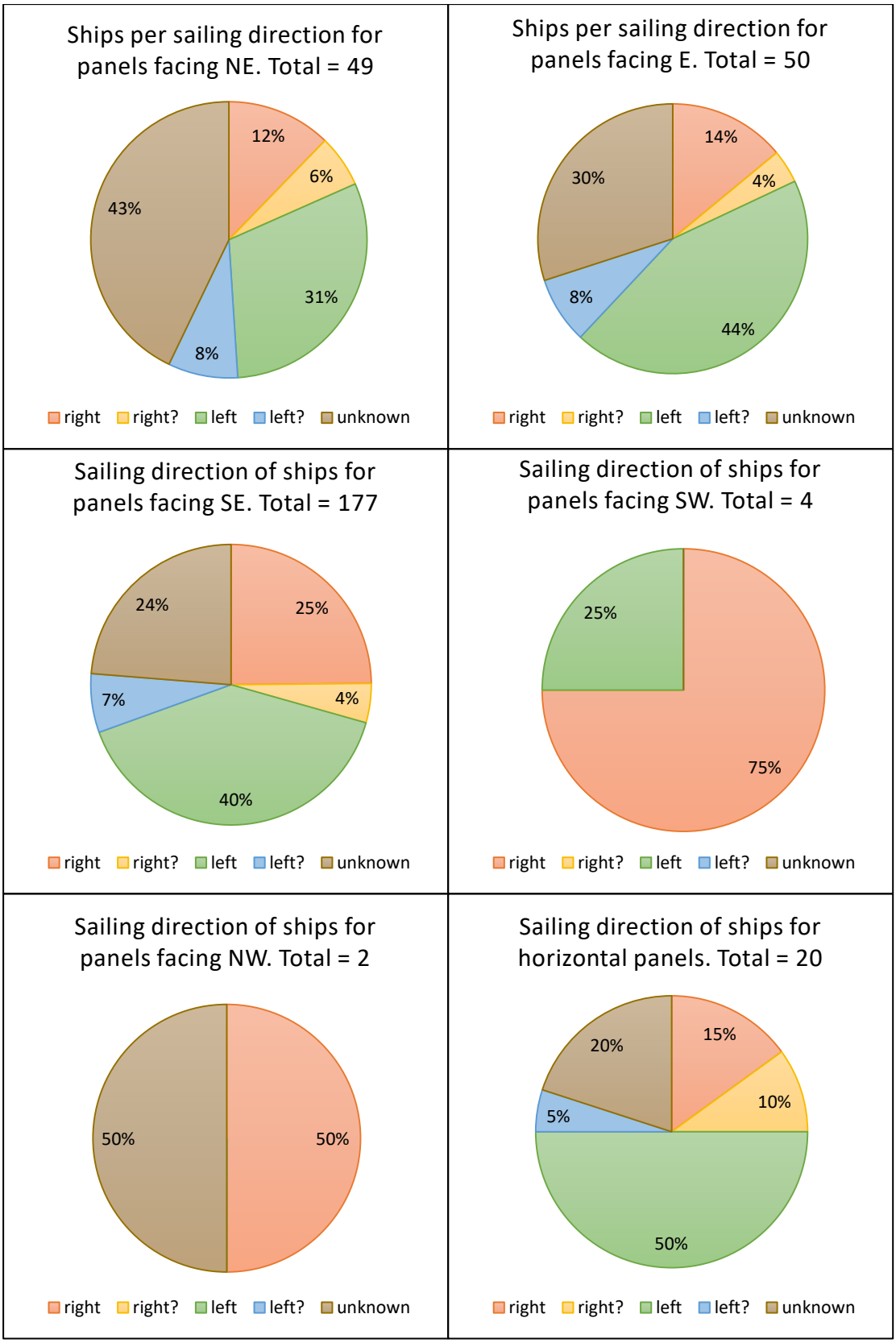


Figure IV-24 Distribution of the sailing direction of the ship carvings per orientation of the rock panel at Fossum.
The ships on panels facing south are not shown in a diagram as there is only one ship for which the sailing direction is unknown.

Figure IV-24 shows that for panels facing the sunrise and for horizontal panels most of the ships sail to the left, although the proportion is bigger in panels facing E (52%) and SE (47%). With 24% and 43% of ships with unknown direction in panels facing SE and NE respectively, it seems that the sailing direction was considered to be more relevant in panels facing SE. In panels facing SW and NW ships are mostly sailing to the right, although due to the small number of figures for these directions the patterns might actually not represent real differences. In horizontal panels 55% of the ships sail to the left and 35% to the right, the proportion of ships with unknown direction is just 20%.

