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Toward a new quasi-geoid model and normal height datum for Iran based on the recent GRACE model

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Several new geoid models recently computed for Iran. The most recent one is the IRG04 geoid model which is determined based on the Least-Squares Modification of the Stokes's formula. In the current research we have a discussion about some basic problems in determination and evaluation of geoid models in Iran. Iran is one the roughest countries in the world which has large lateral density variations in crust. Using of the constant density value for the crust is a well-known assumption in determination of the geoid models and topographic correction. However, the effect of lateral density variation in the geoid can be reach up to 14 cm in Iran which in not negligible in a precise geoid modelling. Also, the current height datum of Iran is based on the orthometric system which the effect of gravity variation were not applied in heights. Further, the height systems of most neighbors couturiers are normal height which can be useful for unification and optimal adjustment of heights in Iran. For these reasons we decided to compute and evaluate new quasi-geoid model based on the combination of the EGM96 and recent global geopotential model of GRACE (ITG-Grace03). This article presents the most recent results from an on-going research project, whose main purpose is to to compute a gravimetric quasigeoid model for Iran base on the Royal Institute of Technology (KTH)approach. The evaluation is made using 477 GPS/levelling height anomalies covering the major parts of Iran except for the mountainous areas to the North and West. After a 7 parameter fit, the most promising attempt achieves a RMS value for the residuals of 85 mm for the combined model based on the independent GPS/levelling data.