



MILLENNIAL-SCALE CLIMATE VARIABILITY DURING THE LAST 28 cal. ka BP IN THE TYRRHENIAN SEA (CENTRAL SECTOR OF MEDITERRANEAN SEA)

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High resolution reconstructions of coccolithophore assemblages and plankton carbon and oxygen stable isotope data from Ocean Drilling Project (ODP) Hole 974D have been studied to investigate climate variability in the Tyrrhenian Sea (Western Mediterranean) during the last 28 cal. ka BP.

The main climatic signal is showed by coccolithophore assemblages and isotopic records at glacial/interglacial timescale. Through the application of statistical analyses, a possible role of half and fourth precession cycles was hypothesised, more likely linked to the influence of the Equator insolation on central sector of Western Mediterranean circulation.

The occurrence of abrupt coolings, more likely connected to Northern Hemisphere global climatic changes, was hypothesised also in the Tyrrhenian Sea during the Last Glacial (LG) and the Holocene, highlighted by the occurrence of the subpolar species *Coccolithus pelagicus pelagicus*. The events of the LG occurred in correspondence of the Dansgaard/Oeschger (D/O) stadial at 28 cal. ka BP and Heinrich event 2. The Holocene events were quite synchronous with several Bond Cycles and Rapid Climate Changes. In addition, marine warm phases, coincident with the D/O interstadial 2 and the Bølling-Allerød interval, were recognised at ODP Hole 974D by increases of warm species. Furthermore, during the Younger Dryas, oxygen stable isotope record indicates the occurrence of a cooling while coccolithophore assemblages testify increased nutrient conditions, highlighted by the group of small *Gephyrocapsa*.

During the transition to the Holocene a latitudinal warming was observed, through the comparison of available data from coccolithophore assemblages of other sites of the Tyrrhenian Sea (Sbaffi et al., 2001; Buccheri et al., 2002; Amore et al., 2004). The latitudinal warming moved northward versus the central part of the basin, reaching the maximum amplitude in correspondence of Tyrrhenian Holocene Climatic Optimum (Buccheri et al., 2002).

Other regional rapid events, not directly connectable to global climatic changes, were also identified during the Holocene. In correspondence of the cold events recognised in the south sector of the basin (Tyrrhenian Cold events; Cacho et al., 2001), in the central Tyrrhenian Sea small *Gephyrocapsa* testify the occurrence of high nutrient conditions. Moreover, warm species of coccolithophores show peculiar increases in correspondence of increased sea surface temperature data derived from alkenones available for the south sector of the basin (Cacho et al., 2001).

References

- Amore et al., 2004. Mar. Microp. 52: 255-276.
Buccheri et al., 2002. Mar. Geol. 186: 447- 470.
Cacho et al., 2001. Paleoceanography 16: 40-52.
Sbaffi et al., 2001. Marine Geology 178: 39-62.