Geophysical Research Abstracts
Vol. 12, EGU2010-13926-1, 2010
EGU General Assembly 2010

The Messinian/Early Pliocene transition in Eastern Mediterranean: New palaeoenvironmental data from the Kalamaki section (Zakynthos Island, Greece)

Hara Drinia, Assimina Antonarakou, Theodora Tsourou, Evi Tzortzaki, Amalia Filippidi, and Konstantinos Nikolaou

University of Athens, Faculty of Geology & Geoenvironment, Dept. of Historical Geology-Paleontology, Athens, Greece (cntrinia@geol.uoa.gr, 0030 2107274394)

The purpose of this study is to describe the Miocene-Pliocene microfaunal development, and to discuss its palaeoenvironmental and palaeogeographical significance. The studied section (Kalamaki section) is located in the eastern part of Zakynthos Island (western Greece). Details on lithology and stratigraphy of the section are given in Dermitzakis (1978) and Nikolaou (1986).

Planktonic species indicate that sediments span the interval which corresponds to MPL1 Zone (Zanclean, early Pliocene) which is in accordance with the biostratigraphic configuration of Rouchy et al. (1992) and Pierre et al. (2006). The studied interval is characterized by the *Sphaeroidinellopsis* Acme Zone and the presence of *Globorotalia margaritae*.

The recognized succession of microfossil assemblages serves to interpret the evolution of some palaeoenvironmental factors (waterdepth, salinity and oxygen content), whereas the planktonic foraminiferal zonation allows an age assignment to the events.

During the Late Messinian brackish conditions became dominant. The early Pliocene is characterized by a sudden return to well oxygenated, open marine, outer shelf conditions.

At the basal part of the record, the high abundance of the 'shallow water component' of the benthic foraminiferal fauna indicates a well-vegetated environment with either normal marine salinity or a tendency to hyposalinity (e.g. Murray, 2006). Open marine conditions are indicated by the diversity of benthic and planktonic foraminifera. The abundance of *Lenticulina* spp., *Cibicidoides pseudoungerianus*, *Planulina ariminensis*, *Pullenia*, *Gyroidina*, and the virtual absence of *Cibicidoides dutemplei* and other typical shelf-taxa, suggest an upper bathyal waterdepth of 300-400 m (cf. Pujos, 1976; Jorissen, 1988).

Partly, the abundance of *Cibicidoides pseudoungerianus*, *Bulimina costata* and *Uvigerina peregrina* reflect fluctuations in oxygen content of the bottom waters. However, extreme conditions were never reached during deposition.

The foraminiferal facies distribution in the studied part of the Kalamaki section is in accordance with isotope oxygen data from basins in the central and eastern Mediterranean basin which indicates the existence of a salinity gradient during this time span.

Ostracod fauna is characterised by low diversity and abundance. It is consisting mainly of *Bythocypris* and *Cytherella* species, which confirm the bathyal depositional environment.

The study of the late Messinian-Early Pliocene sediments in Zakynthos island (Kalamaki section) correlated with time equivalent sections in Crete (e.g. Drinia et al., 2007) and the comparison with the offshore coeval deposits drilled in the ODP Leg 160 boreholes, illustrate the environmental changes which occurred in the Eastern Mediterranean at the end of the salinity crisis.

References

Dermitzakis, M.D., 1978. Stratigraphy and sedimentary history of the Miocene of Zakynthos (Ionian Islands, Greece). Ann. Geol. Pays Hell., 29:47 186.

Drinia, H., Antonarakou, A., Kontakiotis, G., 2007. On the occurrence of Early Pliocene marine deposits in the Ierapetra Basin, Eastern Crete, Greece. Bulletin of Geosciences, 83 (1), 63-78.

Jorissen, F.J., 1988. Benthic foraminifera from the Adriatic Sea: principles of phenotypic variation. Utrecht Micropaleontological Bulletins, 37, 1-174.
Murray, J., 2006. Ecology and applications of Benthic foraminifera. Cambridge University press, 426pp.
Nikolaou, K.A., 1986. Contribution to the knowledge of the Neogene , the geology and the limits of the Ionian and Preapulian zones, in relation to the petroleum exploration , observations in Strofades , Zakynthos and Kefallinia islands. The doct. University of Athens.
Pierre, C., Caruso, A., Blanc-Valleron, M., Rouchy, J. M., Orzsag-Sperber, F., 2006. Reconstruction of the paleoenvironmental changes around the Miocene-Pliocene boundary along a West-East transect across the Mediterranean. Sedimentary Geology 188-189, 319-340. The Messinian Salinity Crisis Revisited.
Pujos, M., 1976. Ecologie des foraminifères benthiques et des thé-camoebiens de la Gironde et du plateau continental Sud-Gascogne: application á la connaissance du Quaternaire terminal de la région Ouest-Gironde. Memoires de l' Institut de Géologie du Bassin d', Aquitaine, 8, 1-274.
Rouchy, J.-M. & Saint Martin, J.-P., 1992. Late Miocene events in the Mediterranean as recorded by carbonate-evaporite relations. Geology, 20: 629-632.