



Chronological constraints on tectonic evolution of the Chinese Tianshan Orogen through detrital zircons from modern and paleo-river sands

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The Chinese Tianshan Orogen marked the prolonged, complicated interactions between the southwestern Paleo-Asian Ocean and surrounding blocks. Massive new and previous detrital zircon U-Pb chronological data from modern and paleo-river sands (more than 7000 ages from 102 samples) were compiled to constrain its tectonic evolution. The Chinese Tianshan Orogen is characterized by predominant Paleozoic and minor Mesozoic and Precambrian detrital zircon ages that show multimodal characteristic. The oldest Phanerozoic zircon population (peak at 475 Ma) results from subduction and closure of the Early Paleozoic Terskey Ocean. But the absence of this peak in Chinese North and southern South Tianshan suggests that the subductions of the North and South Tianshan oceans may not initiate until Late Ordovician, with subsequent 460-390 Ma and 360-320 Ma arc magmatism. Similar to magmatic suite in classic collisional orogens, the youngest massive 320-270 Ma magmatism is supposed to be post-collisional. The North and South Tianshan oceans therefore probably had their closure to form the Chinese Tianshan Orogen during Late Carboniferous. The weak Mesozoic intra-plate magmatism further argues against a Late Permian-Triassic Tianshan Orogen for the lack of extensive syn- and post-collisional magmatism. Moreover, the diverse Precambrian detrital zircon age patterns indicate that the surrounding blocks have distinct tectonic evolution and short-term amalgamation during the Neoproterozoic.