

## **Early Neoproterozoic igneous suites of the western Sør Rondane Mountains (East Antarctica): Evolution to juvenile oceanic-arc crust**

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Evolution and amalgamation of a juvenile oceanic-arc crust should be an important to understand the formation of continental crust. The Sør Rondane Mountains, eastern Dronning Maud Land, East Antarctica, are situated within the Pan-African suture zone, between West and East Gondwana, and the timing of collision event is regarded as the late Neoproterozoic to early Cambrian. The metamorphosed gabbro-tonalite-trondhjemite complex (GTT) is exposed in the southwestern part of the mountains. GTT consists mainly of tonalite associated with gabbro, occurring as magmatic enclaves and later dikes that have intruded both the host and magmatic enclaves. The tonalite is dominant over roughly 100 x 20 km area in the southwestern part of the mountain range and is classified into gneissose tonalite and weakly foliated tonalite. The gneissose tonalite is the main lithotype widely distributed over this area, which is geochemically categorized as low-K tholeiitic granitoid. Petrological studies suggest that the most plausible tectonic setting is a juvenile oceanic arc. The weakly foliated tonalite are scattered as stocks in this area and is geochemically regarded as calc-alkaline rocks. U-Pb SHRIMP zircon ages of tholeiitic granitoid are concentrated at 998 to 995 Ma, whereas the calc-alkaline rocks are younger ages 945 to 935 Ma. The trondhjemite occurs as a stock with weakly foliated lithofacies. It geochemically shows calc-alkaline signature and is 945 Ma similar to the weakly foliated tonalite. The gabbro is geochemically divided into three types; low-Ti, high-Ti tholeiite types and low-Ti calc-alkaline types. The zircon U-Pb ages show c. 990 Ma for the low-Ti tholeiite type and 950-930 Ma for the high-Ti tholeiite and low-Ti calc-alkaline types. These ages are similar to those of relationship between low-K tholeiite tonalite and calc-alkali tonalite including trondhjemite, respectively. Moreover, the geochemical features of the low-Ti tholeiitic gabbro resemble those of an oceanic-arc tholeiite, whereas the high-Ti gabbro has features of a back-arc basalt. Considering geochemical signatures combined with U-Pb zircon ages, the older and younger intrusive suites show a juvenile oceanic-arc crust and an evolved volcanic-arc crust with back-arc spreading, respectively. In other words, GTT of the western Sør Rondane Mountains represents Early Neoproterozoic crustal evolution under the tectonic framework of the arc-related subduction system.