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Crustal Structure and Compensation Mechanism of the Himalaya: Constraint from New Gravity Measurements

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Collision of India with Asia resulted in the formation of Himalaya at ~ 50 ma. This collision of continents caused faulting in the frontal parts of the Indian plate and they are widely known as main Frontal Thrust (MFT), Main Boundary Thrust (MBT) and Main Central Thrust (MCT). Mapping of subsurface structures and extent of mega tectonic features such as Main Boundary Thrust (MBT) and Main Central Thrust (MCT), which are evolved during the continent – continent collision of the Indian plate with the Eurasian plate, can provide an opportunity to study the plate tectonic processes in the Himalayas. There have been several experiments to map subsurface structure in the Himalayas, however many parts have still data gap due to logistic problems. Recently, we have recorded gravity data in the Kumaun and Sikkim Himalaya and used earlier data from western Himalaya to elucidate the subsurface structure. The recorded profiles start from Gangetic plain and run across main tectonic features like MBT and MCT and thus allow us map subsurface structure. These new data are also utilised to constrain the isostatic mechanism and effective elastic thickness that supports the Himalayan load. Our analyses suggests that the Himalaya is flexurally supported and computed Moho constraint from flexural model in the northern end of Sikkim profile fits reasonably well with the southern part of INDEPTH seismic section.