Tracing the final collision of accretionary orogens: Terminal magmatic activities in the southern Central Asian Orogenic Belt (CAOB)

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The key to defining the termination and final collsion of accretion in an accretionary orogen is to recognize the initial magmatic processes that are generated at the time of ocean closure. The first identification of Early-Middle Triassic granitoids with high Sr/Y affinity along the Solonker-Xar Moron-Central Jilin suture zone in the southern CAOB and their emplacement at 251-245 Ma, establish that the North China Craton collided with the South Mongolian terranes in the latest Permian. This accompanied termination of accretionary orogenesis in this region.

Their low MgO, Cr and Ni contents and variable whole-rock $\varepsilon_{Nd}(t)$ values (+5.8 to -5.3), together with the range in zircon $\varepsilon_{Hf}(t)$ (+15.6 to -9.8) and $\delta^{18}O$ values (5.1 to 7.9 ‰), indicate an origin from partial melting of juvenile lower crustal rocks with some old components, including supracrustal recycling under garnet amphibolite facies conditions. Our data, along with available geological and geophysical evidence, lead us to propose a model of final oceanic contraction in the southern CAOB, resulting in sub-linear distribution of high Sr/Y melts along the resultant collision zone, thus defining the onset of post-accretionary processes in the southern CAOB. The identification of collision-related high Sr/Y granitoids from the southern CAOB not only reveal the magmatic process in response to the final episode of orogenic evolution in the CAOB accretionary collision zone, but also constrain how and when an archipelago-type accretionary orogen terminated. As such, this study provides a snapshot of the final fate of archipelago-type systems.