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Intermontane valleys of Northwest Himalayas

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Forelandward migration of the Himalayan fold and thrust systems has resulted in the development of several duns in the foothills belt. Two such duns, namely the Pinjaur dun and the Dehra dun, situated in the northwest Himalayas were investigated for their tectono-geomorphic features and evolutionary history. Both the duns are similar in their geomorphic appearance and consist of similar geomorphic units like alluvial fans, piedmont, terraces etc. Incision by the streams, uplifted gravels at the fan head, folded and faulted gravel beds etc. owe their present form to Quaternary tectonic and climatic processes. There are some dimensional variations in the duns; Pinjaur dun is 150km in length and varies from 8 - 20km in width whereas Dehra dun has a length of about 80km and a width of 15 - 20km. Apart from these variations, the elevation of the northeastern mountain ranges, the southwestern outermost Siwalik hills and the average elevation of the Dehra dun is more than that of the Pinjaur dun. These differences are explained using the variation in movement on the thrusts in wedges with different characteristics. The models of critical wedge taper are applied to the two duns taking the area in front of the MBT as a deforming and advancing wedge. A model [1] predicted that the basins with higher basement dip produce fewer thrusts with larger individual displacements; this probably explains the higher elevations of the northeastern mountain ranges and southeastern outermost Siwalik hills of Dehra dun (basal dip 6º [2,3]) where thrusts may have higher displacements. Same model also predicted that in basins with higher basement dips, thrust belts with faster rates of frontal advance will be produced; the slip on the HFT would show the advancement of the wedge and this slip is greater (4.0km) in Mohand area than in Hoshiarpur area (2.3km) (basal dip 2.5º [2,3]), which demonstrates faster rate of frontal advance in the case of Dehra dun. Friction at the basement and thickness and lithological character of the stratigraphic sequence must have also played a very important role in the thrust development and wedge advancement. Larger wedge and presence of back thrusts in Kangra recess probably suggests lower basal friction whereas higher mountain front in Dehra dun reentrant might suggest higher basal friction [4].

References

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