Geophysical Research Abstracts
Vol. 15, EGU2013-13496, 2013
EGU General Assembly 2013

Isostatic gravity disturbances in the definition of the Vening-Meinesz Moritz inverse problem of isostasy

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The isostatic gravity anomalies have been traditionally used to solve the inverse problems of isostasy. Since gravity measurements are nowadays carried out together with GPS positioning, the utilization of gravity disturbances in various regional gravimetric applications becomes possible. In global studies, the gravity disturbances can be computed using global geopotential models which are currently available to a very high accuracy and resolution. In this study we facilitate the definition of the isostatic gravity disturbances in the Vening-Meinesz Moritz inverse problem of isostasy for finding the Moho depths. We further utilize uniform mathematical formalism in the gravimetric forward modelling based on methods for a spherical harmonic analysis and synthesis of gravity field. We then apply both mathematical procedures to determine globally the Moho depths using the isostatic gravity disturbances. The results of gravimetric inversion are finally compared with the global crustal seismic model CRUST2.0; the RMS fit of the gravimetric Moho model with CRUST2.0 is 5.3 km. This is considerably better than the RMS fit of 7.0 km obtained after using the isostatic gravity anomalies.