Journal of Human Evolution 77 (2014) 17–40

Contents lists available at ScienceDirect

Journal of Human Evolution

journal homepage: www.elsevier.com/locate/jhevol

The origins and significance of coastal resource use in Africa and Western Eurasia

Curtis W. Marean

Institute of Human Origins, School of Human Evolution and Social Change, PO Box 872402, Arizona State University, Tempe, AZ 85287-2402, USA

ARTICLE INFO

Article history:
Received 31 January 2013
Accepted 4 February 2014

Keywords:
Middle Stone Age
Middle Paleolithic
Modern human origins
Coastal adaptation
Shell midden
Marine foods

ABSTRACT

The systematic exploitation of marine foods by terrestrial mammals lacking aquatic morphologies is rare. Widespread ethnographic and archaeological evidence from many areas of the world shows that modern humans living on coastlines often ratchet up the use of marine foods and develop social and technological characteristics unusual to hunter-gatherers and more consistent with small scale food producing societies. Consistent use of marine resources often is associated with reduced mobility, larger group size, population packing, smaller territories, complex technologies, increased economic and social differentiation, and more intense and wide-ranging gifting and exchange. The commitment to temporally and spatially predictable and dense coastal foods stimulates investment in boundary defense resulting in inter-group conflict as predicted by theory and documented by ethnography. Inter-group conflict provides an ideal context for the proliferation of intra-group cooperative behaviors beneficial to the group but not to the altruist (Bowles, 2009). The origins of this coastal adaptation marks a transformative point for the hominin lineage in Africa since all previous adaptive systems were likely characterized by highly mobile, low-density, egalitarian populations with large territories and little boundary defense. It is important to separate occasional uses of marine foods, present among several primate species, from systematic and committed coastal adaptations. This paper provides a critical review of where and when systematic use of coastal resources and coastal adaptations appeared in the Old World by a comparison of the records from Africa and Europe. It is found that during the Middle Stone Age in South Africa there is evidence that true coastal adaptations developed while there is, so far, a lack of evidence for even the lowest levels of systematic coastal resource use by Neanderthals in Europe. Differences in preservation, sample size, and productivity between these regions do not explain the pattern.
© 2014 Elsevier Ltd. All rights reserved.

Introduction

Considerations of the importance of aquatic foods (any foods coming from water) to human diet has seen a jump in interest in recent years, cross-cutting a variety of disciplines including nutrition, cognition, and paleoanthropology. This cross-disciplinary interest has largely come from the recognition that aquatic foods have fatty acids that are important for human health. This has led some researchers to probe the evolutionary context of the introduction of aquatic foods to the hominin diet, and out of these investigations a debate has arisen over whether these particular fatty acids must come from a diet rich in them, and whether or not the terrestrial food chain can supply these fatty acids (Broadhurst et al., 2002; Langdon, 2006; Carlson and Kingston, 2007; Cunnane et al., 2007). While the richness or sparseness of these fatty acids in the terrestrial food chain is debated, there is consensus that the aquatic food chain is rich in them, and that their addition to the diet does have some measurable positive impact on modern human health.

The earliest and best evidence for the exploitation of marine foods comes from a series of sites in South Africa where dense archaeological mollusk remains are found with Middle Stone Age (MSA) stone tools (Voigt, 1973a; Volman, 1978; Parkington, 2003). Until recently, the earliest of these was dated to early marine isotope stage 5 (MIS5) at Klasies River (Deacon and Geleijnse, 1988; Thackeray, 1988). Since then, a series of excavations replicated the result so that there is now consensus that archaeological deposits with dense mollusk remains exist in South Africa beginning about ~110 thousand years ago (ka) and are inter-stratified with deposits that lack mollusks at various sites that date between ~110 ka to the end of the Middle Stone Age ~40 ka. This paper reviews that record.

E-mail address: curtis.marean@asu.edu.

http://dx.doi.org/10.1016/j.jhevol.2014.02.025
0047-2484/© 2014 Elsevier Ltd. All rights reserved.

The appearance and disappearance of these shell-rich layers was evidently influenced by changing sea level heights that, due to the gradual slope of the Agulhas bank, resulted in rapid and substantial changes in the distance of the coast to the sites (Van Andel, 1989; Fisher et al., 2010). There is now a high resolution computer model of this coastline movement in reaction to sea level change over the last 420,000 years, and that model can be run for any location on the coast of South Africa and provide accurate estimates of the distance to the coast at 1500 year time steps (Fisher et al., 2010).

