



Evaluation of GRACE daily gravity solutions for hydrological extremes in selected river basins

Ben Gouweleeuw (1), Andreas Güntner (1), Animesh Gain (1), Christian Gruber (1), Frank Flechtner (1), Andreas Kvas (2), and Torsten Mayer-Gürr (2)

(1) Helmholtz Centre Potsdam, GFZ, Potsdam, Germany (bingo@gfz-potsdam.de), (2) Institute of Geodesy, TU Graz, Graz, Austria

Water storage anomalies from the Gravity Recovery And Climate Experiment (GRACE) satellite mission (2002-present) have been shown to be a unique descriptor of large-scale hydrological extreme events. However, possibly due to its coarse temporal (monthly to weekly) and spatial (> 150.000 km²) resolution, the comprehensive information from GRACE on total water storage variations has rarely been evaluated for flood or drought monitoring or forecasting so far. In the context of the Horizon 2020 funded European Gravity Service for Improved Emergency Management (EGSIEM) project, we evaluate two approaches to solve the spatio-temporal variations of the Earth's gravity field as daily solutions through comparison to selected historical extreme events in medium-large river basins (Ganges-Brahmaputra, Lower Mekong, Danube, Elbe). These comparisons show that highs and lows of GRACE-derived total water storage are closely related to the occurrence of hydrological extremes and serve as an early indicator of these events. The degree to which the daily GRACE solutions contain high-frequent temporal hydrological information, e.g. individual flood peaks, is related to the size of the extreme event.