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3D lithospheric structure and regional/residual bouguer anomalies from Arabia-Eurasia collision in Iran

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The aim of this work is to study the structure of the crust and the lithosphere in order to bring new insights into the shallow mode of deformation of the Zagros Foreland Thrust and Fold Belt, the lateral extension and depth of propagation of the deformation as well as to investigate the large-scale geodynamics of the area. We developed a new technique of regional/residual separation assuming local isostasy and with the calculation of a 3D crustal and lithospheric structure. To accomplish the separation of regional and residual (local) signatures of the gravity data, we have made an approach considering that 1) the level of isostatic compensation is at the base of the lithosphere, and 2) the lithospheric model has to account for the residual geoid anomaly. This method consists of inverting the topography and the residual geoid data to obtain the Moho depth and the depth of the lithosphere-asthenosphere boundary. The regional gravity field is obtained calculating the gravimetric response of the 3D crustal and lithospheric structure obtained by the inversion. Our results show that Moho depth varies from $\sim$ 40 km at the Mesopotamian Foreland to $\sim$ 60-65 km below the High Zagros. The lithosphere is thicker beneath the Mesopotamian Foreland and thinner underneath the High Zagros and central Iran. The residual gravity isostatic anomaly differs noticeable from values obtained by filtering or statically methods. The foreland basin is characterized by a minimum of -20 mGal. Maximum of $\sim$20 mGal are associated with basement uplifts in the Simply Folded Belt and with magmatic and volcanic rocks in the Sanandaj-Sirjan Zone.