



Simulated Multiple Formation Flights for Future Gravity Field Recovery

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A study of the Earth's gravity field recovery from Satellite-to-Satellite Tracking (SST) data of simulated formation flight missions is presented. New scenarios of multiple formation flights with near-polar and near-circular satellites' orbits will be examined. This is done by the combination of various satellite configurations such as GRACE-type scenarios with Cartwheel-type and Pendulum-type missions (e.g. satellite A and B of Swarm mission). The main focus of this study is based upon the use of short arcs of the dedicated formation flights, tailored especially to the recovery of Earth's gravity field solutions. The observation equations are set up for each short arc as applied in the calculation of ITG-GRACE03s gravity field model. The numerical simulations are performed with the Gravity Recovery Object Oriented Programming System (GROOPS) software package, which has been developed at the Department of Astronomical, Physical and Mathematical Geodesy, University of Bonn. The results are analyzed in the spatial wavelength spectrum of the static gravity field. Aliasing effects and ocean tidal models are considered in this study as time-variants gravity field.

Keywords Multiple Formation Flights, GRACE. Cartwheel. Swarm. SST. LOS. Gravity field recovery