



Assessing the ocean contribution to the Earth's Energy Imbalance from combining GRACE and altimetry observations

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Estimates of present-day ocean heat content (OHC) change are of key importance for validating remote-sensing based Earth's Energy Imbalance (EEI) timeseries, e.g. from CERES data. These estimates can be obtained, without relying on in-situ data, from combining the observation of sea level change with the measurement of the time-variable ocean mass redistribution. To this end, one needs to (1) separate thermo-steric sea level change from sea level measured with satellite altimeters, while removing the ocean mass part from GRACE gravimetry, and (2) transform the thermo-steric sea level change to OHC change. In this presentation, we will first assess the error budget of radar altimetry and GRACE, including the corrections required to obtain OHC.

We have recently provided a reconciled ocean mass timeseries from GRACE that agrees across various published approaches, and that we continue after the GRACE lifetime with data from the Swarm mission. Here, we present maps of steric and OHC change and discuss the corresponding globally averaged timeseries (trends are 0.9-1.3mm/y depending on time frame and corrections, leading to 0.47-0.68 W/m²) that we obtain from this approach and its implication for EEI.