



GRACE inferences on the large ice sheets' mass changes: results and uncertainties

M. Horwath and R. Dietrich

Technische Universität Dresden, Institut für Planetare Geodäsie, 01062 Dresden, Germany,
horwath@ipg.geo.tu-dresden.de

The GRACE (Gravity Recovery and Climate Experiment) satellite mission launched in 2002 is able to observe mass changes in the Earth system through their gravitational effect. Hence, ice mass changes of the Antarctic and Greenland ice sheets may be inferred from GRACE data. However, the respective results published from different analyses differ considerably. A thorough understanding of the various error mechanisms involved in the GRACE data analysis and in the geophysical reductions is necessary to ensure reliable results with realistic uncertainty assessments as well as to advance the methods of analysis.

We present our results on Antarctic and Greenland ice mass changes obtained with an adapted methodology from the Release 04 monthly GRACE solutions by GeoForschungsZentrum Potsdam for a more than 5 year time interval from 2002 to 2007. We consider mass changes of the entire ice sheets but also of their individual large drainage basins. For Antarctica, for example, we detect ice mass loss which is clearly dominated by changes in the Amundsen Sea Sector and Northwest Marie Byrd Land (West Antarctica) while East Antarctica appears to be near balance.

Emphasis is put on a thorough error assessment which exceeds previous work. The obtained insights may help to resolve some of the differences between the results of different studies and open the way to even more accurate and more detailed GRACE inferences on ice mass changes.