



Mechanisms of Low-Frequency Mass transport between the Indo-Atlantic and Pacific Ocean Basins

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It has been shown previously that there is a large-scale, low-frequency exchange of mass between the Indo-Atlantic and Pacific Ocean basins, with periods ranging from 1 to 3 years, and possibly longer. The signal is observed in both measurements from the Gravity Recovery and Climate Experiment (GRACE) and ocean models, although the amplitude is somewhat dampened. We examine the mechanisms that drive the mass exchange, using output from the JPL data-assimilating version of the ECCO model run since January 1993 and satellite wind data from the Cross-Calibrated Multi-Platform (CCMP) ocean vector wind project. We find significant between low-frequency zonal winds over the Atlantic and Indian Oceans between 40°S-50°S and the Pacific ocean mass anomalies. Correlations exceed 0.79, which is significant at the 99% level. The area of highly correlated winds lies over the sub-tropical front (STF), which is part of the Antarctic Circumpolar Current (ACC) in the Indo-Atlantic basins, but wanders north of the ACC in the Pacific. We hypothesize that a small imbalance in the transport into the Pacific along the STF and out through the Indonesian Through-Flow (ITF) is responsible for the observed and modeled low-frequency mass anomalies. We test this using transport calculated from the model currents.