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The Tectonic Setting and Evolution of the Longmen Shan in Later Triassic, the Eastern margin of Tibet Plateau, SW China

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There are some controversy about the primeval sediment provenance and tectonic evolution of Longmen Shan Foreland basin in Later Triassic, and the controversy focus on Norian of Late Triassic and the lower strata of Xujiache Formation which deposited at the same time. Beichuan-Yinxu fault was supposed to be the western boundry of Longmen Shan foreland basin in the past, because Xujiache Formation only expose to the eastern surface of Beichuan-Yinxu fault. But the Wenchuan Fault Scientific Drilling(WFSD) find the lower Xujiache Formation in the west of Beichuan-Yinxu fault for the first time, provide new evidence to the research about the early stage of Longmen Shan foreland basin. In the lower strata of Xujiache Formation, the average contents of quartz, feldspar, detritus in particles of sandstone respectively are 43%, 4% and 35%. detritus mainly includes week metamorphic siltstone and mudstone. Heavy mineral assemblage constituted by zircon, rutile, tourmaline, barite. It shows that the provenance is recycle sedimentary rock. According to the analysis of the Triangle Discrimination Diagrams of Dickinson, tectonic setting of the provenance is recycled orogen. Through the geochemical analysis of trace elements and rare-earth elements, we can make sure that the provenance of the lower Xujiache formation is felsic rock of upper crust. The lower Xujiache formation of longmen Shan foreland basin and the stratum of Songpan Ganzi Middle-Upper Triassic is similar in chondrite-normalized REE patterns and detrital zircon U-Pb age probability curves. Through the synthetical and comparative analysis of potential provenance of lower Xujiache Formation, we hold that the Xujiache Formation of Norian has the double provenance character of foreland basin, which's provenance mainly comes from Songpan Ganzi Fold Blet and some part of it comes from Western Yangtze Craton. The analysis of tectonic setting discrimination diagrams and the ratio of trace and rare-earth elements shows that the tectonic setting of lower Xujiache Formation of Longmen Shan foreland basin in Norian is continental island arc, and the type of sedimental basin is the retroarc foreland basin. Combine with the research of tectonic event of Longmen Shan Orogen-Foreland Basin System, and the analysis concequences of the provenance and tectonic setting of lower Xujiache Formation in this paper, we draw a conclusion that in Late Carnian, Eastern Paleo-Tethys was intensively squeeze, the fold generated in the Eastern Songpan Ganzi, which thrust upon the Western Yangtze Craton and created the paleo-island arc. This thrust fault is Maoxian-Wenchuan Fault. So the western boundry of foreland basin and Xujiache Formation is Maoxian-Wenchuan Fault in Late Carnian to Norian. In the end of Norian and the beginning of Rhaetian,

Longmen Shan Orogen was generated, and the western boundary of Longmen Shan foreland basin and Xujiahe Formation change to Beichuan-Yinxu Fault.

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