Quantitative Interpretation on Presalt Carbonate Reservoir From Deepwater Offshore Angola

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ABSTRACT

Presalt carbonate reservoir imaging has always been very challenging and has become very crucial for geophysical advanced analysis such as quantitative interpretation. It requires a good correlation between the well and seismic data. Various acquisition technique and processing workflows could be applied leading to substantial improvement on seismic vertical resolution and illumination of the rock beneath the salt. Broader frequency bandwidth and the accuracy of velocity cube are essential. Published article on this subject has recognized the successful use of broadband data for such particular case. Kneller et al in 2013 illustrated that with the broader bandwidth especially at the low frequency side could give an improvement on the seismic inversion process compares to using conventional dataset. Results on quantitative geophysical interpretation carried out on presalt carbonate interval in the deepwater offshore Angola demonstrated that the details rock physics analyses is crucial approach for presalt imaging. Mechanism includes rock sensitivity analysis and elastic inversion were performed to predict the carbonate facies extension from the offset well. Processed seismic velocity derived from processing result found to be imperative as an inputs for the time-depth analysis and inversion process in this project. In addition, seismic attribute analyses also been conducted to develop better understanding of the structure development within the area. A 3D broadband seismic, seismic velocity and one presalt well data were used as main inputs for this study. A Kirchhoff pre-stack depth migration with input of anisotropic velocity model were used in order to produce the seismic data that would have better definition and good imaging in the presalt layer. Results then supported with a very sound geological model indicated that a good elastic inversion had been achieved and it nicely calibrated to the offset well. In conclusion, the study results demonstrated that the right seismic velocity model is crucial for Quantitative Interpretation application to support frontier exploration even at early stage. Hence to improve presalt prospect understanding and to a point de-risking exercise. The proposed workflow is recommend to be applied for future presalt reservoir characterization evaluation.