

Discrimination of Fluids and Lithologies from Amplitude Versus Offset Derived Seismic Attributes

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Abstract

From the last few decades, the amplitude versus offset (AVO) analysis tools are widely used by exploration, development and production teams to differentiate the reservoir fluids, their saturation and the lithologies in clastic depositional settings. Conventional AVO analysis involves the computation of intercept (I) and gradient (G) from amplitudes of reflected P-waves as function of incident angle or from the seismic parameters at reservoir interface. Various AVO attributes such as intercept, gradient, Poisson reflectivity (PR), fluid factor (ΔF), P and S wave normal incident reflection coefficients (RP and RS) and their difference are applied in the known gas field, Kadanwari, Lower Indus Basin of Pakistan. Our analysis reveals that the gas sand anomaly in the study area is of weak impedance and on the basis of intercept versus gradient crossplot top of gas sand lies in II quadrant. By making the appropriate pair of these attributes, the discrimination strength to the pore fluids (brine and gas) is analyzed. PR vs. I are also very promising attribute pairs to discriminate gas sands from background trend. However, the fluid factor and S wave normal incident reflection coefficient also works as excellent indicators in this area.