



Forcings, temperature response and climate sensitivity in pre-PMIP3 last millennium simulations and reconstructions

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A suite of 26 forced simulations for the last millennium coming from 8 different atmosphere Ocean General Circulation Models (AOGCMs) are analyzed. The AOGCMs, namely ECHO-G, CSM1.4, CCSM3, CNRM, IPSL, MPI-ESM, HadCM3 and CSIRO, have been used to produce simulations that are labeled here as pre-PMIP3 since they do not follow the scenarios proposed for PMIP3. All the runs considered have been obtained under different assumptions of natural and anthropogenic external forcings such as solar variability, volcanic activity, greenhouse gases, anthropogenic aerosols, land use etc. These forcings are described in terms of the total effective forcing for each model and also compared with the agreed set of forcings for the ongoing PMIP3 millennium experiments.

The analysis of the simulations is focused on the temperature response, its temporal evolution, its spatial characterization for the MCA-LIA transition and its relation with the external forcing. The quasi linear relation between the total external forcing and temperature response is used later to calculate the paleo-transient climate response (PTCR) in each model and compare it with the known values of equilibrium climate sensitivity and future climate change transient climate response. In turn, available climate reconstructions for the last millennium are also compared with the simulations and the same procedure to derive PTCR estimates from them is applied.