Zircon O-Li isotopic constraints on the origins of the Cretaceous low-$\delta^{18}O$ Nianzishan granite, NE China

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Mesozoic A-type granites are widely distributed in eastern China. One of the most salient features is that some of the granites have been defined as low-$\delta^{18}O$ granites and are attributed to a reworking or recycling of oceanic or continent crust [1-3]. Our *in-situ* SIMS O-Li isotopes of zircon provide new insights on the petrogenesis and evolution of the Nianzishan low-$\delta^{18}O$ A-type granite in E. China.

The Nianzishan pluton is a peralkaline A-type granite with A_1 affinity. The rock was emplaced at *ca* 119 Ma and is characterized by $\delta^{18}O$ zircon values of 4.6 – 4.9‰. The Nianzishan pluton shows a limited range of whole-rock $\delta^{7}Li$ (1.6 to 3.1‰) with Li abundances range from 37 – 51 ppm. Large and euhedral zircons in situ analysis have a weighted average $\delta^{7}Li$ of 0.7 ± 1.7 ‰. Both whole-rock and zircon *in situ* Li isotopes indicates little involvement of fluids or hydrothermal alteration before/during the granites formation. Our results illustrate the $\delta^{18}O_{(zrc)}$ variation with increasing fractionation. The anhydrous nature of the A_1-type granites confined the crystallization of biotite and hornblende, while low f_{O2} fugacity is responsible for insufficient precipitation of magnetite which should both drive the later differentiates towards relatively O^{18}-depletion. Therefore, we suggest a ferrogabbro-type fractional crystallization may played a major role in producing the chemical variations of the Nianzishan A-type granite and accounts for ~0.5‰ ^{18}O-depletion.

[1] Wei *et al* (2002). *Geology* 30(4):375-378.[2] Valley (2003) *Rev Mineral Geochem*. 53:343-385. [3] Wei *et al* (2008) *Chem Geol*, 250 (1-4):1-15.