Lithofacies and Sequence Stratigraphy of Saraburi Group Located in Na Din Dum Village, Mueang District, Loei Province, Thailand

Boonnarong Arsairai*[1], Piyatida Sangthong[2], Peerawat Kongurai[3], Chintana Titarawat[1], Boonpitak Sitsart[1], and Waraporn Matra[1]

[1]Suranaree University of Technology – Thailand
[2]Mahidol University (Kanchanaburi) – Thailand
[3]Suranaree University of Technology – Thailand

Abstract

The platform carbonate rocks had been underlaid in northeastern Thailand are assessed as high petroleum potential. Accordingly, lithofacies and sequence stratigraphy were classified for providing more natural gases. Outstandingly, the Ban Na Din Dum section was petrographically studied in detail. Then 6 lithofacies were classified; intraformational conglomerate facies (FA1), dolomitic conglomerate facies (FA2), brachiopod rudstone facies (FA3), shale interbedded with thin-bedded micrite and grainstone facies (FA4), thin-bedded limestone and muddy siltstone facies (FA5), and fine-grained rocks with bioturbation and bivalve facies (FA6). That FA1-FA2 were indicated to outer ramp and further location respectively in process of low stand system tract (LST). FA3-FA4 were indicated to lagoon in system tracts of early and rapid transgression (TST). FA5-FA6 were specified to intertidal zone and sand shoal respectively during high stand system tract (HST). Lastly, the source rock potential was higher on FA3 due to unicellular organisms accumulated.

1. Introduction

Thailand is developing country that needs more energy distributing to all segments. The high petroleum potential was mainly focused on the northeastern part due to the platform carbonate rocks having been underlaid. These rocks can be formed as a source, reservoir, and seal rocks which can be provided more natural gases. So that the objective of this project is to classify the lithofacies and sequence stratigraphy as well as petroleum system evaluation of the carbonate Saraburi Group. Outstandingly, the carbonate rocks in area of Na Din Dum village, Muang district, Loei province are interesting.

2. Methods

The outcrops used for lithofacies and sequence stratigraphy were studied and described in detail emphasizing sedimentary structures, textures, and associated macrofossils. Then samples were collected and prepared as thin sections. Petrographically, they were looked through the polarized light microscope (Eclipes Ci-Pol) following Dunham (1962) and Flügel (2004) at Mahidol University (Kanchanaburi).

*Speaker

3. Results and discussion

The stratigraphical section was named as the Ban Na Din Dum that is mainly composed of intraformational conglomerates, brachiopod rudstone, bioclastic grainstone, micrite, shale, and marlstone, siltstone, and fine-grained sandstone with bioturbation and bivalve. Then 6 lithofacies were analyzed; intraformational conglomerate facies (FA1), dolomitic conglomerate facies (FA2), brachiopod rudstone facies (FA3), shale interbedded with thin-bedded micrite and grainstone facies (FA4), thin-bedded limestone and muddy siltstone facies (FA5), fine-grained rocks with bioturbation and bivalve facies (FA6). They were indicated to marine environment which FA1 was specified to outer ramp although the finer and rounder-grained conglomerate (FA2) was far away. They were the results of sea level fall during low stand system tract (LST). FA3 was indicated to inner ramp or lagoon because of sea level rise controlling by early transgressive system tract (TST). Then the sea level rapidly fluctuated rose which 7 sequences of shale, micrite, and grainstone (FA4) with oncolith, foraminifera, and radiolarian were indicated to outer ramp in TST process (high sediment influx). FA5 with cyanobacteria and spicule was specified to intertidal zone as well as subtidal zone. Lastly, finer-grained rocks with bioturbation, brachiopod, cyanobacteria, and lesser associated plant fragments (FA6) were indicated to coarsening upward sequence of sand shoal. FA5-FA6 were probably referred to high stand system tract (HST) in which slow sea level rise and wave dominance. Therefore, FA3 has good source rock potential that accumulates unicellular organisms such as algae, plant debris, and organic matter.

4. Conclusions

The Na Din Dum section has high petroleum potential which can be provided more gases by classifying lithofacies and sequence stratigraphy. Then 6 lithofacies were classified; intraformational conglomerate facies (FA1), dolomitic conglomerate facies (FA2), brachiopod rudstone facies (FA3), shale interbedded with thin-bedded micrite and grainstone facies (FA4), thin-bedded limestone and muddy siltstone facies (FA5), and fine-grained rocks with bioturbation and bivalve facies (FA6). That FA1-FA2 were specified to outer ramp during LST. FA3 was indicated to lagoon and changed to FA4 during seven cyclical rises in TST. FA5 and FA6 were specified to intertidal zone and sand shoal respectively during HST. Lastly, FA3 accumulating the unicellular organisms has good source rock potential.

References

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