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Stratigraphic Correlation And Division of the Salite Strata

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1 Introduction

Stratigraphic correlation is the most important basic work in oil and gas exploration and development, Scientific and reasonable stratigraphic correlation is the premise of developing fine reservoir description, and it is also the guarantee to improve the efficiency of oilfield exploration and development. Whether the facies controlled cycle isochronous correlation method or the high-resolution sequence stratigraphic correlation method (Yan Ke, et al, 2011), both are based on the same lithology to conduct stratigraphic cycle correlation. Because of the complicated sedimentary environment and the great change of lithology in the continental basin, in especial the salt lake basin, the change of lithology often happens in Stratigraphic cycle. In the stratigraphic framework, where there is no sand frequently correspond the salt.

Tankou oilfield is located in the northern part of the Qianjiang Sag, the footwall of the Qianbei Fault. Because of the complex structure and the rich geological phenomena, the strata has its unique characteristics, the phenomenon of the mix of the sandstone and salt rock is Significant. In response to this phenomenon, based on the study of the characteristics of structural evolution and the sequence characteristics of the salt bearing strata in Saline Lake basin, this paper solves the problem.

2 Tectonic evolution characteristics

The early Jingsha group depositional stage, the basin has not yet lifted, and the study area was still a large slope belt that accepted the deposition (Fig.1.a). Because of the structure was not strong, the strata hasn't deformed and the variety of the formation thickness wasn't obvious. Near the end of the Jingsha group depositional stage, influenced by the early Himalayan movement, the whole basin uplift suffered denudation. Slope rose, in especial the north of the slope (Wang Bijin, et al, 2006).

That result the deformation of the formation but the variety of the formation thickness was still not obvious (Fig.1.b). In the Tankou area, the activities of the North Fault and its derived faults was strong, resulting of the fault block mountain, and that was the embryo of the Tankou low uplift.

Late of the Q4x-Q3depositional stage, the activities of the most of the faults were weak even inactive. The Qianjiang Sag changed from the strong fault depression stage to the stable rifting subsiding stage. During this period of deposition, due to the pressure of overlying strata and the temperature of the deep strata, the soft layer in the slope flow towards the direction of the low pressure (Fig.1.c). During the Q2depositional stage, Early Himalayan movement began to be active, and the activity of the fault depression of the Qianjing Sag to be strong. Because of the flow and deformation of the salt rock and soft layer, some strata has been pierced named salt diaper (Fig.1.d).

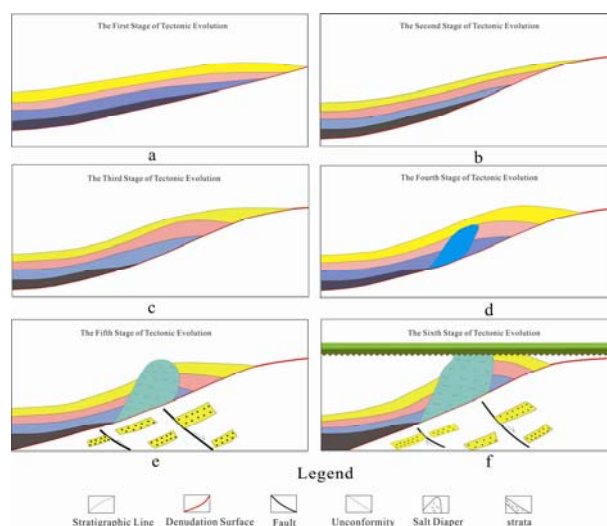


Fig. 1. The tectonic evolution model of Tankou.

At the Jinghezhen group, the second act of the Himalayan movement began to move. Influenced by the tension stress, the activities of the fault and the salt

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diaper became strong, resulting in the whole overlying strata being pierced (Fig.1.e). During the late of Jinghezhen group depositional stage, influenced by the extrusion stress, the whole basin uplifted and was denuded. The strata of the slope was also denuded in varying degree. When the Guanghuasi group depositional stage, the basin accepted the deposition again, the Guanghuasi group is in unconformable contact with the Jinghezhen group (Fig.1.f).

3 Sequence characteristics of saliferous strata

In the base level change cycle, with the move of the accommodation in different base-level position/geographical position, in the time domain and space domain, A/S (Accommodation/Sediment Supply) changing. Due to the influence of tectonic cycles and climate cycles, the salinity of the lake basin is also changing, resulting in wide rhythmic halite deposits.

Qianjiang group is the saline strata that has four saline zones, and a large number of halite deposits have been developed (Fang Zhixiong, et al, 2003). The thick rock salt has a good indication for the division of sequence, that means the base level is minimum, the climate is dry, the lake basin water concentrate, the supply of the detritus is insufficient and halite deposits is abundant (Yin Yanshu, et al, 2008). Influenced by tectonic movement, salt strata flowed plastically, causing overlying strata is deformed. With the continuous strengthening of tectonic movement, salt rock upwelling, the overlying strata slipped until it was pierced and mixed in sandstone. Because of primary sedimentation and salt mix, fine stratigraphic correlation becomes more complicated.

In the process of the stratigraphic correlation, it is found that the distribution range and scale of sand bodies are limited, and the lateral connectivity is poor. In the

stratigraphic framework, where there is no sand frequently correspond the salt, this rule is very significant in the Q4x. The reason for this phenomenon is that the lithologic reservoirs are developed in the area. In order to better exploit oil and gas resources, it's essential to clear the relationship between the sand and salt. On the one hand, the sand and salt can be in the same time, in the same system tract. During the deposition process, the lake basin was in the low water period, the debris formed lobes at the entrance to the lake. Meanwhile, the salt concentration in the lake basin becomes higher, due to the large evaporation, and the mineral saturated precipitation forms the halite deposits. On the other hand, influenced by the later tectonic movement, plastic flow of the salt rock caused the slippage and mix of the sandstone, so the sandstone was broken up.

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