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Morphotectonic Analysis of Upper Tapi River Sub-basin, Madhya Pradesh

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Abstract

The drainage characteristics and morphometric indices of the Upper Tapi river sub-basin, Betul district, Madhya Pradesh, India was investigated using Shuttle Radar Topography Mission-Digital Elevation Model (SRTM- DEM), Remote Sensing (RS) and Geological Information System (GIS) approach. The most common tectonic indices includes channel sinuosity (S), basin elongation ratio (Re), mountain front sinuosity (Smf), drainage basin asymmetry and valley floor along with valley width ratio. The transverse topographic symmetry factor (T) for the Upper Tapi river sub-basin ranges between 0.08 and 0.64. The asymmetric pattern and transverse topographic symmetry factor are approaching to one point towards more asymmetric pattern, which indicates basin tilting. Mountain front sinuosity (Smf) values vary from 1.15 to 2.51, which suggest that the active mountain fronts are associated with active faults of the area due to tectonic influences. The ENE to WSW trending Gavilgarh fault/ Salbardi fault which is present to the southeast of the study area and Son-Narmada North Fault (SNNF) which lies on the northwestern side of the Upper Tapi river sub-basin confirms this observation.

Keywords: Upper Tapi River, Gavilgarh/Salbardi fault, Son-Narmada North Fault, GIS and Remote sensing