Performing χ^2 and Scheffé test shows however that the differences in sailing direction per orientation are not as significant as in Aspeberget and that the differences might just be the result of chance with a probability of 12.5%, see Table IV-7 and Table IV-8. The directions S, SW and NW are left out of the analysis due to the reduced number of samples and the χ^2-test requirements (McHugh 2013:144).

		Category				
		NE	E	SE	horiz	Total
Group	right	9	9	52	5	75
	left	19	26	83	11	139
	unknown	21	15	42	4	82
	Total	49	50	177	20	296
Expected		Category				
		NE	E	SE	horiz	Total
Group	right	12.41554	12.66892	44.84797	5.067568	75
	left	23.01014	23.47973	83.11824	9.391892	139
	unknown	13.57432	13.85135	49.03378	5.540541	82
	Total	49	50	177	20	296
		Category				
		NE	E	SE	horiz	
Group	right	0.939622	1.062519	1.140553	0.000901	
	left	0.698874	0.270521	0.000168	0.275345	
	unknown	4.062129	0.095254	1.00898	0.428345	
χ2 total	9.9832119					
p-value	**0.125**					

Table IV-7 χ2-test results for sailing direction and orientation in Fossum. No significant differences are found.

Scheffé critical value = 3.548		Category			
		NE	E	SE	horiz
Scheffé statistic	right/left	0.351326	1.340478	1.423879	0.338901
	right/unknown	2.228022	1.107095	2.361838	0.478799
	left/unknown	2.120039	0.076352	1.22868	0.919404
	known/unknown	2.344448	0.390867	1.847238	0.871561

Table IV-8 Post hoc Scheffé procedure results for sailing direction and orientation in Fossum. A statistic value higher than the critical value means that the differences are significant.

