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Sedimentological constraints on the final time of various terranes amalgamation in the Northern Xinjiang, China

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The strong debating on the mechanism of the tectonic evolution during the Early Paleozoic Central Asia Orogenic Belt (CAOB) in Northern Xinjiang have been discussed for years. The final amalgamation of the various geological terranes is in controversial and the relationship with the formation of Kazakhstan block is still not clear. This paper summarized the recent results of regional geological survey, and detailed study several representative stratigraphic sections. intends for providing new materials to clarify the final amalgamation time of the various geological terranes. Based on these data, we provide the new evidence for the final amalgamation time of the various geological terranes in northern Xinjiang.

All the Cambrian-Ordovician ophiolites, which are located in the collage zones of different blocks, were all formed in a supra-subduction zone (SSZ) environment, and high-pressure metamorphic rocks were discovered in these ophiolites of Northern Xinjiang. The Early Silurian sedimentary strata that distribute between Junggar-Tuha, Tacheng, Yili and the Middle Tianshan block have homogeneous volcanic-sedimentary assemblage. These strata sedimentary facies are from bathyal sea facies to shallow sea facies and the neritic facies sandy conglomerate were found in the top part. The Early Silurian sedimentary strata overlap on the Middle Ordovician strata with angular unconformity, which are closely contact with the Cambrian-Ordovician ophiolites. All these characteristics of the geological facts have recorded the amalgamation the ancient continental blocks, shows the closure process of ocean basin and the final residual ocean basin under a convergent setting.

To the south of Kelameili fault at East Junggar, the Middle Silurian Baishanbao Formation consists of two parts: deep-water facies to slope facies sedimentary assemblage in the lower part, and shoal facies in the upper part. All these sedimentary assemblages indicate the characteristic of a passive continental margin. The Early Devonian Kelameili Formation is composed of clastic rock and siliceous, with a folding deformation of south-warding thrust nappe. All these geological facts indicate that the Kelameili Formation were formed in the foreland fold and thrust belt on a passive continental margin. To the south of Xiemisitai fault at West Junggar, the bottom of the Early Devonian strata distribute steadily and widely in the region with fluvial facies. In the middle of this formation, the strata show the sedimentary environment changes from meandering river to delta plain and delta front, with a south to north orientation, which is similar to the upper strata. All these sedimentary assemblages were formed in a passive continental margin, and which indicated that there was an ancient entire continental crust in the south of Kelameili - Xiemisitai fault.

In the northern Xinjiang, all the ancient continental blocks were inlaid in the Paleozoic CAOB, resulting from the amalgamation of various blocks before Early Silurian, which accord with the formation process of ancient Kazakhstan block, while the northern margin of the unified continent is the Kelameili-Xiemisitai fault.

