

**AAPG Annual Convention  
Salt Lake City, Utah  
May 11-14, 2003**

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**Log Curve Amplitude Slicing—Visualization of Log Data and Depositional Trends in the Devonian Traverse Group, Michigan Basin, United States**

Well log curve shapes and amplitude trends are routinely used to correlate and map formations and reservoirs across petroleum basins or fields. However, the methods typically employed for correlation and mapping fail to make full use of the vertical resolution of well log curves. A new technique, log curve amplitude slicing (LCAS) facilitates correlation by generating a series of subhorizontal slices through the log curves using sample-by-sample analysis of log curve amplitudes in all wells between two correlative surfaces. The slices represent approximate time lines and are relative chronostratigraphic surfaces that can be gridded and contoured to show trends and patterns in log curve amplitudes in map view. When appropriate logs are used, the slices show the inferred distribution of lithofacies at the time of deposition. Animation allows visualization of changes in the distribution of lithofacies between successive slices. Application of the LCAS technique facilitates correlation because it highlights trends in log curve amplitudes that are not apparent using traditional methods to compare log curves.

Gamma ray log data from 180 wells were used in this study to identify the location, relative timing, and extent of significant fine-grained clastic influx into the carbonate/evaporite-dominated Michigan Basin during deposition of the Middle Devonian Traverse Group. Traverse Group carbonates have produced more than 105 million barrels of oil and currently produce approximately 100,000 barrels per year. Lithofacies patterns observed in LCAS maps at the basin-scale coincide with productive Traverse Group carbonate trends and reveal new potential areas for exploration and exploitation.