

The Early Paleozoic evolution of West Junggar (NW China):
insight for the tectonic collage of the Altaids

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The Altaids tectonic collage of Central Asia represents a natural laboratory to understand the evolution of accretionary orogens in time and space. Presently, conflicting geodynamic models are proposed about this Paleozoic evolution, so that the chronology of the formation of the juvenile continental crust remains uncertain. In this work, we have focused on West Junggar (NW China), a key region that has not been extensively studied yet. A multidisciplinary approach, including detrital zircon provenance study, geochemistry, and field structural analysis, provides new constraints on the evolution of three Early Paleozoic units of West Junggar. Oceanic subduction predominates in Early Paleozoic time, as indicated by ophiolitic mélanges, fore-arc volcanoclastic turbidites and magmatic arc suites. However, the development of an olistostrome supplied by a sub-contemporaneous carbonate platform, the occurrence of continental molasse, and the chronology and geochemistry of magmatic events reveal interruptions of subduction. Discrete collisions of volcanic arcs and micro-continent are inferred from the tectonic structure of the belt, which displays allochthonous units rooted in the suture zone. Early Paleozoic magmatic and sedimentary rocks of West Junggar bear some resemblance to contemporaneous analogues in Eastern Kazakhstan, and suggest a lateral connection. On the basis of these new results, we propose a geodynamic evolution in four steps: 1) Early to Middle Ordovician intra-oceanic subduction forming island arcs, 2) Late Ordovician tectonic accretion of island arcs against the Kazakhstan continental margin, 3) Early to Middle Silurian resumption of subduction and active continental margin magmatism, and 4) Late Silurian-Early Devonian micro-continent collision. This scenario, consistent with the formation of the Kazakhstan Block, supports a model of multiple episodic accretions for the Altaids tectonic collage rather than a continuous continental margin evolution. These results also suggest that, in Central Asia, continental crust growth results from alternating vertical and horizontal growth episodes throughout the Paleozoic.