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Sedimentology, Stratigraphy and Paleogeography of the Triassic Western Ordos Basin, North-Central China

Northwestern Ordos basin contains 4km of Triassic nonmarine strata that accumulated in a continental intraplate setting. Triassic rocks are exposed in two mountain ranges, the Helan Shan and, farther east, the Zhuozi Shan. 2-3 km of fluvial strata and up to 1km of lacustrine strata were observed in the Helan Shan. The fluvial systems are characterized by lenticular, trough cross-stratified sandstone with minor pebble conglomerate lenses, rare mudstone interbeds, and south or east-directed paleocurrents. Lacustrine systems are characterized by dark shale, laminated siltstone beds, and tabular rippled sandstone beds with occasional thick (up to 200 m), laterally extensive packages of fluvial sandstone. In the western Helan Shan only, laterally extensive packages of lenticular conglomerate occur within lacustrine strata. The Triassic section in the Zhuozi Shan is significantly thinner (<2 km), and contains only fluvial strata. This system is characterized by alternating laterally-extensive, lenticular, trough cross-stratified sandstone to pebble conglomerate packages, and red mudstone. Paleocurrents are west-directed.

Facies distribution and variations in stratigraphic thickness indicate rapid subsidence along the western margin of Ordos. The resultant asymmetric trough filled from 3 sides with fluvial followed by lacustrine sediment. This evolution is consistent with a previously hypothesized Triassic extensional basin (Liu, S., and Yang, S., 2000). Our results suggest that this basin was bounded by an east-dipping normal fault system, currently concealed beneath Quaternary deposits west of the Helan Shan.