Stress and Kinematic Evolution of the Hoping Area, northeastern Taiwan

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Taiwan is an active mountain belt located at the conjunction between the Eurasian Plate and Philippine Sea Plate. Due to the subduction flip and the southwestward propagation of Okinawa Trough, the northeastern Taiwan is also influenced by the back-arc extension, besides convergence. Therefore, the study at NE Taiwan provides insights into understanding the stress, kinematic and structural evolution of mountain building processes.
According to fault slip inversion and cross-cutting relationship on the core examination of 600m metagranite and field observation, the sequence of structure development associated with stress change in Hoping region is identified as: (1) regional foliation and early quartz veins in reverse faulting stress regime with SE-NW compression; (2) pseudotachylyte in normal faulting stress regime; (3) flattened structure; (4) kink in strike-slip faulting stress regime with N-S compression; (5) fault slip in strike-slip faulting stress regime with SE-NW compression; (6) open filling fluid conduits and calcite veins in normal faulting stress regime with NE-SW extension. Synthesizing the structure characteristics associated with stress field, tectonic meanings of each structure in terms of structural evolution in the Hoping region can be interpreted. The stress field of regional foliation is reflective of oblique compression between Eurasian and the Philippine Sea Plates. Pseudotachylite and flattening structure may represent evidence of syn-tectonic extension. SE-NW compression inferred from kink bands may correspond to the back-arc extension of Okinawa Trough but the compression of oblique collision still can not be ruled out. NE-SW extensional environment of normal faulting stress regime is appeared, consistent with in-situ stress assessment. The finding of pattern of kinematic and stress evolution of structural development compatible with focal mechanism results from local seismic network shed lights on evaluating the stress evolution with time.

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