

GSA Connects 2024 Meeting in Anaheim, California

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Presentation Time: 8:00 AM-5:30 PM

MID-LATE PERMIAN ALPINE GLACIATION AND ASSOCIATED LOESS ACCUMULATION AT MID-LATITUDE NE PANGAEA, BOGDA MOUNTAINS, GREATER TURPAN-JUNGGAR INTRACONTINENTAL BASIN, NW CHINA

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The Capitanian–lower Wuchiapingian lower and upper Quanzijie low-order cycles (QZJ LCs) in Bogda Mountains, NW China, contain evidence of mountain glaciation and loess deposition in eastern Kazakhstan Plate. They occur in Zhaobishan (ZBS), Tarlong-Taodonggou (TL-TDG), and Dalongkou (DLK) areas, ~100 km apart. The lower QZJ LC overlies a regional unconformity, consists of conglomerate at ZBS at foothills of ancestral north Tianshan and Calcisol, mudrock, sandstone, and conglomerate at TL-TDG and DLK in the basin, and is 1-10s m thick. The basinal deposits are upward-fining meandering stream deposits. In ZBS, fining-upward successions from imbricated boulder–pebble conglomerates to minor sandstones with erosional bases are braided stream deposits. Of 135 randomly-counted cobbles and boulders, 80% are faceted penta-, hexa-, and hepta-hedrons with rounded edges; 75% have at least one flat face; 60% one concave face (60%); 93% smooth, shiny, and smeared faces; 56% 1–3 sets of parallel to non-parallel striations; and 57% one or more grinding pits, indicating a glacial origin. In contrast, the upper QZJ LC is 60-160 m thick in the basin and 205 m in ZBS. Basinal deposits consist of massive mudstone with a consistent silt-size distribution, interspersed with lenticular upward fining conglomerate to sandstone, interpreted as loess and ephemeral braided stream deposits, respectively. In ZBS, the upper QZJ LC contains mainly upward fining conglomerate–sandstone successions of coarse-grained meandering stream deposits. Few ostracod-bearing shales and well rounded and cross-stratified sandstones are lacustrine and eolian deposits, respectively. Gravels are mainly pebble–granule. 22 counted cobbles are similar to those in lower QZJ and 77% have 1–3 sets of striations, suggesting a dominantly proglacial fluvial setting. Petrified woods with distinct frost rings are common in the QZJ, indicating a freezing upland condition. The basal unconformity signifies tectonic uplift and erosion during closure of Paleo-Asian Ocean. Growth of north Tianshan in an icehouse climate promoted formation of alpine glaciers, which supplied copious fluvial sediments of the lower QZJ. Glacial retreat exposed previous sediments to source the loess accumulated in the basin, but proglacial fluvial deposition persisted in ZBS until early Wuchiapingian.

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