

On the interpretation of low-latitude hydrological proxy records based on AOGCM simulations

T.F. Stocker, M. Yoshimori*, C.C. Raible, M. Renold, T. Mölg**

Climate and Environmental Physics, Physics Institute, University of Bern

* now at Rutgers University, New Brunswick, NJ

** Department of Earth & Atmospheric Sciences, University of Innsbruck

We present results using a comprehensive coupled atmosphere-ocean general circulation model (AOGCM) to address the question of changes of the hydrological cycle during the latter parts of the Holocene. Hydrological changes between three different types of experiments are analysed: a present-day control, a perpetual AD 1640, and an ensemble of six transient Maunder Minimum (AD 1640–1715) simulations. Atmospheric moisture transport is investigated in terms of contributions of specific humidity and circulation changes. The study points out the importance of the specific humidity contribution to changes in moisture transport reflected in hydrological proxy records. The moisture budget of the western tropical Pacific is also investigated to aid the interpretation of a proxy record in this specific region. The present-day freshening of the western tropical Pacific, compared to the Maunder Minimum, is explained by the increased zonal moisture transport via trade winds, mainly due to the increased amount of atmospheric water vapor content in the warming world. Most recent simulations with this model exhibit hydrological changes in the region of eastern Africa and the Indian Ocean which resemble those reported in various proxy data records. This suggests that such model experiments can be used to better understand paleoclimatic records. These results are now in press [Moelg *et al.*, 2006; Yoshimori *et al.*, 2006].

REFERENCES:

Moelg, T., M. Renold, M. Vuille, N.J. Cullen, T.F. Stocker, and G. Kaser, Indian Ocean Zonal Mode activity in a multicentury-integration of a coupled AOGCM consistent with climate proxy data, *Geophys. Res. Lett.*, in press, 2006.

Yoshimori, M., C.C. Raible, T.F. Stocker, and M. Renold, On the interpretation of low-latitude hydrological proxy records based on Maunder Minimum AOGCM simulations, *Clim. Dyn.*, in press, 2006.