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Prospecting and Modelling the Deepwater Turbidite Through Integrated G&G Studies

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Abstract

The study was focused on the Sheryl field located in Block 21/23a, Central North Sea, UK. This field was discovered in the Eocene Tay deepwater turbidite reservoir. A robust conceptual geological model was constructed via an integrated approach of utilising the rock physics forward modelling, seismic attribute and geological data for the purpose of further prospect evaluation and static model building.

Rock physics forward modelling was conducted prior to seismic data interpretation to build a geophysical database comprising the analogues of seismic responses under different rock properties and pore fluid contents. This database was used to enhance the accuracy in seismic data interpretation. The forward modelling results concluded that the MuRho ($\mu\rho$) and LambdaRho ($\lambda\rho$) parameters could be used as a lithology and fluid type indicators respectively. The AVO modelling showed that brine, oil and gas saturated sands are characterised by Class I, Class II to IIp and Class III AVO responses respectively.

The MuRho ($\mu\rho$) data was used along with the seismic reflectivity data to minimize the uncertainty in mapping the top and base of the reservoir, which will enhance the accuracy of the horizon based attribute calculations. In addition, the MuRho ($\mu\rho$) data was used as a tool to indicate the sand distribution in 3D space, in order to constraint the shale volume (Vsh) and porosity population within the static model.

Technical Contributions:

- 1) Demonstrate the use of integrated G&G approach in seismic attribute interpretation and prospect evaluation.
- 2) Making use of the G&G understandings in a mature field to minimise the risk in exploring the subtle stratigraphic traps.