Sea-surface dynamics and coccolithophore behaviour during sapropel deposition of Marine Isotope Stages 7, 6 and 5 in the western Adriatic Sea

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A detailed calcareous nannofossil analysis was performed on 234 samples from the core PRAD1-2, collected in the Mid-Adriatic Deep during the PROMESS1 Cruise. The selected sequence includes the Marine Isotope Stages 7, 6 and 5, crossing several sapropel layers (S8 to S3) (Piva *et al*., 2008). The main goal of the present study was to recognise changes in calcareous nannopankton distribution pattern during MIS 7, 6 and 5, and in particular across the associated sapropel layers.

Most of the sedimentological, geochemical and micropaleontological studies (*e.g*. Capozzi & Picotti, 2003; Arnaboldi & Meyers, 2003; Rio *et al*., 1997) refer that sapropels are dark-coloured organic-rich layers interbedded in the normal pelagic sediments of the Mediterranean Sea. They are related to climatic or oceanographic variations. Sapropel generation is also associated to orbital scale oscillations under conditions of maximum summer insolation, corresponding to a minimum of the precession component of Earth's orbit, with a periodicity of 21kyr (Hilgen, 1991; Lourens *et al*., 1996; Hilgen *et al*., 1997).

The results of this work indicate a decrease of the total coccolith abundance during most of the sapropels. A similar pattern was previously observed in others sectors of the Mediterranean (*e.g*., Negri &Villa, 2000; Negri & Giunta, 2001), while the reworked nannoliths exhibit an opposite pattern. The analysis of single species (namely, *C. pelagicus*, *H. carteri*, *Syracosphaera* spp., *R. clavigera*+*Calciosolenia* spp., *B. bigelowii* and small taxa) shows a decrease in abundance during MIS 7, while during MIS 6 and 5 the opposite pattern occurs. Another important feature of the studied samples is the significant increases in *Coccolithus pelagicus* and in *Helicosphaera carteri* at the beginning of MIS 7 sapropel layers, reflecting a phase characterized by cold and mixed waters (eutrophication). However, the same pattern is not so evident for the other interglacial stage (MIS 5). Our results also show important increments of *Syracosphaera*, *Rhabdosphaera*+*Calciosolenia*, and *Braarudosphaera* at the top or above the end of the sapropels; these increments are clearer for MIS 5. This phase is consistent with the end of dryer and cold conditions, and subsequent reestablishment of the general oligotrophy of surface waters. During MIS 7, between these phases and during most of the sapropel deposition, increases in reworked taxa are observed that reflect a more intense runoff. The consequences of this important fluvial erosion may have hampered the development of autochthonous species.

In general, our results indicate the existence of fluctuations in the calcareous nannofossil content between the interglacial stages 7 and 5, and also between these two and the glacial stage 6, revealing a transition of different paleoceanographic conditions across the analysed interval. A similarity in the environmental conditions occurring during sapropel deposition of each stage was also detected.

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