



Constraining monthly GRACE-solutions with hydrological mass estimates

B. Devaraju (1), N. Sneeuw (1), H. Kindt (2), J. Riegger (2), and C. Lorenz (1)

(1) Institute of Geodesy, University of Stuttgart, (2) Institute of Hydraulic Engineering, University of Stuttgart, (devaraju@gis.uni-stuttgart.de)

The GRACE satellite mission provides high resolution time-variable gravity-field information, which has considerably improved the knowledge of mass distribution and redistribution. In terms of hydrological applications, GRACE provides information on monthly changes of water storage. Initially it was thought that this information could be used for validating hydrological models. However; GRACE has not met the expected level of accuracy, which in turn has made validation of hydrological models difficult. On the other hand, there is reliable hydrological information available for about 20% of the land-mass that can be used as mass constraints to improve the quality of monthly GRACE-solutions. In this investigation, the mass constraints are applied in the spectral domain using the sequential estimation technique. It is expected that this approach will improve the mass signal in the constrained regions as well as outside those regions due to correlations. Further, the influence of various structures of the GRACE error covariance matrix (diagonal, block-diagonal, and full) on the estimates will be investigated.