Geophysical Research Abstracts, Vol. 8, 03290, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03290

Centennial-to-Millennial Micropaleontological and Geochemical Records of Rapid Climatic Events in the Low-Latitude NE Atlantic from MIS3 through Early Holocene

O. E. Romero (1, *), J. Kim (2), and B. Donner (1)

(1) Department of Geosciences, University Bremen, POBox 33 04 40, 28334 Bremen, Germany

(2) CEFREM - CNRS UMR 5110, Université de Perpignan, 66860 Perpignan Cedex, France

(*) oromero@uni-bremen.de / Phone: +49 421 21865537

Except for ODP658, detailed investigations have been hampered by the lack of late Quaternary marine records off NW Africa. We describe the centennial-to-millennial changes in paleoproductivity occurred off Cape Blanc for the time period between 45 kyr B.P. and early Holocene on a well-dated core (GeoB7926-2, 20˚13'N, 18˚27'W, water depth 2500 m). In this work we integrate high-resolution analyses of several micropaleontological and geochemical proxies: diatoms, bulk biogenic sediment components, oxygen and carbon isotopes on planktic foraminifera, and X-ray fluorescence. In addition, alkenone-derived SST have been calculated for the time span 23-11 kyr B.P. According to the present stratigraphic framework, the sedimentation rate ranges 10-30 cm kyr^{-1} for the period 45-16.5 kyr B.P., increases up to 70 cm kyr^{-1} after 16.5 kyr B.P., and reaches its highest value, 70-190 cm kyr^{-1}, between Heinrich 1 (H1) and the Younger Dryas (YD). Biogenic productivity was dominated by $CaCO_3$ before the last glacial maximum (LGM). Relative contribution of $CaCO_3$ decreases from early 46 toward ~33-32 kyr BP to increase toward the LGM. The opposite is true for opal and diatoms. Highest relative contribution of upwelling-associated spores of the diatom *Chaetoceros* and moderate opal and diatom concentration from MIS3 through LGM suggests that although upwelling conditions dominated, less silicate was available, and hence siliceous production diminished while calcareous increased.

The Bølling-Allerød (B-A) is characterized by enhanced $CaCO_3$ and a strong decrease in the siliceous signal, suggesting conditions somewhat similar to those of present day. During both H1 and YD a major increase in siliceous productivity occurred as shown by increase in opal content up to 26% and the highest diatom concentration. SST also show dramatic variations: lowest values occurred during H1 and YD ($\sim$17˚-17.7˚C) to increase up to 20˚C during B-A and up to 22˚C during the early Holocene.

The nutrient concentration of upwelled waters and the wind forcing were most likely the main mechanisms driving abrupt climatic changes off Mauritania. The study area is a frontal zone between salty, relatively nutrient-poor North Atlantic Central and the less-saline and nutrient-rich South Atlantic Central Water. In addition, rapid advection within the chlorophyll filaments transports cold, nutrient-rich water and its associated biota from coastal sites to the open ocean (where our core was taken), greatly extending the area of high productivity associated with upwelling off Cape Blanc. Sea level changes appear to be less important in determining upwelling intensity. Spectral analysis of the long-term series of Ti/Ca and Fe/Ca reveals several millennial to multidecadal periodicities with a maximum power of $\sim$2340- and $\sim$1160 years cycles between mid MIS3 and Termination I. Such periodicity, described for the first time for the late Quaternary off NW Africa, suggests some relationship between millennia and century scale cycles of solar activity and the observed climatic changes. These results contribute to our understanding of complex changes and shifts of atmospheric and oceanographic systems in NW Africa and the juxtaposed low-latitude North Atlantic.