IV.4.3 Crew

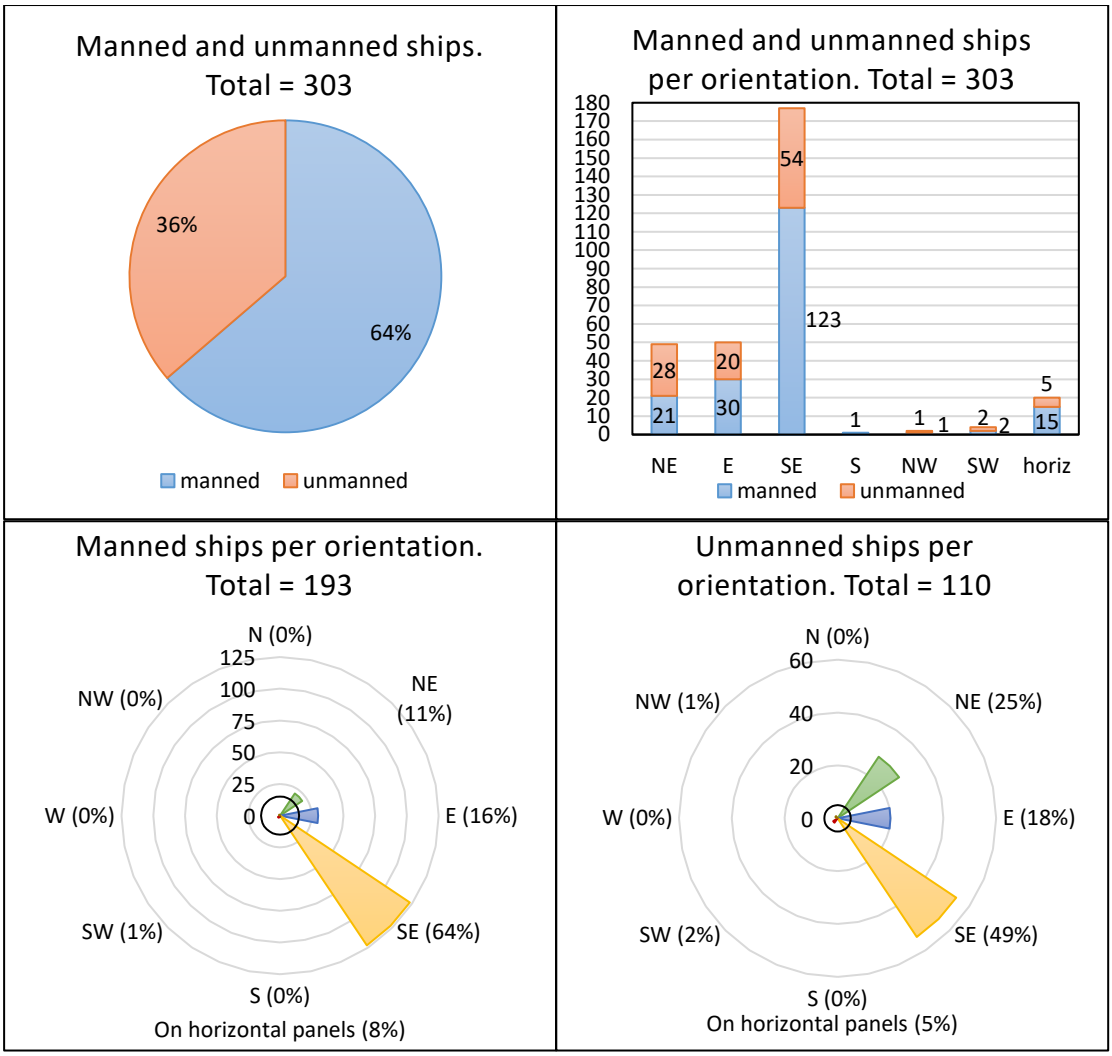


Figure IV-25 Distribution of the manned and unmanned ships per orientation of the rock panels at Fossum.
The black circle in the polar plots indicates the number of horizontal panels.

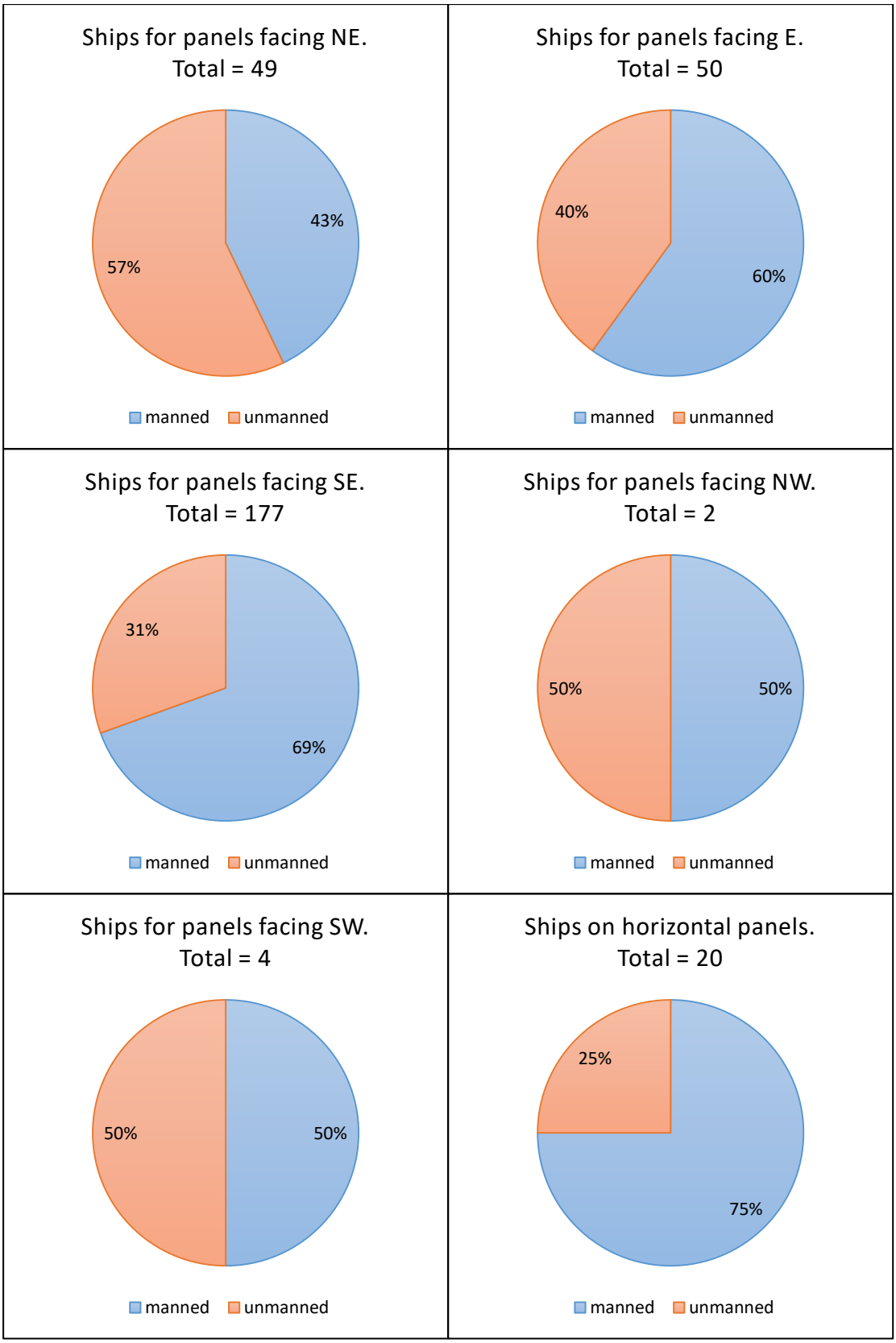


Figure IV-26 Manned and unmanned ships per orientation at Fossum.

