



The Medieval Climate Anomaly: mechanisms beyond a direct radiative forcing

Hugues Goosse (1), Elisabeth Crespin (1), Svetlana Dubinkina (1), Marie-France Loutre (1), Michael E. Mann (2), Hans Renssen (3), Yoann Sallaz-Damaz (1), and Drew Shindell (4)

(1) Université Catholique de Louvain, Institut d'Astronomie et de Géophysique G. Lemaître, Louvain-la-Neuve, Belgium (hgs@astr.ucl.ac.be, +32-(0)10-474722), (2) Department of Meteorology and Earth and Environmental Systems Institute, Pennsylvania State University, University Park, USA, (3) Section Climate Change and Landscape Dynamics, Department of Earth Sciences, Vrije Universiteit Amsterdam, The Netherlands, (4) NASA Goddard Institute for Space Studies, New York, USA.

Recent reconstructions suggest that the highest temperatures at hemispheric- or nearly hemispheric-scale reached during some decades of the so-called Medieval Climate Anomaly (MCA, roughly 950-1250 AD) were only exceeded in the last decades of the 20th century. However, our understanding of the origin of the MCA is still fragmentary and available simulations performed with coupled climate models typically fail to reproduce many important characteristics of the magnitude and timing of the MCA. To provide additional insight into the processes that lead to the MCA, we have performed simulations with the climate model LOVECLIM over the period 501-2000 AD using a data assimilation technique based on a particle filter. Simulations with LOVECLIM without data assimilation agree well with the reconstructed temperatures for the years 1400-2000. The data assimilation strongly improves the agreement with the reconstruction at decadal and multi-decadal timescales and for the arlier period. The mechanisms leading to this better agreement will be analysed and discussed.