Geophysical Research Abstracts
Vol. 16, EGU2014-2818, 2014
EGU General Assembly 2014

Relative importance of coloured noise vs. model errors in reduced scale gravity field recovery of future satellite missions

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The reduced scale simulation software tool (RST) for time-variable gravity field analysis from ll-SST missions (quick-look tool for aliasing analysis), as a closed loop tool, assumes nominal repeat orbits of the satellite formations. The tool avoids orbit integration and therefore benefits from fast calculation approach. There, the time-variable gravity field of the Earth at the positions of the satellites is calculated by the provided time-variable gravity field models for every time epoch which provides the observables in the dimension of range acceleration. The observables are then used for estimation of the gravitational potential, in terms of spherical harmonics coefficients, through the system of equations for different time intervals.

In this contribution the importance of accounting for coloured measurement noise is investigated, especially in comparison to the aliasing effects produced by time-variable background model errors. In particular, the effects of measurement noise of the ranging system (e.g. laser interferometry) and accelerometer for short time-interval and long-time interval of gravity solutions of different formation flights and constellations are studied. The results are then compared to the aliasing errors (e.g. ocean tidal error) obtained by the RST where the relative importance of measurement noise can be investigated.