Like in Aspeberget most of the ships are manned (64%) and panels facing SE have the highest number of manned ships (64%), see Figure IV-25. Since most of the panels face SE in Fossum, most of the unmanned ships face SE as well. However, the number of unmanned ships in panels facing NE is substantial (25%) and is in line with the trend at Aspeberget where most of the unmanned ships are in panels facing NE. Indeed, if we look at the proportion of manned and unmanned ships per orientation, Figure IV-26, we clearly see that most of the ships in panels facing NE are unmanned (57%). Horizontal panels have the highest proportion of manned ships (75%). Panels facing NW and SW have an equal amount of manned and unmanned ships, although due to the limited number of images the patterns might not represent real differences.

Performing χ^2 and Scheffé test confirms that the number of unmanned ships in panels facing NE is significant, for the other orientations the differences are not significant, see Table IV-9 and Table IV-10.

Measured			Category				
			NE	E	SE	horiz	Total
	Group	Manned	21	30	123	15	189
		Unmanned	28	20	54	5	107
		Total	49	50	177	20	296
Expected	Expected		Category				
			NE	E	SE	horiz	Total
	Group	Manned	31.2871	31.9256	113.016	12.7702	189
		Unmanned	17.7128	18.0743	63.9831	7.2297	107
		Total	49	50	177	20	296
χ2-test results			Category				
			NE	E	SE	horiz	
	Group	Manned	3.3824	0.11615	0.88183	0.38931	
		Unmanned	**5.9745**	0.20516	1.55763	0.68767	
	χ2 total	13.194703					
	p-value	**0.004234**					

Table IV-9 χ2-test results for manned and unmanned ships and orientation in Fossum. The highest χ2 value is highlighted, indicating where the significant differences are.

Scheffé critical value = 2.795	Category			
	NE	E	SE	horiz
Scheffé statistic	**3.12054**	0.611162	2.456354	1.151771

Table IV-10 Post hoc Scheffé procedure results for manned and unmanned ships and orientation in Fossum. A statistic value higher than the critical value means that the differences are significant.

Figure IV-27 shows that most of the manned ships sail to the left (48%). Contrarily to Aspeberget, most of the unmanned ships sail also to the left (43%), although there is an equally important proportion of ships with unknown direction (42%). Like in Aspeberget thus the sailing direction seems to be more relevant for manned ships, for which just 20% have an unknown direction. This is confirmed by the χ^2 and Scheffé test showing that the number of unmanned ships with an unknown direction is significant. When ships sail to the right there is a significant preference to depict them manned while no preference is found for ships sailing left, see Table IV-11 and Table IV-12. This is the opposite of what was observed in Aspeberget.

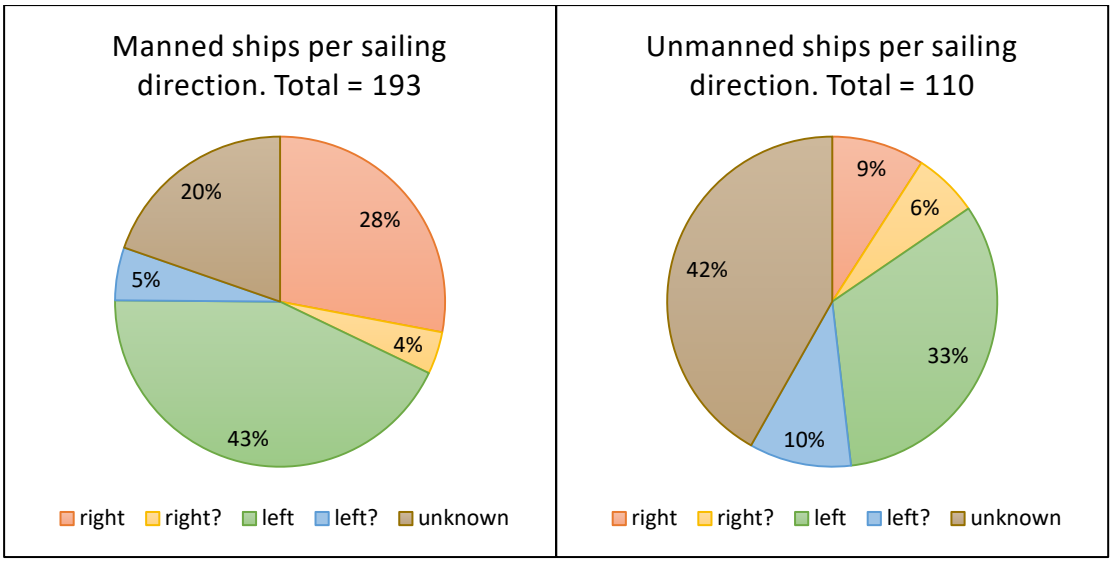


Figure IV-27 Manned and unmanned ships per sailing direction at Fossum.

