

Tectono-metamorphic evolution of the Kurosegawa tectonic belt in Southwest Japan

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The Kurosegawa tectonic belt distributed in Southwest Japan (from Kii peninsula to Kyushu) has a significant role in understanding the tectonics and formation of Japanese Island. The belt is underlain by a serpentinite melange with complicated tectonic block assemblage of granitic rocks, high-temperature (HT)-type metamorphic rocks (metagabbros: Grt-Cpx granulite, Grt amphibolite and Cpx-bearing amphibolite, metapelites: Grt-Crd-St gneiss and Grt-Bt gneiss) and high-pressure (HP)-type metamorphic rocks (metagabbros: Jd-Gln rock, Gln-bearing metagabbro, metabasalt: Lws-Gln schist, metasediments: Phn-Gln+/-Lws schist and Grt-bearing quartzite).

The granitic rocks and the protoliths of the HT-type metagabbros are supposed to be derived from volcanic arc at an active continental margin based on their major, trace, and rare earth element (REE) chemistry. On the other hand, geochemistry of the protoliths of the HP-type metagabbro and metabasalt indicate mid oceanic ridge basalt (MORB)-like precursors. The LA-ICP-MS U-Pb zircon dating of granitic rocks (collected from Nabaenohana, Anan, Mitaki and Yatsushiro areas) gave the Upper Ordovician magmatic ages of ca.450 Ma with the older inherited core ages of 570-3090 Ma. The U-Pb ages of the HT-type gabbros (from Nabaenohana and Yatsushiro areas) have similar magmatic age ranging ca. 439, 446 and 453 Ma concordant clusters. The HP-type gabbros (from Engyoji and Yatsushiro areas) show the igneous age of the Late Cambrian (ca. 490 Ma). The detrital U-Pb zircon ages from the HP-type metasediments (from Anan and Yatsushiro areas) range from 430 to 3000 Ma, therefore the sedimentation would be finalized after Silurian. The Rb-Sr isochron ages for the Lws-Gln schist (typical HP-type blue schist) gave 300-270 Ma, which may indicate the age of HP-type metamorphism. These results show that the Cambrian oceanic magmatic sequence (protoliths of the HP-type gabbros and basalts) covered by Silurian pelagic sediments (protoliths of the HP-type metasediments) subducted to the already existed palaeo-Asian continent and formed an active margin arc system during the Upper Ordovician. The protoliths of the HT-type gabbros and the granitic rocks would be situated in the lower crustal portion and the upper crustal portion of the arc system, respectively. The similar assemblages are present in the South-Kitakami belt and the Nagato tectonic belt suggesting similarities in their origin.

Keywords: U-Pb zircon dating, granitic rocks, HT-metagabbro, HP-metagabbro, Kurosegawa tectonic belt