

Protolith of orthogneiss and amphibolite in Akebono Rock, Prince Olav Coast, East Antarctica

*Hikari Awata¹, Atsushi Kamei¹, Tomokazu Hokada², Sotaro Baba³, Ippei Kitano⁴, Davaa-ochir Dashbaatar⁵, Nugroho Setiawan⁶, Prayath Nantasin⁷, Yoichi Motoyoshi²

1. Shimane University, 2. National Institute of Polar Research, 3. University of the Ryukyus, 4. Kyushu University, 5. Mongolian University of Science and Technology, 6. Gadjah Mada University, 7. Kasetsart University

Akebono Rock distributes in eastern part of Prince Olav Coast, East Antarctica. It is classified as a member of Lützow-Holm complex. Many workers had reported many important informations to investigate the tectonic framework of Gondwana supercontinent based mainly on the studies of metamorphic rocks from 550 to 520 Ma. However, the genetic information of the protolith before the Gondwana amalgamation has been hardly elucidated yet. This study reports some petrological and geochemical informations of the orthogneiss and amphibolite from the Akebono Rock used for a representative analogue to discuss about the protolith of the Lützow-Holm complex.

Akebono Rock mainly consists of psammitic- or pelitic-gneisses, orthogneiss, amphibolite, and syn- or post-metamorphic granitic intrusions. The 58th party of the Japanese Antarctic Research Expedition (JARE58) collected 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. The Bt meta-tonalite shows almost the same geochemical characteristics to ocean ridge granitoids.

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 those of island-arc tholeiitic basalt or MORB.

Igneous history of the above investigated rocks of 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 accompanying an oceanic ridge subduction, 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. The meta-tonalites and amphibolites would be good references of juvenile arc constituents originally.

Keywords: meta-tonalite, amphibolite, juvenile arc, Antarctica