NUMERICAL SIMULATION OF BIOGENIC GAS PLAY OFFSHORE MYANMAR

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Introduction

Biogenic gas is an interesting topic and have become important in the exploration industry. This makes it more important to understand and enhance the numerical 1D, 2D and 3D modelling to improve the prediction of the area and the amount of generated biogenic gas.

Commercial quantities of methane gas were discovered in the Plio-Pleistocene reservoirs, offshore Gulf of Moattama, Myanmar. The gas is structurally trapped in lower delta plain to shoreface bar, tidal channels and distributary channel sandstones. Biogenic gas accumulations are distribute between 500-1900 meters sub-sea. Gas accumulations are of biogenic origin, which was proven by its dryness (>99% methane) and enriched light isotope character (δ13C ranging from 60 to 70 ‰).
The Zawtika-1 well was drilled in 2005 by PTTEPI upon a seismic amplitude anomaly. Since the discovery of biogenic gas in Zawtika-1, the Moattama Basin turned into an active exploration area. PTTEPI, operator of the Zawtika field is willing to develop and to understand the key factors that control the biogenic gas generation within this area of interest. PetroMod software has been used to quantify the factors that control the level of biogenic methane production such as

1- Anoxia

2- Sulfate-deficiency

3- Low temperature (≤ ˚80C)

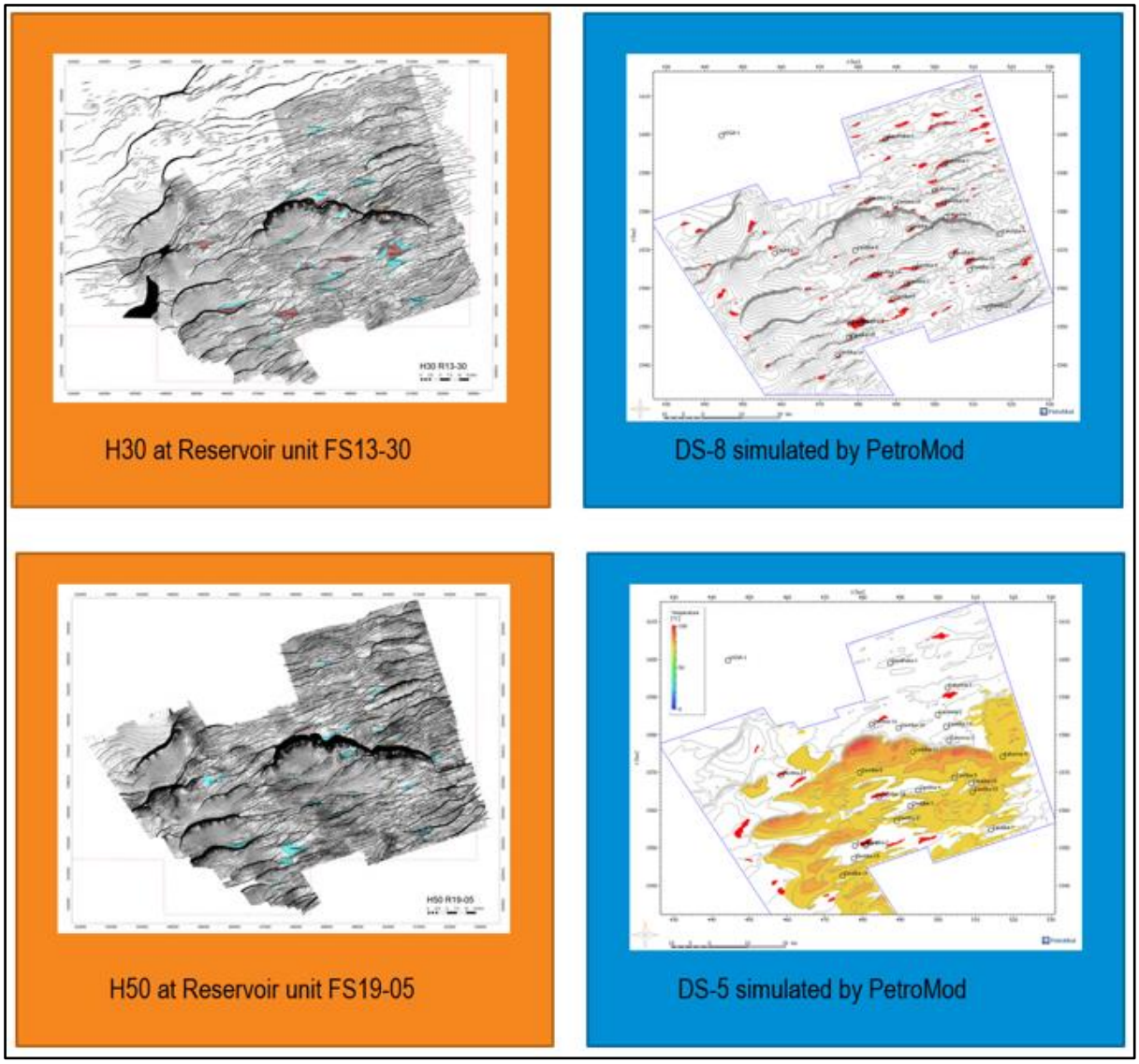
4- Availability of organic matter

5- Sufficient space

6- Timing

The study incorporates geological maps in the area (based on depth-converted interpreted seismic), RockEval data, well tops, pressure and temperature data from ~6 wells, regional geology references and data from the analogue basins.

The numerical 3D model manages to address the generation of biogenic gas in existing fields, the Zawtika well area. For the prospects in the basin the charge modelling works to supply biogenic gas to the traps and the initial simulations showed a good match to the observations from drilling shown in Figure 1. The model results show that in the deeper reservoir units, there are larger but a smaller number of accumulations that were expected. On the contrary, the shallower sequences do show smaller but more accumulations.



Conclusions

A concept of biogenic gas preservation has been introduced. As the model shows short migration pathways, a trap or seal formation had to be in place very early. The presence of paleo-hydrates might have had an impact on sealing the biogenic gas coming from the initial gas generation stage.
Presenting the results of the biogenic gas assessment, it clearly demonstrates that biogenic gas was generated and migrated vertically, with a large amount of the generated gas being lost due to a lack of an effective seal.

References

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