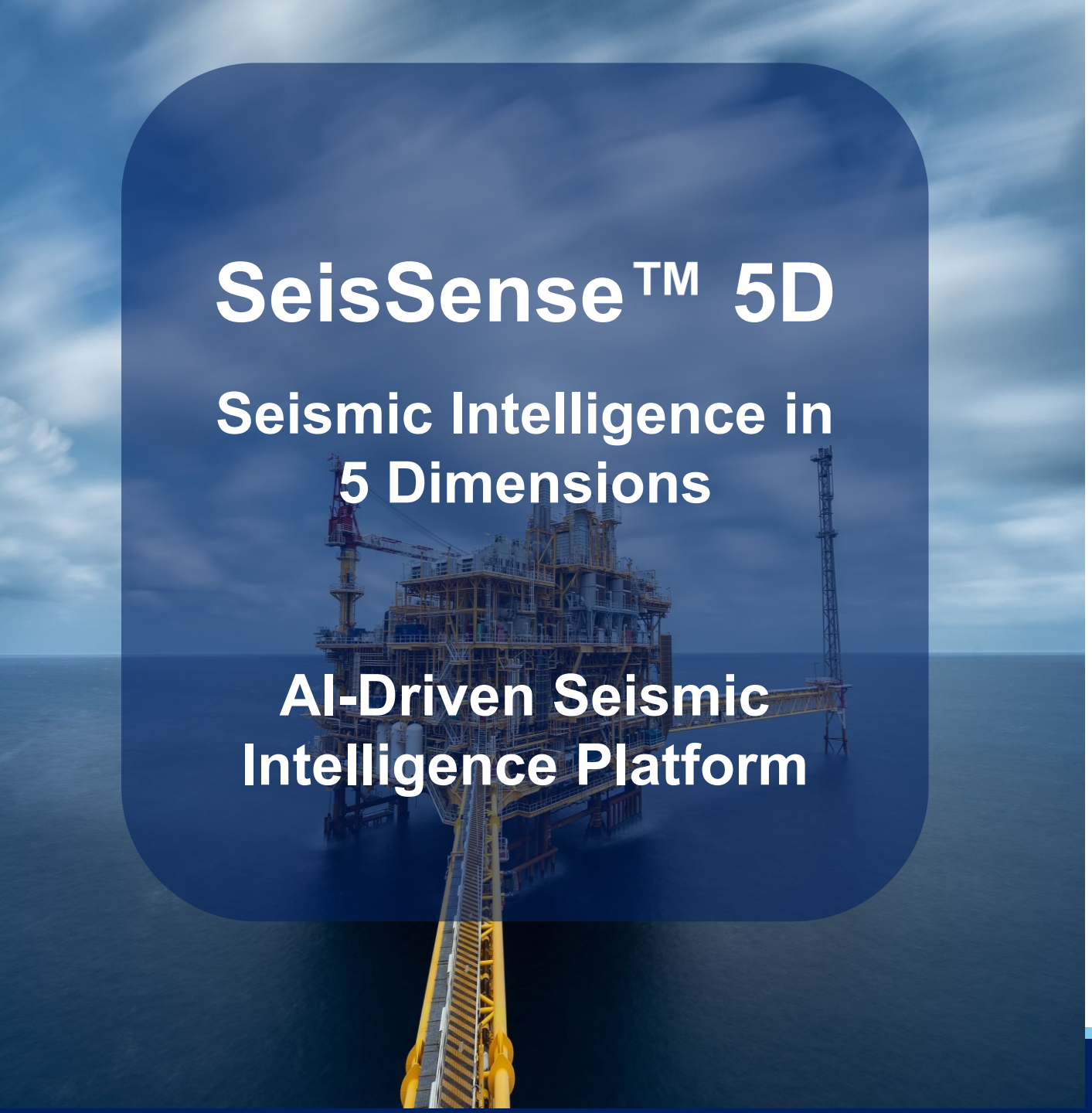

SeisSense™ 5D

Seismic Intelligence in 5 Dimensions

AI-Driven Seismic Intelligence Platform

Nergyflux

What is SeisSense™ 5D?

- AI-powered seismic interpretation and reservoir characterization platform.
- Provides 5D seismic interpolation, fault detection, lithology prediction, and reservoir simulation.
- Designed for oil & gas exploration, geophysical studies, and production optimization.

Revolutionizing Seismic Data Analysis with AI

- **SeisSense™ 5D** is an advanced **AI-driven seismic intelligence platform** designed to process, analyze, and interpret seismic data efficiently.

- **Key Capabilities:**
  - 5D Seismic Interpolation for missing data reconstruction.
  - AI-Powered Fault Detection & Classification.
  - Reservoir Characterization & Lithology Prediction.
  - Seismic Super-Resolution & Inversion.
  - Multi-Well Correlation & AI-Driven QC.

- **Designed for:** Oil & Gas operators, geophysicists, energy companies, and research institutions.
- **Outcome:** Faster, smarter, and more accurate seismic interpretation, reducing operational risks and exploration costs.

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Key Capabilities of SeisSense™ 5D

- Seismic Data Processing & AI-Driven Analytics
- 5D Seismic Interpolation & Reconstruction
- Fault Detection & Structural Interpretation
- Lithology & Facies Classification
- Reservoir Simulation & Production Forecasting
- Seismic Inversion & Attribute Analysis
- 3D Visualization & AI-Driven Insights

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The Need for AI in Seismic Interpretation

Challenges in Traditional Seismic Processing

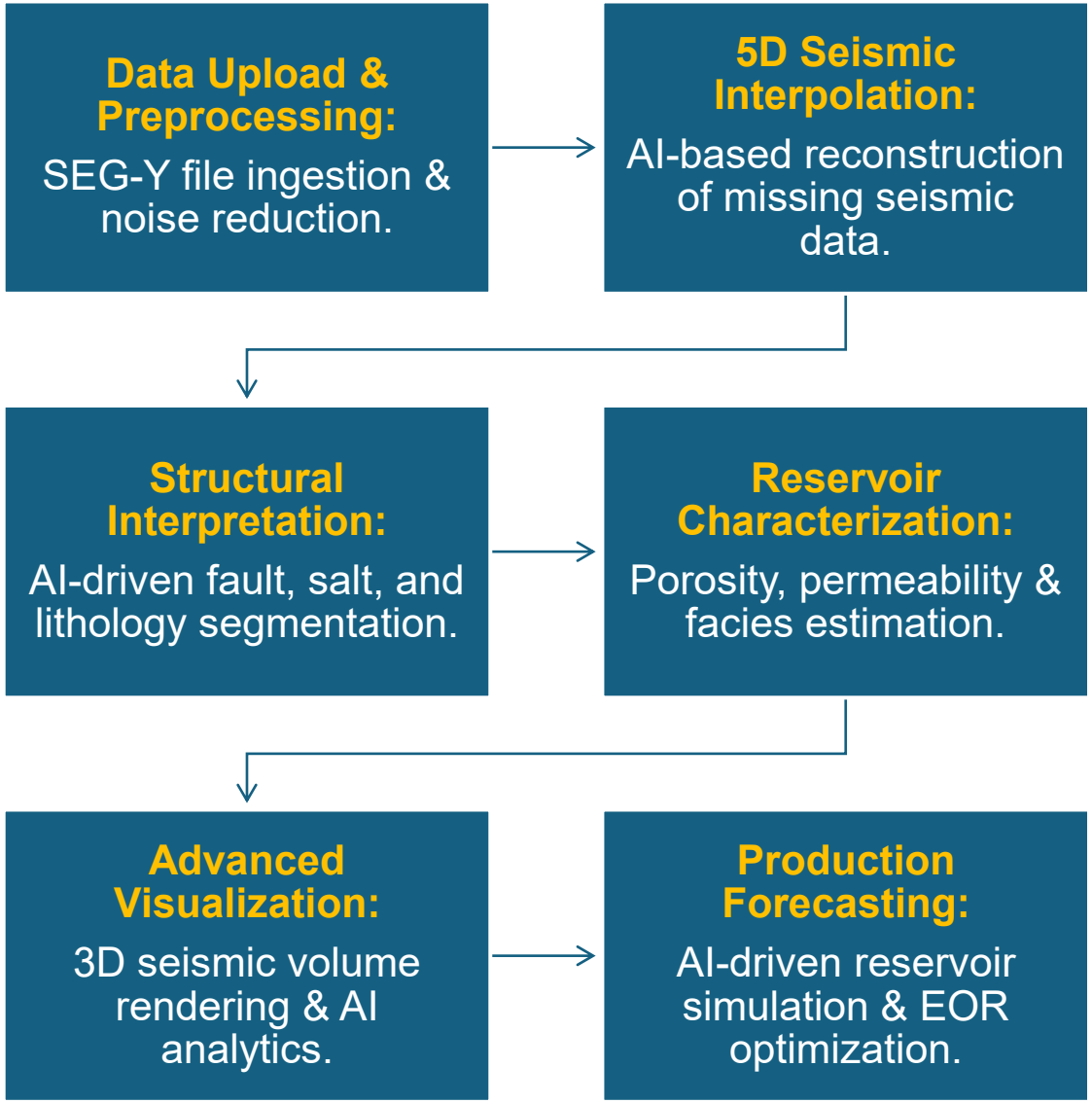
- Data gaps due to incomplete acquisition.
- Manual fault picking is time-consuming.
- Difficulty in detecting subtle geological features.
- Complex reservoir characterization requiring high computational power.

