

PALAEOGENE SEQUENCES WITH SEDIMENTARY CHARACTERISTICS CONTROLLING THE
LACUSTRINE OIL SHALE OF THE MEIHE BASIN*

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As a case study, the Meihe Basin, a typical Cenozoic faulted basin, was divided into and identified as five three-order sequences by utilizing core, well logging, and seismic data, as well as palaeontological and geochemical data. Field measurements of sections, core observations, and a comprehensive analysis revealed that the basin is mainly composed of deposits of alluvial fan, fan delta, lacustrine facies, and gravity flows, and oil shale is mainly developed in semi-deep and deep lacustrine environments. The comprehensive study of the sediment-sequence stratigraphy indicates that Sequence I was formed in the initial rifting stage of the basin, dominated by coarse clastic sediments of alluvial fan and fan delta. Sequence II was formed in the rifting expansion stage of the basin, with more developed sediments of fan delta and lacustrine. Sequence III was formed in the largest expansion stage of the basin, dominated by mudstone of deep lacustrine facies and gravity flow deposits. Sequence IV was formed in the shrinking stage of the basin, dominated by sediments of delta and lacustrine fan. Oil shale is mainly developed in the transgressive system tract (TST) and highstand system tract (HST) of Sequence III (Mudstone Member of lacustrine facies). The lake flooding effect of TST can reduce the decomposition amount of organic matter, increase in organic matter production, and reduce the amount of dilution, thus forming oil shale with a thin consistency but high quality. In the period of the HST, the larger accommodation space and excellent organic matter preservation conditions are conducive to developing stable oil shale with a greater consistency. During the high water level period, however, due to the oxygen brought in by turbidites, the decomposition of organic matter is often increased, resulting in the formation of low-quality oil shale.

Key words: Meihe Basin, oil shale, sequence, sedimentary.