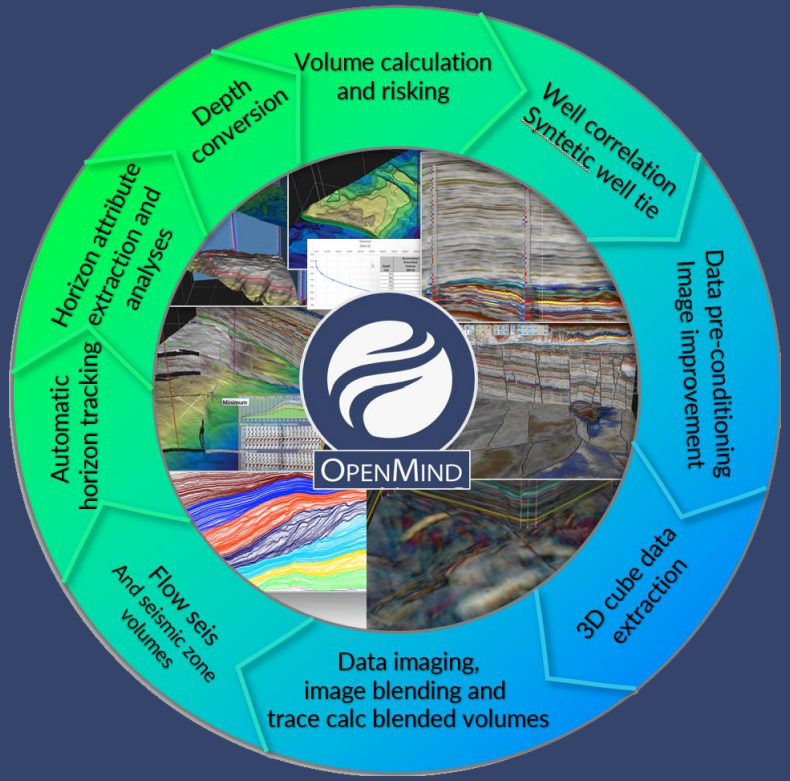
OpenMind NextGen

# Fast, Efficient and Low-cost seismic interpretation tool to speed up the Exploration Workflow

- *Auto-Correlation tracking*
- *Multi-horizon tracking*
- *ML 3D horizon tracking*




- *ML Ajax*
- *ML RBlendD*
- *ML SharpenRefl*
- *ML-Offset cube balancing*

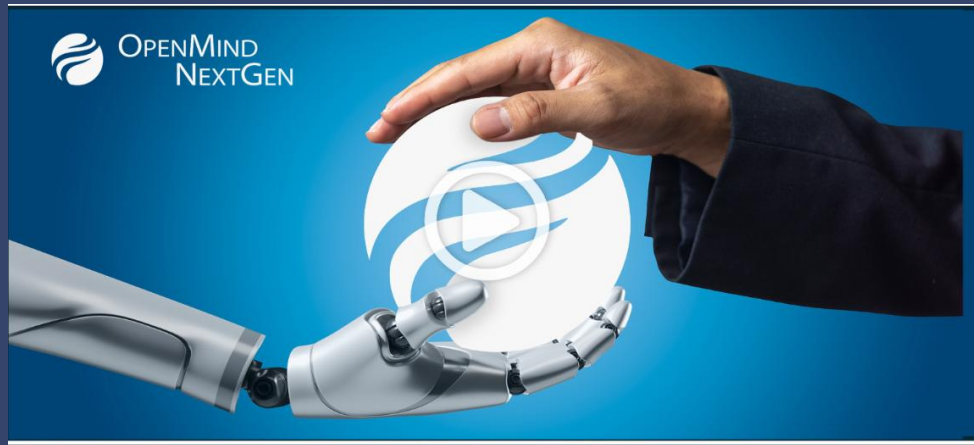
- *RAI*
- *RBlendD*
- *3D ML Faults*
- *RGB Blend*
- *AVO Screening*

- *Optimize for seismic data-based exploration/prospect definition*
- *(Export ZGY to other systems)*

Fast – Efficient - Low$

https://geomind.tech

# OpenMind 2.0 released at Image 2025




A world class autotracker


## Seisflow

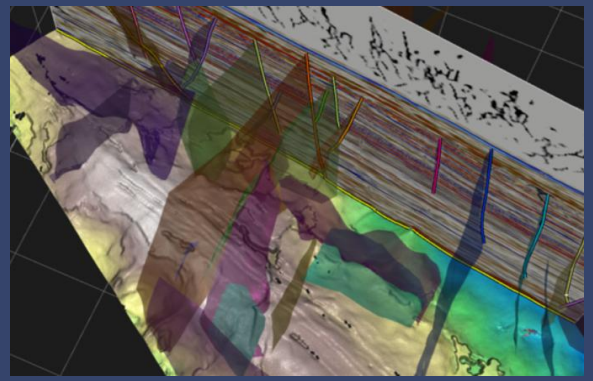
Beyond amplitude tracking

https://geomind.tech

OpenMind NextGen

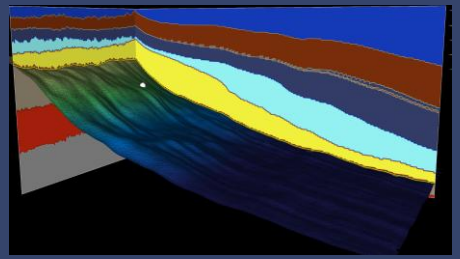
# Import, Clean and Interact

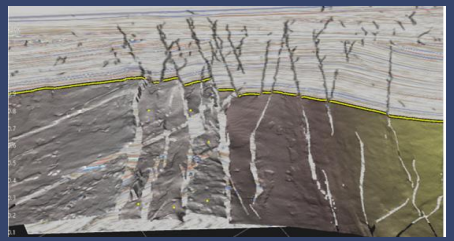
## Interpretation



Fault/Horizons

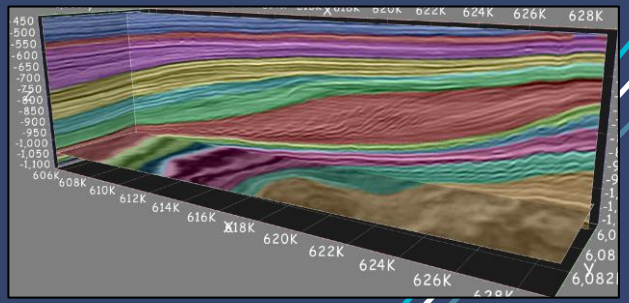
## Zone



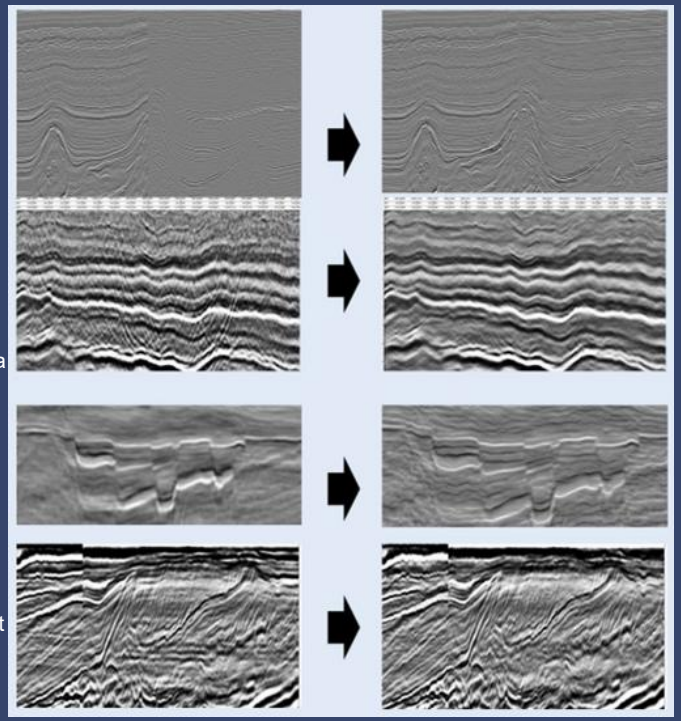


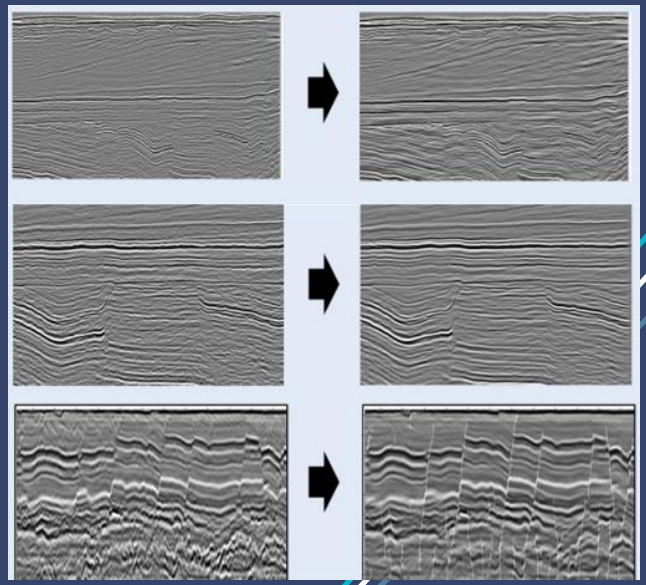
## Fault/Zone Probability volumes

## Seisflow



# AI Functions to improve your seismic

| APPLICATION | INPUT | OUTPUT |
|---|---|---|
| **RblendD**<br>Spectral broadening. Enhances low frequency poor data. Works on merges of different quality. |  | |
| **DeSmile**<br>Removes dipnoise and “smile” artefacts. NB! May attenuate injectites & imaged faults – be careful/apply on focus area | | |
| **Sharpen Reflectors**<br>Simulate “square wave look”. Some relamp is blended in also | | |
| **Simple-H-mult**<br>Attenuates horizontal multiples. Tip: Flatten input cube on seabed/bcu/top chalk first | | |

