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Tectonic evolution of the Kurosegawa tectonic zone with relation to the multiple collisions in East Asia

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In the collision boundary between the North and the South China blocks (e.g. north Dabie terrane, Imjingang belt), various kinds of Permo-Triassic collision zone metamorphic rocks are identified. The Higo metamorphic complex as well as the Hida-Oki terrane in Japan would also have belonged to this type of collision zone and which experienced a top-to-the-south displacement with forming a regional nappe structure before the Cretaceous granitic activities. The Kurosegawa tectonic zone in SW Japan is characterized by the serpentinite melange with various kind of blocks and lenses of metamorphic, plutonic and sedimentary rocks (e.g. Hada et al., 1979; Maruyama, 1981). The metamorphic rocks are Cambrian HP-granulite and amphibolite, Permo-Triassic granulite and gneiss and Triassic LTHP metamorphic rocks. The origin and related evolution process of the Kurosegawa tectonic zone have been considered by many authors, such as (1) paleo-microcontinent (e.g. Maruyama et al., 1984; Yoshikura et al., 1990; Miyamoto et al., 2000), (2) klippe (nappe) derived from Inner Zone of SW Japan (e.g. Isozaki and Itaya, 1991; Izozaki et al., 2010), (3) left-lateral strike-slip movement along the eastern margin of Asian continent with relation to the older rocks in Inner Zone of SW Japan (e.g. Tazawa, 1993; Yamakita and Ohtou, 2000), and (4) transform fault in relation with Izanagi-Kura ridge (Kato and Saka, 2003). Even though it would be able to explain the tectonic evolution of the Kurosegawa tectonic zone through these ideas, there are still remaining problems that why various kinds of metamorphic and plutonic rocks are mixed up in the unique serpentinite melange zone with having different metamorphic features and ages.

The newly determined geochemical characters of the LTHP metamorphic rocks from the Kurosegawa tectonic zone (from Kyushu to Kii-peninsula) analyzed by very precise techniques indicate that the precursors of blueschists and jadeite-glaucophane rocks are clearly classified into N-, E-, T-MORBs and OIB. LA-ICP-MS U-Pb zircon dating from the intercalated pelitic schists within the glaucophane schists show 520-480 Ma (Grt-Phn-Chl schist) and 490-430 Ma (Phn-Chl schist) as the detritus ages, in where inherited core ages of 1850 Ma and 2350 Ma are also determined. Therefore this LTHP metamorphism of the Kurosegawa tectonic zone is thought to be a later event after the Siluro- Ordovician zircon formation. Metamorphic age of 269 Ma is also defined by the Rb-Sr whole rock isochron method using 14 blueschits that having different chemical affinities. An Sm-Nd whole rock isochron for the Kurosegawa blueschits shows ca. 804 Ma, which may indicate the original magmatic activity and show some relations to the Yangtze-Cathaysia continental collision inside in the South China block. Palaeoproterozoic inherited ages also suggest that the precursors of the LTHP metamorphic rocks in the Kurosegawa tectonic zone would be derived from the South China block. Late Permian metamorphic age indicates that the main metamorphism of LTHP conditions took place during the continental collision between the North and the South China blocks slightly before the final continental collision at Triassic time (220-230 Ma).

In the presentation during the 2012 JpGU meeting, the authors will also present the tectonic evolution of the Kurosegawa tectonic zone and other LTHP metamorphic rocks in the Inner Zone of the SW Japan.

Keywords: Kurosegawa, geochemistry, U-Pb dating, collision tectonics, E-Asia