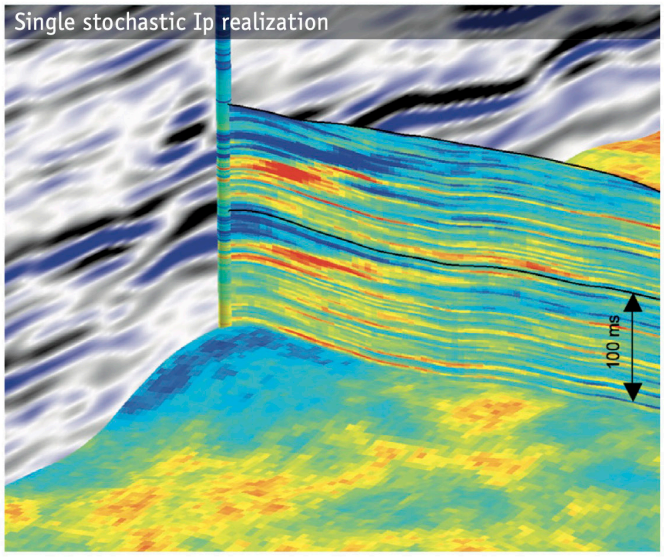
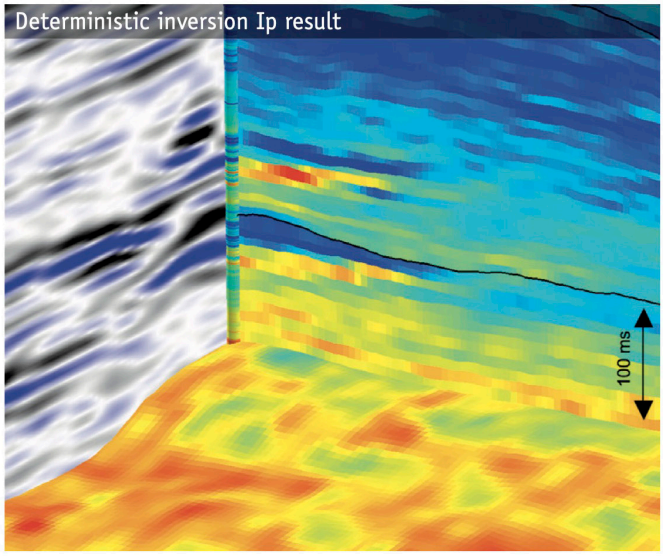
HampsonRussell
GeoSI

Geostatistical Seismic Inversion

GeoSI is a prestack simultaneous elastic inversion which generates high-frequency stochastic models for high-resolution reservoir characterization and uncertainty analysis. It addresses the band-limited nature of deterministic inversion methods and integrates well data and seismic data at a fine scale within a stratigraphic geo-model framework. **GeoSI** is part of the **Geoview** seismic reservoir characterization platform.





A single stochastic realization of P-Impedance from GeoSI (top) displays resolution approaching that of the well log data. The resolution of the equivalent deterministic inversion (bottom) is limited to the seismic bandwidth.

The seismic near-stack image is shown along with a P-Impedance well log for comparison.

Features

- Filters and normalizes logs
- Crossplots logs and seismic data
- Performs non-linear transforms on logs and seismic data
- Computes seismic attributes internally
- Computes Principal Components
- Utilizes an unlimited number of external seismic volumes
- Predicts volumes of any log type (recorded or computed)

Benefits

- Increased resolution by integrating well data
- Supports cascaded reservoir property simulation
- Risk/uncertainty analysis using probability cubes
- Stratigraphic framework facilitates interpretation and reservoir simulation

