

Timing and duration of granulite- to amphibolites-facies metamorphism in Hida metamorphic complex, southwest Japan

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Deciphering the pressure–temperature–time evolution of metamorphic terrain provides fundamental information understanding many tectonic processes. The Hida metamorphic complex, situated at the northern part of southwestern Japan, consists of granulite- to amphibolites-facies metamorphic rocks and Permo-Triassic granitoids, and is an important geological unit for discussion about crustal evolution at continental margin. In this study, zircon U–Pb geochronology was applied to the Hida gneisses affected by granulite-facies metamorphism and the Unazuki metamorphic rocks affected by amphibolites-facies metamorphism to discuss the timing and the duration of regional metamorphism.

Zircon grains collected from the Hida gneisses have a dark CL response mantle and a bright CL response rim around igneous zoning core. The youngest age population of the igneous zoning core is 251 ± 1 Ma, whereas the mantle yielded 247 ± 1 Ma, suggesting a rapid progression from igneous activity to regional granulite-facies metamorphism.

U–Pb data of Unazuki quartzo-feldspathic schist derived from felsic volcanics yield an eruption age of 258 ± 2 Ma, whereas those of a granite intruding the schist is 253 ± 1 Ma, indicating that regional amphibolites-facies metamorphism occurred between 258 Ma and 253 Ma and a rapid metamorphic progression. Further work is needed to confirm this rapidity of crustal-thickening process.