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Ocean tides in GRACE monthly averaged gravity fields

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The GRACE gravity field satellite mission maps the Earth's gravity fields and its variations with unprecedented accuracy during its 5-year lifetime. Unless ocean tide signals and their load upon the solid earth are removed from the GRACE data, their long period aliases obscure more subtle climate signals which GRACE aims at. In this analysis the results of Knudsen and Andersen [2002] have been revised using actual post-launch orbit parameter of the GRACE mission.

The current ocean tide models are not accurate enough to correct GRACE data fully. Those tidal errors may affect the GRACE data up to harmonic degree around 40 and they will not cancel in the GRACE monthly averaged temporal gravity fields. The S_2 and the K_2 terms have alias frequencies much longer than 30 days, so they remain almost unreduced in the monthly averages. In this analysis the tidal residuals are extracted using 4 years of geoid variations from GRACE and LAGEOS data at 10-day intervals over the period from July 29th, 2002 to May 18th, 2006, made available by CNES/GRGS. This is done using the series of 10 day spherical harmonic coefficient sets where tidal constituents are extracted for each harmonic coefficient.