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Three-Dimensional Gravity modeling of Kutch region, India

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ABSTRACT

Understanding the crustal architecture of Kutch region, India is important due to the presence of thick Mesozoic sediments and also due to occurrence of earthquakes. We presented here three-dimensional gravity models. The major features of our shallow model are: 1) thickness of Deccan Traps is almost negligible towards northern side of Vigodi Fault and Katrol Hill Fault 2) Mesozoic sediment thickness is about 3 km on the southern side and 3) several undulations in the basement on the Wagad Uplift. The model is consistent with the geological observation that the basin slopes towards southwest. The observed Bouguer gravity anomalies are explained by ~10 km thick Granitic upper crust of 2.7 g/cm³; ~10 km thick intermediate mid crust of 2.82 g/cm³; ~15 km thick mafic lower crust of 2.91 g/cm³ density. Crustal thickness is about 40-45 km on Wagad Uplift and near Katrol Hill Fault. The modelled gravity data do not require presence of anomalous amount of fluids, melts and/or magma chambers in the deep crust of Kutch region.

Keywords: Kutch region, Bouguer gravity anomaly, Mesozoic sediments, crustal thickness, 3D modeling, partial melt

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