南極、アウストホブデ産のエクロジャイト的な塩基性グラニュライトに見いだされたグランディディエライト

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Grandidierite newly found in eclogitic basic granulite from Austhovde, Lützow-Holm Complex, East Antarctica

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Boron minerals are in the spotlight as they illustrate the relationship between increasing mineral diversity and crustal evolution (Grew, 2017; Grew et al., 2017). We found a tiny grain of grandidierite, $(Mg,Fe)_3O_2(BO_3)SiO_4$, in a felsite inclusion in garnet in eclogitic basic granulite (Sp. 84012223) from Austhovde, East Antarctica (Figs. 1 and 2; Table 1). The granulite consists mainly of garnet and clinopyroxene with lesser amounts of orthopyroxene, hornblende, plagioclase, ilmenite, and magnetite. Quartz is commonly present as inclusions in garnet, but rare in the matrix. Garnet is rich in inclusions, and partially replaced by symplectitic intergrowths of orthopyroxene and plagioclase, suggesting decompression at high temperatures. Felsite-nanogranite inclusions are generally granitic in composition but highly variable in mineral assemblage and texture. They sometimes contain orthopyroxene and dendritic quartz crystals. As far as we are aware (Grew et al., 2017), this is the first report of grandidierite from basic granulite.

今、ホウ素 (B) を含む鉱物は「鉱物進化説」で注目されている (Grew, 2017; Grew et al., 2017)。この度、我々はアウストホブデ産のエクロジャイト的な塩基性グラニュライト (Sp. 84012223) にグランディディエライトが産出することを確認した。このグランディディエライトはざくろ石中の「珪長岩包有物」に伴われるもので、母岩の部分融解時に形成されたものと考えられる。これまでグランディディエライトが塩基性変成岩に産出することは知られていないため、これが最初の報告である。

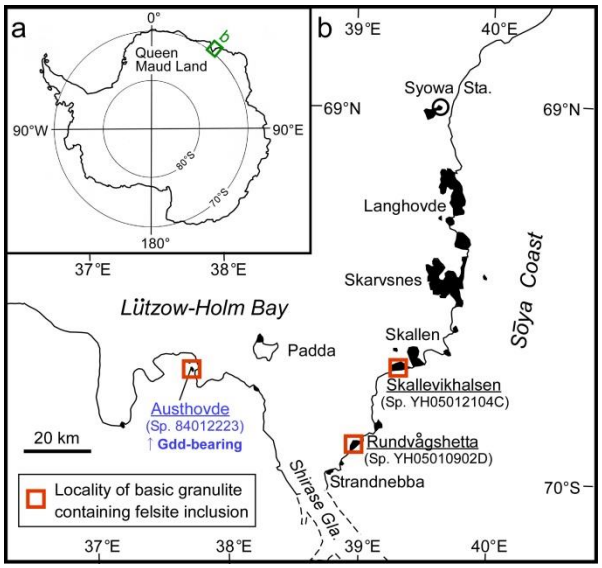

Figure 1. Map of Lützow-Holm Bay area, showing the locality of basic granulite containing felsite inclusions. Grandidierite occurs in Sp. 84012223 from Austhovde.

Table 1 EPMA analysis of grandidierite

SiO_2	Al_2O_3	Cr_2O_3	FeO*	MnO	MgO	total
21.28	50.31	0.06	10.04	0.19	7.05	88.93

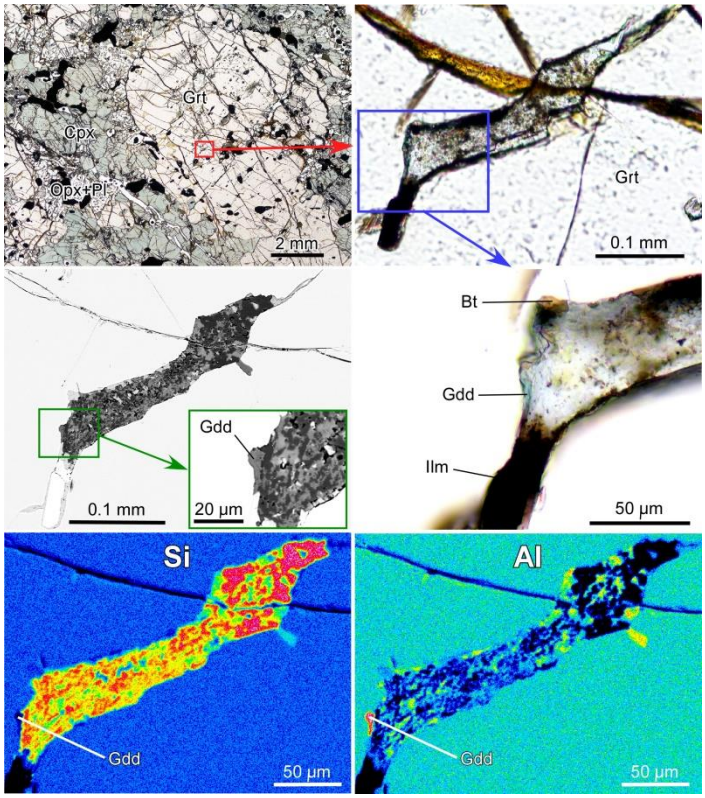

Figure 2. Photomicrograhs, backscattered electron images, and elemental maps of basic granulite (Sp. 84012223) from Austhovde, showing the mode of occurrence of felsite inclusion and grandidierite. Abundance increases from blue to green to yellow to red.

References

Grew, E.S., Boron: from cosmic scarcity to 300 minerals, Elements, 13, 225-229, 2017.

Grew, E.S., Hystad, G., Hazen, R.M., Krivovichev, S.V. and Gorelova, L.A., How many boron minerals occur in Earth's upper crust? American Mineralogist, 102, 1573-1587, 2017.