The depositional characteristics of Cambrian Qingxudong Formation in Southern Sichuan-Northern Guizhou and its control effect on reservoir beds

Ruijing Yan¹ and Li Zhou²
¹Chengdu University of Technology, College of Energy, petroleum geology, China (1173635714@qq.com)
²Yangtze University, School of Geosciences, Geology, China (523525949@qq.com)

The stratum of Qingxudong Formation (Longwangmiao Formation) in Southern Sichuan-Northern Guizhou is generally thin in the west and north, thick in the east and south. The thickness of the stratum is 100m-250m, which is missing only in yaan-chengdu area. The Qingxudong Formation in the study area mainly develop restricted platform facies and open platform facies deposits. The northern to central part of the study area mainly develop restricted platform facies, which can be divided into mixed tidal flat, inner beach, inter beach lagoon and other subfacies. The lithology is dominated by micrite-aplite dolomite and bioclastic dolomite with a thin layer of mud crystal limestone, siltstone, etc. Bean grain limestone and oolitic limestone can be seen at the bottom. The limestone composition of the Qingxudong Formation in the study area gradually increase from north to south, and the lithology of the Qingxudong Formation in the Songlin-Yankong area is dominated by micritic-aplite limestone and granular limestone, followed by dolomite. Open platform facies are developed, which can be furtherly divided into subfaces such as intra-platform beaches and inter-shoal beaches. The reservoirs in intra-platform subfacies of the Qingxudong Formation in the southern Sichuan-northern Guizhou area are relatively developed. Due to the high terrain of the beach, the karstification is favorable. Secondly, later-stage burial dissolution tends to selectively dissolve multi-phase intergranular cements or fillers to form intergranular dissolution pores, providing a lot of storage space. The analysis about the reservoirs' physical properties of different microfacies suggest that, the porosity of the granular beach microfacies reservoirs ranges from 0.29% to 7.32%, with an average of 3.3%; the matrix permeability ranges from 0.006×10⁻³µm² to 0.043×10⁻³µm² with an average of 0.014×10⁻³µm². The porosity of Yunping microfacies reservoir ranges from 0.56% to 7.25%, with an average of 2.9%; the matrix permeability ranges from 0.006×10⁻³µm² to 0.027×10⁻³µm², with an average of 0.01×10⁻³µm². The porosity of other microfacies reservoir ranges from 0.08% to 2.65%, with an average of 1.22%; the matrix permeability ranges from 0.008×10⁻³µm² to 0.01×10⁻³µm², with an average of 0.009×10⁻³µm². It can be seen that the intra-platform subfacies have a constructive effect on reservoir development, which is the basis of reservoir development.

Keywords: Southern Sichuan-Northern Guizhou; Qingxudong Formation; sedimentary facies; reservoir physical property; reservoir characteristics