How AI Solves These Challenges

- Automated fault detection & classification.
- AI-based reservoir property prediction.
- Deep learning for enhanced seismic resolution.
- Rapid, high-accuracy seismic-to-well correlation.

SeisSense™ 5D

Workflow Overview



Platform Interface

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SeisSense™ 5D Navigation:

- (•) Data Input
- ( ) 5D Interpolation
- ( ) Fault Detection
- ( ) Salt Segmentation
- ( ) Reservoir Prediction
- ( ) Denoising
- ( ) Super-Resolution
- ( ) Visualization
- ( ) Fault Classification
- ( ) Lithology Prediction
- ( ) Velocity Model Estimation
- ( ) Anisotropy Analysis
- ( ) 4D Seismic Time-Lapse Analysis
- ( ) Seismic Inversion
- ( ) Seismic Attribute Analysis
- ( ) Seismic Facies Classification
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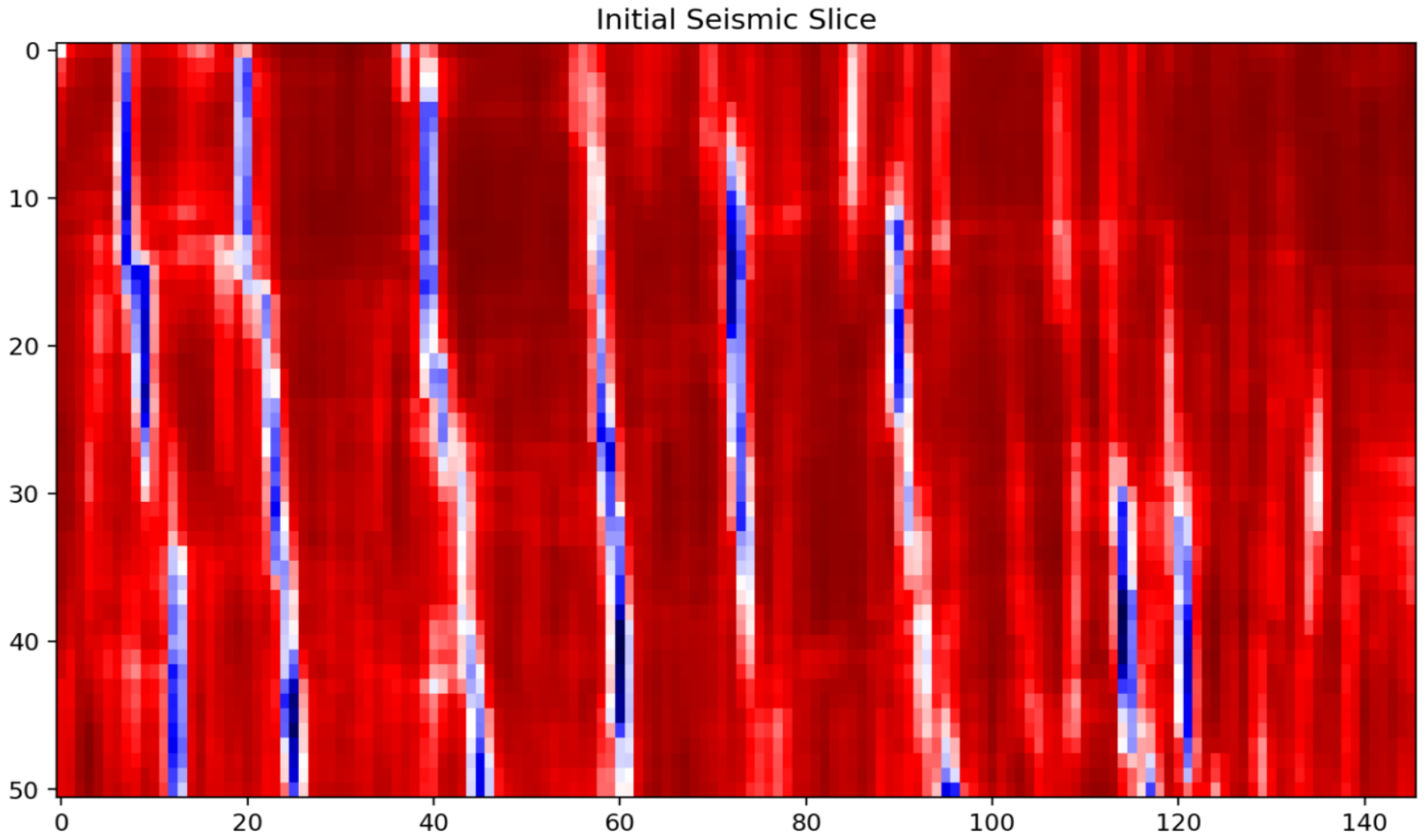
- ( ) Seismic Geobody Detection
- ( ) Seismic Well Correlation & Multi-Well Analysis
- ( ) Seismic Reservoir Simulation
- ( ) 3D vs 5D Comparison
- ( ) Export SEG-Y & HDF5

Loaded cube: (191, 146, 51)

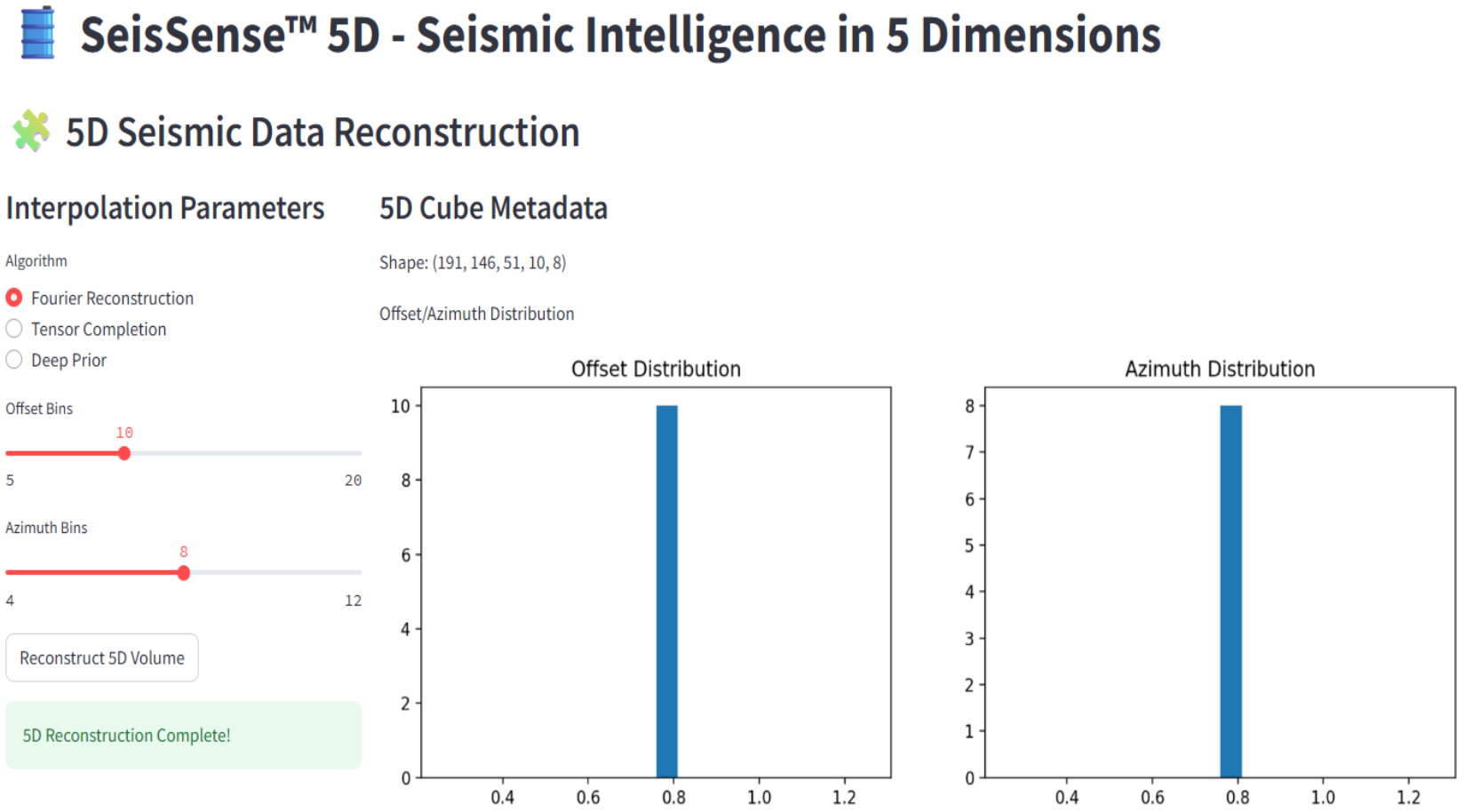


5D Seismic Interpolation

- Purpose: Reconstruct missing seismic data and improve resolution.
- AI Models Used: Fourier Transform, Tensor Completion, Deep Prior Learning.
- Impact: Reduces the need for costly re-surveys and enhances imaging clarity.

