ポスト・ゴンドワナ衝突期に活動した High-K アダカイト：東南極、セール・ロンダーネ山地，ベンゲン花崗岩の例

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High-K adakite in post-Gondwana collisional stage: an example of the Vengen Granite, Sør Rondane Mountains, East Antarctica

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The Sør Rondane Mountains, located in the eastern Dronning Maud Land, East Antarctica, consists of amphibolite to granulite facies metamorphic rocks and various intrusive rocks (Shiraishi et al., 1997). The early Paleozoic granites are generated during the late- to post-collisional stages as a result of continental collision between the West and East Gondwana would be believed to occur before 620 Ma (Shiraishi et al., 2008; Osanai et al., 2013; Owada et al., 2013). The space-time distribution of igneous activities and their petrogenesis would provide us useful information of geodynamic evolution of a continent-continent collision zone.

The Vengen Granite, one of early Paleozoic granitic rocks, is forming the “Kanino-tume Peak”, the southern end the Vengen ridge of the Sør Rondane Mountains, East Antarctica (Shiraishi et al., 1997). The Vengen Granite is mainly composed of medium-grained mylonitic biotite granite, and intruded into the Main Shear Zone and Kanino-tume Shear Zone. The low-angle cataclasite zone exists in this granitic body. The melamocratic and leucocratic fine-grained two-mica granite dykes are intruded into the Vengen Granite. Part of leucocratic dykes is folded. These dykes have has mylonitic foliation parallel to that of the Vengen Granite. The Vengen Granite is also intruded by quartz veins. Elburg et al. (2016) reported a zircon age of 551 ± 8 Ma by using LA-ICP-MS from this granite.

The Vengen Granite is composed of quartz, K-feldspar, plagioclase, biotite with trace amounts of titanite, allanite, apatite, zircon and opaques as accessory minerals. Parts of rocks contain muscovite. K-feldspar and plagioclase are porphyroclast, up to 12mm in diameter. These porphyroclasts are embedded in smaller biotite, plagioclase, K-feldspar, quartz and accessory minerals. These matrix minerals are up to 2.3mm in diameter. Parts of quartz grains indicate ribbon shape. There are asymmetric pressure shadows in some rocks

SiO_2 contents of the Vengen Granite range from 66.5 to 73.0wt.%. The Vengen Granite indicates much higher K_2O (5.0 - 7.6 wt.%), Ba (1937 - 3288 ppm), Pb (27 - 54 ppm), Rb (142 - 292 ppm), Sr (722 - 1192ppm), Th (24 - 58 ppm), Zr (271 - 448 ppm) contents, and much lower CaO (0.72 - 1.86 wt.%) contents than that of the meta-tonalite (Nils Larsen Tonalite) (Kamei et al., 2013 ; Elburg et al., 2016). The Vengen Granite is plotted on the volcanic arc and syn-collisional granite fields in Rb-(Y+Nb) and Nb-Y tectonic discrimination diagrams (Pearce et al., 1984). The Vengen Granite indicates high Sr/Y ratio (36.1 - 71.5), is plotted on the adakite and Archean high-Al TTGs field in (Sr/Y) -Y diagram. Chondrite-normalized REE patterns of the Vengen Granite are enriched in light REE (LREE) and depleted in heavy REE (HREE). The Vengen Granite do not show Eu anomaly. These patterns similar to that of calc-alkaline meta-tonalite of the Nils Larsen Tonalite corresponding with adakite (Kamei et al., 2013). Model εSr and εNd values of the Vengen Granite calculated by 551Ma are 5.6 to 8.6 and -2.3 to -1.1. These values are in that of the tholeiitic meta-tonalite (Kamei et al., 2013).

The Vengen Granite is characterized by high Sr contents and Sr/Y ratios, and corresponds with adakite in Sr/Y-Y diagram. But, this granite indicates high K_2O, Ba, Rb, Zr contents, which are higher than those of common adakite derived from oceanic

slab melting (Martin et al., 2005). The Vengen Granite has high K_2O/Na_2O ratio (1.22 - 1.62 and 3.00) corresponding with adakite derived from lower crust melting (Kamei et al., 2013). Such adakites, which were originated by melting of thickened lower crust, have low MgO, Cr, Co, Ni contents and high Th contents (Xu et al., 2002; Wang et al., 2005; Zhang et al., 2006). Thus, source magma of the Vengen Granite was produced by partial melting in lower parts of thicken continental crust after collision of the West and East Gondwana (Osanai et al., 2013). The source material had isotopic composition similar to the tholeiitic meta-tonalite.

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