

## 東南極プリンス・オラフ海岸，あけぼの岩の変成作用

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### Metamorphism in Akebono Rock, Prince Olav Coast, East Antarctica.

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The Lützow-Holm Complex (LHC) situated along the coastal line from the Prince Olav Coast to the Lützow-Holm Bay, East Antarctica, is a amphibolite to granulite-facies metamorphic terrane (Motoyoshi et al., 1989; Hiroi et al., 1991). The LHC characterized by 1) an increase in metamorphic grade progressively towards the southwest, 2) clockwise metamorphic P-T paths associated with kyanite relics, 3) SHRIMP U-Pb zircon age of 550–520 Ma, and 4) ultrahigh-temperature metamorphism in the highest grade regions (Hiroi et al., 1991; Shiraishi et al., 1994, 1997; Motoyoshi & Ishikawa, 1997; Yoshimura et al., 2008). Recently, numerous zircon U-Pb age dating have been conducted. Dunkley et al. (2014) have proposed the terrane divisions of the LHC based on the detritus zircon age results. Furthermore, basement rocks of the Cape Hinode and the Kasumi rock in the Prince Olav Coast only recorded protolith and metamorphic ages of 1020–984 Ma and of 1007–937 Ma respectively. The age of 550–520 Ma have not been detected (Shiraishi et al., 1997; Motoyoshi et al., 2004; Tsunogae et al., 2015). An evaluation of an evolutionary process of the LHC based on the new insight warranted in future. JARE-58 geology group have conducted a field survey to reveal a geological features between 1000 Ma terrane (e.g. Cape Hinode) and its adjacent regions.

Akebono rock (68°05'–68°06'S, 42°54'–43°00') is located near the central part of the Prince Olav Coast, about 12km northeast from the Cape Hinode. Basement rocks in the Akebono rock consist of a layered gneisses, amphibolite, migmatite granite and pegmatite, and associated with recrystallized mafic dyke. Western part of this area was characterized by appearances of garnet-bearing leucogranite (S-type) and pegmatite, large garnet porphyroblast (up to 3cm)-bearing amphibolite, and of the shear zone (Hiroi et al., 1986). We have obtained following information about metamorphic and deformation process.

- Large garnet porphyroblast in the amphibolite have S-shaped inclusion trails in the core and Z-shaped inclusion trails in the rims. The garnet preserved a compositional zoning with decrease in Mn and Ca, and increase in Mg and Fe towards rim. Presence of shearing during an early stage of metamorphism is evident.

- Kyanite-bearing garnet-biotite gneiss also contains a garnet which have a normal growth zonings. Kyanite is in matrix and no sillimanite is recognized in this sample. The equilibrium P–T conditions of 650 – 700°C and 8 kbar for the peak of metamorphism were obtained using experimentally calibrated geothermobarometers based on the systems Grt–Bt and Grt–Ky–Pl–Qtz. The condition is consistent with the stability field of kyanite.

- In the western part of the Akebono Rock, the garnet porphyroblast was replaced by secondary biotite and muscovite. They form asymmetric fabrics that indicate a dextral shear.

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