[JJ] Evening Poster | S (Solid Earth Sciences) | S-GL Geology

[S-GL31]Regional geology and tectonics

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Sun. May 20, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

The main aim of this session is to discuss geologic structure and tectonic history of East Asia, especially of Japanese Islands, on the basis of the recent results of geology and other earth sciences.

[SGL31-P09]Geometry and evolution of small-scale shear zones developed in the Ryoke Granite in Teshima Island, Seto Inland Sea, SW Japan.

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Small-scale shear zones are developed in the Ryoke older granite, the coarse-grained hornblende-biotite granite, exposed in the south of Teshima Island, Seto Inland Sea, Southwest Japan. Brittle fractures acted as small-scale shear zones precursors because of existence of highly mylonitized quartz veins along the shear zone center. Accordingly, these small-scale shear zones are deformed in the cataclastic–plastic transition regime (Arai et al., 2005). In this study, we estimated the evolutional process of small-scale shear zones based on geometry.

The Ryoke older granite exposed in the island is weakly mylonitized indicating a sinistral shear. The foliations of the mylonites strike ENE–WSW and dip subvertically. The lineations plunge at 0–20° to the northeast. On the other hand, small-scale shear zones indicate a dextral shear. Small-scale shear zones strike WNW–ESE and dip subvertically, that crosscut an older mylonitic foliations striking ENE–WSW. The lineations plunge at 0–30° to the southeast.

Some small-scale shear zones have paired centers of shear which run subparallel to each other. Others develop symmetrical drag pattern of typical dextral shear zone geometry. In some domains, however, the drag pattern can be observed only one side of the shear zone where another side seems to be not sheared. Such "one-side" shear zones are reported within the paired shear zones (Mancktelow and Pennacchioni, 2005) and the fault-like shear zones (Pennacchioni, 2005), though we cannot observe paired shear zones geometry at the "one-side" shear zones in the Teshima Island. The deformation mechanism forming "one-side" shear zones should be solved in future.

Transition of stress field and Tectonics

The Ryoke granite was mylonitized after 93 Ma (Rb–Sr whole rock isochron age; Kagami et al., 1988). Southwest Japan was rotated clockwise through 47° in association with the opening of the Japan Sea in the Miocene time (Hoshi et al., 2015). Prior to the Miocene clockwise rotation, the strike of sinistral mylonitic foliations was NNE–SSW and that of dextral shear zones was NE–SW. This clockwise change of foliation and shear-sense inversion can be explained by the rotation of plate conversion direction at 85 Ma, the Izanagi plate to NNW at 100–85 Ma and the Kula plate to W at 85–74 Ma (Maruyama and Seno, 1986). The Late Cretaceous dextral NW–SE shear zones within the granitic dikes are also reported in the Awaji Island where those shear zones are considered to be influenced by the rotation of the plate convergent direction (Kano and Takagi, 2013).

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