

Timing of metamorphic events in the Wannai and Highland Complexes, Sri Lanka

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The high-grade metamorphic rocks distributed in Sri Lanka record the amalgamation history of Gondwana supercontinent at the location of its center (e.g. Meert, 2003). Therefore, Sri Lankan metamorphic rocks play an important role to reveal the process of Gondwana assembly. Due to the geological importance, numerous geological, petrological and geochronological works have been carried out for the metamorphic rocks in Sri Lanka (e.g. Cooray, 1994). Generally, these rocks are divided into three lithological units of Wannai Complex (WC), Highland Complex (HC) and Vijayan Complex (VC) on the basis of constituent rock types, metamorphic grade and Nd model ages (e.g. Kröner et al., 1991; Kehelpannala, 1997). The WC is mainly composed of amphibolite- to granulite-facies, intermediate to felsic orthogneisses with Nd model ages of *ca.* 1.0–2.0 Ga, while the HC consists of granulite-facies metamorphosed supracrustal rocks and charnockites of which Nd model ages are between *ca.* 2.2 Ga and 3.4 Ga. The basements of the VC are intermediate to felsic orthogneisses associated with amphibolite-facies mineral assemblage and Nd model ages of *ca.* 1.0–2.0 Ga. These metamorphic complexes have been considered to assemble together at ~550 Ma (e.g. Cooray, 1994). Recent geochronological studies of zircon U-Pb dating by spot analyses also provided metamorphic ages of *ca.* 660–550 Ma from high-grade metamorphic rocks in the WC and HC (e.g. Dharmapriya et al., 2016). However, the geochronological studies in the WC and HC are mostly limited at their central parts that correspond to the zone ultra-high temperature metamorphic rocks occur in Sri Lanka. It suggests the necessity of expanding zircon U-Pb dating analyses more wide areas of the WC and HC to understand more clearly the timings of their metamorphic events.

This study conducted LA-ICP-MS zircon U-Pb dating for 45 high-grade metamorphic rocks collected from northeastern to southwestern via center parts of the WC and HC. As a result, the metamorphic ages of *ca.* 650–500 Ma are obtained from most of analyzed samples without depending on rock type and metamorphic grade. However, age populations of the metamorphic ages are different with depending on sample localities. In the southwestern parts and other parts of the WC and HC, metamorphic ages of *ca.* 550–500 Ma and 650–550 Ma are predominant, respectively. The former is consistent with the area strongly affected post-tectonic igneous and fluid activities such as discordant granitoid intrusions and graphite veins. On the other hand, the ages of the latter may be related with the syn-tectonic assembly period of the WC, HC and VC. The petrographic observation and internal textures of dated zircons combined with deformational history and zircon chronology from the VC can give a sight to interpret 650–550 Ma ages more detail. It will be discussed in the presentation.

References

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