



Optimal Ocean Geoid as Reference Surface for Mean Ocean Circulation and Height Systems

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The ocean geoid is the reference surface for mean ocean circulation and is needed for unification of height systems across the oceans. It is determined from a combination of satellite gravimetry for the long to medium wavelengths and from airborne, altimetric and shipborne gravimetry for the short wavelengths. Within a recently completed project of the European Space Agency named GOCE-OGMOC (Optimal Geoid Modelling based on GOCE and GRACE third-party mission data and merging with altimetric sea surface data to optimally determine Ocean Circulation) such an ocean geoid was computed by means of stochastically optimal combination of the various data sources.

The ocean geoid model then was applied to compute an optimal geodetically derived mean dynamic topography (MDT) and related geostrophic current velocities by subtracting it from a recent mean sea surface and by applying dedicated filters. This MDT in detail was analyzed with respect to its signal content and to its consistency over large areas and with respect to leakage of uncertain land gravimetric data into the oceans. In addition it was also investigated to what extent remaining dynamic ocean topography signal in altimetric gravity data is visible in the ocean geoid and/or the MDT solutions. Finally, an attempt was made to use this MDT to connect height systems across continents and to compare them with results from GNSS-levelling.