

Impact of gypseous-salt on hydrocarbons generation and evolution of source rocks in the Dongpu Depression, Bohai Bay Basin

LI SUMEI^{1*}, CHEN XIANFEI², LIU DONG², JI HONG²

¹ State Key Laboratory of Petroleum Resource and Prospecting, China University of Petroleum, Beijing 102249, China (*correspondence: smli@cup.edu.cn)

² College of Geosciences, China University of petroleum, Beijing 102249, China

Dongpu Depression is one of the most important depressions in the Bohai Bay Basin bearing abundant hydrocarbons with most of them generated from saline source rocks the north of the depression. Thick gypsum-salt layers could be perfect cap rocks due to its superior seal capability. Gypsum-salt also has a great influence on the hydrocarbons generation and thermal evolution of source rocks because of its high thermal conductivity [1] and capability as catalyst. A comprehensive study was performed to investigate the impact of gypsum-salt by geological and geochemical methodologies. It was observed that gypsum-salt body significantly controls characteristics of the surrounding source rocks and the relevant oils. The kerogen type and TOC of the saline source rocks coexisting with gypsum-salt body in the North Dongpu Depression is much better or higher than those of the freshwater source rocks in the South Dongpu Depression. It was also observed that oil generation window would be expanded if the thickness of interbedded gypsum-salt is over 50 m in the Dongpu Depression, and both the oil and wet gas window would be enlarged within a certain increase of salt rock thickness. Different thermal evolution trends for the source rocks overlying and underlying massive gypsum salt rocks were observed from biomarker parameters such as C_{29} sterane $\alpha\beta\beta/(\alpha\alpha\alpha+\alpha\beta\beta)$ and diasteranes/regular steranes ratios. The maturity of the subsalt source rocks is obviously restrained whereas those overlying gypsum-salt are significantly encouraged. This study is implicative for further oil and gas exploration in the area.

[1] Mello et al (1995). *Marine and Petroleum Geology*, 12(7): 697–716.

ACKNOWLEDGEMENTS: This study was funded by the Natural Science Funding Council of China (Grant Nos. #41673055 and #41473047).