

Fizz and Commercial Gas Discrimination in the Colombian Caribbean Sea through AVO Attributes and Fluids Substitution Modeling

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In this work, geophysics and petrophysics has been integrated to evaluate indicators of hydrocarbons to identify and discriminate fizz and commercial Gas, gas saturation lower than 10% and greater than 50% respectively, in the Colombian Caribbean through seismic modeling, fluids substitution and AVO attributes extraction. To achieve this goal we made use of all the information of available well logs and the sensitive analysis of the equation proposed by BORTFELD (1961) as a lineal approximation of ZOEPPRITZ to study the reflection and refraction coefficients.

The inversion of Bortfeld's equation with seismic amplitudes from the case study, it was found Fizz gas (non commercial gas) presence in an AVO anomaly class III, which was initially considered as a possible gas sands reservoir with lower impedance than the suprayacent rock, which is very common in unconsolidated sediments. The results were passed through additional analysis, like cross plot (intercept and gradient) because it was necessary to make a tool validation in exploration projects.

The Bortfeld's equation seems to be an excellent fluid discriminator, because it was observed explicitly the P and S wave velocities behavior, as well as the elastic properties variations of the rocks in function of saturation; For these reasons, Bortfeld's equation is propose as an additional tool to decrease the uncertainty level in hydrocarbon exploration projects, where there is a lack in geological and petro physical information.