High-Resolution Sequence Stratigraphy Research for Xishanyao Formation of the Middle Jurassic Series in the Langka Area, Southern Ili Basin

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Abstracts: In order to comprehensively understand the sequence stratigraphic framework and spatial and temporal distribution of Xishanyao Formation in Southern Ili Basin, based on the high-resolution sequence stratigraphy and sedimentology theory, we study the high-resolution sequence stratigraphy and sedimentary facies of Xishanyao Formation in the study area according to the outcrop profiles, drilling cores, geochemical data, well logging and seismic data. The results show that Xishanyao Formation can be divided into 2 long-term sequence cycles (LSC1–LSC2), 3 Intermediate-term sequence cycles (MSC1–MSC3) by analyzing unconformity, scour surface and flooding surface. Meanwhile, 10 short-term sequence cycles (SSC1–SSC10) are further identified according to the sedimentary transformation surfaces and rhythm conversion surfaces. These SSC are subdivided into 3 basic types and 7 sub-types according to the stacking patterns and sedimentary facies of each sequence cycles. Deepening upward nonsymmetrical type (type A), shallowing upward nonsymmetrical type (type B) and symmetrical type (type C) are 3 basic types of high-resolution sequence stratigraphy. MSC and LSC are mainly featured with Type C and Type A only develops in the SSC. The strata in the whole study area are characterized with multi-cycle of base level mostly having ascending and descending half cycles during each MSC and LSC and only ascending half cycle during the SSC1, SSC2, SSC7 and SSC10. The uranium mineralization is prone to enrich at the bottom of the ascending half cycle (SSC1–SSC2). They consist of stacked (underwater) distributary channel sand bodies of different periods, which are the main exploration targets of sandstone-type uranium deposits.

Key words: Ili basin, Xishanyao Formation, high-resolution sequence stratigraphy, base-level cycle, time-sequence stratigraphic framework

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References

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