

SATELLITE REMOTE SENSING, DIGITAL TERRAIN MODELING AND FIELDWORK BASED MORPHOTECTONIC INVESTIGATIONS IN THE NORTHWESTERN GANGA PLAIN, INDIA

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ABSTRACT: The piedmont zone of the Ganga Plain, adjoining the Himalaya, provides an excellent opportunity to understand the tectonic and climatic controls on the geomorphic evolution of the proximal foreland basin. However, the directed efforts towards this crucial geological aspect are generally lacking mainly because of the hindrances due to thick forest cover. This study is an effort in this direction in a hitherto unstudied part of the piedmont zone of the northwestern Ganga Plain.

In this study Digital Terrain Models, IRS LISS III imagery, and field data have been used to identify and map various landforms and tectonic features of the area. Subsequently, this morphotectonic data has been analyzed in conjunction with the published subsurface data of the basin to understand the tectonic and climatic controls on the geomorphic evolution of this part of the proximal foreland basin.

The study reveals that, thick alluvial aprons cover the eastern part of the area whereas a large alluvial fan of the Malin River covers the western part of the area. These landforms are gravelly in the proximal part and fine sandy-silty in the distal part. The area is traversed by active faults, trending longitudinal and transverse to the Himalayan strike. The transverse faults have offset a longitudinal fault and caused pronounced inward indentation into the adjoining mountain-front and are probably related a basement spur of the basin. The dispositions of landforms in the area have been mainly controlled by these tectonic features whereas the depositional processes on them have been mainly climatically controlled. Moreover, the transverse expansion of the piedmont zone has reduced with time because of a reduction in sediment and water budget due to relatively weaker monsoonal rains. Presently, all the rivers draining the area are entrenched and generally have paired terraces in the proximal part of the piedmont zone.