

Geochemical comparison of eastern and western meta-igneous rocks from Lützow-Holm Complex, East Antarctica

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Lützow-Holm complex (LHC) distributes in eastern part of Dronning Maud Land (DML), East Antarctica. The rocks of LHC yield isotopic ages from 500Ma to 2500Ma (Shiraishi et al.,1994). The rocks around 500Ma relate to the tectonic framework of Gondwana super continent. On the other hand, other older rocks may be significant existence to the early super continents (e.g. Rodinia:1000Ma, Nuna:1900Ma). In this study, we select the meta-igneous rocks from Akebono Rock, Langhovde and Rundvågshetta as representative older rocks to compare the difference of geochemical features in eastern and western parts of LHC.

Akebono Rock is mainly composed of psammitic- or pelitic-gneisses, orthogneiss, amphibolite, and syn- or post-metamorphic granitic intrusions (Motoyoshi et al.,1986). Awata et al. (2018) reported petrological features of the orthogneiss and the amphibolite. The orthogneiss is classified into three lithologies under the petrography: Hbl-Bt meta-tonalite, Bt-Hbl meta-tonalite, and Bt meta-tonalite. The Hbl-Bt meta-tonalite is geochemically categorized to adakitic rock derived from low-K oceanic slab melting. The Bt-Hbl meta-tonalite has a similar geochemical compositions to low-K arc-type rhyolites erupted in juvenile arc setting. The Bt meta-tonalite shows almost the same geochemical characteristics to ocean ridge granitoids. On the other hand, Amphibolite is geologically distinguishable to Amphibolite I and Amphibolite II. The amphibolite I is layered member of the bedrock exposure parallel with the psammitic- or pelitic-gneisses, while amphibolite II occurs as dikes discordant to the bedrock stratigraphy. The both are geochemically resemble to the rocks of island-arc tholeiitic basalt or MORB. Igneous activities of the meta-igneous rocks from Akebono Rock were probably considered as follows. The amphibolites were formed as basaltic sediments or dikes. The Hbl-Bt meta-tonalite would be correspond to an adakitic intrusion, while the Bt-Hbl meta-tonalite caused as low-K arc-type felsic magmatism in juvenile arc setting. On the other hand, the Bt meta-tonalite might be occur as an ocean ridge granitoids with a partial melting of the subducted oceanic ridge. They would be good references of juvenile arc constituents originally.

Langhovde and Rundvågshetta distribute in western part of LHC. Langhovde is mainly composed of pyroxene gneiss, garnet-biotite gneiss, garnet bearing granitic gneiss and garnet gneiss. Rundvågshetta consists of high-grade metamorphic rocks including pyroxene gneiss (charnockite) and garnet-biotite gneiss (Ishikawa et al.,1976). In the present study, we compare the geochemical compositions of the meta-igneous rocks in Akebono Rock with those from Langhovde and Rundvågshetta.

References

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