

ACTIVE FORELANDWARD PROPAGATION OF THE HIMALAYAN FRONTAL THRUST: INSIGHTS FROM REMOTE SENSING AND DTM BASED INVESTIGATIONS IN THE NORTHWESTERN GANGA BASIN, INDIA

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ABSTRACT: The Himalayan Frontal Thrust (HFT) defines the tectonic boundary between the Himalaya and its active foreland basin - the Ganga Basin. It represents the surface expression of a low-angle, basal detachment, along which the Indian Plate subducts beneath the Himalaya and southern Tibet. Admittedly, the HFT zone is presently the locus of intense tectonic activities. This study is a focused attempt on documenting and understanding these tectonic activities in forelandward part of the HFT zone. The study area is one of the least studied proximal parts of the northwestern Ganga Basin. Field investigations in the area are impeded due to dense forest cover, extensive cultivation and general flatness of the terrain. Therefore, the investigation methods included analysis, interpretation and integration of remote sensing data, Digital Terrain Models (DTMs) and field data.

The investigations reveal that the HFT has been propagating into the adjoining Ganga Basin through development of splay faults in its footwall, which trend longitudinal to the Himalayan strike. However, these splays are concealed below the alluvium along much of their lengths and expressed on the surface as discontinuous gravel ridges, drainage deflections or subtle surface undulations that are discernible only in vertically exaggerated DTMs. The movements along two of such forelandward splays of the HFT in northwestern Ganga Plain have developed piggy-back basins of Kota-Pawalgarh Duns, sometimes in the Holocene. To the further west of these Duns a fault propagation/bend fold is now developing beneath the alluvium along a blind footwall splay of the HFT, due to which a conspicuous bend has developed along the course of an antecedent river. Moreover, the longitudinal extension of these splays is limited by the faults or lineaments of the Ganga Basin.

The study points to the development of an incipient mountain-front of the Himalaya to the south of existing mountain-front.