

Eastern Mediterranean Foraminiferal Palaeoecological Responses to Late Pliocene Environmental Changes

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This study focuses on the Late Pliocene deposits in Cyprus, a period during which dramatic, global climatic events occurred as the probable consequence of a downturn in atmospheric carbon dioxide concentrations. Pliocene is characterized by glacial (expansion) and interglacial (ablation) periods (e.g. Lambeck et al., 2002), which had inevitable impacts upon the global eustatic sea level, oceanic circulation and latitudinal temperature.

The studied section is located in the center of the Pissouri sub-basin, in southern Cyprus (Pissouri basin) and contains a relatively thick succession (thickness of ~45 m) of rhythmically bedded marls, which constitute regularly bedded, fining upward packages. Each package typically has a sharp-based fine-grained, frequently laminated sandstone/siltstone bed fining upwards into claystone.

The lithological cyclicality of the sediments together with the foraminiferal pattern is used to reconstruct the ocean-climate interactions in the eastern Mediterranean. The regularity of the lithological cyclicality appears to be recording a predictable systematic control, most plausibly related to astronomical forcing which is often expressed as lithological cycles in the sedimentary record.

Benthic microfauna composition and distribution allow an evaluation of the bottom water ventilation during deposition, whereas the combined study of benthic and planktonic assemblages is used to evaluate the impact of climate changes on bottom palaeoenvironment.

A statistical analysis, Hierarchical Cluster Analysis, was performed in order to better describe the composition and distribution of the benthic foraminiferal assemblages. Two main benthic foraminiferal assemblages were recognized. BFA-1 is characteristic of a mixed oligotrophic to mesotrophic, dominantly epiphytic and epifaunal assemblage in a relatively oxic environment. In contrast BFA-2 is interpreted to be indicative of an ecologically stressed environment, with epiphytics becoming absent, in favour of species with a tolerance to high organic matter flux. The stressed conditions are likely to be related to the influx of organic matter through freshwater input (e.g. analogous to periods of sapropel formation).

Moreover, benthic foraminiferal species diversity parameters, including information function (H), equitability (E) and number of species (S) were analysed at Pissouri Section, Cyprus Island, Eastern Mediterranean. The values of these parameters have enabled us to understand deep sea palaeoceanographic changes in the eastern Mediterranean during the studied interval. The major changes in diversity parameters show close linkages to changes in the water mass stratification and productivity.

A cyclostratigraphic approach has been attempted to obtain a detailed chronostratigraphic subdivision. The fluctuations curves of *Globigerinoides* spp. were used to verify the orbital forcing climate variability (Sprovieri et al. 2006). The ratio *Globigerina bulloides* / *Globigerinoides ruber* were used in order to establish the stratification of the water column (Sbaffi et al. 2001).

Keywords: Benthic and planktonic foraminifera, Eastern Mediterranean, Late Pliocene, palaeoceanography

Acknowledgments:

This research has been co-financed by the European Union (European Social Fund – ESF) and Greek national funds through the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework (NSRF) - Research Funding Program: THALIS – UOA- "Island biodiversity and cultural evolution: Examples from the Eastern Mediterranean, Madagascar, Mauritius, Philippines during the past 800,000 years" (70/3/11669, MIS: 375910).

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