

Zircon geochronology and geochemistry of tonalitic gneiss at an unnamed nunatak in western part of the Napier Complex, East Antarctica

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The Napier Complex in East Antarctica has attracted considerable interest from a viewpoint of long Archaean crustal history from 3800 Ma to 2500 Ma and >1000°C ultrahigh-temperature (UHT) metamorphism in a regional scale. It is quite important to confirm the reported early Archaean crustal ages to make more detailed discussion about the Archaean crustal history of the Napier Complex. In addition, the timing of ultrahigh-temperature metamorphism is in argument either >2550 Ma or <2480 Ma. In this study, a tonalitic gneiss (170219-1A-05) was analyzed by a sensitive high resolution ion-microprobe (SHRIMP-IIe) at the National Institute of Polar Research, Japan. The sample was collected at an unnamed nunatak located between Mt. McMater and Mt. Riiser-Larsen during the field work at the 2016-2017 Japanese Antarctic Research Expedition. Geological and geochronological reports of the unnamed nunatak are absence and this study is first geochronological report.

Most zircon grains collected from the sample have rounded habits and are typically >200 µm in size. Some grains show irregular shapes but most grains have crystal face. The dark cathodoluminescence-response domains contain mineral inclusions such as quartz, K-feldspar, albite, K-feldspar, ilmenite, and rutile, whereas the minerals inclusions are absence in the bright CL-response domains. Thirty-seven U–Pb zircon analyses were performed on 37 grains. U–Pb data of the zircons are scattered from 3388 to 2469 Ma and show several age peaks centered at 3225, 3175, 3144, 2910, 2800, 2572, and 2485 Ma. The components of the youngest age peak showed Th/U ratios lower than 0.1, which suggests that the last crystal growth occurred at ca. 2485 Ma regional UHT metamorphism. Further geochemical information such as trace element concentrations including rare earth elements will be demonstrated.