

# **Comparative analysis of the Joint system in the Permian rocks of western and central Khisor Range, Trans-Indus ranges, Pakistan**

**Iftikhar Alam and Abdul Majeed Azhar**

Atomic Energy Minerals Centre, Lahore

This study intends to portray the descriptive and kinematics framework of joint sets observed in the western and central domains of the Khisor Range, Trans-Indus ranges, KPK. Paleozoic to Cenozoic aged rocks exposed in the Khisor Range. The joint system has been studied in the sandstone beds of Chidru Formation in the western and Amb Formation in the central domain of the Permian age Zaluch Group rocks, at different stratigraphic horizons. Two anticlines such as Paniala Anticline in the western domain and Paharwala Anticline in the central domain selected for the desired studies, where Chhidru and Amb formations are dominantly exposed, respectively. Map extension of the joint system observed several meters in length along which there has been imperceptible “pull-apart” movements more or less perpendicular to the fracture surface. T-intersection and X-intersection of joint patterns in the western and central domains observed, respectively. Compressional, tensional and occasionally transitional tension fractures are observed in both flanks. Micro-joints with inconspicuous opening observed on the forelimb of Paniala Anticline in the form of hairline. Some of the non-systematic / random joints are also observed in both domains, which are neither parallel nor perpendicular to the fold axes of both anticlines; they may be induced by restricted fold-related strain. Variant joint orientations observed according to the structural location on a fold and reveal whether a joint forms during the progression of the fold. These anticlinal folds that advanced along simple geometric pathway may evolve synfold-related joint sets, with characteristic structural features such as the orientation and joint density. Most of the joints are systematic but some non-systematic joints are also present, particularly in the western domain. This variation in joint-system reflects the fold growth history and reveals the fluid flow and storage potential of the region as well.