

ACCOMMODATION OF THE INDIA-EURASIA COLLISION RELATED STRESSES IN THE PROXIMAL PART OF THE GANGA FORELAND BASIN, INDIA: INSIGHTS FROM REMOTE SENSING AND DTM BASED INVESTIGATIONS

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ABSTRACT: The proximal part of the Ganga Foreland Basin (GFB), adjoining the Himalaya, provides an excellent opportunity to understand the complex tectonic aspects of the ongoing India-Eurasia collision. However, thick forest cover, extensive cultivation and general flatness of this alluvial terrain impede field investigations here. Therefore, remote sensing, Digital Terrain Model (DTM) and field-based geomorphological investigations have been conducted to understand these tectonic aspects.

The structural boundary between the Himalaya and its GFB is marked by the Himalayan Frontal Thrust (HFT). Geomorphic evidences reveal that the HFT is offset by dip-slip, oblique-slip and strike-slip faults, which trend more or less transverse to the structural grain of the Himalaya. Analysis of these faults in conjunction with the available geological and geophysical data reveals that the ongoing tectonic activities in the area are related to collision driven interactions between Himalaya and basement highs of the foreland. While it is now unequivocally accepted that the HFT is directly a consequence of India-Eurasia collision related compression, the development of transverse faults is generally localized along basement highs of the foreland. These basement structures indent and tear apart the thrust sheets and may have developed during collision either because of a rheological contrast between the basement highs and adjacent sedimentary fill, or a lateral change in cover thickness across the basement highs, or due to the reactivation of pre-existing basement faults. In addition to these tear faults, some transverse faults of limited lateral extent, cutting through the mountain belt and basin have formed during the last event of deformation along the HFT Zone.

The study demonstrates that the stresses of India-Eurasia collision are accommodated not only by the Himalayan thrusts/faults but also by the faults of the foreland basement.