by T. Mike Sheffield,
Magic Earth LLC

Geovolume visualization interpretation: Components and techniques

New visualization technology has created a paradigm shift in the workflow of 3D seismic interpreters. This change in workflow is answering the growing demand for improved accuracy, cycle time and cost. The geovolume visualization interpretation (GVI) components allow interpreters to implement techniques that have previously not been possible. Four main components make up geovolume visualization interpretation: recognition, color, motion, and isolation. Recognition is essential to an accurate interpretation and is dependent on the ability of the interpreter to process data in a method that will separate an important geologic event from surrounding data. Color allows scanning of large volumes of data, using color as a way to stimulate the brain through memory, attention and experience. Motion is the ability to move an object in a manner appearing continuous to the eye of the interpreter, while synchronizing with control movements. Isolation is the determination of a set of viewing parameters that will separate an event from its surroundings. Understanding and combining these components in various techniques is essential to achieving a GVI workflow that identifies geologic events. The presentation involves both slide and live demonstrations of visualization components and techniques.

Biographical sketch

Tatum M. Sheffield is a Geovolume visualization interpretation (GVI) specialist with Magic Earth LLC. He holds a BS in geology from Lamar University, 1979, and an MS in geology from the University of Texas at El Paso, 1981. He joined Texaco in 1981 and worked a variety of interpretation projects resulting in the drilling of over 50 exploration wells. In 1997, he joined the Upstream Technology department of Texaco in Houston where he participated in the development and application of new visualization technology to 3D exploration. During his tenure at Texaco, he received the Texaco Denver Outstanding Contributor Award 1987, Texaco Star Quality Award 1993 and the Texaco Outstanding Partner Satisfaction Award in 1998. He joined Magic Earth in January, 2000. □

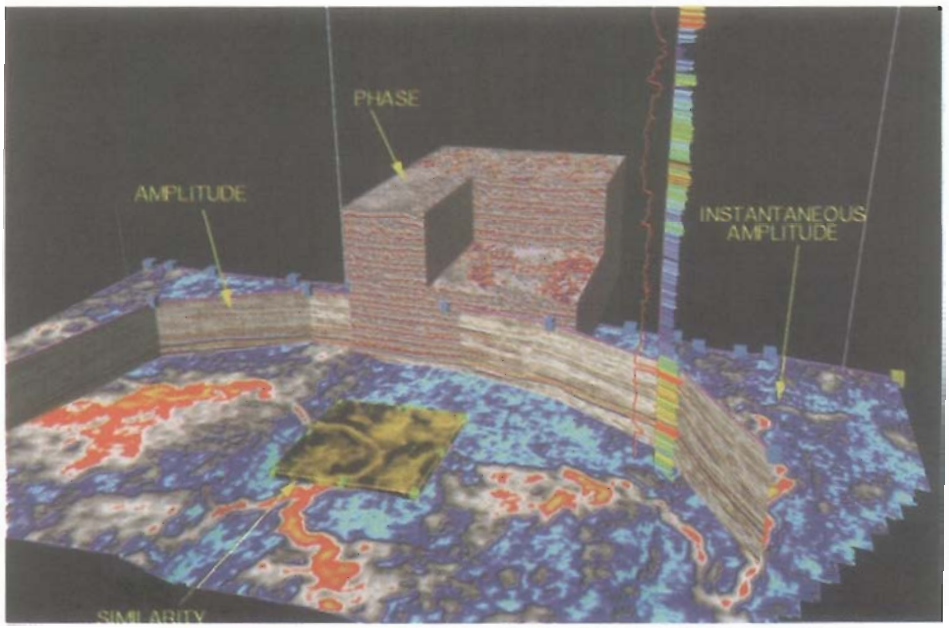


Figure 1. *A seismic amplitude volume, interpreted along with three interactively processed seismic attribute volume (Instantaneous Amplitude, Dip Semblance and Phase). Each seismic attribute volume is processed to enhance the recognition of a specific event or feature in the data, in this case, a stream channel.*

Emerging Technology Dinner Meeting • Thursday, May 18, 2000 • Westchase Hilton, 9999 Westheimer
Social 5:30 p.m., Dinner 6:30 p.m.

