Natural Resources and Cultural Interactions in the Neolithic and Early Bronze Age Mediterranean. A Tentative Response from the Island of Gavdos[1]

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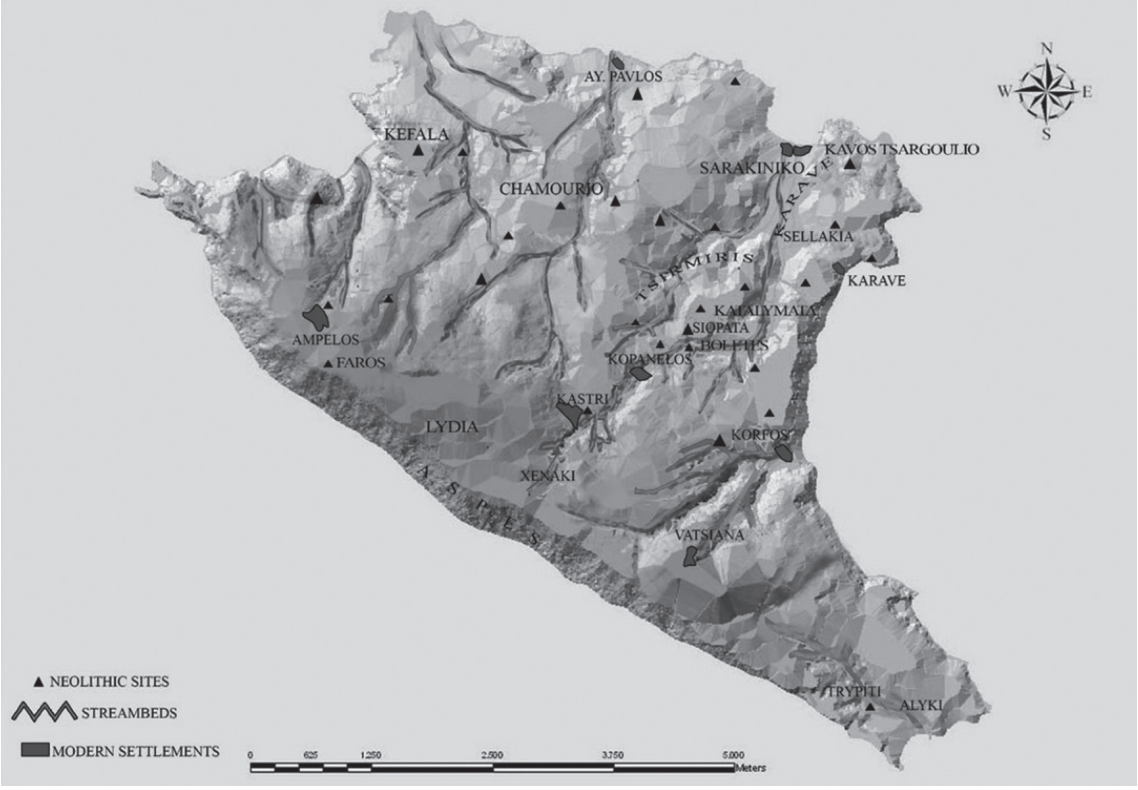
Amidst Harsh yet Long Travelled Sea Routes…

…Gavdos, the southernmost frontier of Europe towards Africa, is the largest and most remote of the islands surrounding Crete. The island's landscape is composed of sand dunes along the coastline, hilly stripes of arable land among dried streambeds, and steep cliffs on its western edge (the Aspes). Its geological structure involves quaternary deposits, volcanic-alluvial metamorphic rocks (notably green schists, quartz, mica, phlysch, flints), while 2/3 of the island are covered by Neogene alluvial deposits.[2] The local ecosystem comprises junipers, pines, shrubs and herbs while the island's climate nowadays is rather dry, with limited annual rainfall.[3] Thinly populated today this seemingly restraint and geographically marginal sea bound *topos,* hosted human activity since the Palaeolithic and Mesolithic times[4] while since the Neolithic, Gavdos presents



Map 1: The distribution of Neolithic sites on Gavdos.

