Assessing the development of societal complexity at the Middle to Later Stone Age transition in the context of the Economic Defensibility Model: Evidence from Knysna, coastal South Africa

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ONE SITE, MANY LANDSCAPES – KNYSNA EASTERN HEADS CAVE 1 (KEH-1): The earliest

coastal foraging groups documented along the southern coast of South Africa were early modern humans of the Middle Stone Age (MSA) that used coastal sites intensively (reflecting the dense, rich, and predictable nature of marine resources), but left more ephemeral and short-term occupation evidence for inhabiting in an inland biome1–4. Here we ask whether this pattern continues across the MSA to Later Stone Age (LSA) transition near the end of the Pleistocene and if there is evidence for a new pattern of landscape use, coinciding with this dramatic shift in forager lifeways?

As the only securely dated Late (post-50 ka) Marine Isotope Stage (MIS) occupation on the southern coast of South Africa, Knysna Eastern Heads Cave 1 (KEH-1) provides a rare opportunity to examine the origins of complex social systems in the southern LSA right at the MSA to LSA transition. KEH-1’s coastal cave sequence documents a significant occupation across a dramatically shifting landscape. During low sea stands, a broad coastal plain, likely forming a large terrestrial faunal biome2 before the cave. Our sequence also strongly suggests the presence of a short (possibly < 5 years), marine transgression, bringing the coast to within 10 km of the cave, coinciding with the appearance of coastal foragers at KEH-1. The shifting coastline would have directly impacted forager territory location and size. Here we present multiple proxies for changing site use from >46 k to ~18 ka ya.

ANTHROPOGENIC FINDS AND FEATURES:

The relative density of anthropogenic finds and features within different levels of the site is a proxy for the intensity of human activity at a site. This “intensity” may reflect a range of factors, including population size, the number of people using the site, or even the frequency with which the site was revisited, the duration of occupation, or some combination of these. In all cases, though, intensive site use suggests the location of some strategic significance to foragers.

At KEH-1 we have identified four major stratigraphic aggregates (Fig. 1, sensu Kartanais et al1) dated by AMS on charcoal and shell. From the base of the stratigraphic sequence (the LSA) to the top (the early MSA), these are: (1) the Orange-Brown Sandy (OBS) dating from >46 ka to ~34 ka, the Dark Shelly (DSh) dating from ~32 ka to ~29 ka, the Dense Hearth Aggregate (DHA) dating from ~29 ka to ~22 ka, and the Orange-Brown Sandy Aggregate (OB-SA) dating from ~19 ka to ~18 ka. Several of these dates are taken from within units, thus gaps between units do not necessarily indicate hiatuses.

More than 25k finds plotted by total station during excavation have been identified to type (i.e., ~69% of all finds excavated) frequency. The frequency of each find type, frequency, provided on the table, is not included within the anthropogenic finds total, although it may also be indicative of intensity of site use. The Dark Shelly aggregate (DSh) contains the largest number of finds, including 17% lithics, 14% charcoal, and 11% marine biogenic material, and is the most productive site in the area for the DHA (~26 ka to ~22 ka) aggregate. During the LSA, the DHA aggregate (~32 ka to ~29 ka) is dominated by lithics, charcoal, and marine shell. In the archaeological assemblage, further geological testing is needed to confirm these as the specific source locations, however, it is reasonable to assume that the majority of the lithics and marine shell from this period was sourced from the local area.

FAUNA: TERMINAL PEOHPRESSING

It has been proposed that foragers focused on low ranked resources (including shellfish) may more intensively process high-ranked terrestrial fauna5. For coastal foraging strategies during the Late Pleistocene, and ultimate to the diversification of human adaptations, the biogeographic expansion of the global population, and the increased availability of shellfish5,6 as a result of human population growth and cultural change, are likely to have played a role in the development of complexity within forager society. The southern coast of South Africa, shifts in coastal position of 75 km or more would have impacted foraging territory location, potentially bringing groups into conflict. The juxtaposition of commodities that may have provided foragers with opportunities for cooperation, and the potential for resource competition, may have impacted forager social organization during this period. The Dark Shelly aggregate (~32 ka to 29 ka) is dominated by lithics, charcoal, and marine shell. In the archaeological assemblage, further geological testing is needed to confirm these as the specific source locations, however, it is reasonable to assume that the majority of the lithics and marine shell from this period was sourced from the local area.

At KEH-1, we note a large increase in anthropogenic materials coincident with the appearance of coastal foraging in the Dark Shelly aggregate (~32 ka to 29 ka). This is a departure from the MSA pattern, and likely reflects a change in forager social organization during this period. The Dark Shelly aggregate (~32 ka to 29 ka) is dominated by lithics, charcoal, and marine shell. In the archaeological assemblage, further geological testing is needed to confirm these as the specific source locations, however, it is reasonable to assume that the majority of the lithics and marine shell from this period was sourced from the local area.

So why do people come to this particular site more often (and/or in larger groups / for a longer duration)? One possibility is that the area associated with coastal transgression of the Dark Shelly stimulated a new approach to territoriality. That is, the site itself may have become a culturally important location during the Dark Shelly, and then later maintained this status within the territory of coastal foraging groups – possibly as these groups increased in size. We could test this by examining mobility across this landscape, and by developing a better understanding of the relationship between the Dark Shelly and Dense Hearth Aggregate populations. Finally, we need to understand the assemblages from these layers with local inland sites such as Bomopla, that chronologically overlap with KEH-1.

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