Paleomagnetic study of the Proterozoic Rayner and Archaean Napier complexes in Enderby Land, East Antarctica

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The East Antarctic continent is a large Precambrian shield composed of Archaean cratons and Proterozoic to early Cambrian mobile belts separating the cratons, and one of key continents in the formation history of supercontinents. The East Antarctic continent, accompanied by Australia and India, formed East Gondwanaland (EG), which has been considered to have acted as a coherent unit through the breakup of Rodinia and subsequent formation of Gondwanaland in the period between about 1000 Ma and 500 Ma. Bedrock exposures between longitudes 40^{o}E and 55^{o}E along the coast are divided into the following three complexes, the Lutzow-Holm Complex (LHC), Rayner Complex (RC) and Napier Complex (NC). The LHC consists of metamorphic rocks of amphibolite to granulite facies, and a mobile belt related to the Pan-African orogeny at about 500 Ma. The RC consists of granulite-facies metamorphic rocks and a mobile belt where the major metamorphic event occurred at about 1000 Ma. A metamorphic event at about 500 Ma has been also suggested for the RC. The NC is an Archaen craton and consists of granulite-facies metamorphic rocks. The NC experienced high-grade metamorphism at about 2900 and 2400 Ma and shearing/fracturing at about 1000 Ma related to the deformation/metamorphism of the RC. In order to obtain paleomagnetic information for clarifying tectonic movements of the East Antarctic continent in the formation process of supercontinents, paleomagntic samplings were performed at 20 sites in 10 bedrock exposures of the RC and NC between longitudes 46^{o}E and 50^{o}E in Enderby Land. A total of 84 block samples of gneisses, granites and mafic dikes were collected.

Progressive demagnetization results indicate that many samples have one or two stable magnetic components isolated at the demagnetization levels above 200^{o}C. Some VGPs of the high-stability (HS) components observed generally between 500^{o}C and 580^{o}C from the RC samples are situated near the segment of the APWP of EG between 700 and 1000 Ma. VGPs of the HS components from the NC samples are apart from the APWPS of EG and scattered. Some VGPs of the intermediate-stability (IS) components between 200^{o}C and 500^{o}C from the RC samples are close to 500 Ma paleomagnetic poles of East Gondwanaland, and there are VGPs of the IS components from the NC samples close to those of the HS components from the RC. The possibility of overprints related to tectonic events of the LC and RC might have been inferred.