

## Integration of well log and 3D seismic data evaluates AVO anomalies to define well locations at Cocuite-Playuela fields, Veracruz Basin, Mexico

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The tremendous success achieved in the Cocuite Field in delineating sand horizons with seismic amplitude anomaly maps and the subsequent calibration using GR and Resistivity logs, was the starting hypothesis for the exploration in the Playuela 3D seismic cube.

The AVO anomalies identified in the Cocuite Field are Type III, (low acoustic impedance sands, positive IXG and negative FF), indicative of a "Bright Spot" environment. However, the AVO response in Playuela Field turned out to be more complicated. This is because for shallow and deep levels the AVO response is Type III while for mid levels, the anomalies are Type I (high acoustic impedance sands, NEGATIVE IXG, negative FF). Furthermore, in one particular well (Playuela 1), the associated amplitude anomaly is Type II, which is not sensitive for analysis with this type of methodology.

The problem with anomalies in sandstones with an AVO type I response, is that amplitude maps show a strong amplitude anomaly in the presence of water. It is for this reason the amplitude extraction maps alone cannot differentiate water from gas. Although for sand anomalies with AVO II, there is no seismic amplitude anomaly in the presence of gas (due to the fact it is a Dim Spot), in the presence of water, the anomaly is moderate and could be confused with gas in sands type III AVO.

We have used a methodology that considers both qualitative (color maps) and quantitative (normalized spectra) evaluation alternatives, that allow us to chose the best location to drill a prospect. We will present two case histories where this methodology has proven it's usefulness.

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