

Oman: Seismic Quantitative Reservoir Characterization Examples

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Abstract

Reservoir characterization plays a pivotal role in Oman's oil and gas industry, driving efficient exploration, development, and production strategies. Given the diverse geological formations across Oman's oil fields, accurate reservoir characterization is crucial for optimizing recovery rates and minimizing operational risks. Being mostly onshore, the quantitative reservoir characterization techniques in Oman are challenged. This mainly due to the complex nature of Oman's geology coupled with the well-known issue of seismic multiples contamination of the seismic data. We received a state-of-the-art seismic dataset that has addressed the issue of the multiples contamination and our next step was to push this seismic product to quantify reservoir quality distribution. Our challenge is, how can we extract more from the seismic data with a degree of confidence that allows us to make informed decisions?

In this work we present two cases where we utilize the seismic inversion products calibrated to the well logs to understand reservoir quality distribution and high grade well placement both for development and exploration scenarios. Our first example covers the correlation of diming of amplitudes from our inversion products with structural elements and available production data. These structural elements seem to have an impact on the seismic attribute response and might be impacting the well performance. Our study suggests that acoustic impedance is decoupled from porosity, hence the seismic attribute alone has no reservoir prediction power; but indications of geologic controls on production have been better explained.

Our second example demonstrates how integration of well results and detailed seismic interpretation within a sequence stratigraphic framework can shed light to new concepts in a well know area. We have identified patters in the well logs that after re-evaluation suggest the presence of a new reservoir unit not identified before. Our study also suggest that the extent of this reservoir is limited to a specific area structurally controlled. We were able, with the limited calibration available, to produce reservoir quality predictions using the seismic data available and support the maturation of a possible new play.