Published in: Martin Bentz – Michael Heinzelmann (Eds.), Sessions 11–12 – Single Contributions | Poster Sessions. Archaeology and Economy in the Ancient World 56 (Heidelberg, Propylaeum 2023) 539–548.
DOI: *https://doi.org/10.11588/propylaeum.1036.c14179*

steady occupation. The earlier economic activity on the island can be mainly traced through archaeological and palaeo-environmental data, however, this work attempts to review aspects of Gavdos' economic activity from the Neolithic and EBA, focusing on five categories of historically deployed natural resources: the juniper trees, salt, minerals, agriculture and animal herding. Our study integrates archaeological and historical data as the Hellenistic Gorty's treaty, 18th–20th century travelers' reports and possible references to Gavdos from the Bronze Age Linear Scripts.[5]

Natural Resources in the Island of "Calypso"

Cedars Forest

Cedars are native in the Mediterranean Basin. In Gavdos, the Juniperus Phoenecea and Juniperus Oxycedrus, sub. sp. Macrocarpa are characteristic of the island's micro-insular environment (especially in the areas of Kedres and Sarakiniko) (fig. 1). Cedar wood has been broadly used and exchanged during the 2nd millennium,[6] due to its manifold utility in carpentry, house and ship building. Moreover, in Gorty's treaty, dated to the 3rd century BC, cedar fruits from Gavdos are documented as prominent products, exported to Crete and favored for exploitation.[7] The indications for the systematic human presence in areas adjacent to the cedar forests since the Neolithic, such as pottery finds

Fig. 1: Juniperus Phoenecea, Juniperus Oxycedrus, sub. sp. Macrocarpa.

and grinding tools, that belong to Bronze Age and even earlier assemblages, could imply various possible treatments of the by-products of this resource.

Salt

Salt is a valuable mineral, essential for life, due to its high nutritional value for humans and animals, and for its numerous potential uses. Apart from saltiness that is one of the basic human tastes, salt has been involved in crafts (pottery, metallurgy, dying, painting) and in a plethora of religious and ritual practices. Its considerable properties were diachronically utilized across the Mediterranean,[8] and archaeologically documented since the Neolithic.[9] Salt collecting is a process that leaves hardly any archaeological remains. However, considering Gavdos, salt exploitation is also documented in the Gortys' treaty. In the present day, salt is still exploited by the habitants that harvest it from the natural rock cavities on the coastal zone of both Gavdos and Gavdopoula and from the salt pan at Trypiti (fig. 2). Thus, LN-EM pottery assemblages – small pithoi and pithoids, basins, amphoroid jars and ladles – from the sites of Sarakiniko and Trypiti, could possibly attest to relevant activities, such as salt processing, short-term storing and transporting, during prehistory.

Fig. 2: Salt pan in Tripiti.

Copper Minerals

Malachite is one of the most commonly used minerals in early metallurgy.[10] In Gavdos, metamorphic rocks, malachite and iron surface deposits are visible in the Kavos-Karaves region (fig. 3).[11] Although limited, they were known[12] and reportedly exploited in the early 20th century.[13] The coastal surface deposits of Gavdos fit well within the preferred FN/EBA exploitation patterns, as they are easily located and could be extracted, smelted[14] and transported by boat elsewhere for further processing.[15] Kavos, the island's major Neolithic site, lies in the vicinity of mineral deposits and the Lavrion ancient mining gallery. So far, no indications for smelting have been identified in Gavdos. However smashed malachite rocks and two pieces of an EM clay crucible preserving copper residues from Gavdopoula, could serve as indications of metal processing in this island complex.[16] Furthermore copper minerals are related to practices that could pre-date metallurgy. Mc Geehan-Liritzis, referring to mainland Greece, argues that "the metamorphic rock formations (where the copper minerals appear)…correlate with good agricultural soils…sought by Neolithic farmers", while in Pre-Dynastic Egypt, malachite and azurite were used, as cosmetics and pigments.[17]

Fig. 3: Pile of smashed malachite rocks; rock with mineral oxidation.

Cultivation

In Gavdos, dry-crop cultivation is favored at present, while dense ancient terraces all over the island indicate an important land exploitation in the past (fig. 4). Local crops (especially barley) are mentioned as exceptional in Venetian sources up to the late 19th century.[18] Indeed barley cultivation in Gavdos, is possibly documented in the LBA Linear B tablet from Knossos. Most Gavdiot Neolithic sites occur in the vicinity of cultivated areas, close to modern farm houses (*metochia*) and their threshing floors. Vines and olives, the two core Mediterranean cultivations, are reported by travelers of the Venetian times, and underlined by the numerous rock-cut wine presses and stone weights found during the archaeological survey (e.g. at Siopata, Kopanelos, Chamourio). Additional evidence for prehistoric agricultural exploitation is provided by various and abundant grinding tools, and a rich array of transportation vases, that suggest systematic processing, storing and transporting of solid and liquid local products.

