

Strain localization in the Konoyama mylonite zone, SW Japan

MAEDA, Sumire^{1*}, OKUDAIRA, Takamoto²

¹Faculty of Science, Osaka City University, ²Graduate School of Science, Osaka City University

In a shear zone, grain size of minerals gradually decreases towards the center of the shear zone, and fine-grained minerals developed as a localized high-strain zone at the shear zone center. The difference between grain sizes of minerals in the shear zone center and the shear zone margin resulted from the difference in (1) strain rate, (2) stress, and (3) duration of deformation. Therefore, we should clarify which is the most important factor to localize the strain in the shear zone center. However, in general, duration of deformation cannot be estimated by a conventional geochronological analysis. In shear zone rocks, if metamorphic minerals crystallized during shearing are different in different lithologies, the formation temperature of different lithologies would be different. Thus, strain localized with decreasing temperature with time. In this case, the formation period of them would be different.

In the Ryoke metamorphic belt, there are many ductile shear zones with different scale. The Konoyama mylonite zone (e.g., Takagi et al., 1988; Ishii et al., 2007) is one of the shear zones, and developed around Mt. Konoyama, Kishiwada, SW Japan. In the area, deformed granodioritic rocks from protomylonite, through mylonite, to ultramylonite can be observed. In this study, to clarify whether the formation temperature of deformed rocks is different in different lithologies, we analyzed mineral assemblages and mineral chemistry for deformed rocks with different degree of strain magnitude.

We found some interesting observations as follows: (1) There is no chlorite and muscovite in protomylonites and mylonites, but present in ultramylonites; (2) The recrystallized biotite in ultramylonites shows lower Ti and higher Al than those in protomylonites and mylonites, although the difference is small. These observations suggest that the formation temperature of ultramylonites is slightly lower than those of protomylonites and mylonites, and the formation period of ultramylonites and protomylonites/mylonites is different. This implies that strain localization in the Konoyama mylonite zone occurred retrogressively.

Ref: Takagi, H., Mizutani, T. and Hirooka, K. (1988) *Jour. Geol. Soc. Japan*, 94, 869-886; Ishii, K., Kanagawa, K., Shigematsu, N. and Okudaira, T. (2007) *Jour. Struct. Geol.*, 29, 1083-1098

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