Figure IV-28 shows that, like in Aspeberget, the most common images in panels facing SE are manned ships sailing to the left (57 out of 177, so 32%). For panels facing NE the most common images are unmanned ships with unknown sailing direction, although their proportion is not very high (14 out of 49, so 29%) and almost similar to the unmanned ships sailing to the left (11 out of 49, so 22%). For panels facing E the most common images are manned ships sailing to the left (17 out of 50, so 34%) and the same applies to horizontal panels but with a much higher proportion (10 out of 20, so 50%).

Measured			Category			
			right	left	unknown	Total
	Group	Manned	62	93	38	193
		Unmanned	17	47	46	110
		Total	79	140	84	303
Expected	Expected		Category			
			right	left	unknown	Total
	Group	Manned	50.32013	89.17492	53.50495	193
		Unmanned	28.67987	50.82508	30.49505	110
		Total	79	140	84	303
χ2-test results			Category			
			right	left	unknown	
	Group	Manned	2.711029	0.164074	4.493107	
		Unmanned	**4.756623**	0.287875	**7.883361**	
	χ2 total		20.296068			
	p-value		**3.92E-05**			

Table IV-11 χ2-test results for manned and unmanned ships and sailing direction in Fossum. The highest χ2 value is highlighted, indicating where the significant differences are. In this case the significant small number of unmanned ships sailing right (17 against the expected 28.7) means that manned ships sailing right are favoured.

Scheffé critical value = 2.448	Category		
	right	left	unknown
Scheffé statistic	**3.462671**	0.920383	**4.019368**

Table IV-12 Post hoc Scheffé procedure results for manned and unmanned ships and sailing direction in Fossum. A statistic value higher than the critical value means that the differences are significant.

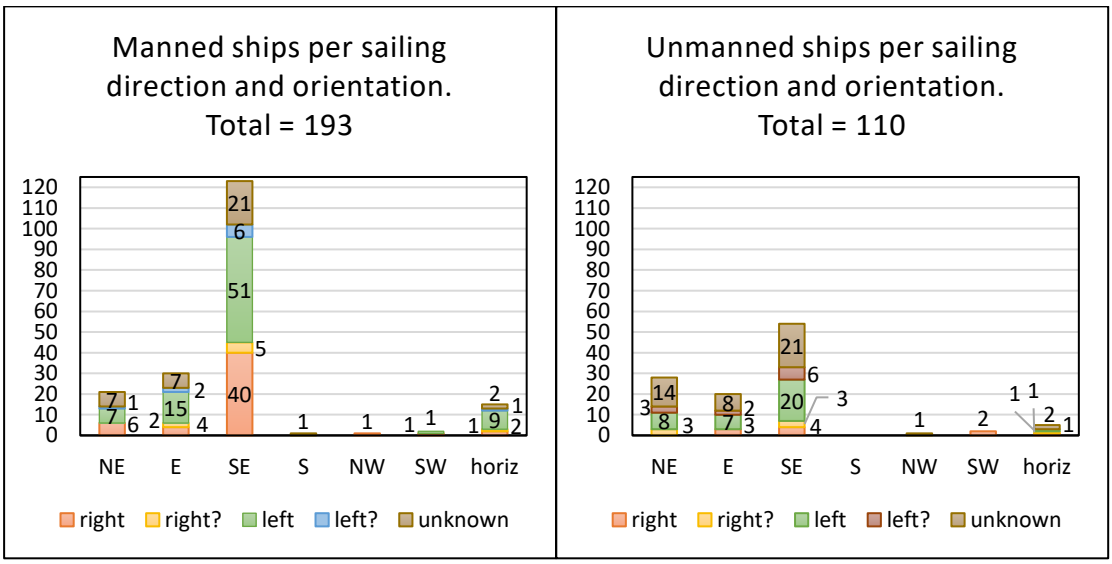


Figure IV-28 Manned and unmanned ships per sailing direction and orientation at Fossum.

V. Discussion

V.1 Summary

The statistical analysis of the ship motifs in Aspeberget and Fossum has yielded the following results.

First, the rock panels on these sites were deliberately chosen depending on their alignment with the sunrise. Additionally, the ship motifs were mostly carved on rocks facing the sunrise in summer and winter. Despite the importance of the sea in the location of rock-art, as discussed in chapters I and 0, the orientation towards the sunrise seems to have been the main factor in the selection of the rock panels. In Aspeberget the panels are facing both the sunrise and the sea but in Fossum the panels, and consequently the ship carvings, are not oriented in the direction of the sea, which would be their natural environment, but are facing the sunrise instead. The displacement of the ship from its natural environment is, as explained in section I.1, an important indication of its symbolism. This strengthens the idea that ships had a symbolic meaning, probably related to the worship of the sun. There are however differences between Aspeberget and Fossum. While in Aspeberget the sunrise both in winter and summer, and to a lesser degree also during the rest of the year, appears to have been important, in Fossum the emphasis is put on rocks facing the winter sunrise. The proportion of ships with respect to other figures in panels facing NE, E and SE appears to be essentially constant in both sites, which indicates that the symbolic importance of the ship was not bounded to a particular season. In Aspeberget most of the carvings are concentrated in one main panel for each orientation, NE, E, SE, while in Fossum the motifs are spread across a larger number of panels although mainly facing SE.

