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HANS PEETERS

This book is an edited version of Astrup's doctoral dissertation (Aarhus University 2018), thus presenting the core of his work on human responses to sea-level change during the Mesolithic of southern Scandinavia (9500–4000 BC). The study area comprises Denmark, southern Sweden, and smaller parts of southern Norway and northern Germany – a vast area bearing an extremely rich archaeological record, but also a complex geological history related to effects of glacio-isostasy and relative sea-level fluctuations. With regard to the Mesolithic, the area is not only well known for many iconic on-land sites, such as Skateholm, Tågerup, Ageröd, Ringkloster, Vedbæk and Hohen Viecheln, just to mention a few, but also for its rich offshore archaeological record. The submerged coastal zones in the southern Baltic have been subject to extensive underwater surveying, having delivered huge numbers of well-preserved finds and sites unequalled anywhere else on the globe. But as Astrup states, little synthetic work has been done as yet, whilst hypotheses about how Mesolithic hunter-gatherers 'adapted' to Postglacial environmental change and sea-level rise, in particular, are still based on old, coarse-grained models, as well as generalised assumptions relying on rather plain archaeological observations at site level. With this book, it is Astrup's intent to make a difference, by evaluating the sea-level record and developing new models of coastal displacement, and confrontation of these models with the archaeological record to evaluate the validity of prevailing archaeological hypotheses about changes in subsistence (increased

exploitation of marine resources) and socio-cultural aspects such as sedentariness and territoriality. By taking into account various potential issues of representativeness of the archaeological record – e.g. what does the inland record of the Maglemose tell us about the exploitation of the coastal zone? – as well as biased contrasts in the conceptualisation of cultural characteristics – the Maglemose as forest and marsh dwellers, the Kongemose as coastal dwellers (Astrup 2018 p. 13) – Astrup has given himself a highly ambitious task.

As a whole, the book is clearly organised in eight chapters, reads well, and is well illustrated. Primary data are included in three appendices (more can be found in Astrup's doctoral thesis). The first chapter clearly outlines the central problems in the current state of knowledge and theory building with respect to Mesolithic socio-cultural developments in relation to environmental change in southern Scandinavia. This is followed by a chapter which presents a concise characterisation of the three cultural traditions distinguished in the region (Maglemose, Kongemose, and Ertebølle), thus providing a clear baseline of archaeological context. Chapter 3 presents a theoretical framework, which, apart from more general theoretical positions in Mesolithic research (processual; post-processual) and issues of temporal scale, elaborates on issues of causality between environmental and cultural change, human agency and the role of individual choice, vulnerability and adaptive capacity, as well as temporal- and spatial-theoretical perspectives. Next, chapter 4 is dedicated to modelling coastline displacement and reflects meticulous work to critically assess geological, environmental, and archaeological data as a baseline for systematic and quantitative modelling of sea-level change, taking variation of glacio-isostatic adjustment as an important factor into consideration. The resulting paleo-coastline maps with a 500-year interval, covering the period 8000–4000 BC, serve a basis for the critical assessment of the perceived (non-)importance of marine resources in Early Mesolithic southern Scandinavia (chapter 5) and 'field' testing in the Bay of Aarhus (chapter 6). Chapter 7 attempts to identify human

responses to sea-level change at the long- and short-term scale, where chapter 8 presents a closing discussion on the overall aim of this study to use existing data in new and different ways, as to ‘explain adaptation and how society was maintained over time by exploiting the local environment’ (Astrup 2018, p. 34).

Central in Astrup’s book is the question as to what extent the perceived lack of importance of marine resources in the Maglemose, in contrast to the Kongemose and Ertebølle, is defensible from the perspective of landscape change and the position of coastlines in particular. To avoid cherry-picking and snapshot approaches, he combines systematic modelling with empirical data in a way quite familiar to me (Peeters 2007), and obviously one I like. Drawing on the theoretical considerations in chapter 3, Astrup adopts the conceptual model of the SINCOS project (Harff and Lüth 2007) and which interconnects the socio-economic system with climate, the geosystem, and the ecosystem. This model remains coarse, however, and raises the question of how useful it is. The key question is just how relevant concepts such as ‘vulnerability’, ‘resilience’, ‘agency’, and ‘adaptive capacity’ show in the archaeological record? Fortunately, these issues are returned to in chapter 7, which picks up on aspects like site abandonment, flood-risk, sea-level impact on primary animal prey, carrying capacity, territorial impact, adaptations to sea-level change, impacts of abrupt sea-level change, as well as physical and social exposure, and experiencing sea-level change.

An important basis for the archaeological assessment is the modelling of coastline displacement. Such work always comes with difficulties and inherently necessitates to deal with uncertainties, which are related to the data themselves, as well as to the various model assumptions that are made. Astrup is clearly aware of the issues and complexities of sea-level rise and palaeogeographical modelling. The particular situation in southern Scandinavia, however, permits to obtain relatively robust results with rather high spatial resolution. This is quite different from the southern North Sea, for instance, a region more familiar to me. Here, the data are maybe sparser, while the Postglacial history of landscape and coastal change comes with complexities, related to different processes. In the North Sea region, much progress has been made over the past decade or so, although models of sea-level rise and coastal displacement are, as yet, still quite coarse. High-resolution sub-bottom profiling is providing us

with detailed insight into paleolandscape configurations and stratigraphies, which are now assessed by means of multi-proxy analyses of core samples. All this is very promising, although we will probably never reach the situation of the southern Baltic where archaeological surveying is possible by scuba diving.

