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A new 3D Moho depth model for Iran based on the terrestrial gravity data and EGM2008 model

R. Kiamehr (1) and D. Gómez-Ortiz (2)

(1) Zanjan University, Department of Geomatics, Zanjan, Iran (ramin@infra.kth.se), (2) ESCET-Área de Geología, Departamental 2, Universidad Rey Juan Carlos, C/Tulipán s/n, 28933 Móstoles, Madrid, Spain (david.gomez@urjc.es)

Knowledge of the variation of crustal thickness is essential in many applications, such as forward dynamic modelling, numerical heat flow calculations and seismologic applications. Dehghani in 1984 estimated the first Moho depth model over the Iranian plateau using the simple profiling method and Bouguer gravity data. However, these data are high deficiencies and lack of coverage in most part of the region. To provide a basis for an accurate analysis of the region's lithospheric stresses, we develop an up to date three dimensional crustal thickness model of the Iranian Plateau using Parker-Oldenburg iterative method. This method is based on a relationship between the Fourier transform of the gravity anomaly and the sum of the Fourier transform of the interface topography. The new model is based on the new and most complete gravity database of Iran which is produced by Kiamehr for computation of the high resolution geoid model for Iran. Total number of 26125 gravity data were collected from different sources and used for generation an outlier-free 2x2 minutes gravity database for Iran. At the mean time, the Earth Gravitational Model (EGM2008) up to degree 2160 has been developed and published by National Geospatial Intelligence Agency. EGM2008 incorporates improved 5x5 minutes gravity anomalies and has benefited from the latest GRACE based satellite solutions. The major benefit of the EGM2008 is its ability to provide precise and uniform gravity data with global data coverage. Two different Moho depth models have been computed based on the terrestrial and EGM2008 datasets. The minimum and maximum Moho depths for land and EGM2008 models are 10.85-53.86 and 15.41-51.43 km, respectively. In general, we found a good agreement between the Moho geometry obtained using both land and EGM2008 datasets with the RMS of 2.7 km. Also, we had a comparison between these gravimetric Moho models versus global seismic crustal models CRUST 2.0. The differences between EGM2008 and land data versus CRUST2 model are in the order of 3.45 and 4.15 km, respectively. In conclusions, we think that the resolution of both EGM2008 and land Moho maps are greater than the previous models and it can be used as an up to date models for the future geophysical and seismological applications.