

Evaluation of Late Stress System in the Chamba Valley of Western Himalaya, India

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The Chamba valley is located south of the Higher Himalayan Crystalline, in between the Pir Panjal and Dhauladhar and Higher Himalaya sequences. The Chamba rocks belong to Precambrian upper Palaeozoic sequences. The Chamba sequence consists predominantly of phyllites, quartzo-phyllites, quartzites, slates and metamorphosed limestone with metavolcanics of basaltic and andesitic composition.

The study of the minor structures imprinted on the rocks and their analysis shows that the rocks have been affected by three phases of deformation DF1, DF2 and DF3 respectively. The kink-bands were developed on S_1 cleavage during third and last phase of the DF₃ deformation in the slate/phyllite sequence of Chamba-Bhramaur syncline in the Western Himalaya.

The evaluation of late stress system from kink-bands involves bisecting the angle between the conjugate pairs of kink planes. The direction of the maximum compressive stress σ_1 is taken as the bisectrix of the obtuse angle between the conjugate pair of kink-bands, and the intermediate stress σ_2 direction is as the axis of intersection of conjugate kink-bands. The minimum compressive stress σ_3 is normal to the σ_1 - σ_2 plane, bisecting the acute angle between the conjugate kinks.

The conjugate kink-bands are concentrated around Tarota, Pukhri, Koti, Chamba-Saho road section, Mahela, Gehra and Bhramaur-Harser localities and were analysed separately. We found that the NE-SW compressive stress σ_1 is responsible for their developments in the most of the areas, which corresponds to the principal compressive stress σ_1 of Himalayan orogeny.