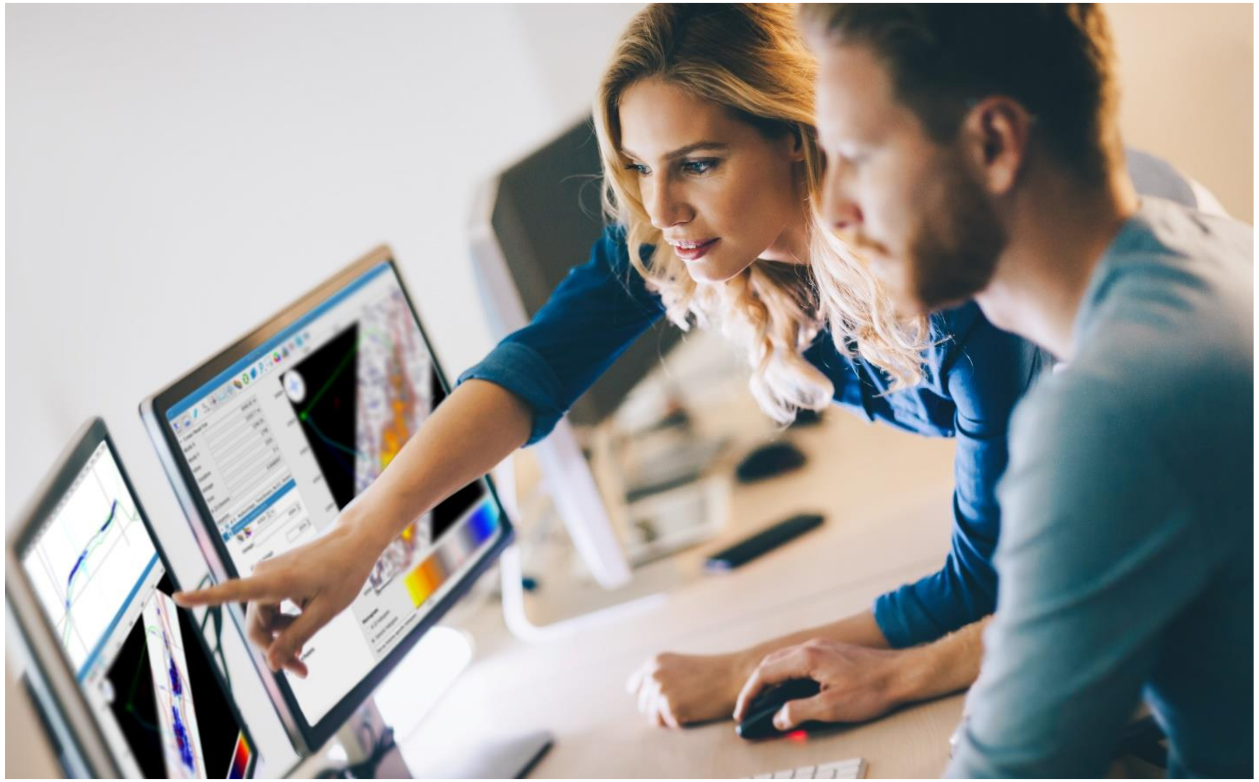
The GATHERing Knowledge Exchange

Advanced Conditioning Session

with new ML and new QCs



Peter Harris, Andreas Rasmussen

SHARP REFLECTIONS
DISCOVER MORE

20 October 2023

How the exercise works …

We have a swath of raw (time-migrated) gathers running through three wells.

These have been processed through a simple data conditioning workflow, and the processed gathers are also available.

The same raw gathers have been run through two ML algorithms, the first removing noise that is coherent across offset (eg multiples, linear noise). The second performs gather alignment.

The first part of the exercise is to generate a variety of QCs on all three volumes, with the aims of evaluating the data quality and of comparing the ML processing with the classical route.

The second part of the exercise is an open-ended challenge to improve the gather quality and their fitness for QI work. AVA scaling is a particular challenge!

1) Open project
2) Create synthetics for wells 16/2-21, 16/3-8S, 16/3-6
3) Create maps for synthetics

Section 1

4) Load raw gathers
5) Run QC workflow
6) Run relative PCube+
7) Make QC plots
8) Add synthetics to QC plots

Section 2

9) Load conditioned gathers
10) Run QC workflow
11) Run relative PCube+
12) Add to QC plots

Section 2

13) Load ML gathers
14) Run QC workflow
15) Run relative PCube+
16) Add to QC plots

Section 2

22) Conclusions for AVO scaling?
23) Conclusion for ML processing?

17) Run conditioning workflow around 16/3-6
18) Run QC workflow
19) Run relative PCube+
20) Add to QC plots
21) Tweak workflow

Section 3

The idea of this exercise is to run section 1, then section 2 for each dataset, and accumulate the QC plots.
There is then an evaluation stage where the QC plots are digested and this may give rise to further questions.
These questions are addressed in section 3.

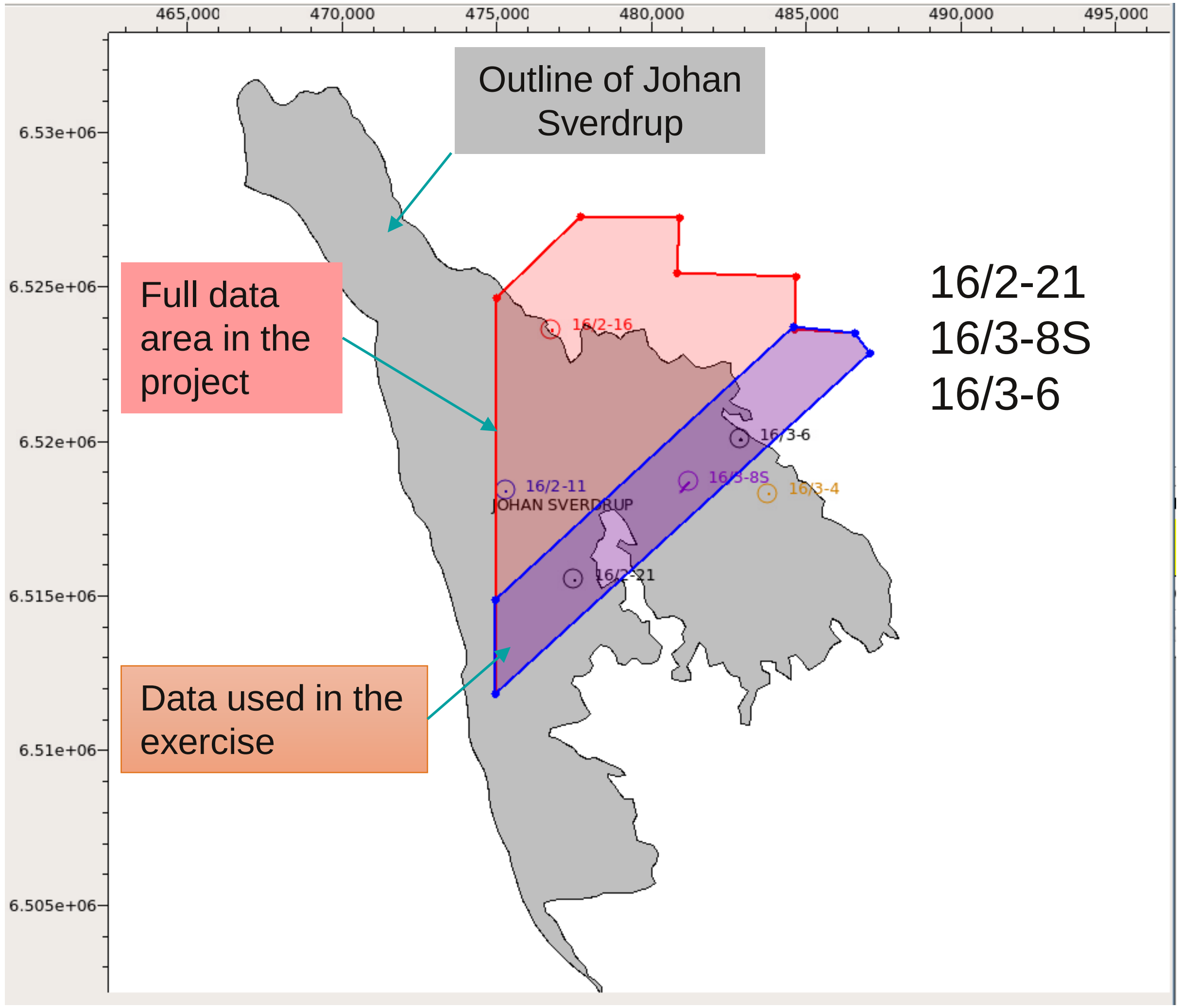
Background Information: Johan Sverdrup

Johan Sverdrup in short

- Johan Sverdrup located 150 km from the Norwegian coast in the North Sea
- Discovered in 2010
- Production start in 2019
- Jurassic Sandstone reservoir at 1900 metres depth, 200 km^2
- Reservoir thickness varies across the field and is estimated to range from 2 metres to 38 metres
- Operator : Equinor (42,6 %), Partners : Lundin Norway (20 %), Petoro (17,36%), Aker Bp (11,57%) and Total (8,44)
- Expected production per day : 400.000 (Phase 1) to 660.000 barrels per day (Phase2)
- Resources are estimated 2.7 billion barrels of oil
- Norway’s third largest oil field

Johan Sverdrup dataset

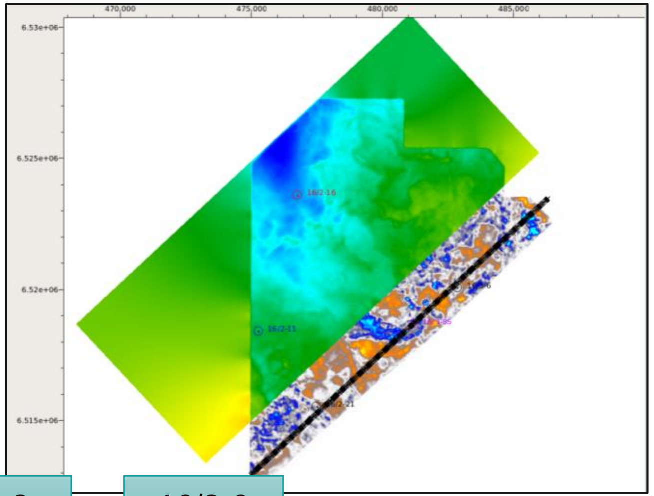
- This dataset covers only part of Johan Sverdrup
  - Approx. 100 km2
  - Cropped dataset for exercises : 33 km2
- Wells:
  - 22 wells within the project
  - 3 wells within the cropped dataset
- Horizons
  - Ekofisk, Draupne, Zechstein, Basement

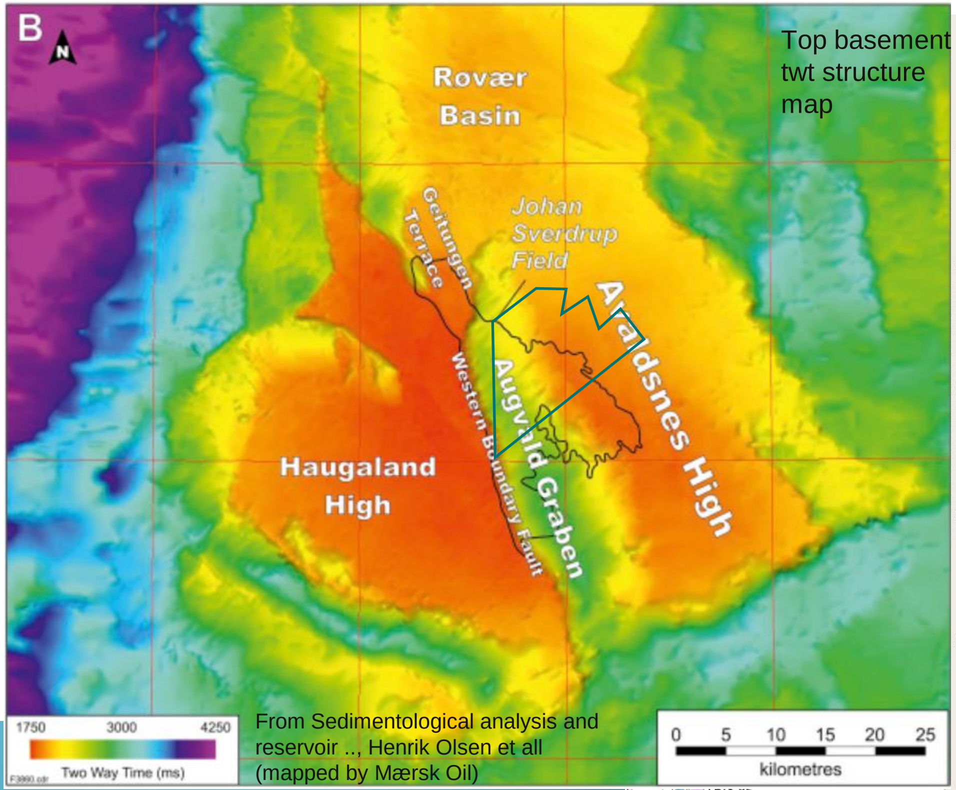


SHARP REFLECTIONS

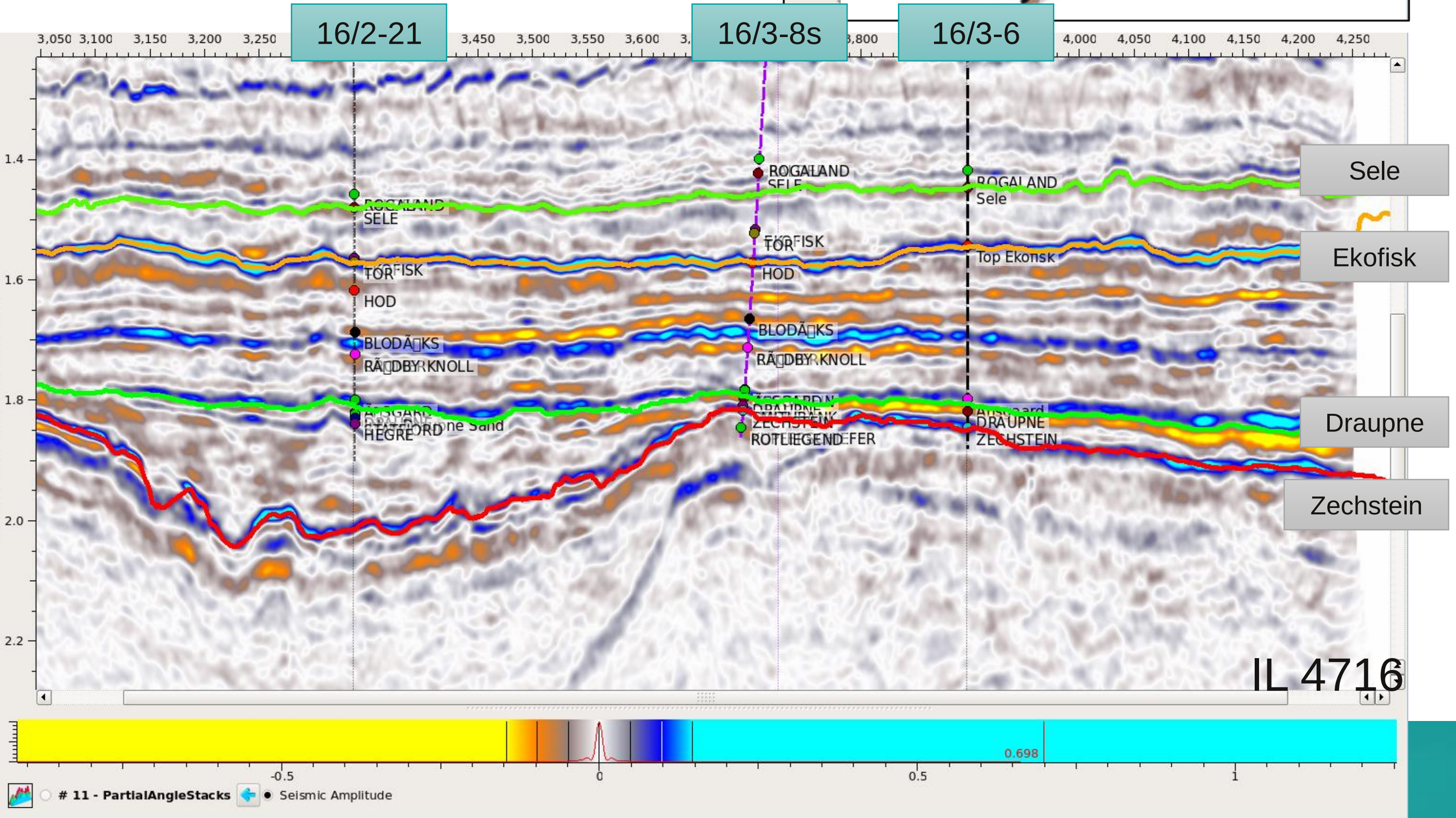
Johan Sverdrup dataset

- A conditioned seismic dataset is used for the following exercises
- Draupne sand is interpreted to be a time-transgressive sheet sand with varying thickness vary across the field from 2-38 metres.
- Draupne sand is in most places overlain by varying thickness of soft Draupne Shale
- The Draupne formation, which has a high permeability, overlies various lithologies





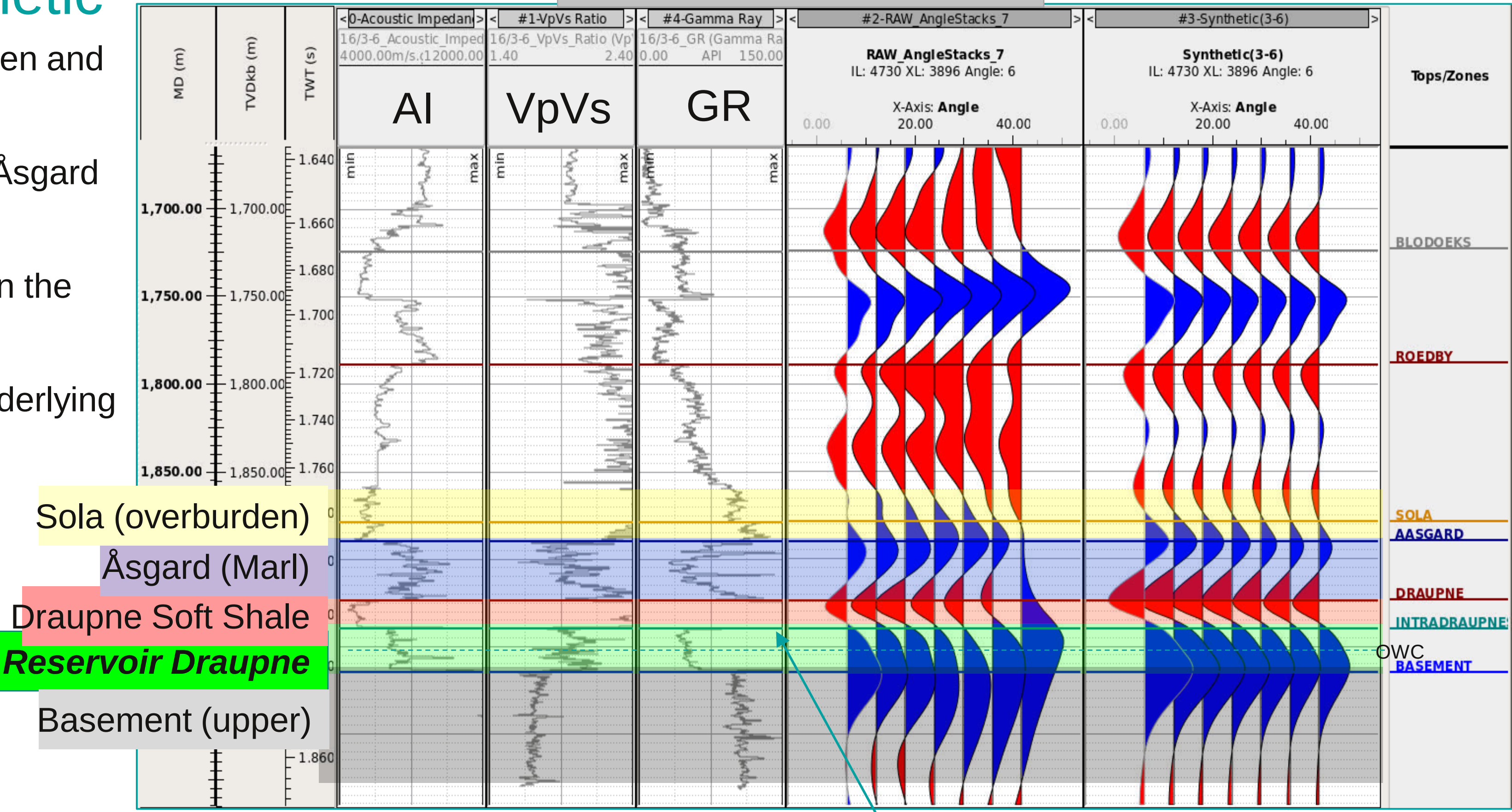
From Sedimentological analysis and reservoir ..., Henrik Olsen et all (mapped by Mærsk Oil)



Rock Physics and Well Synthetic

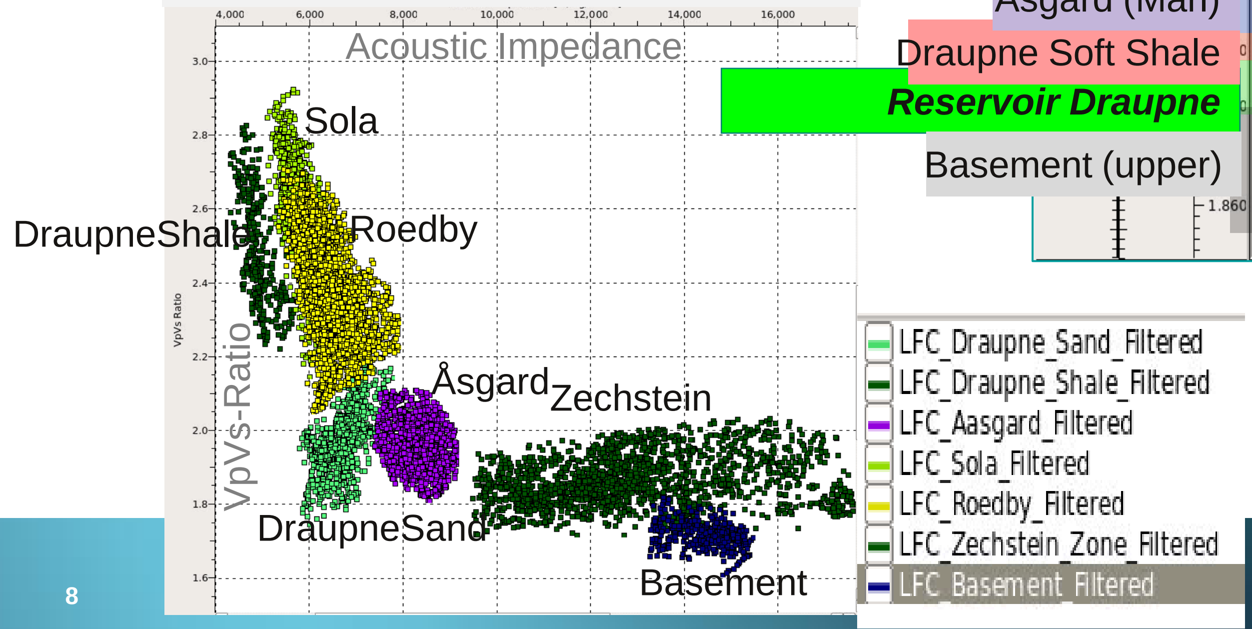
- Distinct elastic properties for the target, overburden and underburden lithologies
- Top Draupne varies across the field due to hard Åsgard Marl thickness variations
- Top Draupne Sand response varies depending on the overlying Draupne Shale thickness
- Base Draupne response varies depending on underlying lithologies (Basement, Zechstein, Statfjord)

