Geophysical Research Abstracts
Vol. 19, EGU2017-10089, 2017
EGU General Assembly 2017

Gravity inversion of the Kermadec-Tonga subduction zone by GOCE data and seismic information

Lorenzo Rossi (1), Ahmed Hamdi Mansi (1), Mirko Reguzzoni (1), and Daniele Sampietro (2)
(1) DICA, Politecnico di Milano, Milan, Italy (lorenzo1.rossi@polimi.it), (2) GReD srl, Lomazzo (CO), Italy

The modelling of the main subducting plates is usually performed by combining different data sources, like active-source seismic and deep seismicity. Moreover, high-resolution bathymetry models and sediment thickness maps can contribute to define the geometry of the subducting slab at the trenches. Since in correspondence of the subducting plate there is generally a large mass density discontinuity, due to the contrast between the light crust and the heavy mantle, gravity data can be used to study the geometry and some physical properties of subduction zones. In particular, the recent availability of direct satellite observations, like the gravity gradients acquired by the ESA-GOCE mission, opens to the possibility of improving seismic models by imposing a consistency with the observed gravity field.
In this work the Kermadec-Tonga subduction zone is studied, starting from the CRUST1.0 and the SLAB1.0 seismic models, and inverting the GOCE gravity gradients to improve our knowledge of the whole area. More specifically, the CRUST1.0 Moho discontinuity is refined, and the subducting plate is modelled for thickness and density contrast, since SLAB1.0 provides only the top surface. The inversion method is basically an iterative regularized least-squares adjustment and the main property of the obtained result is that it is at the same time close to the starting seismic models and consistent with the satellite gravity observations.