

Seismic Sequence Stratigraphy of the Upper Morrow Formation—a Regional Study in the Western Anadarko Basin

J. R. Halverson¹, Calvin H. Stevens², David W. Andersen², and John P. Brooke²

¹Synergy Exploration, Amarillo, Texas and ²San Jose State University, San Jose, California

The upper Morrow Formation in the western Anadarko Basin, northeastern Texas Panhandle, was studied using 360 km of seismic-inversion data integrated with data from 80 wells. The goals were to use seismic data to interpret the lithologies, depositional environments, evolving paleogeography, and changing sea level represented by this stratigraphic interval.

Seismic-interval velocity contouring, based upon wavelet character, and correlation with borehole data provided the basis for the interpretations. Characteristic seismic signatures of three lithologies, sandstone, shale, and clayey siltstone, were recognized.

Sandstone anomalies, concentrated at three seismic horizons, were mapped. The highest and lowest horizons are interpreted to represent deltaic distributary channel systems, whereas the middle horizon is interpreted to represent a meandering fluvial system. These seismic horizons also are interpreted to represent three minor progradational pulses of fourth- to fifth-order global stratigraphic cycles produced by repeated glaciation in the southern hemisphere, with possible tectonically generated pulses superimposed.