Example: Well 16/3-6



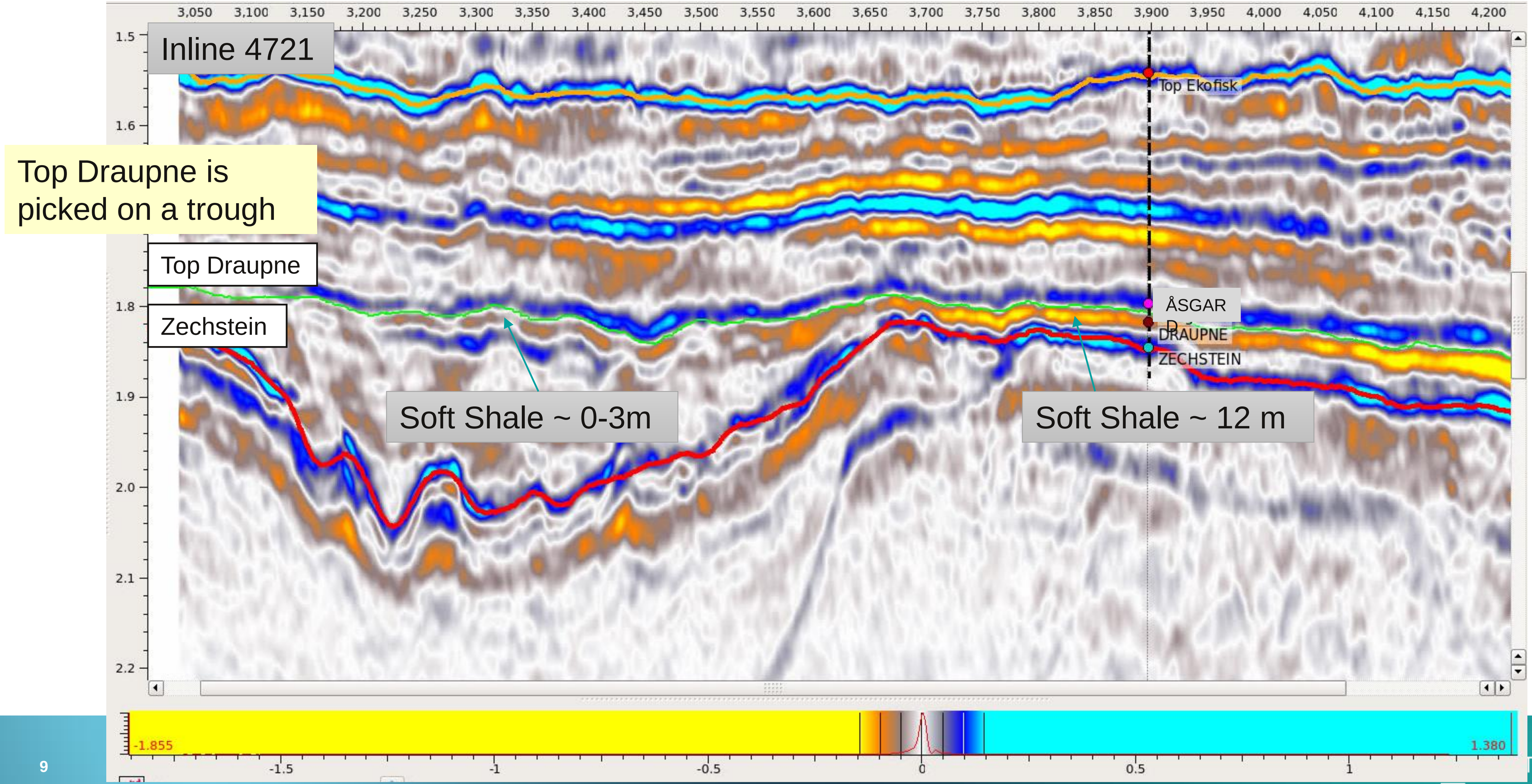
IntraDraupne marks top of san

AI-VpVs crossplot from multiple wells



NPD factpages:
24m of Intradraupne Sand with excellent reservoir quality
GOR ~33 Sm3/Sm3
oil density ~0.892 g/cm3
gas gravity ~1.06 (air = 1)

Variation in Draupne Soft Shale thickness influences the top reservoir reflector



Summary: AVA and Layer Thickness

Well	**Depth -> Thickness**			**Formation below Draupne?**	**Identifiable reflection? If yes, what is the polarity & AVA response?**			
	Åsgard marl	Draupne shale	Draupne sand		Top Draupne	Top Draupne sand	Base Draupne sand	Base Draupne
16/2-6	*14 m*	*5 m*	*6 m*		*No TD table*			
16/2-11	*15 m*	*2 m*	*30 m*		*Tuned with Åsgard*	*Tuned*	*Tuned*	*Top Skagerrak (peak, flat)*
16/2-13A	*32 m*	*13 m*	*17 m*	*Heather*	*No TD table*			
16/2-13S	*30 m*	*10 m*	*16 m*	*Heather*	*Soft, Class IV partly tuned*	*Tuned*	*Tuned with Top Rotliegend*	*Tuned with Top Rotliegend*
16/2-16	*12 m*	*3 m*	*5 m*	*Heather*	*Tuned*	*Tuned*	*Tuned*	*Tuned*
16/2-21	26 m	3 m	11 m	Hegre shale	Soft, Class IV	No, tuned	No, tuned	Top Skagerrak (peak, flat)
16/3-6	34 m	16 m	23 m	Basement	Soft, Class IV	No, tuned	Hard, flat to weak Class I	Hard, flat to weak Class I
16/3-8S	26 m	6 m	14 m	SmithBank shale/Zechstein	No, tuned	No, tuned	Hard, flat to weak Class I	Hard, flat to weak Class I

Section 1: Well Synthetics

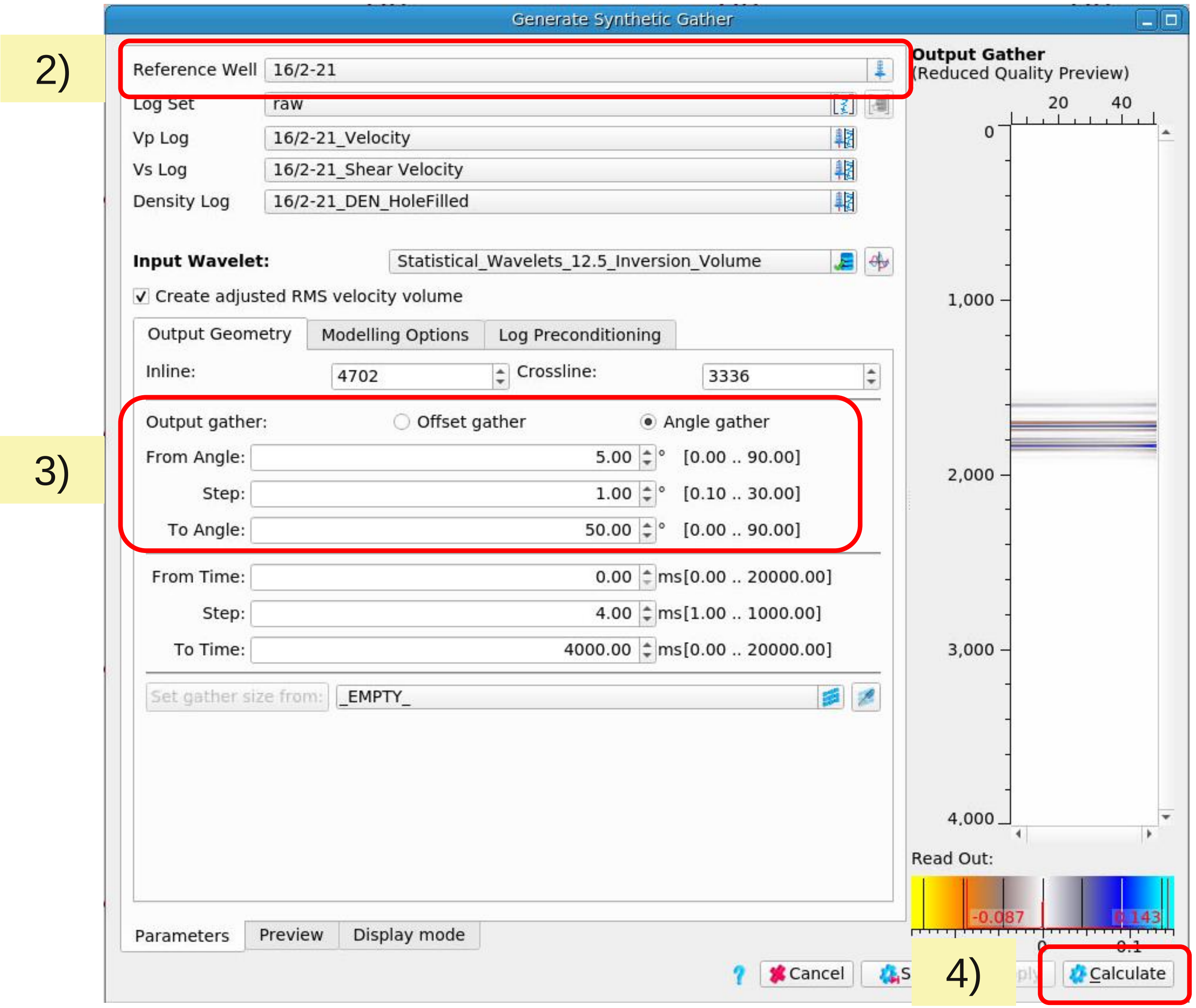
The first part of the exercise is to make angle gather synthetics at each of the three wells.

These will be used for comparison with the different versions of the seismic data.

The following steps should be repeated for all three wells, 16/3-6, 16/3-8S and 16/2-21.

1) From the Interpretation-Processing menu, select Create Synthetics.
2) Choose the well.
3) Set the angle geometry.
4) Click Calculate

These wells only have one log set and one TD curve, so they are selected by default. There is only one wavelet in the project.

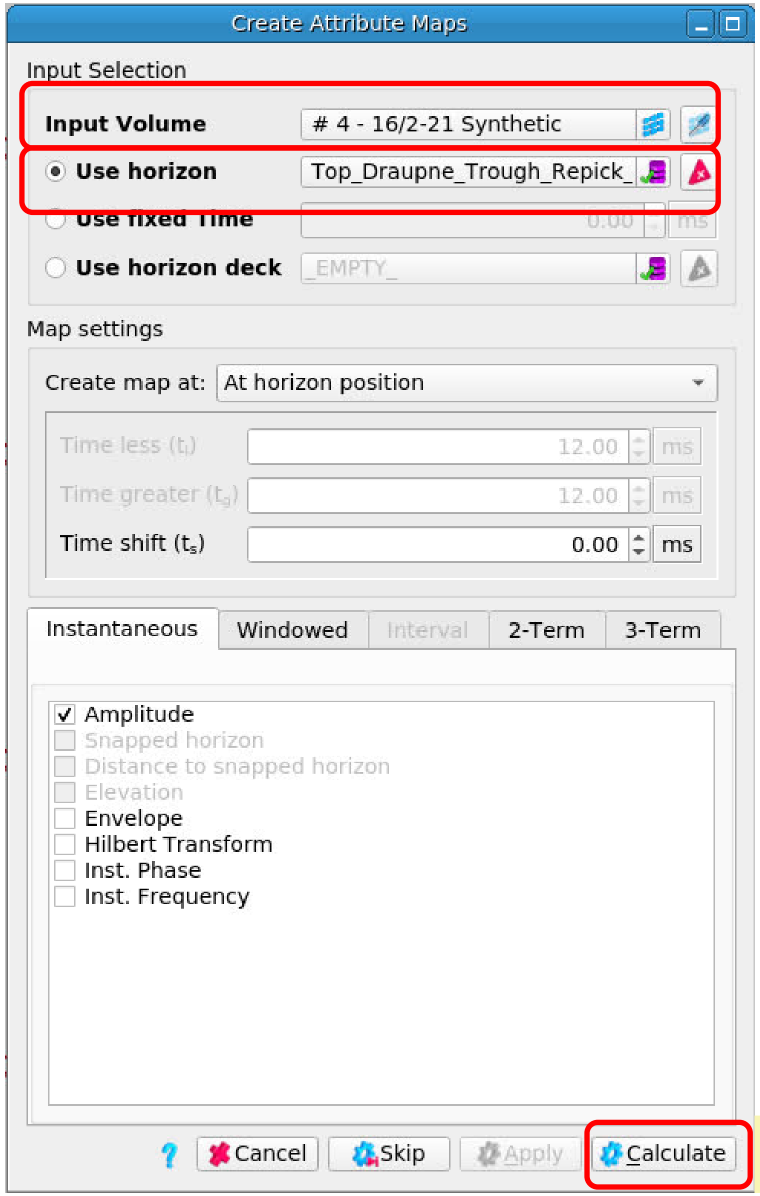


We are making amplitude maps from the synthetics to compare with the seismic data in the cross-plotter.

1) From the Interpretation-Processing menu, select Create Maps.
2) Choose the synthetic.
3) Use the Top Draupne surface. The first time that it is used, it will be necessary to click the red triangle to the right.
4) Click Calculate

2)

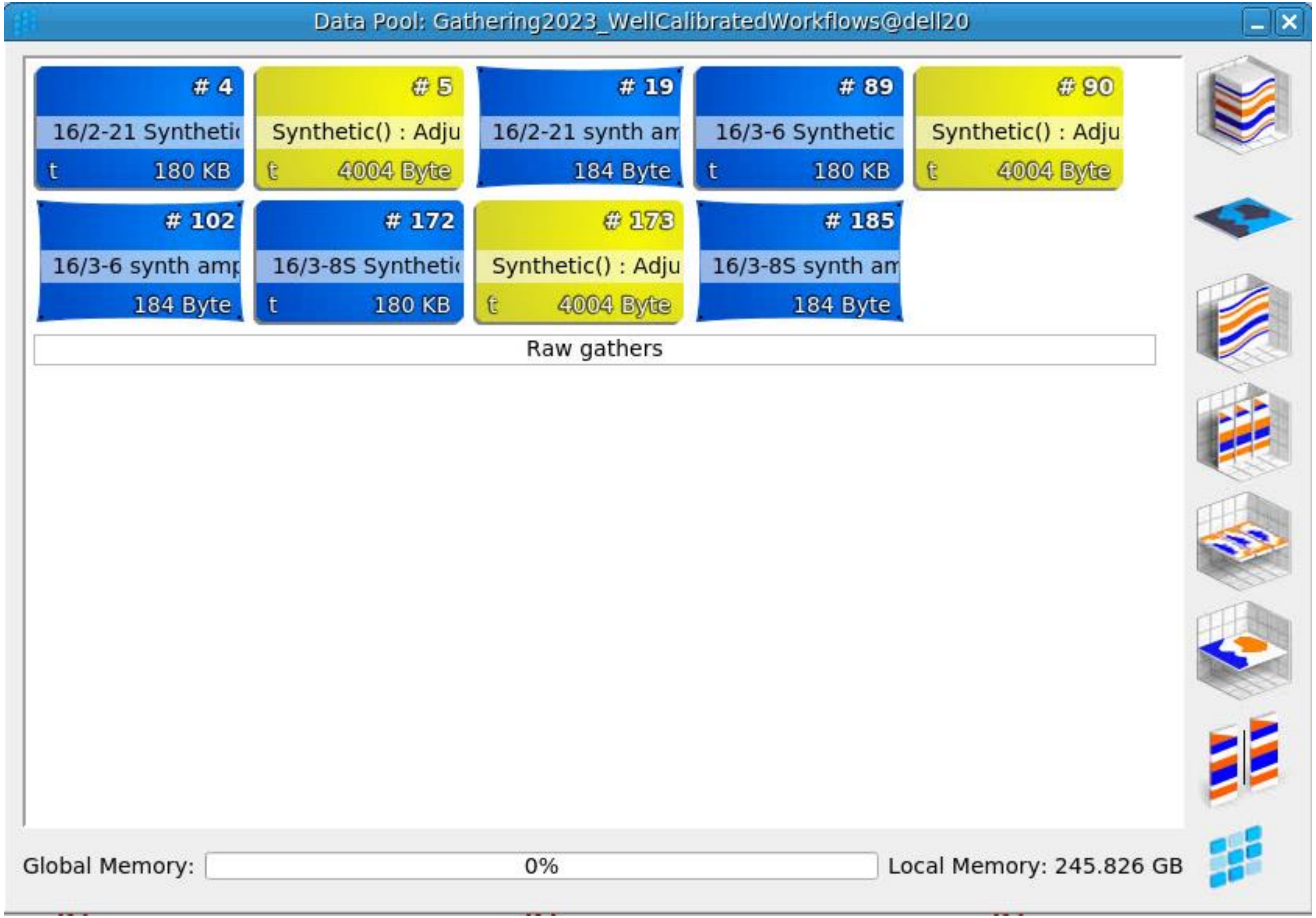
3)



4)

After all three synthetics have been made with amplitude maps, the volume pool should look like this. It is advisable to rename the synthetics and maps to keep track of them later. RMB on a volume and select the Rename option.

After the volumes, using a separator also helps to keep the data pool organised. The next stage is investigating the raw gathers.



Section 2: Gather Analysis

In this section, offset gathers are loaded and we will make some QC displays.

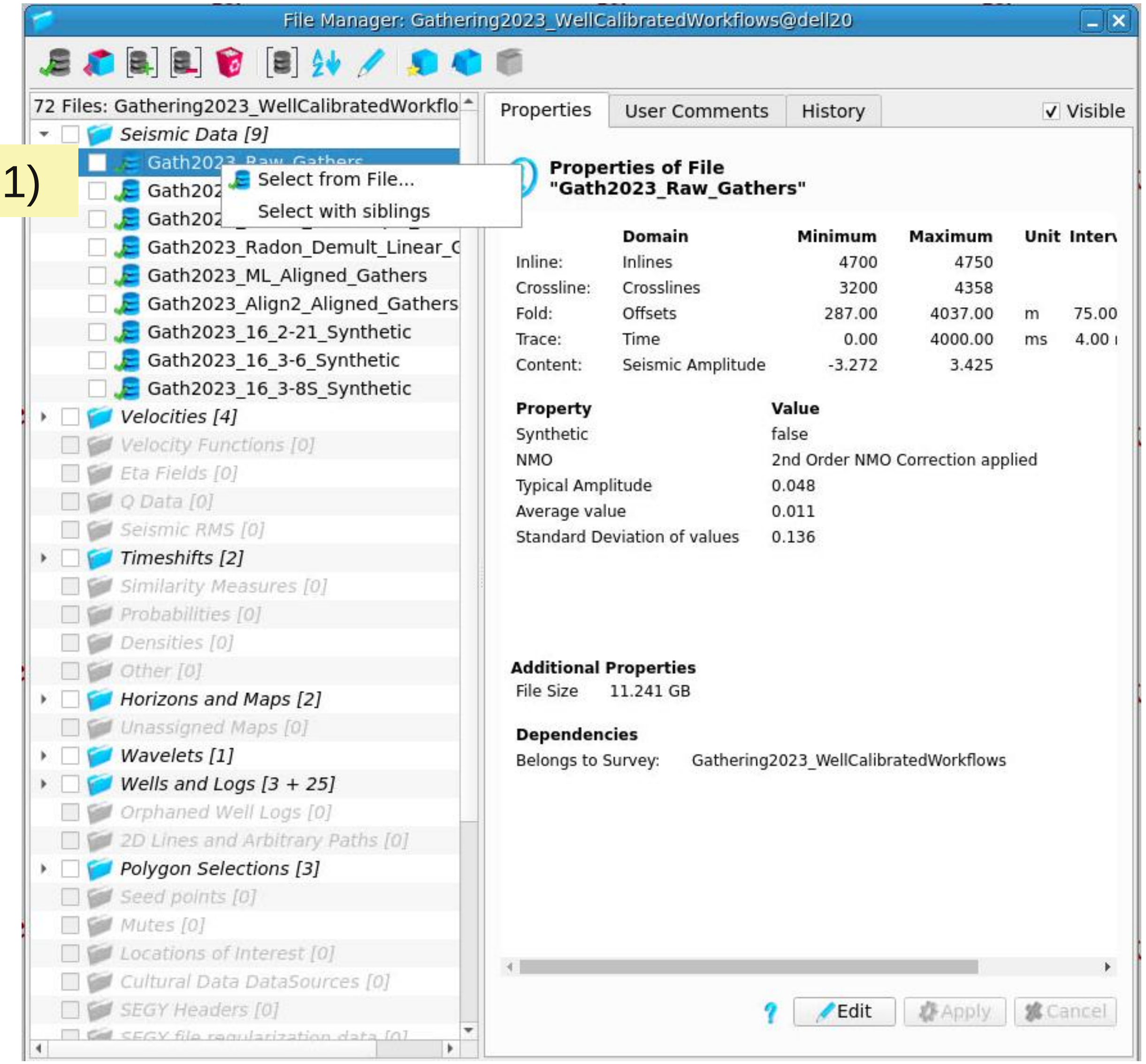
There are two main aims:
1. Compare the raw and conditioned data.
2. Compare the data conditioned by standard processing with the ML data.

This section should be run three times, using the raw gathers, the conditioned gathers, and the ML-processed gathers.

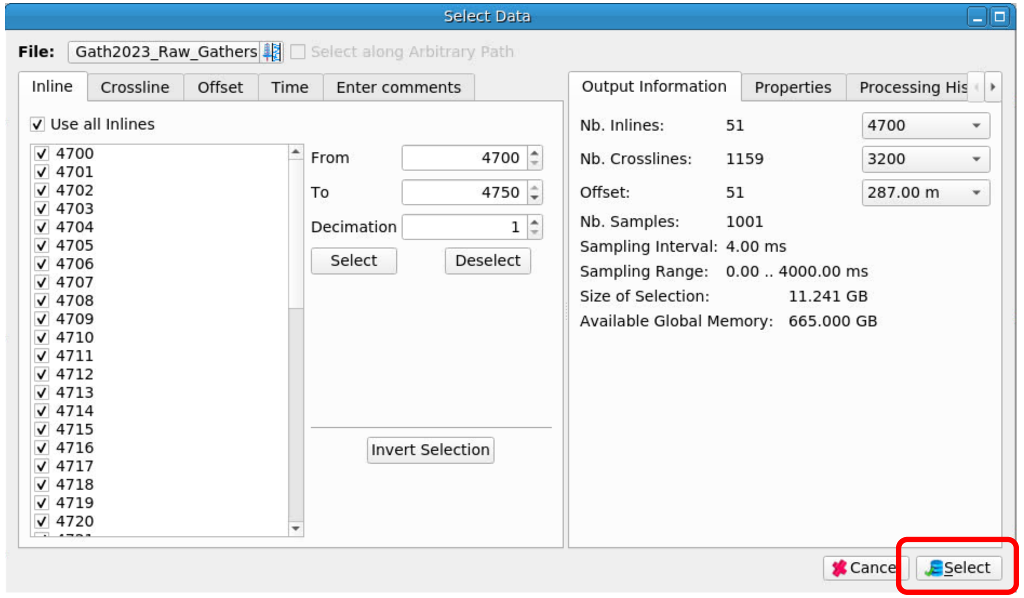
There are many possible QC attributes and displays. We have focussed on amplitude spectra, AVA curves, and using relative inversion via PCube+ in this exercise, but others would normally be included. Feel free to add your own favourites as you go!

1) From the File Manager, RMB on the gathers and choose Select from File.
2) In the Select Data window, just click Select.

The raw gathers are in file Gath2023_Raw_Gathers.
Conditioned gathers: Gath2023_Align2_Aligned_Gathers.
ML gathers: Gath2023_ML_Aligned_Gathers.

