



## **Observations of Atlantic overturning variability and latitudinal coherence with GRACE time-variable gravity**

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The Atlantic Meridional Overturning Circulation (AMOC) is a key mechanism of pole-ward planetary heat transport. Concerns about AMOC changes imply the need for a continuous, large-scale observation capability to detect and monitor changes on interannual to decadal time scales. Here we present measurements of AMOC component transport changes directly obtained from time-variable gravity observations of the Gravity Recovery and Climate Experiment (GRACE) satellites from 2003 until now. Recent improvements at JPL of monthly gravity field retrievals allow the detection of AMOC-related interannual bottom pressure anomalies and in turn LNADW transport estimates. In the Atlantic at 26N, these GRACE AMOC estimates are in good agreement with those from the Rapid Climate Change-Meridional Overturning Circulation and Heatflux Array (RAPID/MOCHA). We extend the GRACE-based estimates of AMOC variability from the Southern Ocean to the Northern sinking branch to assess meridional coherence and discuss challenges of the GRACE observing system. Our results highlight the efficacy and utility of space-gravimetry for observing AMOC variations to evaluate latitudinal coherency and long-term variability.