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3D Forward Stratigraphic Modeling of the Rub Al Khali Wasia Formation - A Case Study

K. Leyrer* (Saudi Aramco) & P. Van Laer (Saudi Aramco)

SUMMARY

Since a few years, the vast area of the Rub' Al Khali enjoys increased attention in the search for hydrocarbons. Despite the fact that huge amounts of new data have been acquired and new seismic and drilling activity is still ongoing, the overall quantity of data is rather sparse compared to the size of the area to be explored. In addition to this, the available legacy data is mostly sketchy and sometimes has quality issues to it.

To overcome the data limitations in this frontier basin, it was decided to perform 3-D forward stratigraphic modeling using the software DIONISOSTM and consequently to support exploration activities on a regional scale.

Available internal as well as published geophysical, petrophysical and geological data sets have been used as input and contributed considerably to reduce uncertainty in the modeling results. Continued cross-checks with the latest results from all geoscience disciplines involved, ensure high-quality modeling products which, in combination with the results of other analytical approaches, can be used to guide upcoming exploration activities.

The 3-D forward modeling is not only able to reproduce temporal and spatial occurrences of source rocks, reservoirs and seals and therefore complements existing knowledge but also gives valuable insights into so far unexplored areas of the Rub' Al Khali. It allows for the identification and subsequent tracking of individual facies belts and consequently adds to the generation of reliable geological models. Furthermore, the reconstruction and quantification of crucial depositional parameters allows for the testing of existing models and enables the generation of sequence stratigraphic frameworks, which can be used to improve the understanding and prediction of exploration-relevant geobodies in a regional context and scale.