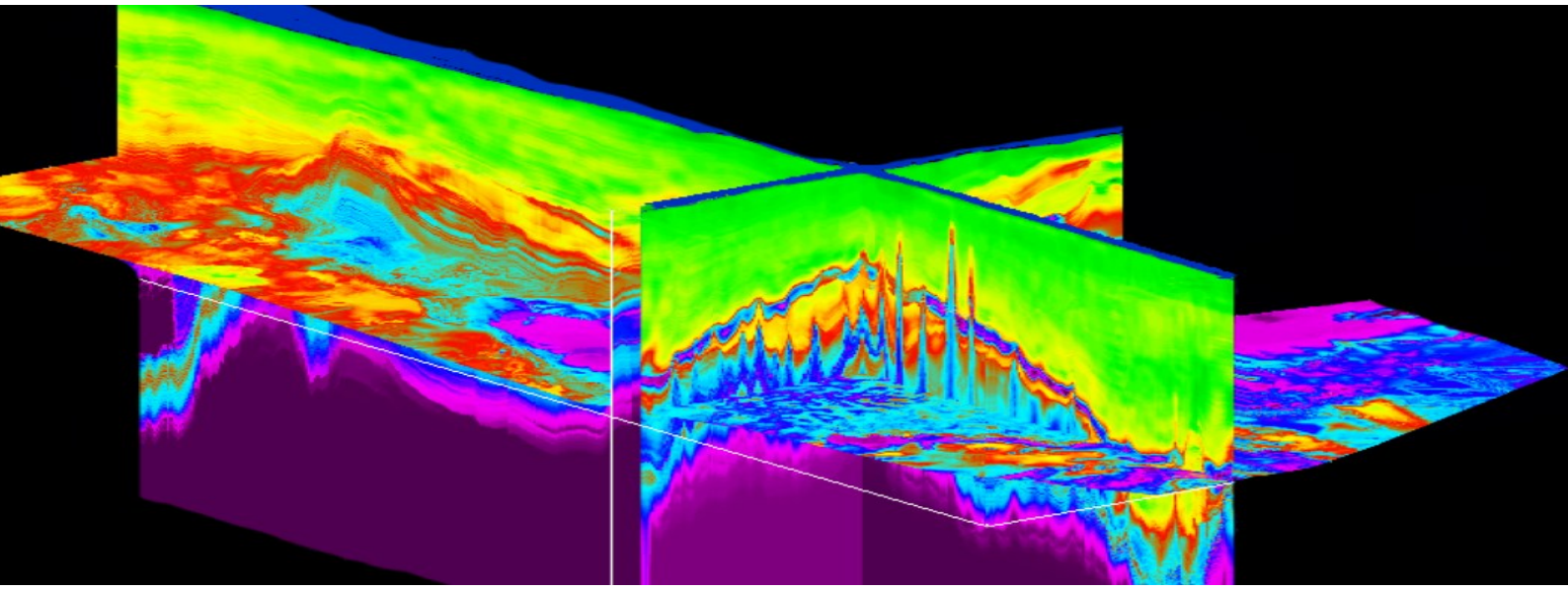
Interval Velocity Model Construction by PSS-Geo AS



Example of Interval cube constructed for Tool Kit 1&2
Exploro, South-North Norwegian Sea 3D Interval Velocity
195 surveys (3D and 2D), 721 well's check shots
and 8 interpreted horizons are used for construction.

PSS-Geo AS suggests geophysical services which include velocity building models:

-Stacking

-Interval

-for Time Migration (see below)

-for Depth Migration (link 2)

-for Depth Conversion

-High Resolution

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Depth Conversion Velocity Building Techniques and Examples

As part of seismic processing delivery, PSS-Geo AS delivers constructed interval velocity cubes for depth conversion. PSS-Geo AS uses internal techniques which include adjustment of seismic velocity with horizontal component (tomography) and Check Shot correction seismic full component cube. We make sure that wells are tied to seismic and check shot correlated P-wave are used at well position, while between wells velocity anisotropy are guided by interpreted horizons, normally, supped by clients.

Depth conversion should be exact at the well positions, and between the wells the error should normally be within 5 meter.

