

The crustal evolution of microcontinents in the Beishan orogen of the southern Central Asian Orogenic Belt

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Microcontinents with Precambrian basement have played an important role in the accretionary and amalgamation history of the Central Asian Orogenic Belt (CAOB). However, their geological evolution is only poorly constrained due to restricted exposure of the Precambrian rocks, which were extensively overprinted mainly by Paleozoic tectonic, metamorphic and magmatic events. In the present study, in situ zircon U–Pb age and Hf isotopic data of 64 Paleozoic and early Mesozoic (from 499–217 Ma) as well as 14 Mesoproterozoic and Neoproterozoic (from 1555–871 Ma) granitic samples from four major arc terranes of the Beishan orogen (southernmost CAOB) were compiled in order to assess the nature of their crustal basement as well as the subsequent Paleozoic tectonic evolution. Zircon $\epsilon_{\text{Hf}}(t)$ values and calculated Hf model ages are similar for all arc terranes with Hf model age peaks at approximately 1.0–0.8 Ga and 2.0–1.8 Ga. We suggest that all of these Paleozoic arc terranes formed on a single, uniform Precambrian continental terrane. Furthermore, this continental terrane shows typical characteristics of Mesoproterozoic (~1.4 Ga) juvenile crustal growth, which may have been part of an extensive Mesoproterozoic continental terrane, now tectonically fragmented and located over a distance of more than a thousand kilometers in the southern CAOB. Among the cratons bordering the CAOB, Baltica displays most similarities with this continental terrane, while a Mesoproterozoic correlation with the Tarim Craton is rather questionable.