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Last millennium simulations and reconstructions: comparison and uncertainties

Laura Fernández-Donado (1), J. Fidel González-Rouco (1), Elena García-Bustamante (2), Jason E. Smerdon (3), Christoph C. Raible (4), and Jürg Luterbacher (5)

(1) Institute of Geosciencie (UCM-CSIC), Dpt. Astrophysics and Atmospheric Sciences, University Complutense Madrid, Spain (laurafernandez@fis.ucm.es), (2) Department of Physics, University of Murcia, Spain, (3) Lamont-Doherty Earth Observatory of Columbia University, USA, (4) Climate and Environmental Physiscs and the Oeschger for Climate Change Research, University of Bern, Switzerland, (5) Department of Geography, Justus Liebig University of Giessen, Germany

An overview of the current state of knowledge of the temperature evolution for the last millennium is offered. The analysis is based on the exhaustive comparison of the two main sources of evidence for the paleoclimatic studies: reconstructions and simulations. So, the suite of last millennium simulations coming from the various existing high complexity general circulation models (including PMIP3/CMIP5 and "non-PMIP3" ones) are explored together with the available hemispherical and global last millennium temperature reconstructions.
Simulations, including the external forcings used to produce them, as well as reconstructions are subjected to uncertainties. Understanding the factors that contribute to such uncertainties is relevant to improve model data comparison exercises. We present an assessment of the factors that contribute to model and reconstruction spread and how this changes our perspective of model and reconstruction responses to external forcing in the last millennium.

In addition, at multidecadal and longer timescales, simulations and reconstructions evidence a linear relationship with total external forcing at hemispheric and global scales. We use this relationship to analyze the consistency of the simulated and reconstructed response to the variety of external forcing configurations considered in the model ensemble. We provide then, not only a qualitative, but also a quantitative assessment of the model-data comparison exercises for the whole available suite of reconstructed and simulated evidences.