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# A Unified 3-D Seismic Workflow

A geophysicist who practices seismic data analysis for earth modeling and imaging in depth is overwhelmed by the prolific number of inversion methods to estimate layer velocities and delineate reflector geometries --- the two constituents of a seismically defined earth model in depth. Given a specific type of structural play, the key to estimating an accurate earth model in depth, however, is a workflow that is based on a judicious combination of inversion methods appropriately selected for their robustness. We present a unified workflow for processing, inversion, and interpretation of 3-D seismic data that is applicable to low-relief structures and complex structures associated with pull-apart, extensional, and compressional tectonics. With some modifications, the workflow also is applicable to complex overburden structures associated with salt and overthrust tectonics. We describe the unified seismic workflow by a 3-D structural inversion case study.

The objective behind the design of the unified workflow is to attain the best estimate of a structurally consistent initial earth model model in depth with layer velocities that are based on rms velocities associated with migrated data, so as to minimize the work required to update the model and thus obtain a final earth model in depth. Hence, implicit to the model building strategy advocated here is the requirement for doing 3-D prestack time migration for earth modeling prior to 3-D prestack depth migration for earth imaging in depth.