For regional depth conversions, PSS-Geo AS adapted the techniques described above to benefit accuracy for prospect depth conversion as well, with next simplification:

- Seismic velocity prepared by extended QC (added or killed traces), smoothed, normally 3 km x 3 km laterally. Water velocity (offshore), salt or other layers assigned and filled by constant and gradient values, and from the base model horizon velocities are filled gradually down, normally up to 8,5 second.
- At the well position, vertical velocity created from check shots are used mostly. P-wave log used only if time project is allowed.
- In the shallow part where data is not acquired, well log (P-wave or created from Check Shot) extended by constructing it from check shot correlated seismic interval velocity trace or control points provided by clients.
- First control point is assigned for all well and counted base on water depth (offshore) and KB.
- Important. Wells are not tied to seismic. It means that, during depth conversion QC, horizons miss picks should be taken into account.
- Velocity cubes resolution is 500 m x 500 m and 8 ms sample rate.

For project QC, bad check shot detection (wells) and elimination we propose to rerun constructed model two times with pointed adjustments, if client willing to.

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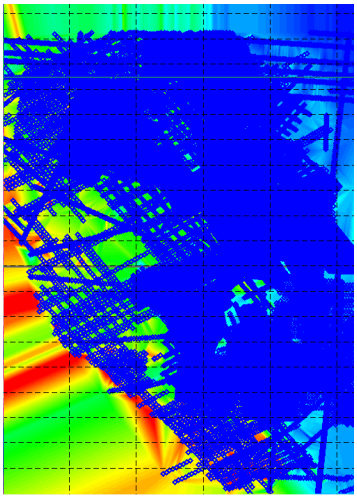
Depth Conversion Velocity Building Step's Examples

Example 1

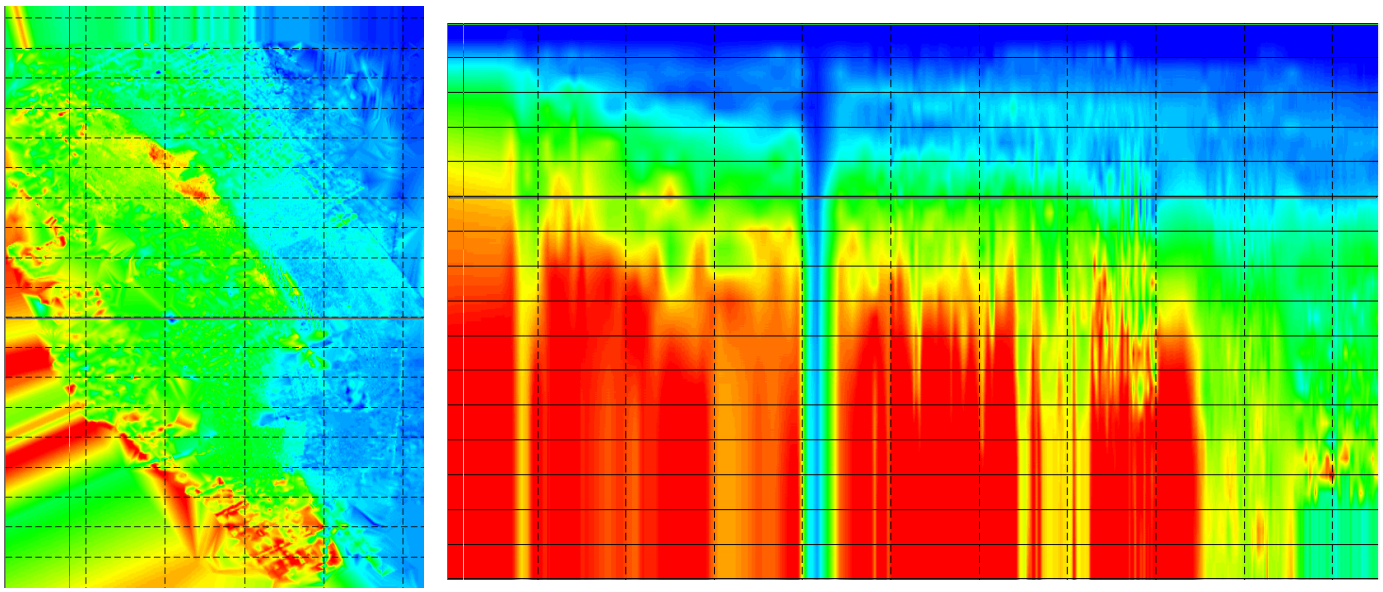


Base Map of 2D and 3D available velocity fields. Converted to Interval velocities.

