



The climate of the last two millennia off Iberia

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More than global or hemispheric variability, regional scale climate conditions are the ones that are highly relevant to ecosystems and societies. The Iberian Peninsula, at mid-latitude and the western extreme of the European continent, is a key point for climate reconstructions. In this study we combine a multi-proxy analyses of six inner-shelf high-sedimentation sites covering the last 2 millennia, that span along the Iberian margin from 41° N to 36 °N. This approach provides a latitudinal perspective of the Sea Surface Temperature (SST) evolution as well as information on the continental conditions (mainly precipitation) and marine primary production at multi-decadal scale. Furthermore, a regional stack was constructed and compared to North Hemisphere (NH) and global climatological series in order to investigate the role of external forcing on regional climate.

Results show a temporal SST variability comparable with the NH and European mean atmospheric temperature records for the last 2 millennia, over a long-term cooling trend that ends at the beginning of the 20th century. Reconstructed cold conditions, with an average of 0.5 °C colder SST in the north and 1.2°C in the south, encompassing most of the 15th to the 19th century, characterizes the Little Ice Age (LIA). During the 20th century SSTs are equivalent to pre-LIA, but marked by higher amplitude decadal oscillations, in particular after 1970, within the Great Solar Maximum.

Precipitation is high in the northern sites at the beginning of the Medieval Warm Period and during the LIA in all records. Strong precipitation/ flood events occur in good agreement with the Tagus basin terrace ages and historical documentation and at times of major shifts in solar activity.

Primary production shows a southward decrease specially clear for the Algarve site and an important shift at AD 1800, when the opposing trend in the southern and north sites points to a general weakening in upwelling intensity in the north concomitant with an upwelling increase in the south.