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Local Moho estimate in the Italian area based on a global Moho from GOCE data

R. Barzaghi (1), A. Borghi (1), M. Reguzzoni (1), and D. Sampietro (2)

(1) DIIAR, Politecnico di Milano, Milan, Italy, (2) DIIAR, Politecnico di Milano - Polo Territoriale di Como, Como, Italy (daniele.sampietro@polimi.it)

The estimate of the Moho surface in the Italian area has been performed to refine a global Moho model. In fact, at regional scale, the gravity based Moho estimate can benefit from the availability of such a global model. This information can be usefully exploited to remove low frequencies from local gravity data allowing a better detection and inversion of high frequency details.
The used global Moho has been computed by assuming a simple two-layer model, with known density contrast and a mean Moho depth. Under these hypotheses, a linear relationship can be derived between the spherical harmonic coefficients of the anomalous potential and those representing the Moho depth. Based on this linear relationship and properly reduced GOCE data, the harmonic coefficients of the global Moho have been first computed and then used as a basis for a local refinement, thus outlining a two-step procedure. Particularly, gravity data in the Italian area have been reduced for the gravity signal implied by this global Moho and used in a second step estimation procedure based on a collocation approach. Also, in reducing the local gravity data, the density variations with respect to the simple two-layer model have been considered and accounted for. The obtained local Moho corrections have been finally mapped onto the original GOCE global Moho to improve its high frequency pattern. The effectiveness of this stepwise estimation procedure has been tested by comparison with other Moho solutions known in literature over the same area.