



Ocean Mass Variations from 2003 to 2011: Implications for the Global Water Cycle

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Water is exchanged globally among the ice sheets, continents, and ocean. On seasonal time-scales, we know that the largest exchange is between the oceans and the continents. The magnitude of exchange on longer-periods has not been well quantified, until the launch of the Gravity Recovery and Climate Experiment (GRACE) in 2002. Now, with data from August 2002 until early 2011, we can fully measure the variation in water storage in the ocean, as well as the exchanges with the continents and ice sheets. We find that for the current length of the GRACE record, there are interannual changes in the exchange of water with the continents that exceed the long-term gain of mass from the ice sheets by a factor of 3 or more. Additionally, we find evidence of a small, but significant (95% confidence level) increase in the annual exchange of water between the oceans and continents.