

## **Integrating 3D seismic data to improve the geological understanding of the Mishrif carbonate reservoir, Rumaila Field, South East Iraq**

Olabode J. Olatoke<sup>1</sup>, Christoph Lehmann<sup>1</sup>, Kenneth Tough<sup>1</sup>, James A. Gardner<sup>1</sup>

<sup>1</sup>BP, Sunbury-on-Thames, UNITED KINGDOM

### **ABSTRACT**

The first 3D seismic dataset over the giant Rumaila field in South East Iraq was acquired in 2012. Over 1800 km<sup>2</sup> of high-fold, wide-azimuth seismic was acquired using the ISSN™ simultaneous source technique. The dataset underwent a bespoke ISSN processing sequence that included a Kirchhoff Pre-Stack Time Migration (Pre- STM) imaging in 2013. This abstract focuses on the complex seismic character of the Upper Cretaceous Mishrif carbonate reservoir and illustrates how the 3D seismic data is helping to improve the geological understanding of the reservoir. It highlights how acquisition and processing techniques can result in good seismic data quality in a challenging brownfield environment. The core of the article focuses on how seismic attributes are being used for predicting reservoir character with varying degrees of confidence – and how these predictions are being integrated into the geological models.

The new 3D seismic dataset has recently been interpreted and been compared to a geological model that was based on more than 700 wells, mainly drilled along the crest of the structure. Primary input to the geological model was well and core data, with depositional elements derived from 3D modelling parameters and trends. The availability of 3D seismic presented a unique opportunity to compare the seismic attributes to the geological model. Some of the large- scale depositional elements such as platform margin and interior-shoals, coral reef margins, and lagoonal deposits were delineated in the pre-seismic geological model. The 3D seismic has been able to validate and refine some of these depositional features with tidal channels, tidal deltas, and sink holes identified on various seismic attributes and sections. Therefore, even with a high density of wells, 3D seismic is proving to be an insightful, complimentary tool, especially away from well control.

The integration of the well and seismic interpretation has resulted in updates to the geological model and are expected to be tested as more production wells are drilled.