

Paleostress analysis using healed microcracks in the Ryoke granites, southern Chubu District.

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Paleostress analysis using 3-D orientation distribution of healed microcracks (HC) in quartz grains was carried out for the Ryoke granites in the southern Chubu District, central Japan. From the previous microthermometry analyses on the fluid inclusions forming HC in the Ryoke (Toki) granite (Takagi et al., 2008), the healing temperature were estimated about 300-400deg.C near the blocking temperature for the K-Ar system of biotite. The samples analyzed are Busetsu, Inagawa and Obara granites that are distributed between previously analyzed Shinshiro tonalite and Toki granite bodies in which the sigma-3 orientations of HC are very different in both granitic rocks (Aizawa and Takagi, 2008, Takagi et al., 2008). The orientation distributions of HC show two or three maxima nearly orthogonal each other. This orthogonal concentration pattern is probably due to the transposition of principal stress during microcrack formation. To clarify the orthogonal concentration pattern, we used cluster analysis and reconstructed sigma-3 orientations. The angles of sigma-3 orientations with respect to the strike of the Median Tectonic Line (MTL) tend to increase gradually towards the MTL from around 30deg. plus or minus 40deg. in the Toki granite (northernmost) to 83deg. plus or minus 27deg. in the Shinshiro granite (southernmost) near the MTL.

The sigma-Hmax orientations (normal to the sigma-3 orientation on the horizontal plane) intersect the strike of MTL at a distance from the MTL in the Toki and peripheral areas suggest the regional compressive stress field caused by the movement of subducting Pacific Plate at early Paleogene (K-Ar biotite ages for the Toki granite). On the other hand, sigma-Hmax orientations subparallel to the strike of the MTL near the MTL suggest the changes in stress field by the activity of the MTL and/or the influence of the uplift of the high-P/T type Sanbagawa metamorphic terrane underlying the Ryoke terrane by the MTL (Takagi et al., 2008).

References

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