Second, the sailing direction in which the ships are depicted appears to be related to their orientation with the sun and therefore to seasonality. In Aspeberget the differences are significant: ships facing NE sail mostly to the right while ships facing SE sail mostly to the left. In ships facing E the sailing direction is significantly less relevant with ships sailing equally left and right and many symmetrical ships with no keel

extensions. In Fossum the differences in sailing direction per orientation are less significant, however this might be because at this site the emphasis is given to the SE alignment. Most of the ships in this direction sail indeed to the left as in Aspeberget.

Third, the results show a preference for ships with crew, especially when facing the winter sunrise. About two thirds of the ships are depicted with crew both in Aspeberget and Fossum. Furthermore, in Aspeberget there is a significant preference for manned ships in panels facing SE. In panels facing NE there is a larger proportion of unmanned ships, as well as in panels facing E. In Fossum there is a significant number of unmanned ships facing NE while ships facing SE are mostly depicted with crew, as in Aspeberget. Depicting the sailing direction of the ships appears to have been more relevant when crew is on-board and most of the manned ships sail to the left.

Based on these results, I will hereafter present a plausible interpretation. Of course, I do not imply that this interpretation is proved by the observed patterns but in my opinion, it is a reasonable explanation that is worth investigating further.

V.2 Interpretation

Since the rock carvings, especially ship motifs, in Aspeberget and Fossum are clearly aligned with the position of the sunrise at different times of the year their symbolic meaning might be connected to the change of seasons and to the yearly cycle of the sun rather than the daily one as observed by Kaul on the bronze razors, see section II.3.2. This could explain the difficulty in identifying on the rock carvings the left-right logic in which the ships sailing to the right represent day-ships and the ships sailing to the left represent night-ships. Yet, the results from the current statistical analysis show that, contrarily to Randsborg's (1993:89-97) statement, the sailing direction is a significant feature of the rock-art ship iconography and consequently BA cosmology. As mentioned, most of the ships facing the summer sunrise sail to the right while most of the ships facing the winter sunrise sail to the left. Additionally, the sailing direction appears to be less relevant for ships facing the sunrise around the equinoxes. This suggests that the carvers deliberately chose to emphasise the sailing direction in some cases and decided to omit this information in others, maybe because they wanted to

depict stationary ships or ships that could sail in both directions. Ideally, weathered and damaged ship carvings should be disregarded so that the significant differences of the sailing directions with respect to the orientation of the panels are less biased by the missing information. However, one would expect that the weathering occurs with the same probability independently from the orientation and therefore the significant differences would remain virtually the same.

My interpretation would be that ships sail according to the movement of the sun in the horizon at dawn throughout the year, see Figure V-1. So, ships sailing to the left would indicate the shortening of the daytime and ships sailing to the right would indicate its lengthening. Around the equinoxes ships might be depicted without clear sailing direction or sailing either way because day and night are equally long. This could also explain why not all the ships facing SE or NE sail in one direction, since they might be depictions made either before or after the solstices. This idea is in line with Kaul's interpretation of the BA cosmological order where "right is associated with the heavens, up, day and light, whereas left is associated with the underworld, down, night, and darkness" (Kaul 2018:239). Indeed, the sun is higher and the days are longer in summer. As Bradley and Nimura (2013:22) point out, the cosmology based on the daily cycle of the sun would not have been meaningful in the northernmost parts of Scandinavia since there are periods in summer where the sun never sets and periods in winter when it is always night.

However, if ships sailing to the left are linked to winter and the shortening of days it is clear that they do not relate to the movement of the sun as experienced from someone facing it, since right to left is the direction in which the sunrise moves from winter to summer, see Figure V-1. It is when facing the rock carvings, and thus with the sunrise behind, that the sailing direction makes sense. Ships depicted sailing to the left on a rock facing the sun imply that they sail in the direction in which the sun moves towards the winter solstice. It has been suggested that some carvings might in fact have been directed to the sun rather than a human audience (Bradley 2009:198). This could be the case in Aspeberget where, for instance, the inaccessibility and extremely deep slope of panel 120, Figure AI-22, makes Ling (2014:119) wonder about its communicative purpose.

