

Prestack Constrained Stratigraphic Inversion

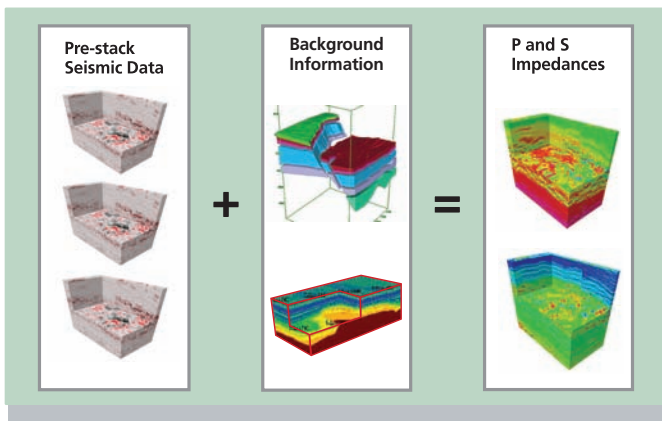
Accurate and Reliable Reservoir Characterization

Paradigm's Prestack Constrained Stratigraphic Inversion module is a unique and powerful technology which provides optimal elastic inversion results in a variety of geological/petrophysical scenarios. Developed by the prestigious Institut Francais du Petrole (IFP), the Prestack Constrained Stratigraphic Inversion performs simultaneous inversion of multiple angle stacks, to provide P and S impedance volumes and an optional density volume.

With the integration of this advanced program into its seismic data-driven reservoir characterization workflows, Paradigm is able to significantly enhance the accuracy and reliability of the subsurface description. The high performance and excellent turnaround time of this product enhance the user's personal productivity and provide unprecedented workflow efficiencies.

Flexible Data Input and Constraints

In addition to angle stacks and standard background information (I_p , I_s , Density), the unique formulation of Paradigm's constrained inversion enables the user to integrate non-seismic information into the inversion process. This includes the macro-model, micro-structure, micro-layer topology, confidence information for both inverted seismic data and the background model, as well as one wavelet for each angle stack. This wide range of data results in more accurate and reliable results.



▲ Simultaneous inversion workflow



A Highly Integrated Workflow

A successful inversion procedure requires an involved set of steps. Running on the Epos® integration framework, the Paradigm Quantitative Seismic Interpretation solution efficiently performs the entire inversion workflow through an interactive environment, advanced geostatistical tools and comprehensive modeling and calibration capabilities. In complex modeling situations, users can take advantage of the unique capabilities of the SKUA-GOCAD™ geostatistical model-building application to generate highly reliable background models, which accurately honor faults and structure.

Compared to conventional inversion technologies, the Prestack Constrained Stratigraphic Inversion offers numerous advantages:

- The inversion is performed simultaneously for all elastic parameters, maximizing consistency between P impedances, S impedances and density.
- The inversion is model-based, ensuring higher reliability through constraints based on geological information.
- The inversion provides unique lateral consistency through a global, 3D, multi-channel operator.
- Consistency between P and S impedances is achieved by integrating AVO information into the inversion process, using Aki & Richards modeling.
- The inversion handles wavelet variations between offsets by enabling a different wavelet for each angle stack.
- Low-frequency components are not merged, resulting in improved accuracy.
- Using well information and interpretation results as soft constraints improves reliability.
- Parameter uncertainties in both the seismic data and the background information can be incorporated into the inversion, minimizing errors in the results.
- Parallel computing and cluster support increase efficiency and provide very fast turnaround.