



Paleo-climate changes during Termination V off Iberia as revealed by coccoliths assemblages

Eliana Palumbo (1), Filomena Ornella Amore (1), José-Abel Flores (2), and Antje Volker (3)

(1) University of Sannio Benevento, Dipartimento Studi Geologici e Ambientali, Italy (eliana.palumbo@unisannio.it), (2) Universidad de Salamanca Facultad de Ciencias Departamento de Geología 37008 Salamanca Spain, (3) LNEG Unidade de Geologia Marinha 2610-143 Amadora Portugal

Several glacial-interglacial cycles occurred during the Pleistocene separated by shorter or longer transitional periods in which the climatic system structure was modified. Termination V (425.1–431.2 ka) is one of the largest glacial to interglacial transition of the middle Pleistocene (Voelker et al., 2009). It represents the transitional period between the glacial stage MIS 12 and the interglacial stage MIS 11. The study of Termination V represents a key to understand the dynamics causing the installation of the warm conditions of the MIS 11, a warm period considered to be an analogue of the actual interglacial stage (Bauch et al., 2000; Hodell et al., 2000; Droxler et al., 2000; Raynaud et al., 2005; Voelker et al., 2009).

In this work deep-sea core MD03-2699 (39°02.20'N, 10°39.63'W) has been studied. Modern surface waters at the site derive from the Gulf Stream and the North Atlantic Current (NAC) and are transported to the western Iberian Peninsula by two currents, the Portugal Current (PC) and the Azores Current (AzC). Hydrographic conditions of the area are influenced, during the summer, by the southward flowing PC and the upwelling filaments off Cape Roca and Peniche. During the winter the PC is displaced further offshore by the Iberian Poleward Current, which transports subtropical surface and subsurface waters, of the Azores front, northwards to the site (Peliz et al., 2005, Fiúza, 1984; Alvarez-Salgado et al., 2003).

The study area is an upwelling region where phytoplankton blooms occurred in the past. Coccolithophores are a special phytoplankton group living today at all latitude regions within the photic zone (0–200 m) (Winter & Siesser, 1994). They are sensitive indicators of environmental conditions, because they directly depend on temperature, salinity and nutrients as well as the availability of sunlight (McIntyre and Bé, 1967; Giraudeau et al., 1993; Winter & Siesser, 1994; Baumann & Freitag, 2004). Therefore coccolithophores quickly respond to fluctuations in climate as well as changes in surface-water conditions (Baumann & Freitag, 2004). Site MD03-2699 is located in a region where several different currents of the Northern Hemisphere came together influencing temperature and nutrient concentrations during glacial-interglacial stages. Thus this site is in a key-position to reconstruct the impact of the Mid-Pleistocene forcing on the Portuguese upwelling system and the North Atlantic's transitional waters. In this work coccolith assemblages have been studied in order to understand the differences established off Portugal within phytoplankton structure and to reconstruct environmental and paleoceanographic conditions established during Termination V.

References:

- Bauch, H.A., Erlenkeuser, H., Helmke, J.P., Struck, U., 2000. *Global Planetary Change* 24: 27–39.
- Baumann, K.-H., and Freitag, T., 2004. *Marine Micropaleontology* 52: 195–215.
- Droxler, A.W., Bruce, C.H., Sager, W.W., Watkins, D.H., 1988. *Proceedings of the Ocean Drilling Program, Scientific Results* 101: 221–244.
- Giraudeau, J., Monteiro, P.M.S., Nikodemus, K., 1993. *Mar. Micropalaeontol.* 22: 93–110.
- Hodell, D. A., Charles, C. D., Ninnemann, U. S., 2000. *Global and Planetary Change* 24: 7–26.
- McIntyre, A., and Bè, A.H.W., 1967. *Deep-Sea Res.* 14, pp. 561–597.
- Raynaud, D., Barnola, J.M., Souchez, R., Lorrain, R., Petit, J.R., Duval, P., Lipenkov, V.Y., 2005. *Nature* 436: 39–40.

Voelker, A. H. L. , Rodrigues, T., Stein, R., Hefter, J., Billups, K., Oppo, D., McManus, J., And Grimalt, J. O., 2009. *Clim. Past Discuss.*, 5: 1–55.

Winter, A., and Siesser, W., 1994. Cambridge University Press Cambridge 242p.