Paleomagnetic study of the Cape-Hinode block in the Lutzow-Holm Complex, East Antarctica

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Although East Antarctica had been considered to have behaved as a single craton in the period from the break-up of Rodinia to the formation of Gondwana supercontinent, tectonic blocks with different movements have been suggested in East Antarctica recently. The Lutzow-Holm Complex (LHC), extending in the coastal region between longitudes 39 and 45E in East Antarctica, is a metamorphic belt of amphibolite to granulite facies. The LHC provides geochronological data of about 500 Ma, indicating that the LHC had suffered the Pan-African orogenic event related to the amalgamation of Gondwana members. Previous paleomagnetic data from the LHC has supported the amalgamation event.

In Cape Hinode area (42.7E, 68.1S), metamorphic rocks of granulite facies exist, whereas amphibolite facies metamorphic rocks are exposing in the surrounding areas. SHRIMP zircon ages of about 1.0 Ga were reported from the metamorphic rocks in Cape Hinode area, and there are no evidence for ˜500 Ma event in zircons in the rocks. Cape Hinode area has been thus regarded as an extraneous block (called Cape-Hinode block (CHB) in this study) in the Lutzow-Holm Complex. In order to investigate tectonic relationships between the LHC and CHB, paleomagnetic researches were performed on rock samples collected from metamorphic rocks and intrusive rocks (granites, pegmatites and mafic dikes) in Cape Hinode area. Adding to the SHRIMP zircon ages, K-Ar and Ar-Ar mineral ages of 530-480 Ma were reported from the metamorphic rocks and pegmatites.

Progressive demagnetization analyses provided characteristic remanent magnetic components (ChRMs) carried by magnetite from the metamorphic rocks and ChRMs carried by magnetite and/or hematite from the granites and mafic dikes. Dominant directions of the ChRMs from the metamorphic rocks were similar to directions of ChRMs from the granites and mafic dikes and paleomagnetic directions from the LHC. It is inferred that the ChRMs of the CHB isolated in this study might have been acquired at around 500 Ma, and that the CHB might have belonged to the LHC at that time.