

## 東南極セール・ロンダーネ山地に分布する変トータル岩の岩石学

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### Petrology of meta-tonalite in the Sør Rondane Mountains, East Antarctica

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Proterozoic meta-tonalite named the Nils Larsen intrusion is widely distributed in the Sør Rondane Mountains of East Antarctica. The meta-tonalite mainly dominates Nils Larsenfjellet, Widerøefjellet, Walnumfjellet, and Lunckeryggen in the southwestern part of the Sør Rondane Mountains. Pioneering workers reports some important information; 1) the exposed area is fixed on the geological map; 2) the rocks are mainly gneissose meta-tonalite; 3) isotopic dating yields an age of 956-920Ma; 4) geochemical features are similar to those of Archean tonalite-trondhjemite-granodiorite (TTG) (e.g., VanAutenboer1964; Takahashi et al., 1990; Shiraishi et al., 1992, 2008; Osanai et al., 1996; Ikeda and Shiraishi, 1998). Therefore, the first petrogenetic model of the Nils Larsen intrusion was concluded that the meta-tonalite composes a huge single batholith and was derived from a partial melting of oceanic crust in the timing of the Grenvillian.

The field party of the 50th Japanese Antarctic Research Expedition performed a detailed geological survey of the Nils Larsen intrusion. The meta-tonalite is accompanying various other plutonic rocks such as granodiorite, quartz-diorite, and gabbro. Sometimes, they are mingled with each other. Moreover, lithofacies of the meta-tonalite lack unity over the studied mountains. These evidences lead us to the consideration that the rocks in the Nils Larsen intrusion are not derived from a single TTG magma, and they comprise a complex intrusion. The petrological features and their petrogeneses should be reconsidered.

The rocks in the Nils Larsen intrusion are largely divided into two types on the basis of the degree of mylonitic deformation. The first is a gneissose meta-tonalite with many elongated mafic enclaves. This is the main lithotype in the Nils Larsenfjellet, the Widerøefjellet, and the Walnumfjellet. The gneissose tonalite has geochemical features of volcanic arc granitoid with low-K tholeiite, and not TTG. It is quite likely that the gneissose meta-tonalite was generated as a component of juvenile continental crust in oceanic-island arc setting. The intrusive age of the meta-tonalite would be ca. 956Ma (Takahashi et al., 1990). The second is massive plutonic rocks, but weak mylonitic deformation can be recognized under the micro scope. This type is widely distributed in the Lunckeryggen, and locally crops out in the southeastern end of the Walnumfjellet and the northern part of the Nils Larsenfjellet. In the Lunckeryggen, meta-tonalite is dominant, but minor meta-gabbros occupy the southern part. The both are poor in mafic enclaves. The meta-tonalite is lithologically similar to those of the Walnumfjellet. However, meta-tonalite in the Nils Larsenfjellet is mingled with granodiorite and quartz-diorite. The all rocks of the massive type correspond chemically to those of calc-alkaline TTG. In the Lunckeryggen, the meta-tonalite yields an age of ca. 703Ma by Rb-Sr whole rock isochron method, moreover the meta-gabbro shows an age of ca. 868Ma by Sm-Nd whole rock isochron method. They would be the timing of slab-melting. Therefore, these massive rocks may be indicators of the tectonic event of ridge subduction against the juvenile continental crust in oceanic-island arc setting.

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