Development of the Hatagawa Fault Zone clarified by geological and geochronological studies

Tomoyuki Ohtani[1], Tomoaki TOMITA[2], Norio Shigematsu[3], Hidemi Tanaka[4], Koichiro Fujimoto[5], Yoji Kobayashi[6], Yukari Miyashita[7], Kentaro Omura[8]

[1] GSJ, [2] Geoscience Inst., Univ. of Tsukuba, [3] Earth Sci., L'pool Univ., [4] Dept. of Earth and Planet Sci., Univ. Tokyo, [5] AIST, [6] Tsukuba Unv., [7] Active Fault Research Center, GSJ/AIST, [8] NIED

http://staff.aist.go.jp/tomo-ohtani/

The occurrence of fault rocks, mineral assemblage of cataclasite, and K-Ar ages of surrounding granitoids and dikes were described to examine the possibility that the Hatagawa Fault Zone, NE Japan was formed under the brittle-plastic transition zone. The Hatagawa Fault Zone is divided into three structural settings, mylonite zones with a sinistral sense of shear and a maximum width of 1 km, a cataclasite zone with a maximum width of about 100 m, and locally and sporadically developed small-scale shear zones. Occurrence of epidote and chlorite in cataclasite and the coexistence of cataclasite and limestone mylonite suggest that the cataclasite was deformed at the range from 200 to 300 deg.C. The existence of crush zones in mylonite near the cataclasite zone was recognized from one outcrop, and crush zones have the structure which is concordant with the surrounding mylonite and mylonitic foliation in fragments is sometimes bending along the fracture. Aplite veins near the Hatagawa Fault Zone are deformed as well as the host granitic rocks, and granodiorite porphyry dikes intrude into cataclasite and mylonite with a sinistral sense of shear and exhibit no deformational features. K-Ar ages of biotite from one of these aplite veins and hornblende from one of these granodiorite porphyry dikes are 113+-6 and 98.1+-2.5 Ma, respectively. These indicate that the fault activity gradually changed from mylonitization to cataclasis within 23 m.y., and suggest that the Hatagawa Fault Zone experienced the brittle-plastic transition during its activity.