ESF - Short Visit Grant - Final Report

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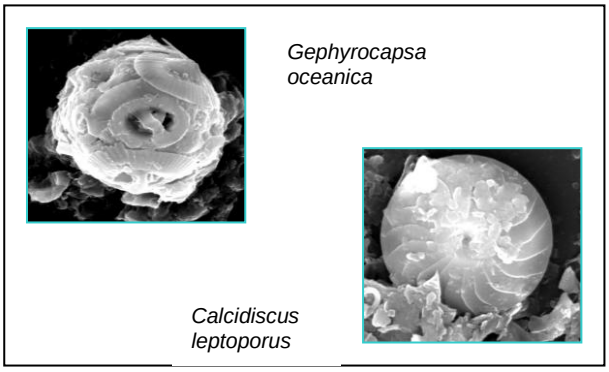
Paleoclimatic and paleoenvironmental changes during the Mid-Pleistocene Revolution (MPR): the response of calcareous planktonic assemblages in the Mediterranean Sea and in the Atlantic Ocean

Aims

The main aims of the visit were to compare the data, to discuss about the results and to project publications of the results of the piston core MD03-2699. This is the first step of a project which have as main aim the comparison of calcareous planktonic assemblages of Mediterranean Sea and Atlantic Ocean during the Mid-Pleistocene Revolution (MPR). The coccolithophores assemblages of core MD03-2699, located in the Estremadura promontory (NW of Lisbon), offers the opportunity to obtain data on the Middle Pleistocene climatic changes in the Atlantic Ocean. The work carried out during this visit was focused on:

- the selection of the last 50 samples, planning the preparation and the counting of the slides,
- the comparison of some specimens at Light Microscope,
- the discussion and comparison of the trends of some species,
- the finding of other steps of the data analysis (selection of key-species, comparison of the trends of these species with the alkenone, Ca and Sr trends, Cex index).

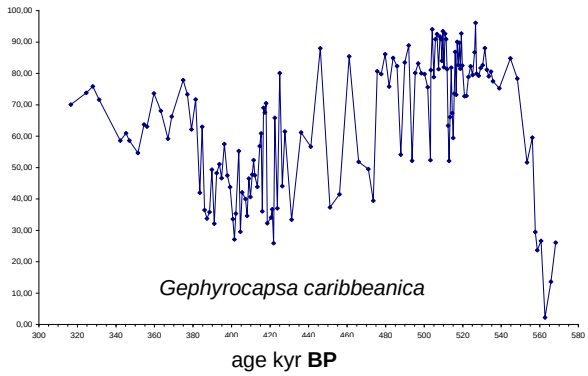
Main results obtained

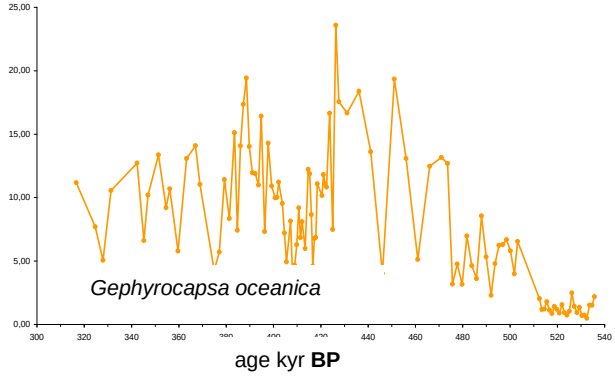


The main results obtained concern, especially the interval which ranges from MIS 9 to MIS 13, including the Mid-Brunhes event (MIS 9 to 11), which is considered one of the warmest period during the Pleistocene. In order to reconstruct the phasing of climatic changes, their relationship with the ice sheet instability and the changes in the water circulation and paleoceanographic evolution, the evolution of the structures of coccolithophores assemblages were monitored, comparing the trends of some key-species and highlighting the response of the biota to Middle Pleistocene climate instabilities.

Variations occur in the abundance and composition of the coccolithophores assemblages. These abundance fluctuations and these changes in composition are the response of the coccolithophores assemblages to the Middle Pleistocene climatic changes and to the variations of other environmental factors like temperature of water masses, nutrient availability, terrigenous input, water turbidity etc. In particular during MIS 9 to 13 the assemblages are dominated by *Gephyrocapsa caribbeanica* (a small but robust and well-calcified placolith). *G. oceanica* shows low abundance values during MIS 11 and 13. The dominance of *Gephyrocapsa caribbeanica* would indicate low-productivity conditions and

relatively warm and uniform surface water temperatures; reaching, in same samples, values more than 80% of the coccolith assemblage.





Other species such as *Calcidiscus leptoporus*, *Gephyrocapsa margerelii, Coccolithus pelagicus* and warm water species have been also compared.

This interval is also characterized by generally high carbonate concentrations (and high productivity) and fluctuations in the degree of preservation in the calcareous nannofossil assemblages were observed. The high carbonate production and the moderate/high dissolution in certain intervals might be linked to nutrient available, ocean geochemistry, and upwelling.

Future collaboration

The future collaboration with host institution was planned, also planning to apply for a sabbatic year during the accademic years 2009/2010.

Publications

Projected publications resulting from this grant were organized, focusing on their structures and titles and identifying possible journals to which to be applied.