

PS Exploration Practice of Subtle Reservoirs in Slope Zone of Shaleitian Uplift in Bohai Bay Basin*

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Abstract

Shaleitian Uplift is in the central part of Bohai Bay Basin. Surrounded by several hydrocarbon depressions, the Shaleitian Uplift has excellent hydrocarbon accumulation conditions and abundant oil and gas reserves. Experienced complex tectonic and sedimentary evolution history, the Shaleitian Uplift has various hydrocarbon migration pathways and multiple types of subtle entrapments formed on it. This makes the uplift have great exploration potential of subtle reservoirs. To locate favorable exploration targets accurately in the slope zone where the exploration degree is lower, we study geologic conditions especially some key geological factors of all kinds of subtle entrapments systematically in Shaleitian Uplift. In our study, ant tracking algorithm together with genetic inversion and several other technical methods are adopted to identify and describe the key geological factors such as deep sandstone lens, unconformities, fault systems, special lithologic cap rocks and shallow fluvial facies sand bodies. Based on our knowledges of these geological factors above, we built a geologic model for the whole Shaleitian Uplift to describe spatial associations of main strata and the key geological factors. In the geologic model, all the subtle entrapments are more obvious and the favorable exploration targets are easier to be located. Among these exploration targets, with favorable hydrocarbon accumulation conditions, multiple subtle entrapments and large potential hydrocarbon resources, C11-E Structure attracted attention. In this structure, large dip angle strata together with fault system, unconformity surfaces, cap rock with various lithology and reservoirs with various sedimentary facies create rare conditions for the formation of all kinds of subtle reservoirs. In recent years, reserves in C11-E Structure has been explored and evaluated. More than 20 subtle reservoirs including lithologic up dip pinch out reservoir, stratigraphic unconformity reservoir, stratigraphic overlap reservoir, sandstone lens reservoir and composite reservoir are discovered, and large proven reserves are obtained by 1 appraisal well. The successful evaluation of C11-E Structure helps us get more geological knowledges about hydrocarbon accumulation conditions of subtle reservoirs and confirm great potential reserves of subtle reservoirs in Shaleitian Uplift. It also provides a reference for exploration and evaluation of other structures on Shaleitian Uplift.

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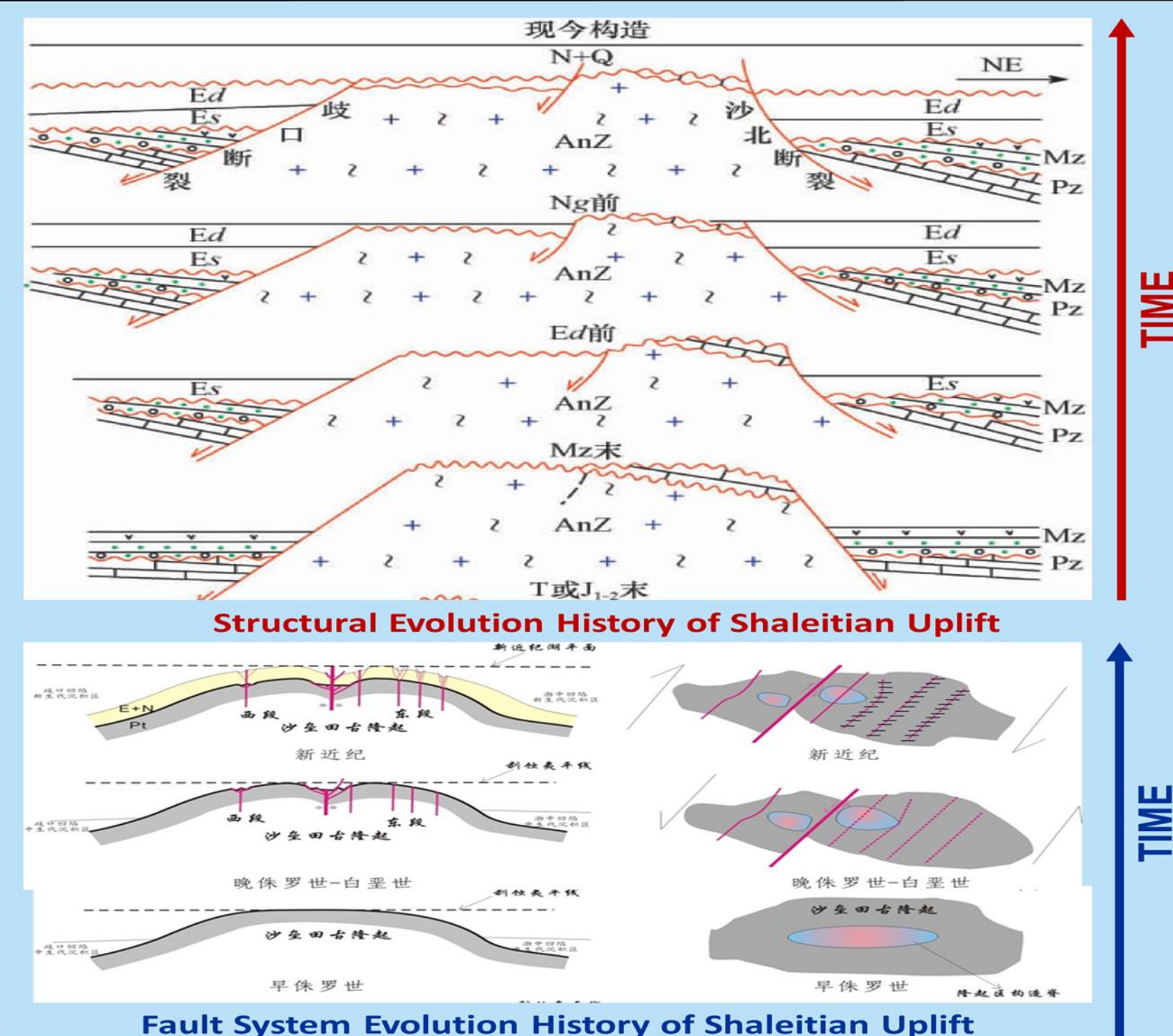
(China National Offshore Oil Corporation (CNOOC) Limited, Tianjin, China)



