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Paleoclimate and paleoceanographic reconstruction in the southern Iberian Mediterranean and Atlantic margins across the Younger Dryas event

Marta Rodrigo-Gámiz and Francisca Martínez-Ruiz
Instituto Andaluz de Ciencias de la Tierra (IACT), CSIC-University of Granada, Granada, Spain (martarodrigo@ugr.es)

The Alboran Sea basin in the Mediterranean and the Gulf of Cadiz in the Atlantic have provided excellent paleoarchives for reconstructing past climate variability in southern Iberian regions. Particularly interesting has been the study of the paleoclimate evolution of abrupt climate events from the Last Glacial Maximum (LGM) to the onset of the Holocene such as the Younger Dryas (YD). A diverse range of geochemical proxies, integrating inorganic and organic, has been used for paleoclimate reconstructions in these regions. Elemental concentrations and elemental ratios have been used for determining detrital inputs and bottom water oxygen conditions while organic molecular biomarkers as algal and archaea derived lipids have been used for estimating sea surface temperature (SST). Al-ratios mirroring eolian input, such as Zr/Al and Si/Al ratios, record enhanced dust input at the end of the LGM, during the last Heinrich event (H1) and at the onset of the YD in the Alboran Sea. For this latest interval, these ratios suggest an initial dry phase followed by a progressive aridity decrease throughout the YD. In the Gulf of Cadiz, these variations are not similarly recorded, probably due to less sensitive open ocean records in comparison to the restricted nature of the Alboran Sea basin. Selected redox proxies, Fe/Al and Mn/Al ratios, show peaks of oxidation fronts during the LGM and the H1 in the Alboran Sea and during the Bölling-Alleröd and the onset of the Holocene in the Gulf of Cadiz, derived from variations in ventilation and oxygen conditions that differ in the Mediterranean and Atlantic regions. SST records have also showed remarkable differences between both basins with minima temperature estimated values during the YD of ca. 12ºC in the Alboran Sea and ca. 18ºC in the Gulf of Cadiz, according to the freshening of the Atlantic jet along the Alboran basin. In general, a different paleoclimate and oceanographic evolution with a different YD response is recorded along the Mediterranean-Atlantic transect.