

東南極レイナー岩体西部地域における U-Pb 年代測定

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U-Pb geochronology in western part of the Rayner Complex, East Antarctica

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The Rayner Complex in East Antarctica was initially defined by Kamenev (1972) to include coastal outcrops and minor inland nunataks in western Enderby Land and Kemp Land adjacent to the Napier Complex and further east into MacRobertson Land where amphibolite-granulite-facies metamorphism occurred at ~900 Ma (e.g., Sheraton et al., 1987). Shiraishi et al. (1997) reported that western coastal region of this Complex contains younger zircons (537–522 Ma) and monazites (~500Ma) than inland region (~1320–760 Ma), and this western coastal region is later defined as Western Rayner Complex (Shiraishi et al., 2008). However, the boundary and the mutual relationship between the main Rayner Complex and the Western Rayner Complex is still remained ambiguity.

U-Pb isotopic analyses of zircon were performed for Mt. Yuzhnaya, Condon Hills, and Mt. Lira using a Sensitive High Resolution Ion Microprobe (SHRIMP II) at National Institute of Polar Research. The studied samples were collected during the field work at the 2004-2005 Japanese Antarctic Research Expedition. 3 garnet-biotite gneisses were collected from Mt. Yuzhnaya and Mt. Lira, respectively. 2 garnet-biotite gneisses and quartzite were collected from Condon Hills.

U-Pb age data of three gneiss samples from Mt. Yuzhnaya are scattered from 572 to 2462 Ma. The gneiss samples show continuous age population ranging from 860–1030 Ma and older inheritances centered at ca. 1940 Ma and ca. 2181 Ma. Two gneiss samples are characterized by young age population at around 580 Ma and lower Th/U ratios. The other gneiss sample does not contain zircons of ca. 580 Ma, and shows the youngest age peak of 890 Ma. Three gneiss samples from Condon Hills contain inheritance older than 2500 Ma. The oldest zircon ages are over 3600 Ma. Main age population of Condon Hills samples are centered at ca. 2073 Ma, ca. 1934 Ma, and ca. 1878 Ma. Overgrowth rim with low Th/U ratio yields a weighted mean ²⁰⁶Pb/²³⁸U age of 894 ± 2Ma (95% confidence).

Based on these newly obtained zircon data, we could suggest the following points:

- (1) The ca.1000~860 Ma Rayner metamorphic event is commonly recorded in these areas.
- (2) The presence of common magmatic 2200–1940 Ma zircons in all analyzed samples suggests that the area share the common history after the supply of sediments with these age materials.
- (3) Neoproterozoic ~580 Ma age event, which is relatively older than the previously reported 530–520 Ma ages, is obtained only in two samples from Mt. Yuzhnaya and is typically lacked in Condon Hills samples.
- (4) Archean inherited (>2500 Ma) zircon is only found from Condon Hills.

These lines of geochronological evidences combined with the petrographical data can constrain the geologic evolution of Proterozoic-Cambrian boundary region of this part of Antarctica.

References

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