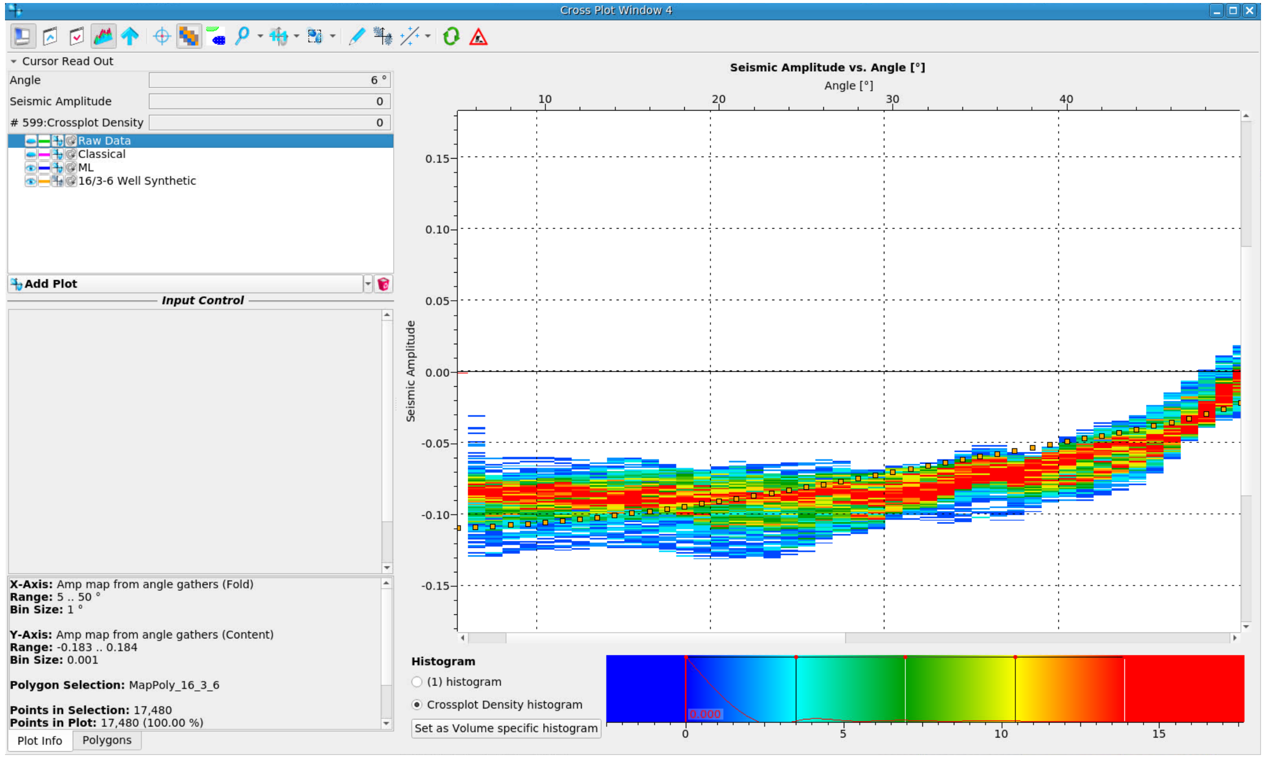


1)



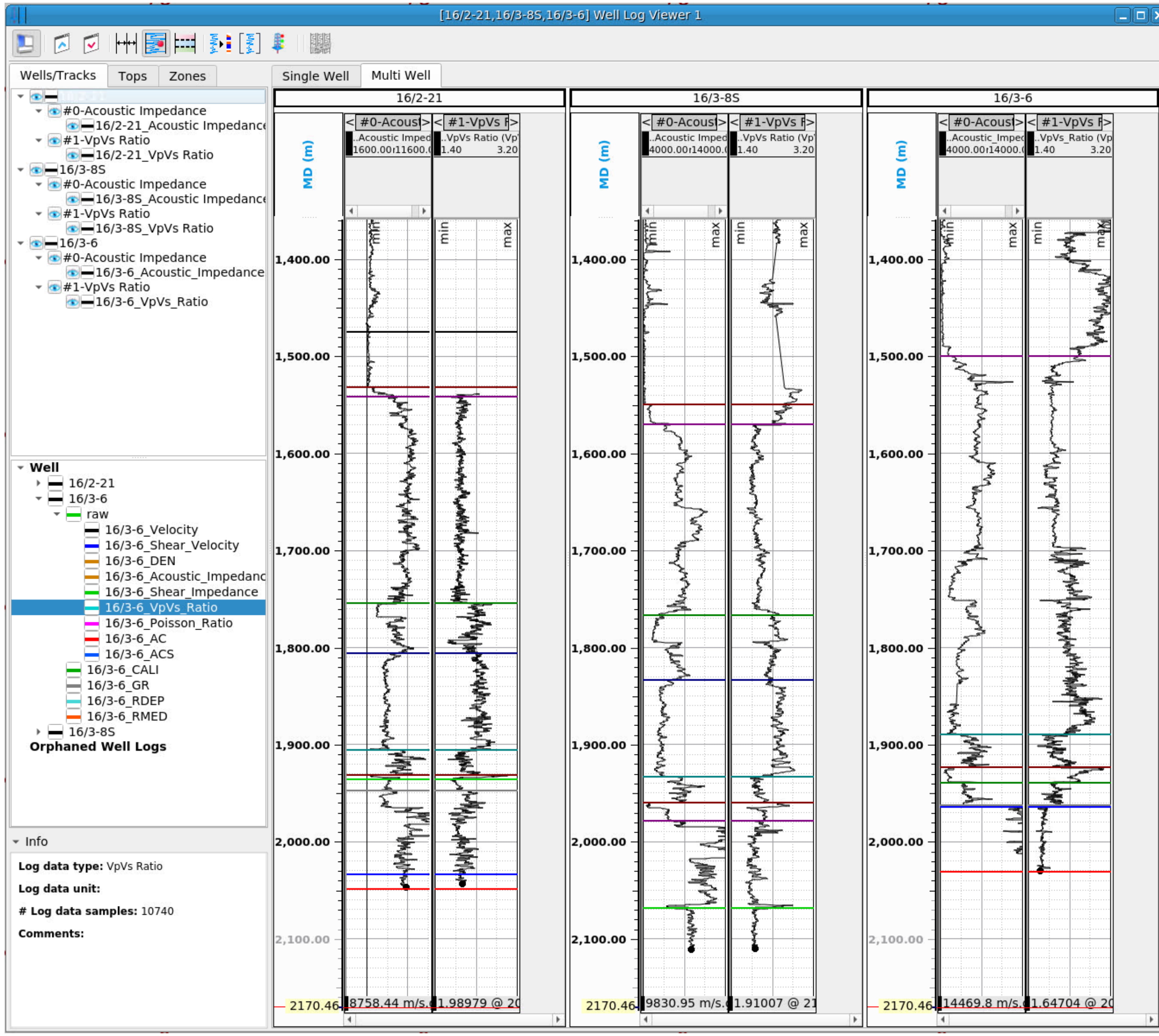
2)

1) Run the QC workflow, as described in Appendix A.
2) The first time through this section, open up the map viewer and create a small map polygon around the toe of each well. These polygons will be used in step 3.
3) Create/add to the amplitude v angle cross-plot. See Appendix B for details.
    a) The first time through, create cross-plots of amplitude v angle using the amplitude map from step 1. Create 3 different cross-plots, one for each well, using the polygons created in step 2. Also add the data for the synthetic for the well.
    b) In subsequent runs, add the new data to the existing three cross-plots.

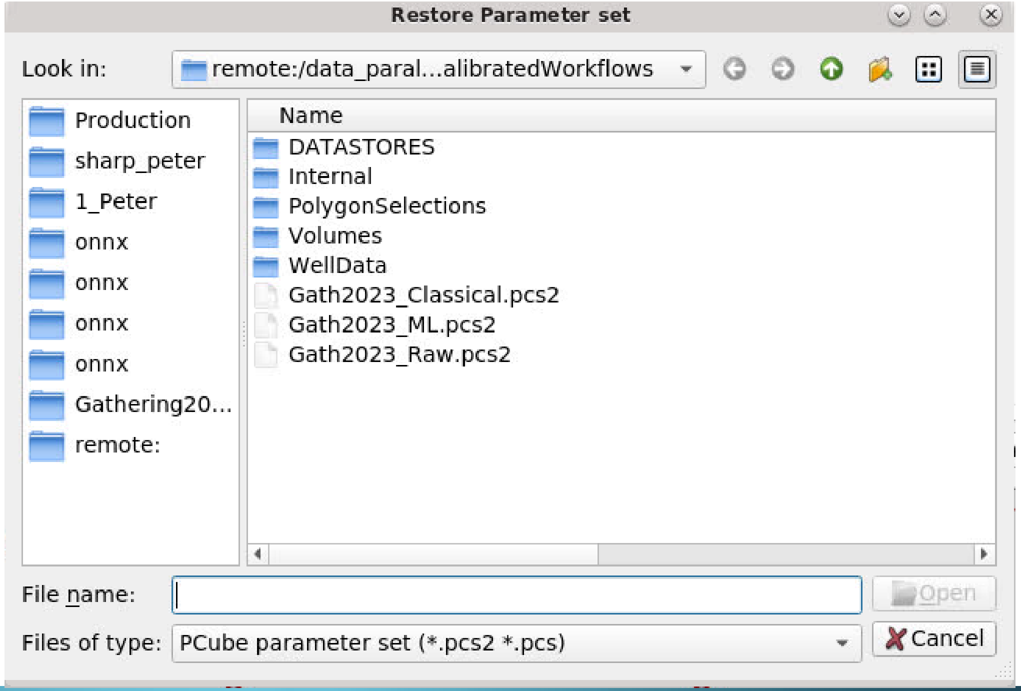


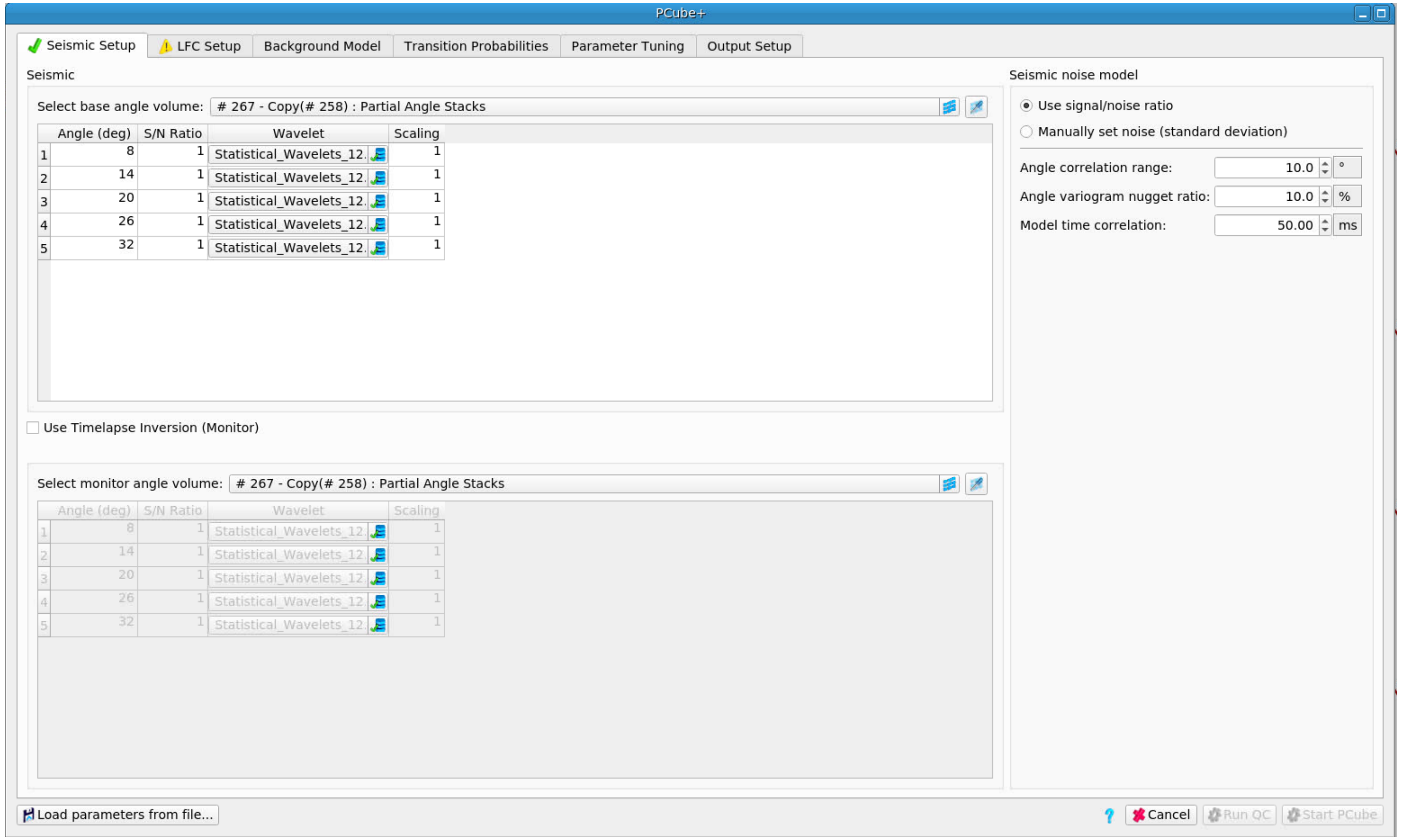
1) The first time through this section, open up the well viewer.
2) Drag the AI curve from 16/2-21 into the empty space.
3) Drag the Vp/Vs curve from the same well next to the AI track.
4) Drag the well 16/3-8S into the empty space to the right of the viewer.
5) Drag the AI and Vp/Vs curves from this well in.
6) Repeat steps 4) & 5) for well 16/3-6.

The inversion results will be added to this plot through the exercise.

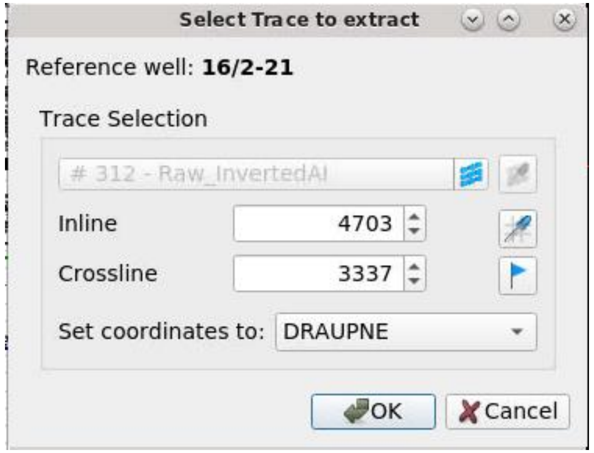


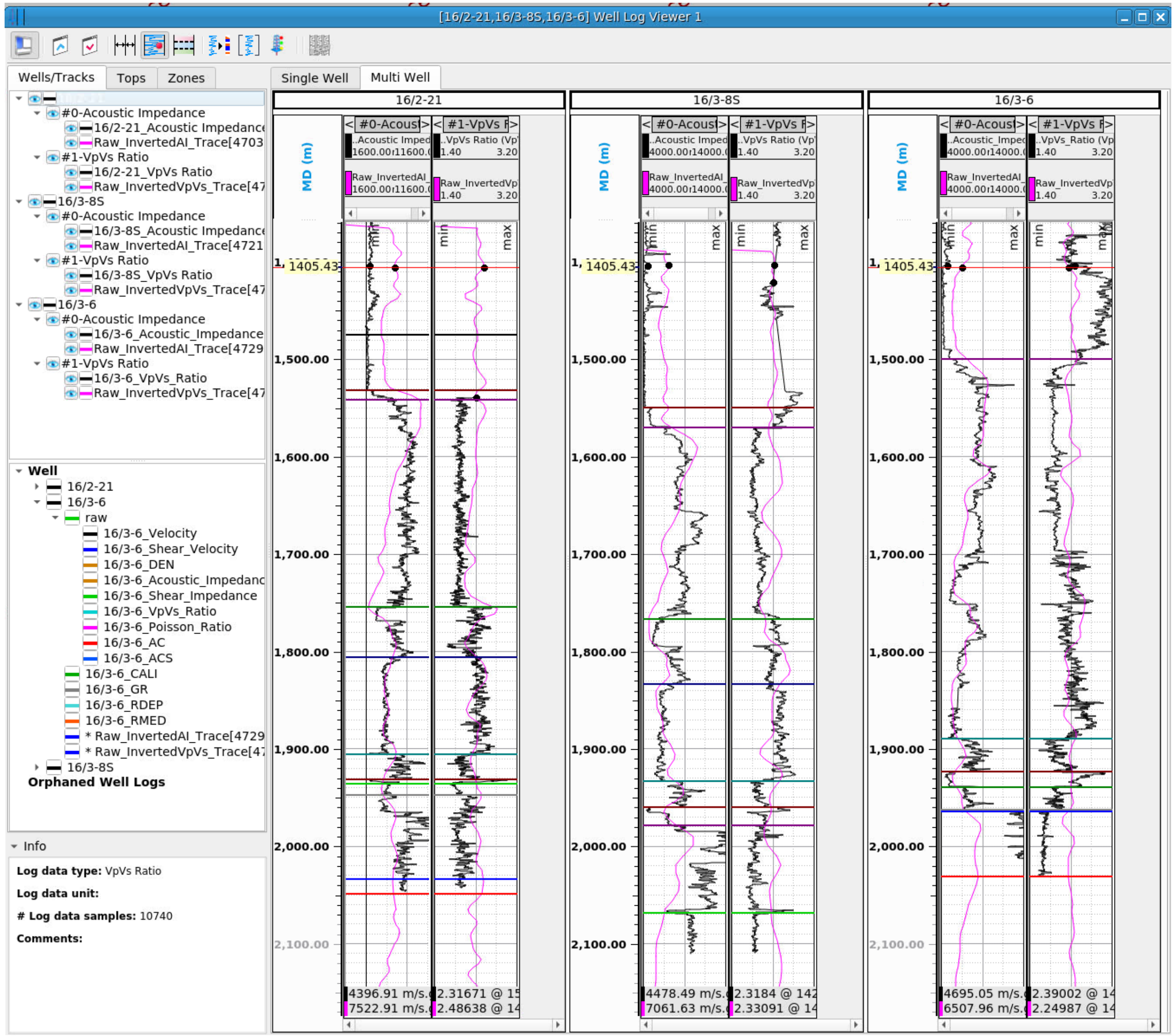
1) Open PCube+ from the Interpretation-Processing menu.
2) Select the partial angle stacks from the QC run.
3) Click on Load parameters from file. There are different parameter files for each of the 3 data volumes because the signal to noise ratio and wavelet scaling change with conditioning.
4) Click the Start PCube button.





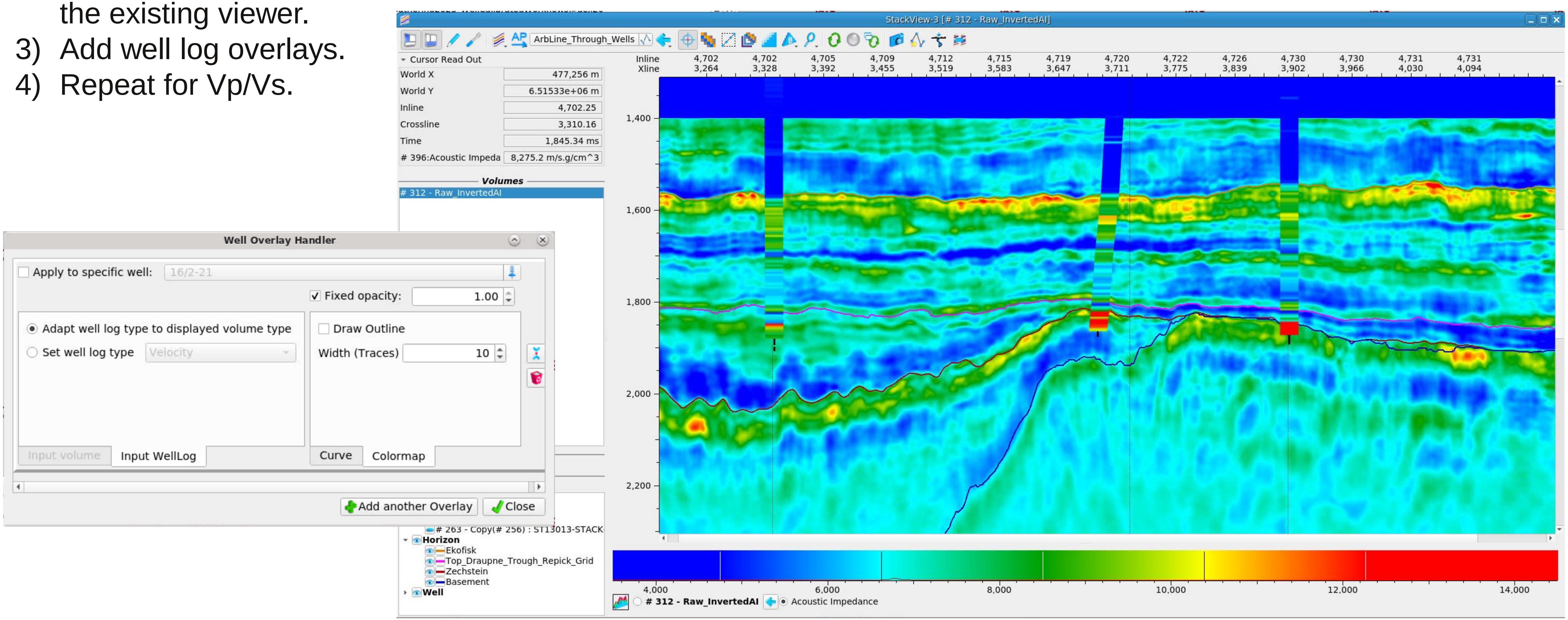
1) Add the inverted AI into the well viewer by dragging the volume onto the track. Ensure that the correct location is used by choosing the DRAUPNE top. Repeat this for all three wells.
2) Repeat step 1) for the inverted Vp/Vs.
3) It is recommended that the curves are coloured by data set.





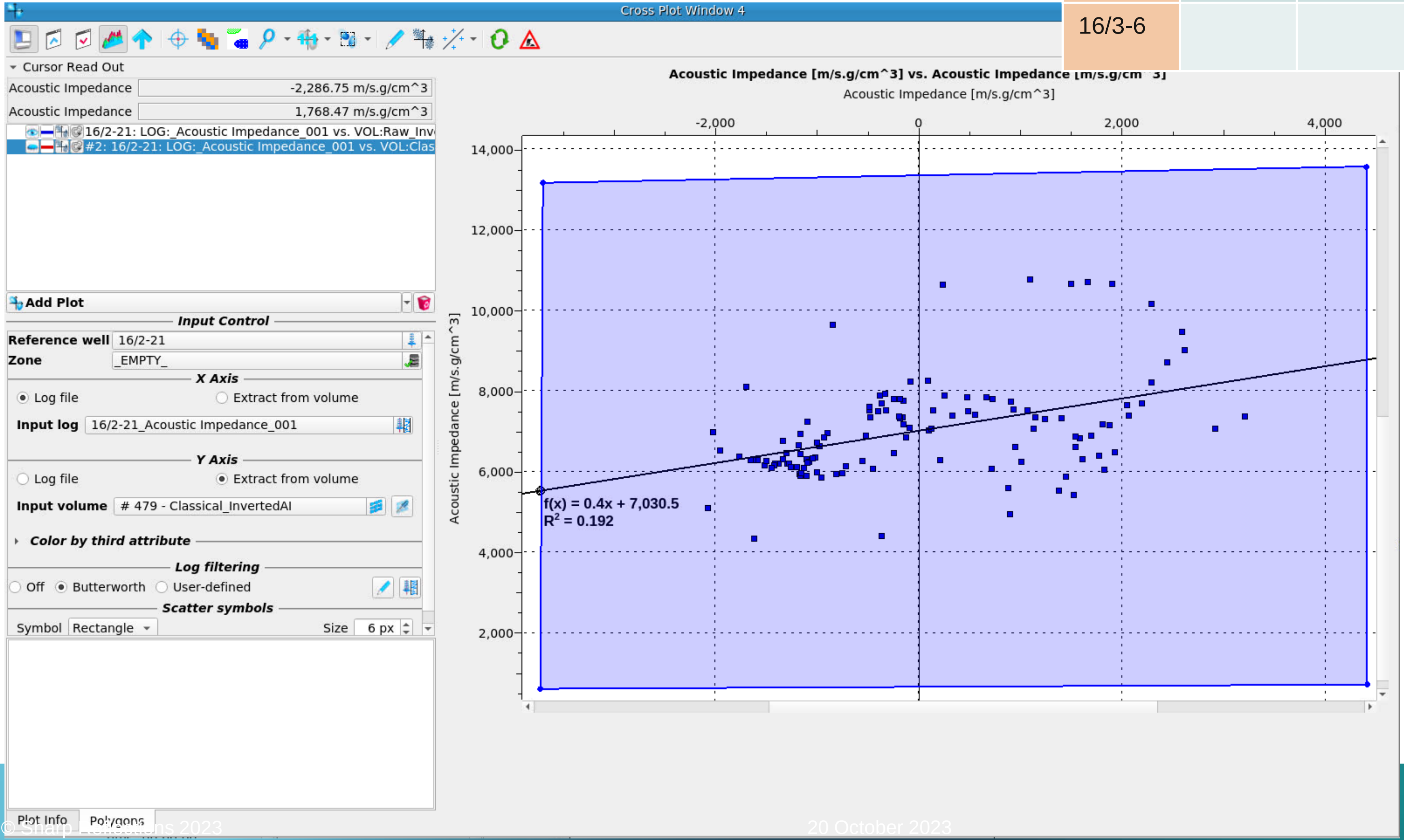
SHARP REFLECTIONS

1) The first time through, create an arbitrary path through all three wells.
2) Display the PCube+ relative AI along the path. On second & third runs through the section, just add to the existing viewer.
3) Add well log overlays.
4) Repeat for Vp/Vs.



1) Create a cross-plot of inverted AI against the filtered logs for all three wells. See Appendix C.
2) Repeat step 1) for the inverted Vp/Vs.
3) Make a table capturing the slope of the regression line (0.4 in the illustration) and the R^2 value for each well, dataset pair.

