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Microscopic analysis of shear-concentrated zone and its surroundings, in the brittle damage zone of the Nobeoka Thrust

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Investigation of the microscopic structures inside the brittle damage zone in the footwall of the Nobeoka Thrust was examined. The Nobeoka Thrust in Kyushu, southwest Japan, is a fossilized out-of-sequence thrust, bounding the northern and southern Shimanto Belts of the Cretaceous-Tertiary accretionary complexes. Microscopic analysis was examined focusing on boudinage, which was one of the most typical structures in the study area. Boudinage is the disruption of layers, bodies or foliation planes within a rock mass in response to bulk extension along the envelope surface(Goscombe et al.,2003).

Coefficiency ratios of viscosity for the black shale and brown silt rock were calculated, using Smith(1977)'s equation. Viscosity was smaller for black shale than for brown silt rock, and the difference was greater inside the shear-concentrated area than the surrounding area.

XRD and EPMA analysis was performed for black shale and brown silt rock, and both results show that the conversion of smectite into illite occurred more strongly in the black shale than in brown silt.

The results indicate the relationship between the viscosity coefficient and the procession of diagenesis in clay minerals. The difference of viscosity was greater in the shear-concentrated area. However, the details of how viscosity and procession of diagenesis are related, are still unclear, and investigation from further analysis such as with XRD is necessary.

Keywords: Nobeoka Thrust, boudin, viscosity ratio