



Late Pleistocene-Holocene paleoclimatic and paleoenvironmental changes in the Ionian Sea (ODP Hole 964B) as revealed by planktonic foraminifera and calcareous nannofossils assemblages

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A quantitative analysis of calcareous nannofossils and planktonic foraminifera assemblages in sediments from core ODP 964 (36°15,62' N, 17°45,025' E), retrieved at a depth of 3650 m in the Ionian Sea (Eastern Mediterranean basin), was carried out in order to obtain a high-resolution reconstruction of the paleoclimatic and paleoceanographic changes in this area during the last ca. 20 ky BP.

The studied sedimentary sequence (the upper 168 cm interval at Hole 964B) mainly consists of undisturbed nannofossil oozes. Sapropel S1 occurs between 66 and 72 cm (Shipboard Scientific Party, 1996). Three radiocarbon ages indicate that the studied sequence covers the last 24 ky BP.

On the basis of the calcareous nannofossils and planktonic foraminifera abundance fluctuations and on the basis of the paleoclimatic curves constructed, the major paleoclimatic and paleoceanographic changes of the investigated time interval were recognized. The Last Glacial and Oldest Dryas periods were characterised by the presence of cold, fertile and generally not stratified water masses, as testified by high abundances of cold and eutrophic planktonic foraminifera (e.g. *Globorotalia scitula* and *Turborotalita quinqueloba*) and by low abundances of warm water coccolithophorids species (*Rhabdosphaera* spp., *Umbellosphaera* spp., *Discosphaera tubifera*) and *Florisphaera profunda*. The Bølling/Allerød climatic warming is highlighted by an increase of *Globigerinoides ruber* and warm water coccolithophorids species and by the presence of *Globorotalia inflata* and *Globorotalia truncatulinoides*. During this period the planktonic assemblages denote the presence of less cold-water

masses, probably seasonally stratified. A significant drop in the warm water species, an increase of the cold and eutrophic species of planktonic foraminifera and low values of the *Gephyrocapsa oceanica*/*Gephyrocapsa muelleriae* ratio characterize the Younger Dryas period, during which cold and fertile water masses occupied the investigated area. The Late Pleistocene – Holocene boundary is characterised by an increase of all the warm water species. At the beginning of the Holocene, the presence of *G. inflata* and *G. truncatulinoides* testifies the presence of vertical mixing in the water column during winter, but then the gradual increase of *F. profunda*, together with the decrease of *G. inflata*, *Neogloboquadrina pachyderma* dx and *T. quinqueloba*, reflect the onset of oligotrophic surface waters and the establishment of seasonal stratification. The base of S1 sapropel is characterised by a sharp increase of *G. ruber* var. *alba* and *F. profunda*. High abundance values of warm water species, the decrease of *G. inflata* and *N. pachyderma* dx, the absence of *G. truncatulinoides*, high values of specimens per gram and the increase in the mean size of some species (*O. universa*, *G. ruber*, *G. bulloides*) characterise the planktonic foraminifera assemblages during the sapropel period. The coccolithophorid assemblages show high abundance of warm water species, the increase of *H. carteri* and reworking coccoliths. These changes in the assemblages represent the response of the planktonic communities to the strong variations in the structure and properties of the water masses during the S1 formation. The time interval between the S1 top and the *subrecent* is characterised by the presence of water masses generally warm and stratified.

References

Shipboard Scientific Party (1996). Site 964. In: Emeis K.-C., Robertson A.H.F., Richter C. et al. (Eds), Proc. ODP, Init. Rep. 160, 85-123.