

## **Tectonic Complexity: Out-of-Sequence Thrusting in the Higher Himalaya of Jhakri-Sarahan region, Himachal Pradesh, India**

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**Abstract :** The study focuses on the tectonics of out-of-sequence thrusting (OOST) in the NW region of the Himalaya, particularly in Himachal Pradesh. The research aims to identify the features and nature of OOST in the field and the associated rock types and lithological boundaries in the field of NW Himalaya, Himachal Pradesh, India. The research employs fieldwork and micro-structure observations, correlations, and analyses to identify and analyze the OOST features and associated rock types. The study reveals the presence of three OOSTs, namely Jhakri Thrust (JT), Sarahan Thrust (ST), and Chaura Thrust (CT), which consist of several branches, some of which are still active. The thrust system exhibits varying internal geometry, including box folds, boudins, scar folds, crenulation cleavages, kink folds, and tension gashes. The CT, which is concealed beneath Jutogh Thrust sheet, represents a steepened downward thrust, while the JT has a western dip and is south-westward verging. The research provides crucial information on the tectonics of OOST in the NW region of the Himalaya, particularly in Himachal Pradesh, which is crucial in understanding the regional geological evolution and associated hazards. The data were collected through fieldwork and micro-structure observations, correlations, and analyses of rock samples. The data were analyzed using tectonic and geochronological techniques to identify the nature and characteristics of OOST. The research addressed the question of identifying Higher Himalayan OOST in the field of NW Himalaya, Himachal Pradesh, India, and the associated rock types and lithological boundaries. The study concludes that there is minimal documentation and a lack of suitable exposure of rocks to generalize the features of OOST in the field in NW Higher Himalaya, Himachal Pradesh. The study recommends more extensive mapping and fieldwork to improve understanding of OOST in the region.

**Keywords :** out-of-sequence thrust (OOST), main central thrust (MCT), jhakri thrust (JT), sarahan thrust (ST), chaura thrust (CT), higher himalaya (HH)

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