

Integration of GRACE and GNET GPS in modeling the deglaciation of Greenland

Per Knudsen (1), S. Abbas Khan (1), F. Bo Madsen (1), Michael Bevis (2), and Tonie van Dam (3)

(1) DTU Space, National Space Institute, Geodesy, Kgs. Lyngby, Denmark (pk@space.dtu.dk), (2) Ohio State University, Columbus, Ohio, USA, (3) University of Luxembourg, Luxembourg

The use the monthly gravity fields from the Gravity Recovery and Climate Experiment (GRACE) has become essential when assessing and modeling the mass changes of the ice sheets. The recent termination of the current mission, however, has hampered the continuous monitoring of ice sheet masses, at least until GRACE Follow-On mission will become operational. Through the recent years it has been demonstrated that mass changes can be observed by GPS receivers mounted on the adjacent bedrock. Especially, the Greenland GPS Network (GNET) has proven that GPS is a valuable technique for detecting mass changes through the Earths elastic response.

An integration of GNET with other observations of the Greenland ice sheet, e.g. satellite altimetry and GRACE, has made studies of GIA progressing significantly. In this study, we aim at improving the monitoring of the ice sheet mass by utilizing the redundancy for reducing the influence of errors and to fill in at data voids and, not at least to bridge the gap between GRACE and GRACE FO. Initial analyses are carried out to link GRACE and GNET time series empirically. EOF analyses are carried out to extract the main part of the variability and to isolate errors. Subsequently, empirical covariance functions are derived and used in the integration. Preliminary results are derived and inter-compared.