

Seismic interpretation and inversion leading to an accurate reservoir characterization in a Central Luconia carbonate field, offshore Sarawak, Malaysia

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Abstract: Seismic data acquired in the field show the subsurface reflectors or horizon among the geological strata, while the seismic inversion converts this reflector information into the acoustic impedance section which shows the layer properties based on lithology. The research aims to predict the porosity to identify the reservoir which is in between the tight layer. So, the output of the seismic inversion is much more better than the seismic as it is closer to reality such as geology. Seismic inversion is frequently used to determine rock physics properties, for example, acoustic impedance and porosity. Carbonate reservoirs exhibit complex pore structures and heterogeneity which increases the difficulty of their characterization. In this research, we aim to predict the porosity of the carbonate reservoir in Central Luconia, Sarawak. The objectives are accomplished through a cross-plot of porosity and acoustic impedance (AI) (Bashir *et al.*, 2019). We also utilize the seismic attribute interpretation and deterministic seismic inversion for this research. Acoustic impedance result from seismic inversion is compared to porosity in the zone of interest. The correlation in the zone of interest indicates the porosity estimate in the range of 10% - 35%. With help from the inversion results and porosity-impedance relationship, a conclusion is drawn that the zone of interest has the potential for a hydrocarbon reservoir. The novelty of our method is to integrate multiple geophysical approaches such as seismic attribute, interpretation, and seismic inversion in delineating reservoir which shows the possibility of hydrocarbon accumulation.

Keywords: Seismic, porosity, hydrocarbon reservoir