Growth pattern of fold-thrust belts in a part of Indo-Myanmar Range (IMR): Insights from Integrated RS-GIS, Geomorphic, and Field investigations

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The present study pertains to be integrated analysis and interpretations of RS-GIS based techniques, geomorphic, and field investigations to understand the active growth of parts of three adjacent thrust sheets of the Manipur Hills of Indo-Myanmar Range (IMR), namely Nungba, Churachandpur-Mao, and Thoubal-Chandel thrust sheets, (hereafter called NTS, CMTS, and TCTS, respectively) the basal thrusts of which are known as Nungba, Churachandpur-Mao, and Thoubal-Chandel thrusts respectively. A number of landforms, their dispositions, and associations bring out that the basal thrusts of the thrust sheets register active oblique-slip movement. Continued stress build-up has resulted in the development of discontinuous segments of out-of-the-sequence backthrust along the leading edge of the CMTS, and in-sequence footwall imbricate of the Thoubal-Chandel thrust. Analyses of such geomorphic indices as Stream Length Gradient Index (SL), Hypsometric Integral (HI), Basin Asymmetry Factor (AF), and Transverse Topography Symmetry Factor (T) suggest that the extents of activities on these major thrusts are considerably variable along-strike, and also influenced by transverse faults of the region. The SL and HI reveal that the northern part of the trailing edge of NTS is tectonically more active than its southern part as well as the CMTS and TCTS. Spatial distribution of AF and T values suggests overall northward down-tilting of the CMTS, southward down-tilting of the TCTS and northern part of the NTS, and northward down-tilting of the southern part of the NTS. The style of down-tilting of the CMTS and TCTS is ascribed to differential uplift rates along their basal thrusts, whereas the bidirectional down-tilting of the trailing edge of NTS could have been due to cumulative effect of the movement on its basal thrust and active plunging of a fold in the northern part of it. The present study suggests that the growth pattern of even the adjacent fold-trust belts in a growing orogen varies considerably despite the same principal stress regime.

Keywords: RS-GIS, Active Tectonics, Thrust Sheets, IMR