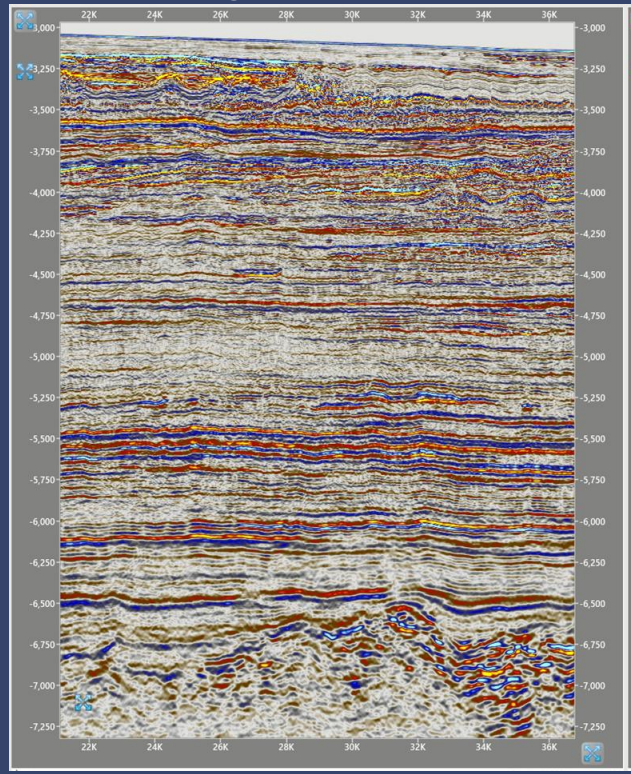
| APPLICATION | INPUT | OUTPUT |
|---|---|---|
| **Ajax**<br>Typical inhouse processing scheme: frequency dependent structurally consistent noise attenuation++ |  | |
| **Simple denoise**<br>Removes “salt and pepper” / random noise. | | |
| **Fault Probability**<br>Current version is not generalized enough. Will work on some but not all volumes/faults | | |

Additional AI models added:

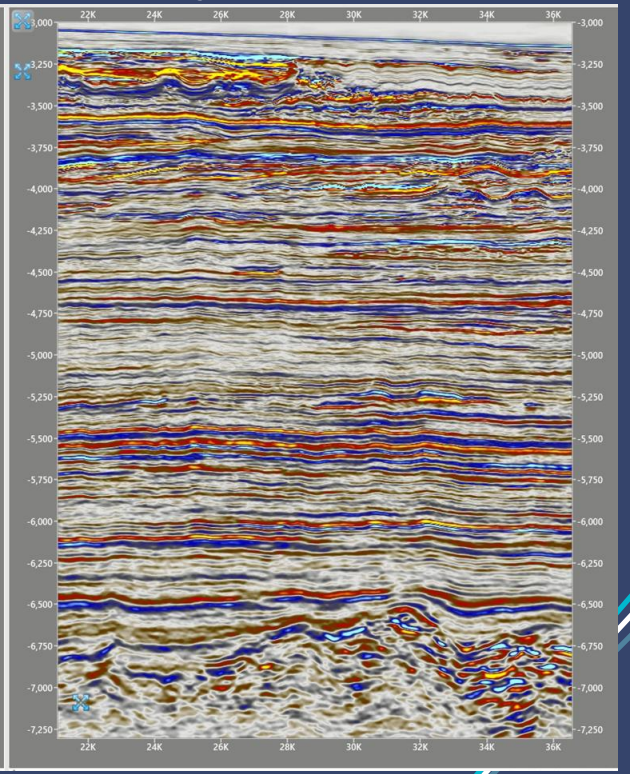
**Angle Stack Conditioning** - Conditioning for AVO misalignment correction on every CDP for far/mid/near angle stacks. Improves AVO analysis and attribute generation.

