



## **Verification of ocean mass variations from GRACE using altimetry, models, and in situ heat storage**

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Recently, the preliminary GRACE observations have been used to derive an estimate of global ocean mass variations. Chambers, Wahr, and Nerem [2004] compared this time-series to a mean climatology determined from satellite altimeter measurements of global mean sea level corrected for the steric variation. The GRACE observations show a seasonal exchange of water mass with the continents of the same magnitude and phase as the steric-corrected altimetry.

We present estimates of ocean mass variations using the latest GRACE fields for each ocean basin. In addition to using a mean climatology to steric-correct TOPEX/POSEIDON and Jason altimetry data, we also derive a thermal steric height variation from monthly upper ocean heat storage estimates. The heat storage fields have been generated from observed temperature profiles (e.g. expendable bathythermograph data). We also present basin-scale comparisons using ECCO model output to steric-correct altimetry data. Finally, preliminary results of secular variations of ocean mass will be discussed.