Geophysical Research Abstracts
Vol. 12, EGU2010-10737, 2010
EGU General Assembly 2010

Full Resolution Geoid from GOCE Gradients for Ocean Modeling

Matija Herceg (1), Per Knudsen (1), Ole Andersen (1), and Carl Christian Tscherning (2)
(1) DTU Space, National Space Institute, Geodesy, Copenhagen, Denmark, (2) NBI, University of Copenhagen, Denmark

The main objective of the study is to improve the methodology for combining GOCE gravity field models with satellite altimetry to derive optimal dynamic ocean topography models for oceanography. Here a method for full resolution geoid determination using simulated GOCE gradients is presented.

Preliminary results by Knudsen and Tscherning have indicated that compared to a spherical harmonic expansion truncated at degree 200 a full resolution determination of the geoid may reduce the omission error from about 30 cm to 15 cm. In this study a method for regional geoid computation based on mass points is tested. The test is carried out in part of the GOCINA region in the North Atlantic. The Earth anomalous gravity field is modeled by the set of base function, each obtained as the anomalous gravity potential from each point mass. From the anomalous gravity field, the geoid is then calculated using Bruns formula. The unknown masses may be estimated by inverting gravity data. In this case gravity GOCE gravity gradients in the gradiometer reference frame are used to fully utilize the superior accuracy of the along track gradients. To evaluate the results of the point mass method, the Gravsoft program package is used.

Applying this method on GOCE gradient data, it is possible to make independent validation of already accepted methods for geoid determination. The presented point mass method shows that it is possible to acquire a full resolution geoid from GOCE gradients. Results of the method can be used in future geoid modeling. New detailed geoid surface will serve as a homogeneous and accurate reference surface for satellite altimetry and in that way it will provide important improvements in the ocean circulation modeling.