

Examining AVO Crossplots with Visualization Tools

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Amplitude-versus-offset (AVO) crossplotting is a widely employed AVO analysis technique that has gained acceptance in the geophysical community over the past decade. Crossplotting AVO attributes such as the AVO intercept (A) and gradient (B) has proven useful in hydrocarbon diagnostics in unconsolidated clastic basins worldwide. Improved interpretation of the crossplot results can be obtained through 3D visualization of the AVO crossplot.

AVO crossplotting, which typically uses the intercept and gradient, aids standard AVO analysis techniques by identifying background trends and anomalous responses that may or may not be associated with hydrocarbons. Using the A and B data volumes and small, target-specific windows where V_p/V_s ratios are nearly invariant, we can often determine a background trend that defines the wet-

sand/shale interfaces and other similar lithologies. A-B pairs lying off the trend are considered anomalous, and through interactive testing, with a priori information through modeling, and with geological integration of the basin geology, can be used to assess hydrocarbon-bearing strata or key lithologies. In light of the aforementioned, crossplotting has evolved to be a crucial component in the AVO analysis.

The 3D crossplot display has many advantages over the composite-summary 2D displays traditionally used. By visualizing the seismic data in 3D space, the resulting interpretation is more reliable. Modeled and observed 3D crossplots through visualization techniques demonstrate the improved recognition of background trends and AVO anomalies that in turn improves interpretation and analysis.

Notes