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High-resolution geological mapping in provenancing the building stones of the Archaic sanctuary on Despotiko Island (Aegean)

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This study aims to classify the various rock types used in the main building of the Archaic sanctuary on Despotiko Island (Cyclades) and to discuss possible local and imported origin of the recognized lithologies, based on the comparison with rocks found on the island. Additionally the reconstruction of the local coast line change based on published data and new observations, provides important insights into the relationship of the sanctuary, the Órmos Despotiko and former communication paths.

Despotiko is a small, presently uninhabited island, southeast of Antiparos in the central Aegean with a surface of almost 8 km2. At present the only natural occurrences of fresh water on the island during the summer are two small water seeps in the northwest part of the island. Tectonically, Despotiko, Antiparos and Paros, belong to the Attic-Cycladic Crystalline of the Central Hellenides, a stack of metamorphic tectonic nappes, mainly comprising variable types of gneiss, schist, marble and amphibolite, and tectonic slices of unmetamorphosed sediments on top, separated by low-angle normal faults from the metamorphic units below. Structurally, Despotiko is characterized by foliation surfaces dipping quite uniformly towards the southwest at shallow angles, with stretching lineations plunging in the same direction. Folds have been observed rarely; usually they are isoclinal folds with fold axes parallel to the stretching lineation. The metamorphic rocks are cut by steep, northwest-southeast trending brittle faults, some of them showing displacements of several hundred meters.

The sanctuary is situated on a gently northeast dipping slope in the northeast part of Despotiko, in range of sight of the Órmos Despotiko. Since 1997 large parts of this important sanctuary have been excavated during several excavation campaigns. The sanctuary consist of a main building (building A) with 5 rooms, which is situated on the west side of a rectangular court with several more buildings on the north side. Additional buildings exist towards the northeast, closer to the coast. Most of the buildings date to the Archaic and Classical periods, although finds from later periods witness activities in this area also during later times. Southeast of the building A several buildings small, irregular rooms with inferior masonry quality and abundant re-used archaic/classical building stones are from the medieval period (Kourayos, Y. 2006. Despotiko Mandra: a sanctuary dedicated to Apollo. In: M. Yeroulanou and M. Stamatopoulou (eds.), Architecture and Archaeology in the Cyclades, BAR International Series, 1455, Archaeopress, Oxford, 105-133).

In building A of the archaic sanctuary six different lithologies have been recognized in the building stones. So far no samples have been taken from the building stones, therefore their lithological description is based on macroscopic inspection of in situ stones, aided by a pocket lens (10 x magnifications) and a grain size comparison chart and as long as they are not supported by additional analyses like thin-section inspection, which obviously demand the use of samples from the building stones, they remain preliminary. (i) Medium grained white calcite marble with thin, rose-coloured dolomite marble layers (marble 1), (ii) coarse, white calcite marble (marble 2), (iii) white mylonitic gneiss and (iv) grey granite gneiss represent the most important lithologies, while (v) dark grey banded calcite marble and (vi) yellowish calcarenite (“lithos poros”) have been found only rarely.

The well dressed, rectangular and even faces of the eastern façade of building A are exclusively made of marble 1, which is also commonly used rough or variably dressed for all other walls. The large and very well finished thresholds are solely made of marble 2. Partly dressed or rough white gneiss is used for the inner side of the buildings eastern wall as well as for most other walls and represents by far the most common foundation stone. A detailed geological map of Despotiko at the scale of 1:10,000 is in preparation and provides essential information about the distribution of different rock types on the island. With exception of marble 2 all rock types of the building stones in building A of the sanctuary can be found on Despotiko and therefore theoretically could originate from the island.

Possible local provenance of at least some building stones is further supported by nine (presently undated) quarry-like hollows; seven in white gneiss, one in dark grey calcite marble and one in white calcite marble resembling marble 1.

Submerged archaeological structures at the sea bottom of the Órmos Despotiko (Morrison, J.A. 1968. Appendix I. Relative sea-level change in the Saliagos area since Neolithic times. In: J.D. Evans, C. Renfrew (eds.), Excavations at Saliagos near Antiparos, Thames and Hudson, London, 92-98), a Classical marble inscription from the sanctuary (Kourayos, 2006) and partly submerged agriculture trenches at the east coast Despotiko, indicate that the relative sea-level in this area was at least 3 m lower during the Early Bronze Age and still more than 1 m lower during Classical time. Neglecting vertical tectonic movements and by means of the present sea floor bathymetric configuration the sea level reconstruction implies the possible existence of an isthmus between Despotiko, Kimitiri and Antiparos linking the islands at least until Classical time. Obviously, more geomorphologic studies and dating of archaeological remains on the sea floor are essential for a more accurate reconstruction of the local relative sea-level rise.