	Raw		Classical		ML	
	Slope	R^2	Slope	R^2	Slope	R^2
16/2-21						
16/3-8S						
16/3-6						



SHARP REFLECTIONS

Evaluation of the Results

This section collects up the various displays that have been made and asks some questions.
It’s up to you to answer them!

If you would like other QCs not produced already, feel free to make them.

We will look at the conditioning flow after this evaluation section and consider how it might be improved.

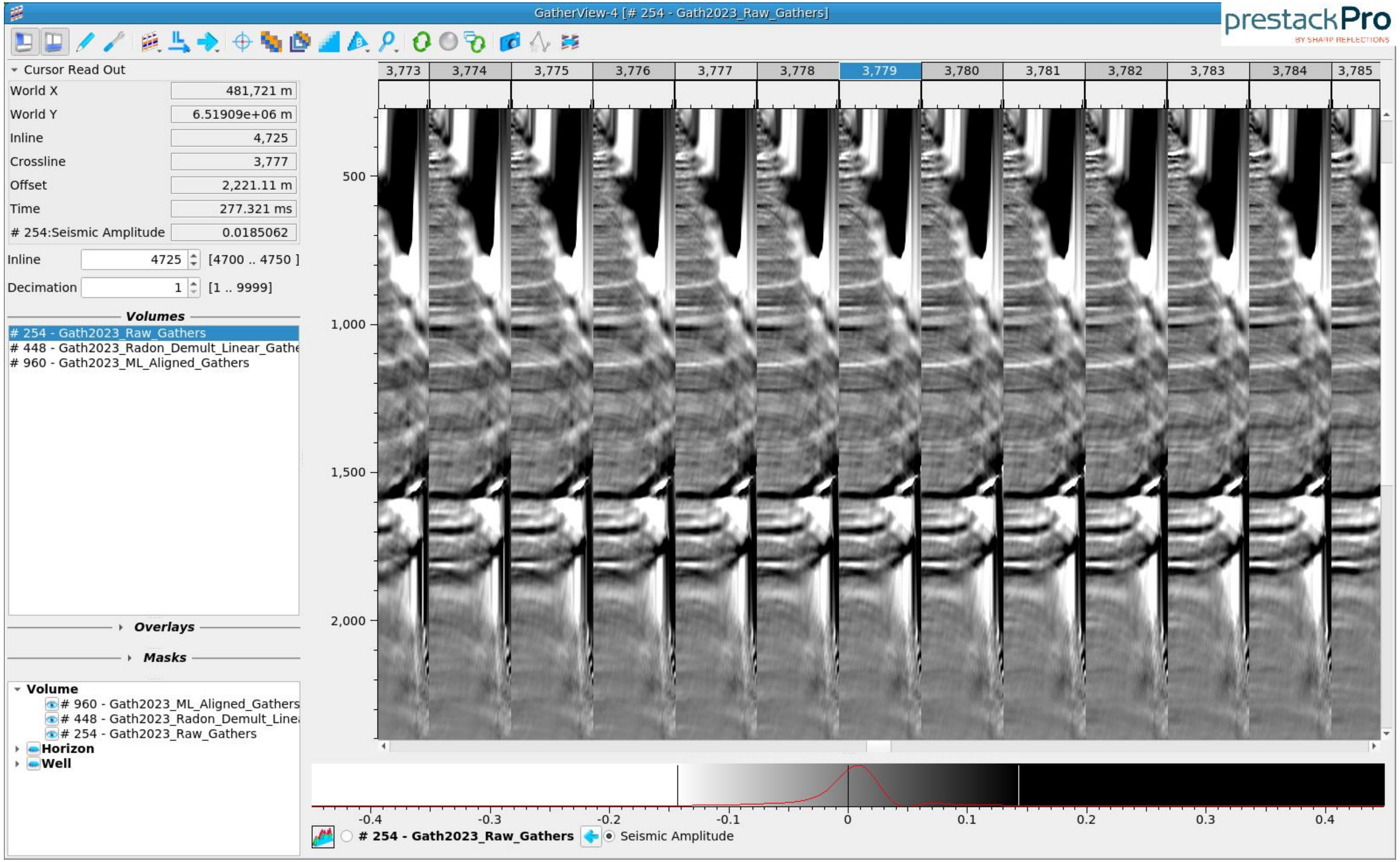
Visual comparison of gathers from the three stages

Scan through the three sets of gathers and compare
- Noise, what kinds, how strong
- Multiple content
- Gather flatness
- Anything else that attracts your attention

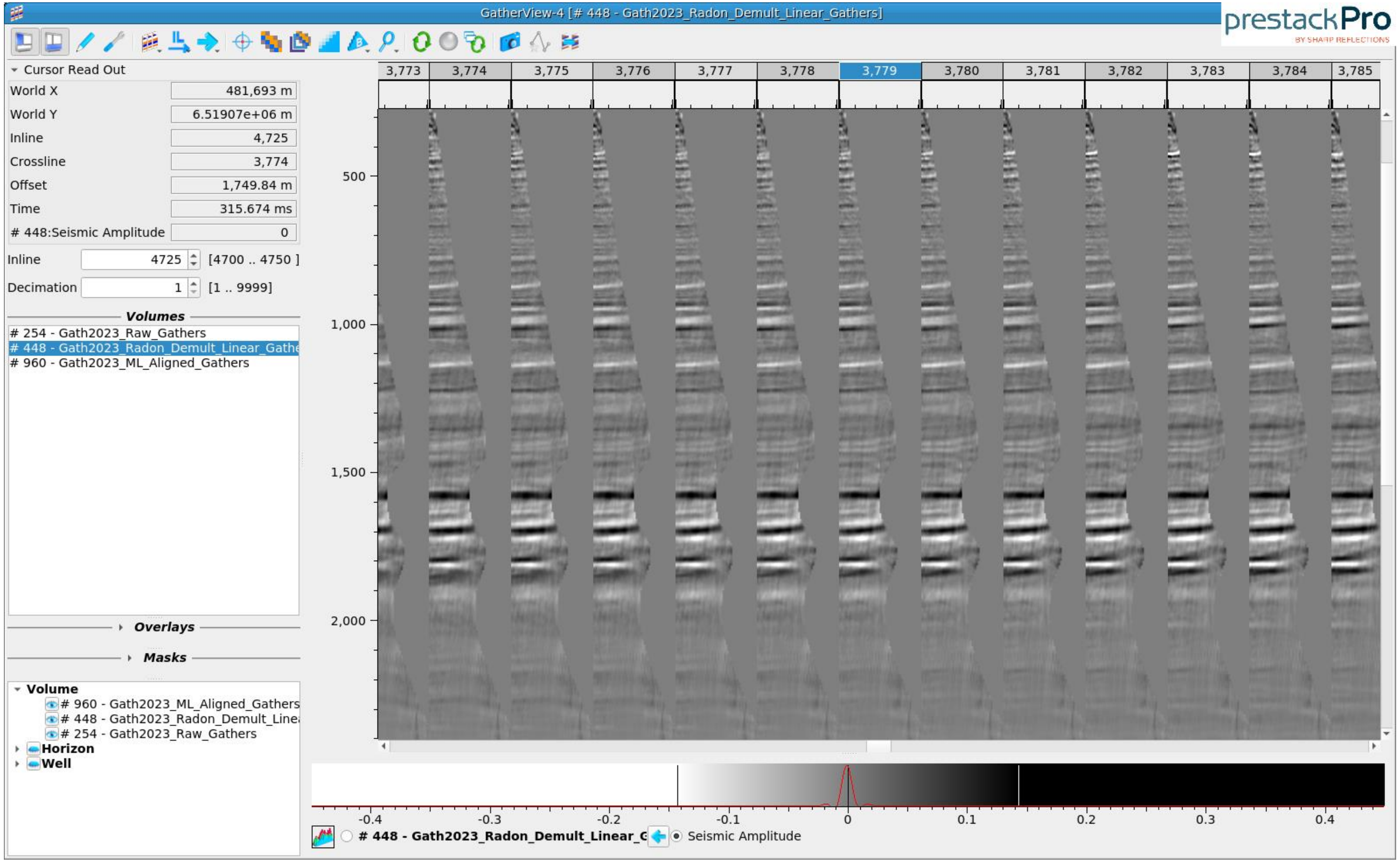
Make use of the difference in viewer.
Link the gather viewer to a map view and look near the well locations.

How do results compare from the different processing methods?

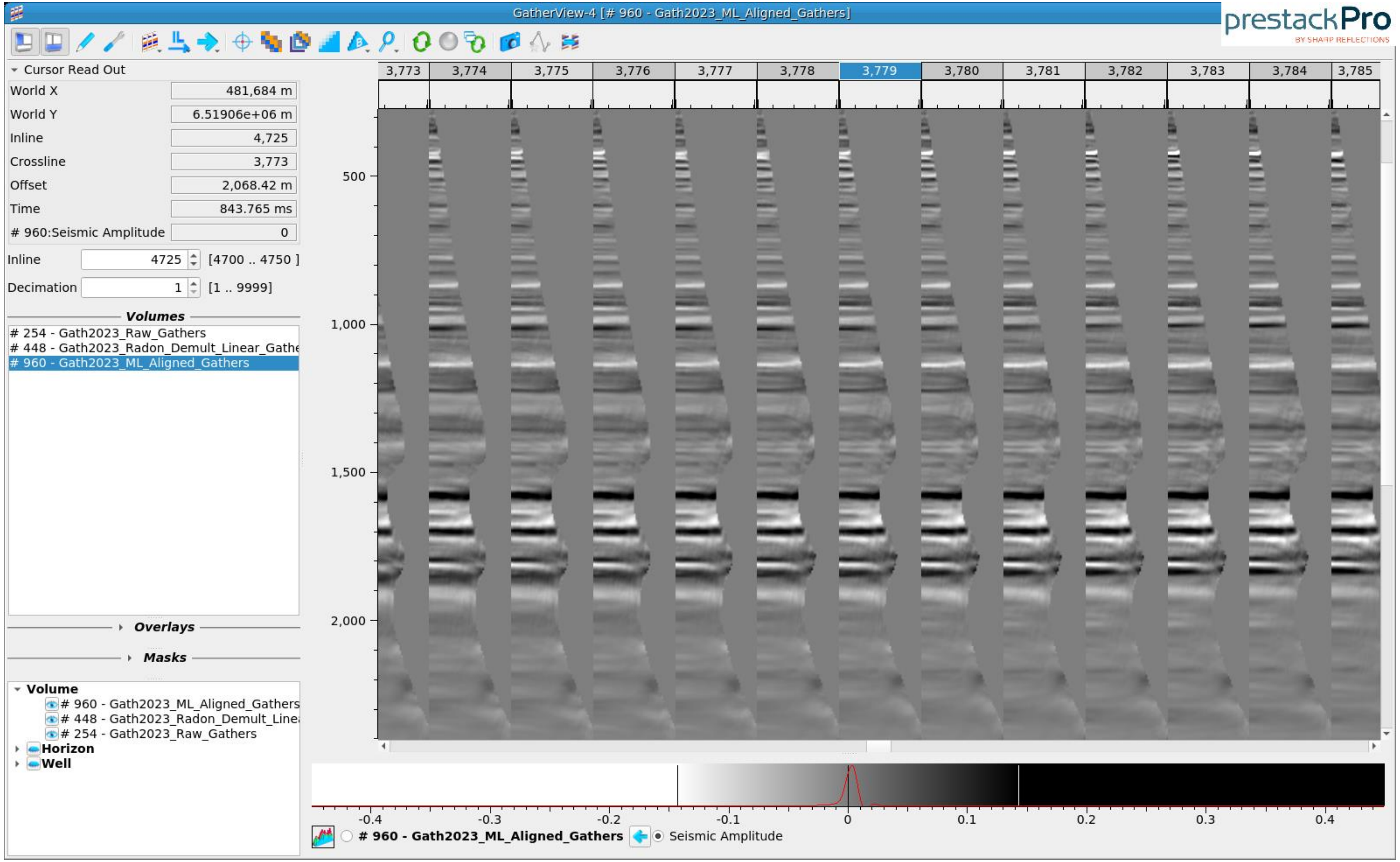
Visual comparison of gathers from the three stages: Raw



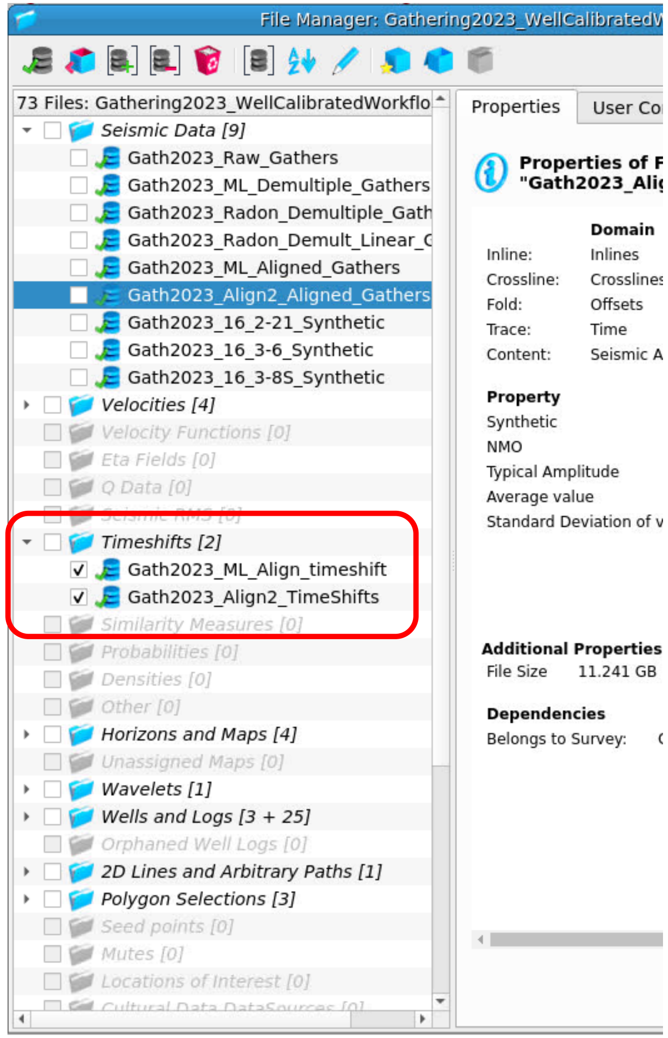
Visual comparison of gathers from the three stages: Classical conditioned



Visual comparison of gathers from the three stages: ML conditioned



Timeshift evaluation

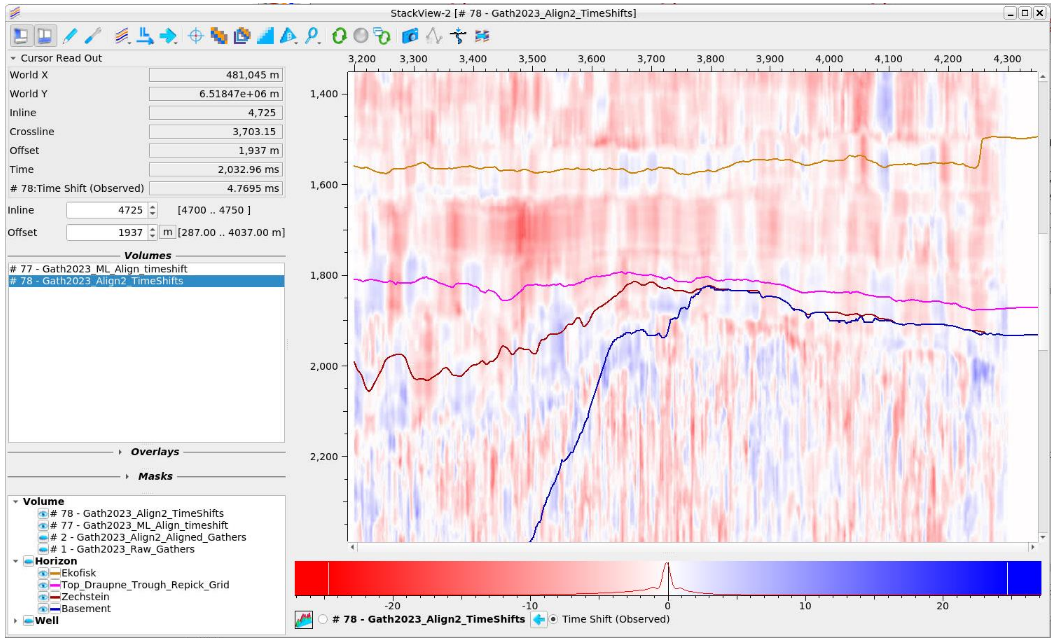


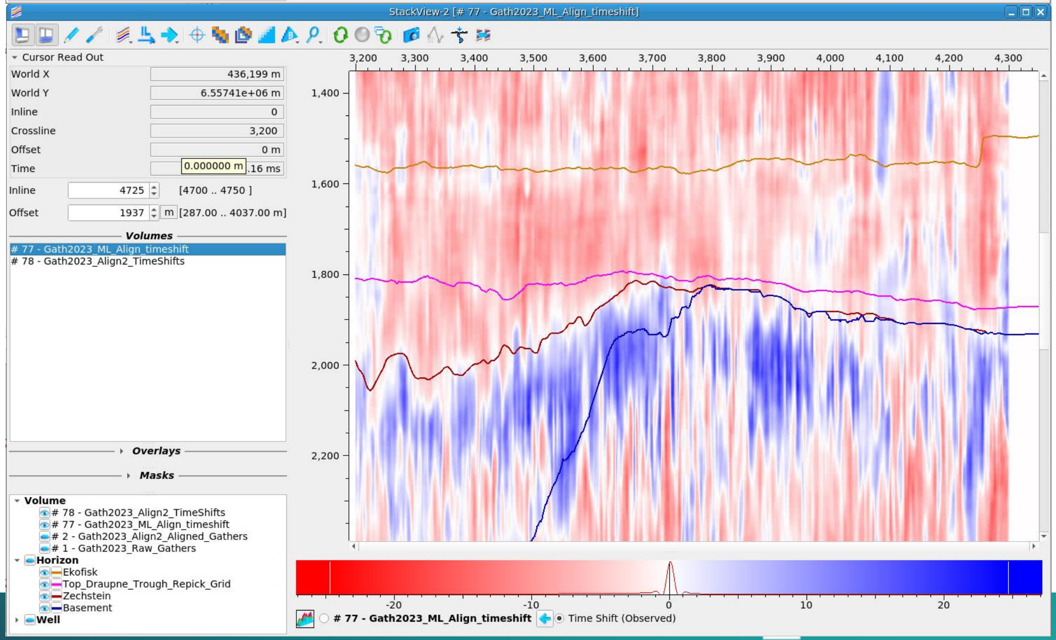
Load the time shift volumes from Align 2 and from ML.

Display them in a stack viewer, particularly for offsets around 2000-3000 m.

Comment on the smoothness and resolution (both laterally and vertically).

Also switch the display to prestack mode and look at the offset dependence of the shifts.

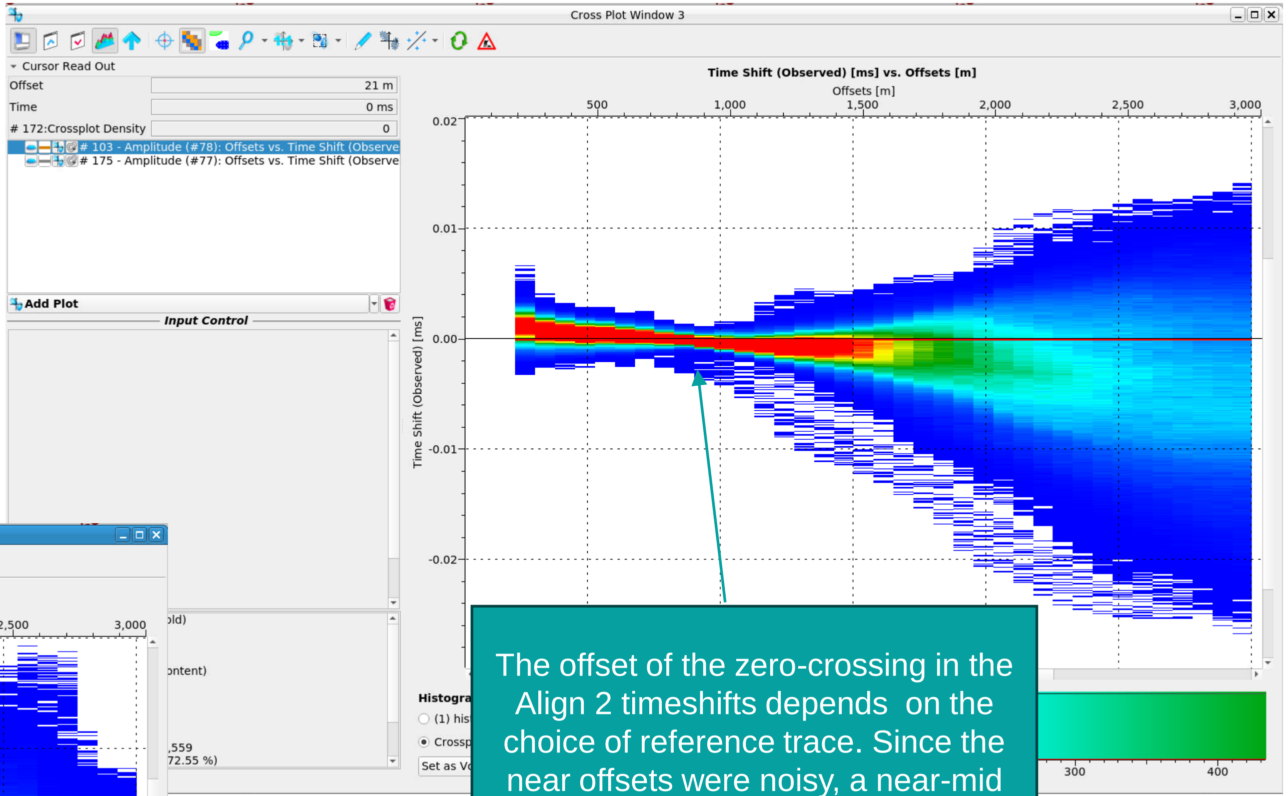




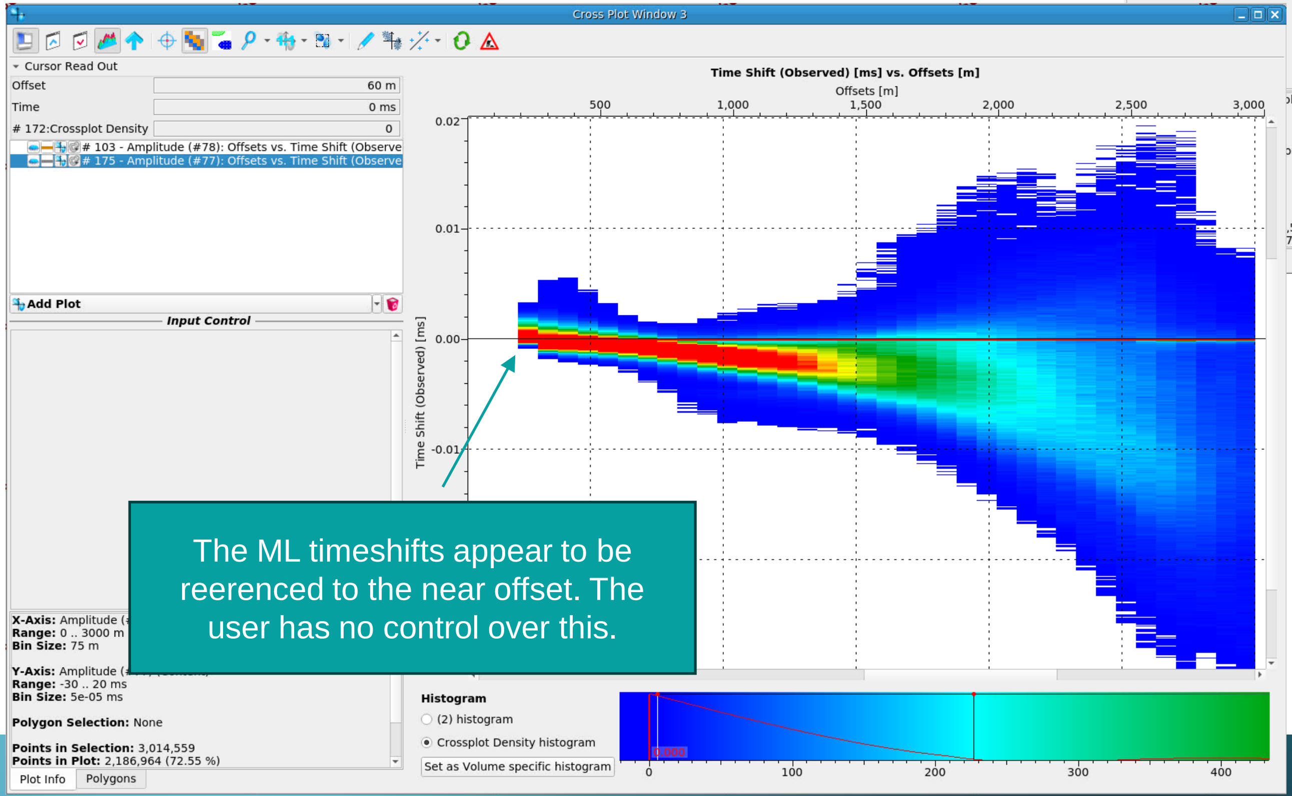
Timeshift evaluation

Use Create Maps on both of the time-shift volumes to make maps at the Top Draupne.

