

Complex Model Building using Objective Construction of Curve Ray Time Migration Moveout with Geologic Constraints

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Abstract/Excerpt

A time domain system for high density, high resolution migration velocity estimation and imaging is introduced. The methodology for objective, data driven determination of the velocity and effective anisotropy is based on direct optimization of the image gathers and image cube. With the inclusion of additional structural constraints on the resultant interval velocity, meaningful geologic interval velocity models are constructed. The automatic process is detailed using real and synthetic data sets. The veracity of the determined geologic interval velocity model is tested using prestack depth migration, and also by using it as the initial model for subsequent prestack depth updating.

Automatic dense estimation of time migration velocities and effective anisotropy is possible and practical based on optimization of measures of gather flatness and image continuity. The approach has proven to be robust over a wide range of geological settings and complexities. The addition of Structural Constraints for interval velocity into the objective function optimization allows the methodology to determine geologically reasonable interval velocity models, as will be shown on real and synthetic data sets.