Example:

- Seismic dataset with missing traces reconstructed using AI-based Fourier Interpolation.
- Benefits: ✓ Enhances subsurface clarity. ✓ Provides accurate imaging of geological structures.

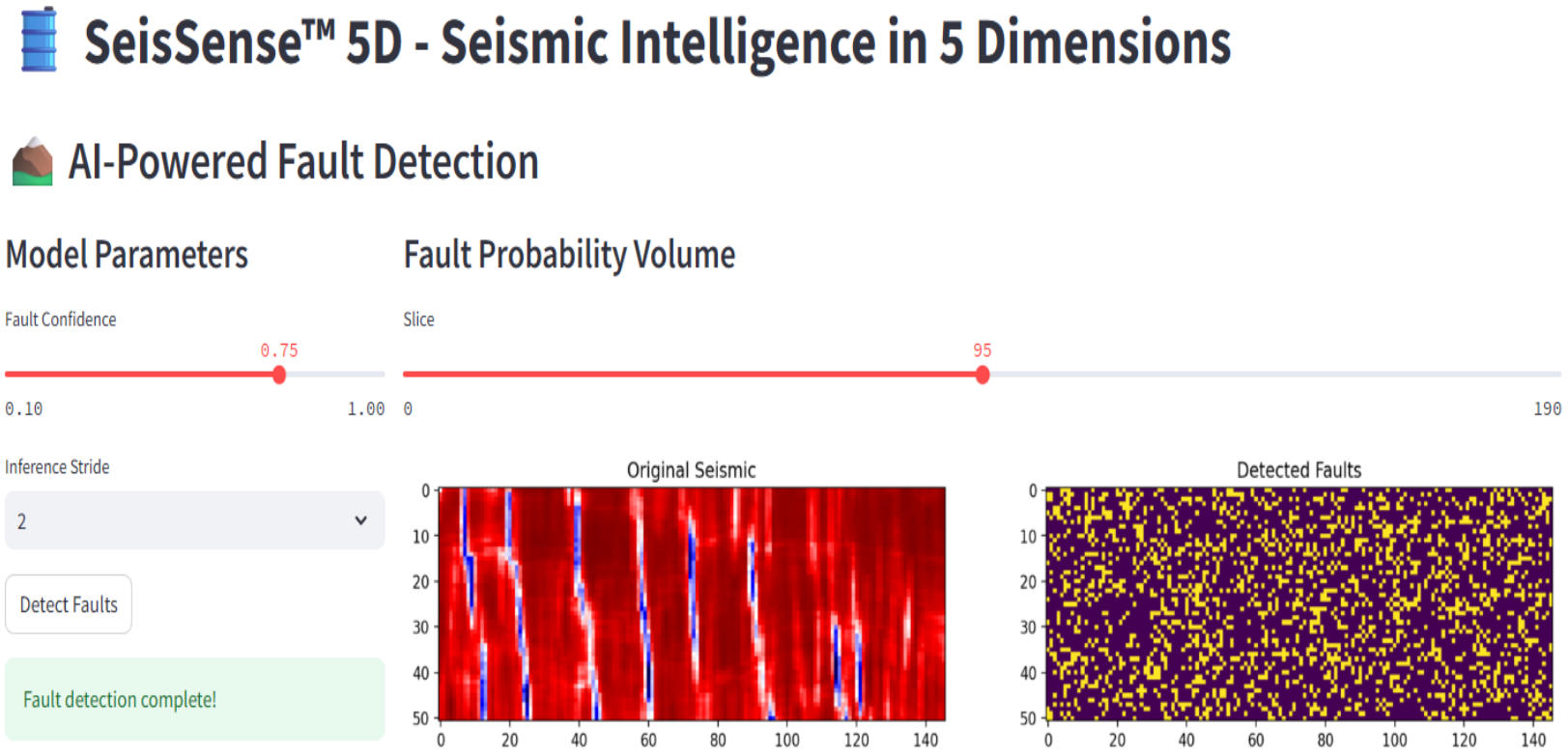


Fault Detection & Classification

- Purpose: AI-based automatic fault interpretation.
- AI Models Used: CNN-based classifiers for detecting fault planes.
- Impact: Reduces manual fault-picking time from weeks to hours.

Example:

- AI model detecting normal and reverse faults in deep-sea seismic data.
- Benefits: ✓ Automated fault detection improves structural interpretation. ✓ Enhances risk assessment for well drilling.

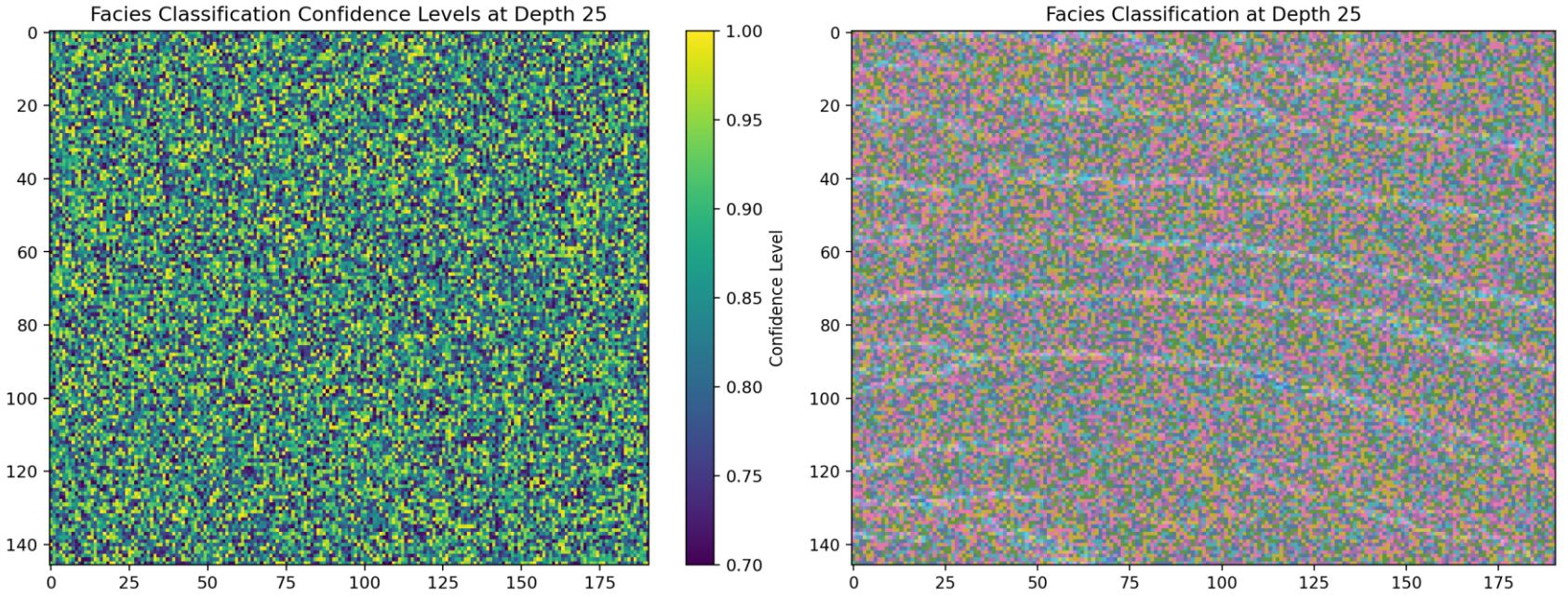


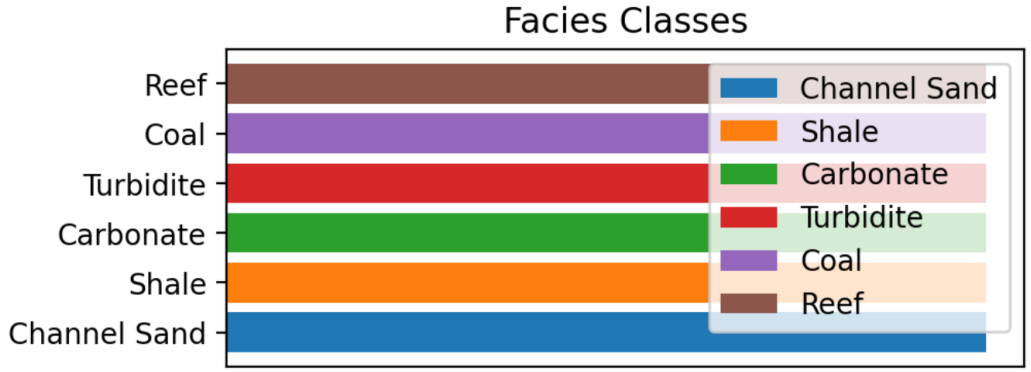
Lithology Prediction & Facies Analysis

- Purpose: AI-powered lithology classification using seismic attributes.
- AI Models Used: Supervised learning classifiers, Decision Trees, Random Forest.
- Impact: Improves reservoir facies identification and stratigraphic interpretation.

