**POSTER.**

# Foraminiferal response to Eastern Mediterranean circulation and oxygenation during sapropel S1 formation

*Antonarakou A.[1], Drinia H.[1], Kontakiotis G.[1] & Anastasakis G.[1]*

[1]National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Dept. of Hist. Geology and Paleontology, Panepistimiopolis, 157 84 Athens, Greece
[1]*aantonar@geol.uoa.gr*

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## Abstract

The Holocene sedimentary sequences from the Eastern Mediterranean Basin are generally characterised by the occurrence of an organic carbon rich-layer (sapropel S1), which is sometimes constituted by two dark lobes (S1a and S1b) with a lighter coloured central segment (S1 interruption). Sapropels are organic-rich sediments that occur periodically in the sedimentary record of the Eastern Mediterranean Sea. Increased productivity and preservation due to increased nutrient supply and bottom water stagnation are the two main factors responsible for the enrichment in organic carbon in the sediments.

A high-resolution study of benthic and planktonic foraminiferal abundances in one core (M22-18) from the SE Aegean Sea is presented. With its 3 m of undisturbed sediments the core covers the last 10 kyr time interval. Its sedimentary sequence is well suited to reconstruct the palaeoceanographic events that occurred within the SE Aegean Sea during the uppermost part of the Quaternary.

In all 39 samples were studied for foraminifera. In order to compare our data with results form other ODP Mediterranean Sites, sediments were dried and washed on a 63 μm sieve and counting was performed on the residue greater than 125 μm.

Planktonic foraminifera are abundant and well preserved. Significant changes in quantitative distribution of planktonic foraminiferal taxonomic units allowed us to identify several events useful to define boundaries of ecozones. They are based on the temporary appearance and disappearance of specific taxa or of marked abundance peaks.

Abundance variations of selective planktonic foraminifera, which live at a different water depth, can be used to infer paleoceanographic changes along the sedimentary sequence. The palaeoceanographic evolution in the water column in terms of stratification and productivity during the different stratigraphic intervals is further discussed.

Between 10 and 6 kyr BP, which largely corresponds to the S1 deposition interval, diagnostic changes in the foraminifera assemblages are recorded. The time interval corresponding to sapropel S1 deposition, including the intermediate segment, was identified by calcareous plankton abundance fluctuations (particularly by *Globigerinoides ruber* - white and pink varieties), even though lithological evidence of this sapropel is not present. From the end of this time interval to the top of the studied sequence, a small, gradual decrease of the warm species is interpreted as the result of a gradual climatic deterioration.

The composition of the benthic foraminifera in the studied core records distinct changes in benthic populations and the environmental variables controlling these populations.

Benthic foraminifera occur throughout the studied interval and demonstrate that at least dysoxic conditions prevailed in upper bathyal ecosystems of the Aegean Sea during sapropel S1 deposition. However, drops in benthic foraminiferal numbers and diversity are quite significant.

The pre-S1 fauna is mainly dominated by *Melonis barleeanum* assemblage. *Melonis barleeanum* prevails in environments characterized by increased fluxes of organic matter to the sea bottom and fine-grained sediments. The abrupt increase of this benthic species indicates an increased delivery

of organic matter but not severe low-oxygen conditions within the sediments (Corliss 1985, Caralp 1989).

The assemblage found near and within sapropel S1 is composed of *Chilostomella oolina, Globobulimina* spp. and *Bolivina* spp., reflecting stronger oxygen depletion. Concomitant abundance of low-oxygen tolerant benthic foraminifera and presence of the more oxyphilic benthic foraminifer *Uvigerina mediterranea*, indicate repeated deep water re-oxygenation events throughout the deposition of S1. The post-S1 population dominated by small epifaunal taxa which are referred to have a much more opportunistic life strategy, are typical of a very rapid re-oxygenation of the benthic environment after sapropel deposition (Jorissen 1999).

In general, the faunas at the M22-18 core reflect an oligotroph and well-ventilated benthic ecosystem. However, faunal fluctuations at this site suggest the repeated influence of short-term climate changes on reventilation and re-colonization of deep-sea ecosystems in the SE Aegean Sea.

**References**

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