# Ajax run to clean up the seismic – removing noise

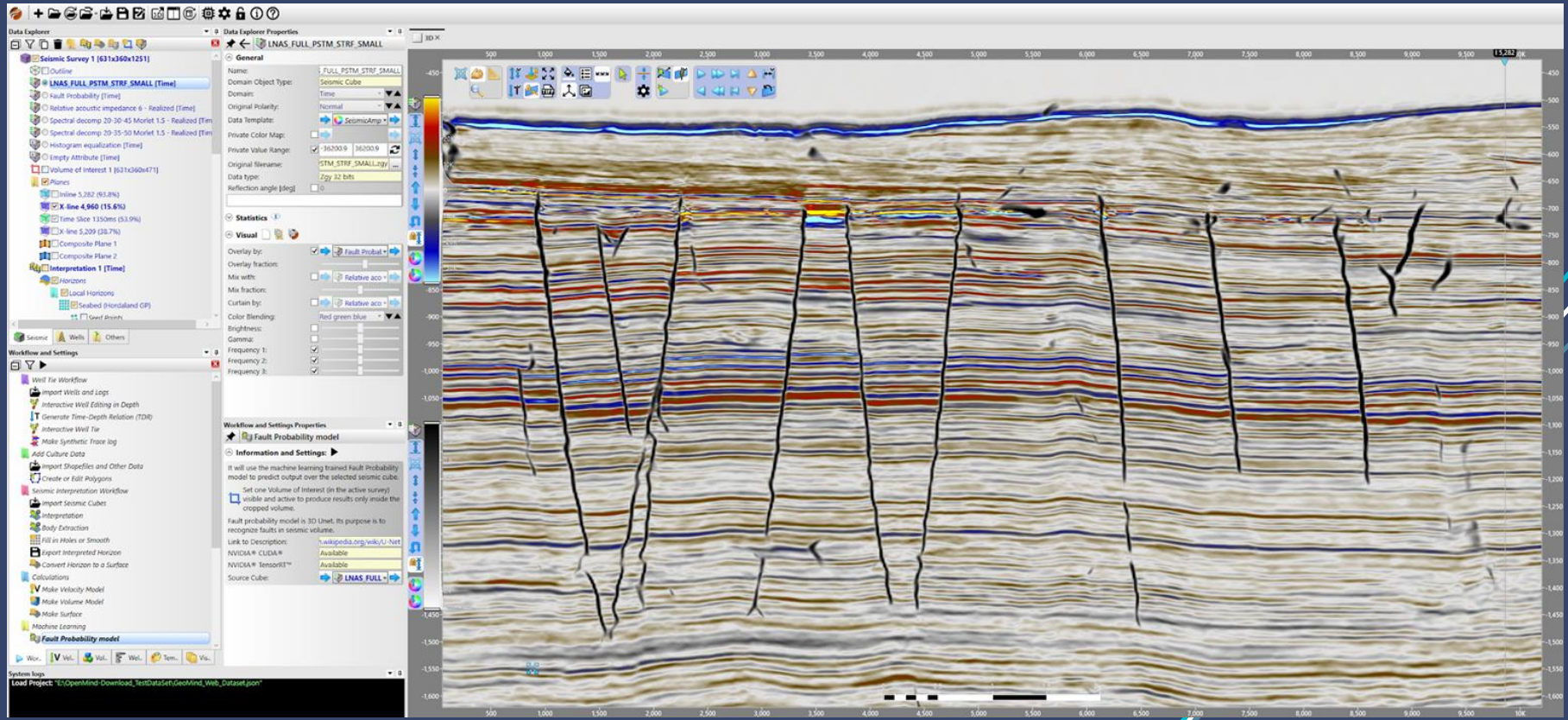
Original seismic



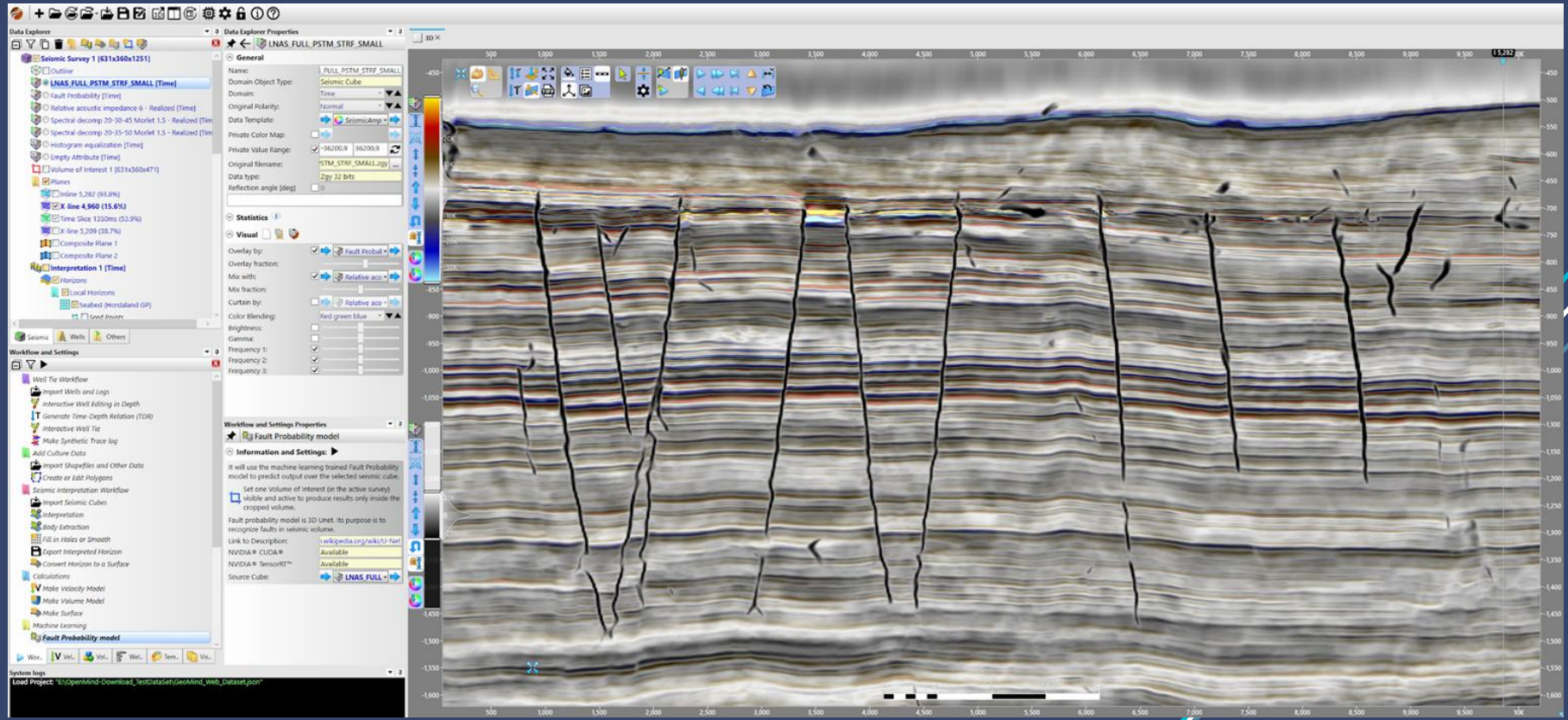

Ajax seismic



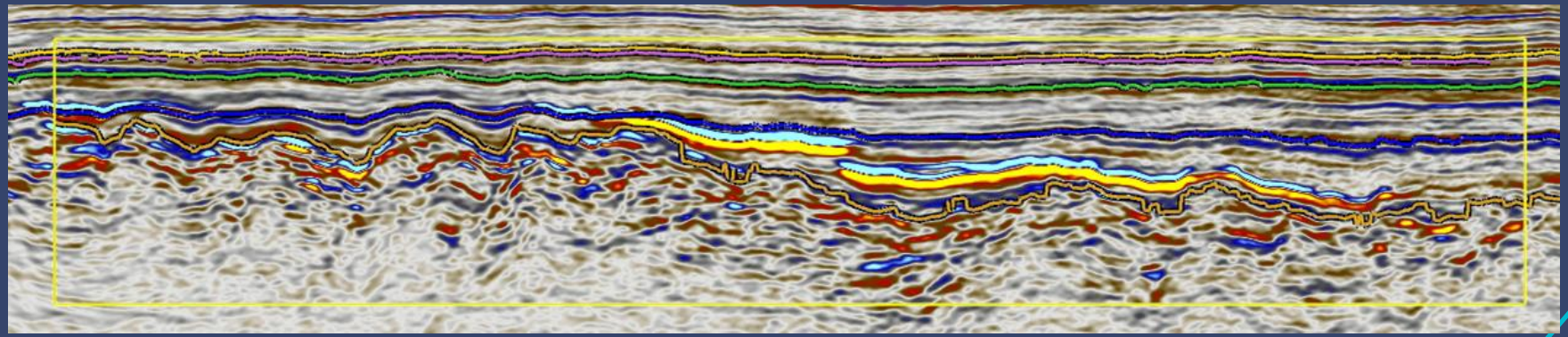
# Ajax cleaned seismic

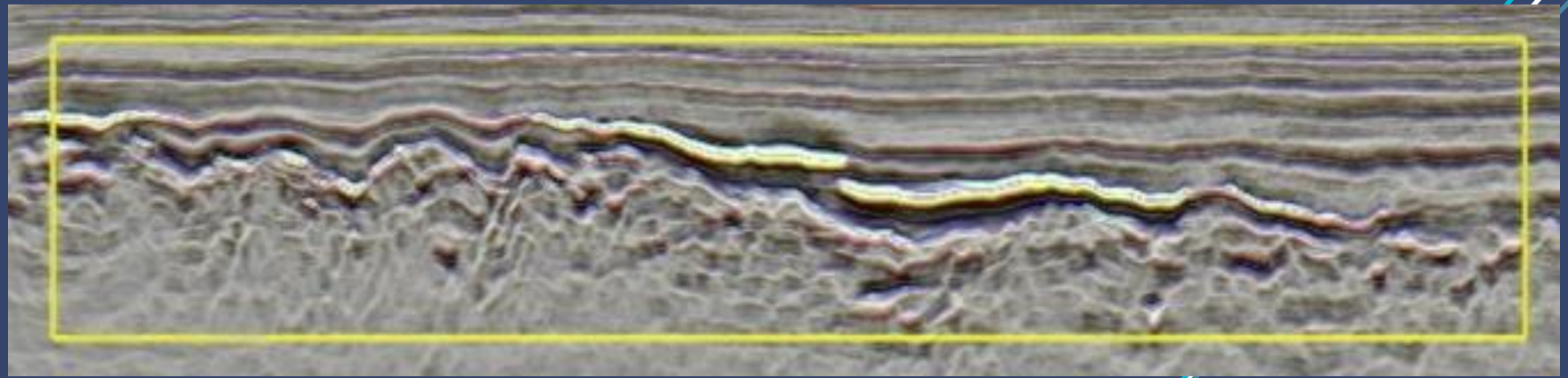


# Mixed Ajax and RAI for 3D effect on seismic



# Practical example of highlighting unconformity

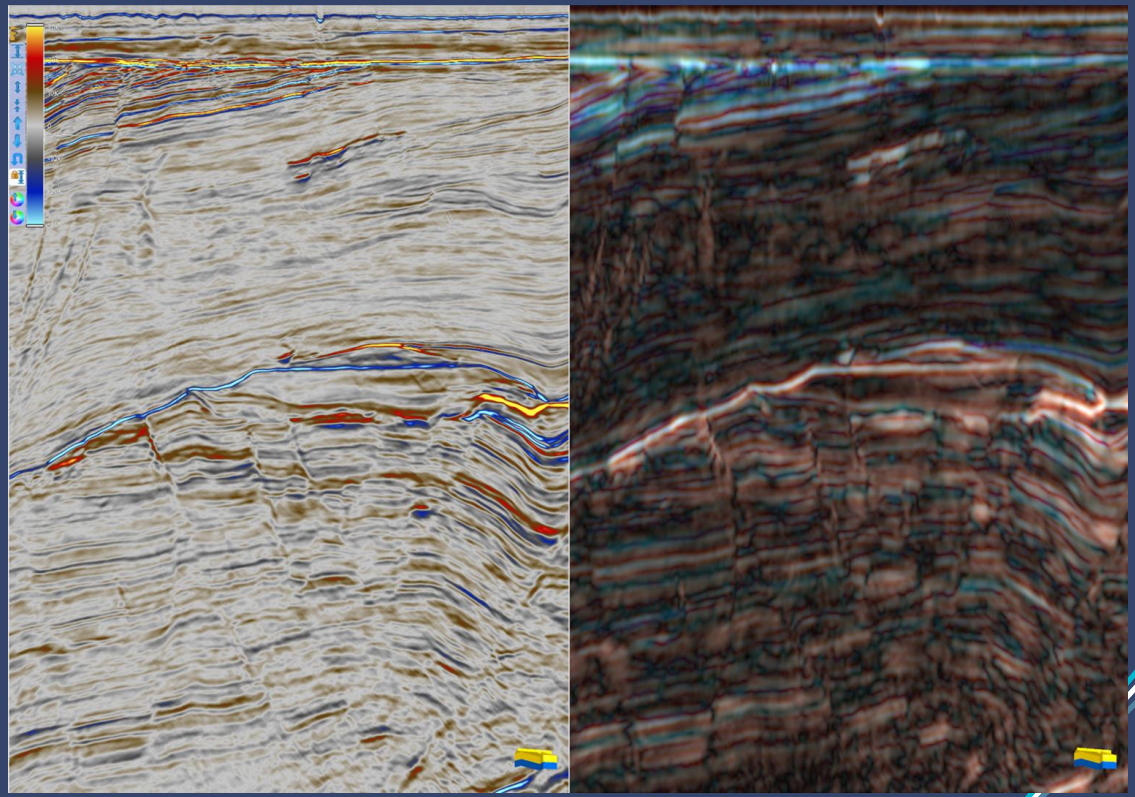




# Example of flat spot shown with spectral color blend attribute

Original seismic

Spectral Color Blend



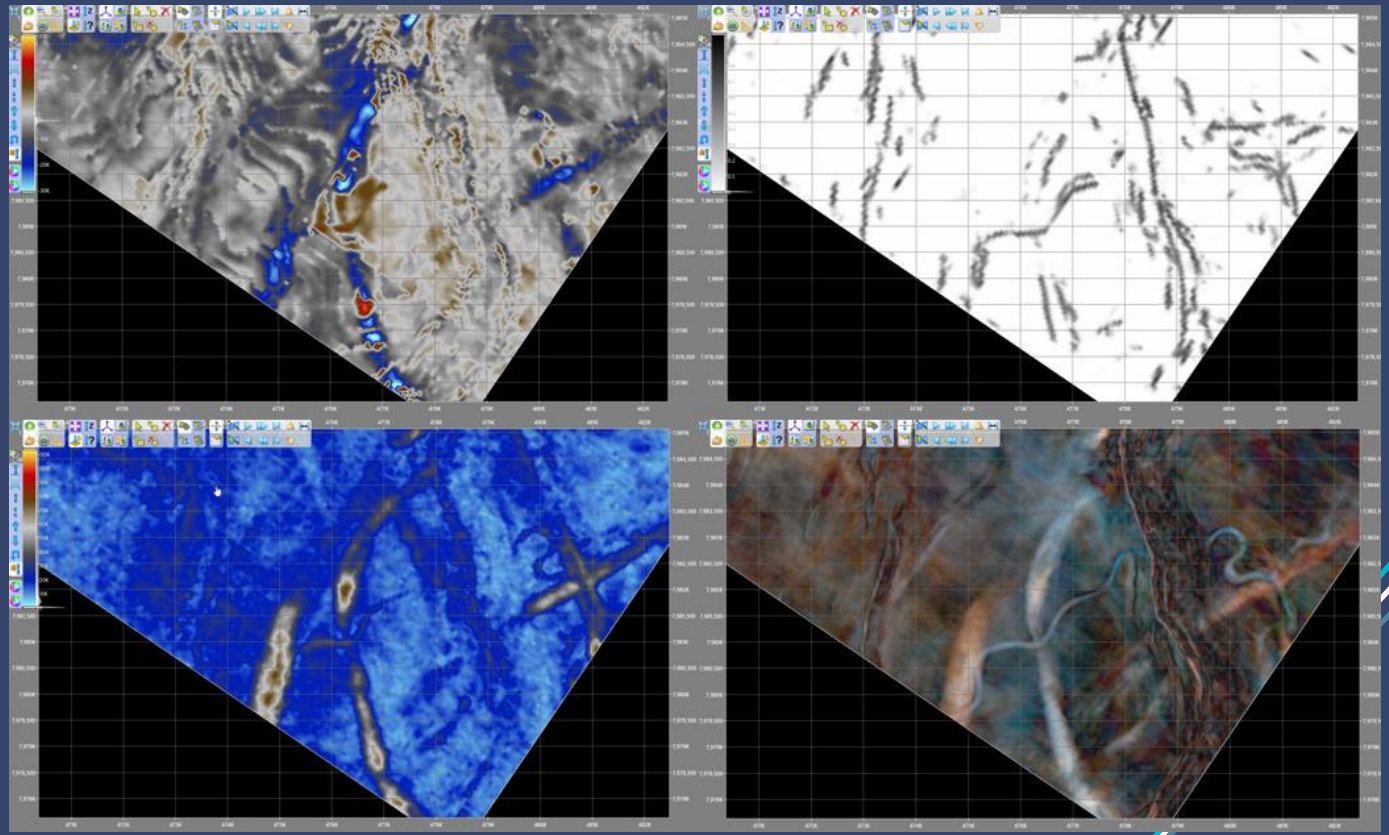
# Four attribute examples to extract from seismic

Amplitudes

Fault Probability

Magnitude

Spectral Color Blend



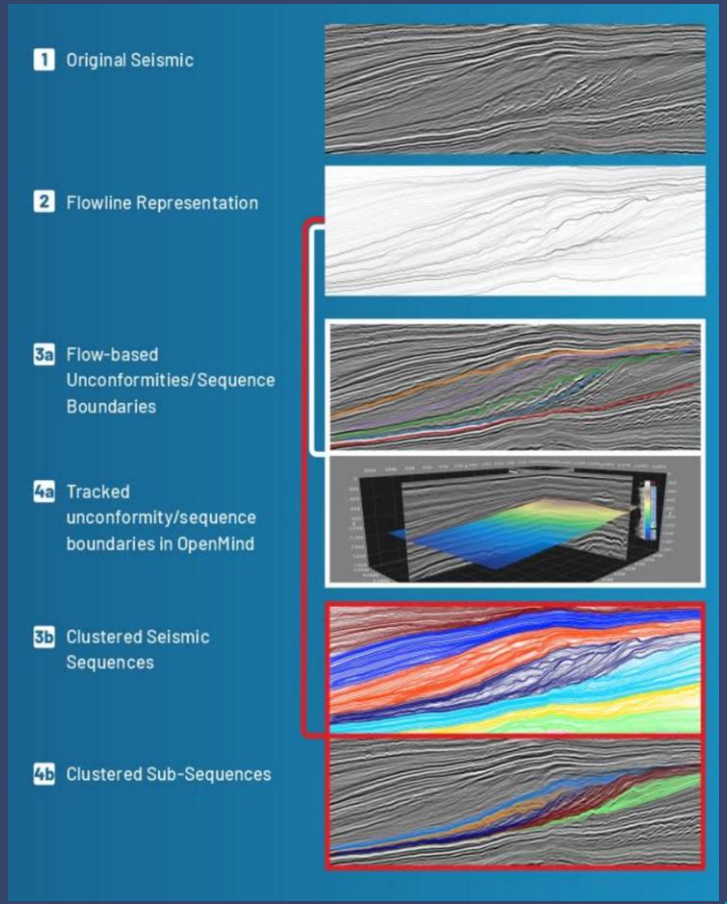
# StratCracker – OpenMind 2.0

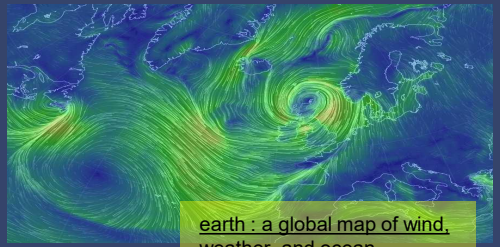
Flow based unconformity detection

Start with 1st order sequences, geo-forms and faults

Move into the next level of sub-zonation

Iterative stratigraphic zonation process

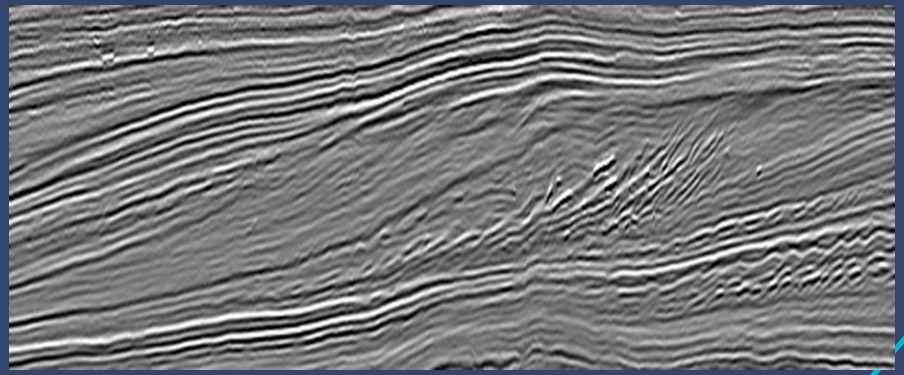


