

Benefiting from 3D AVO

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Abstract

In AVO analysis, one tends to assume the AVO behavior based on even-spacing offset bins or angles, which in fact confine the AVO to a two-dimensional framework. For AVO analysis on 3D dataset, superbinning/PSTM is usually applied to form even-spacing offset-dependent gathers, which converts 3D to 2D. In the structural interpretation, 3D data has more advantages over multi 2D lines because of its full spatial coverage. For AVO analysis on 3D data, one needs to exploit three dimensionality of the data to benefit from it rather than just considering the 2D aspects.

The paper starts with probing the reliability of AVO inversion due to signal/noise ratio, offset ranges, fold distribution, sample population, etc, which are usually limited by seismic acquisition, and shows the improvements on AVO reliability for 3D data. In addition, the AVO workflow on 3D data is explored to handle the irregularities of fold distributions on pre-stack time migration to benefit AVO analysis.

Both synthetic datasets and 3D field datasets from WCSB are used to explain the issues and solutions.