



Neural Network Analysis of Seismic Attributes and Facies at Deep Basin Tight Gas Exploration of WCSB

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Abstract

Individual seismic attribute analysis about peak or trough, sometimes, can't tell you any signature about reservoir character because of the low seismic resolution, especially, for thin bed tight reservoir. However, Neural network, based on seismic waveshape analysis which carries important seismic information, such as, amplitude, frequency and phase, can combine multiple complex seismic attributes together and generate a seismic facies distribution, then may reveal the subtle stratigraphic feature affecting waveform shape in subtle and, perhaps, non-intuitive ways. In such instances, seismic facies classification based on waveshape may provide an optimal method to seismic reservoir identification and characterization.

Two datasets is chosen to test the seismic facies analysis derived from the seismic waveshape in deep basin of WCSB. One represents a minor channel-delta system, the other is a meandering channel system. Here, reservoir is thin bed and low porosity, and difficult to identify from typical seismic data interpretation techniques. Neural network technology is introduced to build the relationship between seismic attributes and reservoir property, and seismic facies classification is generated out of waveshape. Further more, petro-acoustic model is build to connect the seismic facies to geological information from well and to verify the waveshape analysis result based on the drilling and well logging information.