Correlation data as an aid in fault interpretation: A case study

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The prolific use of 3D seismic has only been a geophysical commonality since the mid 1980's. Since that time, 4D seismic (and beyond 4D), multi-component seismic, visualization, and others have emerged as the forebearers of future seismic interpretation state-of-the-art. However, while increased familiarity and improving economics are working to bring these successors to the forefront, there is still no shortage of new ideas for extending the range of uses for conventional 3D seismic data. One of these, of course, is the use of correlation, or coherency attributes.

While companies may have experimented with the technology earlier, correlation attributes really sprung to prominence within the geophysical community as recently as 1995 with compelling examples published in *The Leading Edge*. With its emergence as a viable, user-friendly tool, other similarly striking coherency examples have been quickly and ardently documented.

While 3D data clearly offers a significant advantage over 2D data for interpreting complicated fault patterns, correlation data goes at least one step beyond in terms of improved resolution or ease of detection. With great visual clarity, correlation slices demonstrate that faulting may be significantly more complicated, both in terms of number of faults and orientation, than previously interpreted from conventional 3D data.

Proponents of the technology point to the immediate interpretability offered by correlation time or vertical slices, as reason enough for generating correlation cubes on a routine basis. While conventional time slices often look like "wiggles" and can be dominated by the dip component, correlation slices bear a remarkable resemblance to "real geology" where geometry, morphology, and sedimentary features are readily identifiable. Where an interpretation is fairly complete, horizon oriented correlation slices, too, can be very useful. Slices through shallow, relatively flay-lying, high frequency data often show valley, channel and levee features with clarity and beauty.

Multiple *en-echelon* faults, relay-ramps and cross-faulting producing compartmentalization are often immediately apparent on correlation data. The early identification of such features which may significantly impact field drainage patterns can affect important development decisions and economics. Correlation cubes are currently being used within SSB/SSPC and are proving to be a valuable part of the interpretation portfolio.