Geophysical Research Abstracts
Vol. 13, EGU2011-4819, 2011
EGU General Assembly 2011

Climate oscillations and changes in the freshwater budget of the central-eastern Mediterranean between 20,000 and 70,000 years ago

Mario Sprovieri (1), Enrico Di Stefano (2), Alessandro Incarbona (2), Nicola Pelosi (3), Maurizio Ribera d'Alcalà (4), Daniela Salvagio Manta (1), and Rodolfo Sprovieri (2)

(1) IAMC-CNR, Capo Granitola, Italy (mario.sprovieri@iamc.cnr.it), (2) Dipartimento di Geologia e Geodesia, Università di Palermo, Italy (distefano@unipa.it; alessinc@unipa.it; rspr@unipa.it), (3) IAMC-CNR, Naples, Italy (nicola.pelosi@iamc.cnr.it), (4) Stazione Zoologica 'A. Dohrn', Naples, Italy (maurizio@szn.it)

Here we present a high-resolution record of faunal, floral, stable isotopes and Ba/Ca measured on G. ruber specimens, from the sediments of ODP Site 963 (central Mediterranean basin), that evidences striking centennial/millennial-scale resemblance to the high-northern latitudes rapid temperature fluctuations documented in the Greenland ice cores, over the interval between 20 and 70 kyr BP.
Oxygen and carbon isotopes, planktonic foraminifera and calcareous nannofossil distributions suggest that Dansgaard–Oeschger (D/O) and Heinrich events (HE) are distinctly expressed in the Mediterranean climate record. Moreover, significant Ba/CaG.ruber rises (up to $\sim$3.0 mmol/mol, more than three times the present background values) during the warmest intervals of D/O events testify important change in the freshwater budget of the Mediterranean possibly triggered by northward displacement of the Intertropical Convergence Zone with associated intensification of southern continental runoff. Results from a basic box-model provided quantitative information on the riverine inputs to the basin during the interstadial events and on the associated salinity changes of the basin. Scenarios on the 3-D dynamics of the Mediterranean during the MIS3 are explored and tested by means of the available surface and deep-water carbon isotope constrains. Essentially, the D/O interstadials warm/humid phases induced short-term stratification of the column water, with associated relative declining of surface productivity. HEs are constantly associated to lightening in the δ18O record of planktonic foraminifera, possibly because less salty modified Atlantic waters could have influenced the isotopic composition of forming Mediterranean intermediate Waters. At least in two cases, HE2 and HE5, fresher Atlantic waters may have had an impact even on deeper levels of intermediate waters.
The results highlight the complex response of the Mediterranean ecosystem to the interplay between high-latitude and tropical climate control on the intermediate latitudes.