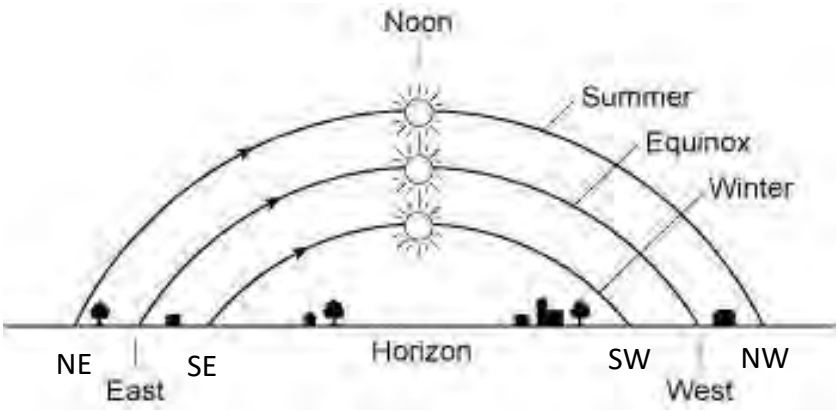


Figure V-1 The Sun's motion across the sky as seen from the Northern Hemisphere. The maximum height of the Sun in the sky, and the Sun's rising and setting points on the horizon, change with the seasons. In the summer, the Sun rises in the northeast, reaches its highest maximum height, and stays up longest. The Sun rises southeast and remains low in the winter when the days are shortest. The length of day and night are equal on the Vernal, or Spring, Equinox (March 20) and on the Autumnal Equinox (September 23) when the Sun rises exactly east and sets exactly west. (Illustration, adapted, and caption text taken from Lang 2010, figure 1.2).

BA people might indeed have tried to guide or influence the journey of the sun (Kaul 1998:55; Kaul 2018:245) and BA rock-art should thus be considered as an active social action related to magic rituals rather than the depiction of an ideal cosmology or religious narrative (Ling 2014:174; Ling and Cornell 2010:33,34,40).

The differences between Aspeberget and Fossum might be the result of their setting. Aspeberget, located next to the BA shore, might have been considered a liminal place within the BA tiered cosmology, see section II.3, and thus its ritualistic importance might have been greater throughout the whole year. The fact that there is a main panel for each of the three orientations suggests that the site was regarded as a whole and that its purpose might have been to guide the sun to and from the solstices. Fossum, however, might have been a gathering site mainly in winter, where rituals were perhaps performed to aid the sun reach and overcome the solstice. Noteworthy is the number of horizontal panels or horizontal parts of panels that show ships sailing in any direction and even upside-down and overlapping each other, see Figure AII-2, Figure AII-26 and Figure AII-27. Since these face no specific orientation, they might be associated with any position of the sun during the year and even at different times of the day. Of course, the most accessible panels might as well have been used for other rituals such as funerals, weddings and other rites of passage (Bradley 2009:198).

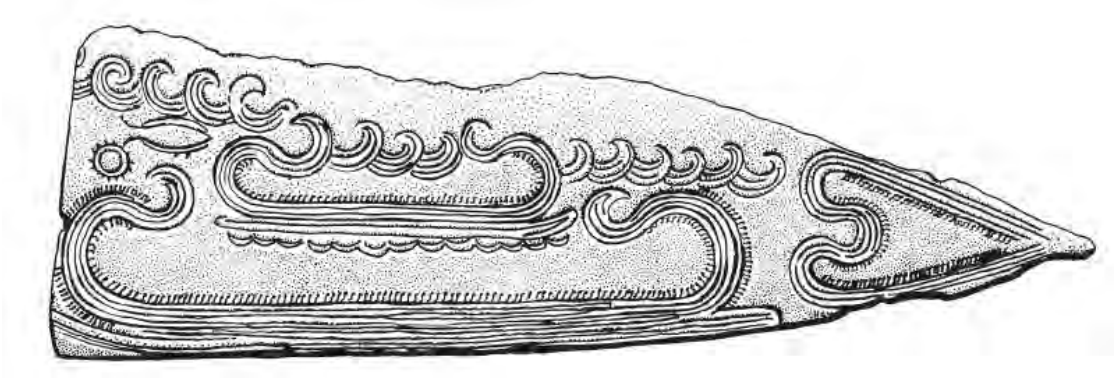


Figure V-2 Bronze razor with unknown provenance.
It shows a larger ship sailing left with a sun depiction above its prow and a smaller ship sailing right. The keel extensions indicate their sailing direction (Taken from Kaul 2018:240, figure 3.29. Drawing: Bjørn Skaarup).

