

## **Attributes Analysis of Chert Reservoirs in the Devonian Thirtyone Formation, West Texas**

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Fractured chert reservoirs of Devonian age in west Texas have produced over 700 million barrels of oil, and considerable amount of mobile hydrocarbon remains intact. These reservoirs are characterized by microporosity, heterogeneity and compartmentalization, which result in low recovery rates (less than 30%). We utilize petrophysical logs, cores and 3-D seismic data to characterize the deep-water depositional facies and fracture distribution of these reservoirs on the Central Basin platform. Data from cores, sonic logs as well as seismic data tie the geologic information at different scales. Gassmann's fluid substitution method, which uses elastic properties measured from core samples, is validated to model the seismic responses caused by the variation of fluids in the reservoir rock. We utilize newly developed seismic attributes and apply new classification methods to infer distribution of various lithofacies, high-porosity zone and fractures. These inferences are calibrated with fractures detected in core. The research indicates reasonably good relations between P-wave velocity and porosity measured from cores, between impedance and producing zone, and between initial production rates and seismic "fracture lineaments". We are also building a detailed 3-D geologic model and will use reservoir simulation to test our prediction of permeability pathways.