

Modification of thermal structure of the Ryoke metamorphic belt by ductile shear movement in the Takago area, Nagano Prefecture

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Mylonite zone derived from older Ryoke granitoids and metamorphic rocks extends along the Median Tectonic Line (MTL) with thickness of 500-1000m from central Kii Peninsula to Chubu Region in the Ryoke belt. The stretching lineation of mylonitic rocks is nearly horizontal to plunging to the east (north) at shallow angles except to the north of Takato where plunging angle is moderate to high. These high plunging angles brought about relative uplift of the inner (western) side of

the Ryoke belt with respect to the outer (eastern) side (Nagahama and Takagi, 1985). Mylonitization postdate the peak metamorphism of the Ryoke belt and thus it probably modified original thermal structure of the Ryoke belt. To evaluate this modification, we observed 228 XZ thin sections of pelitic metamorphic rocks in the Takato area and determined mineral assemblages. The samples influenced by contact metamorphic overprint by intrusion of Takato granite are excluded. From the mineral assemblage, metamorphic grade was divided into biotite, cordierite, sillimanite and garnet-sillimanite zones from west to east (MTL). Each isograd extends approximately NE-SW oblique to

the N-S trending MTL, however, each isograd protrudes westward at the Gatsuzoyama area to the north of Takato. Comparing to this protruded isograd and regional general trend of the isograd, this protrusion brought about one-rank higher grade at the Gatsuzoyama area.

The estimation of P-T condition of each isograd using those of the Ryoke belt in the Yanai area, the one rank difference between the cordierite zone and sillimanite zone is about 100C and 1kb, that suggests the difference in

depth about 3.5 km. From this relative difference in uplift and average plunging angle around the Gatsuzoyama area, the net slip of the whole mylonite zone can be estimated as 4.3 km. This estimation is included in the range of the displacement (0.6-6km) estimated by the thickness-displacement relationship (Nakamura and Nagahama, 1992) using the data of total thickness 600m of the mylonite zone in the study area.