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Obsidian circulation in the early Holocene Aegean: A case study from Mesolithic Damnoni (SW Crete)

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ABSTRACT

Excavation at the Mesolithic site of Damnoni in southwest Crete generated nine tools made of obsidian, a raw material foreign to the island. This study characterises these artefacts' raw material via elemental analyses and their techno-typological nature. These data when located within a broader consideration of the larger Damnoni chipped stone assemblage and the consumption of obsidian at other Mesolithic sites of the larger region enables us to further develop our understanding of maritime activity and hunter-gatherer interaction in the Early Holocene Aegean. Using energy-dispersive X-ray fluorescence spectroscopy the obsidian is shown to be Melian, primarily from Sta Nychia, in keeping with Aegean Mesolithic procurement habits more generally. The artefacts were accessed in the form of ready-made tools, likely via exchange with intermediaries, the procurement of such exotic pieces conceivably serving to both maintain and reproduce social relations and cultural traditions at distance.

1. Introduction: obsidian consumption in the early Holocene Aegean

Until recently the received wisdom was that Crete was not colonized until the Neolithic (Broodbank and Strasser, 1991; Cherry, 1981, 1990) with the establishment of a small farming village at the well-known site of Knossos at the start of the 7th millennium cal BC (Evans, 1994; Douka et al., 2017). In 2008 this late colonisation model was tested by a survey designed to locate pre-Neolithic hunter-gatherer activity in the Plakias region of south-west Crete (Rethymnon district), leading to the discovery of a number of sites whose associated material culture closely resembled that from well-dated Lower Palaeolithic – Mesolithic excavations of continental Eurasia (Strasser et al., 2010, 2011). One of these sites, Damnoni 3 (hereafter 'Damnoni'), has since been excavated, a joint venture between the American School of Classical Studies in Athens and the Ephoreia of Palaeoanthropology-Speleology, co-directed by Strasser and Panagopoulou (Fig. 1). This is the first Mesolithic site to be dug on Crete, and the only one with well-stratified deposits (Strasser et al., 2016).

The site's chipped stone assemblage comprises the primary evidential basis for reconstructing the inhabitants' activity at Damnoni, their geographical spheres of interaction, and cultural traditions. As detailed below, the majority of these implements were made from local raw materials; there were, however, nine artefacts made of obsidian, a raw material exogenous to Crete whose closest sources lay to the north in the islands of the Cyclades and Dodecanese (Fig. 1). This paper details an integrated, multi-faceted analysis of these obsidian artefacts, a study that was undertaken with a number of questions in mind, whose significance ranges from the site-specific/local to supra-regional, namely: (1) what was the source(s) of the obsidian used to make these Damnoni artefacts? (2) How comparable is their form and mode of manufacture to that of the other artefacts in the assemblage? (3) How similar are the Damnoni obsidian artefacts to those from other Aegean Mesolithic sites, particularly with regard to the previously claimed bias towards the exploitation of the Sta Nychia source (Carter, 2016: 17–18)? (4) How does the obsidian assemblage help us reconstruct the means through which the Damnoni hunter-gatherers procured this exotic resource? (5) What light does the material shed on Aegean Mesolithic maritime activity, and hunter-gatherer spheres of interaction in the wider context of Eastern Mediterranean Mesolithic/Epi-Palaeolithic

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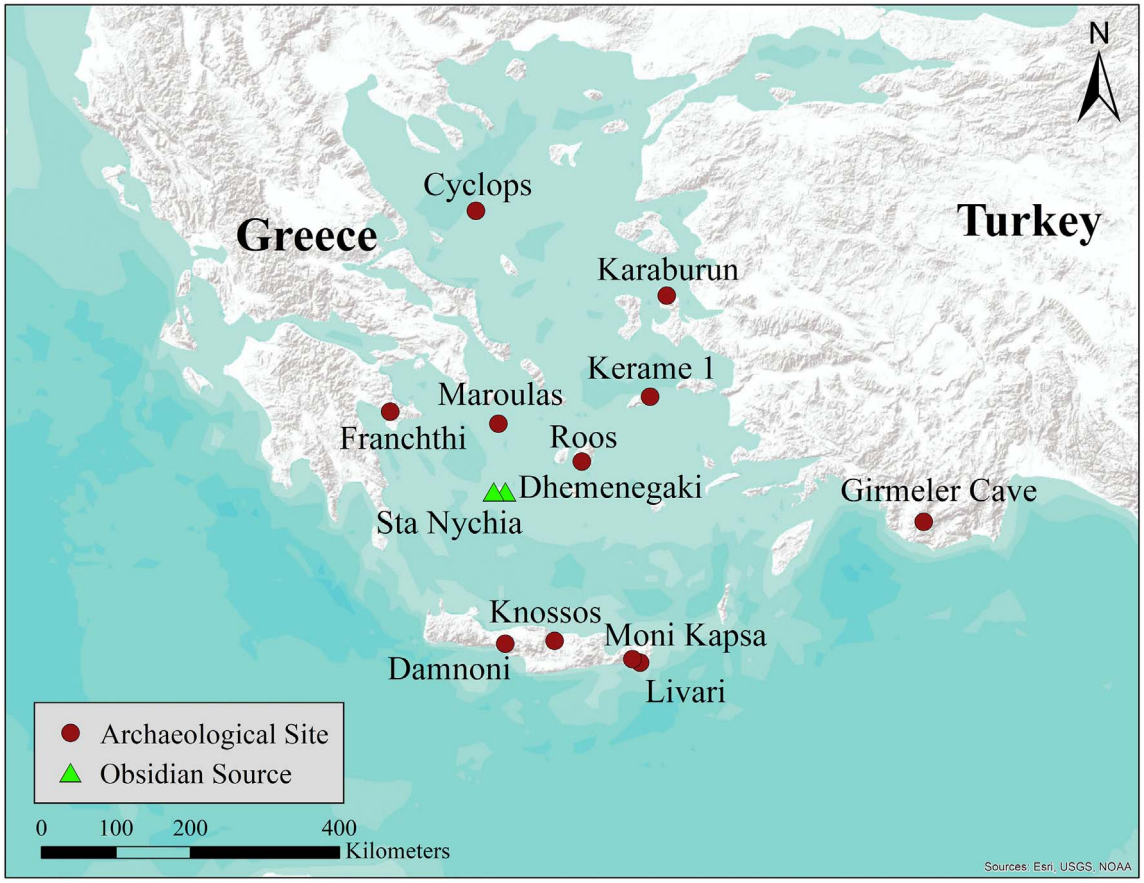

