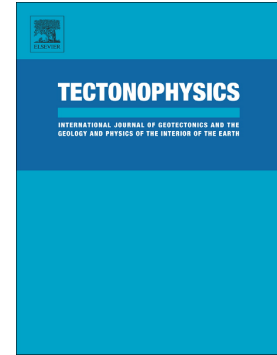


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The thermal evolution of Chinese central Tianshan and its implications:
Insights from multi-method chronometry

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Abstract

The Chinese Tianshan is located in the south of the Central Asian Orogenic Belt and formed during final consumption of the Paleo-Asian Ocean in the late Palaeozoic. In order to further elucidate the tectonic evolution of the Chinese Tianshan, we have established the temperature-time history of granitic rocks from the Chinese Tianshan through a multi-chronological approach that includes U/Pb (zircon), ⁴⁰Ar/³⁹Ar (biotite and K-feldspar), and (U-Th)/He (zircon and apatite) dating. Our data show that the central Tianshan experienced accelerated cooling during the late Carboniferous- to early Permian. Multiple sequences of complex multiple accretionary, subduction and collisional events could have induced the cooling in the Tianshan Orogenic Belt. The new ⁴⁰Ar/³⁹Ar and (U-Th)/He data, in combination with thermal history modeling results, reveal that several tectonic reactivation and exhumation episodes affected the Chinese central Tianshan during middle Triassic (245-210 Ma), early Cretaceous (140-100 Ma), late Oligocene-early Miocene (35-20 Ma) and late Miocene (12-9 Ma). The middle Triassic cooling dates was only found in the central Tianshan. Strong uplift and deformation in the Chinese

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