Metamorphic rocks from Chijire Rocks in the eastern part of the Prince Olav Coast, East Antarctica

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The Lützow-Holm complex, East Antarctica, predominates the area from the eastern part of Droning Maud Land (35°E) to the western part of Enderby Land (45°E) and is the Ediacaran-Cambrian mobile belt (Hiroi et al., 1991; Shiraishi et al., 1994; 2003). The Japanese Antarctic Research Expedition (JARE) surveyed this complex and compiled 27 geological maps. However, numerous small exposures have not been explored, and their geological constituents are unresolved. The geological survey team of the 63rd JARE (2021-2022) conducted a geological survey of unknown outcrops of the Lützow-Holm complex and outcrops that have not been surveyed in recent years. We will introduce the geological overview, characteristics of constituent lithology, and metamorphic conditions of the unexplored Chijire Rocks.

The Chijire Rocks are located about 160 km west of Syowa Station. Two rock exposures are distributed to the east and west of the small glacier. In this survey, we investigated small exposure in the west, about 1km east-west, and about 0.5 km north-south. Basement rocks show an isoclinic structure with a northwest-southeast trend and dip to the south at 65-80 degrees. Structurally from lower to upper levels: biotite-garnet gneiss, hornblende-garnet gneiss/amphibolite, biotite-garnet gneiss, layered gneisses, hornblende-biotite gneiss are recognized, and are intruded by pegmatite and minor basalt. Layered gneisses consist of alternating layers of large garnet-bearing amphibolite, garnet-gedrite/anthophyllite gneiss, garnet-biotite gneiss, and felsic gneisses, which develop a layered structure well. The Garnet-biotite-sillimanite gneiss was found in the biotite-garnet gneiss close to the boundary between layered gneisses and biotite-garnet gneiss. Since this rock contains staurolite, it is beneficial for estimating metamorphism's temperature and pressure conditions. We selected significant rocks from each lithofacies and clarified their mineral and chemical compositions.

This presentation discusses the differences in the precursor rocks of these gneisses inferred from the mineral chemical composition. In addition, we compare the chemical composition and occurrence of the staurolite with those of the neighboring outcrops and consider the difference in formation conditions.

References

Hiroi, Y., Shiraishi, K., Motoyoshi, Y., Late Proterozoic paired metamorphic complexes in East Antarctica, with special reference to the tectonic significance of ultramafic rocks. In: Thomson, M.R.A., Crame, J.A., Thomson, J.W. (Eds.), Geological Evolution of Antarctica. Cambridge University Press, pp. 83–87, 1991.

Shiraishi, K., Ellis, D.J., Hiroi, Y., Fanning, C.M., Motoyoshi, Y. Nakai, Y., Cambrian orogenic belt in east Antarctica and Sri Lanka: implications for Gondwana assembly. J. Geol. 102, 47–65, 1994.

Shiraishi, K., Hokada, T., Fanning, C.M., Misawa, K., Motoyoshi, Y., 2003. Timing of thermal events in eastern Dronning Maud Land, East Antarctica. Polar Geosci. 16, 2003.