Geophysical Research Abstracts
Vol. 19, EGU2017-12952-1, 2017
EGU General Assembly 2017

The computation of the terrain correction close to ground stations in GTE software

Martina Capponi (1,2) and Daniele Sampietro (3)

(1) DICA, Politecnico di Milano, Milan, Italy, (2) DICEA, Università di Roma "La Sapienza", Rome, Italy,, (3) GReD srl, Lomazzo (CO), Italy

In many geophysical and geodetic applications related to the gravitational field, the detailed modeling of the vertical component of the gravitational attraction due to topographic masses, represents a major issue. In fact, the increasing resolution of recently developed DTM, the increasing number of observation points and the increasing accuracy of gravity data demand the computation of a very accurate terrain correction (TC) of a fine DTM on large areas. As well known, classical methods such as prism or point masses approximations are indeed too slow while Fourier based techniques are usually too approximate if compared to the required accuracy. In 2016 GReD and Politecnico di Milano developed a new software, called GTE, based on an hybrid FFT-prism algorithm to compute TC for airborne observations.
In this work we present the improvements of the GTE software to compute TC also at ground level. This requires to modify the FFT algorithm previously implemented and to properly handle the DTM slope close to the observation ground station. In order to resolve the latter problem, different algorithms, namely triangulated polyhedrons, ultra high resolution squared prisms and segmented concentric cylindrical rings centred on the station, have been tested to define an optimal method.
Some tests to analyse the computational time and the accuracy obtained with each method are here presented and the performances of the improved GTE software to compute terrain corrections on ground stations are presented too. In details, the performed tests show that the algorithm is able to compute the TC from a DTM of 1001×1001 cells on the same grid in less than 5 minutes with accuracies of the order of 0.002 mGal, degradating to 0.2 mGal when computed on the ground stations.