

Rock Physics Diagnostic for a Better Understanding of Seismic Attributes in the Acema Area, Eastern Venezuela

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A successful methodology to integrate results from “rock physics diagnostic” and seismic attributes in the Acema Area, Venezuela, is shown on this paper. This methodology has been particularly important on this area, where hydrocarbon’s reservoirs occur in Early Miocene sandstones of the Oficina and Merecure Formations and the trapping mechanism is predominantly stratigraphic.

The rock physics diagnostic performed in the area revealed great opportunities in terms of lithology and porosity identification. Additionally, it showed that it was not possible to distinguish among fluids on the reservoir interval due to the ‘control’ that the rock matrix has over the whole rock-fluid system in terms of densities and wave-propagation velocities.

The rock physics diagnostic was computed from well log information, which limited initially the lateral propagation of results to the whole field. Another restricting aspect to be considered was whether an extrapolation using different frequency-range data (seismic data) would be successful.

Various post-stack seismic attributes from a 3D seismic cube showed interesting anomalies, which were associated to petrophysical parameters thanks to the previous rock physics diagnostic. It was necessary to incorporate all the geological / stratigraphical knowledge of the model to achieve an adequate integration of seismic attributes and rock physics diagnostic conclusions.

Results allowed minimizing considerably uncertainty associated with reservoir properties. It can be concluded that limitations associated to differences between seismic and well data were bypassed.
