Effective AVO Cross-plotting Techniques

Satinder Chopra*, Vladimir Alexeev and Yong Xu
Core Lab Reservoir Technologies,
301, 400 3rd Avenue SW, Calgary, AB, T2P 4H2
schopra@corelab.ca

ABSTRACT
Cross-plotting has evolved to be a widely used technique in AVO analysis. Generally, common litho-units and fluid types cluster together in AVO cross-plot space, allowing identification of both the background lithology trends and anomalous off-trend aggregations that could be associated with hydrocarbons. Integration of available associated geological information and the *a priori* information through modelling with AVO attribute cross-plotting has effectively contributed to the assessment of hydrocarbon-bearing strata.

This work is discussed in 3 parts: (1) Using the measured well log parameters, like P-wave and S-wave velocities, this paper first examines the crossplot patterns for different lithologies. Next, these patterns are examined in the derived elastic parameter cross-plot space, e.g. Lambda*Rho vs Mu*Rho space and other combinations. The advantages that accrue in using these derived parameter cross-plot patterns towards detecting anomalies are emphasized. (2) Principal component analysis of some measured well log parameters is carried out and the cluster patterns for different litho-units are discussed. (3) The above analysis is extended to 3D cross-plot space. Clusters hanging in crossplot space are more readily recognizable and diagnostic, resulting in more accurate, reliable and hence useful interpretation.