



Towards a new ITSG-Grace release: improvements within the processing chain

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Compared to the official ITSG-Grace2014 release, multiple improvements within the processing chain have been implemented: updated background models, instrument data screening, improved numerical orbit integration, and covariance function estimation.

An instrument data screening step is now included within the data pre-processing. Based on the Sequence of Events (SoE) file time periods containing calibration maneuvers are excluded from processing. Additionally, time periods affected by yaw-turns (which are necessary for battery maintenance) are excluded based on the analysis of the corresponding inter-satellite pointing angles. The Level-1B accelerometer data is compared to modeled non-conservative forces (atmospheric drag, solar radiation pressure and albedo) in order to enable an a-priori accelerometer calibration and to detect large-scale outliers.

Furthermore, the numerical orbit integration was improved by introducing an elliptical reference orbit replacing the linear motions used before.

During the gravity field recovery process the KBR range-rate data is decorrelated by an empirical covariance function, the length of which was increased to three hours. A robust covariance estimator is now used to guarantee that the estimated covariance function is resistant to outliers.

The constraints used for the combined estimation of daily gravity field variations are now based on improved error estimates for the dealiasing models.

First investigations indicate a noise reduction within the monthly solutions of about 20 percent, especially the north/south striping can be reduced visibly. The reprocessed release is presented and selected parts of the processing chain, as well as their effect on the estimated gravity field solutions, are discussed.