ハイランド岩体およびリュツォ・ホルム岩体の砕屑性ジルコン年代：スリランカと東南極の関連性に対する示唆

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Detrital zircon geochronology of the Highland and Lützow-Holm Complexes: Implications for the regional correlation of Sri Lanka and East Antarctica

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Neoproterozoic-Cambrian high-grade metamorphic rocks exposed in Sri Lanka and East Antarctica have been regarded as important materials for unraveling the processes of ocean closure and continent-continent collision during Gondwana amalgamation. The Highland Complex (HC), Sri Lanka, and the Lützow-Holm Complex (LHC), East Antarctica, are considered to have been juxtaposed and developed as a depositional basin before the final collision (Shiraishi et al., 1994). In the recent studies, the HC has been proposed as a suture zone formed by double-sided subduction during Neoproterozoic based on petrological and geochronological data of meta-igneous rocks (e.g. Santosh et al., 2014; He et al., 2016). Similar subduction-related features and Early Neoproterozoic magmatic ages have been reported from meta-igneous rocks in the LHC, based on which it is suggested that the HC and the LHC possibly developed under similar subduction-related setting during Early Neoproterozoic (e.g. Tsunogae et al., 2015; Kazami et al., 2016). However, the LHC also have unique features different from the HC; (i) increase of metamorphic grade from amphibolite-facies in the northeast to granulite-facies in the southwest, (ii) remnants of Neoarchean (ca. 2500 Ma) magmatic arcs occur adjacent to Neoproterozoic terranes. In order to further evaluate Sri Lanka-Antarctica correlation, detailed geological, petrological, and geochronological investigations on the two complexes are necessary.

Geochronological investigations of detrital zircon and comparison of their age spectra with those of adjacent terranes are common approaches to understand the evolution of orogen and crust, and continent reconstruction. Although some geochronological data suggesting Archean to Paleoproterozoic (ca. 3200-1800 Ma) and Neoproterozoic (ca. 1000-700 Ma) ages have been published from the HC and the LHC (e.g. Kröner et al., 1987; Shiraishi et al., 1994; Dharmapriya et al., 2016), they may not be sufficient to compare the age spectra of the HC and the LHC, and to precisely constrain the provenances of the complexes. In this study, we report new geochronological data on detrital zircons in metasediments from the HC and the LHC, and compare the age spectra of detrital zircons for unraveling the correlation of Sri Lanka and East Antarctica.

The detrital zircon cores from the HC samples show predominant Neoarchean to Paleoproterozoic (ca. 2700-1700 Ma) and minor Neoproterozoic (ca. 800-600 Ma) ages (Takamura et al., 2016), which is consistent with the results of previous studies. We also found very minor Paleoarchean (ca. 3500 Ma) and Mesoproterozoic (ca. 1200 Ma) zircon grains that have not been reported in previous studies. Neoarchean to Paleoproterozoic detrital zircons are considered to have been supplied from old cratons amalgamated at latest Neoproterozoic, for example, the Congo-Tanzania-Bangweulu Block in East Africa or the Dharwar craton, southern India. Neoproterozoic detrital zircons also can be sourced from magmatic suites of the adjacent Wanni, Vijayan and Kadugannawa Complexes, Sri Lanka. The age spectra of the HC are similar to those of the northern Madurai Block, and potentially the Trivandrum Block, southern India (e.g. Plavsa et al., 2014) suggesting strong correlation between the HC and southern Indian terranes.

The detrital zircons from the southwestern part of the LHC in the Lützow-Holm Bay area (Austhovde and Skallevikshalsen) show predominant Neoarchean to early Paleoproterozoic ages (ca. 2700-2400 Ma), that is similar with the results of previous study (e.g. Shiraishi et al., 1994). In contrast, the detrital zircon cores in metasediments from the northeastern part of the LHC along the Prince Olav Coast (Tenmondai Rock and Akarui Point), show predominant Neoproterozoic (ca. 1000-700 Ma) and very minor Paleoproterozoic (ca. 2000, 1600 Ma) ages, obviously different from the southwestern part of the complex. Previous studies (e.g. Shiraishi et al., 1994, 2003) reported Neoarchean to early Paleoproterozoic ages of some detrital zircons from the southwestern part of LHC, which is consistent with the results of this study. However, they also reported middle to late Paleoproterozoic and Neoproterozoic ages from the southwestern LHC that is not found in our study. On the other hand, previous studies reported Neoproterozoic detrital zircon ages from a part of the northeastern LHC, consistent with the results of this study. The older components could have been derived from Archean to

Paleoproterozoic provenances similar to those of the HC, whereas Neoproterozoic detrital zircons are considered to have been sourced from arc-related magmatic terranes in the LHC (e.g. Tsunogae et al., 2015; Kazami et al., 2016). These results suggest that southwestern and northeastern parts of the LHC might be discrete crustal blocks and amalgamated before the latest Neoproterozoic to Cambrian collisional events, or the two metasedimentary groups deposited at different age, metamorphosed together, eroded in different degrees and simply exposed together by chance.

Although the southwestern part of the LHC can be correlated with the HC because of their Archean to Paleoproterozoic and Neoproterozoic detrital zircons, only small amount of Paleoproterozoic and Neoproterozoic detrital zircons have been shown in previous studies, therefore the southwestern LHC and the HC can be potentially derived from different major provenances each other. In addition, those from the northeastern LHC have unique age spectra different from the HC. Regional correlation of the HC and the LHC should be re-investigated based on the new data.

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