Geophysical Research Abstracts,
Vol. 11, EGU2009-10038, 2009
EGU General Assembly 2009

Geochemical and mineralogical record of eolian input in the westernmost Mediterranean Sea since the Last Glacial Maximum

M. Rodrigo-Gámiz (1), F. Martínez-Ruiz (1), F. J. Jiménez-Espejo (2), D. Gallego-Torres (3), V. Nieto-Moreno (1), D. Ariztegui (4), and O. Romero (1)

(1) Instituto Andaluz de Ciencias de la Tierra, CSIC-Universidad de Granada, Granada, Spain (martarodrigo@ugr.es), (2) Institute for Frontier Research on Earth Evolution, Japan Agency for Marine-Earth Science and Technology, Yokosuka, Japan, (3) Departamento de Mineralogía y Petrología, Facultad de Ciencias, Universidad de Granada, Granada, Spain, (4) Section of Earth & Environmental Sciences, University of Geneva, Geneva, Switzerland

Eolian supply has significantly contributed to terrigenous sedimentation in the Mediterranean. Its reconstruction has further allowed the characterization of the atmospheric response to climate oscillations. Here we present a high-resolution record of eolian input oscillations in the westernmost Mediterranean (Alboran Sea basin) for the last 20.000 yr. The Alboran Sea basin is a key zone for paleoclimate reconstruction because high sedimentation rates provide excellent analysis resolution. We have analyzed marine sediments from core 293G, recovered in the east Alboran basin during the TTR-12 cruise. Radiocarbon ages and stable oxygen isotope record from planktonic foraminifera have provided a detailed age model for this site. Characterization of eolian terrigenous material from the African margin has been based on geochemical/mineralogical tracers. Sediments are composed of terrigenous materials (mostly clays, quartz and feldspars) and biogenic carbonates. Detrital clays are mainly dominated by illite followed by smectites, chlorite and kaolinite. Arid periods are also characterized by enhanced palygorskite content. Geochemical profiles (e.g., Si/Al, Ti/Al, Zr/Al) correspondingly reveal aridity oscillations during this time interval. In particular, Zr/Al ratio records major climate fluctuations with a significant increase during the last Heinrich event (H1). Wetter conditions at time of deposition of the sapropel S1 in the eastern Mediterranean are also recorded by a decreasing trend in Zr/Al ratio. Other element ratios such as Mg/Al, K/Al, Rb/Al have been used as proxies for changes in river runoff and support rapid climate changes in the western Mediterranean borderlands involving significant fluctuation in the fluvial input to the marine basin. These fluctuations are also accompanied by changes in marine productivity and reflected as changes in sedimentary organic matter. Furthermore, Ba-based proxies, used for paleoproductivity reconstruction, point to productivity peaks during cold periods, H1 and Younger Dryas, and a progressive decreasing trend until present day levels. Substantial changes in oxygen conditions are similarly related to major climate oscillations. Other than these millennial oscillations, the analyzed geochemical and mineralogical profiles reveals brief fluctuations at shorter time scales providing new insights into the causes, timing, and mechanisms of atmosphere-ocean interactions in the western Mediterranean during the last 20 kyr.

Acknowledges: Projects Marcal CGL2006-13327-C04-04, Sagas CTM2005-08071-C03-01, Ministerio MARM 200800050084447, RNM 0179, CSD2006-00041.