



Form Stress, Antarctic Bottom Water Formation, and GRACE: A Satellite Gravity Analysis of the Southern Ocean

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Ocean bottom pressure signals surrounding major bathymetric features along the Antarctic Circumpolar Current (ACC) are caused by topographic form stress balancing the zonal wind stress being applied to the Southern Ocean. Variability in this pressure field can be attributed to changes in the ACC. However, Antarctic Bottom Water (AABW), which is formed locally, flows northward into the basin. This flow is geostrophic and has an altering effect on the bottom pressure observed along the bathymetry. This signal can be observed in the remotely-sensed ocean bottom pressure data from the Gravity Recovery and Climate Experiment (GRACE) and GRACE-Followon satellites and can be used as a tool for better understanding the variability of this system in a changing climate. In this experiment, we use GRACE bottom pressure data from the Center for Space Research at the University of Texas to examine both the upstream and downstream sides of two significant bathymetric features along the path of the ACC: the Drake Passage and the Kerguelen Plateau. We show the variability of the bottom pressure signal in these locations and analyze their relationship with each other as well with regional zonal wind stress and AABW formation over time.