Use the cross-plotter (Volume Axes option) to plot time-shift v offset for both maps. The steps are similar to Appendix B, but using offset instead of angle.



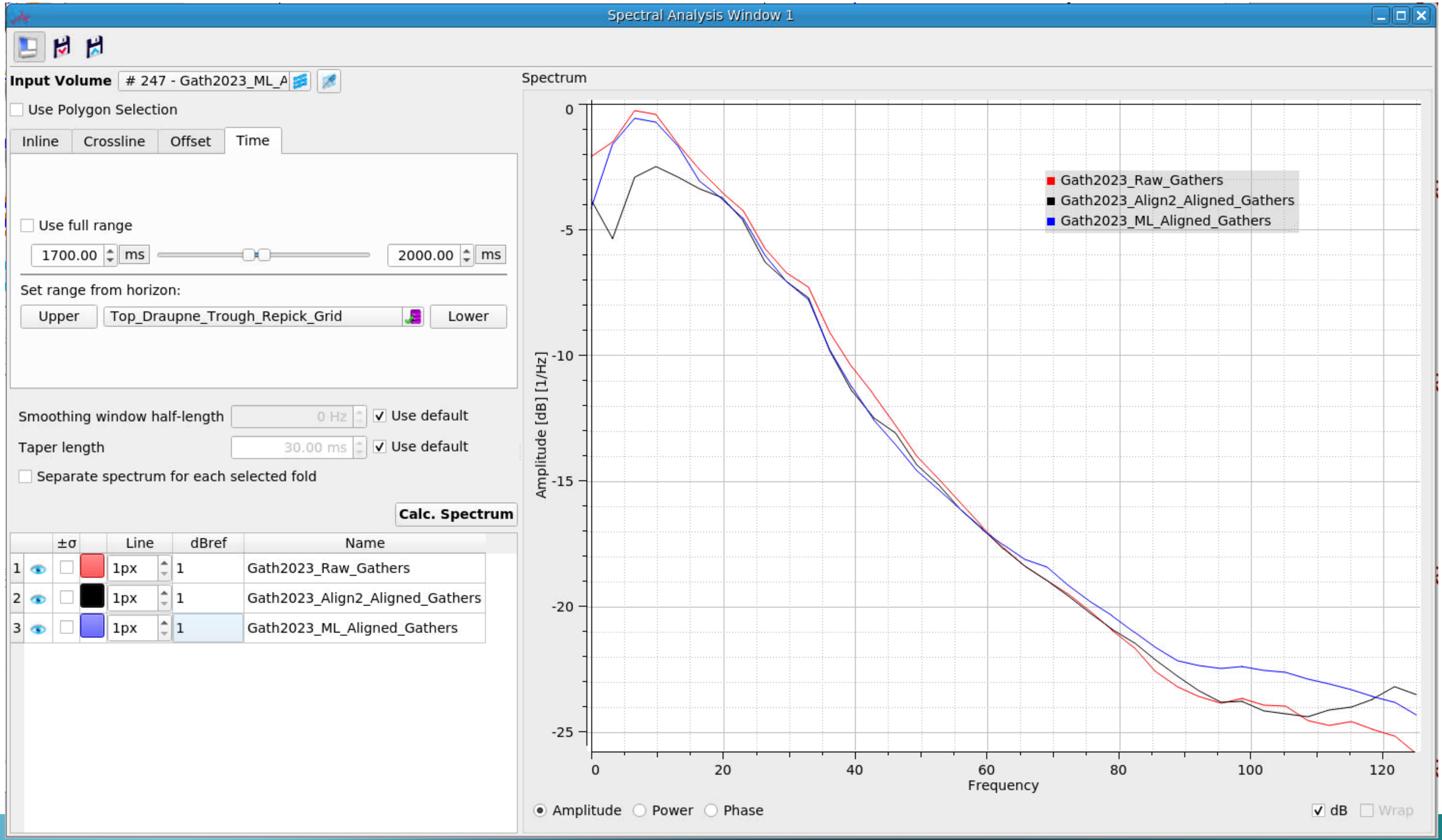
The offset of the zero-crossing in the Align 2 timeshifts depends on the choice of reference trace. Since the near offsets were noisy, a near-mid stack was used in this case.



The ML timeshifts appear to be reerenced to the near offset. The user has no control over this.

These plots show that we can expect a systematic difference between the two sets of shifts due to the different reference offsets.

The different vertical resolution in the two time-shift methods implies different amounts of wavelet distortion, especially at further offsets. This illustration uses an offset at abut 2000 m.
For this reason, it is worth comparing amplitude spectra for further offsets from the different methods.



The Align 2 spectra are relatively lower at low frequencies than the raw data and ML aligned data. Explain this observation in terms of time shift resolution.

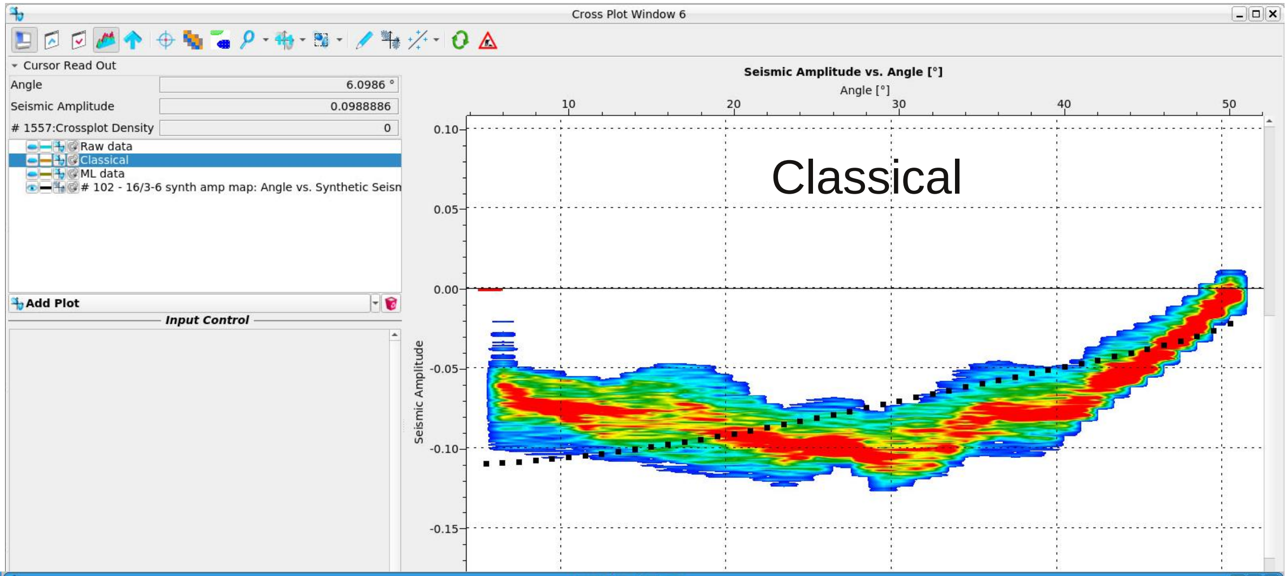
AVA Scaling

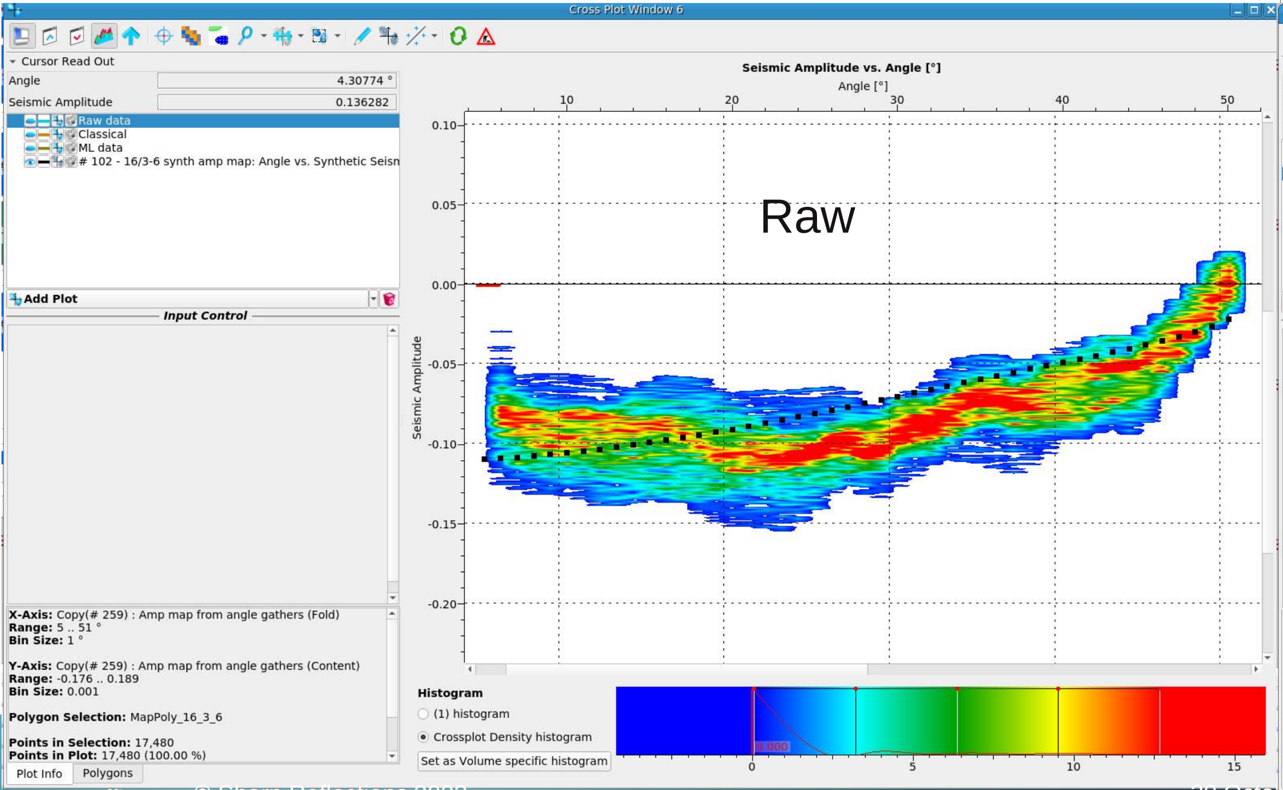
Compare the cross-plots of amplitude v angle at the three wells.

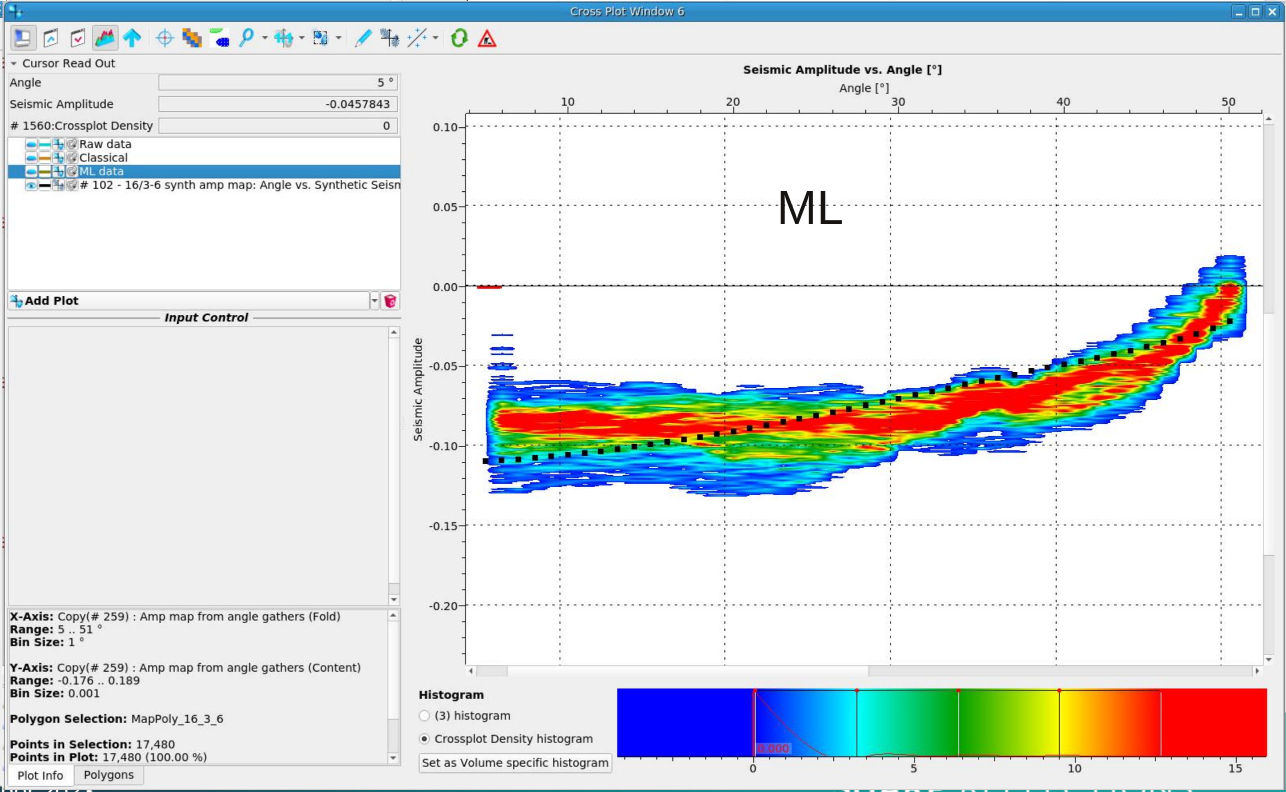
How good are the results compared to the synthetics?
Has conditioning improved the AVA fit to synthetics?
Does one processing method stand out as best?
Is there consistency between wells?

Given these results, what would your strategy be to obtain consistent AVA scaling at all wells for AVA/inversion work?

