



Z5-D 5-D Interpolation and Regularization

Z5-D is Z-Terra's 5-D interpolation using Azimuth Moveout (AMO) and Offset Vector Tiles (OVT). AMO is a wave-equation operator that can be effectively applied to interpolate and regularize 5-D seismic data and improve the accuracy, illumination, and imaging of structurally complex targets. AMO is strictly derived from the wave equation and therefore carries the correct kinematic, phase, and amplitude transformation. Dipping events are moved correctly under this transformation and interpolation of the data, and diffractions are preserved in a manner that is consistent with the wave equation. This property sets AMO apart as a seismic interpolator from more conventional ones. The AMO operator rotates the azimuth and modifies the offset of 3-D prestack data. It is analytically derived by cascading the forward and inverse 3-D DMO.

Traditionally, AMO was designed to address the marine acquisition shortcomings and regularize common azimuth data. Typical implementations in the time-space domain or frequency-wave number domain were primarily designed for 4-D data output. The recent focus by exploration and production companies on wide azimuth data both onshore and offshore creates the need to extend the AMO implementation to 5-D, by using OVT to control the output geometry. Also recent interest in using Diffraction Imaging for imaging and delineating fracture fields in unconventional shales or fractured carbonates puts a premium on workflows that preserve diffractions.



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