Example:

- Differentiating sandstone, shale, and carbonate facies using AI-driven clustering.
- Benefits: ✓ Enhances depositional environment analysis. ✓ Reduces exploration risk.



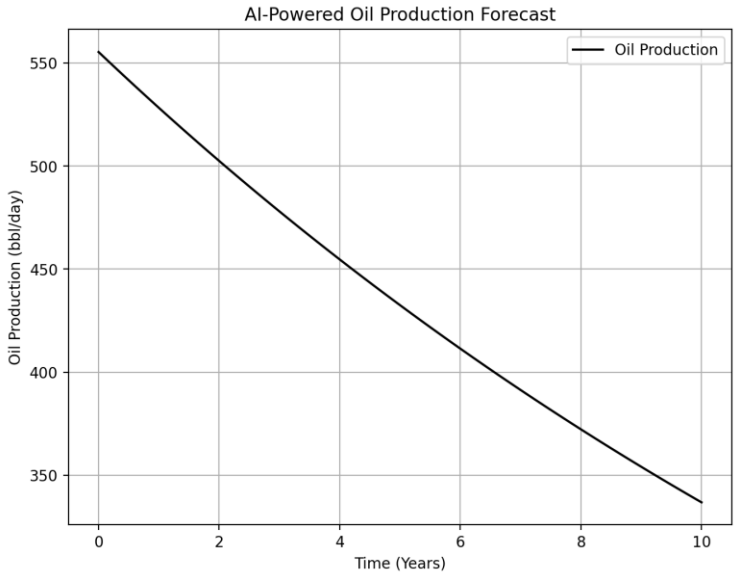


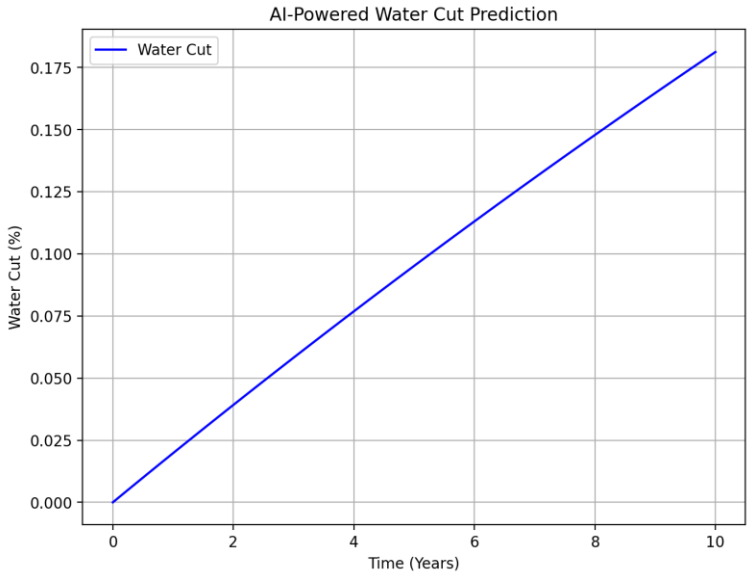
AI-Powered Seismic Reservoir Simulation

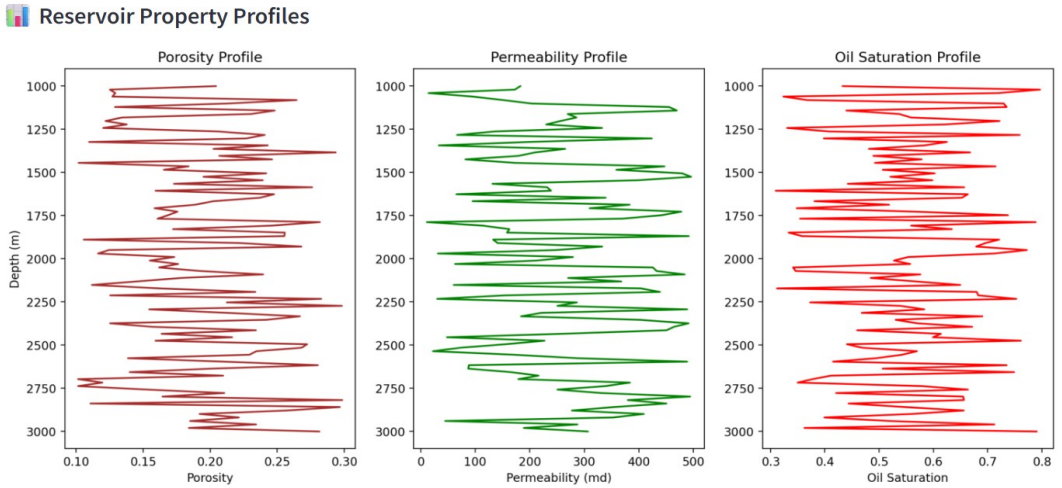
- Purpose: Predict fluid flow, pressure distribution, and hydrocarbon recovery.
- AI Models Used: Proxy models trained on full-physics reservoir simulations.
- Impact: Optimizes enhanced oil recovery (EOR) techniques and field development strategies.

Example:

- AI-based prediction of production decline over 10 years in a sandstone reservoir.
- Benefits: ✓ Supports data-driven decision-making. ✓ Improves production forecasting accuracy.





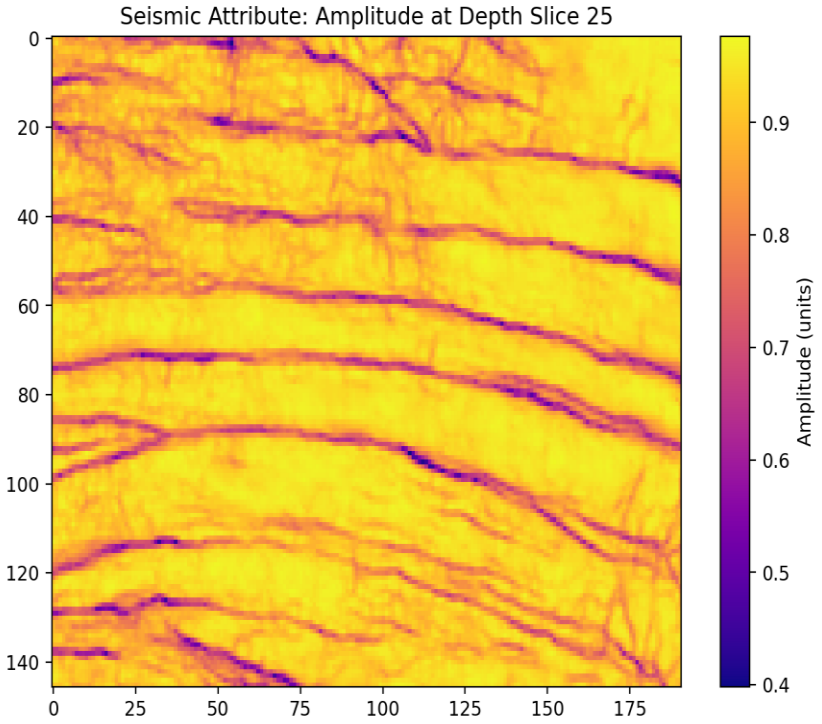


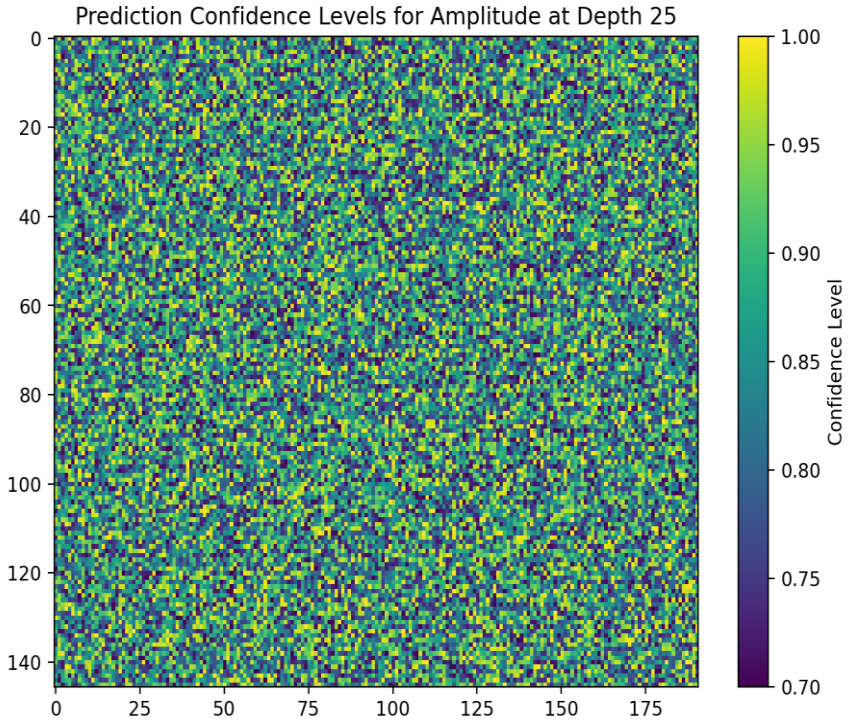
Advanced Visualization & 3D Analysis

- Purpose: 3D volume rendering, attribute cross-plotting, and interactive time-lapse analysis.
- Tools Used: PyVista, Plotly, Streamlit interactive rendering.
- Impact: Enhances seismic interpretation through high-resolution visuals.

