Rock Physics for Prediction of Gas Reservoirs, Tertiary Basin of Veracruz

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ABSTRACT

The seismic velocity response is a function of the petrophysical properties of the rocks such as lithology, porosity, and fluids. The goal of the rock physics is to understand and relate the seismic response with reservoirs. With impedance crossplots and related petrophysical properties can be used for distinguishing gas, water, and compacted and clay zones in different stratigraphic levels. By matching the impedance trends to the seismic response, one can predict from seismic information new gas reservoirs and even delimit producing fields. By analyzing impedance crossplots for unproductive wells, using a color scale, the clay volume was observed to exist in the lateral ends of the general trend, with the separation of clean sand over clay, which indicates that the impedance contrast is due to the mineralogical composition of sands in place of the presence of gas. Impedance charts indicate that the separation of interest areas is due to the type of fluid, the mineral composition, porosity, and/or to diagenetic processes such as compaction and cementation. The impedance crossplots analysis with rock physics helps us among other things: identify interest areas, differentiate the type of fluid, reduce business risk, optimize reservoir delineation, and predict new gas reservoirs.

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