

Application of Seismic Attributes Analysis in the Prediction of Channel Sand Development and Lateral Continuity: A Case from Some Part of Offshore Niger Delta

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Seismic attribute analysis of "Tee-Tee Field", Niger Delta was carried out with a view to predicting the channel sand development and lateral continuity within a stratigraphic package identified between 3.0-4.0 seconds. The study was also to determine if hydrocarbon is present within the package in order to determine optimal well location. Poststack seismic inversion techniques were used to get quantitative Acoustic impedance (AI) values from seismic reflectivity volume. Acoustic impedance volumes produced from seismic inversion were later converted to a lithology cube for Individual channel interpretation,

Complex attributes extracted from horizons close to the top and bottom of the channels were used for lithological differentiation, facies identification and hydrocarbon mapping. RMS amplitude and variance attributes were utilized for paleogeography, facies analysis, and mapping of sand thickness; while acoustic impedance was used for porosity determination.

The results of this work showed a cross-plot between acoustic impedance and porosity which reveal a relatively linear relationship with higher porosity associated with low acoustic impedance and vice versa.

The 3D visualization of the facies and the paleogeography using an RMS amplitude and variance attributes concluded that the channel geometries and gross sand distribution in the formation are highly affected by the presence of paleohighs and faulting at the time of its deposition. These faults then controlled the channel geometries, porosity and gross sand distributions. The eastern portion of the area experienced more intensive faulting and erosion which increased the porosity of the area, indicative of high potential for hydrocarbon accumulation.