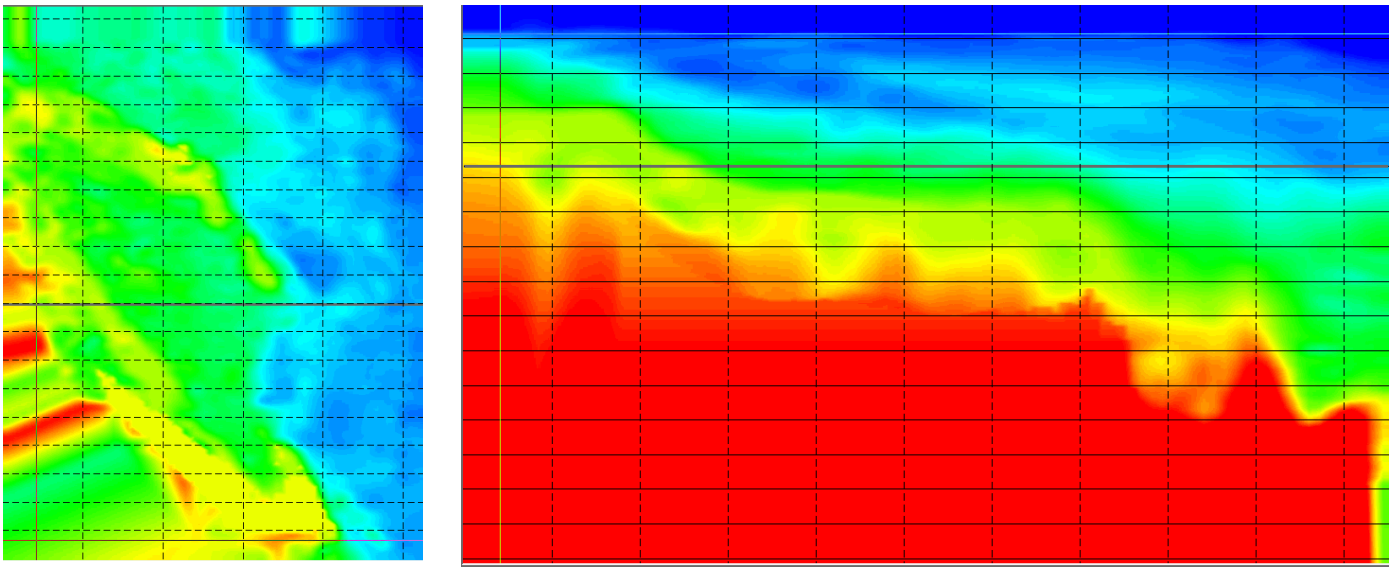
Job includes:

1. Convert surveys to one coordinate system, UTM zone.
2. Convert to Interval velocity necessary surveys.
3. Interpolate available surveys.
4. Construct Salt/Chalk or other layers (if it necessary) by assigning and/or clipping the data.

Time slice of 2D and 3D velocity field and section. Interval seismic velocity. Original.



Time slice of 2D and 3D velocity field and section. Interval seismic velocity. **Prepared.**



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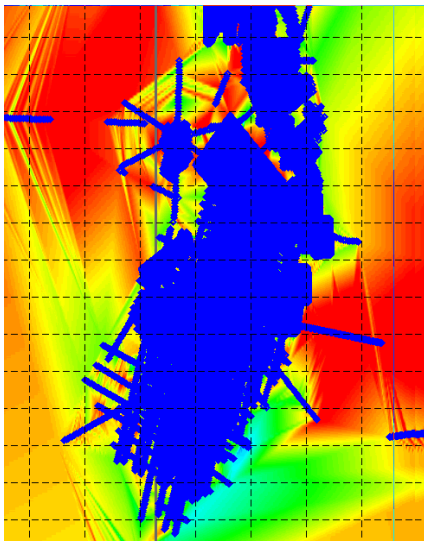
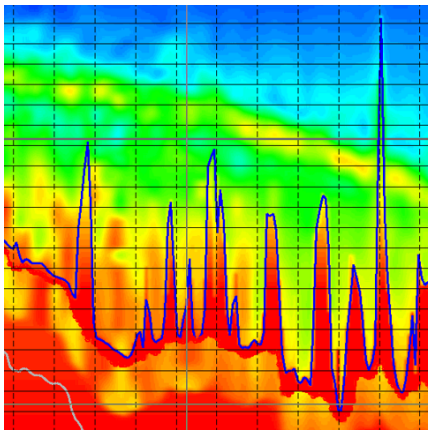
Depth Conversion Velocity Building Steps Examples

