INVERSION OF FAULT SLIP DATA FOR PALEOSTRESSES ALONG JHELUM FAULT AND SURROUNDING AREAS, HAZARA KASHMIR SYNTAXIS, PAKISTAN

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Abstract

In northeast Pakistan, the Hazara Kashmir Syntaxis (HKS) marks the northwest termination of Himalayan Arc. The steeply dipping N-S directed Jhelum Fault displaces the lateral continuation of Himalayan structures along the western limb of the Hazara Kashmir Syntaxis. The paleostress orientations were calculated by inversion of brittle fault-slip data at 17 outcrops along the Muzaffarabad-Kohala segment of the Jhelum Fault and surrounding areas. The systematic inversion of overprinted, coated (calcite/quartz) and uncoated striated fault surfaces helped us to constrain the temporal and spatial distribution of paleostress states within the antiformal Hazara Kashmir Syntaxis. The paleostress analysis separates three paleostress tensors. The earlier NE-SW compressional paleostress tensor occurs in the east of the Jhelum Fault. The NE-SW stress tensor formed the northwest trending and southwest verging open to close F_1-folds and southwest directed D_1-faults. The second E-W compressional paleostress tensor is local and overprint the NE-SW paleostress tensor. The Hazara Kashmir Syntaxis initially formed under the E-W compressional stress tensor. The most recent third NW-SE compressional and wrench stress tensor occurs along and hanging wall of the Jhelum Fault. This stress tensor is oblique to the N-S trending Jhelum Fault and perpendicular to the northeast trending and southeast verging open to close F_1-hanging wall folds and southeast directed *D1*-faults. This stress tensor initiated the pure to oblique left lateral sense of shear along the Jhelum Fault and the Main Boundary Thrust. The NE-SW directed earlier paleostress tensor has been reactivated during the present-day seismic activity along the Indus Kohistan Seismic Zone in the Hazara Kashmir Syntaxis. These results imply that regional deformation within the Hazara Kashmir Syntaxis is asymmetric with compressional faulting on the east and transpressional faulting on the west.