

LA-ICP-MS Zircon U-Pb ages for metamorphic rocks from the Highland and Wannai Complexes, Sri Lanka.

*Ippei Kitano¹, Yasuhito Osanai², Nobuhiko Nakano², Tatsuro Adachi²

1. Graduate School of Integrated Sciences for Global Society, Kyushu University, 2. Faculty of Social and Cultural Studies, Kyushu University

Sri Lanka has been considered to locate inside the collision zone during amalgamation of Gondwana supercontinent (e.g. Meert, 2003). Therefore, Sri Lanka plays an important role to elucidate the process of amalgamation of the Gondwana supercontinent. However, the origin, tectonic evolution and even lithological divisions of Sri Lankan metamorphic rocks are still unclear, although many petrological and geochronological works have been carried out previously. One of the reasons is the shortage of reported zircon U-Pb ages which provide us some information about protolith formation and metamorphism. This study reports LA-ICP-MS zircon U-Pb ages from 45 metamorphic rocks in the high-grade complexes (Highland and Wannai Complexes), and reconsiders about the lithological boundary between these complexes and their origin.

On the Basis of rock type, metamorphic grade and Nd model ages, the metamorphic rocks in Sri Lanka are subdivided into three major crustal units (e.g. Cooray, 1994), which are Wannai Complex (WC), Highland Complex (HC) and Vijayan Complex (VC). The HC is composed of interlayered granulites including charnockite, pelitic to psammitic gneiss, marble, quartzite and mafic granulite with Nd model ages of *ca.* 2.0-3.0 Ga. On the other hand, the WC consists of amphibolite to granulite-facies, banded orthogneiss, charnockite, pelitic to psammitic gneiss, migmatite and minor quartzite, calcsilicate rocks with Nd model ages of *ca.* 1.0-2.0 Ga.

Geochronologically, the HC and WC are clearly characterized by > *ca.* 1500 Ma of detrital zircon ages with *ca.* 2000-1800 Ma of protolith (igneous) ages and *ca.* 1100-700 Ma of detrital zircon ages with *ca.* 1100-800 Ma of protolith ages, respectively. The age differences between them strongly indicate that their origins are different. Therefore, considering with zircon ages, rock distributions, the direction of metamorphic foliations and geography, the boundary between the HC and WC are reconsidered. Additionally, metamorphic ages of *ca.* 650-500 Ma are widely recognized from the HC and WC. The age distributions of metamorphic ages can be broadly divided into three age peaks of *ca.* 650-600 Ma, *ca.* 600-550 Ma and *ca.* 550-500 Ma. It may imply three metamorphic events for metamorphic rocks in the HC and WC. In view of field occurrence, petrography and areal distribution, *ca.* 550-500 Ma of metamorphic ages may be related with post-tectonic events (igneous and fluid activities). Although the lack of petrological evidences, *ca.* 650-600 Ma and *ca.* 600-550 Ma of metamorphic ages may be related with collision events among the HC, WC and VC. Finally, based on the detrital zircon ages and protolith ages, the HC and WC are clearly comparable with Trivandrum Block (TB) and Southern Madurai Block (SMB) in southern India, respectively. This suggests the possibilities of same origin between HC and TB, and WC and SMB.

Keywords: LA-ICP-MS zircon U-Pb age, Highland Complex, Wannai Complex, Sri Lanka, Gondwana supercontinent