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Sedimentary Patterns and Stratigraphic Trap Models of Deeply Buried Intervals in the Baxian Depression, North China

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The Baxian depression is a typical half-graben located in the Jizhong sub-basin, north China. Commercial petroleum traps have been discovered in the Jizhong sub-basin. However, petroleum exploration in the 3rd and 4th members of the Shahejie Formation has been relatively uncommon. These members, of Lower Paleogene age, are buried deep in the depression. Favorable petroleum reservoir conditions exist in deep intervals of the half-graben due to the presence of different types and extent of deltas and turbidite fans in various areas. Three types of turbidite fans are developed in the sag below the transitional belt on the gentle eastern slope of the basin. In this study, three stratigraphic petroleum trap belts are summarized: the steep slope, gentle slope, and sag. On the steep slope, structural-stratigraphic petroleum traps within small-scale, delta front and turbidite sand bodies are well developed. However, on the gentle slope, hydrocarbons generally accumulated in large-scale delta front, onlapping beds, and in sandbodies adjacent to unconformities. In the sag, petroleum trap models are typically characterized by pinched-out turbidite sandbodies. Stratigraphic petroleum traps easily formed in turbidite fans below the eastern transitional belt. The petroleum traps that have already been discovered or predicted in the study area indicate that stratigraphic traps have favorable petroleum exploration potential in deeply buried areas (depth > 5000 m) in a half-graben basin or depression.

Key words: half-graben, stratigraphic petroleum trap, transitional belt, turbidite fan