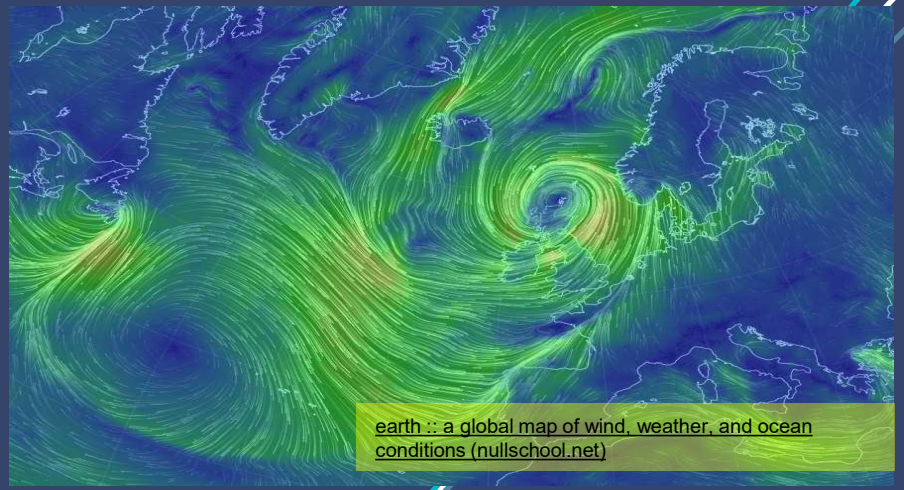



earth : a global map of wind, weather, and ocean conditions (nullschool.net)

# Motivation

- There are many tools effective at tracking coherent seismic reflectors
- Unconformities and sequence boundaries are defined by the surrounding geometry.
- Unconformities changes laterally – amplitude and correlative pattern.
- Identification and extraction becomes significantly easier in the flowline domain.

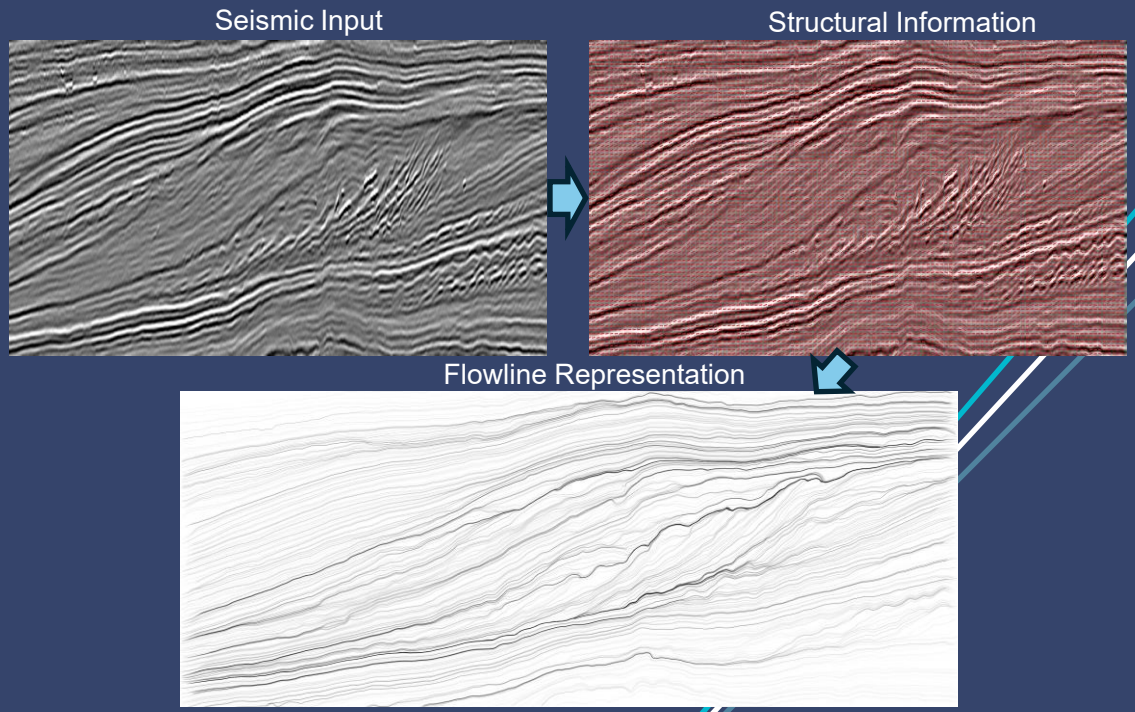




# The Flowline Domain

Helps understand lateral relationships

- Drawing inspiration from meteorological maps.
- Areas of convergence / divergence in the flow field captures the context and the long-range dependencies.
- A significant portion of research in automatic seismic interpretation, particularly with the rise of CNNs, involves analysing seismic data as patches
- Dip field as an analogy to a fluid velocity field have been done by previous authors *(van Hoek, Gesbert, and Pickens 2010)*.