Fig. 1. Map showing major sites mentioned in the text (K. Freund).

mobility?

The primary means of achieving this study's research aims were to characterise the obsidian artefacts through a combined elemental and techno-typological analysis, the former using energy-dispersive X-ray fluorescence spectroscopy [EDXRF], the combined data then being situated within a larger Aegean Mesolithic data-set (Carter, 2016).

2. The archaeology of Damnoni

Damnoni is the first excavation on Crete dedicated to a site of Mesolithic date (Figs. 1–2), and the only one thus far to have discovered stratified Early Holocene deposits (Strasser et al., 2016). The site was located in 2008 by the Plakias Survey (Strasser et al., 2010: 160, Tables 1–2, Figs. 5, 8 and 23), a research project dedicated to the location of Mesolithic activity on Crete using a targeted site-location model developed in continental Greece (Runnels, 2009; Runnels et al., 2005). Environmental features prominent in this model constituted nearby water sources, south facing limestone caves, and steep bathymetric descents near coasts. Of the 20 Mesolithic sites discovered by the survey (as evidenced by their distinctive chipped stone assemblages), Damnoni 3 was considered the most propitious for excavation due to soil preservation.

Excavations at Damnoni were conducted in 2011 and 2013, with 98 1 × 1 m trenches established in the talus outside of the cave in a checkerboard fashion to establish the extent of the site, with Areas A, D and G being particularly artefact-rich (Fig. 2). The same three stratigraphic units were documented across the excavation areas. The uppermost unit, stratum 1, was a brown topsoil; stratum 2 was an orange aeolian deposit that contained the bulk of the Mesolithic artefacts, and the lowest unit, stratum 3 was comprised of hard-packed, red palaeosol. Most finds from the basal layer came from the first four centimetres, the lowest parts being typically sterile. Recovery was thorough, with all soil dry sieved or floated, a necessary strategy when most of the stone tools can be classified as microlithic (see below).

The aeolian sands and *terra rossa* soils that comprised Strata 2 and 3 did not preserve organics, thus hindering environmental and subsistence reconstructions. By extent, radiocarbon dating was not possible whereby Damnoni's proclaimed Mesolithic date is based upon its chronologically distinctive chipped stone assemblage., whose best-dated parallels (detailed below) suggest that the site was occupied sometime between 9000 and 7000 cal BC.

3. The Damnoni chipped stone assemblage

The following overview of the Damnoni chipped stone is based on a detailed analysis of the material recovered from 92 of the 98 trenches, some 4437 pieces. In keeping with Aegean Mesolithic tool-making traditions (e.g. Carter et al., 2016a: 90) most of these artefacts were knapped from local raw materials, primarily quartz (97% [Fig. 3]), which is available in abundance, with much of the surrounding area comprising a phyllite-quartzite geological unit. There were also smaller quantities of varying coloured cherts (1.7%), radiolarite (0.9%), and rock crystal (0.4%), some of which may be extra-local (Fig. 4). Obsidian is clearly exotic and represented by only nine artefacts, a mere 0.2% of the Damnoni chipped stone assemblage (Figs. 5–6). This raw material is foreign to Crete, with the closest sources located c. 170–290 km linear distance to the north/north-east in the Cycladic and Dodecanesian islands (Fig. 7). As to whether this raw material's foreign origin bestowed these articles with a particular value, or function, is impossible to say given these items context of recovery, and the lack of a use-wear study.

The quartz worked on site was either collected from the surface as natural chunks, flaked off large boulders, or sometimes introduced in