

Effect of the upper mantle structure on the Moho geometry

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We investigate the effect of the lateral density structure within the upper (most) mantle on the Moho geometry. The gravimetric forward and inverse modeling methods are applied to determine the Moho depths using the gravity data corrected for major known anomalous density structures within the Earth crust. In our numerical experiment we compute and compare the Moho geometry determined using uniform and laterally varying models of the Moho density contrast. The laterally varying model of the Moho density contrast incorporates the information on the upper mantle lateral density structure taken from the CRUST1.0 global crustal model. For the uniform density contrast model, the constant value of the Moho density contrast is determined based on minimizing the spatial correlation between the gravity data and the Moho geometry. Except for the upper (most) mantle, the deeper heterogeneous mantle density structures including the core-mantle boundary zone are not taken into consideration due to the absence of a reliable 3-D density model of the whole mantle. The numerical results revealed that the consideration of the upper mantle density structure improves the fit of the gravimetric solution with the seismic Moho model.

Keywords: crust, density, gravity, mantle, Moho