# Working with the Seismic in the flowline domain



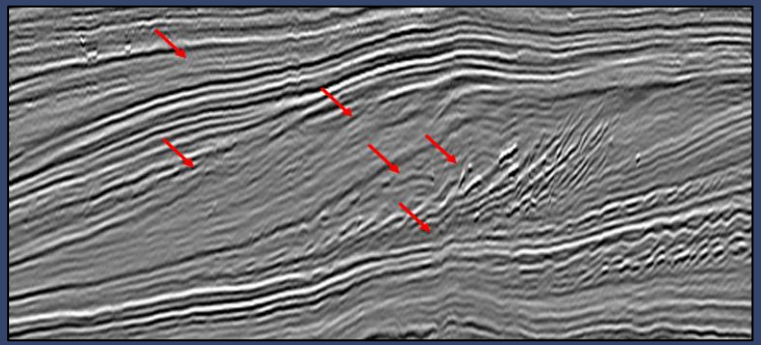
**Exploring seismic data in the flowline domain: Automated extraction of unconformities, sequence boundaries, and conformable reflections**

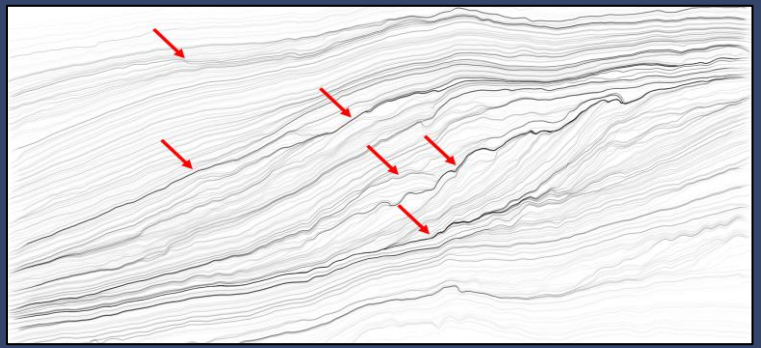
Dennis Adelved, Jan Erik Lie, Aina Juell Bugge, and Peter Bormann

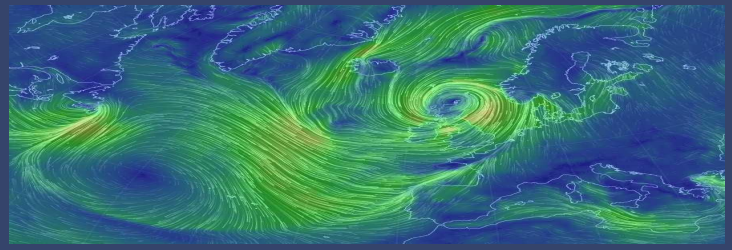
https://doi.org/10.1190/tle44030214.1

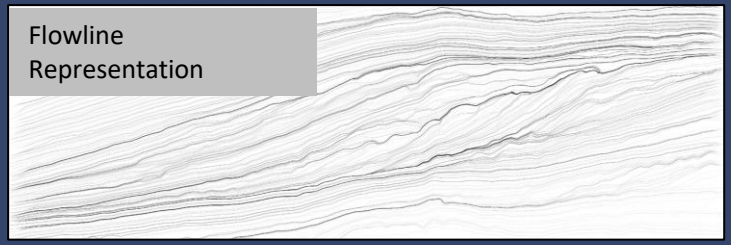
Pages: 214–223 | Published Online: 3 March 2025

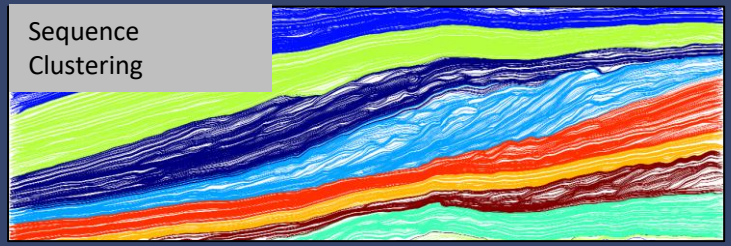
The Leading Edge

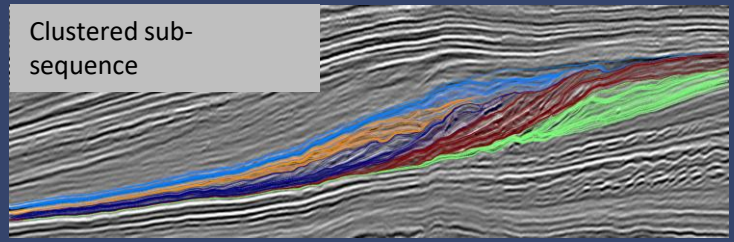






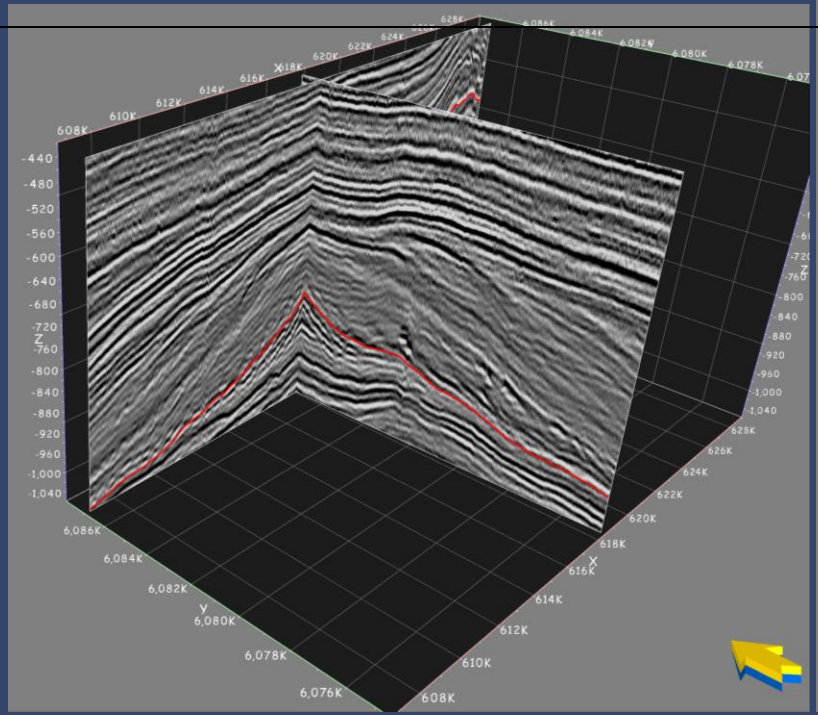


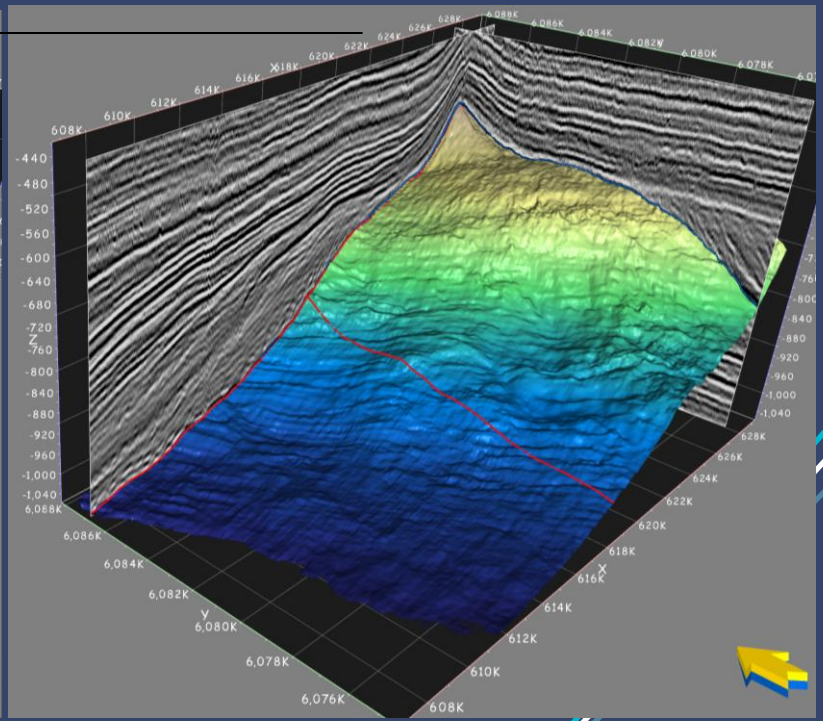



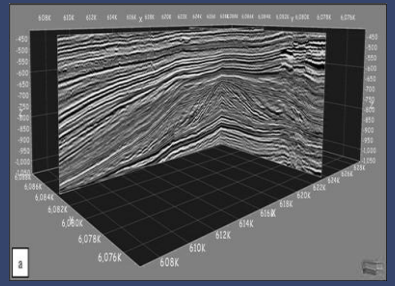
OpenMind NextGen

# Extension into 3D

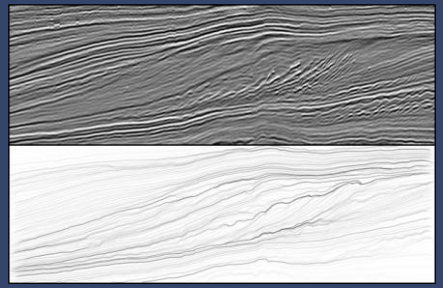


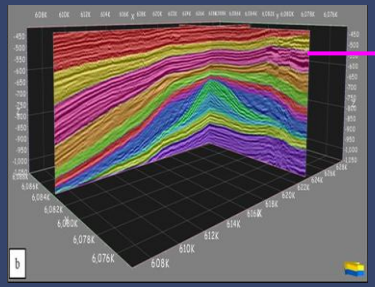
# Automatic extraction and interpretation of geomorphology



