



Simulated and reconstructed climate during the last millennium

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The main motivation of this study is the current lack of a comparison between the different paleoclimate simulations existing over the last millennium and several reconstructions.

The paleoclimate 1000-yr simulations from several high complexity general circulation models (AOGCMs), such as ECHO-G, HADCM3 or CCSM, are analyzed and compared with some paleoclimatic reconstructions. Different natural and anthropogenic external forcing conditions as the solar activity, the atmospheric concentrations of carbon dioxide and methane or the volcanic aerosols, are considered in a suite of forced simulations. Some models also offer a control run simulation, which does not include any external forcing, and allow to represent better their internal variability.

The analysis addresses the temperature and circulation response in the various model simulations, paying a special attention to the influence of the internal variability and to the sensitivity to the external forcing. The temperature is studied in a global and hemispheric context, comparing the control and the different forced runs during the last millennium. The circulation response is focused on different known dynamical patterns, as the annular modes: the Arctic Oscillation (AO) in the Northern Hemisphere and the Antarctic Oscillation (AAO) in the Southern Hemisphere. At regional scales, the North Atlantic Oscillation (NAO), El Niño-Southern Oscillation (ENSO) or the Pacific Decadal Oscillation (PDO) are also analyzed in the pool of models. This information is also put in the context of available climate reconstructions.