Paper Number: 4075

Structural Mapping Based on Remote Sensing and Potential Field Data from Son-Mahanadi Gondwana Rift Basin, India

Chowdari Swarnapriya[1], Bijendra Singh[1] and A.P. Singh[1]

[1]CSIR-National Geophysical Research Institute, Uppal Road, Hyderabad, India, swarnapriya.ngri@gmail.com

Abstract: Intracratonic Son-Mahanadi Gondwana rift basin located in the eastern part of Indian peninsular shield is flooded with numerous mafic dykes and sills intruding the sediments and posed a serious problem in seismic data acquisition and interpretation. This work presents the results of combined analysis of gravity and magnetic (GM) and Remote Sensing (RS) data to delineate the subsurface structures to understand the tectonics and evolution of the basin. The Bouguer gravity anomaly map of the region depicts short wavelength gravity lows and highs due to undulations in the basement superposed on a long wavelength regional gravity low centered over the basin. Interestingly, the regional gravity low bears an inverse correlation with the regional topography which suggests that the excess topographic load is compensated at depth and the required buoyancy might be the consequence of deep seated low density heterogeneities due to thinning of the lithosphere. Presence of high heat flow and occurrence of large number of volcanic dykes and sills of Deccan origin and its proximity to the Deccan volcanic terrain suggests impact of Deccan plume as the preferred mechanism for the uplift of Gondwana sediments. The lineament trends (ENE-WSW & NW-SE) show preferred spatial distribution in three sub basins (Son, Hasdo-Arand and Mahanadi), each separated by basement ridges. The ENE-WSW trend is dominant in the northern part of the basin (Son sub basin), the NW-SE trens is present in the Southern part i.e, Mahanadi sub basin and distribution of both trends in Hasdo-Arand sub basin.