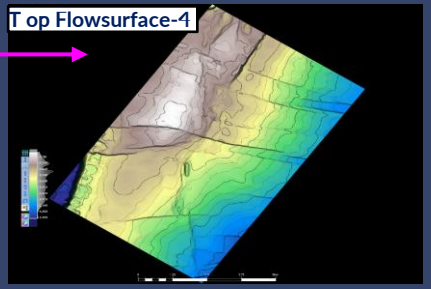
original seismic cube



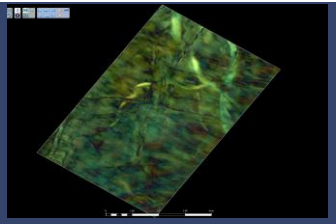
Smart selection of prominent flowlines based on overlap or other attributes



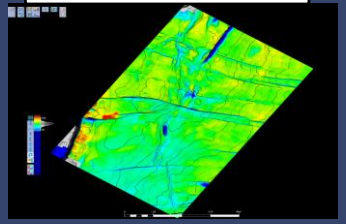
Extension of selected flowlines to 3D, extracting sequences



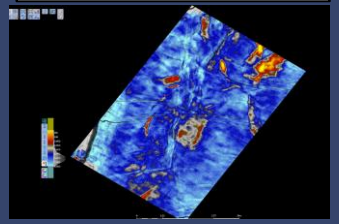

*RGB blend time slice Flowsurface4*



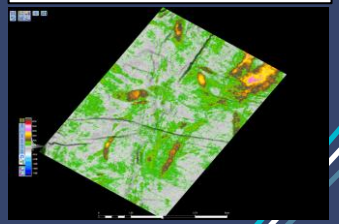
*Isochore Flow-surface 4-5*



*RMS amp Flow-surface-4-5*



*Fluid-factor Flow-surface 4-5*



***Information related to all flow surfaces and sequences instantly available***

Select – Compile – Think Geology

# StratCracker First order

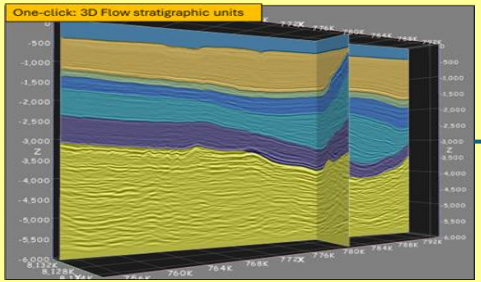
**INPUT**

**3d Seismic**
- Fault prob
- Ajax
- AVO FF/RGB/RMS amp…
- Slope

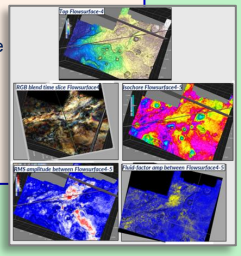
**Automatic horizons** via FlowScanner

**Interpretation**
(external/internal or mix)
- Horizons
- Faults

**Zone Builder** → **Zone volume**



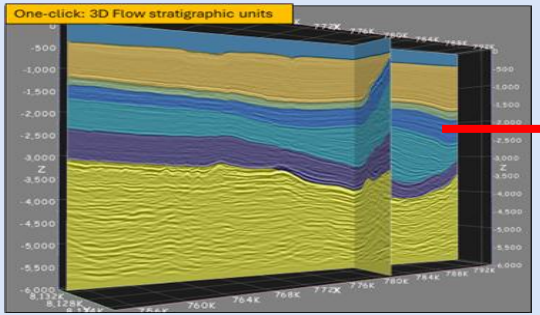

**AUTPUT PRE-MAID (In batch)**
**ATTRIBUTE MAPS**
- Generate and display associated attributes:
  - RMS amp, max positive, max neg
  - RGB blend
  - Etc
- Instantaneous available
- Individual maps and/or
- Tile map viewer:
  2, 4, 6 tiles
- Horizon/level player



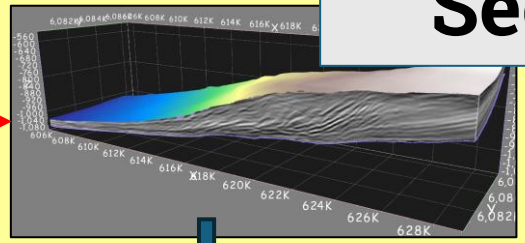
# Second order…

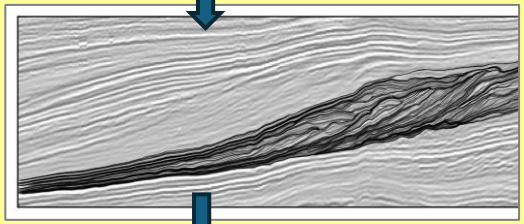
## INPUT

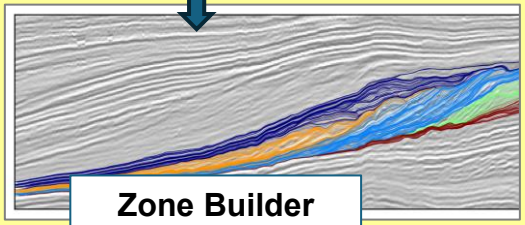
1st Order Zone volume



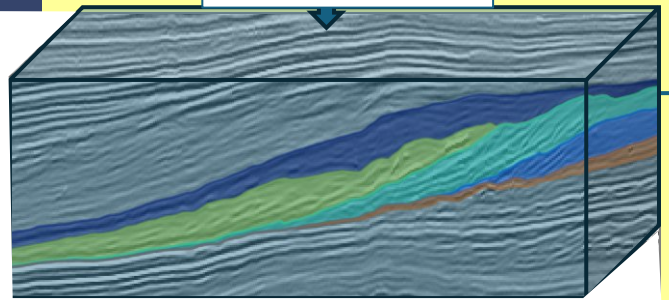

FlowScanner





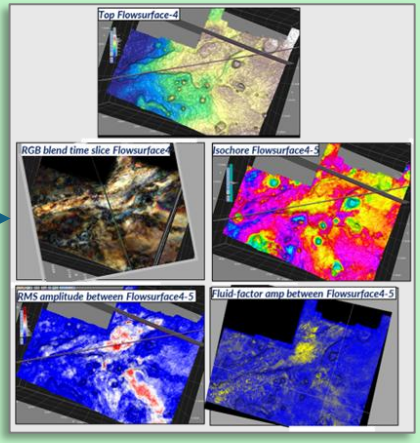


Zone Builder

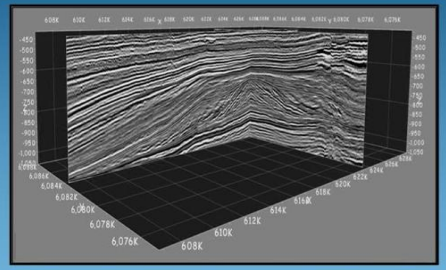


Zone Builder

2nd Order Zone volume

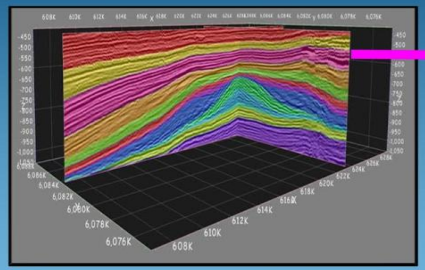


# AUTOMATIC EXTRACTION AND INTERPRETATION OF GEOMORPHOLOGY

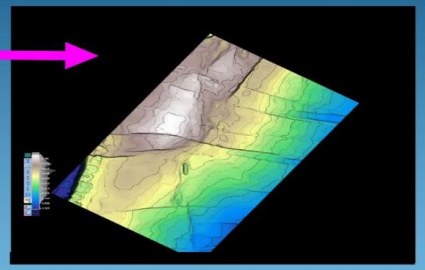


Original Seismic Cube

Smart selection of prominent flowlines based on overlap or other attributes

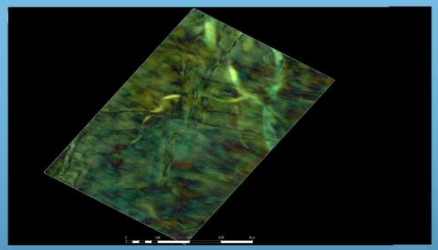


Extension of selected flowlines to 3D, extracting sequences

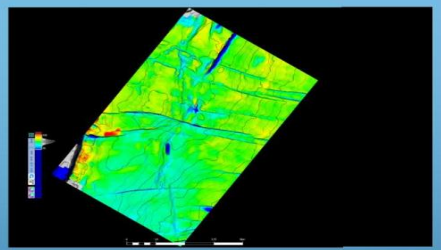


Extract surfaces from selected flowlines

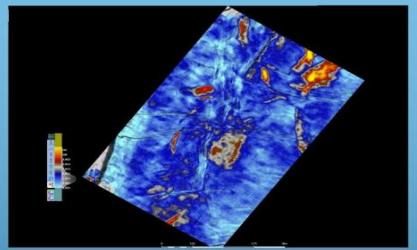
**Pre-designed workflows available as one-click functions**



