Geophysical Research Abstracts
Vol. 16, EGU2014-4228, 2014
EGU General Assembly 2014

Full scale simulation of MWI and LRI based GRACE-FO gravity models

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During 12 years of very successful operation in orbit, the US-German GRACE mission has demonstrated its outstanding capability to monitor mass motions in the Earth system with unprecedented accuracy and temporal resolution. These results have stimulated many novel research activities in hydrology, oceanography, glaciology, geophysics, and geodesy which also indicate that long term monitoring of such mass variations, possibly with improved spatial and temporal resolution, is a must for further understanding of phenomena such as ice mass los in Polar Regions and large glacier systems or the continental hydrological cycle.

Due to the onboard battery situation, GRACE can likely not be operated further than 2015. Fortunately, a GRACE follow-on mission is currently being implemented jointly by JPL/NASA and GFZ and due for launch in August 2017. GRACE-FO will be based on GRACE heritage and lessons learnt during operation. Therefore, the prime SST (satellite-to-satellite tracking) instrument will be again the Microwave Ranging Instrument (MWI). Additionally, GRACE-FO will carry a Laser Ranging Interferometer (LRI) demonstrator which will have a factor of 10-50 improved SST measurement accuracy.

We will present a multi-years full scale simulation based on realistic error assumptions for instrument noise and background models such as tidal and non-tidal mass variations. The results shall indicate what the users can expect in terms of precision and spatial and temporal resolution when using future GRACE-FO MWI and LRI based gravity models.