Crustal configuration of Proterozoic Delhi Fold Belt using gravity data and its relation with the Himalayan Seismicity

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The Aravalli Delhi Fold Belt shows a prominent gravity high in the region and has been related to the underplated material below the crust in the southern region of Aravalli craton. In the present work, we study the continuation of the high density magmatic rocks in the northern Delhi Fold Belt (~ 150 km from southern region) and its likely relation with the seismicity of Himalayan region. We model the Bouguer gravity anomaly over different geological formations of the region to understand the subsurface structure and density of the crust. We constrain the crustal structure using radially averaged power spectrum, the Depth from Extreme Points (DEXP) method, filtering of the gravity anomaly and 3D structural inversion of the Moho. The radially averaged power spectrum analysis suggests three-layered crustal model corresponding to the Moho, the Conrad and basement depth respectively. The DEXP method is useful to study the isolated sources using extreme points of the scaled potential field and gives information about the shape of the causative sources by calculating the Structural Index (SI). The application of the DEXP method on gravity dataset estimates shape of the Delhi Fold Belt as a horizontal cylinder. The depth extent of the Delhi Fold Belt is also manifested in the filtered regional and residual anomalies. We estimate the depth of Moho by inverting the regional gravity anomaly. The integration of results of the spectral analysis, the DEXP with gravity modeling gives insight into the crustal structure across the Delhi fold belt. We will present the modelled crustal structure and evolutionary geometry of Delhi Fold Belt based on gravity signatures.

Keywords: Crustal structure, Delhi Fold Belt, Depth from Extreme Points Method, Gravity modelling, Spectral analysis

