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Tectonics of Out-of-Sequence Thrusting in Higher Himalaya- Example from Jhakri-Chaura-Sarahan Region, Himachal Pradesh

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Abstract : The Out-of-Sequence Thrust (OOST) is a common phenomenon in collisional tectonic settings like the Himalayas. These OOSTs are activated in different locations at different time frames. These OOST are linked with the multiple Himalayan Thrusts. Apart from minimal documentation in geological mapping for OOST, there exists a lack of field data to establish OOST in the field. This work has considered three thrusts from NW Himalaya in Himachal Pradesh with published data from other sources, allowing a re-examination for correlation of OOST. For the Sutlej section, the approach has been to do fieldwork and microstructural studies. The information related to the cross-cut signature of S/C- and relative time relation could help to predict the nature of OOST. The activation timing, along with the basis of identification of OOST in Higher Himalayan, was documented in various literature. Compilation of the Grain Boundary Migration (GBM) associated temperature range (400–750 °C) was documented from microstructural studies along the Jhakri-Chaura section. No such significant temperature variation across thrusts was observed. Strain variation paths using S Λ C angle measurement were carried out along the Jeori-Wangtu transect to distinguish overprinting structures for OOSTs. Near the Chaura Thrust (CT), angular variation of S Λ C was documented, and it varies within a range of 15° - 28 °. Along the NH22 (National Highway, 22), all tectonic units of the orogen are exposed in NW Himalaya, INDIA. But there are inherent difficulties in finding field evidence of OOST, largely due to the lack of adequate surface morphology, including topography and drainage pattern.

Keywords : out-of-sequence thrust (OOST), main central thrust (MCT), south tibetan detachment system (STDS), jhakri thrust (JT), sarahan thrust (ST), chaura thrust (CT), higher himalaya (HH), greater himalayan crystalline (GHC)
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