Simulation study on combination of GRACE monthly gravity field solutions

Yoomin Jean, Ulrich Meyer, and Adrian Jäggi
University of Bern, Switzerland (yoomin.jean@aiub.unibe.ch)

The GRACE monthly gravity fields from different processing centers are combined in the frame of the project EGSIEM. This combination is done on solution level first to define weights which will be used for a combination on normal equation level. The applied weights are based on the deviation of the individual gravity fields from the arithmetic mean of all involved gravity fields. This kind of weighting scheme relies on the assumption that the true gravity field is close to the arithmetic mean of the involved individual gravity fields. However, the arithmetic mean can be affected by systematic errors in individual gravity fields, which consequently results in inappropriate weights. For the future operational scientific combination service of GRACE monthly gravity fields, it is necessary to examine the validity of the weighting scheme also in possible extreme cases. To investigate this, we make a simulation study on the combination of gravity fields. Firstly, we show how a deviated gravity field can affect the combined solution in terms of signal and noise in the spatial domain. We also show the impact of systematic errors in individual gravity fields on the resulting combined solution. Then, we investigate whether the weighting scheme still works in the presence of outliers. The result of this simulation study will be useful to understand and validate the weighting scheme applied to the combination of the monthly gravity fields.