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Crustal structure of NW of the Iranian Plateau based on 2D interpretation of gravity, aeromagnetic, and seismic data

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A crustal scale 2D density and magnetic susceptibility model of the NW part of Iranian plateau has been constructed based on receiver functions and sediment thickness. To first order, Moho depth correlates inversely with topography.Our density/susceptibility model includes three distinct tectonic zones: The Zagros Zone, the Central Iranian Block, and the Caspian Sea Block. All three zones are covered by at least 6 km of sedimentary layers. A broad, pronounced negative Bouguer gravity anomaly below the Zagros mountains is mainly related to the thickening of the crust and partially related to thickening of the sedimentary layers. The 2D density model shows that the thickening of the crust beneath the Zagros is accommodated by thickening of a high-density lower crustal layer, whereas similar thickening below the Central Iranian Zone is mainly due to thickening of a high-density middle crustal layer. Shallow Curie isotherm in the vicinity of the Zagros suture zone may be related to partial melting at depth. The NE-dipping suture between the Arabian and Eurasian plates marks a change in density structure of the whole crust. The absence of strong magnetic and gravity anomalies over the south Caspian basin with $\sim$ 30 km Moho depth and $\sim$ 20 km Curie isotherm, indicates that the crystalline rocks are only weakly magnetized and dense, supporting the idea that the crystalline crust is likely of continental type. The transition from the Iranian Plateau to the Caspian Sea Block includes a thick body with intermediate density between the crust and mantle. It may represent either an underplated layer or a present zone of partially molten mantle rocks.