Geophysical Research Abstracts
Vol. 12, EGU2010-11171, 2010
EGU General Assembly 2010

Assimilating GRACE, hydrology and hydrometeorology datasets for estimating monthly water storage changes over continents

Balaji Devaraju (1), Nico Sneeuw (1), Mohammad Javad Tourian (1,2), Johannes Riegger (2), Benjamin Fersch (3), and Harald Kunstmann (3)

(1) Institute of Geodesy, Universität Stuttgart, Stuttgart, Germany (devaraju@gis.uni-stuttgart.de), (2) Institute of Hydraulic Engineering, Universität Stuttgart, Stuttgart, Germany, (3) Karlsruhe Institute of Technology, Institute for Meteorology and Climate Research, Garmisch-Partenkirchen, Germany

One of the primary aims of GRACE gravity field satellite mission is to measure monthly water storage changes in catchments at regional/continental scales, which are then used for closing the monthly water balance at these scales. The presence of high frequency noise in GRACE data necessitates filtering, which inevitably introduces a bias in the filtered water storage change estimates. The bias, due to filtering, in the estimates is a major hurdle in utilising them for closing the water balance. In order to quantify this bias and to evaluate the GRACE water storage change estimates, reliable measurements of precipitation, runoff and evapotranspiration are needed. While precipitation data is available globally, runoff data is available only partially and evapotranspiration data at regional/continental scales is available only from model data.

In this contribution, the problems of bias due to filtering of GRACE data and data-deficiency for evaluation are negotiated. This is done by devising certain conditions from the available hydrological and hydrometeorological datasets, and using these conditions as constraints on the parameters of a data assimilation scheme involving GRACE, hydrology and hydrometeorology datasets. Data assimilation is carried out using constrained least squares estimation, which then allows to quantify the contribution of the individual datasets towards the assimilated dataset. The constrained estimation is expected to bring consistency to the assimilated dataset.