Late Quaternary ooid-bearing aeolianites from Rhodes (Greece): indicators for frequent tropical conditions?

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Coastal aeolian carbonates are widespread throughout the Quaternary and occur most extensively between latitudes of 20° and 40° in glacial as well as interglacial intervals. In the Mediterranean region aeolianites are well-known from many coastal settings but seem to be more common in the eastern Mediterranean region.

The ooid-bearing sands exposed at the Kattavia Road Cutting, SW Rhodes, are interpreted as aeolian deposits based on (1) their ± well-sorted medium sand-size grainstone texture, (2) the regular about 2 cm thick foresets, which can be followed laterally for several meters and exhibit dips of up to 39°, (3) the common presence of mammal traces throughout the section, (4) its subdivision into three units by soil horizons rich in rhizoliths and shells of land snails. The deposit shows a low angle sheet-like morphology which follows the underlying basement. All three aeolian sequences bear dominantly ooids, which suggests three ooid-forming intervals.

According to Odyke & Wilkinson (1990) all Quaternary aragonitic ooid occurrences are restricted to latitudes < 40° and form in areas with an aragonite saturation of at least Ω_{arag} = 3.8. Thus making ooids a good proxy for tropical climatic conditions. Especially in higher latitudes, where their occurrence is most likely linked to climatic optimum conditions. Hence, the following scenario for the formation of the Kattavia aeolianite is suggested:

The stratigraphic and geographic position of the Kattavia aeolianite, the Late Pleistocene occurrence of other aeolianites on the island and the exclusive presence of still-living land snail taxa in the soil horizons suggest a Late Pleistocene deposition. As pointed out above, the formation of ooids most likely took place during climatic optimum, interglacial, conditions in a nearby shallow marine environment. Meanwhile, the increased humidity of the eastern Mediterranean palaeoclimate during interglacials, as suggested by Bar-Matthews et al. (1999), and others, most likely caused the stabilisation of aeolianites by soils. Consequently, aeolianite formation is interpreted to have taken place during more arid glacial intervals. During glacials the island shelf, the most probable source of ooid-bearing sediment, was subaerially exposed and ooids were available for aeolian transport. Sequence internal cyclic variations may be due to variations in wind velocities or to a stepwise regression of the sea level. Other Quaternary ooid occurrences from the Gulf of Lion, the Strait of Otranto, the Peloponnesus and from Sedir Island further support our interpretation of frequent subtropical to tropical conditions in the northern Mediterranean during the Late Pleistocene.

References: Bar-Matthews M et al. 1999. The Eastern Mediterranean paleoclimate as a reflection of regional events: Soreq cave, Israel. *Earth Planet Sci Let* 166: 85-95. Opdyke BN and Wilkinson BH 1990. Paleolatitude distribution of phanerozoic marine ooids and cements. *Palaeogeogr, Palaeoclimatol, Palaeoecol* 78: 135-148.