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Sedimentary characteristics and evolution of reservoir with thin interbeds of Paleogene Liushagang Formation in Beibuwan Basin, China

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Abstract: The structure and sedimentary characteristics of the Paleogene Liushagang Formation in Beibuwan Basin were very complex and the understanding of sediment sources and sedimentary facies is controversial. In order to identify the distribution and evolution of sedimentary facies in the study area, to predict favorable reservoir distribution characteristics, to better serve the oil and gas exploration and development, the sediment sources, sedimentary facies characteristics of the Paleogene Liushagang Formation in the study area are studies, based on core data, logging data, seismic data and analytical laboratory data. With the method of seismic multi-attribute anaylysis, waveform classification, seismic facies analysis, coupling relations of structure and sedimentation, etc., following the research path of point(well) – line(profile) – map(plane map) – tract(temporal evolution and special distribution) – point(trap), the depositional system's planar distribution and vertical evolution of intended intervals of each period in the region of interest are studied. According to the analysis, the sedimentary source of the Paleogene Liushagang Formation is from the northern high-lying area, which is characterized by the delta front-deep lake sedimentary sequence. The normal deltaic sediments are mainly developed, and the thickness of the single sand bodies is small, which manifests as multilayer interactive distribution. The Paleogene Liushagang Formation is divided into four sequences from bottom to top, the sequence of MSC2 and MSC3 shows that the short-term rapid water regression is involved into the process of longer-term water transgression, the supply of material source is abundant and the development of sand body is high. It is concluded that the reservoir properties of the Paleogene Liushagang Formation are mainly controlled by the buried depth and sedimentary facies. The reservoir property of 17-2 Oil Field is better than that of 16-1 Oil Filed. The underwater distributary channel and estuary dam developed near the source of the delta front are favorable reservoir distribution areas.

Key words: Beibuwan Basin; the Paleogene Liushagang Formation; sediment sources; sedimentary characteristics; sedimentary evolution

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