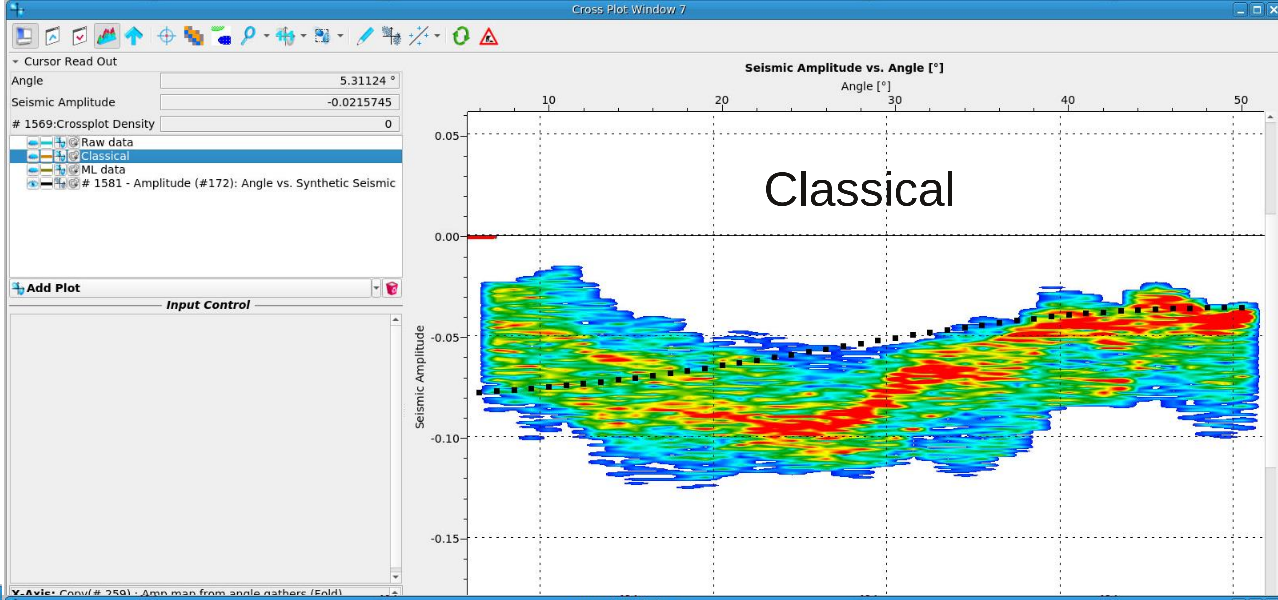
AVA scaling: well 16/3-6

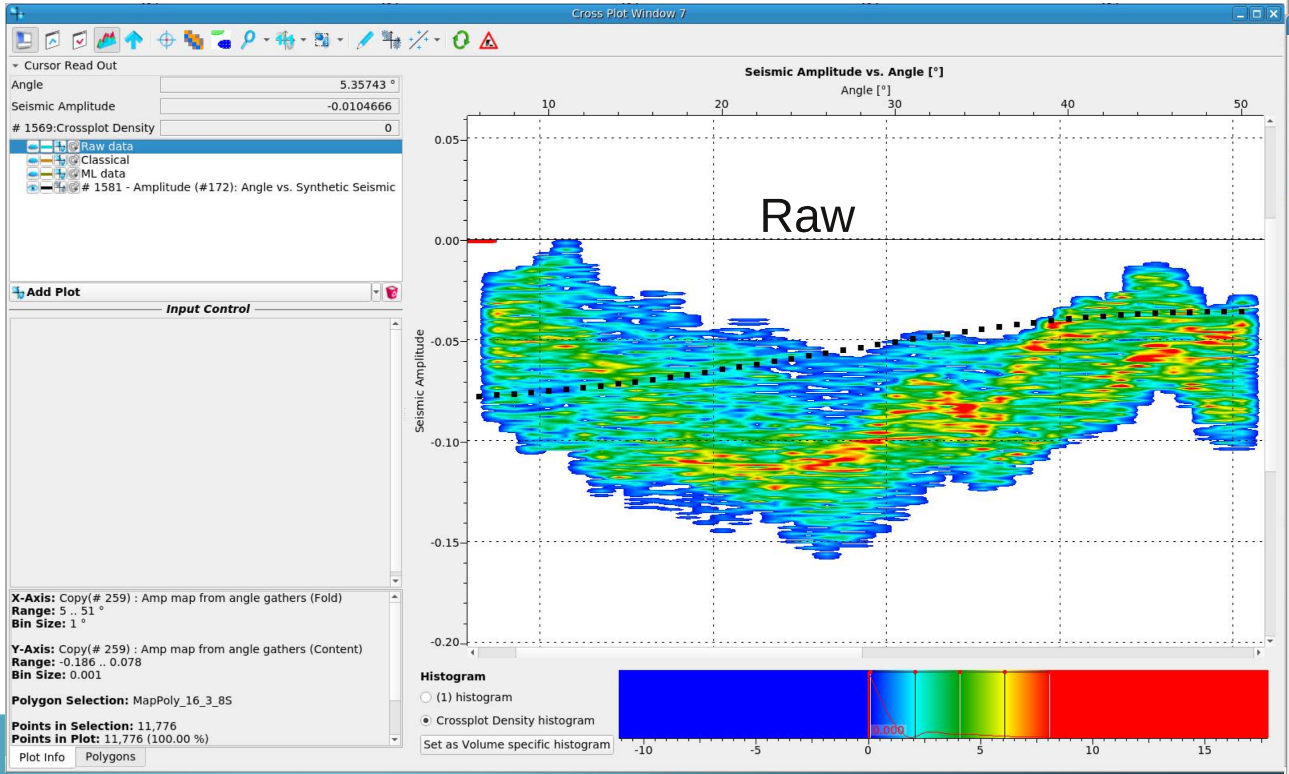


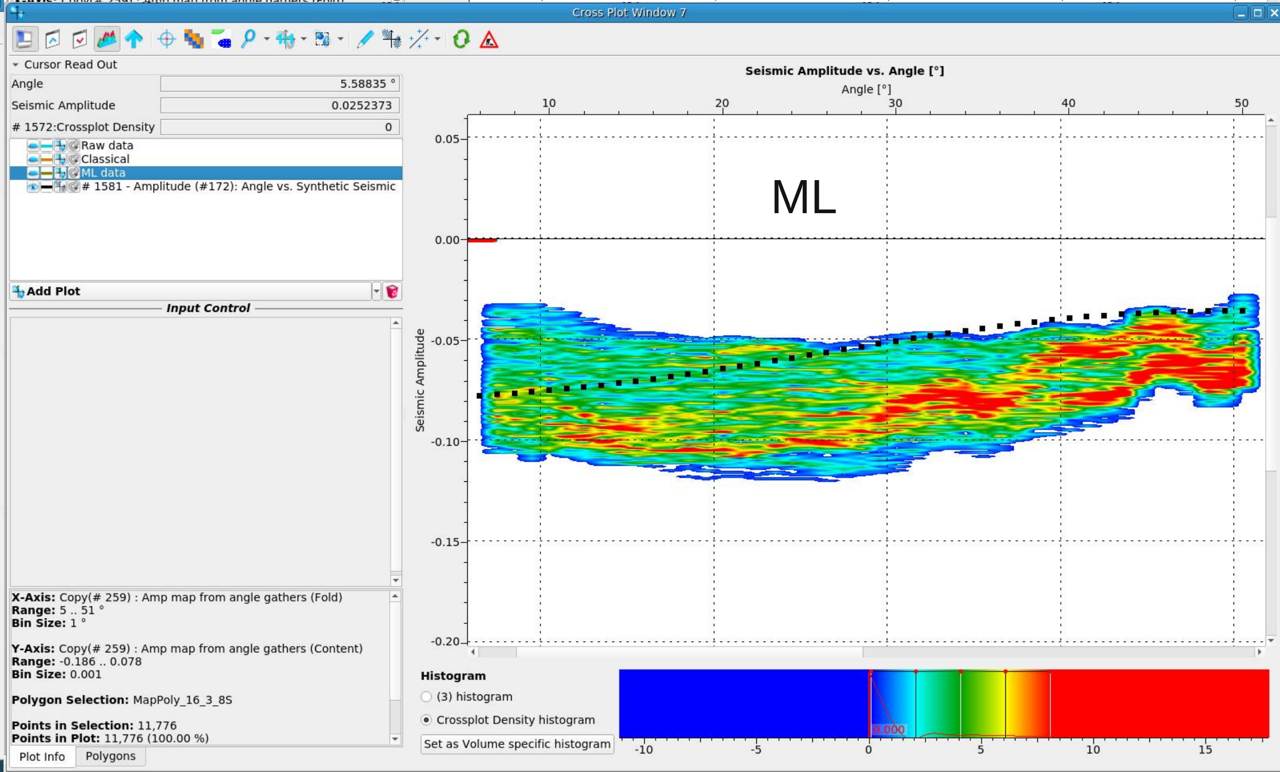




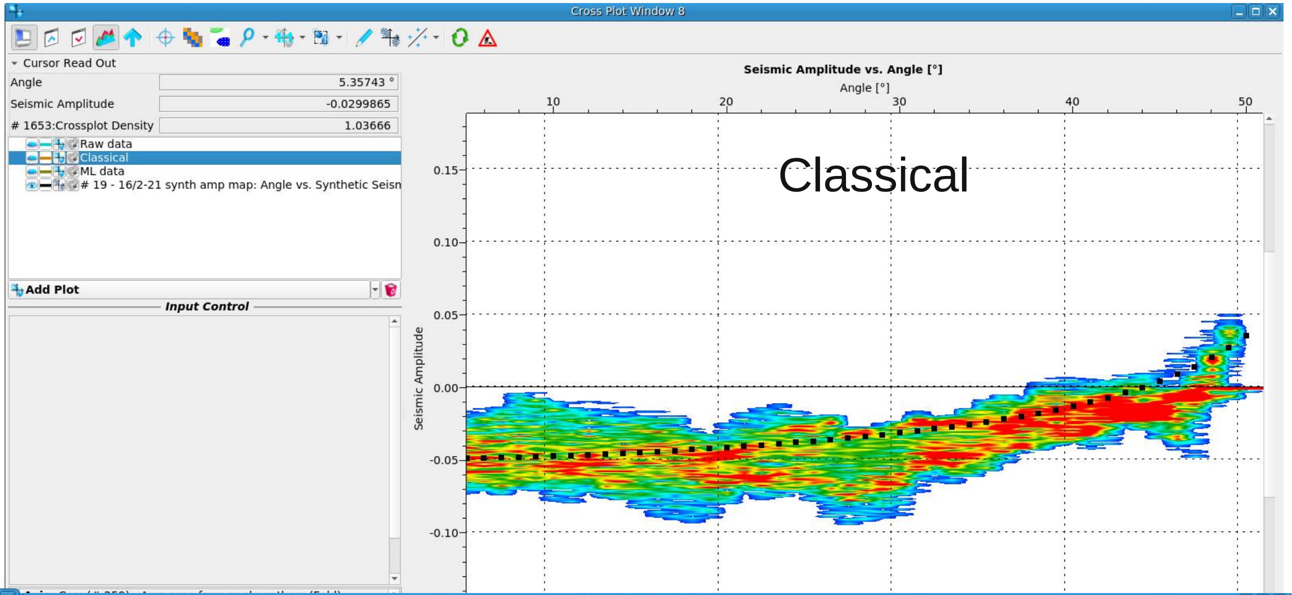
AVA scaling: well 16/3-8S

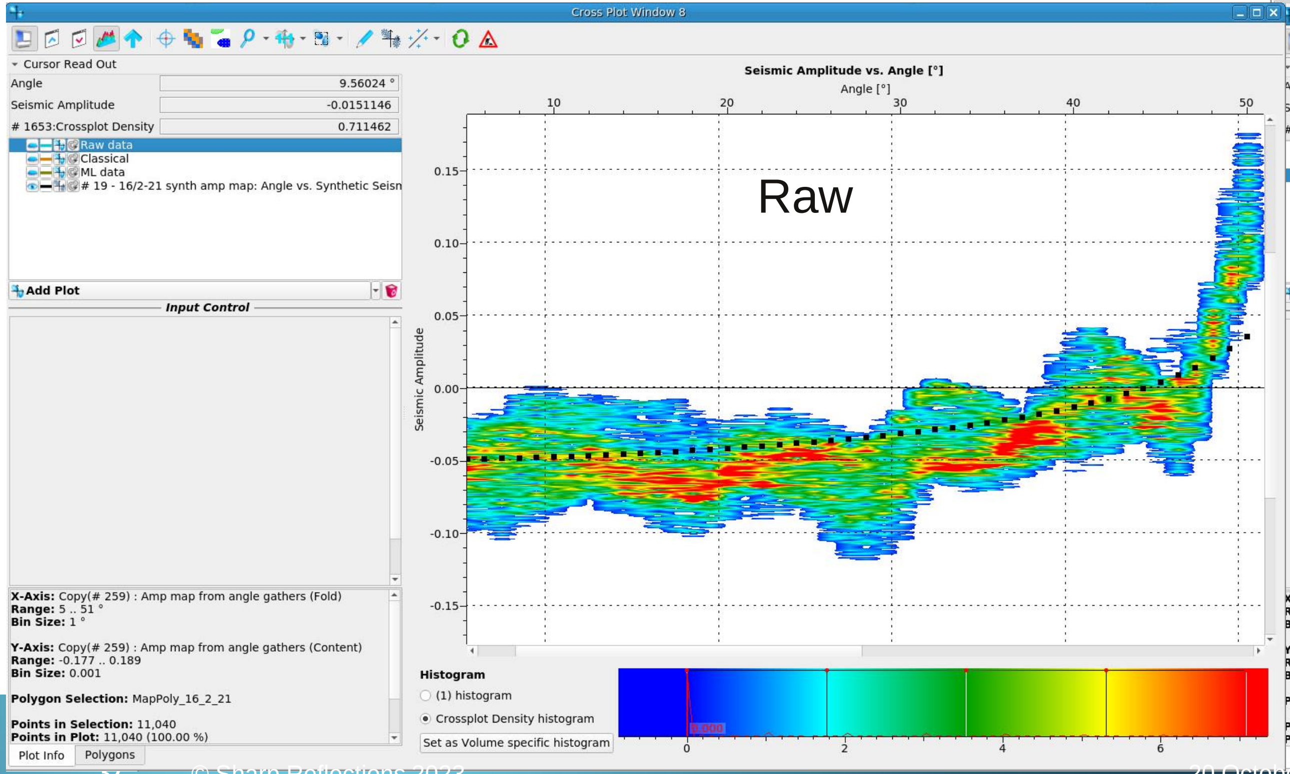


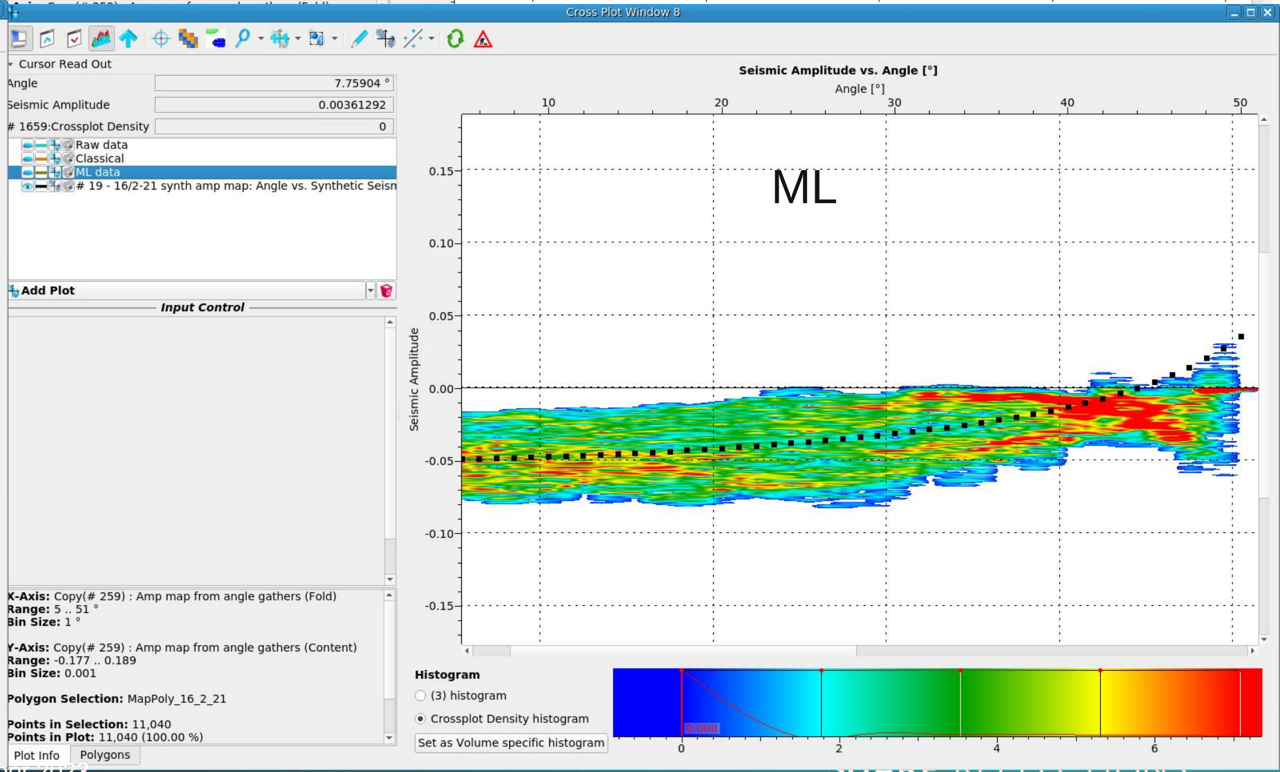




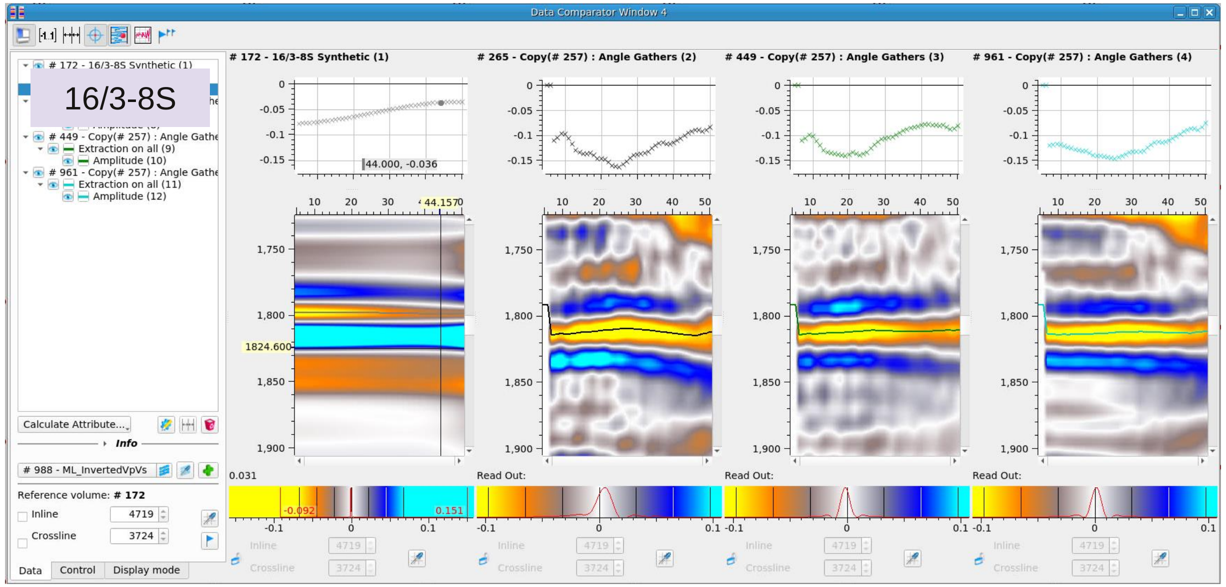
AVA scaling: well 16/2-21



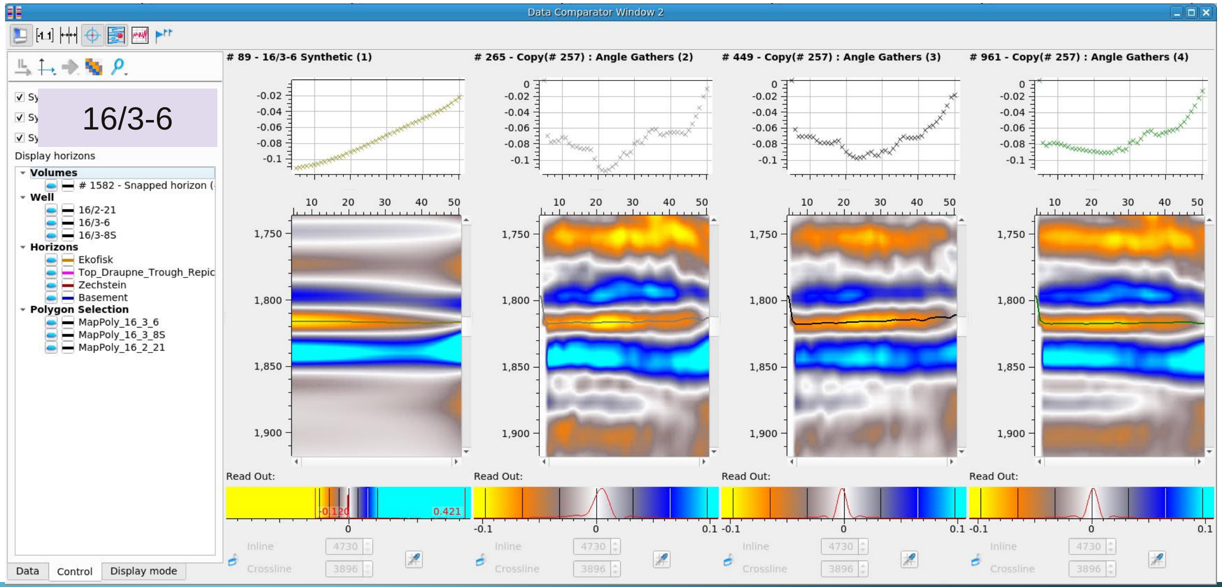


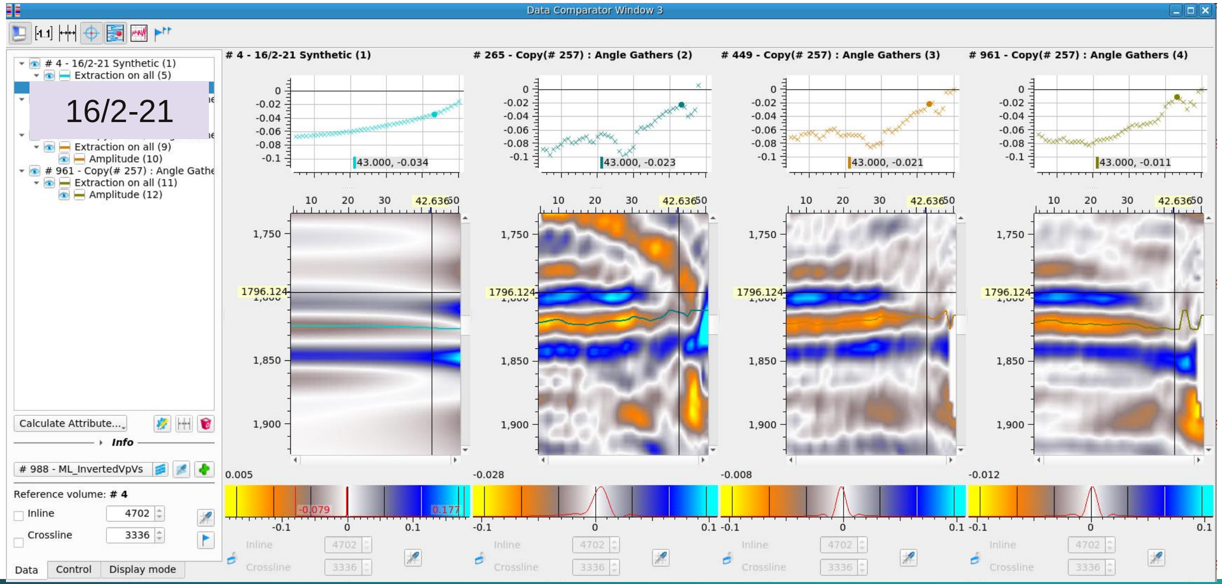


The data comparator is also useful to evaluate AVA responses extracted on key surfaces.
What is the impact of noise and residual non-flatness at the Top Draupne?



Synthetic Raw Classical ML





SHARP REFLECTIONS

Visual comparison of inversion results from the three stages

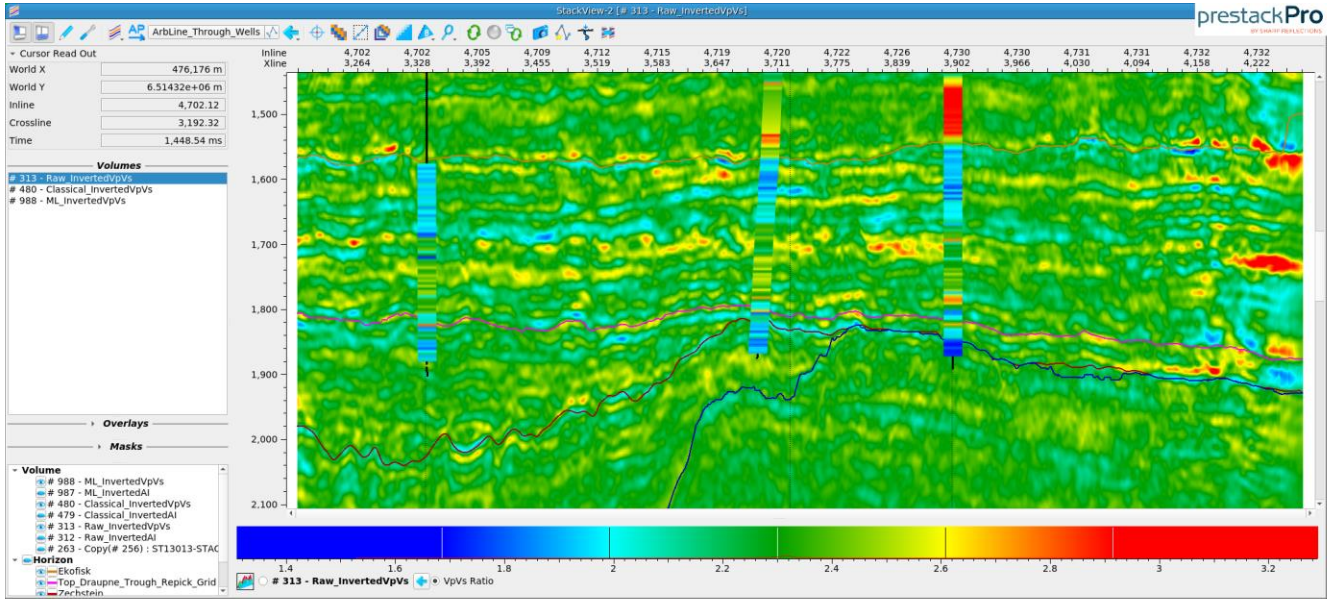
Scan through the three sets of AI, Vp/Vs and compare

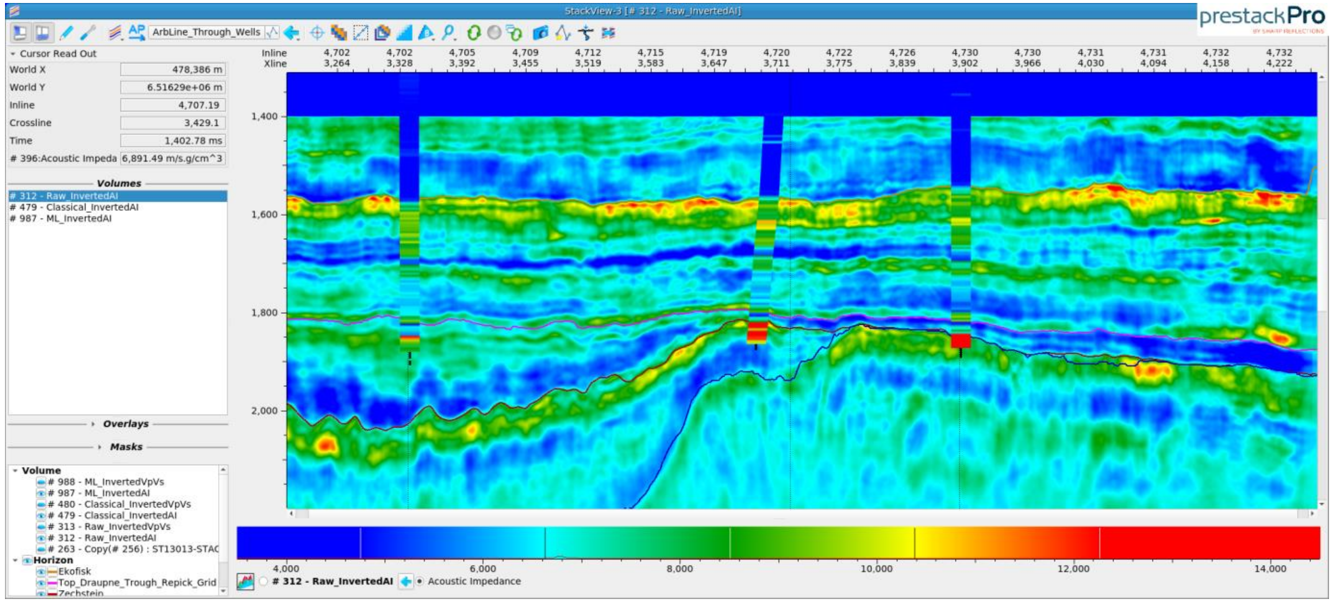
- Noise,
- Event continuity
- Resolution, especially around the Draupne
- Anything else that attracts your attention

Make use of the difference in viewer.
Link the gather viewer to a map view and look near the well locations.

How do results compare from the different processing methods?