Fig. 4: Cultivation terrains at Vatsiana.

Animal Herding

The introduction of domesticated animals in Gavdos most likely dates to the Neolithic. Today, a considerable number of goats and sheep are kept on the island (fig. 1) in order to meet the needs of meat year-round. In Crete, 18th and 20th century sources mention animal herding.[19] For the Bronze Age, animal husbandry is indicated by the numerous bones found within stratified contexts, from the excavated site at Katalymata. Moreover, a great number of prehistoric loom weights and spindle whorls, found during the survey all over the island, put an important emphasis on wool weaving.[20]

Un-Centrality and Interaction

In Gavdos an interesting economic exploitation of local natural resources (juniper trees, minerals, arable land and Mediterranean poly-culture, animal herding) dates back to Prehistoric times (possibly already from the MN onwards). This presence of natural resources along with extended fertile alluvial soils must have provided a backdrop that favored a varied patterns and exploitation. Easily accessible surface minerals, and especially malachite deposits, could have made Gavdos a convenient source for metals, since the late 4th millennium BC. Similarly, the olive and vine cultivation, possibly from the Bronze Age onwards, shows that the island's agricultural potentials were positively identified since the Neolithic. Local communities must have shaped their own exploitation forms but also both adopted and were adapted to a resourceful Mediterranean economic landscape, developing strategies towards a long-term occupation of the island. Indeed, Gavdos's material culture shows typical Neolithic features and is involved in the wider cultural networks of the time. For example, wishbone, horned handles and carinated bowls, that are well represented in Kavos ware, shards of cheese-pots and combed/scored pottery, along with tools of Melian obsidian, are all of a Cretan, Aegean and of a wider Eastern Mediterranean distribution in the FN/EBA.[21]

Accordingly, the un-centrality/marginality of the small and remote Gavdos and its dependency from neighboring Crete, does not seem to result from any economic dearth or isolation effect. Instead, it appears as the outcome of exploitation tactics dependent on wider production and economic needs of the time.

A more thorough study of these forms of exploitation and interactions could eventually help us understand how, unlike the other isles that surround Crete,[22] Gavdos managed to remain inhabited throughout its long historical course, although more than once on the verge of abandonment.

List of Abbreviations

MN Middle Neolithic
FN Final Neolithic
EBA Early Bronze Age
MM Middle Minoan
LM Late Minoan

Notes

[1] We thank the organizers of the AIAC 2018 conference for the opportunity to announce a preliminary discussion on Gavdos' early economic subsistence strategies and colonization, Katerina Kopaka for the authorization over our research, Christina Papadaki for her preliminary and useful observations on pottery obtained from the survey, the whole Gavdos project team, Eleni Chreiazomenou, Despoina Markaki and Roxanne Papadaki-Metzikof for accompanying us in our visits to the island of Gavdos for the purposes of this paper. Furthermore Antonis Vratsalis-Pantelaios would like to thank the Hellenic Foundation for research and Innovation, for the scholarship he was granted during the 2017–2018 academic year.
[2] Αλεξόπουλος 1999.
[3] Delipetrou et al. 2015.
[4] Kopaka – Matzanas 2009.
[5] Kopaka 2002.
[6] For Egypt see Vinson 2009, 3–8; Asouti 2003b, for MBA Akrotiri see Asouti 2003a.
[7] Kopaka 2002, 197–199; Kopaka 2005.
[8] Robb – Farr 2005.
[9] For MM-LM Crete see Kopaka 2011.
[10] E.g Catapotis – Bassiakos 2007, 69.
[11] Kopaka 2005; Kopaka – Theou 2015.
[12] Mosso 1910, 227.
[13] Battye et al. 1913, 87; Kopaka – Theou 2015, 42.
[14] McGeehan et al. 1983, 148.
[15] See Mosso 1910, 227 and Catapotis – Bassiakos 2007, 72 for Chryssokamino.
[16] Kopaka – Theou 2015, 41.
[17] Gale et al. 1981, 178.
[18] Kopaka 2002; Λαμπρινάκη 1890.
[19] Kopaka 2002, 206.
[20] Lazar, Kopaka 2020.
[21] See e.g. Coleman 1977.
[22] Chalikias 2013.

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