High-Frequency Stratigraphic Sequence Characteristics in the Gentle Slope Zones in Large Depression Basins - Case Study of Qingshankou Formation of Northern Part of Songliao Basin in China

Liang, Sujuan [1]; Wang, Jiangong [1] (1) Research Institute of Petroleum Exploration&Development-Northwes,PetroChina, Lanzhou, China.

Qingshankou formation is one of important hydrocarbon target of depression sediment in Songliao basin which is a prolific producer of hydrocarbon. To reveal the strata distributing and reservoir-forming rules in gentle slope zones in large depression basins which were formerly studied rarely, this article will discuss high-frequency stratigraphic sequence taking Qingshankou formation as an example. Comprehensive data and means including core observation, logging response, seismic reflection and paleo-biology data were used to identify the sequence boundaries and flood surfaces to establish logging curve frame correlations and their corresponding seismic reflection sections. Based on these work, high-frequency sequence dividing criterions and scheme of Qingshankou formation were build up. After that the whole strata in the north of Songliao basin was divided and correlated.

Qingshankou formation, which is part of TST of the second-order sequence in Songliao basin. Qingshankou formation was composed by fluvial - delta - lacustrine sedimentary systems. It was made up of three third-order sequences respectively corresponding to the first, the second and the third section of Qingshankou formation. These three sections all consists of TST and HST, and no one LST was developed. the first section was further divided into two forth order sequences, the second into three and the third into three too. Although the principle of dividing one sequence into LST, TST and HST was kept to and sedimentary features are Controlled by paleogeomorphology, paleoclimate and paleo-resource supply, etc, result of the study showed no sedimentary bodies (incised valleys, wedges, slope fans etc.) of LST but TST and HST were deposited whether in the third or forth order sequences in the zones with flat surface relief where deposition mainly is progradation and aggradation. More of sandstone was deposit in TST and less in HST as more coarse clastic was transpoted to the large accommodation while TST formed, and less to the larger ‘s of HST, and the scale of fluvial-delta sedimentary system reduced as the lacustrine’s expanded. Thus the exploration of lithologic reservoir should be focused on TSTs, and giving consideration to HSTs in gentle slope zones in large depression basins in which channel sandbodies and delta front sheet sandbodies are favorable reservoirs that have been verified by hydrocarbon shows in the drilled wells.