

Volume Visualization and Interpretation at the Reservoir Scale

KIDD, G. D.; Paradigm Geophysical Houston, Houston, USA

Standard workflows are becoming well established for utilizing volume visualization for the rapid scanning of large 3D seismic surveys and for examining large-scale structural and stratigraphic detail. Less well established, but perhaps more important, are methods of using volume visualization to extract detailed stratigraphic information at scales relevant to reservoir characterization. This paper will present several specialized techniques specifically aimed at detailed stratigraphic visualization and interpretation.

Conventional approaches to volume visualization, including time slicing and horizon amplitude mapping, have been shown to reveal the gross character of many subsurface depositional systems. However, when focussing down to the reservoir scale many of these approaches lose their effectiveness. Closely stacked subfacies of the larger depositional systems frequently are difficult to distinguish, and the reservoir-scale details of the stacking patterns are hard to visualize. New approaches for resolving reservoir-scale stratigraphic details, utilizing a combination of visualization, subvolume detection and horizon interpretation, will be discussed in the context of reservoir mapping and analysis. Tips for utilizing data scaling, seismic phase and seismic signatures for enhanced visualization at the reservoir scale will be discussed.

In addition to details of the stratigraphic architecture, reservoir-scale structural information can be extracted by careful application of multivolume rendering. By rendering both an amplitude volume and some form of continuity volume at the same time and in the same space, one can examine the 3-dimensional interaction between depositional facies and subtle fault geometry which often leads to reservoir compartmentalization.