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The Effect of early meteoric Diagenesis on the Ca-isotope System: A Case Study from altered Holocene/Pleistocene Bivalves (Gulf of Corinth, Greece)

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Bivalve shells, formed by distinctive growth bands, provide excellent high-resolution archives for the reconstruction of past environmental parameters. In particular, reliable sea-surface temperature records (SST) are amongst the most fundamental reference data in climate reconstruction. Thus, the importance of reliable SST-data has led to the development of a number of new and complementary temperature proxies. Adopting a multi-proxy approach (δ^{18}O, δ^{13}C, Mg/Ca, $\delta^{44/40}$Ca) to a Late Cretaceous, "pristine" low-Mg calcite rudist shell, Immenhauser et al. (2005) critically assessed SST-seasonality-data from Tethyan epeiric waters. However, in order to test the geological reliability of geochemical proxies from fossil bivalve shells, it is important to examine the sensitivity of the shell geochemistry (isotopic and trace elemental composition) to early diagenetic alteration.

For this purpose, selected fossil bivalve shells (e.g. *Lithophaga*, *Mytilus*, *Spondylus*) from chronologically different time slices were collected at Mavra Litharia and at Cape Heraion, two sites of uplifted marine terraces located in the southeastern Gulf of Corinth area, Greece. Samples are dated to be of Holocene and Pleistocene (MIS 5e) age. Both sites are currently within the meteoric vadose zone. Uplift rates and sea-level reconstructions even suggest prolonged subaerial exposure of these shells throughout the Late Holocene. The shell material includes a series of quasi-pristine shells, such that show incipient diagenetic alteration and such that have seen a pervasive diagenetic overprint. The degree of shell preservation is tested by both optical (shell microstruc-

ture) and geochemical (Mn, Fe, Sr content) screening methods. Placing these shells on a relative diagenetic alteration scale, Ca-isotope measurements are preformed in order to quantify the effects of increasing diagenetic alteration on the Ca-isotope system. This is a contribution to EUROCLIMATE project 04 ECLIM FP08 CASIOPEIA.

Reference: A. Immenhauser, T. F. Nägler, T. Steuber and D. Hippler (2005) A critical assessment of mollusk $^{18}O/^{16}O$, Mg/Ca, and $^{44}Ca/^{40}Ca$ ratios as proxies for Cretaceous seawater temperature seasonality. Palaeo3, 215, 221-237.