Geophysical Research Abstracts, Vol. 8, 08835, 2006
SRef-ID: 1607-7962/gra/EGU06-A-08835
© European Geosciences Union 2006

North-South teleconnections in a conceptual and an ocean general circulation model

G. Knorr (1, 4), G. Lohmann (2) and M. Prange (3)

(1) Meteorological Institute, University Hamburg, (2) Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, (3) Research Center Ocean Margins, University Bremen, (4) now at the School of Earth, Ocean and Planetary Sciences, Cardiff University; (Contact: gregor.knorr@dkrz.de)

For the two most recent glacial terminations, different scenarios have been discussed referring to the initiation of deglacial warming in the Northern and Southern Hemisphere. These global scale climate transitions, as well as rapid climate shifts during the last glacial have been attributed to massive reorganizations in the Atlantic thermohaline circulation (THC). Applying an ocean general circulation model (OGCM) and an atmosphere-ocean box model, we examine the sensitivity of the THC to different warming scenarios and meltwater fluxes. The OGCM experiments show that an amplification of the glacial THC can be achieved more effectively in the Southern Hemisphere in comparison to the Northern Hemisphere. This model response is substantiated by low order model studies of a density driven THC, which shows that a THC intensification can by achieved if warming and abrupt meltwater fluxes are applied to the Southern Hemisphere. The effect is related to the interactions of atmosphere and ocean heat transports that enable an effective interhemispheric mediation of a Southern Hemisphere warming induced THC amplification. The equivalent forcing in the Northern Hemisphere leads to a less effective heat transmission to the Southern Hemisphere, since a weakening of the THC and broad scale upwelling in the global ocean reduces the contribution of the oceanic mediation.