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Tectonic footprints and landscape evaluation along Kulur River valley, Kumaun Lesser Himalaya, India

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Abstract

Tectonic reactivation along the major boundary thrusts and subsidiary thrust/faults in the Himalaya during the Quaternary period has resulted in the rejuvenation of the landforms. Considering, the role of neotectonic activity in the hazardous Kumaun region, we aim to study the neotectonically formed landscape along the Kulur River valley, a non glacier fed tributary of the Saryu River in the zone of the Berinag Thrust (BT). The field evidences encompassing a variety of geomorphic indicators, e.g., unpaired fluvial terraces, palaeo river channels, alluvial fans, active and stabilized landslides, lineaments, waterfalls, alignment of springs, deeply dissected hills, straight/meandering course of rivers/streams, V-shaped valleys, triangular fault facets and water logged/river ponding along with integrated values of eight morphometric parameters and Stream Steepness index (K_s) indices characterize the modification of landscape in the Kulur River valley. The computed morphometric parameters in the Kulur River drainage and its tributaries show that the basin has been tilted and uplifted forming V-shaped valleys along with deformed and disequilibrium longitudinal profile, thereof, suggesting it to be controlled by lithology and tectonics. Based on the response of active tectonics in form of geomorphic features and quantitative measurements of river channels, the entire basin has been divided into three segments in which the northern and southern segments are active compared to the middle sector. A possible NNE-SSW trending lineament/fault, running parallel to the Kulur River has been observed in the upper catchment and is characterized by fluvial terraces, river ponding and deflection and offsetting of drainage with rectangular pattern etc. This may have given rise to the widening and straightening of river courses which provide the favorable room for river ponding, resulting in deposition of about 2 m thick lacustrine mud deposit.

Key Words: Kumaun Himalaya; Kulur River; Berinag Thrust (BT); Neotectonics; Morphometric analysis.

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