

Reconstruction of the climate of Andalusia (southern Spain) during the period 1750-1850 from documentary sources: evaluation and comparison with climate model simulations.

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In this work, a reconstruction of the climatic conditions in Andalusia (southern Iberia Peninsula) during the period 1701-1850, as well as an evaluation of its associated uncertainties, is presented. This period is interesting because it is characterized by a minimum in the solar irradiance (Dalton Minimum, around 1800), as well as intense volcanic activity (for instance, the eruption of the Tambora in 1815), when the increasing atmospheric CO₂ concentrations were of minor importance.

The reconstruction is based on the analysis of a wide variety of documentary data. The reconstruction methodology focuses on seasonal temperature and precipitation, and it is based on accounting the number of extreme events in the past, and inferring mean value and standard deviation using the assumption of normal distribution for these variables.

This methodology is validated within the pseudoreality of a high-resolution paleoclimate simulation performed with the regional climate model MM5 coupled to the global model ECHO-G.

Results show that the reconstructions are influenced by the reference period chosen and the threshold values used to define extreme values. Finally, an ensemble of reconstructions was obtained, using two different reference periods and two pairs of percentiles as threshold values. Results correspond to winter temperature, and winter, spring and autumn rainfall, and they are compared with simulations of the climate model for the considered period.