

Porosity Variation Detection using Seismic Velocity in Unconventional Shale Reservoirs: Antrim, Marcellus and Collingwood Shales.

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Both matrix porosity and fracture porosity influence well performance in terms of ultimate recovery and production rates. Identifying and drilling in areas of above average porosity will result in above average ultimate recoveries. Areas of high porosity consistently exhibit a slower seismic velocity than lower porosity areas. Slow velocity anomalies associated with high porosity are detected by conducting high resolution velocity analysis on each common depth point and every sample within the common depth point. The velocity anomalies are easily mapped using both 2D and 3D seismic data. Azimuthal anisotropy can influence results if fracture porosity is the dominate porosity type. Several examples of seismic velocity data verified with well control are presented from Antrim, Marcellus and Collingwood Shale localities.