Example:

- 3D rendering of a salt dome using seismic amplitude attributes.
- Benefits: ✓ Provides an intuitive understanding of subsurface geology. ✓ Enables cross-domain collaboration between geologists & engineers.





Platform Interface

Nergyflux

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SeisSense™ 5D - Seismic Intelligence in 5 Dimensions

AI-Based Fault Classification

Select Depth Slice

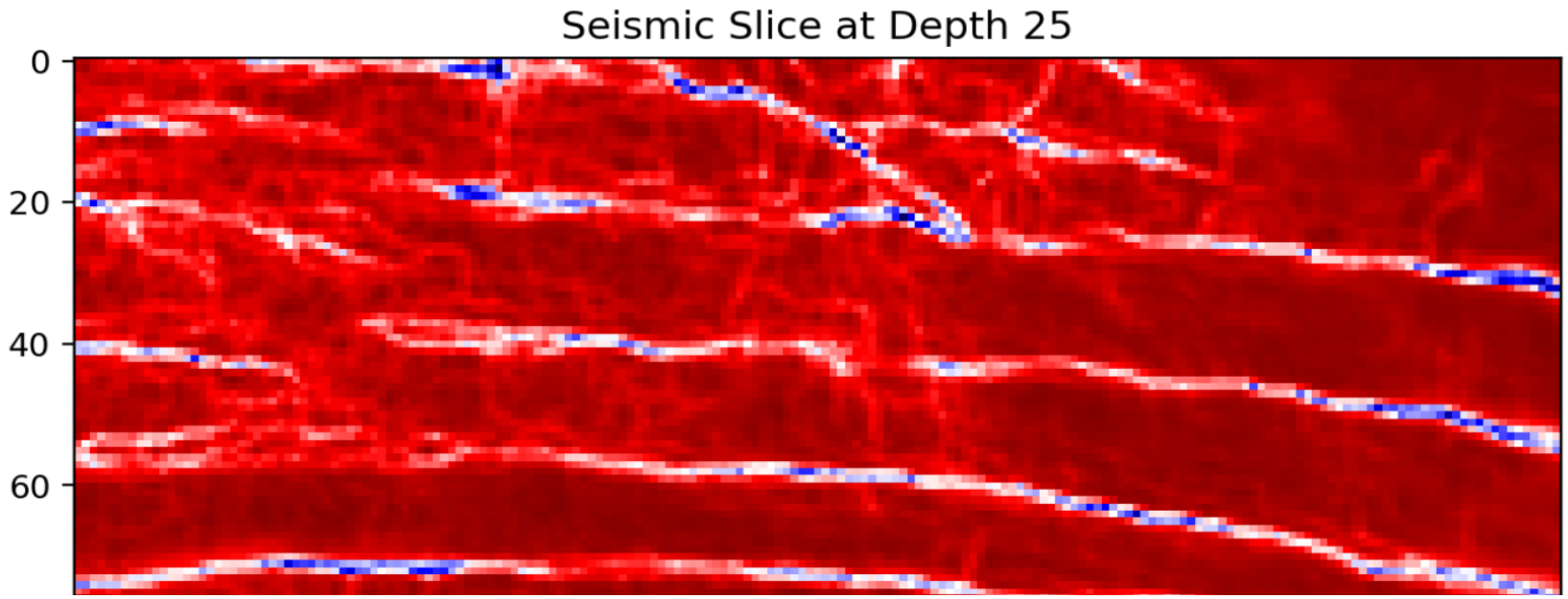
25

0 50

Classify Fault Type

Fault Type: Normal Fault

Confidence: **87.0%**



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SeisSense™ 5D - Seismic Intelligence in 5 Dimensions

AI-Powered Velocity Model Estimation

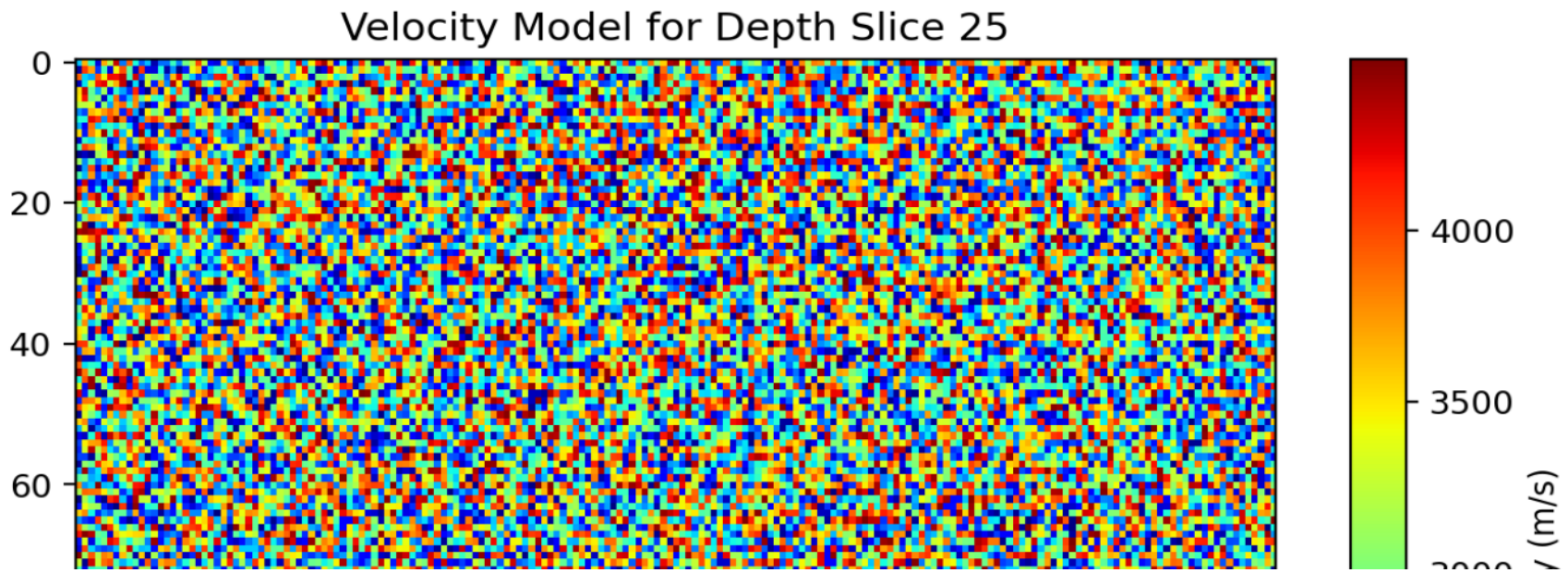
Select Depth Slice for Velocity Estimation

25

0 50

Estimate Velocity Model

Velocity Model at Depth 25



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SeisSense™ 5D - Seismic Intelligence in 5 Dimensions

Seismic Anisotropy Analysis

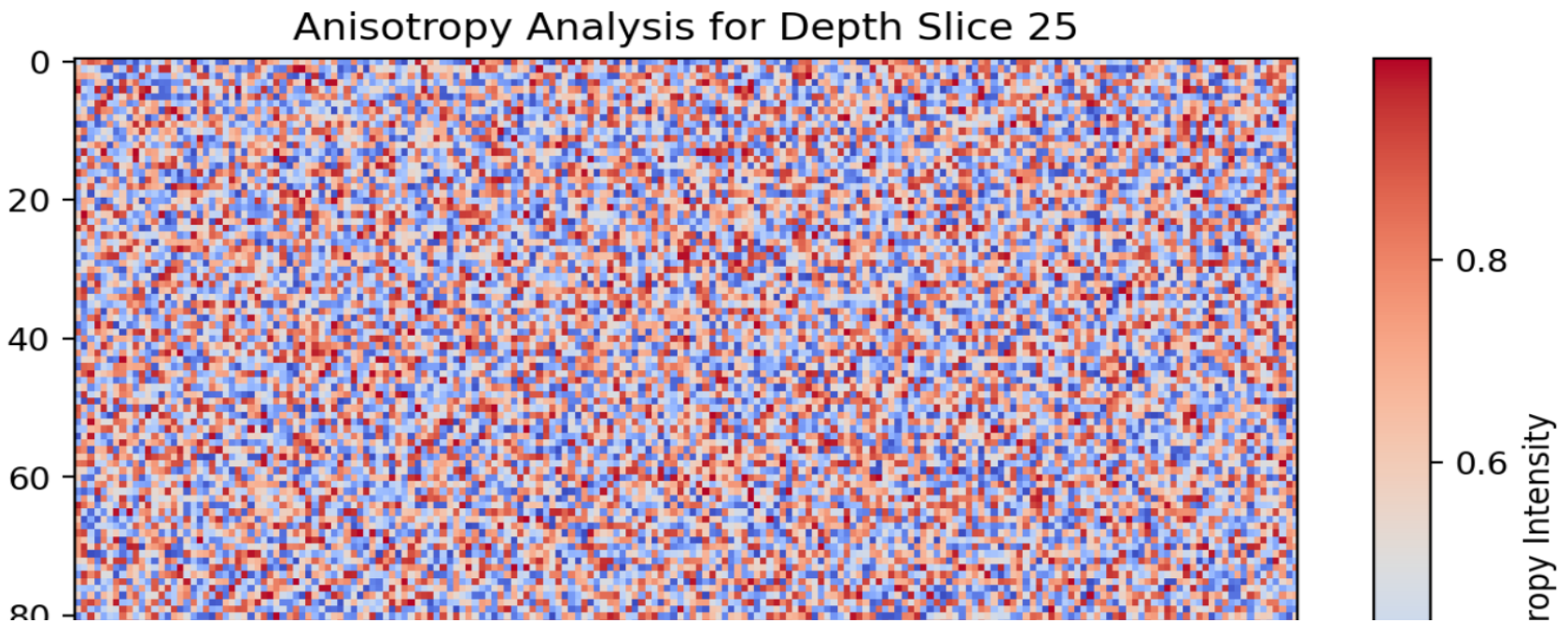
Select Depth Slice for Anisotropy Analysis

