Geophysical Research Abstracts
Vol. 18, EGU2016-1008-1, 2016
EGU General Assembly 2016

Hydrological and thermal changes along the last 2.7 kyr in the central-western Mediterranean based on a multi-archive approach: speleothem and marine sediments

Mercè Cisneros (1), Isabel Cacho (1), Joan J. Fornós (2), Ana Moreno (3), Heather Stoll (4), Larry Edwards (5), Hai Cheng (5), and Jaime Frigola (1)

(1) GRC Geociències Marines, Dept. of Stratigraphy, Palaeontology and Marine Sciences, Universitat de Barcelona, Barcelona, Spain (mbermejo@ub.edu), (2) Dept. of Earth Sciences, Universitat de les Illes Balears, Mallorca, Spain, (3) Dept. of Geoenvironmental Processes and Global change, Zaragoza, Spain, (4) Dept. of Geology, Universidad de Oviedo, Asturias, Spain, (5) Dept. of Geology and Geophysics, University of Minnesota, MN 55455, USA

Climatic conditions over the last 2.7 kyr are reconstructed in base to six speleothems from a cave in Mallorca and a group of sediment cores from the Menorca Rise. Speleothem records provide a solid chronology in base to high resolution U/Th dating. Both δ 13C and particularly δ 18O records show pronounced oscillations related to pre-roman times as the Dark Middle Ages, the Medieval Climate Anomaly and the Little Ice Age. The geochemical proxies from the six studied speleothems have been stacked in a unique record, which provides decadal-multidecadal resolution. In parallel, Sea Surface Temperature (SST) conditions have been reconstructed in base to Globigerina bulloides-Mg/Ca ratios from a group of multicore records, and they have been combined with δ18O data to reconstruct changes in the evaporation-precipitation ratio of the basin. These records have also been stacked in a single anomaly curve after the accurate construction of robust multi-proxy chronologies (Cisneros et al., under evaluation). The comparison of the marine and speleothem records reveal the occurrence of synchronous changes in both SST and humidity conditions over land along the last 2.7 kyr, although the relationship of these two climatic variables changed along the different climatic events. These results support that the driest conditions occurred during part of the Roma Classic Period and also during the Medieval Climate Anomaly when climate conditions were mostly warm, but also during the second part of the Little Ice Age when cold conditions dominated. This combined land-sea proxy approach offers a powerful tool to reconstruct past climate variability with highly precise chronologies.

REFERENCES:

M. Cisneros, I. Cacho, J. Frigola, M. Canals, P. Masqué, B. Martrat, F. Lirer, and G. Margaritelli. Sea surface temperature variability in the central-western Mediterranean Sea during the last 2700 years: a multi-proxy and multi-record approach. Submitted on 28 Sep 2015 for open discussion on Climate of The Past.