

Geopotential Models Evaluation in Algeria Using Stochastic Method, GPS/Leveling and Topographic Data

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Abstract : For precise geoid determination, we use a reference field to subtract long and medium wavelength of the gravity field from observations data when we use the remove-compute-restore technique. Therefore, a comparison study between considered models should be made in order to select the optimal reference gravity field to be used. In this context, two recent global geopotential models have been selected to perform this comparison study over Northern Algeria. The Earth Gravitational Model (EGM2008) and the Global Gravity Model (GECO) conceived with a combination of the first model with anomalous potential derived from a GOCE satellite-only global model. Free air gravity anomalies in the area under study have been used to compute residual data using both gravity field models and a Digital Terrain Model (DTM) to subtract the residual terrain effect from the gravity observations. Residual data were used to generate local empirical covariance functions and their fitting to the closed form in order to compare their statistical behaviors according to both cases. Finally, height anomalies were computed from both geopotential models and compared to a set of GPS levelled points on benchmarks using least squares adjustment. The result described in details in this paper regarding these two models has pointed out a slight advantage of GECO global model globally through error degree variances comparison and ground-truth evaluation.

Keywords : quasigeoid, gravity anomalies, covariance, GGM

Conference Title : ICPGGA 2018 : International Conference on Physical Geodesy and Gravity Anomalies

Conference Location : Rome, Italy

Conference Dates : September 17-18, 2018