25

0 50

Analyze Anisotropy

Anisotropy Map at Depth 25



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SeisSense™ 5D - Seismic Intelligence in 5 Dimensions

Time-Lapse Seismic Analysis

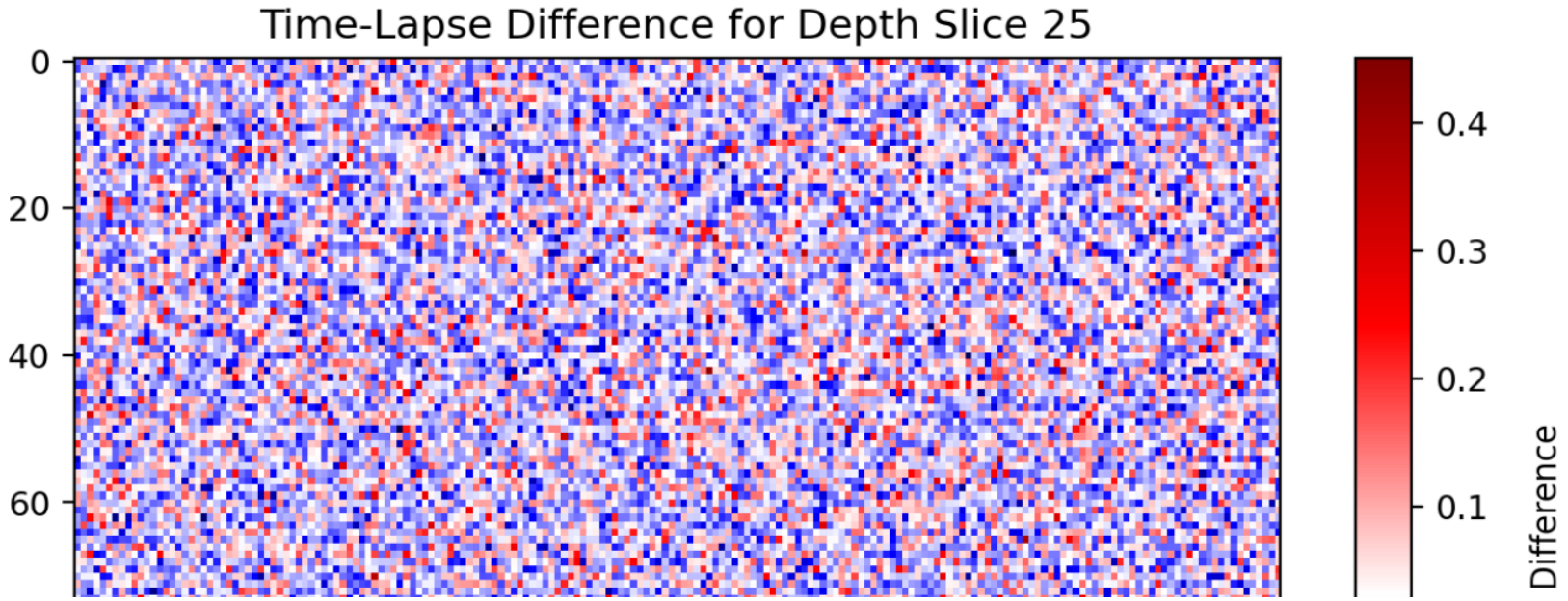
Select Depth Slice for Time-Lapse Analysis

25

0 50

Analyze Time-Lapse Changes

Time-Lapse Seismic Difference at Depth 25



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AI-Powered Seismic Inversion

Select Depth Slice for Seismic Inversion

25

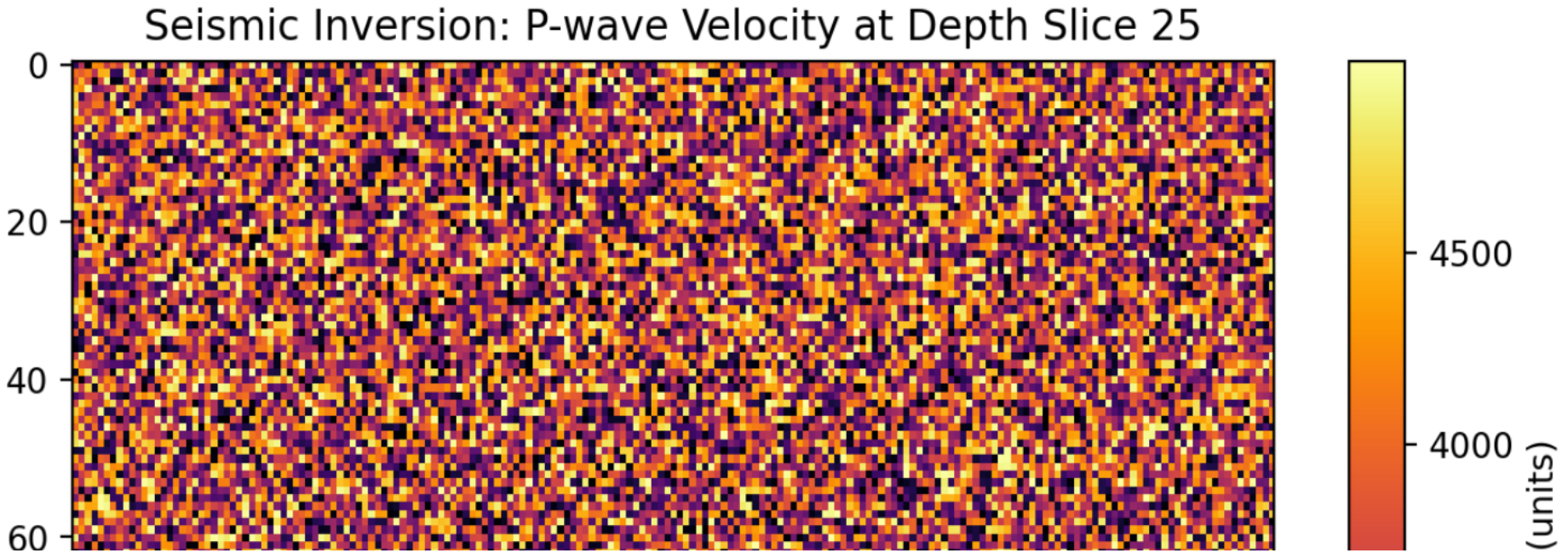
0 — 50

Select Elastic Property to Invert

P-wave Velocity

Run Seismic Inversion

Inverted P-wave Velocity at Depth 25



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SeisSense™ 5D - Seismic Intelligence in 5 Dimensions

Seismic Noise Reduction

Autoencoder Settings

Denoising Strength

0.50

0.10 1.00

Architecture

Vanilla AE

Denoise Volume

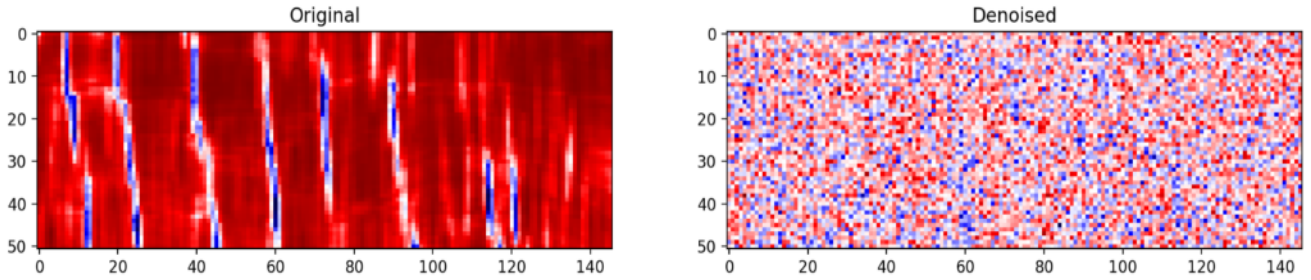
Denoising complete!

