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Global Moho model derived based on the Vening-Meinesz Moritz isostatic model and the non-isostatic gravity correction

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We assess the effects sediment and ice density contrasts on the Moho geometry. This is done globally by computing the gravitational contributions of mass density contrasts due to ice and sediments. We then evaluate respective changes in the Moho geometry. Residual differences between the gravimetric and seismic Moho models are used to predict a remaining non-isostatic gravity signal, which is mainly attributed to unmodeled density structures and other geophysical phenomena. We utilize three recently developed computational schemes in our numerical studies. The apparatus of spherical harmonic analysis and synthesis is applied in forward modeling of the isostatic gravity disturbances. The Moho depths are estimated globally by solving the Vening-Meinesz Moritz inverse problem of isostasy. The same estimation model is applied to evaluate the differences between the isostatic and seismic models. We demonstrate that the application of the ice and sediment density contrasts stripping gravity corrections is essential for a more accurate determination of the Moho geometry. We also show that the application of the additional non-isostatic correction further improves the agreement between the Moho models derived based on gravity and seismic data. Our conclusions are based on comparing the gravimetric results with the CRUST2.0 global crustal model compiled using results of seismic surveys.