



Tectono-depositional Setting and Its Evolution during Permian to Triassic around Mahu Sag, Junggar Basin, NW China

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Mahu Sag of Junggar Basin is proved to be rich of oil and gas, and famous for its Permian and Triassic fan sandy-conglomerate super-giant oil and gas fields. To discuss the tectono-depositional setting for the development of fan bodies is an important clue to explore the coupling among the tectonic, the climatic, and the geomorphic processes, a foundation for appraisal of petroleum exploration potential, and an accelerator for petroleum exploration and development. Based on the newly-acquired drilling and geophysical exploration data, the paper is to disclose the tectono-depositional setting during Permian to Triassic Period from a point of view of sedimentary source to sink concept. It shows that the Mahu sag is a depression of Carboniferous to Quaternary built upon the pre-Carboniferous folded basement. The Permian to Triassic sees its dominant period of sedimentary filling, and undergoes such processes as the post-orogenic extension during Late Carboniferous to Early Permian, the compression and thrusting during Middle Permian to Middle Triassic, and intra-cratonic depression in Late Triassic. It develops alluvial fan, fan delta, and lake systems. The multi-phase and breaking-forward thrusting, the tear faults and the transitional transfer zones constituting as priority routing systems, and the arid environment controlled in association the large-scale fan delta systems in and around Mahu sag. It is an integrated petroliferous system with the Lower Permian Fengcheng Formation mudstone rocks in the extensional alkali lacustrine facies as the excellent hydrocarbon source, the overlying fan deltas as the favorable reservoirs, and the Upper Triassic thick mudstone as the regional cap rocks. The Mahu sag is of great potential for oil and gas, and has a board area for multi-layer stereotype exploration.