

Geochemistry and zircon U-Pb-Hf isotopes of Paleozoic granitoids along the Solonker suture zone in Inner Mongolia, China: Constraints on closure of the Paleo-Asian Ocean

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The closure of the Paleo-Asian Ocean resulted in formation of the Central Asian Orogenic Belt (CAOB) accompanied by considerable Phanerozoic juvenile crustal growth. The Solonker suture zone is the site of final closure of the Paleo-Asian Ocean and records the terminal evolution of the CAOB in Inner Mongolia. This study presents the geochemistry and zircon U-Pb-Hf isotopes of granitoids along the Solonker suture zone to constrain the subduction and closure processes of the Paleo-Asian Ocean. Granitoids from the Xilinhot area in the northern accretionary zone comprise diorites and granodiorites with I-type granitic affinities, LA-ICPMS zircon U-Pb ages of 316 ± 2 Ma, 302 ± 2 Ma, 285 ± 2 Ma and 243 ± 4 Ma, positive $\epsilon\text{Hf}_{(t)}$ values of +2.39 to +13.31 and T_{DM2} model ages of 481-1191 Ma. The *ca.* 316-285 Ma and the *ca.* 243 Ma granitoids were generated mainly from partial melting of juvenile arc crust, but in an arc-related setting and collisional setting, respectively. The granitoids from the Linxi area in the southern accretionary zone include muscovite monzogranites and monzogranites with S-type granitic affinities and LA-ICPMS zircon U-Pb ages of 525 ± 6 Ma, 274 ± 2 Ma and 261 ± 4 Ma. The *ca.* 525 Ma muscovite monzogranites have negative zircon $\epsilon\text{Hf}_{(t)}$ values of -19.36 to -13.61 with T_{DM2} model ages of 2348-2711 Ma. They were generated from partial melting of Neoproterozoic to Paleoproterozoic metagreywackes. The *ca.* 274-261 Ma monzogranites show negative zircon $\epsilon\text{Hf}_{(t)}$ values ranging from -10.48 to -0.66 with T_{DM2} model ages of 1335-1942 Ma. They were derived from remelting of Paleoproterozoic to Mesoproterozoic continental crust. Combining our results with existing data, we infer that the initial southward subduction of the Paleo-Asian Ocean started at *ca.* 525 Ma, and late Paleozoic bidirectional subduction of the ocean lasted until *ca.* 275 Ma. Along the Solonker suture zone, the regional collision occurred shortly at *ca.* 275-273 Ma, then the crust thickened further through *ca.* 262-250 Ma and followed by a phase of post-collision after *ca.* 250 Ma.