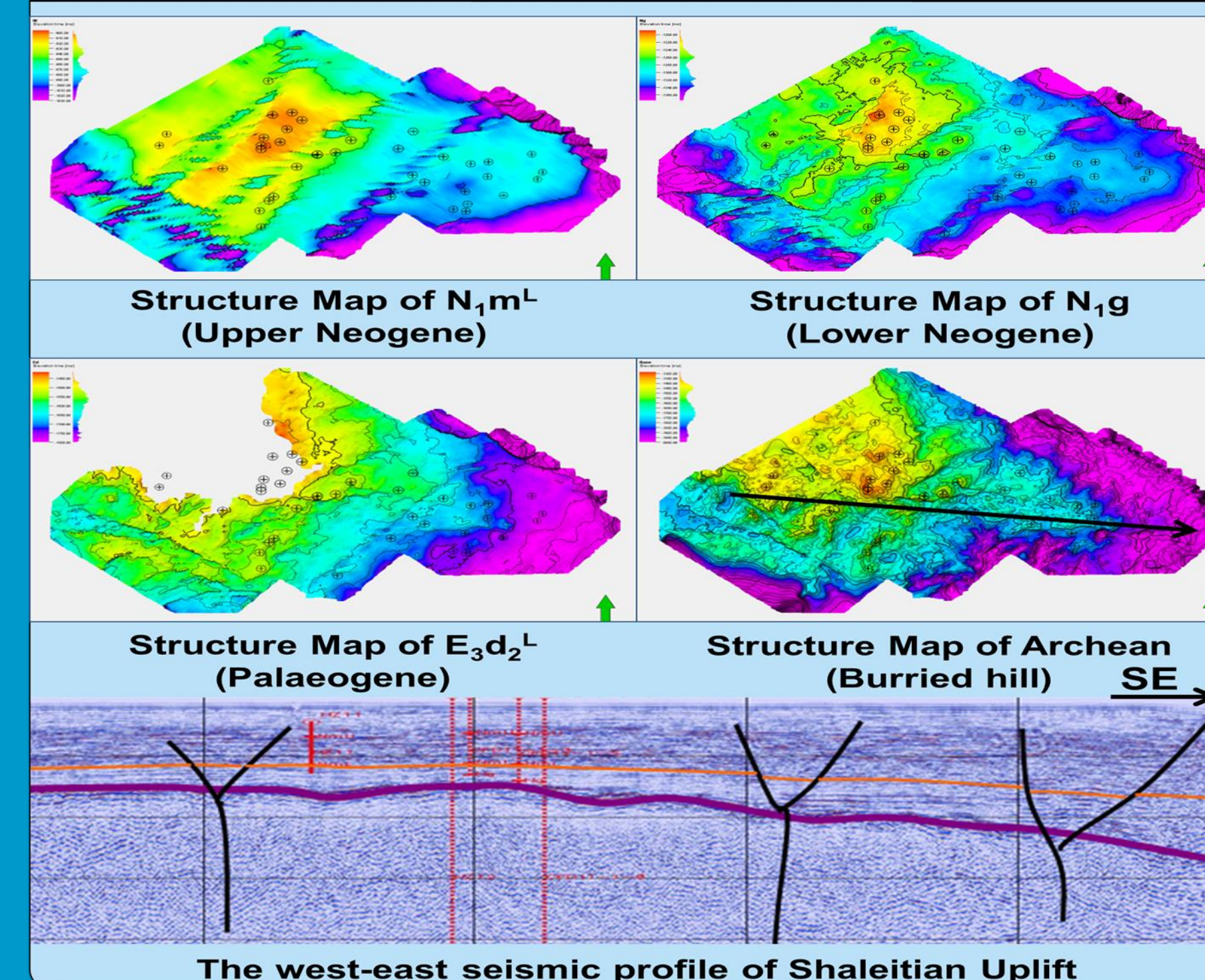
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