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A Method of Estimating the Moho Density Contrast with a Tentative Application of EGM08 and CRUST2.0

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A b s t r a c t

Based on Vening Meinez-Moritz global inverse isostatic problem, the Moho density contrast is formulated as that of finding a solution of a Fredholm integral equation of the first kind. We present solutions to this equation by combining global models of gravity (EGM08), topography (DTM2006) and seismic crust (CRUST2.0) to a resolution of 2° × 2°. The test computations yielded Moho density contrasts ranging from 81.5 kg/m^3 (in Pacific) to 988 kg/m^3 (Tibet), with averages of 678 ± 78 and 334 ± 108 kg/m^3 for continental and oceanic regions, respectively, and a global average of 448 ± 187 kg/m^3. Estimated Moho depths range from 8 to 75 km with continental and oceanic averages of 36.6 ± 5.3 km and 12.9 ± 5.8 km, respectively, and a global average of 21 ± 12.5 km.

This article has its emphasis on the new theory, while significant corrections to computational results are expected in a forthcoming study, where the isostatic gravity anomaly will be reduced for several disturbing signals.

Key words: density contrast, isostasy, moho, topographic compensation.