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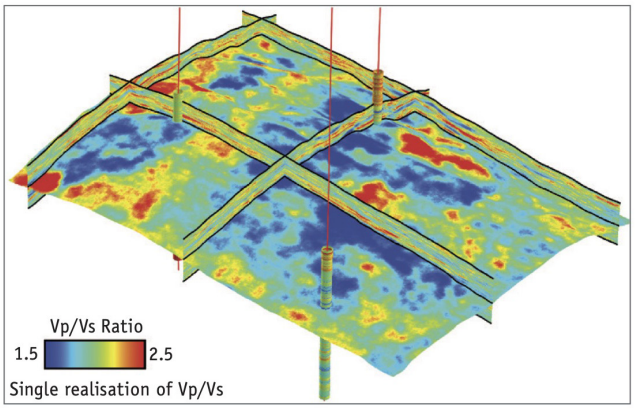
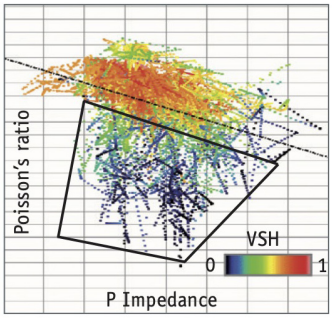


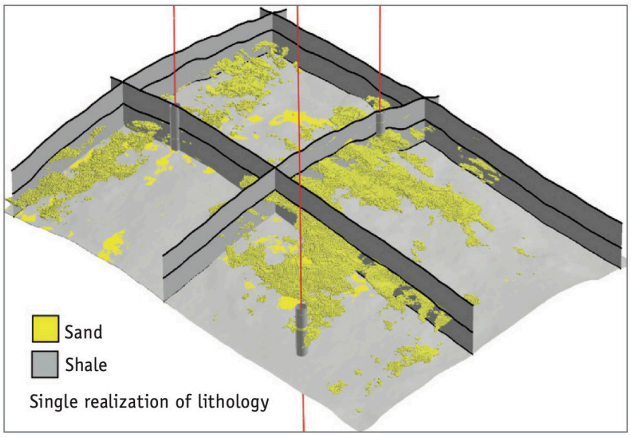


A petro-elastic statistical calibration or user-defined petro-elastic model (PEM) is used to convert elastic reservoir attributes to rock properties. A simple user-defined PEM is shown above with a polygon defining sand lithology. The color scale is Shale Volume (VSH).

Cascaded Lithology Simulation

The multiple high-resolution realizations generated by GeoSI can be used in a lithology simulation workflow, cascaded from the inversion. The GeoView platform provides seamless integration for cascaded lithology simulation.

A user-defined petro-elastic model is used to convert the elastic reservoir attributes into lithology or other rock properties.



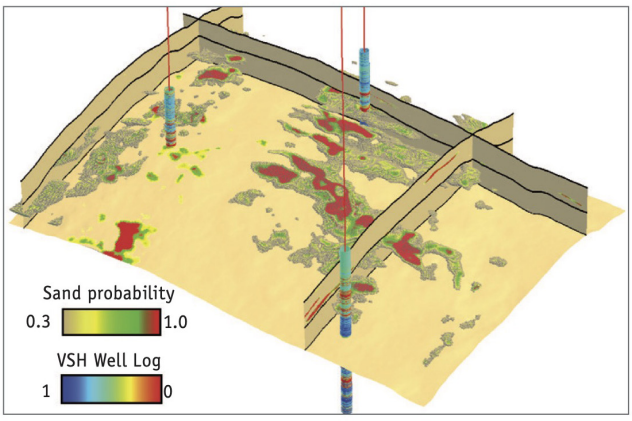
The suite of realizations from the cascaded lithology simulations show the range of possible sand distribution scenarios within the reservoir.

Risk/Uncertainty Analysis

The next step in the workflow is to generate a litho-probability cube from the multiple realizations. This allows the interpreter to analyze the uncertainty associated with the inversion results and examine best and worst case scenarios for the reservoir.

Finally, additional tools for calculating lithology volumes, geobody building and connectivity to wells are available to further enhance interpretation.

This workflow maximizes the full potential of the stochastic inversion approach. It reduces the risk associated with interpretation and leads to more accurate assessment of potential reserves.



Litho-probability cubes are generated by combining the full suite of realizations.