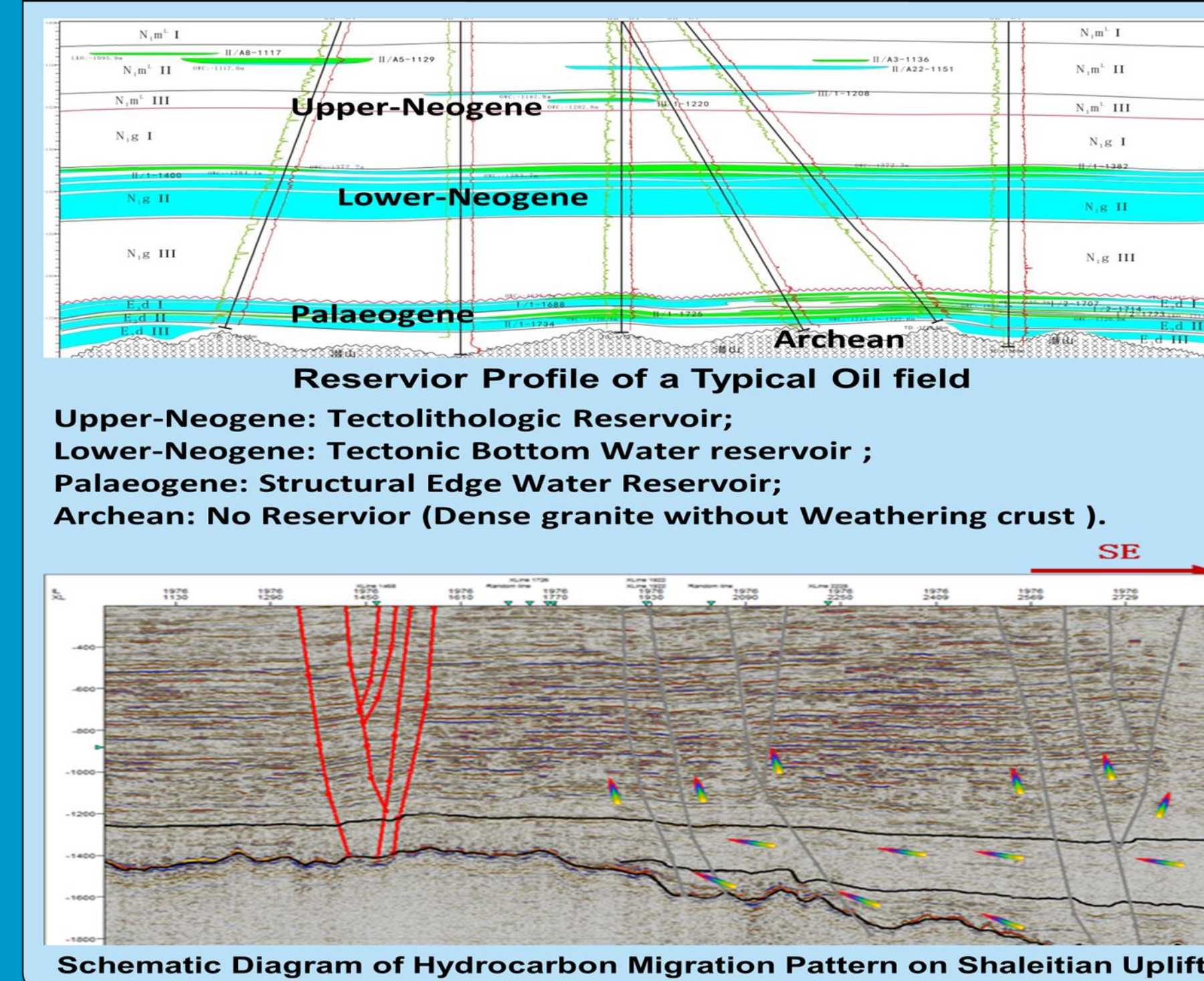
2. Regional Tectonic Evolution



