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Dem Based Surface Deformation in Jhelum Valley: Insights from River Profile Analysis

Authors : Syed Amer Mahmood, Rao Mansor Ali Khan

Abstract : This study deals with the remote sensing analysis of tectonic deformation and its implications to understand the regional uplift conditions in the lower Jhelum and eastern Potwar. Identification and mapping of active structures is an important issue in order to assess seismic hazards and to understand the Quaternary deformation of the region. Digital elevation models (DEMs) provide an opportunity to quantify land surface geometry in terms of elevation and its derivatives. Tectonic movement along the faults is often reflected by characteristic geomorphological features such as elevation, stream offsets, slope breaks and the contributing drainage area. The river profile analysis in this region using SRTM digital elevation model gives information about the tectonic influence on the local drainage network. The steepness and concavity indices have been calculated by power law of scaling relations under steady state conditions. An uplift rate map is prepared after carefully analysing the local drainage network showing uplift rates in mm/year. The active faults in the region control local drainages and the deflection of stream channels is a further evidence of the recent fault activity. The results show variable relative uplift conditions along MBT and Riasi and represent a wonderful example of the recency of uplift, as well as the influence of active tectonics on the evolution of young orogens.

Keywords : quaternary deformation, SRTM DEM, geomorphometric indices, active tectonics and MBT
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