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Surface mass variability from GRACE and hydrology

R. Schmidt (1), F. Flechtner (1), A. Güntner (2), R. König (1), Ul. Meyer (1), K.-H. Neumayer (1), S. Petrovic (1), Ch. Reigber (1), S.-Y. Zhu (1)

(1) GeoForschungsZentrum Potsdam Department 1 Geodesy & Remote Sensing
(2) GeoForschungsZentrum Potsdam Department 5 Geoengineering
Telegrafenberg A17, D-14473 Potsdam Germany
(rschmidt@gfz-potsdam.de/Fax-No: +49-8153-28-1735)

The Gravity Recovery And Climate Experiment (GRACE) has demonstrated its capability in resolving time-variable gravity down to length scales of a few hundred kilometers at a monthly resolution. The derived estimates of gravity variations converted into mass variations at the Earth's surface are a fundamental input for the understanding and numerical modeling of the underlying geophysical or climatological processes such as changes in the global continental water storage, variations in the mass balances of the polar ice sheets or changes of the mass distributions in the lithosphere due to post-glacial rebound. Current results show that in particular the contribution from changes in the continental water storage is traceable by GRACE gravity measurements. In this contribution we present the current status of time-variable gravity signal recovery respectively surface mass variability based on 16 monthly GRACE-only gravity models reprocessed recently at GFZ. We derive region-specific, averaged surface mass variations from GRACE including an error assessment based on calibrated variance-covariance matrices of the gravity solutions. Results from GRACE are compared to a state-of-the-art hydrology model for a selection of river basins at various length scales.