

The Structural Type, Hydrocarbon Transporting Capacity and its Reservoir Forming Control Model of Unconformity in Continental Faulted Basin

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Jiyang depression is a typical Mesozoic-Cenozoic faulted basin, and is one of the most important oil-gas bearing province in China. Because of the Yanshan movement and the Himalayan movement, there were several nconformities from Mz to N in Jiyang depression, which played an important controlling role in the formation of the stratigraphic reservoir.

According to the core observation and a large number of tests in 52 wells, it is found that some unconformities have been a three-tiered structure composed of the roof rock, weathered clay, and semi-weathered leaching zone. Among them, the formation of weathered clay layer is controlled by the development of the original lithology, intermittent periods, the ancient terrain, and the roof lithofacies. Based on the analysis of a large number of exploratory wells , a prediction model of unconformity structure has been established.

The semi-weathered leaching zone and basal conglomerate above the unconformity play a true role in transporting oil and gas. In continental faulted basin, horizontal distribution of the basal conglomerate with large area is difficult to form for variability of sedimentary facies and frequent interaction of sandstones and mudstones in space. Compared with the original rock, the sandstones of the semi-weathered leaching zone have better physical property, with maximum porosity increased by 18%, but the mudstones in the zone are obviously different. The analyses of more than 70 wells show that the porosity of the semi-weathered mudstones can only be increased by 4% at the most, and when the thickness of overlying strata is greater than 2000m, it is difficult to transport oil and gas for the improved physical property formed by the weathering turned to its origin state. In continental rift basin, the unconformity conduit is confined, so it is difficult to be the long-distance migration of oil and gas channel. Among 118 proved stratigraphic reservoirs in Jiyang depression, the transporting systems of 56% of the reservoirs consist of fault, sand body, and the unconformity; and those of 44% of the reservoirs consist of fault, and sand body except for unconformity.

Based on reservoir-forming analysis of 118 stratigraphic reservoirs, according to the structural characteristics of the unconformity and its relationship with fault and sand body, the reservoir forming control model of the unconformity is divided