

## **Imaging Subtle Faults Using Azimuthal Coherence Attribute: A Case Study from Central Saudi Arabia**

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### **ABSTRACT**

The coherence attribute is an edge detection method that is widely used for interpreting faults on 3-D seismic time slices. The traditional coherence attribute is calculated on migrated volumes using traces from all available azimuths. It has recently been shown that calculating coherence along specific azimuths can enhance the detection of faults running perpendicular to those azimuths. In this study, we applied azimuthal coherence attribute analysis on a 3-D seismic data set from a gas field in Central Saudi Arabia. We generated four migrated 3-D data volumes sorted by azimuth in addition to a conventional full-azimuth volume. We then calculated the coherence attribute for all volumes and compared each azimuthal coherence volume to the conventional full-azimuth coherence volume. The azimuthal coherence results exhibited an improved definition for faults whose strikes are perpendicular to the sorting azimuth. More specifically, systems of NW-trending discontinuities were imaged more clearly in the NE-SW oriented coherence volume than it was in the full-azimuth coherence volume. The reason for this enhancement is the fact that seismic waves tend to avoid passing through the fault when they propagate parallel to the fault strike therefore missing the effects of the fault while they must pass through the fault when propagating perpendicular to the fault strike which results in better illumination of the fault.