Lower-middle Miocene sapropelic layers (Nicosia, Cyprus) and paleoceanographic implications

Maria Athanasiou

National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Panepistimioupolis, 157 84 Athens, Greece; mairyatha@hotmail.com

Maria V. Triantaphyllou

National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Panepistimioupolis, 157 84 Athens, Greece; mtriant@geol.uoa.gr

Margarita D. Dimiza

National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Panepistimioupolis, 157 84 Athens, Greece; mdimiza@geol.uoa.gr

Alexandra Gogou

Hellenic Centre for Marine Research, Institute of Oceanography, 190 13 Anavyssos, Attiki, Greece; agogou@hcmr.gr

Efthymios Tsiolakis

Geological Survey Department, Cyprus Geological Survey, 1 Lefkonos Street, 2064 Strovolos Lefkosia Cyprus; etsiolakis@gsd.moa.gov.cy

The Kotaphi Hill section (KHS, Cyprus) with its marly-chalky cyclic alternations and numerous organic-rich siltstone intercalations is assigned to calcareous nannofossil Zones NN2-NN7, indicating a late Aquitanian-early Tortonian time span. The increased abundance of *Helicosphaera* spp., *Discoaster* spp., *Sphenolithus s*pp., and *Rhabdosphaera* spp. within the laminated siltstone layers at the upper KHS (c. 15.69 to younger than ~11.6Ma) are associated with sapropel deposition that was triggered by both increased primary productivity and water column stratification under warm oligotrophic conditions. The lower $\delta^{18}O_{\ O.\ universa}$ values that were observed in the same layers are interpreted as due to high freshwater input from the Nile River into the basin, combined with increased sea surface temperatures. The sapropel layers of the KHS record are considered to be the oldest (early Laghian) in the eastern Mediterranean, implying that sapropel deposition began earlier in the eastern than in the western part of the basin. The variations in the isotopic signals, along with an increase in cold nannofossil indicators at four distinct intervals, are probably linked to a series of cooling episodes that are globally recognized as Miocene oxygen isotope events Mi3a, Mi3b, Mi4, and Mi5, which reflect changes in paleoenvironmental conditions. An observed decrease in the values of $\delta^{18}O_{\ O.universa}$ and the concomitant increment of the fresh-water indicator *Helicosphaera* spp., along with the gradual increasing trend of warm calcareous nannofossil assemblages, imply a pronounced change towards warmer and more humid conditions after ~12.4Ma.