

Himalayan - Induced Deformation and Kinematics of The Arcuate Nature of The Trans Indus Salt Range, North Pakistan

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The structural elements of the NW Himalayan Pakistan include a chain of arcuate orogenic belts known previously as arcs, oroclines, syntaxis, and re-entrants. One of such belts is the Trans-Indus Salt ranges which is the focus of this study. The Himalaya-induced deformation that has affected the Trans-Indus Salt ranges is distinguished into three distinct episodes including (a) pre-molasse, (b) syn-molasse and (c) post-molasse deformation. The pre-molasse episode of deformation is correlative with the Oligocene unconformity during which the region was eroded down to the level of Eocene in the eastern, up to Triassic in the central and Paleocene in the western Trans-Indus ranges. The syn-molasse deformational episode is interpreted by the gradual south-younging deposition of molasse sediments in the Kohat Basin. The post-molasse deformational episode started in the region at the time when the regional basal detachment underneath the Kohat Basin ramped at the site of Trans Indus Salt range producing the present day frontal ranges. Based on the early paleomagnetic studies conducted in the Surghar Range, it is believed that the arcuate nature of the Trans Indus ranges is in-situ without any significant rotation. The arcuate geometry of the Trans-Indus Salt ranges is probably controlled by preexisting basement irregularities, down to the north basement normal faults and possible strain partitioning. The strain-partitioning may also be caused by synchronous multi directional stresses produced by the oblique subduction of the northwestern indenter of the Indian Plate.