



Combination of SLR, GRACE and SWARM monthly gravity fields at normal equation level

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At the Astronomical Institute of the University of Bern (AIUB) long time-series (1995 – 2017) of low resolution (spherical harmonic degree/order 6) gravity field coefficients have been determined from a combination of LAGEOS and geodetic SLR satellites in low Earth orbit, namely: Beacon-C, Ajisai, Starlette, Stella, Larets, and Lares. Monthly gravity fields, excluding degree 1 terms, are co-estimated with orbits (10-day LAGEOS and 1-day LEO arcs), station coordinates, range biases, geocenter variations and Earth orientation parameters.

For the period 2003-2016 also GRACE monthly gravity fields were produced at AIUB with a significantly higher resolution (degree/order 90). After truncation of the gravity field corresponding to SLR the derived mass variations match well in selected areas with strong mass transport signals and SLR can thus serve to shed light on mass transport in the pre-GRACE period.

Finally monthly gravity fields have been determined from high-low tracking data of the three SWARM satellites and are combined with SLR at normal equation level. The combined gravity fields turn out to be well suited for Greenland ice mass observation at low spatial resolution and therefore bridge the gap between GRACE and GRACE-FO.