



CAGG-AGH-2019

INTEGRATED GEOLOGICAL AND GEOPHYSICAL DATA TO PREDICT MIOCENE DEPOSITIONAL ENVIRONMENT EVOLUTION IN THE NORTHERN PART OF SONG HONG BASIN, VIETNAM

Ha Quang MAN¹, Bui Viet DUNG², Nguyen Van KIEU³, Vu Minh HANG⁴

¹*Petrovietnam Exploration Production Corporation, 117 Tran Duy Hung, Cau Giay, Hanoi, Vietnam, manhq@pvep.com.vn*

²*Vietnam Petroleum Institute, Petrovietnam, 173 Trung Kinh, Hanoi, Vietnam*

³*PhD student at AGH University of Science and Technology, Krakow, Poland*

⁴*Institute of Oceanography and Environment, 10 Lang Stress, Dong Da, Hanoi, Vietnam*

Introduction

Song Hong Basin is one of several Cenozoic basins located in the northern South China Sea, offshore Vietnam. The basin contains several oil and gas discoveries. These discoveries contain two types of reservoirs: pre-Cenozoic Carbonate basement and Miocene clastics. Despite being extensively explored, the paleoenvironmental evolution of the basin has not been described in detail. In this study, we aim to reconstruct the time stratigraphic development of Miocene depositional environments based on geological and geophysical data.

Methodology

In this study, we combine sediment cores, well-logs, biostratigraphy samples, and seismic surveys to reconstruct the time stratigraphic development of Miocene depositional environments. Our workflow involved five major steps (Fig 1a):

- 1) Analyze the depositional environment and biostratigraphy from sediment core samples in wells where this data is available;
- 2) Correlate these results with well-log shapes to construct the well-log facies for each depositional environment;
- 3) Integrate the well-log facies with biostratigraphy to interpret the depositional environment for all wells in the study area;
- 4) Combine structure maps, isopach maps, seismic facies analysis, and well-log facies analysis to create Gross Depositional Environment (GDE) maps.
- 5) Combine the above to predict the evolution of the Miocene depositional environment in the northern part of the Song Hong Basin, Vietnam.

Results

The results of this study indicate that the Miocene depositional environment in the Northern Song Hong basin varied from fluvio-deltaic in the northwest to pro-delta and shallow marine environment in the southeast. The main source of sediment supply was from the paleo-Red River in the northwest. The incised fluvial channel and shoreface sands are important reservoirs of Miocene sediments in the Northern Song Hong Basin (Fig. 1b).

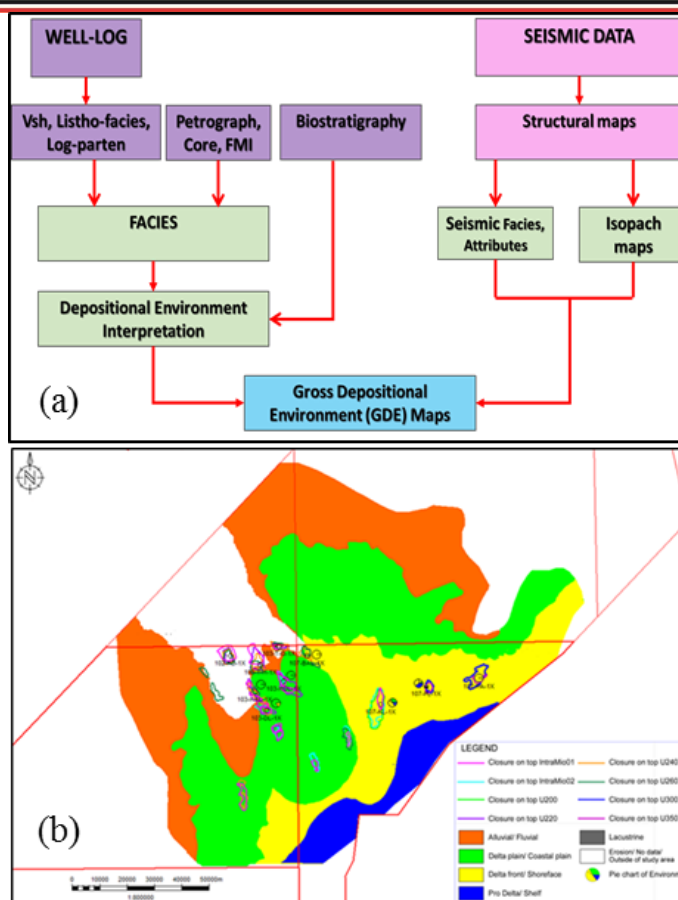


Figure 1. (a) The workflow in this study; (b) One of the Gross Depositional Environment (GDE) map of Miocene sequence.

Conclusions

The study has documented evolution of depositional environments for Miocene mega sequence in the Northern Song Hong basin. This result can be used as a predictive tool in the evaluation of the petroleum systems in the area.

References

- Briaux, A., Patriat, P. & Tapponnier P., 1993. Updated interpretation of magnetic anomalies and seafloor spreading stages in the South China Sea: implications for the Tertiary tectonics of Southeast Asia. *Journal of Geophysical Research*, 98, 6299– 6328.
- Clift, P.D. & Sun, Z., 2006. The sedimentary and tectonic evolution of the Yinggehai-Song Hong Basin and the southern Hainan margin, South China Sea; implications for Tibetan uplift and monsoon intensification. *Journal of Geophysical Research*, 111 (B6, 28).
- Hoang L.V. et al., 2010. Large-scale erosional response of SE Asia to monsoon evolution reconstructed from sedimentary records of the Song Hong-Yinggehai and Qiongdongnan basins, South China Sea. *Geological Society of London, Special Publications*, 342, 219–244. DOI: 10.1144/SP342.13.
- Kenneth T. Peters, Clifford C. Walters, and J. Michael Moldwan, 2005. *The Biomarker Guide, Volume 1: “Biomarkers and isotopes in the environment and human history.*