Geophysical Research Abstracts
Vol. 13, EGU2011-11441, 2011
EGU General Assembly 2011

Rigorous Fusion of Gravity Field, Altimetry and Stationary Ocean Models

Silvia Becker (1), Wolf-Dieter Schuh (1), Martin Losch (2), and Grit Freiwald (2)

(1) University of Bonn, Institute of Geodesy and Geoinformation, Theoretical Geodesy, Germany, (2) Alfred-Wegener-Institute for Polar and Marine Research, Bremerhaven, Germany

Many characteristics of the ocean circulation are reflected in the mean dynamic topography (MDT). Therefore observing the MDT provides valuable information for evaluating or tuning ocean models. In principle the dynamic topography results from subtracting the geoid height from the altimetric mean sea surface. However, the data types have different representations and spatial resolutions. In this approach the altimetric sea surface is expressed as a sum of geoid heights represented in terms of spherical harmonics and the mean dynamic topography parameterized by a finite element method. The altimetry information and a gravity field model (e.g. GRACE/GOCE) can now be combined in terms of normal equations. In addition, the infinite space is also parameterized. Different approaches regarding the stochastic characteristics of the omission domain are considered.
Within this framework the inversion and smoothing processes are avoided that are necessary in step-by-step approaches, so that the normal equations of the MDT can be estimated in a straightforward way. These normal equations are the appropriate weights for model-data misfits in least-squares ocean model inversions. Following the different strategies regarding the omission domain combined MDT models are developed for the North Atlantic Ocean and assimilated into a 3D-inverse ocean model. The results will be demonstrated on this poster.