



Structural evolution of the Irtysh Shear Zone: implication for the Late Paleozoic amalgamation of multiple arc systems in Central Asia

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The NW-SE Irtysh Shear Zone represents a major tectonic boundary in the Central Asian Orogenic Belt, recording the amalgamation history between the peri-Siberian orogenic system and the Kazakhstan orogenic system. The structural evolution and geodynamics of this shear zone is still poorly documented. Here we present new structural data complemented by chronological data in an attempt to unravel the geodynamic significance of the Irtysh Shear Zone in the context of accretion history of the Central Asian Orogenic Belt. Our results show three episodes of deformation for the shear zone. D1 foliation is locally recognized in low strain area and recorded by garnet inclusions, whereas D2 is represented by a sub-horizontal fabric and related NW-SE lineation. D3 is characterized by a transpersonal deformation event, to form a series of NW-SE mylonitic belts with sinistral kinematics, and to overprint D2 fabric forming regional-scale NW-SE upright folds. A paragneiss sample from the shear zone yielded the youngest detrital zircon peaks in the late Carboniferous, placing a maximum age constraint on the deformation, which overlaps in time with the late Paleozoic collision between the Chinese Altai and the intraoceanic arc system of the East Junggar and West Junggar. We interpret three episodes of deformation to represent orogenic thickening (D1), collapse (D2) and thickening (D3) in response to this collisional event. Sinistral shearing (D3) together with the coeval dextral shearing in the Tianshan accommodate eastward extrusion of the Kazakhstan orogenic system during the late Paleozoic amalgamation of the Central Asian Orogenic Belt.

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