Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.18083

Distribution of different quality shale in Wufeng-Longmaxi Formation in the middle and upper Yangtze region and its oil and gas geological significance

FU XIAO DONG[1], CHEN YANA[1], WENZHENG LI[2] AND WANG XIAOFANG[1]

[1]PetroChina Hangzhou Research Institute of Petroleum Geology
[2]PetroChina Hangzhou Research Institute of Geology
Presenting Author: 19217206@qq.com

The Wufeng Formation-Longmaxi Formation (O_3w-S_1l) is an important hydrocarbon source rock and shale gas exploration target layer in the middle to upper Yangtze area. It is of great significance to define the distribution of thickness of different quality source rocks for both conventional and unconventional natural gas exploration. Based on the experimental analysis of a large number of drilling cores and outcrop samples, TOC logging evaluation 2D and 3D seismic data interpretation and inversion, the distribution of different quality source rocks in O_3w-S_1l Formations has been revealed, and the new hydrocarbon generation center has been found.

In the middle to upper Yangtze area, the thickness of shales with TOC>0.5% in O_3w-S_1l formation is 15-250m, the thickness of shale with TOC>1.0% is 10-200m, the thickness of shales with TOC>2.0% is 5-90m, and the thicknes of shale with TOC>3.0% is 0~50m.The distribution of excellent shales(TOC>2.0%) is mainly controlled by several archicontinents such as central Sichuan, central Guizhou and southern Hannan, and Yichang underwater paleo-uplift. From deep-water shelf sedimentary area to archicontinent or paleouplift,the thickness excellent shale gradually decreases. The thickness of excellent shale in East Sichuan-West Hubei and South Sichuan-North Yunnan is the largest followed by Northeast and North Sichuan areas. On the contrary,the thickness of excellent shale in northwestern and southwestern Sichuan,western Hunan is small, and the source rocks in central and western Sichuan have been denuded. In different regions, the TOC of the source rocks of the O_3w-S_1l Formations shows five types of vertical variation trends, reflecting different sedimentary evolution processes.

The source rock of O_3w-S_1l Formations has great hydrocarbon generation potential with hydrocarbon gas generation intensity mainly distributed in $10\text{-}100\times10^8/km^2$. Five hydrocarbon generation centers have been identified.based on the distribution of excellent shale of O_3w-S_1l Formations,two types of fine plays for conventional natural gas exploration and favorable zones for deep shale gas exploration are pointed out.