

第 52 次地質隊リュツォ・ホルム岩体調査報告

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Geological fieldwork of the Lützow-Holm Complex by JARE-52 geology party

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We report the summary of field geological survey on metamorphic and associated intrusive rocks in the Lützow-Holm Complex, East Antarctica, which underwent regional high-grade metamorphism probably related to the amalgamation of Gondwana Supercontinent during Late Neoproterozoic to Early Cambrian. The fieldwork has been carried out as a part of JARE-52 summer operation around Showa Station during the period of 23rd of December 2010 to 18th of February 2011 with the support of SHIRASE and JARE helicopters as well as icebreaker SHIRASE. We totally spent 50 days in the field and visited 20 locations that include Skallevikshalsen, Kjuka, Skallen, Berodden, Telen, Sudare Rocks, Rundvågshetta, Vesleknausen, West Ongul, East Ongul and Langhovde along Soya Coast, Futatu-iwa (Cape Karamete), Innhovde and Austhovde in the western margin of Lützow-Holm Bay, and Niban Rock, Kasumi Rock, Tenmondai Rock, Akarui Point, Oku-iwa Rock, and Cape Tama in Prince Olav Coast (Figure 1). Among the locations mentioned above, so far no detailed study has been done on some localities such as Sudare Rocks, Vesleknausen and Cape Tama. Below we summarize brief geological and petrological characters of representative localities.

Detailed fieldwork and rock sampling have been done on the high-grade metamorphic region of the Lützow-Holm Complex around Skallevikshalsen and Rundvågshetta. Various metasedimentary and metavolcanic rocks that underwent peak metamorphism of $T \sim 900^{\circ}\text{C}$ occur in Skallevikshalsen. Some ultramafic granulites contain garnet + clinopyroxene + quartz assemblage, which suggests prograde high-pressure ($P > 14$ kbar) metamorphism probably along a clockwise P - T history. The boundary between marble and pelitic granulite in this area shows spectacular metasomatic reaction textures useful for detailed studies on the role of fluid and/or melt related to high-grade metamorphism. Lithological and structural patterns of Sudare Rocks, located southwest of Skallevikshalsen, are principally similar to those in Skallevikshalsen. Rundvågshetta region along the thermal peak of the complex contains pelitic granulites with some typical UHT mineral assemblages such as sapphirine + quartz and orthopyroxene + sillimanite + quartz as reported in previous studies. Our preliminary fluid inclusion study suggests that CO_2 -rich fluid played an important role on the stability of such UHT assemblages. Some post-tectonic intrusive rocks were also collected from the locality. Vesleknausen located immediately southwest of Rundvågshetta exposes charnockite, biotite gneiss, mafic-ultramafic granulites and amphibolite with post-tectonic pegmatite intrusions. The pseudosection analysis of Vesleknausen charnockite demonstrated that the thermal peak of this locality is about 800 - 900°C . Amphibolite- to lower granulite-facies equivalents of such high-grade rocks were collected from several localities in Prince Olav Coast. Our ongoing petrological, geochronological and geochemical studies on the Lützow-Holm Complex would provide new data useful for better understanding of the extreme crustal metamorphism and tectono-thermal evolution of the complex as well as the regional correlation of Gondwana suture zones.

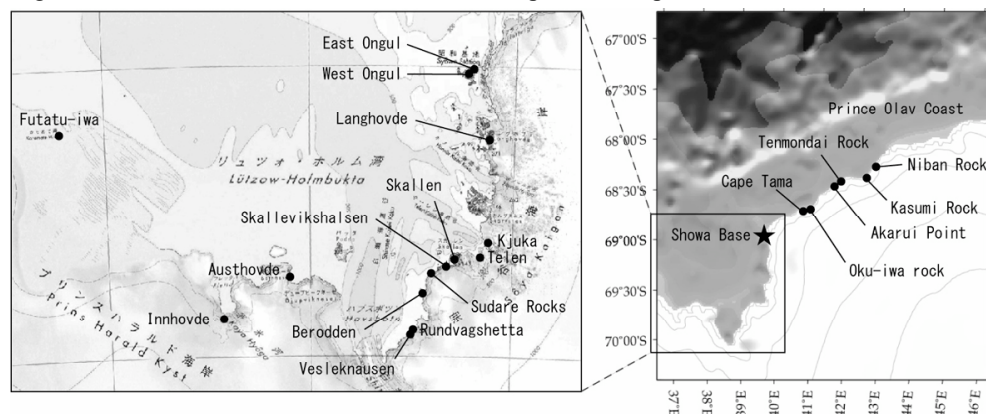


Figure 1. Location map of the study areas.