Geophysical Research Abstracts
Vol. 14, EGU2012-11044, 2012
EGU General Assembly 2012

Climatology of cold and warm periods in recent centuries - consistency of simulations and reconstructions

O. Bothe (1), D. Zanchettin (2), and J. Jungclaus (2)

(1) Klimacampus, University of Hamburg & Max Planck Institute for Meteorology, Hamburg, Germany (oliver.bothe@zmaw.de), (2) Max Planck Institute for Meteorology, Hamburg, Germany

Reconstructions and simulations of past climatic variability indicate three rather distinct periods between 1650 and 1850 CE consistent with estimates of past external drivers of the climate system. Rather cold conditions concurrent with negative radiative forcing anomalies persisted until the middle of the 18th century and throughout the first half of the 19th century. Interjacent, a warmer period occurred commensurate with positive radiative forcing anomalies.

Previous work depicts these 200 years as the period in which large scale climate estimates by reconstructions and simulations agree best. In addition, the number of available proxy indicators is comparably large in this time and their estimates less uncertain compared to earlier periods in the last millennium.

By defining three climatologic periods (two cold and a warm episode), we are able to evaluate the performance of a number of climate simulations under relatively small uncertainty and under notably varying external forcing. We utilize simulations of the climate of the last millennium performed at the Max Planck Institute for Meteorology and the ensemble of "Last Millennium" simulations available in the CMIP5 database. Difference climatologies are calculated for temperature, precipitation and sea level pressure between the warmer period from 1741 to 1790 and the two colder episodes 1661 to 1710 and 1801 to 1850. While the so defined difference climatologies are generally similar within individual simulations, simulations strongly deviate from each other in estimates of temperature, hydrology and circulation. The difference climatologies are further compared to reconstructions focussing on the North Atlantic / European sector, and the probabilistic consistency is assessed.