In my opinion the ship iconography on the bronze razors could also be explained in terms of the annual cycle of the sun. Kaul (1998:263-265) developed his narrative by logically linking together individual motifs on razors which are geographically and chronologically distant from each other, razors that would not have been observed together by BA people. What would be the logic of representing only a section of the story about the daily journey of the sun on a given razor? I think it is more logical to regard the ship renderings as depictions of a specific time of the year, maybe the time when the razor was produced and the related rituals performed. Actually, Kaul (1998:153) suggests the possible link between the razors and the achievement of specific rites of passage, such as the transition from childhood to adulthood. Thus, the day-ships sailing to the right as identified by Kaul might actually represent ships sailing towards the summer solstice and the night-ships sailing to the left would represent ships sailing towards the winter solstice. The height of the sun depictions, interpreted by Kaul (1998:264) as the daily position of the sun from dawn till dusk, with the highest position representing noon, might as well represent the height of the sun throughout the year as depicted in Figure V-1. It would still make sense that the ships sailing left on the razors appear without sun depictions since in winter the night is longer (and in the arctic the sun does not rise at all around the solstice). Furthermore, there is one razor with a depiction of two ships sailing in opposite direction in which the sun seems to be linked to the ship sailing left, Figure V-2. Kaul (1998:218) interprets it as the moment in which the sun is transferred from the night-ship to the day-ship at dawn.

However it might very well represent the winter solstice, when the sun has reached its southernmost (left) position and will from that moment on move towards the north (right), see Figure V-1. What is more, “there is a ship on a razor that funnily enough seems to be sailing in both directions” (Kaul 1998:185). This ship appears to be “funny” because it does not fit the narrative of the daily journey of the sun, however if we consider the yearly movement of the sun it could be representing an equinox.

Figure V-3 Photograph of the left part of the panel Tanum 255:1 at Fossum. (Source: SHFA 2019. Id: 32. Author: Gerhard Milstreu, THU. Year: 1992).

Similarly, Kaul attempts to interpret panel 255 at Fossum, Figure V-3, as depicting the same moment. Here, again, the ships sailing left at the lower part of the panel appear with cup-marks, which could be interpreted as sun depictions, and he claims that since they are small, they do not necessarily contradict the idea of them being night ships (Kaul 1998:266). In my opinion it makes more sense that these represent ships sailing towards the winter solstice and the ships at the top part represent ships sailing towards the summer solstice. It is not a coincidence that the ships sailing left are at the bottom and the ships sailing right at the top since the sun appears lower in the sky in winter and higher in summer. On the left side of these ships and between the upper

and lower ships we find many human figures and big circles which according to Kaul depict the rituals associated with the transfer of the sun from the night to the day ships, thus the sunrise. I think, again, that it could as well represent the winter solstice. Indeed, the rock panel is oriented towards the SE, thus facing the sunrise around the winter solstice. Of course, there is the possibility that both narratives regarding the daily and yearly journey of the sun were intertwined and made use of similar symbolism. Maybe since in summer the days are longer the day-ships would assist the sun in his journey across the sky sailing to the right while in winter when the nights are longer the night-ships would assist the sun underground sailing left. Indeed, a symbol is a representation of something inexpressible that merges many referents and meanings into a cognitive and emotional concept (Kobylinski 1995:9).

Interpreting the meaning of the presence or absence of crew from the observed patterns in Aspeberget and Fossum is more complicated. The idea of considering manned ships as ships of the living and unmanned ships as ships of the dead, as suggested by Randsborg (1993:96,120), is not in line with the observed larger number of manned ships facing the sunrise in winter and sailing towards the winter solstice, if winter is linked to death and summer to life. The concept of death would make sense for manned ships if these are considered to be ships carrying the dead to the otherworld, but this interpretation is very speculative. It would be worth performing a similar analysis for sites with rock panels facing the sunset to see whether in these the majority of ships are empty. Maybe then a significant difference between sunrise and sunset can be observed regarding the presence or absence of crew.

V.3 Concluding remarks

In this dissertation I have shown the potential of using pictorial semiotics and statistical analyses in the understanding of the symbolic meaning behind BA Scandinavian rock-art. The current analysis if of course very limited since I have only examined one motif, three variables and two rock-art sites. Ideally, a multivariate statistical analysis of all the situations in which the ship motif occurs and its relationships with other motifs should be performed in order to obtain significant patterns describing the cosmological master-narratives deeply embedded in Scandinavian BA society. This

remains a challenge for the future (Kobylinski 1995:14), but I believe my work is a step in this direction. Surely, these statistical analyses, and semiotics more generally, have their limitations since we know from historical and anthropological studies that specific images can convey disparate meanings to different groups of people and thus there is always the possibility of the existence of multiple symbolic models for a given set of semiotic patterns (Goldhahn 2008:16; Kobylinski 1995:14). For instance, in a poly-semantic culture the ship could have a symbolic meaning for a group of people while it would just represent a utilitarian artefact to other people (Kobylinski 1995:14).

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