Geological Model of Carbonate Weathering Crust Karst Reservoir

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Carbonate weathering crust karst reservoir is widely distributed. In recent years, the breakthrough of oil and gas exploration continues to be achieved, and karst reservoir has been becoming an important exploration field. But this type of reservoir has strongly heterogeneity in the vertical and horizontal, which is controlled by many factors, so the reservoir geological model is very difficult to establish. The study shows that hydrocarbon distribution in Ordovician of Lunguxi area is closely related with solution hole and fracture in the top of buried hill.

Through comprehensive study of field geological investigation, core observation, imaging logging, seismic reservoir prediction, well testing and early production test, etc, the types of karst reservoir are divided into four types:fracture, fracture-hole, hole-cave and cave. Based on the analysis of karst reservoir characteristics, it is considered that the degree of karstification, paleogeomorphic, the degree of faults and fractures, lithology and sedimentary diagenesis, cavity filling are the main controlling factor in karst development. Karstification, and the rupture causing by tectonic movements are the favorable factors that improve storage space, while the cement filling, compaction, and cave stacking interaction are the main factors that lead to dense of reservoir rocks, and reduce the porosity. Karst reservoir distributes in quasi-layers in vertical. It can be divided into epi-karst zone, seepage karst zone and subsurface flow zone. The reservoirs of epi-karst zone and subsurface flow zone have good reservoir property. The distribution of karst reservoir in the horizontal is mainly controlled by paleogeomorphic. The developing direction of karstification is controlled by the directions of the faults and fractures, and the growth strength and developing depth in vertical of which separately controlled the scale and the deepness of karstification.

According to the main control factors of development of karst reservoirs and its developmental characteristics, the geological model has been established, which is scientific, rational, and practical. It has been applied practically in many areas, and all applications have achieved good results. It provides a solid foundation for the efficient exploration and development of carbonate karst reservoir.