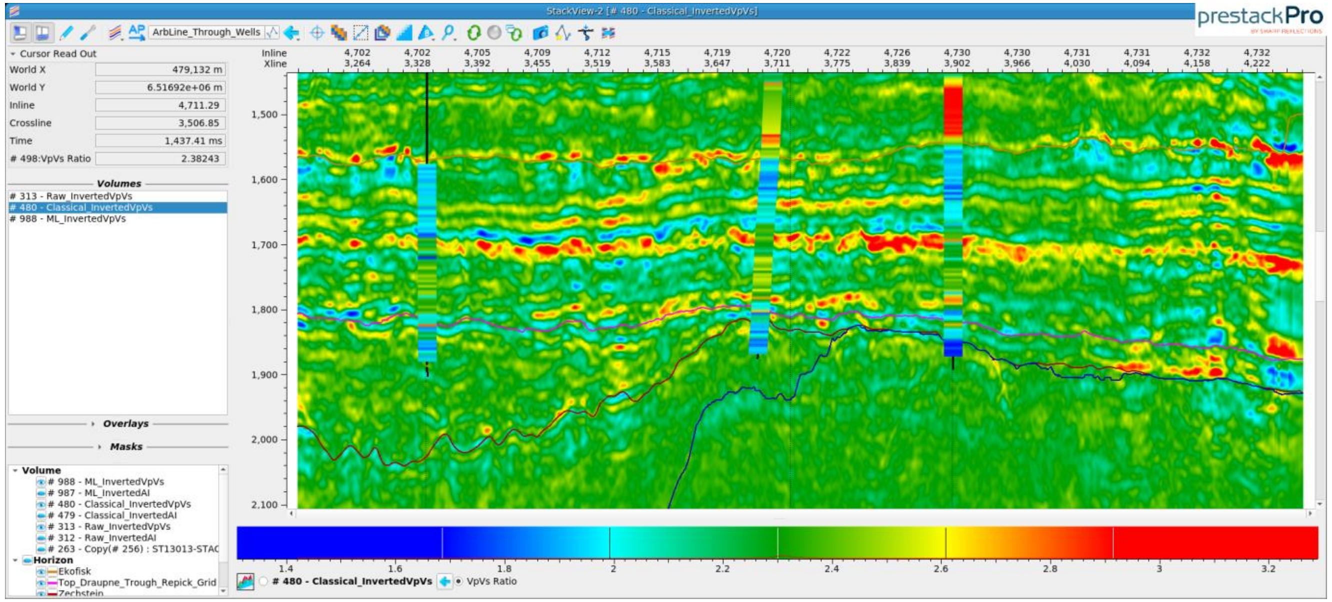
Raw data

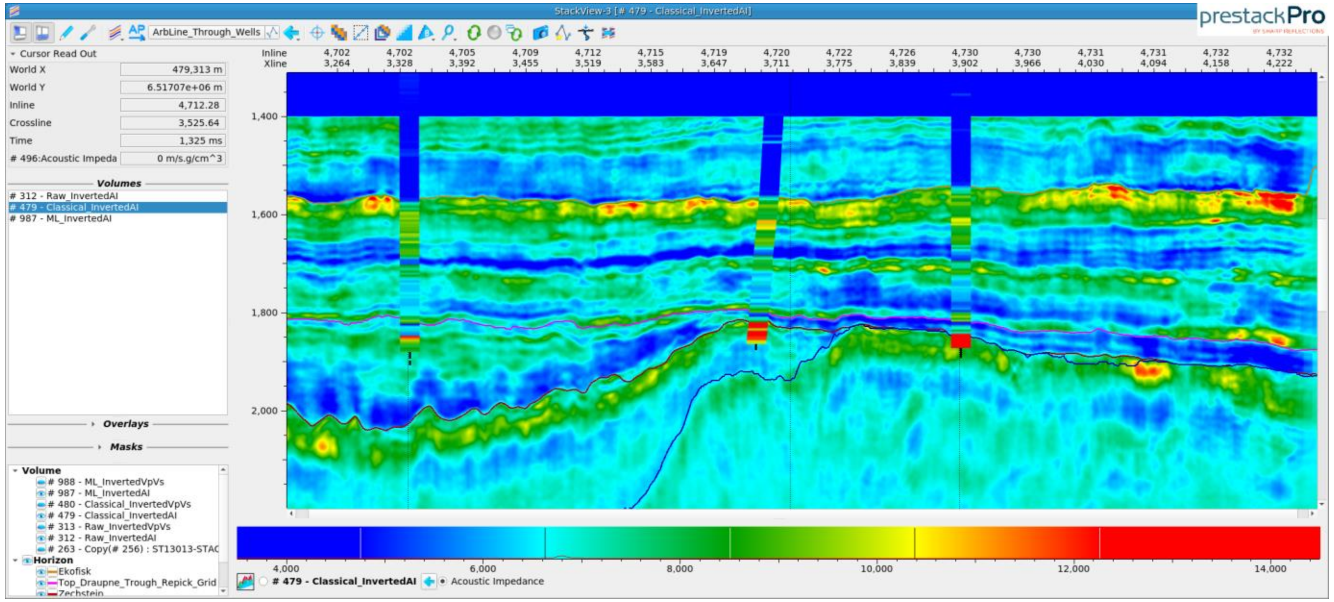




SHARP REFLECTIONS

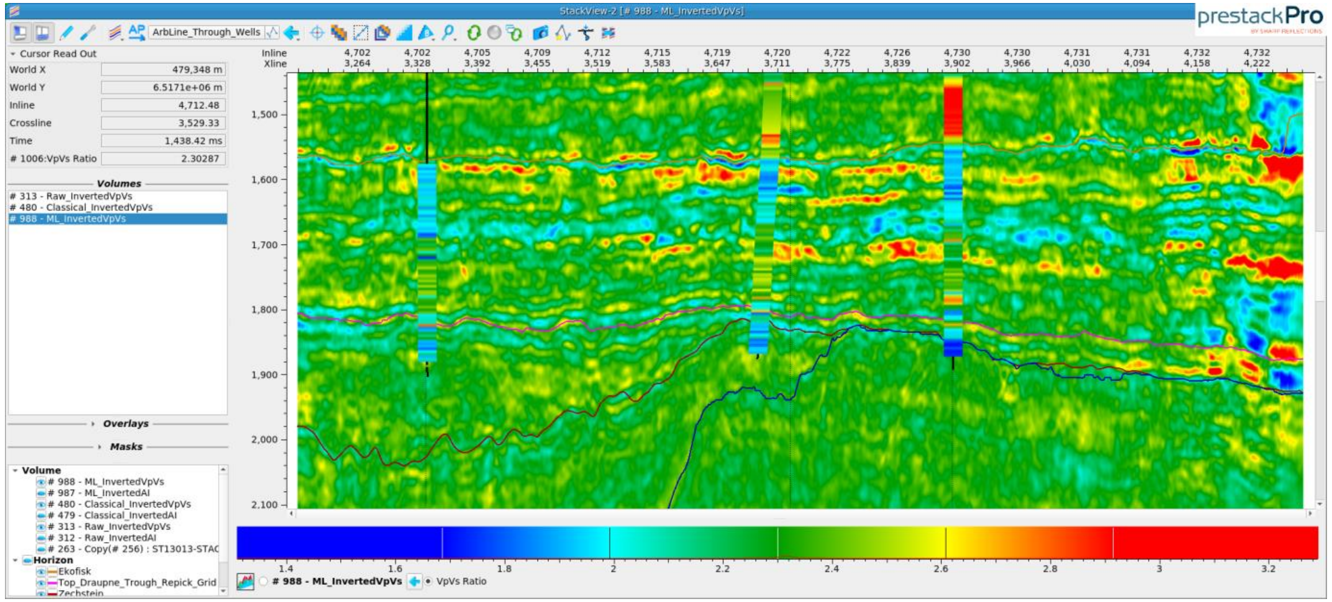
Classical conditioned data

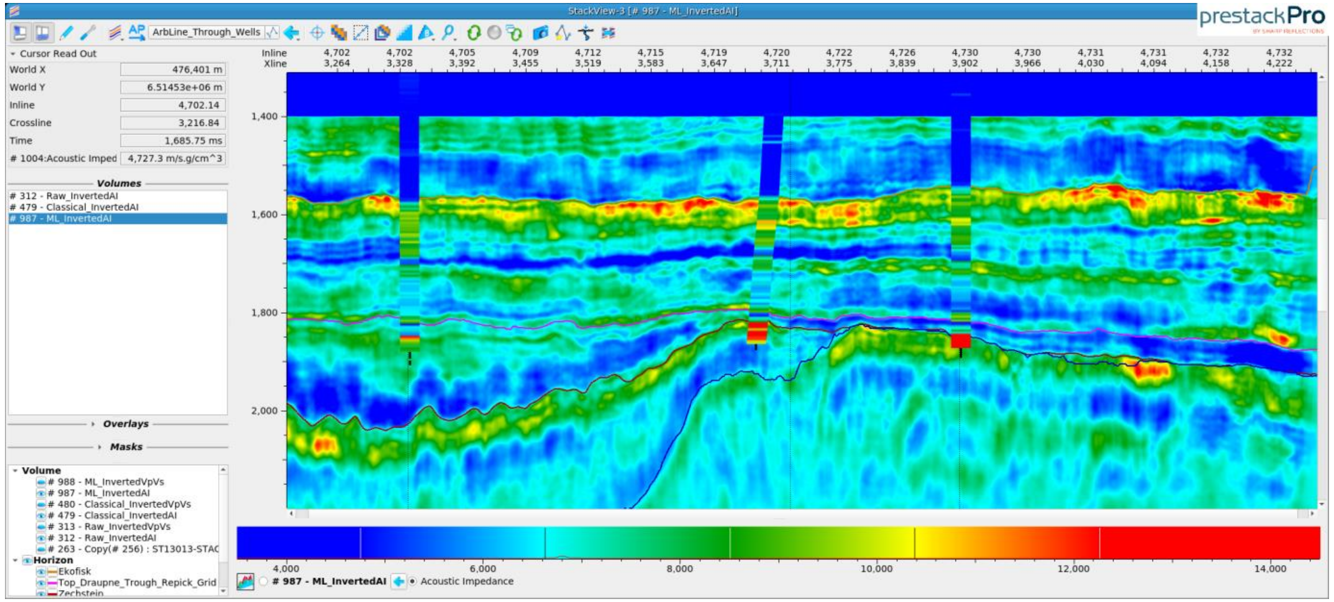




SHARP REFLECTIONS

ML conditioned data





Relative inversion results:

- Raw data – pink
- Classical conditioning – green
- ML conditioning - blue

How good are the visual fits

- Per well?
- By conditioning?

Look at the gathers for each processing stage at the well locations. Do they help to explain your observations?

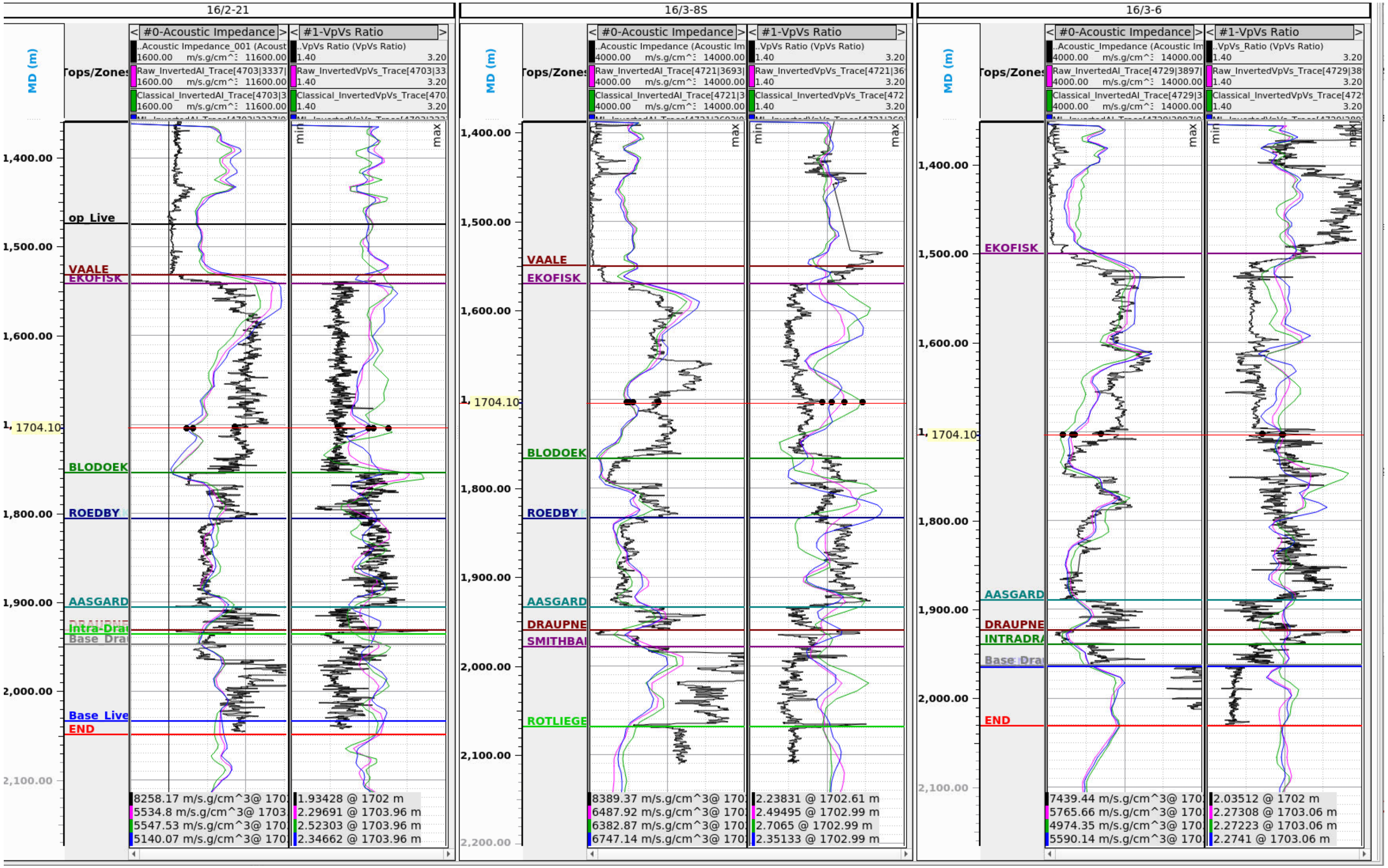


Table of fits from cross-plotting: filtered AI logs v inversion results

	Raw		Classical		ML	
	Slope	R^2	Slope	R^2	Slope	R^2
16/2-21	0.423	0.200	0.324	0.160	0.390	0.134
16/3-8S	0.460	0.335	0.495	0.451	0.478	0.317
16/3-6	0.542	0.619	0.482	0.528	0.598	0.598

What should the slopes be in an ideal result?
What factors may cause them to be off?

What do the correlations tell us

- Overall?
- About the inversion at each well?
- Per conditioning method?

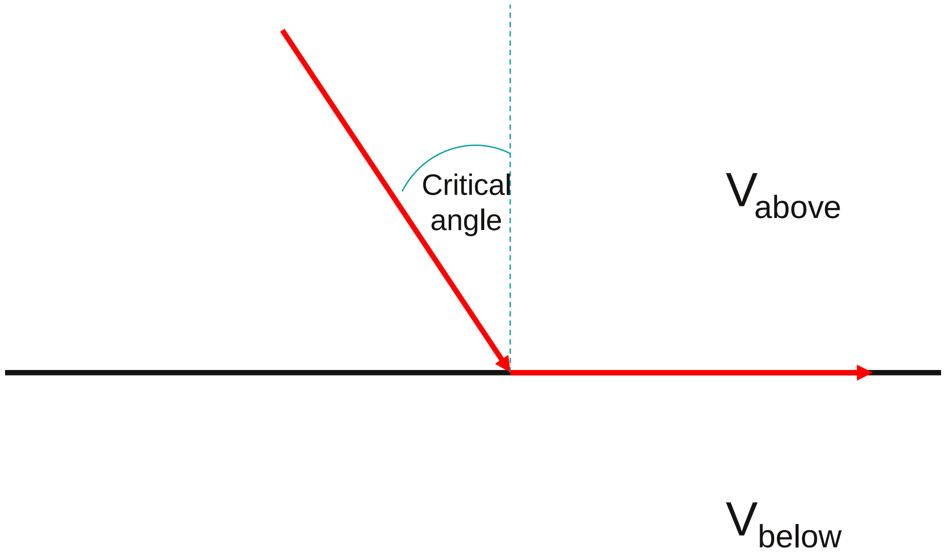
Are these observations consistent with your thoughts from the previous slide?

From this evaluation:

- Has the conditioning improved the data fitness for AVA/inversion work? How much?
- How does the ML processing compare with the classical flow? In what respects is one choice better/worse than the other?
- Which other QCs would help you to answer these questions?
- What would you do about the AVA scaling?
- What would you change or add in the conditioning flow? … Next section!

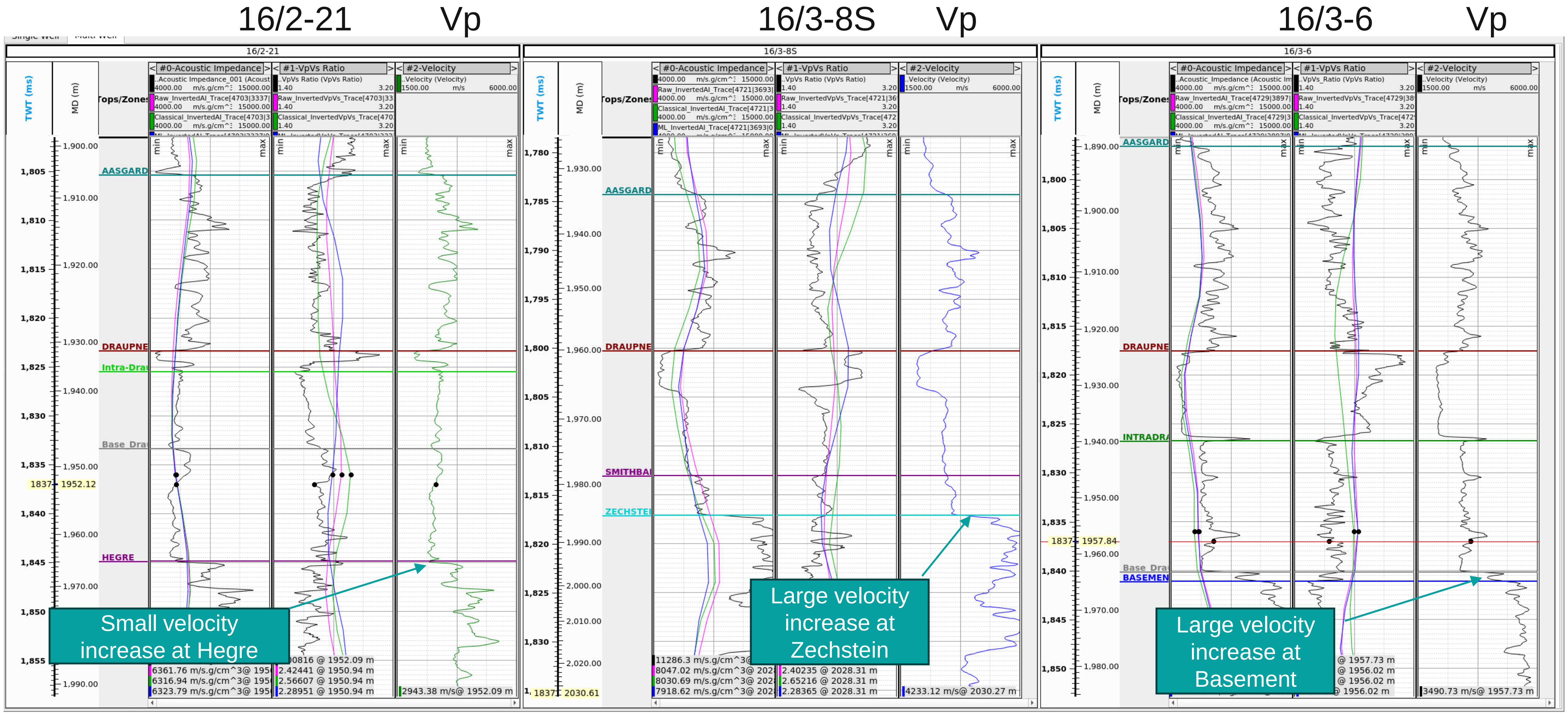
Section 3: Can you improve the results?

The next few slide discuss the critical angle. For various reasons it is quite important in this dataset.



A critical angle occurs when the velocity below an interface is greater than the velocity above the interface. The larger the velocity contrast, the smaller the critical angle. For angles at and above critical, refractions and post-critical reflections (with a phase change) are generated, and these typically have high amplitudes and complicated moveout behaviour.

Look at the well data, particularly Vp, a short distance below the Draupne. In 16/3-8S and 16/3-6, there are large velocity contrasts below the reservoir but within tuning distance.



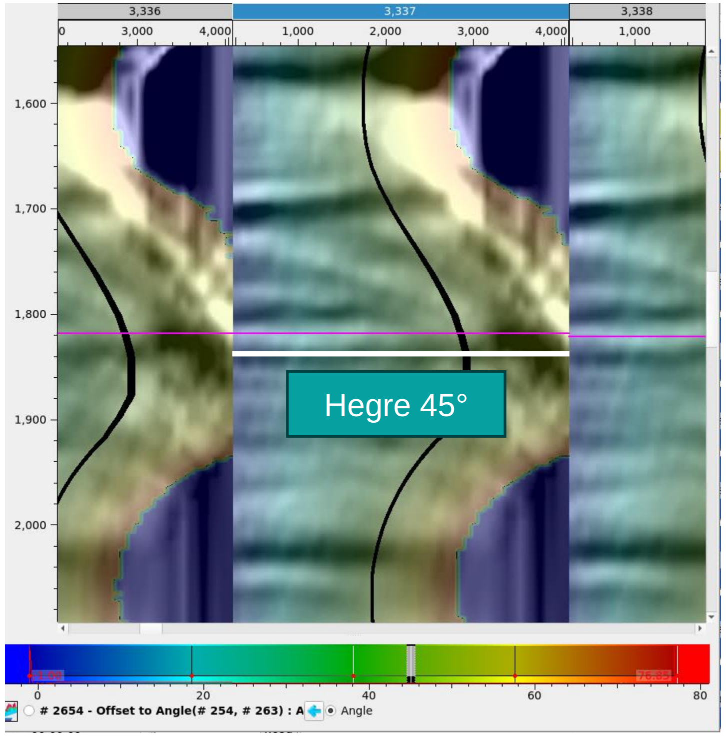
SHARP REFLECTIONS

Using rough readings off the Vp logs, calculate the critical angles at each of the 3 boundaries marked in the previous slide: $\vartheta_{critical} = arcsin\left(\frac{V_{above}}{V_{below}}\right)$.

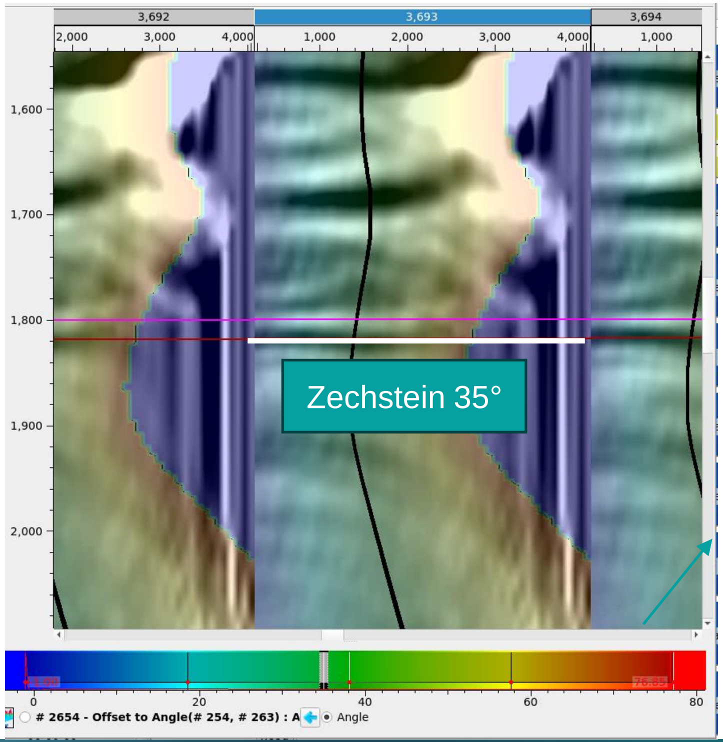
Create an angle map for the offset gathers (Offset to Angle) and overlay it on the raw gathers. For each well, insert an interval in the colour map at the appropriate critical angle (RMB on the colour bar).

Do you see strong evidence of critical energy on the gathers? What does it do to the far-offset response of the reservoir?

