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Comparison of ocean heat variations from different GRACE products

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The Gravity Recovery And Climate Experiment (GRACE) monthly solutions of the time-variable gravity field allows direct estimates of changes in the ocean water mass budget. In combination with satellite altimetry (e.g. JASON) observations, this can be used to estimate heat content changes in the ocean as well. Since the amplitudes of these signals are relatively small (compared to the signal over land), it is important that both the GRACE and altimetry data are corrected and combined in a consistent manner.

Here, we present the results for different GRACE data solutions (CSR, GFZ, JPL and CNES/GRGS) and a combination of the four. We discuss how to optimize the post processing method of Swenson and Wahr (2006) to suppress noise in each solution. This, in combination with careful preparation of the altimetry data (through the removal of high frecuency signals) allows retrieval of steric height chances at a resolution of up to 500 km and even lower at a seasonal period. At this scale, we still find large regions with a signal to noise ratio significantly higher than 1, though mainly at lower latitudes.