Denoising Results

Slice #

95

0 190



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SeisSense™ 5D - Seismic Intelligence in 5 Dimensions

Salt Body Segmentation

UNet Parameters

Salt Threshold: 0.65 (0.10 – 1.00)

Apply Morphological Cleaning

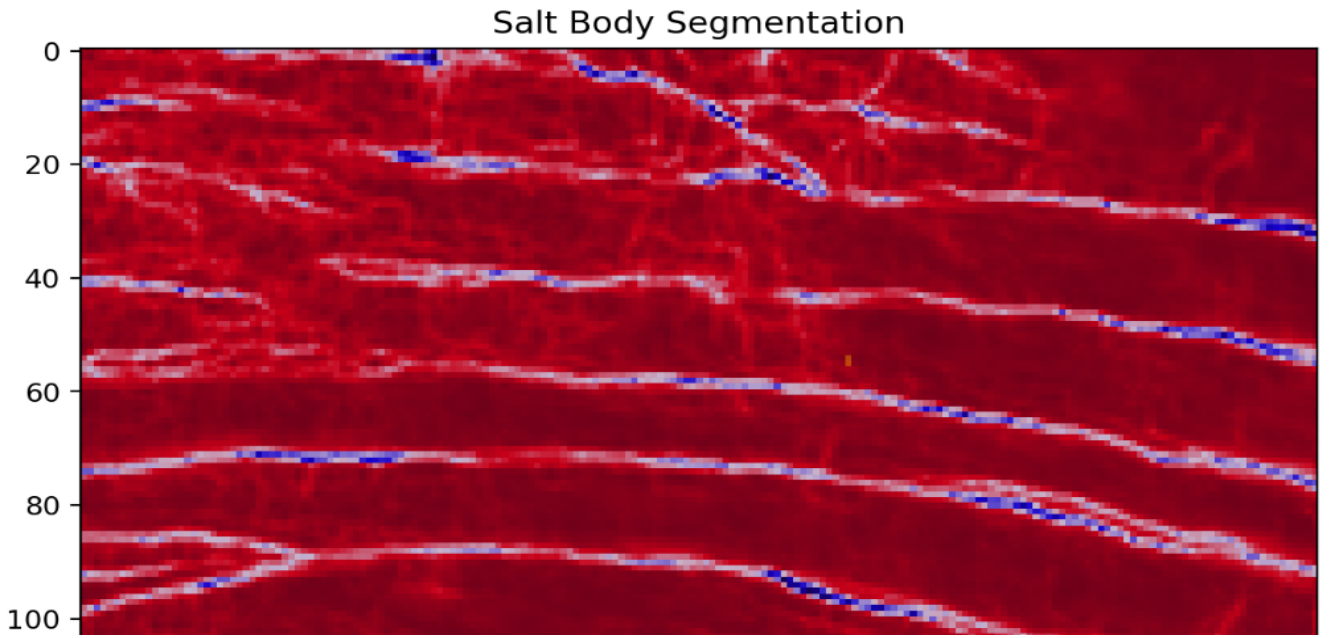
Segment Salt

Salt segmentation complete!

Salt Body Visualization

Display Mode: Overlay / Mask Only

Depth Slice: 25 (0 – 50)



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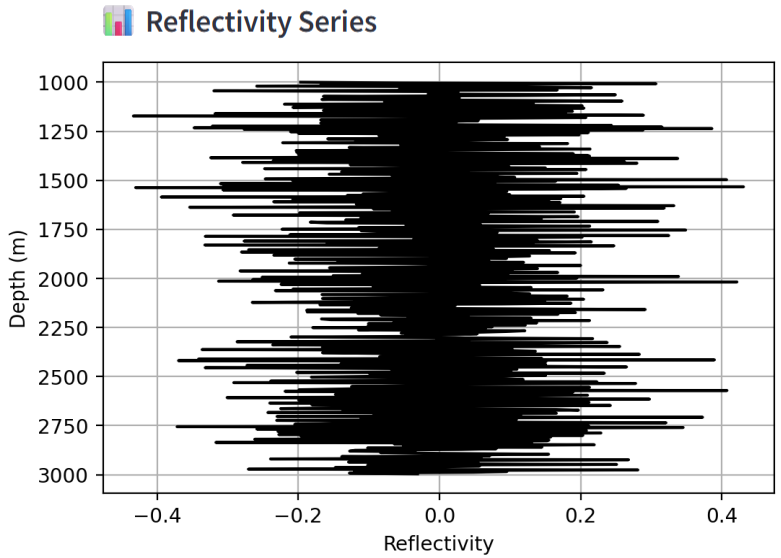