In 2007, our team working at Pinnacle Point published on a MIS6 occupation (in a stratigraphic aggregate named Lightly Consolidated-MSA Lower, or LC-MSA Lower) in a cave called Pinnacle Point 13B (PP13B) dated to 164 ka ± 12 ka, using a combination of uranium–thorium (U–Th) dating on directly overlying speleothems, optically stimulated luminescence (OSL) ages on sediments, and correlation to the output of the coastline model mentioned above (Marean et al., 2007). In 2010, we enriched this record with a full set of publications on the context and finds from PP13B, extending the record to ~90 ka (Marean, 2010a). With increased grain samples and added analysis and modeling, the OSL age estimate for the LC-MSA Lower was revised to 162 ka ± 6 ka (Jacobs, 2010). Middle Stone Age occupations directly dated by numerical techniques to MIS6 are rare along the southern African coast (there is only PP13B), and in Africa overall, probably because populations were very small at this time (Foley and Lahr, 1997). Following qualitatively the quantitative principles of patch choice (McArthur and Pianka, 1966) and time allocation to patches (Charnov, 1976), when these populations were small and the landscape relatively sparsely occupied, people probably positioned themselves adjacent to the highest ranked patch: the coast (Marean, 2010b, 2011). Here they could exploit both the rich mollusk beds as well as the diverse geophytes so common in the Cape Floral Region (CFR) (Marean, 2010b, 2011). As an added bonus, it is possible that the exposed sections of the Agulhas bank harbored an east-west moving large mammal migration ecosystem, creating a tri-pedal nutritional (shellfish, geophyte, large mammal) refuge for hominins during cold climate cycles. As sea level changed over time, this long thin habitat moved back and forth across the Agulhas bank and the centroid of people's annual foraging radius moved with it, so that occupation intensities rose and fell at current 'neo-coastal' sites such as PP as a function of distance to coast. This coastline model applies only to when populations are very small, and during the MSA this was probably during MIS6 and early in MIS5. Populations seem to recover in late MIS5 and pack the CFR landscape. However, the model seems to apply again during MIS3 and 2, when the record has few numerically dated Later Stone Age (LSA) sites.

The record for South Africa, still our best record for use of coastal resources at this early stage, forces us to ask the question "why did a diet focused on marine foods occur so late in human evolution?" In South Africa at least, regular and effective use of coastal resources probably required an understanding of the relation between the lunar calendar and tidal cycles since return rates on mollusk collection should be driven by the tides (Marean, 2010b, 2011). All things being equal, the lowest and therefore most productive mollusk collection times are when the moon is either full or new and the tides are in what is called a 'spring' phase. This is when people should position themselves near the coast, and they should move away from the coast at other times of the lunar month when the tides reveal less of the inter-tidal zone in what is called the 'neap' phase (Marean, 2010b, 2011). This required a complex cognition that could make a novel connection between an astronomical observation, tidal character, and collection return rates (Fig. 1). Due to the specific (but not unique) inter-tidal topography and tidal character in South Africa, it is only during spring low tides that the exposed inter-tidal zone is large and mollusk collection is safe and produces high returns. During neap tides it is neither, and those unfamiliar with coastlines of the South African type need to know that walking into inter-tidal zones to collect shellfish during neaps is highly risky and can be a death sentence. The Mediterranean coast, where much of the contemporary Neanderthal record is reported, is a totally different system (discussed further below). My hypothesis for South Africa may not apply in the Mediterranean.

It has been known for some time that there is evidence for the use of marine resources outside of Africa and by Neanderthals (Garrod et al., 1928; Stiner, 1994). The presence of mollusks in association with Middle Paleolithic artifacts attributable to Neanderthals is, in my opinion, unquestioned. More recently this observation has been elaborated to more expansive claims that Neanderthals used coastal resources in a 'systematic' manner (Finlayson, 2008; Stringer et al., 2008; Cortés-Sánchez et al., 2011a) and even had a 'coastal adaptation, as do modern humans in Africa and other locations worldwide' (Cortés-Sánchez et al., 2011a). Others have hypothesized that the coastal adaptation may have unlocked a coastal route for movement of modern humans out of Africa (Oppenheimer, 2009), and even perhaps allowed complex cognition to evolve (Parkington, 2001; Broadhurst et al., 2002).

Clearly, there is consensus that the use of marine resources and coastal adaptations are important topics in need of consideration but there is little consensus as to how such marine resources were significant, if at all, to human origins. Previous discussions of the significance of a coastal diet to human origins have focused on the importance of its high quality protein rich character, but I argue in this paper that it is other impacts that are more significant. As I will discuss below, ethnographic and archaeological evidence from many areas of the world shows that modern humans living on coastlines ratchet up the use of marine foods in ways that stimulate the development of social and technological features unusual to hunter-gatherers and more consistent with small scale food producing societies. Focused use of marine resources drives reduced mobility, larger group size, population packing, smaller territories, increased economic and social differentiation, complex technologies, and more intense and wide-ranging gifting and exchange. The commitment to temporally and spatially predictable and dense coastal foods stimulates investment in boundary defense and intergroup conflict as predicted by theory and documented by ethnography. Inter-group conflict provides an ideal context for the proliferation of cooperative behaviors beneficial to the group but not to the altruist; the hyper-prosocial proclivities of *Homo sapiens* (Bowles, 2009; Bowles and Gintis, 2011). The origins of this coastal adaptation mark a transformative point in the diversity of adaptations in the hominin lineage in Africa since the previous adaptive system probably was highly mobile, low-density, and non-territorial. The implication is that hyper-prosociality may have been a late addition to the human uniqueness suite (Hill et al., 2009), and probably was cultivated under very specific ecological conditions where resources were predictable and dense. On the way to developing that hypothesis, I need to work through the definition of a coastal adaptation and define its character of appearance in Africa and elsewhere.

How do we define a coastal adaptation?

The most comprehensive review of resource use of aquatic (both marine and riverine/lacustrine) resources is that of Erlandson (2001) and I refer the reader to that important paper for a full and detailed review. I will focus only on coastal resource use, being restricted to those resources found at the contact of the sea and land. Littoral and coastal differ in definition and character (Hallam,

Download English Version:

https://daneshyari.com/en/article/4556063

Download Persian Version:

https://daneshyari.com/article/4556063

Daneshyari.com