



Variability in deep ocean circulation from GRACE

Carmen Boening (1) and Michael Watkins (2,1)

(1) Jet Propulsion Laboratory, United States (carmen.boening@jpl.nasa.gov), (2) Center for Space Research, University of Texas at Austin

Although nearly impossible to observe on a global scale, total water mass transport and inter-basin exchange are central to understanding long-term changes in ocean circulation. Of particular interest are changes in the Meridional Overturning Circulation (MOC) as they pose potential impacts in continental climates. However, in-situ observations are limited in space and time preventing a holistic view of current variability. The representation of long-term transports in ocean models is highly dependent on the atmospheric forcing fields, which may misrepresent real interannual variability. The bottom pressure observations from the Gravity Recovery And Climate Experiment (GRACE) provide for the first time the ability to observe this global water mass transport. Here, we present the first near-global maps of variability in the depth-independent ocean circulation derived from advanced analysis of GRACE data. We find that significant variability on annual to decadal time scales exists in the deep large-scale circulation, some of which are related to the Southern Annular Mode forcing dominating Southern Ocean variability.