

Discussion on oil and gas sources of Paleozoic and Sinian in central Sichuan, Southwestern China

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Sichuan Basin is located in southwestern China. There are three sets of source rocks: Doushantuo Formation (Z_2d), the third member of Dengying Formation (Z_2dn^3) and Qiongzhusi Formation ($\epsilon 1q$) in Cambrian and Sinian system. So far, $\epsilon 1q$ source rock has been considered as the main contributor to the Paleozoic and Sinian gas reservoirs, but the other two sets of source rocks are rarely mentioned. The purpose of this paper is to study if these two sets of source rocks have contributed to the overlying strata.

In the recent analysis of the field outcrop observation and outcrop samples show that these source rocks are better in organic matter abundance, organic matter types and thermal evolution. And also, a large number of bitumen are found in the second member of Dengying Formation (Z_2dn^2) from a large number of well cores in central Sichuan. Vertically, source rocks of Z_2d , with Z_2dn^3 and $\epsilon 1q$ successively overlying it. So Z_2d source rock is likely an important contributor to these ancient reservoirs bitumen.

Further studies focus on bitumen-source correlation. Studies have shown that the traditional comparison method has been difficult to effectively complete this task. So the mathematical cluster analysis of statistical analysis is used to this paper. geochemical Indicators involved 25 including $C_{27}diasterane/C_{27}sterane$, $C_{29}20S/(20S+20R)$, tricyclic terpane/ 17α (H)-hopanoid, sterane / 17α - hopanoid, oleanane/ C_{30} (hopanoid+moretane) etc. The amount of bitumen samples is 20 and that of source rock samples is 27. The results indicate that the similarity coefficient of bitumen and source rocks is 0.905. It is possible to infer that the bitumen in Z_2dn^2 of central Sichuan came from Doushantuo Formation source rocks. This study proved that Z_2d source rock is also important in Sichuan basin. Researchers should break through the traditional understanding and also given enough attention to the other two source rocks.