

Mineralogical, micro textural, and K-Ar age dating approaches for a fault in the Yeonghae area

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Yongsan fault in Yeonghae area is the northern part of Yongsan fault line (YFL), and is the east segment of Yeonghae pull-apart-basin formed by sinistral movement of YFL. A combination study of field description and Shape Preferred Orientation(SPO) analysis, and K-Ar age dating analysis for Yeonghae area was performed to define Fault history. The fault in Yeonghae area was initiated between the Paleoproterozoic biotite gneiss and the Cretaceous sedimentary rock. Attitude of the fault plane is N30°E/65°E. The fault zone consists of fault gouge zone, fault cataclasite zone, and fault damage zone, and each appears several times repeatedly within the whole fault width of about 200m. Moreover the most dominant slickensides in the fault zone is close to horizontal, indicating that the strike-slip movement is the main motion of the fault. The structural features occurred in each fault zone, such as fault foliation, grain rotation, shear surface, were interpreted based on field observation, microtextural analysis, and 3D-SPO analysis. The results strongly indicate that Yeonghae fault has been reactivated 6 times in minimum with dextral and sinistral strike-slip motions, which developed the complex architecture of Yeonghae fault. Illite fundamental particle (R1 or R3 illite-smectite interstratified mineral), poorly crystalline illite (1Md), and chlorite are defined as a main authigenic fault clay in extremely fine fraction (<0.1 μ m) by XRD analysis for oriented-mount samples. And K-Ar age dating provide fault activation timings by using Full-Pattern-Fitting(FPF) for random oriented-mount samples.