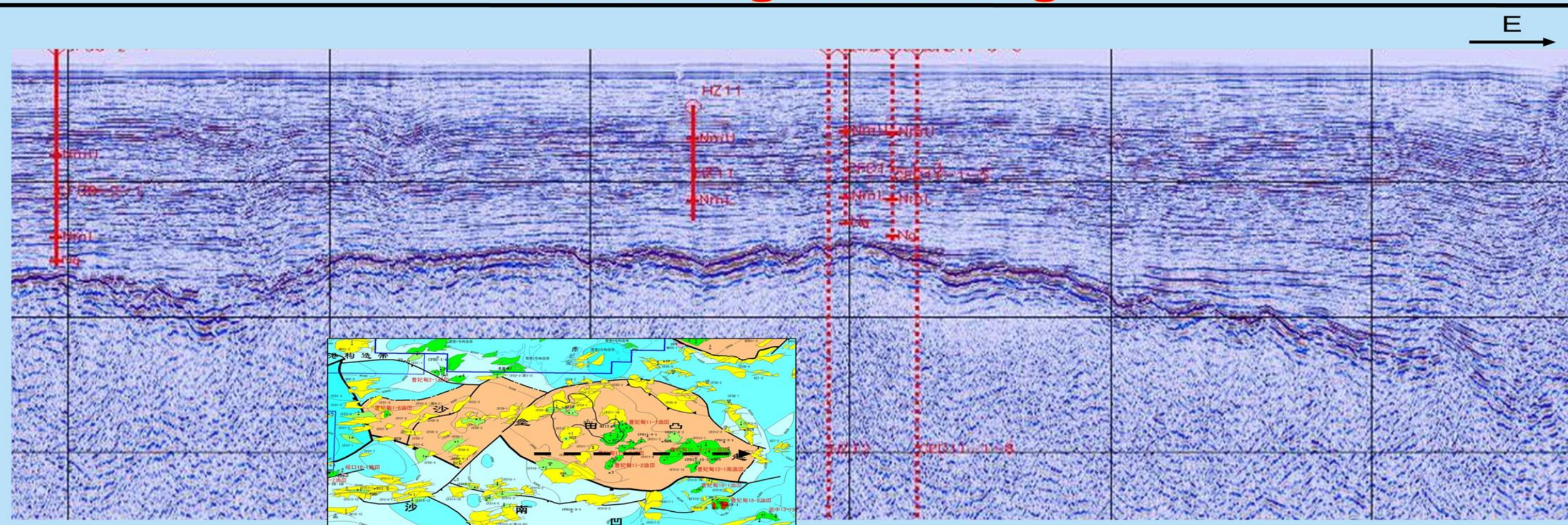
3. Tectonic Characteristics



4. Reservoir Types

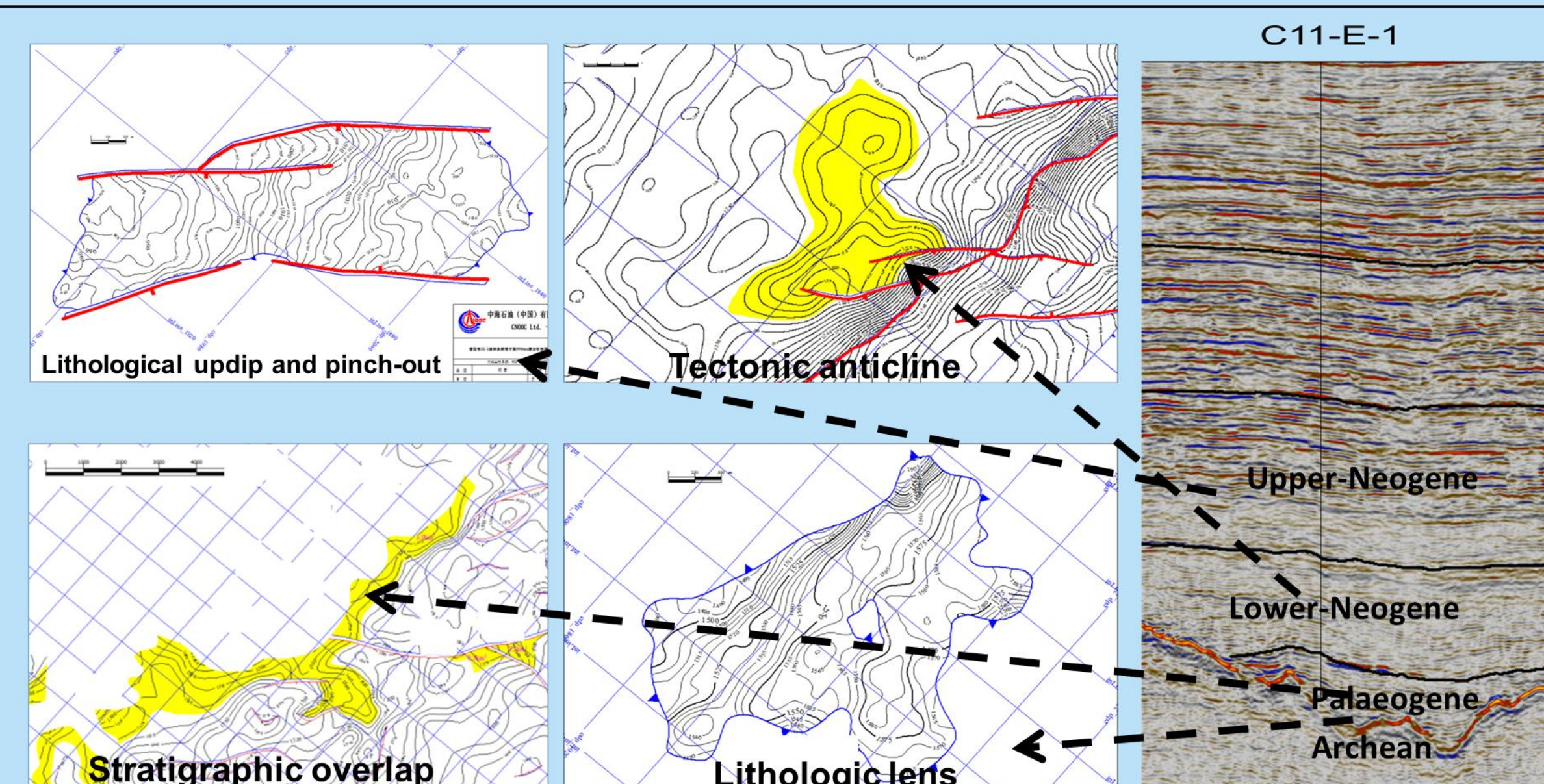


1. Geological Setting



- **Location:** Western of Bohai Bay Basin, North China;
- **Structure :** Surrounded by three hydrocarbon-generation sags, contacted with fault systems and slope;
- **Stratigraphy:** Ar (buried hill), Palaeogene (partly), Neogene ;
- **Sedimentation and Lothology:** Archean-Granite, Palaeogene-delta and fan delta, Neogene-braided river and fluvial.

5. Exploration Targets & Results



6. Conclusion

There are many potential subtle reservoirs in the slope zone of eastern block of Shaleitian uplift, among which the overlap reservoirs on the top of buried hill, the overlap reservoirs of Dongying Formation and the barrier reservoirs, the overlap reservoirs of Guantao Formation and the lithologic updip pinch-out reservoirs of Minghuazhen Formation have large-scale resources and

7. Acknowledgments

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