Example 2

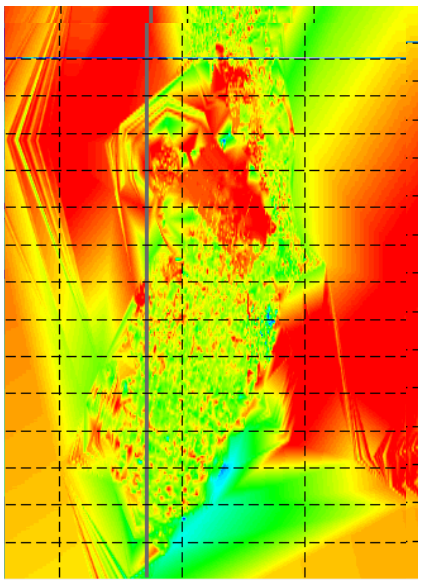


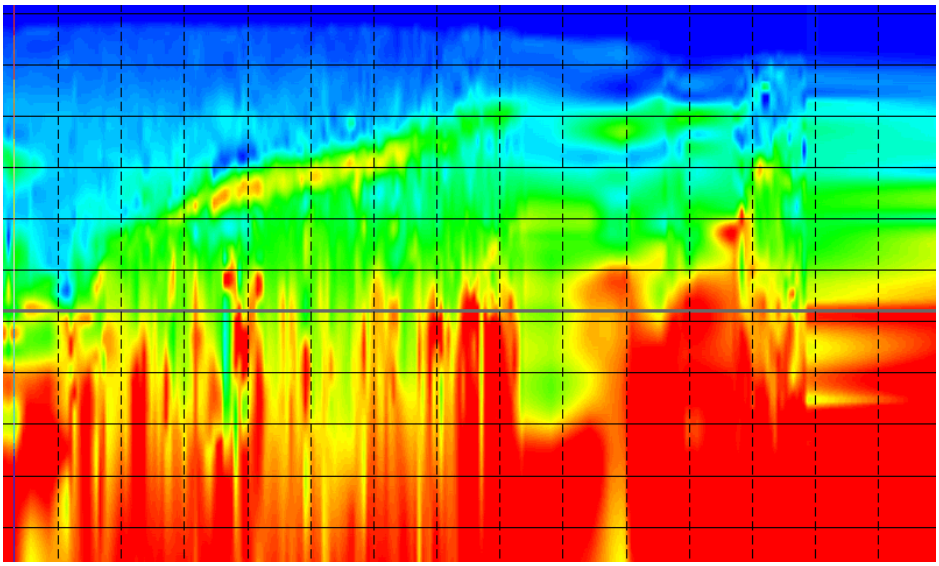
Base Map of 2D and 3D available velocity fields. Converted to Interval velocities.



