Geophysical Research Abstracts, Vol. 8, 09506, 2006
SRef-ID: 1607-7962/gra/EGU06-A-09506

Black Sea depositional environments since the Last Glacial Maximum: implications from mineralogical and geochemical proxies

F. Martinez-Ruiz (1), D. Gallego-Torres (1), F. Guichard (2), G. Lericolais (3), C. Morigi (4), P. Koelle (5), and Assemblage Partners

(1) Instituto Andaluz de Ciencias de la Tierra (CSIC-UGR), Spain, (2) CEA.LSCE, France, (3) IFREMER, France, (4) Universita de Ancona, Italy, (5) University of Hamburg, Germany (fmruiz@ugr.es / Fax: +34958243384 / Phone: +34958246228)

Different scenarios have been proposed to explain the evolution of the Black Sea since the Last Glacial Maximum and the main changes in the limnic and marine sedimentation. In order to approach such evolution, a geochemical and mineralogical high resolution analysis has been performed in cores recovered during Blason 2 and Assemblage Cruises. Cores spanning lithological units I, II and III were recovered at different water depths, from the shallow shelf to the deep basin. Mineral and chemical compositions have been used to establish paleoceanographic proxies in order to reconstruct depositional environments. Geochemical indices and trace metal/Al ratios have been used as redox proxies and Ba has been used as a paleoproductivity proxy. Regarding mineral composition, the analyzed sediments are composed predominantly of clay minerals, calcite, dolomite and quartz, with trace amounts of feldspars. Pyrite is relatively abundant in anoxic levels and aragonite is abundant in enriched-shell intervals. Clay mineral assemblages mainly consist of illite, smectite and chlorite. Clay mineral distribution is affected by detrital riverine input and the cyclonic rim current that transport suspended sediments along the coast to the deep basin. Oxygen proxies suggest that significant changes in oxygen conditions occurred since the LGM. Although the upper coccolith ooze (Unit I) shows some fluctuations in redox indices, the most considerable changes correspond to the sapropel unit (Unit II). In contrast, the deep limnic sediments of Unit III exhibit a very uniform chemical composition. Lower oxygen levels correlate with enhanced organic carbon concentrations in Unit II. However, at the studied sites original Barite accumulation rates have not been pre-

served, which leads to a difficult correlation of productivity and organic carbon content. Ba excess profiles show peaks above the sapropel level indicating that sulfate reduction took place in the extent to barite dissolution. SEM analyses of sediments from those peaks horizons evidence diagentic barite and thus reprecipitation of Ba upon encountering oxygenated pore waters. Although original Ba-enriched intervals cannot be recognized, the presence of Ba peaks may suggests that sapropel levels may have been originally enriched in biogenic Ba and therefore enhanced productivity during sapropel deposition. Thus increased organic carbon may have also resulted from enhanced plankton production. All geochemical proxies show uniform profiles within Unit III suggesting only slight changes in depositional conditions. The transition from the limnic sediments to the carbon rich-sapropel of Unit II is rather abrupt. Here geochemical indices used as oxygen proxies support anoxic conditions and important changes in redox-dependent biogeochemical processes. The transition from Unit II to the lower organic carbon Unit I is marked by significant carbonate concentrations derived from cocccolith production.