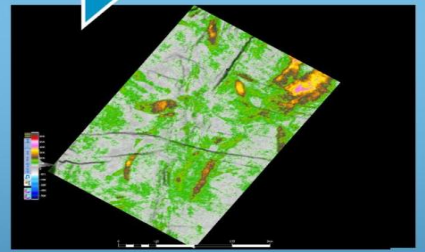
RGB blend time slice Flowsurface4



Isochore Flow-surface 4-5



RMS amp Flow-surface-4-5



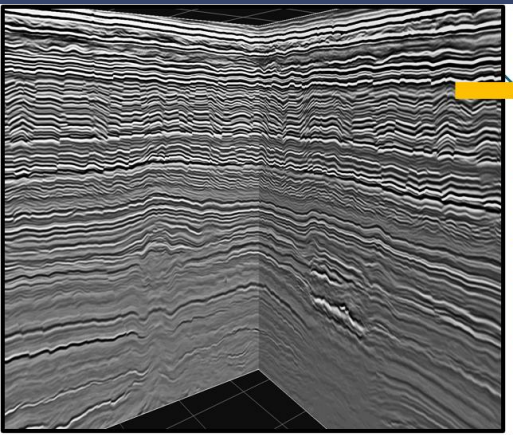
Fluid-factor Flow-surface 4-5

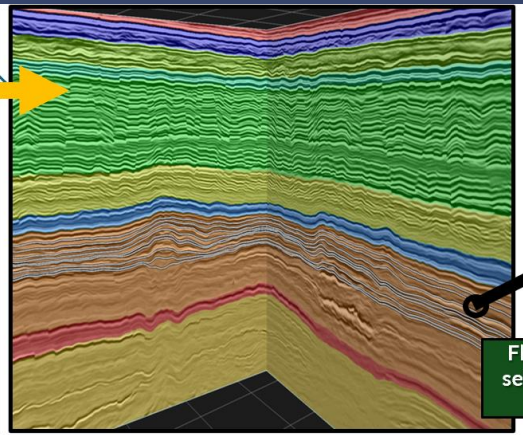
OpenMind NextGen

www.geomind.tech

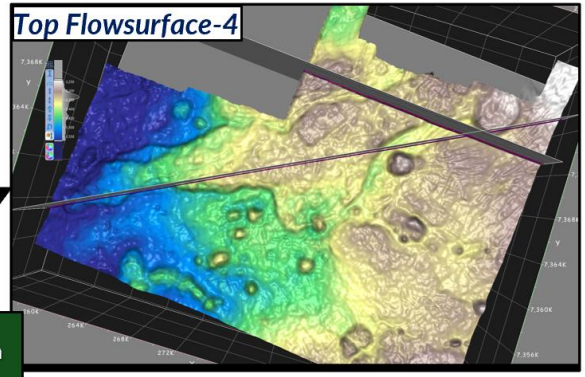
**SELECT COMPILE THINK GEOLOGY**

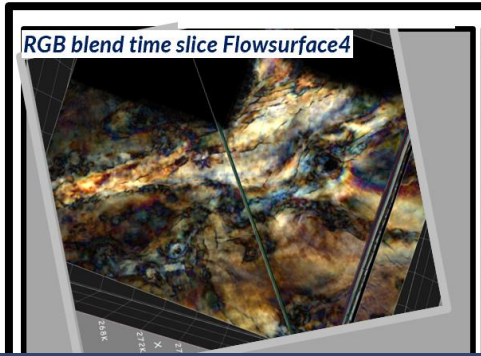
# Towards automatic 3D interpretation - StratCracker

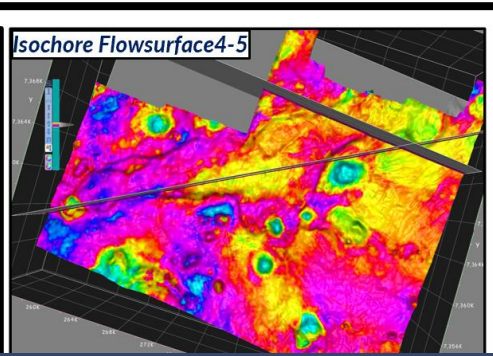


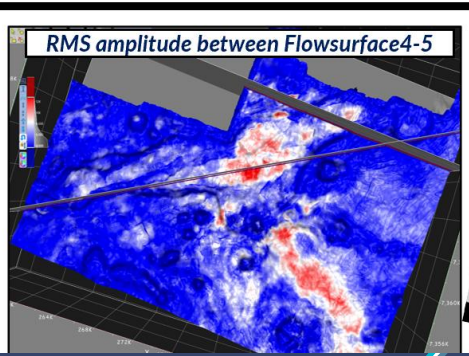


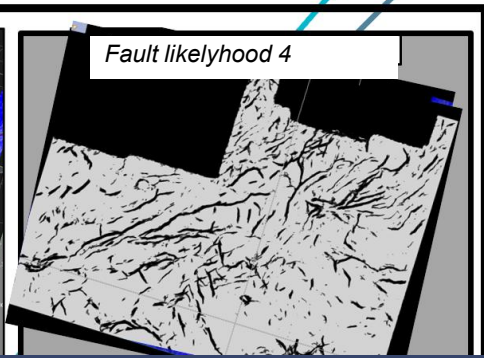
Flow surfaces selected within Strat-unit



