

100 Ma magmatism in the Jiamusi Block, NE China: an indication for lithospheric extension driven by Paleo-Pacific roll-back

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The Jiamusi Block of NE China is located in the eastern part of the CAOB between the North China and Siberia cratons [1]. In the early Mesozoic, it collided with the Songliao Block to the west as a circum-pacific accreted block, formed the unified Eurasian eastern boundary [2]. In the late Mesozoic to Cenozoic, huge amounts of igneous rocks were produced caused by back-arc intraplate extension triggered by paleo-pacific subduction [1, 3].

The late Mesozoic magmatism of the Jiamusi Block is important for understanding subduction triggered intraplate igneous processes. It occurred mainly in 104-100 Ma based on SHRIMP zircon U-Pb dating, and belong to high-K calc-alkaline series, with a bimodal signature, all rich in LILE and HREE, depleted in HFSE. It is represented by (1) 104±1 Ma adakite derived from juvenile lower crust ($\epsilon\text{Nd}(t) \sim +0.5$; zircon $\delta^{18}\text{O} \sim 8.0$, $\epsilon\text{Hf}(t) = +6$ – $+9$); (2) 102±1 Ma basalt derived from asthenosphere mantle ($\epsilon\text{Nd}(t) \sim +3$); (3) 100±1 Ma composite dyke complex [4] consists of asthenospheric mantle derived dolerite ($\epsilon\text{Nd}(t) = -1$ – $+4$, zircon $\epsilon\text{Hf}(t) = +9$ – $+16$) and ferroan (A-type) rhyolite; and (4) 100±1 Ma Type-2 composite dyke (zircon $\delta^{18}\text{O} \sim 6.5$, $\epsilon\text{Hf}(t) = +1$ – $+5$) and diorite enclave bearing granite porphyry country rock (S-type, $\epsilon\text{Nd}(t) = -4.5$, derived from recycled upper crust).

The ~100 Ma magmatism in the Jiamusi Block thus reveals the processes of slab dehydration and roll-back triggered asthenosphere upwelling, intraplate extension and crustal thinning. Combined with previous work, the start time of 165-90 Ma magmatism in NE China shows an ~1.8 cm/y eastward temporal migration, consistent with global slab sinking rate [5], supporting the paleo-Pacific roll-back model.

[1] Wu *et al* (2011) *JAES* **41**, 1-30. [2] Zhou *et al* (2013) *GR* **23**, 1365-1377. [3] Xu *et al* (2013) *JAES* **74**, 167-193. [4] Sun *et al* (2013) *Lithos* **162-163**, 317-330. [5] Butterworth *et al* (2014) *J. of Geody* **73**, 1-13.