



Vegetation and climate evolution over the last two millennia in the westernmost Mediterranean region: The Alboran Sea record

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Reconstructing climate evolution over the past millennia is crucial for elucidating future climate scenarios. In this regard, the Mediterranean is of special relevance because it is at present a biodiversity hot spot and the expected temperature rise and precipitation decrease for the next decades can dramatically affect those environments. Due to its semi-enclosed nature and the short residence time of its water masses, the Mediterranean has been highly responsive to external forcing. In particular, the Alboran Sea basin, in the westernmost Mediterranean, has been an exceptional natural laboratory for paleoclimate reconstructions since high detrital input, mainly derived by fluvial discharge and eolian pulses, have resulted in very high sedimentation rates, allowing high-resolution studies. We have integrated diverse proxy records for reconstructing climate and paleo-oceanographic conditions over the last two millennia. Specifically detailed palynological, grain size and geochemical analyses of two marine sediment records, core 382G (35°59'N, 04°45'W, 1023 m water depth) and GP02 (35°47.261' N, 04° 32.089' W, 1035.4 m water depth), have been used for such reconstructions. Sediment cores were sampled for the afore-mentioned analyses at 1.5 cm intervals. The age models used for the two sedimentary records are based on radiocarbon dates obtained from planktonic foraminifera and on correlations with diverse records previously dated in this basin. Obtained taxa from pollen analysis were grouped in Mediterranean taxa, including deciduous and evergreen *Quercus*, *Pistacia* and *Olea*, and semi-desert taxa, including *Artemisia*, *Ephedra* and *Chenopodiaceae*. Samples for grain size analysis were treated with hydrogen peroxide to eliminate organic matter and a dispersant agent prior to measurement. Inductively coupled plasma-optical emission spectrometry (ICP-OES) and inductively coupled plasma mass spectrometry (ICP-MS) were used for major and trace element analysis respectively. The K/Al and Zr/Al ratios were used as detrital proxies and the V/Cr ratio was used as a redox proxy. Obtained results reveal that during the Dark Ages (DA; 1450-1050 cal yr BP) the paleoclimate conditions were arid. The Medieval Climate Anomaly (MCA; 1050-650 cal yr BP) presents an early wet phase (1050-900 cal yr BP), followed by a second arid phase (900-750 cal yr BP) and another late humid phase (750-650 cal yr BP). The (LIA; 650-150 cal yr BP) is characterized by predominantly humid condition with relative aridity between 650 cal yr BP and 450 cal yr BP. Although the analyzed records are located relatively nearby, some variability in the geochemical profiles is also observed, likely linked to different local factors as circulation patterns and/or sedimentary regimen.