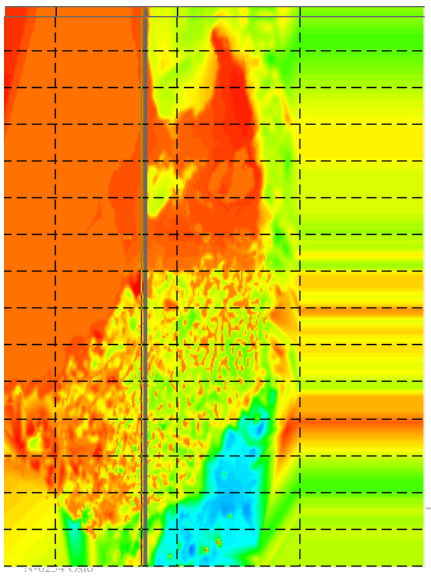
Salt work example

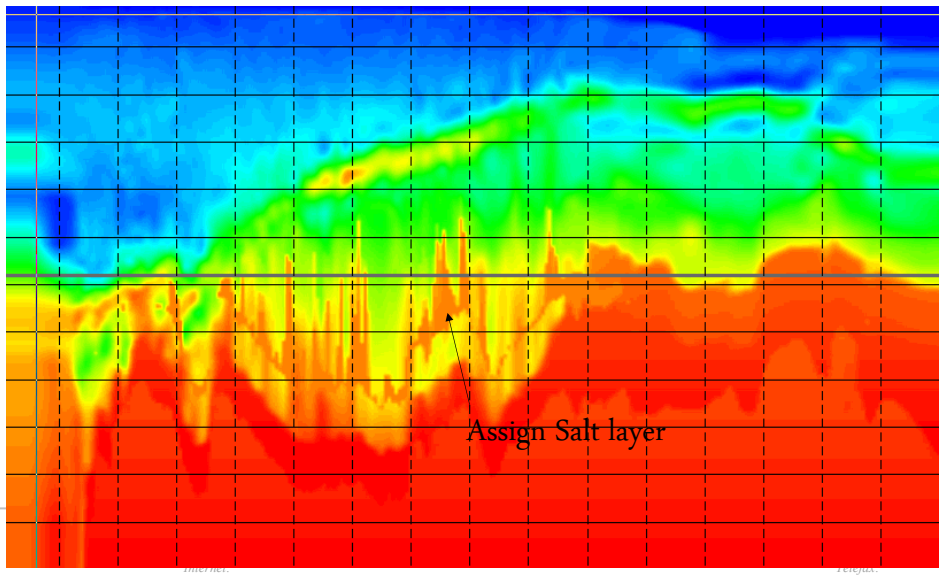
Time slice of 2D and 3D velocity field and section. Interval velocity. Original.



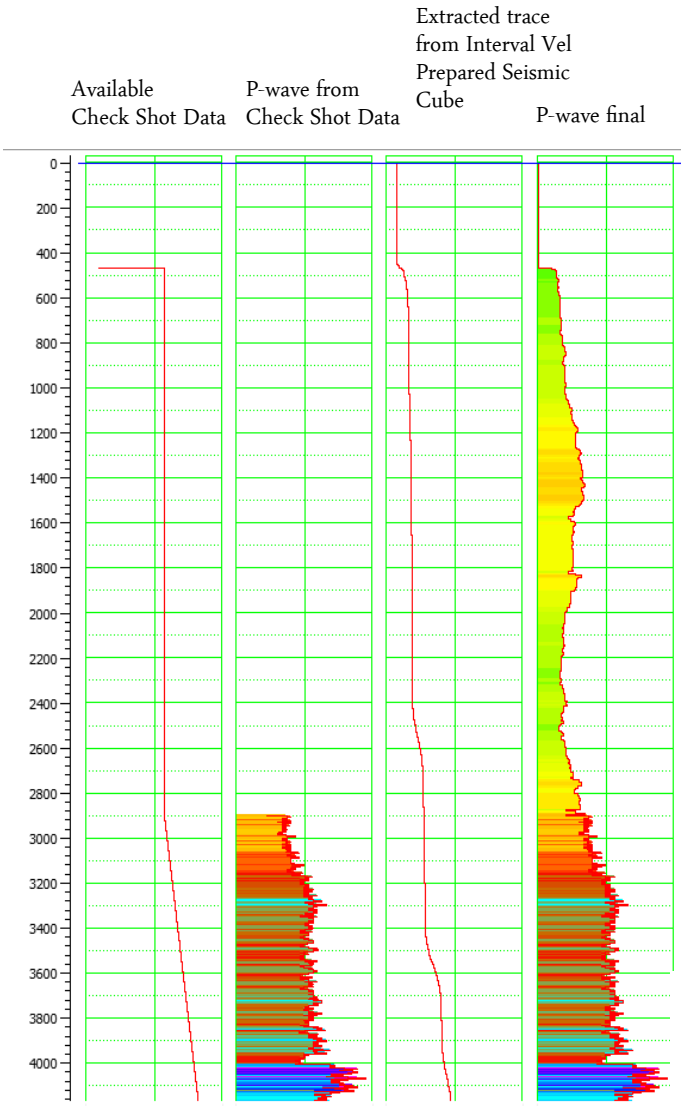


Time slice of 2D and 3D velocity field and section. Interval velocity. **Prepared.**