But whatever the differences between the regions with regard to the ‘practicalities’ of underwater research, both are similar with respect to modelling choices that have to be made. Typically, despite the high numbers of sea-level index-points (SLIPs) available to Astrup, the time lapse in his models is coarse with intervals of 500 years. As Astrup points out, the aspect of temporal resolution is important for our understanding of socio-cultural dynamics and most certainly when one considers the role of individual decision-making. Five-century time windows include a considerable number of generations of hunter-gatherers – indeed, one may wonder to what extent the oral tradition of story-telling among hunter-gatherers could have survived such a time span. And with that, to what extent decision-making at group level might have been directly influenced by what ancestors had experienced several generations before. Based on what is presented in the book, I cannot judge whether another time resolution could be obtained, but I wonder to what extent the choice for pre-defined time windows, instead of using a ‘continuous’ sea-level rise curve, is somewhat frustrating the possibilities to reach better insights into dynamics of socio-cultural developments at the ‘human scale’.

This brings me to Astrup’s attempt to connect the paleocoastline models with the archaeological record (chapter 7), focussing on human responses to, and perceptions of sea-level rise. His approach is as systematic as the coastline modelling and abundantly uses GIS tools to ‘quantify’ various potential effects. Fortunately, Astrup does not take such GIS approaches as a means to ‘reconstruct reality’ (a mistake that is made far too often by uncritical users). Instead, he uses the outcomes of these exercises as models, as hypothetical frameworks to look at what the archaeological remains can or cannot tell us. With respect to his aim to assess the perceived change towards subsistence strategies based on the exploitation of stable/predictable marine resources, and the assumed socio-cultural implications of this, Astrup concludes that the absence of coastal exploitation in the Maglemose is likely

to be a biased archaeological record or that it reflects cultural traditions limiting (or maybe prohibiting?) use of marine resources. Interestingly, stable isotope data of Mesolithic and Neolithic human remains from the southern North Sea and Dutch coastal zone seem to suggest that people in this region maintained an important fresh-water aquatic component in their diet, despite the coast having been near to where they lived (Smits and Van der Plicht 2009, Van der Plicht *et al.* 2016). Marine resources seem to have been of limited importance, and in fact, when looking at the Netherlands, exploitation of full marine species such as cod and haddock does hardly show before the Late Neolithic. This shows in the fish-bone assemblages, as well as in the fishing technology (large fishing hooks are added to the tool spectrum that was dominated by harpoon points, fish traps/funnels, and fish weirs).

Astrup does not limit himself to what the data tell us as archaeologists, but also questions what narratives about the past are told by archaeologists. In reference to the National Geographic documentary *Stone Age Atlantis*, in which the Storegga tsunami hits Mesolithic coastal hunter-gatherers in Doggerland, he questions the motivations for presenting an ‘exciting, dramatic and gripping story for a wider audience’ in the absence of evidence (p. 159). I can answer this with an anecdote: when the producer of the documentary was making preparations, he had a conversation with me and Prof. (emeritus) Leendert Louwe Kooijmans about the flooding of Doggerland, and of course he wanted to know what we observe in the archaeological record. We said that we did not see much at all, for the time being – business as usual. Baffled, the producer asked us ‘But where’s the drama?’. Our reply apparently was enough to keep it to this one conversation – we were left out of the documentary (which I do not regret at all by the way). National Geographic is eager to make documentaries with ‘sensation’ as the main keyword.

A study, like the one conducted by Astrup, has several merits. First, it provides a sound basis for theory-building. The systematic assessment and synthesising of available data permits to evaluate the ‘validity’ of existing ideas of what happened in the past. All too often, such ideas are based on isolated observations and are too easily and uncritically repeated by subsequent researchers. Indeed, in the

context of other regions, like the southern North Sea, such ideas often frustrate the independent development of hypotheses. Second, it provides a better basis for interregional comparative studies, despite all sorts of problems, notably with respect to the use of local (subregional) sea-level models. The region studied by Astrup was, of course, never isolated from other regions, and certainly where it comes to the Early Mesolithic, the coast stretched far into the southern North Sea. Particularly coastal zones may have played an important role in mobility, even without coastal resources having had a major role in subsistence. Indeed, as also Astrup questions, what factors are decisive for what people exploit or not? The ‘picture’ for southern Scandinavia is likely to be different from what is generally accepted. And for me, there is no reason to assume that what happened in southern Scandinavia will probably also have occurred in the southern North Sea, even when cultural remains may look similar. I oppose to Louwe Kooijman’s suggestion that ‘the Mesolithic occupation of the “North Sea Land” is made very plausible merely by the distribution of “Maglemose” finds all around the southern North Sea. [...] So the Brown Bank finds do not provide anything new in this respect, but only offer the possibility of further working out a known fact’ (Louwe Kooijmans 1970/1971, p. 32). We cannot rely on the assumption that ‘comparable’ environmental conditions lead to the same behaviour and that other factors are at play simultaneously – otherwise, there is no reason to study this altogether.

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