Geophysical Research Abstracts
Vol. 21, EGU2019-8020, 2019
EGU General Assembly 2019

Mapping of a priori gravity field information into LEO orbit determination

Rolf Dach, Daniel Arnold, Ulrich Meyer, and Adrian Jaeggi
University of Bern, Astronomical Institute, Bern, Switzerland (rolf.dach@aiub.unibe.ch)

The orbits of GNSS satellites have a limited sensitivity to the Earth gravity field. Only the terms up to degree and order 7 or 8 have a noticeable effect on the orbits. Therefore, the selection of the Earth gravity field model is typically considered not critical for GNSS orbit determination.

At the same time, GNSS is a well-established technique for the orbit determination of Low Earth Orbiting satellites (LEOs), as well as for the recovery of the long-wavelength part of the Earth gravity field from LEO positions. After the end of the dedicated gravity mission GRACE, LEOs like Swarm are a crucial source of information to derive global gravity field parameters.

The question we are going to answer in the context of this study is to which extent gravity field information used for the GNSS satellites influences the GNSS-derived LEO trajectories. Kinematic trajectories for the Swarm satellites are computed based on GNSS orbits and satellite clock corrections obtained with different gravity fields. Finally, it is tested to which extent the differences in the kinematic orbits can map into the long wavelength gravity field coefficients.