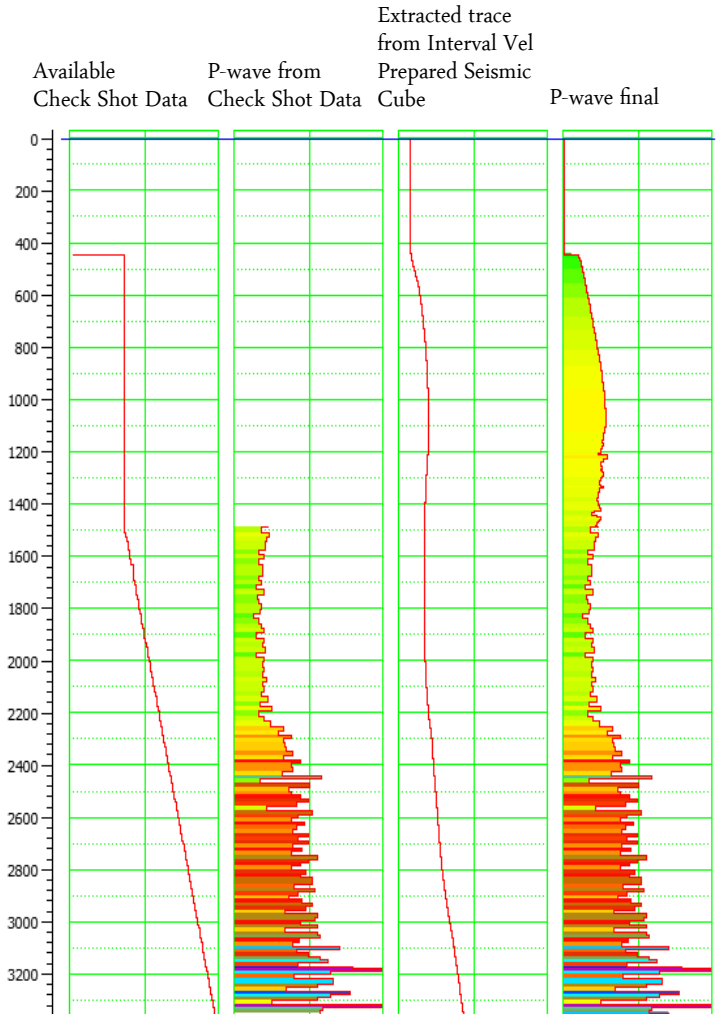




Well log preparation. Steps Examples



Example 1



Example 2

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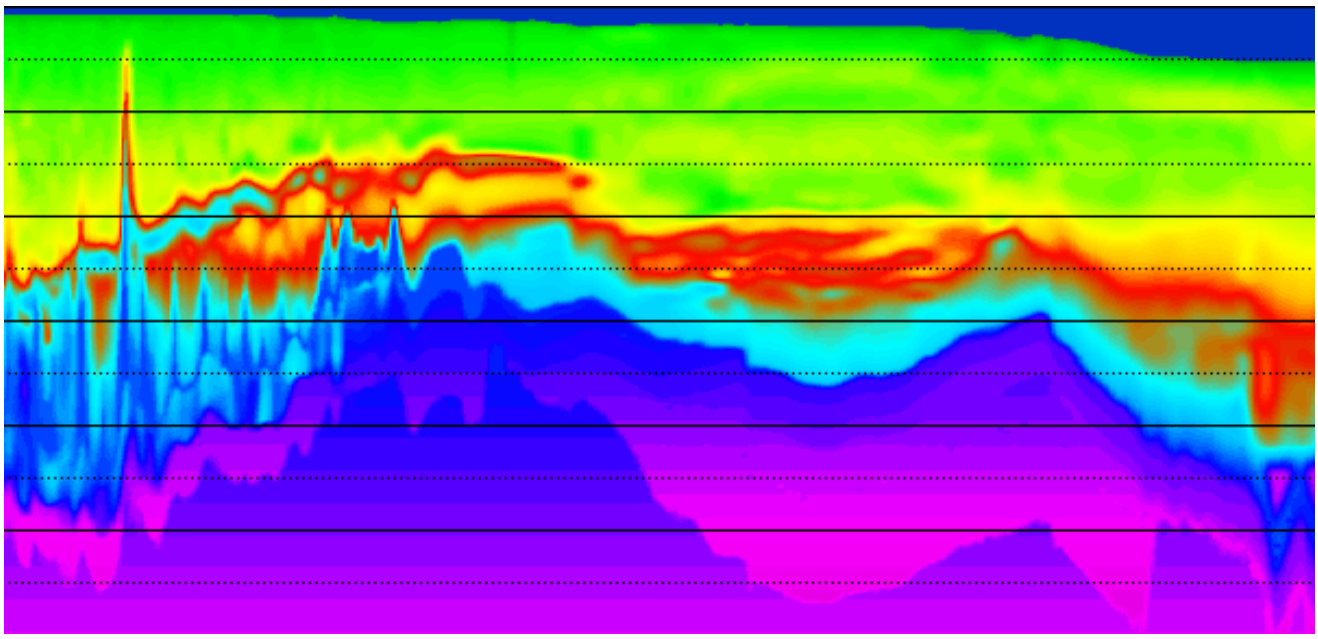
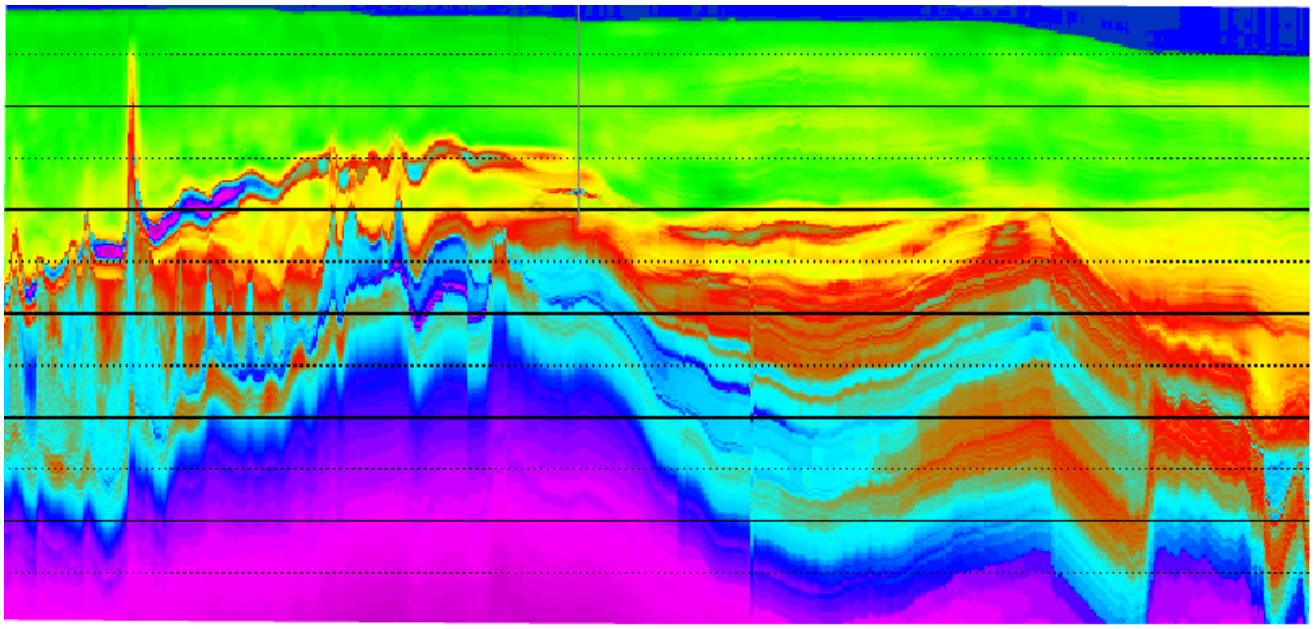
Final velocity Model. Example.

Interval seismic velocity. **Prepared.** 2D section.



Interval velocity cube with integrated well logs **Final.** 2D section.



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