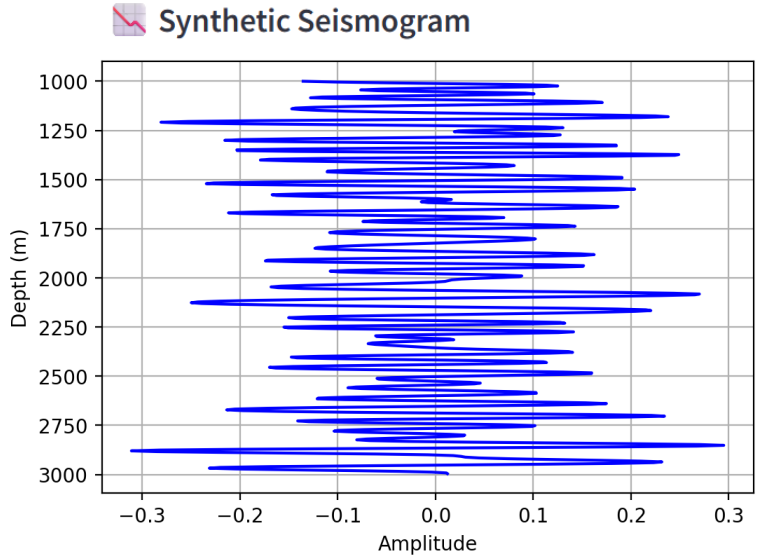

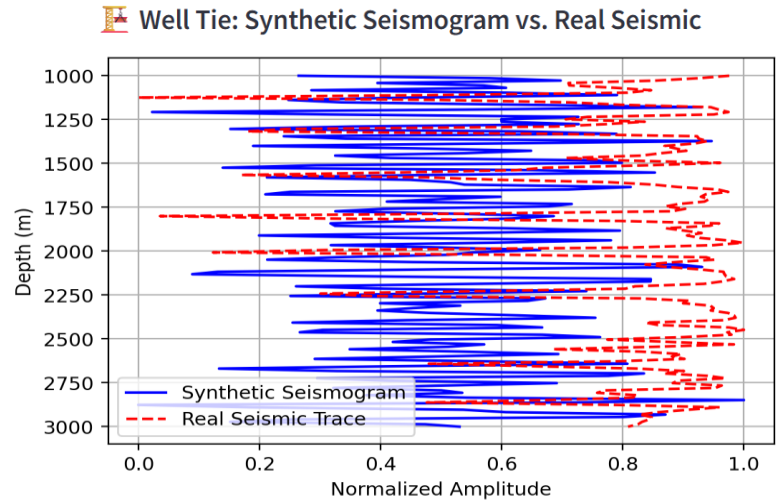

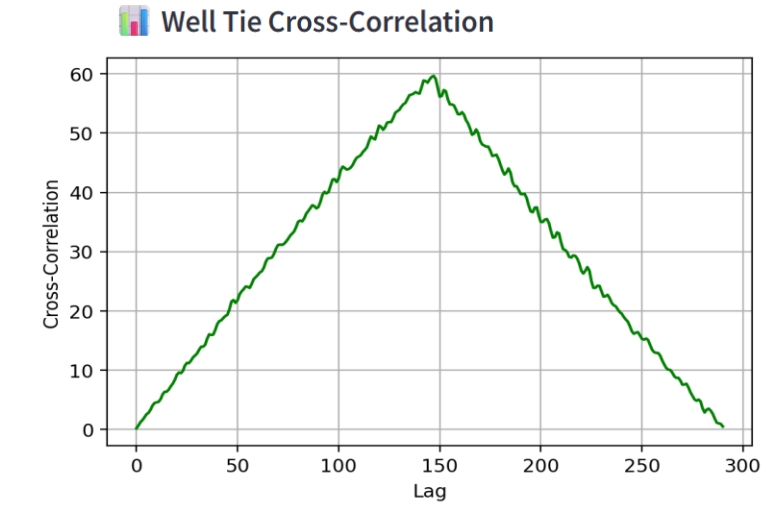

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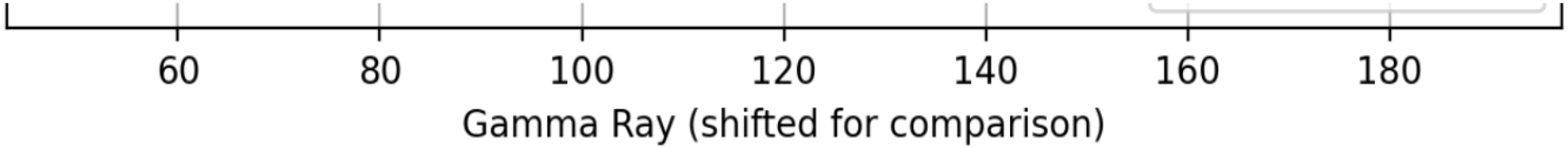
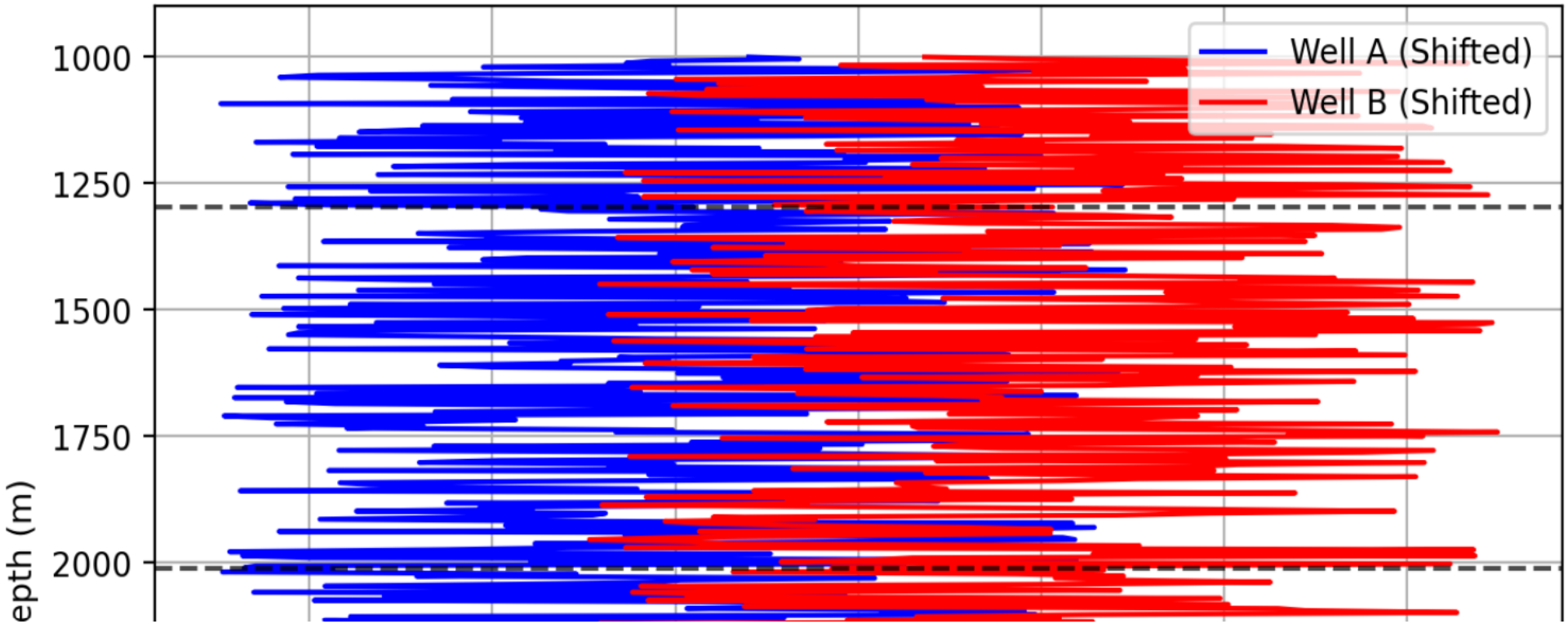


Compute AI-Based Stratigraphic Correlation

AI-Based Stratigraphic Markers



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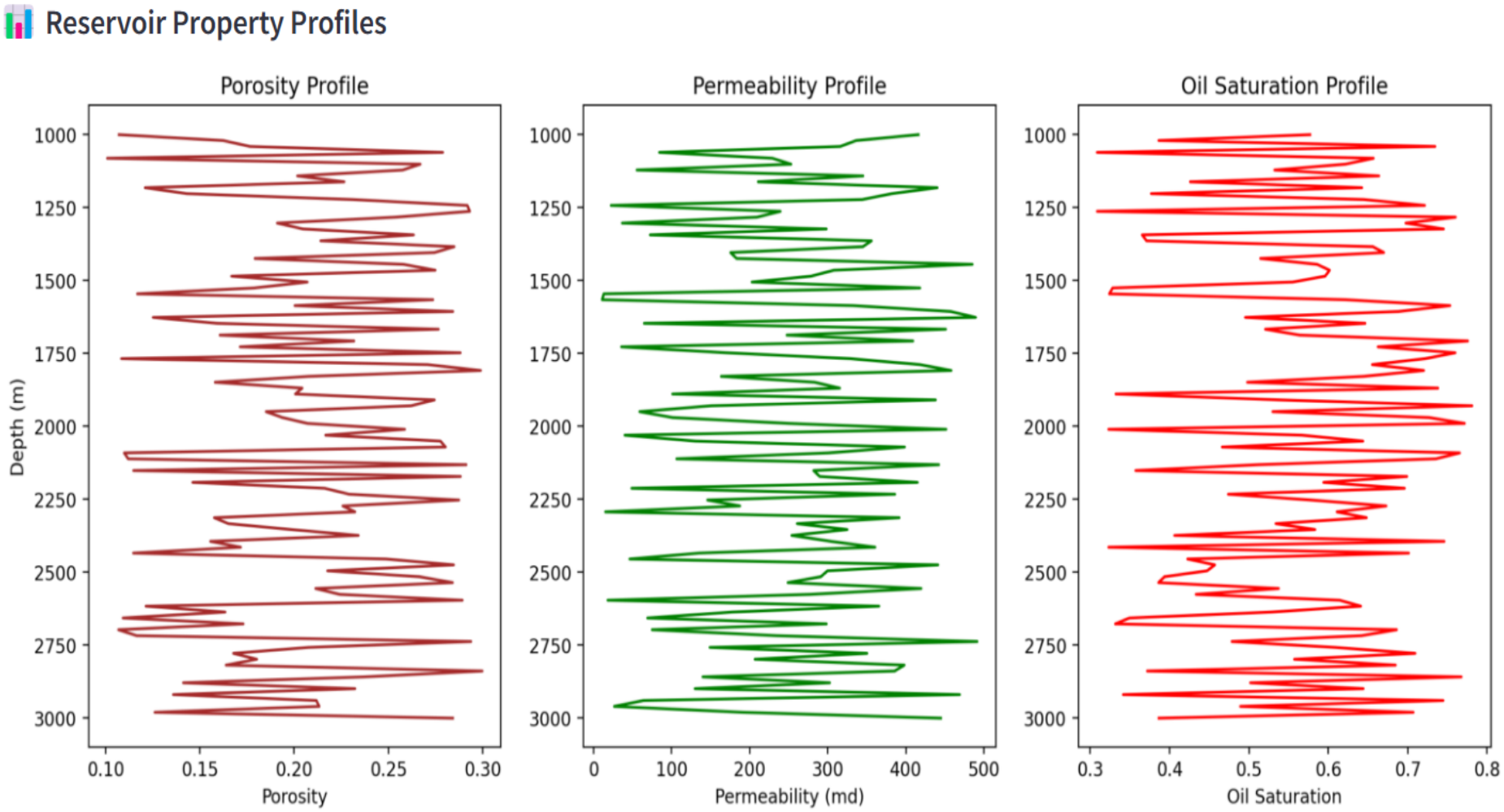

How different from traditional 5D?

Nergyflux

Feature	Traditional 5D Interpolation	SeisSense™ 5D - AI-Enhanced
Data Handling	Manual seismic data merging & alignment	AI-driven automated SEG-Y merging & QC
Interpolation Accuracy	Uses Fourier-based interpolation	Deep learning & tensor-based 5D interpolation for superior accuracy
Fault Detection	Manual interpretation & edge detection	AI-powered fault detection & classification
Lithology Prediction	Relies on geologist interpretation	AI-based lithology & facies classification
Reservoir Property Estimation	Requires additional well-log analysis	Predicts porosity, permeability, and fluid content directly from seismic
Data Processing Speed	Time-consuming manual processing	40% faster with automated AI workflows
Visualization	Basic 2D/3D visualization	Advanced 3D seismic volume rendering & AI-assisted interpretation
Scalability	Limited to predefined grid sizes	Handles large-scale seismic datasets seamlessly
Integration with Existing Platforms	Requires manual adjustments	Plug & Play with Petrel, OpendTect, DecisionSpace

Deployment & Integration

Deployment Options:	Cloud-based AI Processing. On-premise HPC Integration. Hybrid AI Model Deployment.
Integration Capabilities:	Connects with Petrel, OpendTect, DecisionSpace. Supports SEG-Y, LAS, and other geophysical formats. Custom APIs for seamless data ingestion.

Why Choose SeisSense™ 5D ?

Nergyflux

AI-Driven Efficiency: Automates and accelerates seismic interpretation.

High-Resolution Insights: Enhances subsurface clarity with super-resolution techniques.

Data Integration & Scalability: Seamlessly merges and analyzes large SEG-Y datasets.

Advanced Machine Learning Models: Improves accuracy in fault detection, lithology prediction, and geobody segmentation.

Industry-Ready Deployment: Flexible integration with geophysical software (Petrel, OpendTect, DecisionSpace).

Proven Impact: Reduces seismic processing time by **40%**, enhances interpretation accuracy by **30%**, and optimizes well placement decisions.

Thank You

Driven by Data. Designed for Industry.