High resolution climatology
- towards climate change services

Variability and Long-term Memory on an Aquaplanet with a Coupled Atmosphere-Ocean Model

E. Dahms (1,2), K. Fraedrich (2), F. Lunkeit (2), and H. Borth (2)

(1) Max Planck Institute for Meteorology, Hamburg, Germany (eileen.dahms@zmaw.de), (2) KlimaCampus Hamburg, Meteorological Institute, Germany

Various aquaplanet experiments are conducted with the Planet Simulator atmospheric general circulation model (AGCM), which is coupled to the Hamburg Large Scale Geostrophic ocean circulation model (LSG-OGCM). The Planet Simulator is a spectral model of intermediate complexity (MIC). The LSG ocean model is designed for climate studies with large spatial and temporal scales.

In an aquaplanet environment the entire surface of the earth is covered by one ocean. However, besides the conventional aquaplanet, set-ups with different configurations for the ocean basins are applied by idealized meridional boundaries. These oceanic barriers do not extend into the atmosphere. If meridional boundaries exist in the ocean, western boundary currents are able to form, which do not only alter the oceanic circulation but also have an influence on the atmosphere.

Besides the mean state, the atmospheric variability and long-term memory in the climate system are analyzed, as are the potential mechanisms behind these processes.