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Sensitivity of regional atmospheric paleoclimate simulations to changes in physical configuration and low boundary conditions

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Regional Climate Models (RCM) provide and added value to Global Circulation Models (GCM), which results in a valuable information for palaeo climate studies. Examples of the use of this kind of simulations can be testing the spatial coherence among independent climate reconstructions, better understanding of the interactions between synoptic and mesoscale processes that can be amplified under different climateforcings, or providing a better design of strategies for collection of proxy data, among many others.
But the dynamical downscaling process is affected by a number of uncertainties. Therefore, in order to increase the confidence we put in regional climate experiments, it is necessary first to evaluate their sensitivity to changes in some key factors such as physical parameterizations, sub-models for specific components of the climate such as land soil or ocean, etc. Additionally, the sensitivity of the regional climate models can also be dependent on the forcing scenario. Hence, it would be desirable to evaluate also the regional model sensitivity under several forcing conditions .

In this work we present an ensemble of climate simulations over the Iberian Peninsula using two different regional climate models (WRF and MM5) for two periods: a reference period (1900-1950) and the Late Maunder Minimum (1675-1715). They use different physical parameterization for Boundary Layer processes and Cumulus. Preliminary results show that there is an important spread in the ensemble, mainly due to the different physical configuration of the models. On the other hand, further experiments using a dynamical ocean coupled to the regional atmospheric component introduce differences respect to experiments which use SST directly interpolated data from the GCM as boundary condition. However in this case the spread is smaller, although some other important information can be extracted for this kind of coupled models related to perturbations of sea currents that affect mainly coastal areas.