Controls of disposition and activities of the Main Frontal thrust zone on geomorphic architecture and evolution of frontal mountain-segments of the Kumaun Himalaya, India: Insights from remote sensing and GIS technologies coupled with field-based investigations.

Pradeep K Goswami[1]*

[1] *Department of Geology, Kumaun University, Nainital -263001, INDIA*

The Main Frontal thrust (MFT), aka Himalayan Frontal thrust (HFT), defines the southern structural boundary of the Himalayan mountain range that came into existence as a result of collision between Indian and Eurasian plates. Evolved sometimes in Middle Pleistocene, it is an in-sequence thrust developed on the footwall of the Main Boundary thrust and places Cenozoic sedimentary sequence of the outer Himalaya over the alluvium of the Indo-Gangetic basin. Continued collision between Indian and Eurasian plates has led to evolution of new splays in many segments farther forelandward on the footwall of MFT. The geomorphic architecture of the frontal Himalayan mountain segments is principally controlled by such tectonic developments in the MFT zone, and two main types of frontal mountain segments have developed depending on the disposition of MFT zone. In segments where splays of MFT have developed farther in the foreland, longitudinal synclinal intermontane valleys (known as Duns) have developed as wide piggy-back basins behind a fault-propagation/fault-bend fold on such splays. Investigations comprising thorough investigations of digital satellite remote sensing data, ancillary data and field-based data in a GIS brings out that, progressive forward propagation of the MFT zone and development of successive splays of MFT in Kumaun Himalaya has resulted in the development of Kota and Pawalgarh duns. The initially developed Himalayan range-bounding thrust in the region is represented by the Dhikala thrust and successive foreland ward, in-sequence splays of it are known as Pawalgarh thrust and MFT, developed as piggy-back basins on the hanging wall of which are the Kota and Pawalgarh duns, respectively. Frontal Himalayan mountains lack wide intermontane valleys in areas where such splays of the MFT have not developed. Geomorphic investigations of two such mountain-segments, separated from each other by fourth- and fifth-order antecedent streams, suggest that both of them have evolved as a result of differential, along-strike uplift on the MFT, and their laterally progressed from west to east.

Keywords: Piggyback basins, range-bounding thrust, Frontal Himalaya