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## Assessment of Neotectonic Influence on Intermountain Terraces Developed in Tista River, Sikkim Darjeeling Himalaya

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### Abstract

Tista River is flowing through the major lithotectonic units and thrust system of the Himalayas. In this aspect, river terraces preserve valuable geological records and are exposed at different locations along the river course. Therefore, it is needed to investigate these river terraces for understanding the response of rivers to intermountain deposits as influenced by tectonic processes. The present study area focused on intermountain deposits from Dikchu to Melli. The methodology consisted of calculation of Vf ratio as a geomorphic parameter, facies analysis by field sedimentology, grain size and heavy mineral analysis of selected terrace sediments, and correlation of terraces. The Vf ratio as an indicator to differentiate between tectonic activity or tectonic quiescence in the area, which showed considerable variation in the proximity of valley areas of thrust within the intermountain area. The results of field sedimentological studies showed that terraces of the upper part of Tista valley preserved alluvial records of channel and bar deposits, while lower parts in addition comprised floodplain deposits indicating differential aggradation process operating in the valley fill. Grain size analysis showed that Tista River sediments are characterized by higher clastic fractions than a fluid phase. The heavy mineral analysis revealed the provenance of sediments from lesser and Higher Himalayan regions while ZTR index values indicated mineralogical immaturity of sediments. Therefore, Tista River terraces were alluvial in origin and have varied developmental stages in intermountain front depositional zones in Sikkim-Darjeeling Himalaya.

*Keywords:* Tista River, Neotectonic, Terraces, Sedimentology, Geomorphology, Sikkim

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