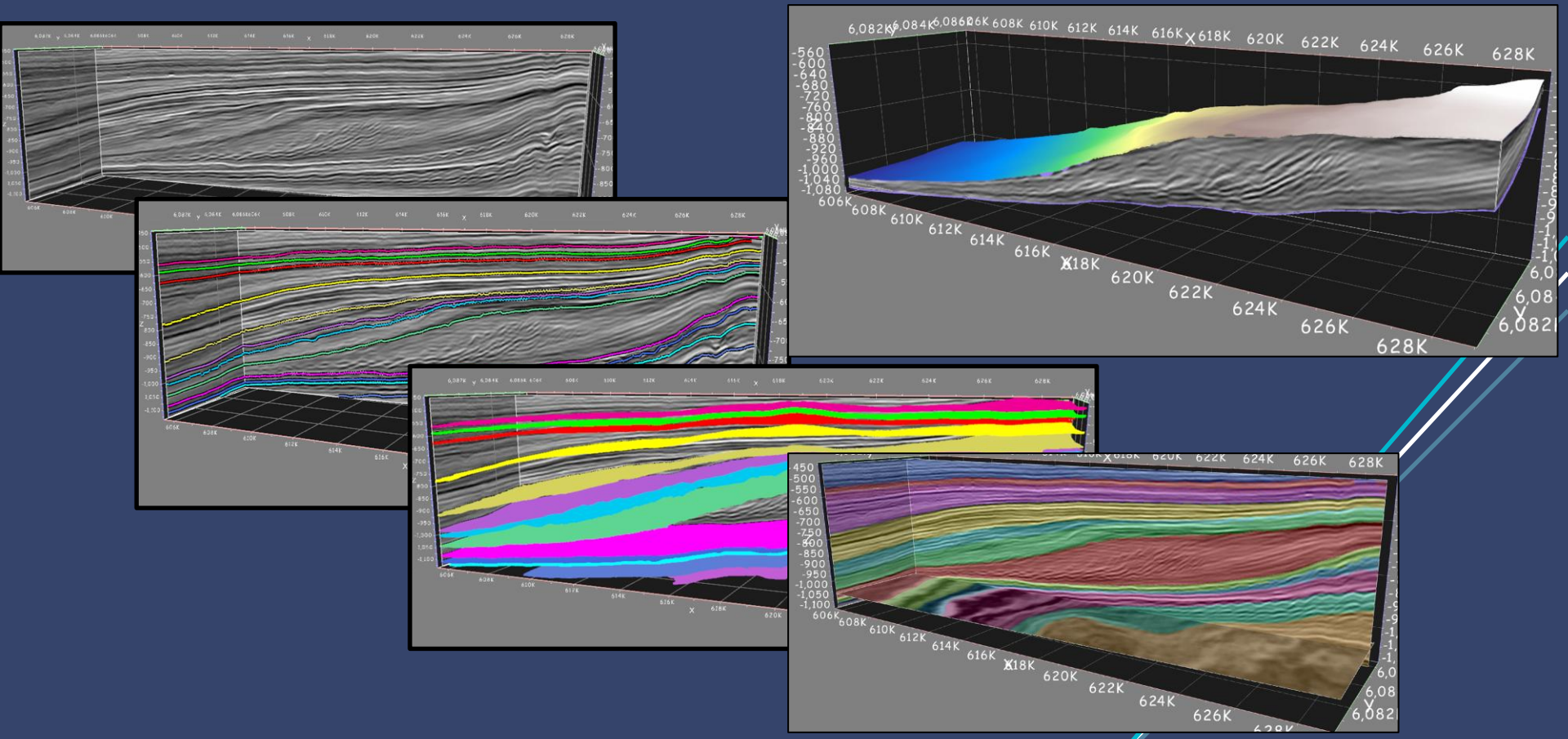



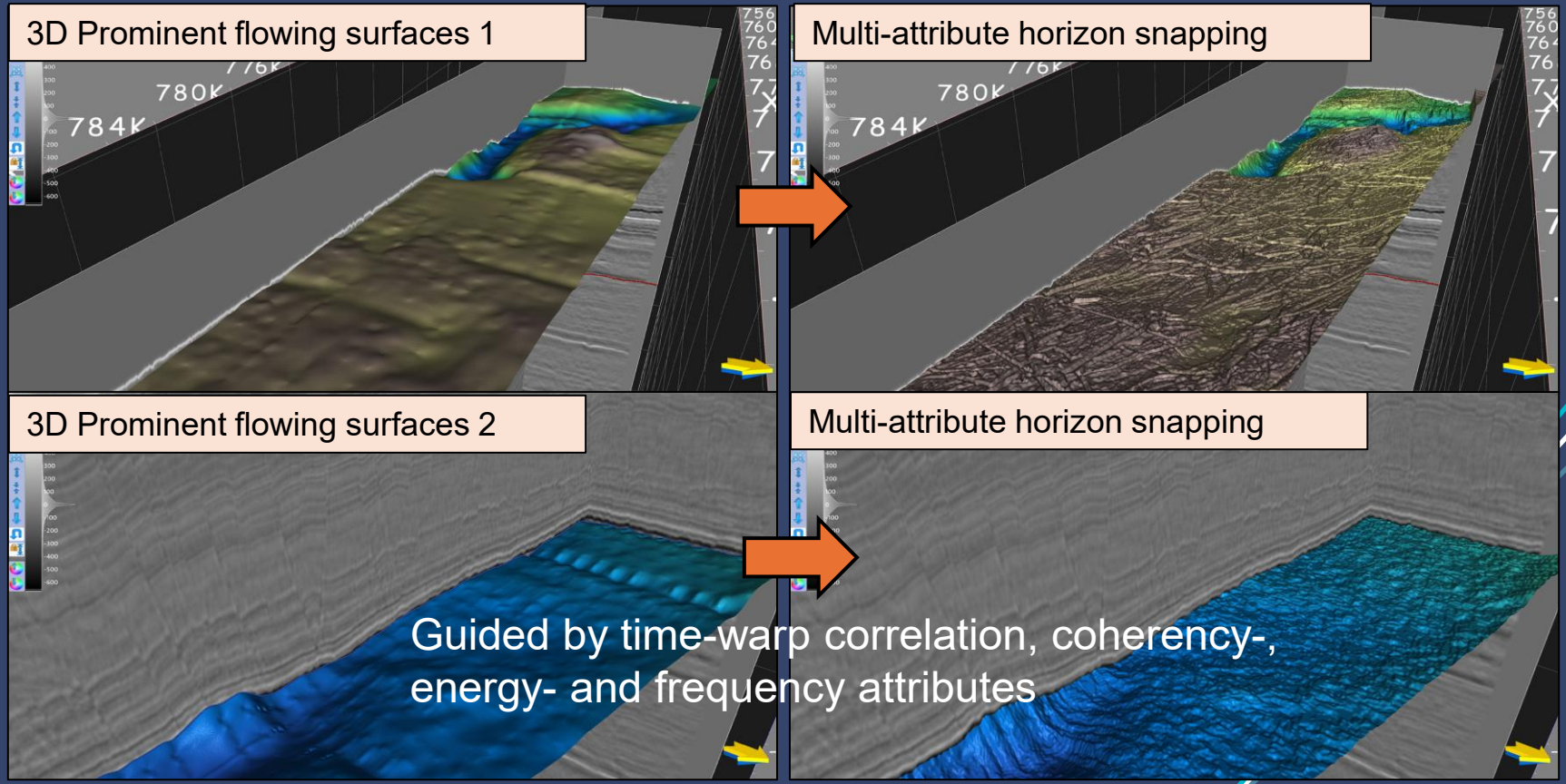
OpenMind NextGen

# One-click automatic seismic facies mapping with selection



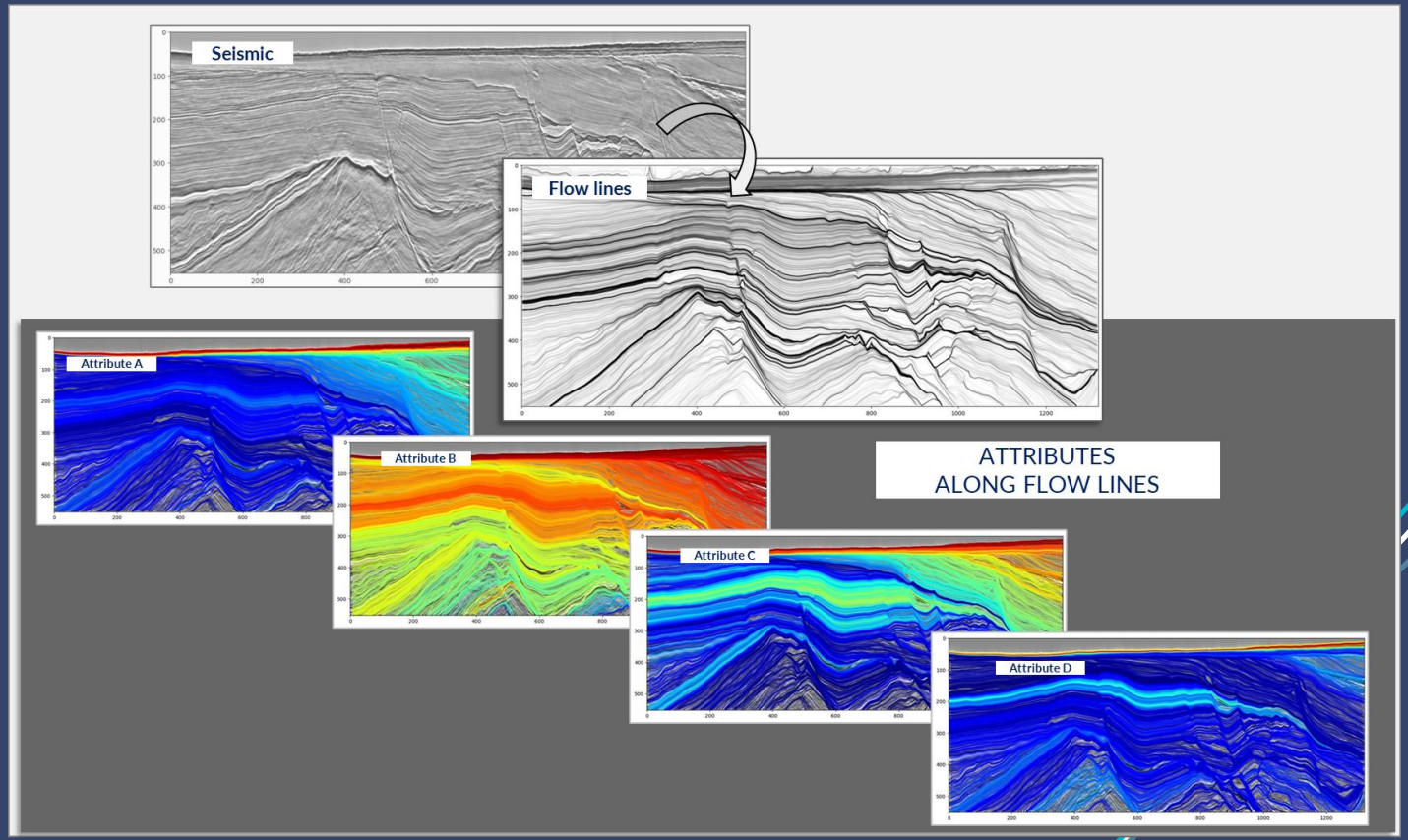
https://geomind.tech

# Robust multi-attribute horizon snapping



OpenMind NextGen

# Attributes along flow lines



# OPTIMIZE FOR SEISMIC INTERPRETATION AND INFORMATION EXTRACTION

**Preparation for optimal geological interpretation and prospect generation**

OpenMind NextGen
www.geomind.tech

Enhance image quality and information extraction from seismic data for the interpreter:

- For experts (template builder/workbench/lab)
- For interpreters (one-click templates)

Set up batch jobs in background

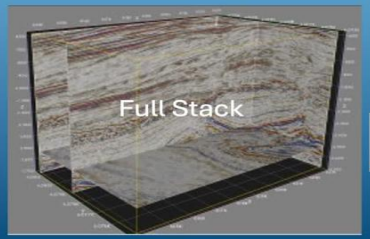
Physical blend of volumes => output in zgy format

**OM DATA EXPLORER**

- Seismic Data
  - Near angle stack
  - Mid angle stack
  - Far angle stack
  - Full angle stack
  - Full AJAX + RAI + Fault Probability

**PROCESSING TOOLS**

| ML Network Based | Function based | Custom Python |
|---|---|---|
| AJAX | Automatic Gain Control (AGC) | Custom function 1 |
| RblendD | Cos phase | Custom function 2 |
| Sharpen Reflections | Dip | Custom function 3 |
| Fault Probability | Relative Acoustic Impedance (RAI) | Custom function 4 |
| ... | ... | ... |



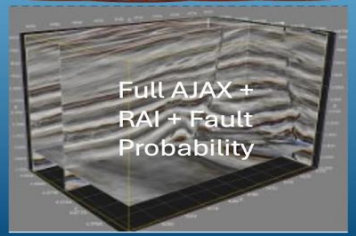

PROCESSING TEMPLATE WORKBENCH

- Template 1 → AJAX → RAI → FPROB
- Template 2
- Template N

ONE CLIC

CURATED TEMPLATES

- Template 1
- Template 2
- Template N



# OpenMind Rental Model (preliminary)

| Currency USD | 1 Week | 1 Month | 1 Year |
|---|---|---|---|
| 3D Visualization | Free | Free | Free |
| Base Module * | 300 | 1000 | 10000 |
| OpenMind GoProbe ** | 300 | 1000 | 10000 |
| OSDU | 100 | 300 | 3000 |

* Includes all features except GoProbe

** Includes StratCracker (SeisFlow) RGT and Advanced AVO

Companies with < 10 employees ½ price

Universities Free

OpenMind NextGen

# OpenMind Rental Model