



The magnetic field of the Indian Lithosphere from aeromagnetic and satellite data

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Available degree sheet aeromagnetic maps purchased from the Geological Survey of India are digitized, corrected for normal variations, reduced to a common altitude and merged. An accurate aeromagnetic anomaly map of India up to 25 degrees North latitude is thus prepared. A composite magnetic anomaly map of the region utilizing available marine and ground magnetic anomaly data is also prepared to outline the main tectonic blocks of the region and understand the geology of the region that is under surface cover. Further, the aeromagnetic anomaly map is utilized to calculate the depth to the bottom of the magnetic sources, corresponding to the Curie isotherm depth of the region. This is achieved using filtering techniques and spectral depth estimates and these depths are compared with Deep Seismic Sounding profiles where available.

The MF4 lithospheric model derived from the CHAMP satellite together with the magnetization model derived from Champ is utilized to understand the long wavelength lithospheric structure over the Indian subcontinent, covering the region from 0 to 40 degrees N latitude and 60 to 100 degrees E longitude. This covers the offshore region as well. The lithospheric depth estimates derived from this model is compared with the Curie isotherm depths derived from the aeromagnetic data. The heat flow / geothermal gradient has inverse relation to the Curie isotherm of a region. Assuming a steady state conductive model, the heat flow values are estimated from the Curie isotherm depths derived from the aeromagnetic data as well as the ones derived from the MF4 model. Interpretation of the heat flow values thus calculated, in terms of the tectonics of the region, will be presented for the Indian subcontinent.