



Mass variations in areas of glacial isostatic adjustment on the Northern hemisphere from GRACE data

J. Müller, H. Steffen and H. Denker

Institut für Erdmessung (IfE), Leibniz Universität Hannover, Schneiderberg 50, 30167 Hannover, Germany (mueller@ife.uni-hannover.de)

The GRACE satellite mission (Gravity Recovery And Climate Experiment) is able to map the Earth's gravity field by making accurate measurements of the distance between two satellites orbiting the Earth in decaying altitudes. Observed variations in the gravity field result from the integral effect of mass variations in the atmosphere, hydrosphere and geosphere. After reduction of oceanic and atmospheric contributions as well as tidal effects during the GRACE standard processing, monthly solutions of the gravity field are provided by three main GRACE analysis centers (GFZ Potsdam, Germany; JPL Pasadena, CA, USA; CSR Austin, TX, USA). The solutions of the three analysis centers differ slightly, as different time spans are covered and different reduction models and processing schemes are applied. In addition, residual signals from insufficient pre-processing may be present.

In our presentation we investigate the mass variations in the glacial rebound areas of North America and Northern Europe. One key issue is the separation of the various signal parts and the reduction of the observed (or derived) quantities by applying dedicated filters (e.g. Gaussian with different radii) and models of the non-GIA induced contributions such as hydrological variations. In a further step, we analyse the results of both regions on their reliability and finally compare them with results from GPS campaigns (e.g. BIFROST) and geodynamic modelling results.

Our results clearly show that the quality of the GRACE-derived gravity change signal benefits from improved reduction models and dedicated analysis techniques. Nevertheless, the comparison with results of terrestrial observation methods and geodynamic models still reveals differences, and thus further studies are in progress.