
Utilizing 3D Pseudo-Seismic Data Volumes for Stratigraphic Interpretation and Delineation of the Carter Sand Member of the Mississippian Parkwood Formation in the Black Warrior Basin, Alabama

Mark C. Robinson¹ and Roger Espinosa²

¹Log 3D, LLC, 324 Mirafiel Ln., Austin, Texas 78737

²Metano Energy, LP, 7330 San Pedro Ave., Ste. 620, San Antonio, Texas 78216

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EXTENDED ABSTRACT

Digital well logs were used to create a pseudo-seismic 3D data volume in the Black Warrior Basin, Alabama. The study area shown in [Figure 1](#) covers an area of 400 square miles in Fayette, Lamar, and Marion counties. Within the study area there have been approximate 875 oil and gas wells drilled over the last 100 years, with the vast majority of these having been drilled since 1970. Digitized well logs in log ASCII standard (LAS format) were available for a total of 827 of the wells in the study area and these are shown in [Figure 1](#).

A rectangular grid composed of 500 ft squares was superimposed upon the study area and all 827 wells were assigned to a unique node within the grid. The digital well logs for each well were then processed to generate 3D-pseudo seismic data cubes in Society of Exploration Geophysicists (SEG)-Y format. The process used to create these data cubes is detailed in Robinson (2014). Data cubes were generated for the gamma ray (GR), spontaneous potential (SP) and deep resistivity (ILD) curves, which were subsequently loaded into software designed for the interpretation of 3D seismic data. Data was sampled at one foot intervals and transformed to subsea depths. An example of the data displayed in a 3D seismic workstation is shown in [Figure 2](#).

Many of the same techniques and interpretation methods commonly used with seismic data were utilized during the interpretation of the data cubes created from well log curves. [Figure 3](#) shows a portion of a cross-line composed of wiggle traces from the GR curve superimposed upon a variable-density display of the ILD curve. Horizons were interpreted with auto-picking tools that used seed-points created from manual correlation of the data cubes. Structural and depositional maps were generated for the Carter Sand interval in the study area which confirmed results generated in previous studies (Bearden and Mancini, 1985; Epsman, 1987). Additional data visualizations were made by generating horizontal slices through the data cubes.

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