Geophysical Research Abstracts
Vol. 15, EGU2013-7199, 2013
EGU General Assembly 2013

The influence of error correlation on the assimilation of GRACE data into global hydrological models

Maike Schumacher (1), Annette Eicker (1), Hannes Müller Schmied (2), Petra Döll (2), and Jürgen Kusche (1)

(1) University of Bonn, Institute of Geodesy and Geoinformation, Germany (schumacher@geod.uni-bonn.de), (2) University of Frankfurt, Institute of Physical Geography, Germany

Global hydrological models contribute to the understanding and quantification of the global water cycle. However, large model uncertainties persist due to insufficient model realism and climate forcing and anthropogenic data not being available with sufficient spatial/temporal resolution on the global scale. The GRACE mission provides an independent observation of water storage change with global coverage, which can be used to improve global hydrological models. Here, we introduce an ensemble-based approach to calibrate the WaterGAP global hydrological model (WGHM) against measured water storage change, and to assimilate GRACE data into the model. New is that the method makes use of the full spatial resolution of the GRACE data, and that it incorporates the full error information of the GRACE solutions into the ensemble Kalman filter.

Gravity field solutions provided by GRACE exhibit a strongly correlated error structure due to the GRACE measurement principle and orbit configuration. Previous assimilation studies have suggested to use constant error bars to represent the error level of GRACE. In this presentation, we demonstrate the importance to consider the full GRACE correlation structures and investigate its influence on the assimilation results. Furthermore, the uncertainties and correlation patterns of GRACE will be compared to the empirical error structures of the model derived from the ensemble approach.