Brittle and ductile textures within Kashio mylonites along the Median Tectonic Line, Urakawa area, Shizuoka, Japan

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In this study, we considered microstructural development of Kashio mylonites in the Urakawa area, Sakuma-cho, Shizuoka, central Japan. Median Tectonic Line (MTL) is the largest fault in Japan, and is the geological boundary between Inner zone and Outer zone. Kashio mylonites occur in Inner zone along the MTL. We collected the Kashio mylonites outcropped in Ohchise-gawa and Shippei-sawa and made thin sections in XZ-plane. These thin sections were observed by optical microscopes and were subsequently analyzed crystallographic orientations by a SEM-EBSD system. Several samples were analyzed to identify mineral phases by XRD. Kashio mylonites showed typical sheared textures consisting of fine-grained matrix and coarse-grained porphyroclasts and were classified into protomylonites, mylonites and ultramylonites. The protomylonites have fine-grained quartz matrix with larger feldspar and amphibole porphyroclasts. Intragranular microfractures locally occur in feldspar porphyroclasts in the fine-grained matrix. The mylonites consisted of dynamically recrystallized fine-grained quartz and feldspar matrix (about 20 micron). Intragranular sheared microfractures occur feldspar porphyroclasts in the fine-grained matrix. One ultramylonite sample consists of very fine-grained matrix of quartz and feldspar with a few large porphyroclasts and is subsequently overprinted by cataclasitic textures. On the other hand, one cataclasite sample consists of mylonite clasts in fine-grained fragments with chlorite infills. Calcite veins occur in all samples, whereas laumontite veins occur in the protomylonites and the cataclasite. The crystallographic orientation analyses show that quartz c-axis fabrics in Kashio mylonites show Y-maxima patterns. It suggests that prism slip promoted in the medium temperature (amphibolite facies) was dominant. Some of the mylonites have quartz c-axis fabrics of weak single and cross girdle patterns in addition to Y-maxima patterns. There quartz c-axis fabrics could result from transition of slip systems from prism to rhomb as well as basal slip promoted in lower temperature (greenschist facies). As a consequence, it suggests that Kashio mylonites in Urakawa area have been developed under the conditions ranging from plastic to brittle regime. This microstructural development in Kashio mylonites during progressive retrogression may be associated with the development of MTL.

Keywords: Median Tectonic Line, Kashio mylonite, Brittle texture, Quartz c-axis fabric

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