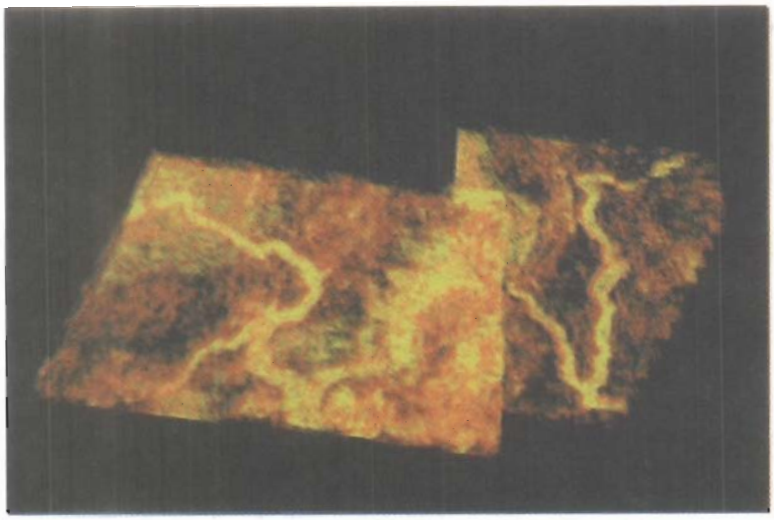
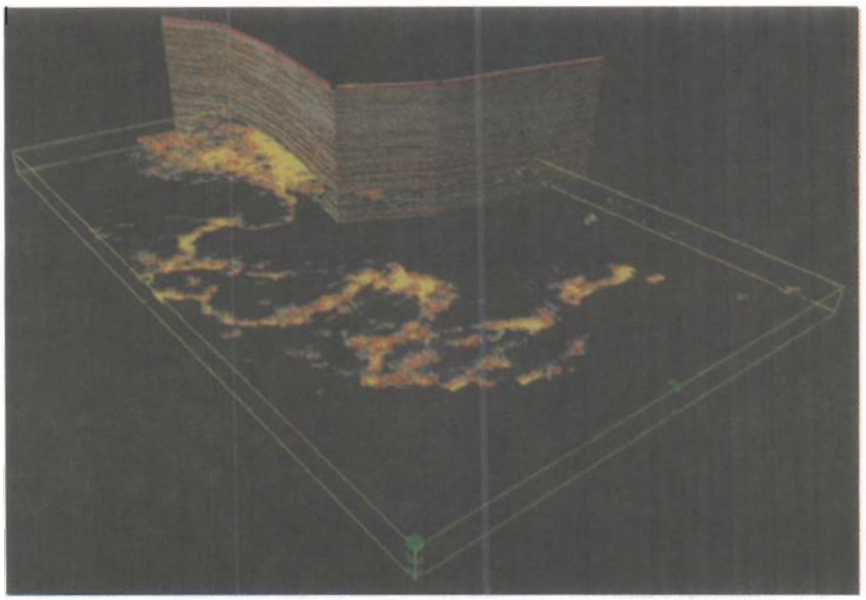


Figure 2.
This figure shows the use of volume rendered probes to locate a channel. The left probe is on the up-thrown side of a fault and the right probe is on the down-thrown side. The occlusion of one probe over another gives a depth perspective to the two probes, and shaving ads contrast and texture to the channel. The use of volume rendering isolates the event of interest.

Figure 3.
Both color and transparency further enhance the recognition and isolation of the anomaly identified in Figure 1 and 2.



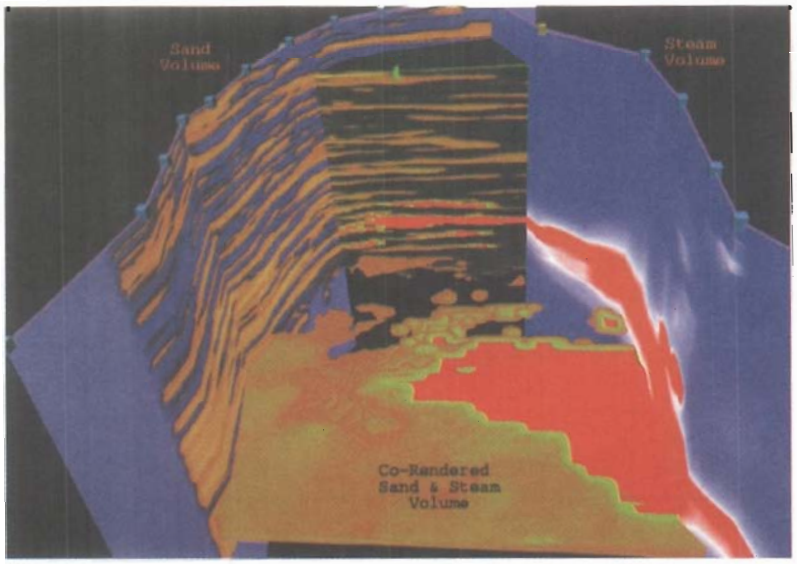


Figure 4.
Two geostatistically derived volumes. (sand vs. shale, and steam). The center volume is a combined rendering of both. The cross-section view is shown in back and the volume rendered view is shown in front. This technique allows the interpreter to visualize steam-penetrated sands. Displaying the steam volume at different time steps shows which sands take on steam the fastest. The co-rendering technique illustrated here shows the use of visualization technology to fully integrate all of the diverse data types available in an interpretation project.