

Oligocene-Early Miocene Paleoceanographic Events of Afales Basin, Ithaki island, Ionian Sea, W. Greece: Evidence from Benthic and Planktonic Foraminifera

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Introduction

The late Oligocene and early Miocene periods have generally been viewed as time of moderate global warmth and ice-free conditions (Freeman and Hayes, 1992; Pagani et al., 1999). We present a quantitative and paleoecological study using deep-sea benthic and planktonic foraminifera as a tool to interpret the depositional environment and to identify climate in the Oligocene and early Miocene deposits of Ithaki island, Ionian Sea, W. Greece.

Geological setting

A detailed study based on planktonic and benthic Foraminifera has been carried out in one section (Afales Section) restricted to the northern part of the Ithaki island. The island is situated in the external part of today's Hellenides, a NNW-SSE trending orogenic belt. In the concept of Aubouin (1959, 1965) the area belongs to the Ionian Zone (Fig. 1).

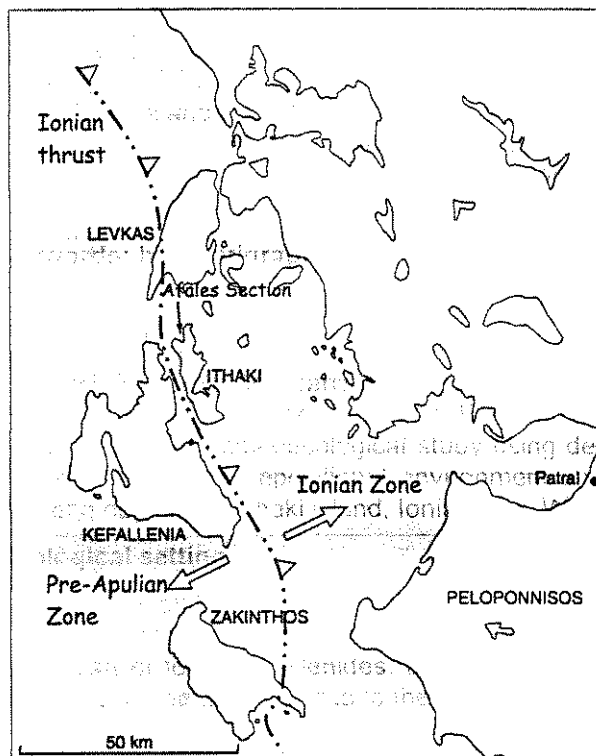


Fig. 1. Generalized location map of the studied section.

A generalized lithostratigraphy of the Afales Section has been worked out by de Mulder (1975). The studied section is characterized by several non-connected successions of steeply inclined and partly overturned detrital limestones, calcareous conglomerates, marls and sandstones (Fig. 2).

Methodology

Paleoenvironmental interpretations were based on the foraminiferal analysis of 45 samples collected every 1-3 m along the entire length of the section. Processing involved pre-soaking in water,

gentle hand disaggregation, and wet sieving into 125 µm fraction. Dried residues were examined for foraminifera.

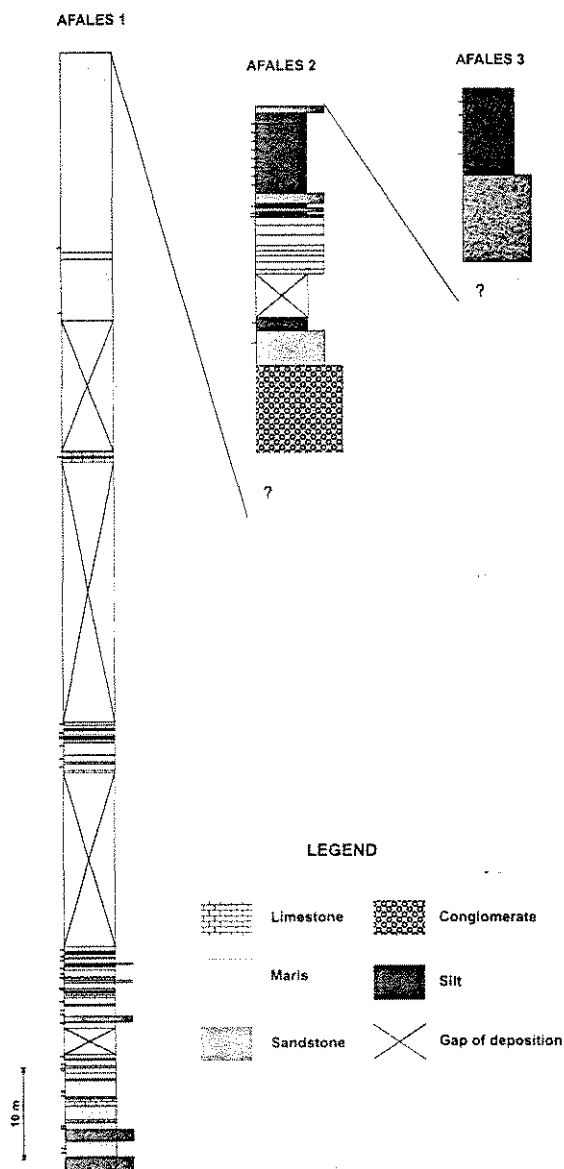


Fig. 2. Stratigraphical column of the studied section.

Census counts were based on subsamples of 200-300 specimens from >125µm fraction, obtained with an Otto microsplitter. This procedure was applied separately for the census of both benthic and planktonic specimens.

The paleodepth of the deep-water assemblages is inferred from the P/B ratio and distributional patterns of recent foraminifera belonging to the same families found in the studied succession.

Interpretation of the data

Foraminifera are abundant throughout the section, with planktonic taxa generally more abundant than benthic taxa.

The biostratigraphic analysis revealed an Oligocene to lower Miocene age for the sedimentary sequence. The presence of *Paragloborotalia opima opima* and *Globigerina tripartite* and *Globigerina tapuriensis* which dominate the planktonic foraminifera fauna yielded an middle Oligocene age up to 30. The middle part is characterized by the presence of *P. kugleri* while the assemblages of the upper part (48) supports a lower Miocene age dominated by *Globigerinoides* spp. and *Globiquadrina dehiscens*.

Benthic foraminifera are often dominated by calcareous forms, although agglutinated taxa occur in small numbers in some levels of the record.

The deep benthic assemblages show high diversities and are characterized primarily by *Cibicides*, *Anomalina*, *Vulvulina*, *Spiroplectammina*, *Gyroidinoides*, *Planulina* and *Pleurostomella*. *Bolivinitidae* are present, yet in small numbers.

The study of the benthic foraminiferal assemblages indicates a bathymetric interval of the sea floor ranging from the lower bathyal to the lower/middle bathyal zone, during the entire period of time taken into consideration. Distinctive shallow shelf species (e.g. *Elphidium advenum*, *Notorotalia* sp.) occur in very small numbers throughout the section, yet are interpreted as being transported.

The planktonic foraminifera from Afales section are abundant and diverse. Abundance signatures for planktonic microfossils suggest that temperatures of near-surface and intermediate water masses were oscillatory.

Acknowledgements

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