

U-Pb zircon geochronology in the Napier Complex, East Antarctica: Data from Mt. Reed, Mt. MacMaster, and an unnamed nunatak (0219-1 Nunatak)

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The Napier Complex, East Antarctica, has attracted many scientists as a region that has both evidence of ultrahigh-temperature (UHT) metamorphism (Harley, 2016, and references therein) and long Archean crustal history from 3800 Ma to 2500 Ma (e.g., Harley & Black 1997). The protoliths of the metamorphic rocks contain evidence of the Archean continental crusts. The previous studies reported Hadean to Eoarchean signatures from Mt. Sones and Gage Ridge regions (e.g., Black et al., 1986), and for others, the possibility of the early Archean crust. Some previous studies reported old zircon ages of >3800-3600 Ma from the Fyfe Hills and Mt. Cronus regions in the western part of the Napier Complex (e.g., Compston and Williams, 1982), whereas 3000 Ma or younger protolith ages were also reported from the same regions (Horie et al., 2012). It suggests the importance of confirming the distribution of the early Archean ages and the protolith age to promote a discussion about the Archean crustal history in the Napier Complex.

To obtain new insights from geochronological data, we focused on several outcrops in the Napier Complex and analyzed the tonalitic gneisses using a sensitive high-resolution ion-microprobe (SHRIMP IIe) at the National Institute of Polar Research, Japan. The samples were collected at Mt. Reed, Mt. MacMaster, and an unnamed nunatak (0219-1 Nunatak) between Mt. MacMaster and Mt. Riiser-Larsen during the fieldwork at the 58th Japanese Antarctic Research Expedition.

In the case of a tonalitic gneiss from the unnamed nunatak, the 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 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. The older components show the protolith ages. On the other hand, in the case of a tonalitic gneiss from Mt. Reed and Mt. MacMaster, U-Pb data of the zircons are scattered from 2858 to 2344 Ma and from 2985 to 2462 Ma. In this presentation, further geochronological data and interpretation will be demonstrated.