

Timing of regional metamorphism in the Hida Belt and Unazuki area

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The Hida Belt is one of crucial sites for deciphering the Permo-Triassic orogeny in East Asia and is important for discussing the eastern extension of the Triassic continental collision between North and South China Cratons in the Japanese Islands. The Hida Belt consists of granitoids and metamorphic complex which consists mainly of paragneisses, orthogneisses, amphibolite and marble with multiple episodes of metamorphism evident, as based on petrography. However, the timing and duration of the regional metamorphism is still controversial, because radiometric ages mainly determined by Rb-Sr and K-Ar methods are scattered from 240 Ma to 220 Ma. The Unazuki area, situated at the northeastern part of the Hida Belt, has experienced the kyanite-sillimanite type metamorphism characterized by a clockwise P-T path. Radiometric ages of the Unazuki schists, previously determined by Rb-Sr and K-Ar methods, are scattered from 248 Ma to 175 Ma primarily because of multi-phase metamorphism and deformation. In this study, U-Pb zircon geochronology was applied to Hida gneiss in the Kagasawa area and the Unazuki schists to discuss about timing of the regional metamorphism in the Hida Belt and the Unazuki area.

Zircon grains of the Hida gneiss sample are rounded to well-rounded in habit. Cathodoluminescence images of zircon revealed that overgrowth rim surrounds oscillatory zoning core. The oscillatory zoning core yielded ca. 251 +/- 2 Ma. U-Pb age of the overgrowth rim with low Th/U ratio is ca. 247 +/- 1 Ma, which suggests that the regional metamorphism started between 251 and 247 Ma in the Kagasawa area.

On the other hand, in the Unazuki area, U-Pb data of quartzo-feldspathic schist derived from felsic volcanics yield an eruption age of 258 +/- 2 Ma, indicating that regional metamorphism occurred after 258 Ma. U-Pb age of a granite in north part of the Unazuki area is 253 +/- 1 Ma. The granite contains some xenoliths of the Unazuki schist, in which staurolite is replaced by andalusite and cordierite due to thermal flux from granitic magma. Therefore, regional metamorphism occurred between 258 and 253 Ma, suggesting a rapid metamorphic progression. 251 +/- 1 Ma of gneissose quartz diorite containing the Unazuki schists supports the timing of the regional metamorphism.

Keywords: zircon, U-Pb, Hida Belt, Unazuki, SHRIMP