

Accumulation conditions of a Giant gas field in Sinian- Cambrian, central Sichuan basin, SW China

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Recently, important gas discoveries have been made in Sinian- Cambrian reservoirs in the central Sichuan Basin, in which the geological gas reserves are over trillions of cubic meters [1]. This is the largest gas reserve to have developed from the oldest marine source rocks in China. The main production layers of Sinian-Cambrian buried deep 4500-6000m were formed 5-6 million years ago, organic matters have reached high to over mature stage. The gas accumulations in Sinian-Cambrian had experienced a complex tectonic movement.

We conducted a series of geochemical analyses on the gases, and undertook geological investigations of the reservoirs. The gas generation, oil cracking in paleo-oil pools, and the gas accumulation process in details. We found that the natural gas is mainly oil cracking gas and the main source rocks were black shales of Qiongzhusi formation in Lower Cambrian, followed by dark algae dolomite and shale in the third member of Dengying formation.

Three sets of reservoir in the gas field including Cambrian Longwangmiao formation, the second member and the fourth member of Sinian Dengying formation. The formation of effective reservoir was controlled by supergene karstification and sedimentary facies. The reservoir was widely distributed with large thickness but strong heterogeneity. The area located at the east high point of an ancient uplift in a long period. It developed large-scale which had strong oil and gas capability.

Analysis of the structural evolution history of the region and thermal history of the source rocks showed that: The allocation of the ancient rift, the ancient dune, the paleo uplift, the ancient trap and the preservation condition in the time and space is the key to the formation of the giant gas field. Forming of hydrocarbon generation center, source-reservoir combination and a lateral sealing condition was controlled by paleo-taphrogenic trough. The scale karst reservoirs and the lithologic-stratigraphic traps were based on ancient algal dune body. The paleo uplift controlled the formation of large oil paleo reservoirs and the effective preservation conditions at late Himalayan period. The ancient lithologic-stratigraphic traps determined the forming of gas reservoir groups.

[1] Zou C N, et al. (2014) *Petroleum Exploration & Development* 3:278-293.