Geophysical Research Abstracts
Vol. 20, EGU2018-7171, 2018
EGU General Assembly 2018


# North Atlantic internal variability changes in response to global warming

Johann Jungclaus, Ralf Hand, Juergen Bader, Daniela Matei, and Rohit Ghosh

Max-Planck-Institute for Meteorology, The Ocean in the Earth System, Hamburg, Germany
(johann.jungclaus@mpimet.mpg.de)

The Atlantic Meridional Overturning Circulation (AMOC) is expected to slow down under global warming. Recent modelling studies have confirmed such wakening but also identified a more complex interplay between AMOC and the gyre circulation leading to regionally different changes in heat transport and its divergence. Moreover, forcing by increasing greenhouses gases may not only lead to changes in the mean state of the ocean but also to variations in the characteristics of internally-generated variability and/or to rapid transitions from one preferred state to the other.

Here we analyse large ensembles of historical and scenario simulations carried out with the MPI-ESM to assess variability changes in ensemble space. There is a substantial decrease of variability in the AMOC and in the associated heat transports in mid-latitudes whereas ocean heat transport variability increases in the gateways to the Arctic. We assess dynamical and thermo-dynamical mechanisms leading to these changes and investigate how they project onto ocean-atmosphere-sea ice interactions in different regions (sub-polar North Atlantic, Nordic Seas, Barents Sea). Finally, we investigate the consequences of these changes for related climate variables, such as sea-ice extent, and predictability of climate in the North Atlantic/European region.