Consistent occurrence of moderately elevated $\delta^{18}O$ magmas in Acasta gneiss complex from 4.0 to 3.5 Ga.

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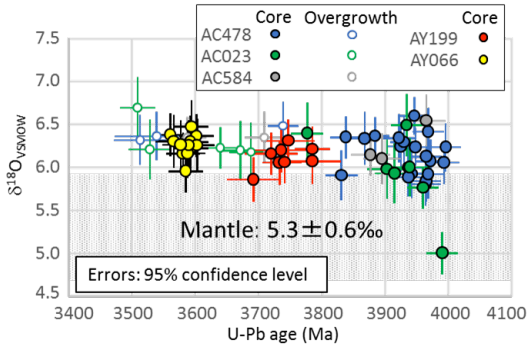
Oxygen isotope ratios of zircons from 5 felsic gneisses (ca. 4.0 to 3.5 Ga) of the Acasta Gneiss Complex (AGC) [1] were measured with an ion microprobe, CAMECA IMS 1280-HR at Kochi Institute, JAMSTEC. A new kimberlite zircon standard: KC-KLV-Zrc1 from Kaalvallei, South Africa ($d^{18}O$=5.43±0.14‰ VSMOW, 2SD, laser fluorination) was used as a running standard for SIMS analysis.

The 4.0 to 3.5 Ga AGC zircons consistently have moderately elevated $d^{18}O$ values (6.0 to 6.8‰) with a few exceptions having mantle-like $d^{18}O$ values (Figure). No low $d^{18}O$ (<4.7‰) zircon (e.g., phase II in [2]) was recognized in our samples, indicating that production of low $d^{18}O$ magma was not major igneous process in this area after ca. 4.0 Ga.

Constant $d^{18}O$ values of AGC zircons for 500 Myr, with a narrower range than Jack Hills detrital zircons ($d^{18}O$=4.7 to 7.5‰ [3]) or zircons from SW Greenland (mostly mantle-like or lower $d^{18}O$ values [4]), indicate that uncontaminated primitive magma in this region and time period was limited and that recycling of pre-existing crust with a small contribution of aqueous alteration products has consistently occurred after ca. 4.0 Ga.



[1] Iizuka *et al*. (2007) *Precam. Res.* **153**, 179-208. [2] Reimink *et al*. (2014) *Nat. Geosci.* **7**, 529-533. [3] Cavosie et al. (2005) *EPSL* **235**, 663-681. [4] Hiess et al. (2011) *Contrib. Mineral. Pet.* **161**, 1027-1050.