

## **Structural geometries of the frontal fracture zone of the northwest Himalayan orogenic belt of Pakistan**

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The Marwat-Khisor and Salt ranges of the northwestern Pakistan depict the most latest and frontal fracture zone of the Himalayan deformation. These ranges define an east-west to northeast bearing fold-thrust belt bordering the outskirts of the Bannu Basin and Potwar Plateau in the south. Imperative structural elements of the Khisor Range are the Paniala, Saiyiduwali, Mir Ali and Khisor anticlines along with a frontal fracture zone in the form of Khisor thrust zone whereas Marwat Anticline construct the key topographic expression of the Marwat Range. All these anticlinal folds are generally asymmetric, overturned exhibiting south facing geometry. Construction of the balanced structural cross sections across the Marwat-Khisor ranges suggest that the structural style is thin-skinned encompassing decollement related thrust-fold assemblages, kinematically related to a regional basal decollement located at the foot of the Jhelum Group rocks. The Marwat Anticline initially developed as a medium amplitude detachment fold. This anticline was later on displaced southward over a non-emergent fault ramp to produce fault bend fold geometry. This episode was followed by a new ramp from the basal decollement in the south, forming fault-bend anticlinal folds in the overlying strata and at last emerged as Khisor Thrust at surface juxtaposing Jhelum Group against the rocks of Siwalik Group creating the latest frontal fracture zone of the northwestern Himalaya.