

Fault kinematics along the Itoigawa - Shizuoka Tectonic Line in western Yamanashi

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Fault kinematics of the Itoigawa - Shizuoka Tectonic Line (ISTL) in western Yamanashi is discussed based on structural observations and analyses of fault rocks.

In the eastern foothill area of Mt. Ho-oh, the ISTL forms the boundary between the Kaikoma-Ho-oh granite with an intrusion age of ca 15 Ma on the west and the sediments of the Momonoki Subgroup in the Miocene Koma Group on the east. It strikes NNW in the northern and southern subareas, but NNE in the central subarea, and dips 45-60 degrees toward W. The microstructures of the mylonitized granite near the ISTL indicate reverse faulting toward SE during its mylonitization. Based on the temperatures during its mylonitization inferred from quartz microstructures and c-axis fabrics and the cooling history of the granite pluton inferred from K-Ar ages (Sato et al., 1989), this reverse faulting likely occurred at 12-13 Ma. Cataclasites along the ISTL have structures indicative of sinistral faulting, while gouges along the ISTL show structures indicative of reverse faulting.

In the Hayakawa River area located ca 20 km southward away from the Mt. Ho-oh area, the ISTL forms the boundary between the slates of the Eocene to Miocene Setogawa Group on the west and the volcanoclastic rocks of the Kushigatayama Subgroup in the Miocene Koma Group on the east. It strikes NNW and steeply dips toward W. Asymmetric structures in the Setogawa slates near the ISTL indicate reverse faulting toward ESE during cleavage development at ca 15 Ma and the subsequent sinistral faulting after the cleavage development. Based on the temperatures during these two stages of faulting inferred from vein quartz microstructures and c-axis fabrics and the cooling history of the Setogawa slates inferred from fission-track ages of detrital zircon (Yamagiwa et al., 1997), the reverse faulting likely changed to the sinistral faulting at ca 13 Ma. Cataclasites along the ISTL have structures mostly indicative of sinistral faulting, while gouges along the ISTL show structures mostly indicative of reverse faulting. K-Ar ages of gouges (Tanaka et al., 1997) suggest that this reverse faulting occurred after 7 Ma.

In summary, three stages of faulting along the ISTL are recognized in both areas in western Yamanashi; initial reverse faulting associated with granite mylonitization and slate cleavage development, secondary sinistral faulting associated with the formation of cataclasites, and final reverse faulting associated with the formation of gouges. These three stages of faulting occurred in this sequence, and accordingly the pressure and temperature during faulting decreased. However, the ages described above suggest that the change from the initial reverse faulting to the secondary sinistral faulting occurred ca 1 Ma earlier in the Hayakawa River area than in the Mt. Ho-oh area. This is likely because the collision of the Izu arc with the Hoshu arc started from the south and propagated northward with time.

Keywords: Itoigawa - Shizuoka Tectonic Line, western Yamanashi, fault kinematics