



Late Paleozoic closure of the Ob-Zaisan Ocean along the Irtysh/Chara shear zone and implications for arc amalgamation and oroclinal bending in the western Central Asian Orogenic Belt

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The Irtysh/Chara Shear Zone is one of the largest strike-slip systems in the Central Asian Orogenic Belt (CAOB). It records collisional processes of the peri-Siberian orogenic system with the West Junggar-Kazakhstan-Tianshan orogenic system following the closure of the Ob-Zaisan Ocean, but the exact timing of these events remains enigmatic. We conducted detailed structural analysis along the Irtysh Shear Zone (NW China), which together with new geochronological data allows us to reconstruct the tectonic evolution during the final closure of the Ob-Zaisan Ocean. Our results showed that subduction-accretion processes lasted at least until the Late Carboniferous in the Chinese Altai and the East/West Junggar. The subsequent arc amalgamation is characterized by a cycle of crustal thickening, orogenic collapse and transpressional thickening.

On a larger scale, the West Junggar- Kazakhstan -Tianshan orogenic system defines a U-shape oroclinal structure (e.g. Xiao et al., 2010). A major phase of oroclinal bending that involved $\sim 110^\circ$ rotation may have occurred during the Late Devonian to Early Carboniferous (Levashova et al., 2012). Previous authors have linked oroclinal bending with the late Paleozoic amalgamation of the western CAOB, and proposed that a quasi-linear West Junggar- Kazakhstan -Tianshan orogenic system was buckled during the convergence of the Siberian and Tarim cratons following the closure of the Ob-Zaisan Ocean (in the north) and the South Tianshan Ocean (in the south) (e.g. Abrajevitch et al., 2008). This model, however, is not supported by our new data that constrain the closure of the Ob-Zaisan Ocean to the Late Carboniferous. Alternatively, we propose that oroclinal bending may have involved two phases of bending, with the $\sim 110^\circ$ rotation in the Late Devonian to Early Carboniferous possibly associated with trench retreat. Further tightening may have occurred in response to the convergence of the Siberian and Tarim cratons during the Late Carboniferous to Permian.

References:

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