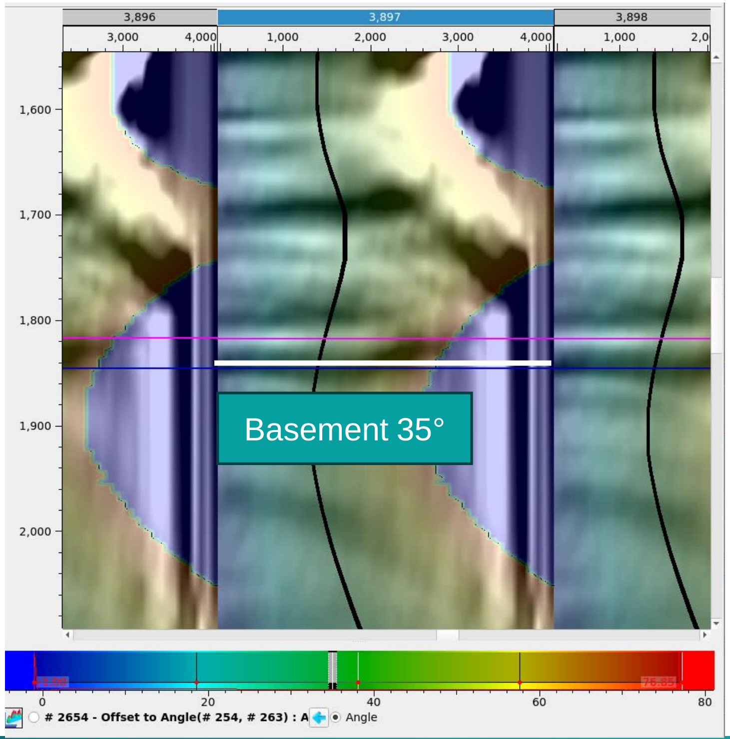
16/2-21



16/3-8S

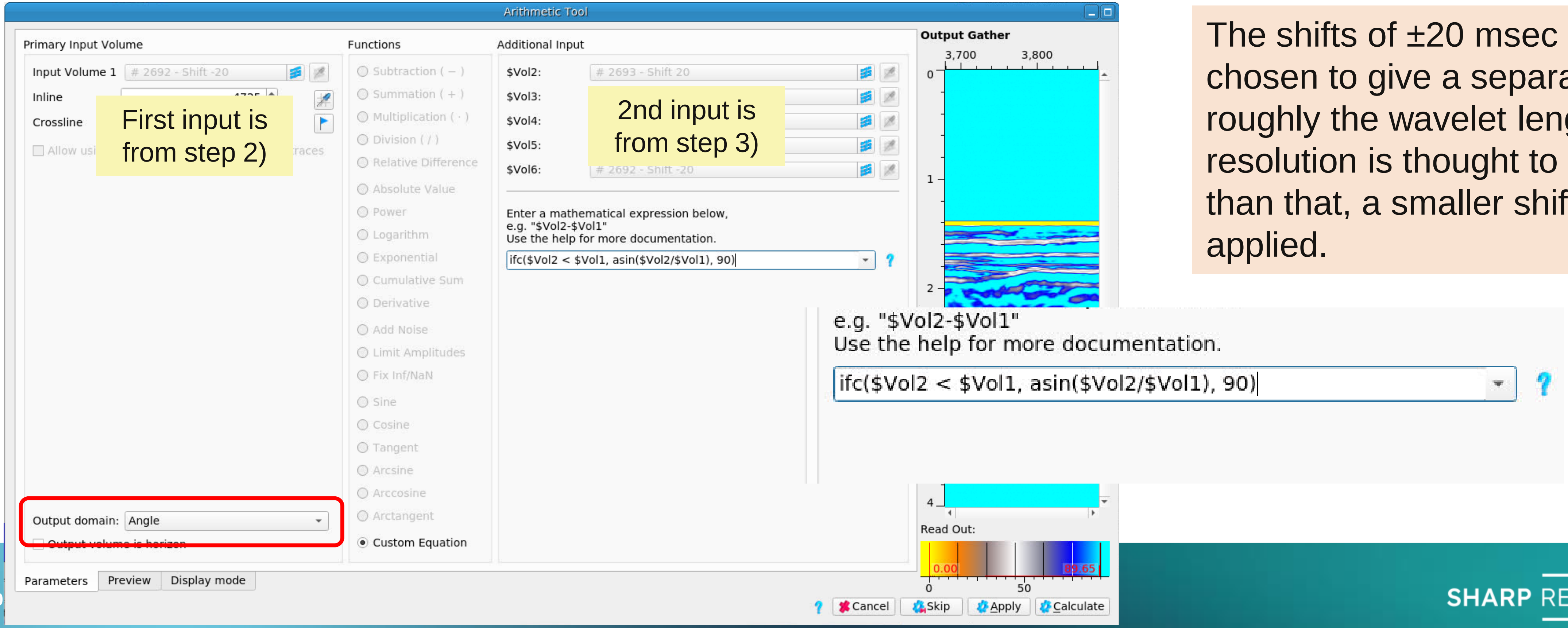


16/3-6

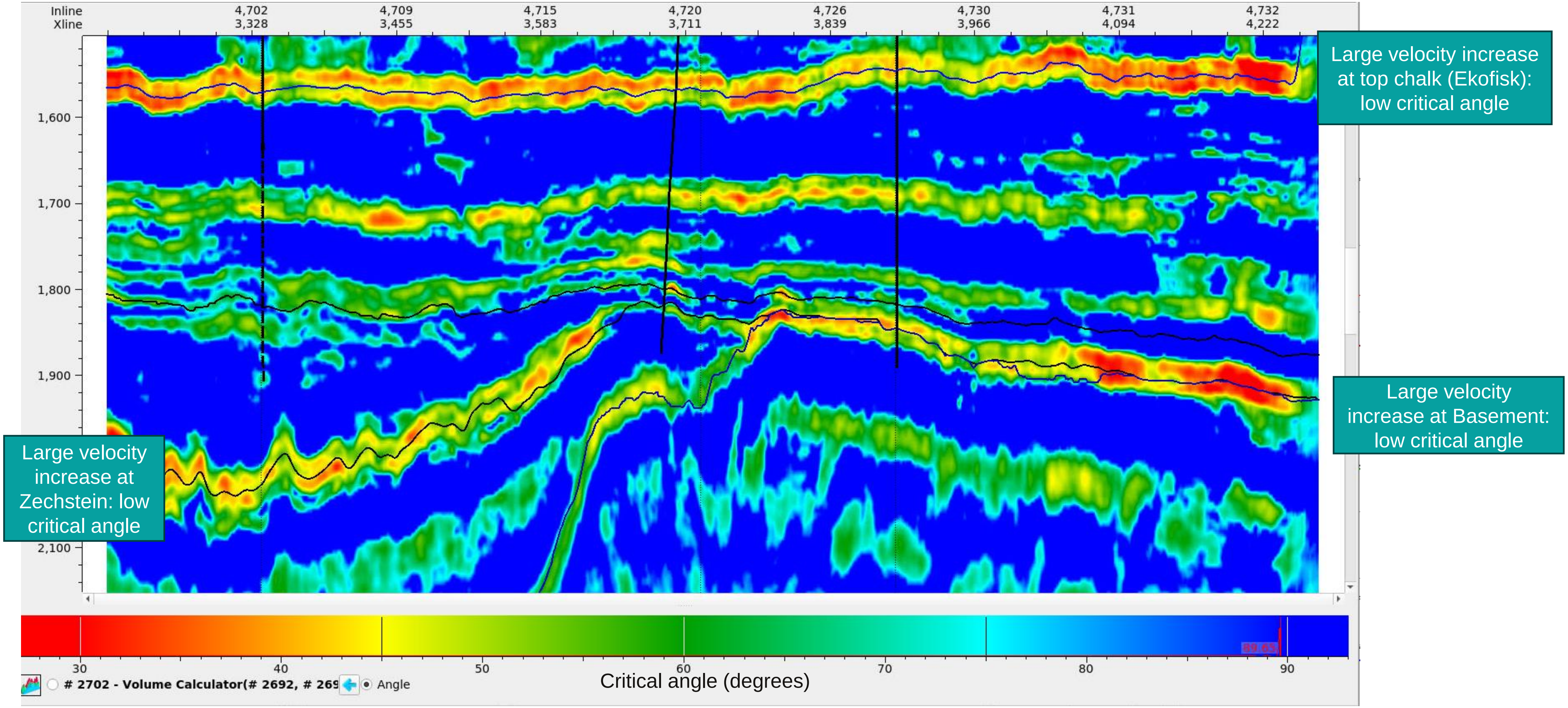


To make a rough estimate of critical angle in a volume, we need Vp in the volume. The seismic interval velocities are not suited to this purpose (why not?), but we can use the relative inversion output.

1) Open one of the relative PCube+ runs (Edit Copy) and, in the output tab, ensure that Vp is ticked on. Run the inversion.
2) Apply a bulk shift of -20 msec to the inversion output Vp.
3) Apply a bulk shift of +20 msec to the inversion output Vp.
4) Use the volume calculator with the volumes from steps 2) & 3) to calculate a critical angle volume.



The shifts of ±20 msec are chosen to give a separation of roughly the wavelet length. If the resolution is thought to be better than that, a smaller shift could be applied.



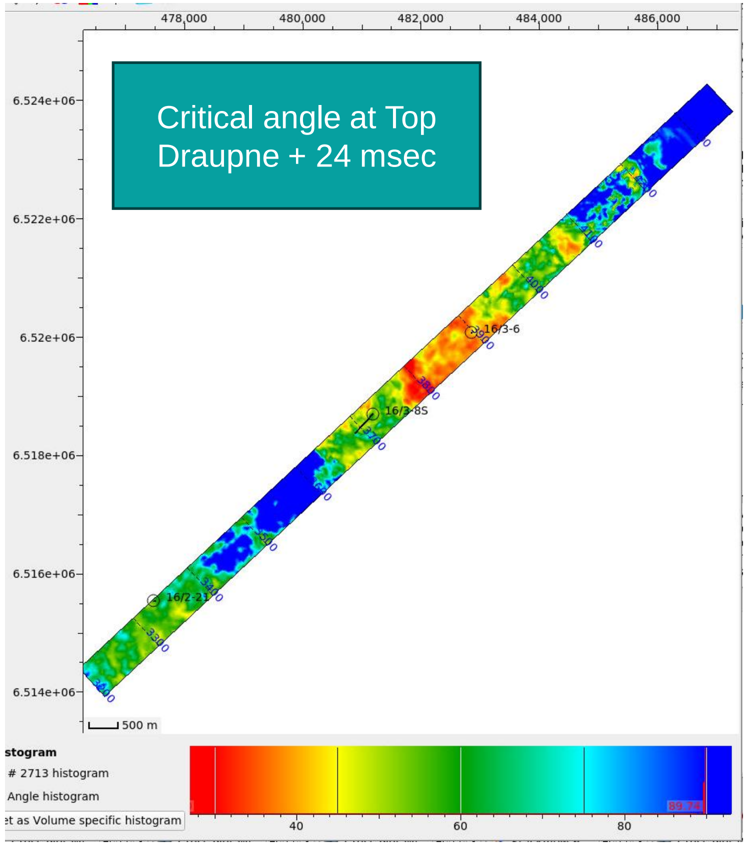
These estimates depend on the inversion quality. How good are they at the wells?
Relative PCube+ is adequate since the critical angle depends mainly on the relative local contrast in Vp.

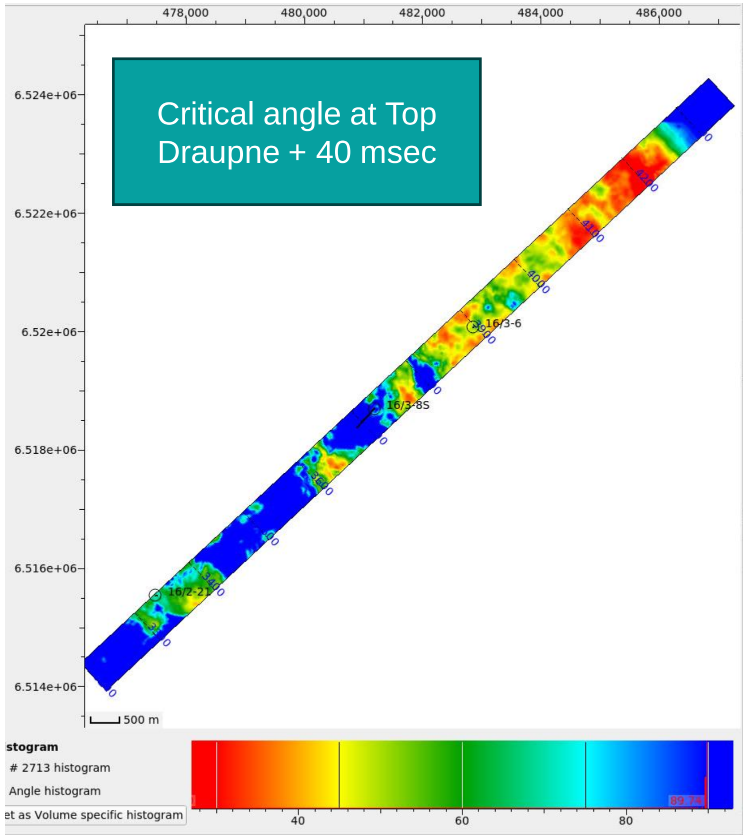
SHARP REFLECTIONS

The critical angle volume may be used as a QC and should be compared with the gathers, particularly with an angle overlay.

- Why might the angle overlay have inconsistent angles with the critical angle volume?
- How could you use it as a mute on offset gathers?
- Why is the critical angle important for this dataset?

Flatten the critical angle volume on the Top Draupne and display it in a map view.



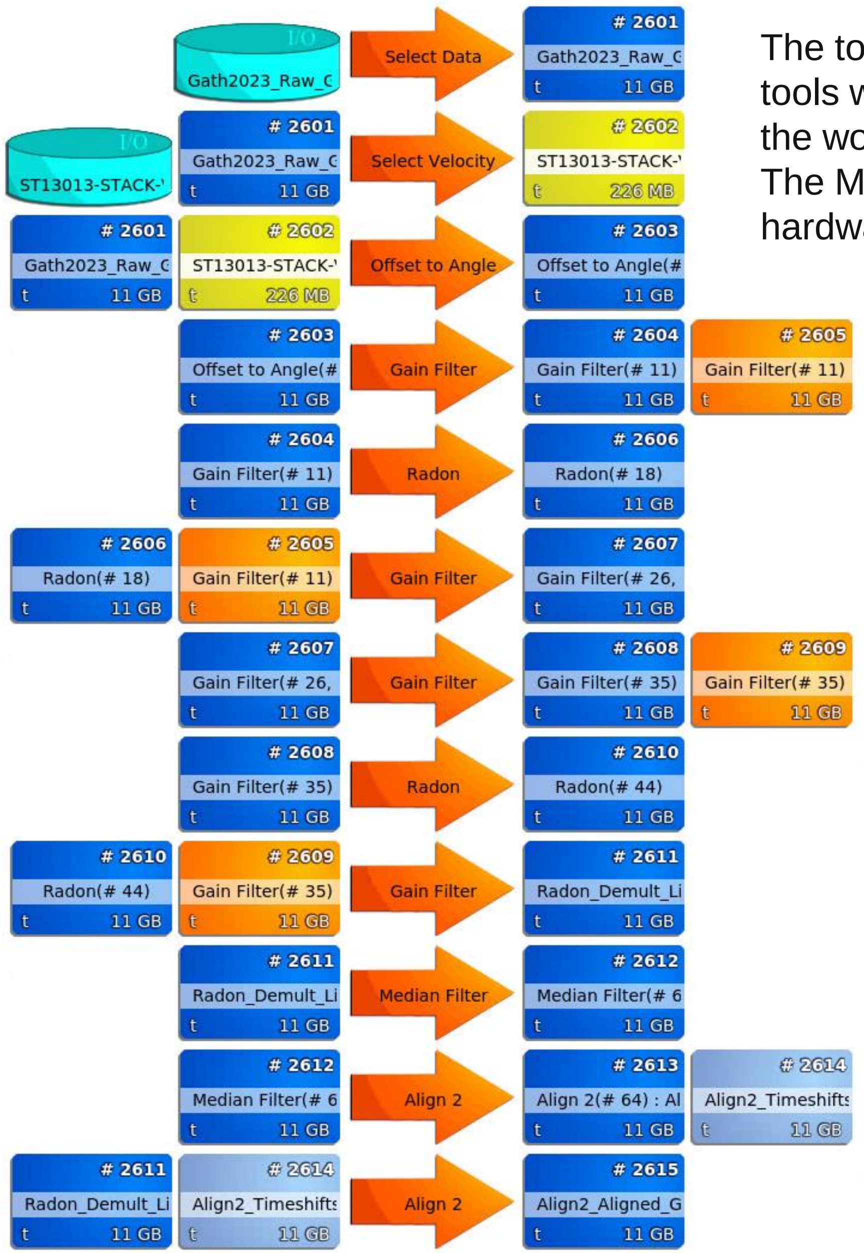


Where is post-critical energy from below the target going to interfere with pre-critical energy in the target?

What does this mean for AVO scaling?

What does it mean for comparison of seismic data with synthetics, and well-ties?

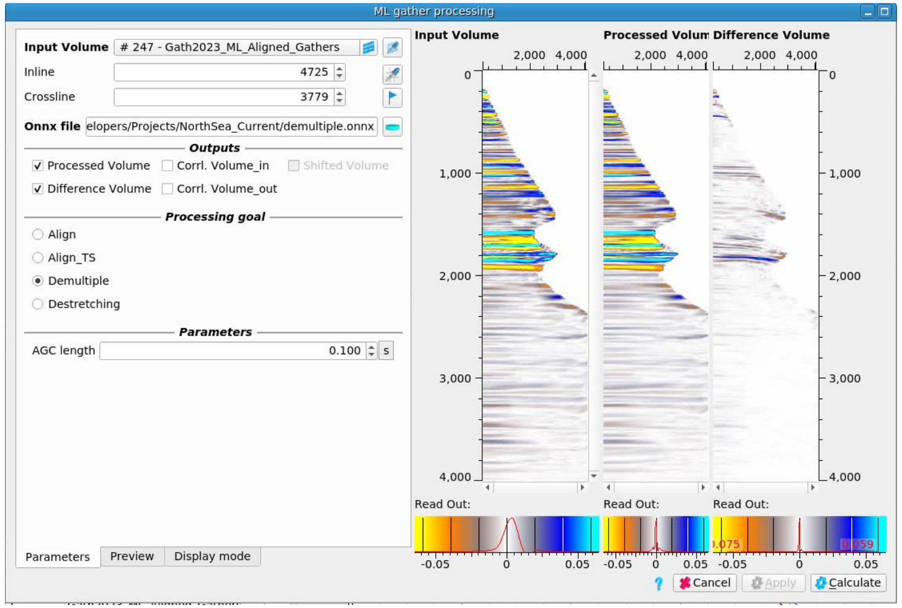
The total classical workflow is replaced by 2 tools with almost no parameters. However, the workflow took about 25 minutes to run. The ML tools took 2 hours each on the same hardware.

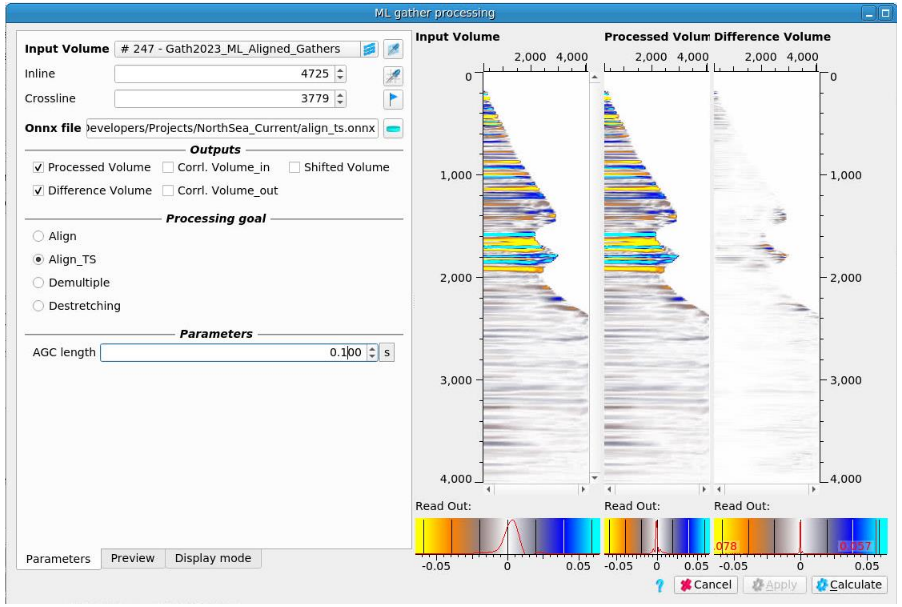


Parabolic Radon

Linear Radon

Gather alignment





SHARP REFLECTIONS

Challenge!

The classical workflow, Gath2023_ConditioningWorkflow, was made for a comparison with the ML tools. The gathers are not ready for QI analysis.

Obvious missing steps include

- More denoise
- Making the wavelet consistent across offsets/angles
- AVA scaling

There may be others …

What would you do to make the data fit for QI?

- Tweak parameters in the workflow
- Add more conditioning steps
- Throw out the workflow and start again

Load a small patch of the raw gathers around 16/3-6 (all inlines and crosslines 3800 to 4000) and tweak the existing workflow, add to it, or make your own. The aim is to use the QCs that we have already seen, plus any others of your choice, and end up with the best data for QI analysis. Pay particular attention to AVA scaling!

Appendix A: QC Workflow

This appendix explains how to run the QC workflow.

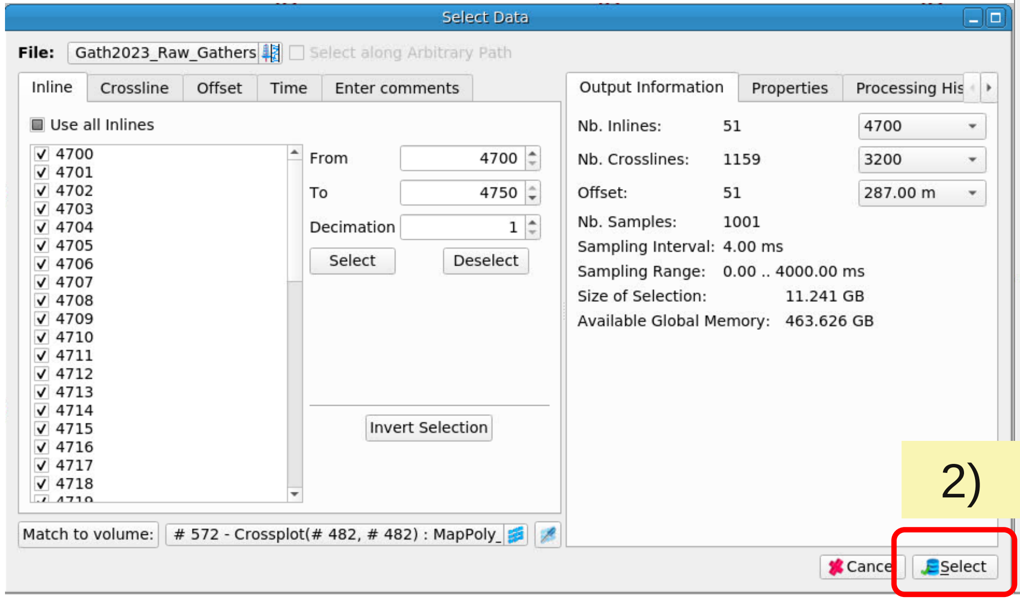
The input is offset gathers. It also requires a velocity field.
The output is
- Angle gathers for comparison with the well synthetics.
- Maps of the angle gathers at top Draupne for cross-plot amplitude analysis.
- Partial angle stacks for input into relative PCube+.

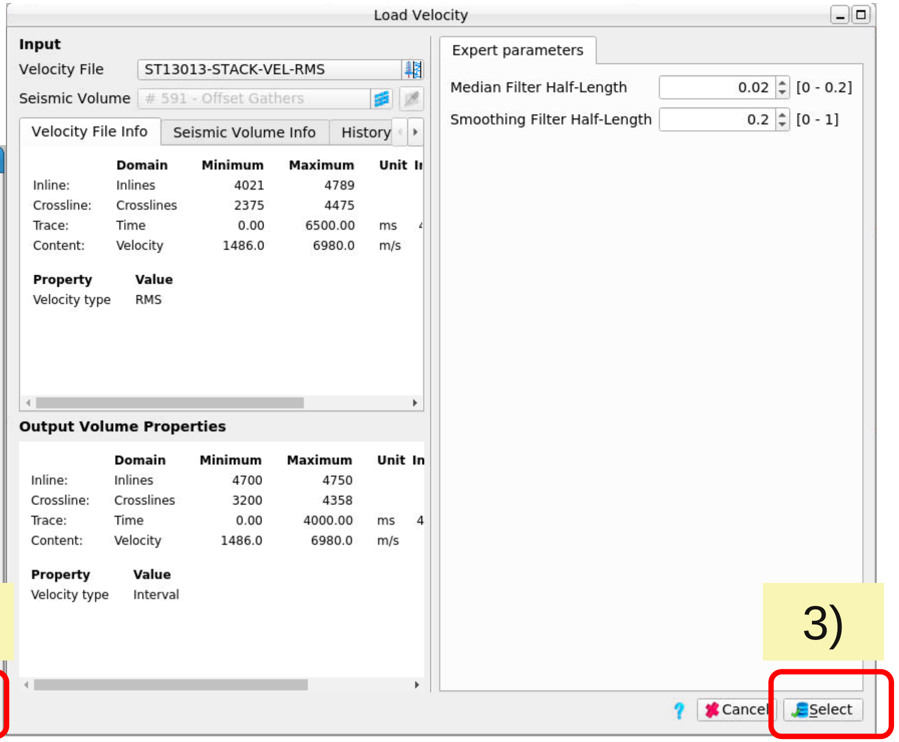
Once opened, this workflow should not be closed as it will be re-used through the exercise. The idea is simply to keep it open at the side of the screen and re-run it when you make a new conditioned volume of offset gathers.

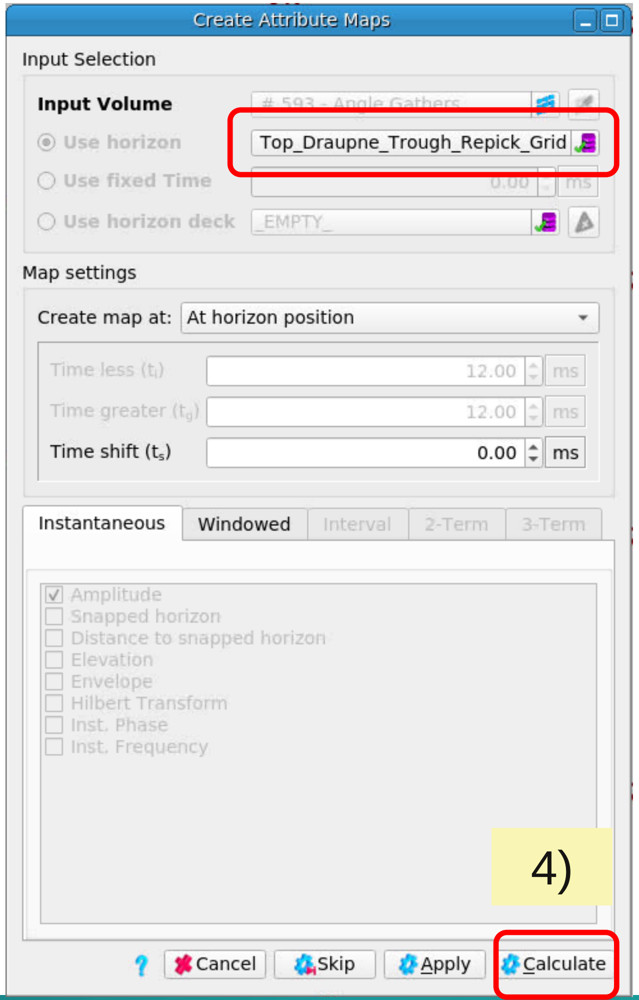
The first run of this workflow will have to load data from disc. After the first run, we will edit the workflow and make it run with data direct from the volume pool.

1) From the Workflow menu, select Gath2023_QC_Map_Workflow.
2) In the file selection box, accept all of the settings and just click Select.
3) Accept the default settings for the velocity input and just click Select.
4) In Create Attribute Maps, ensure that the Top Draupne surface is selected and click Calculate.

The workflow is now ready to run.

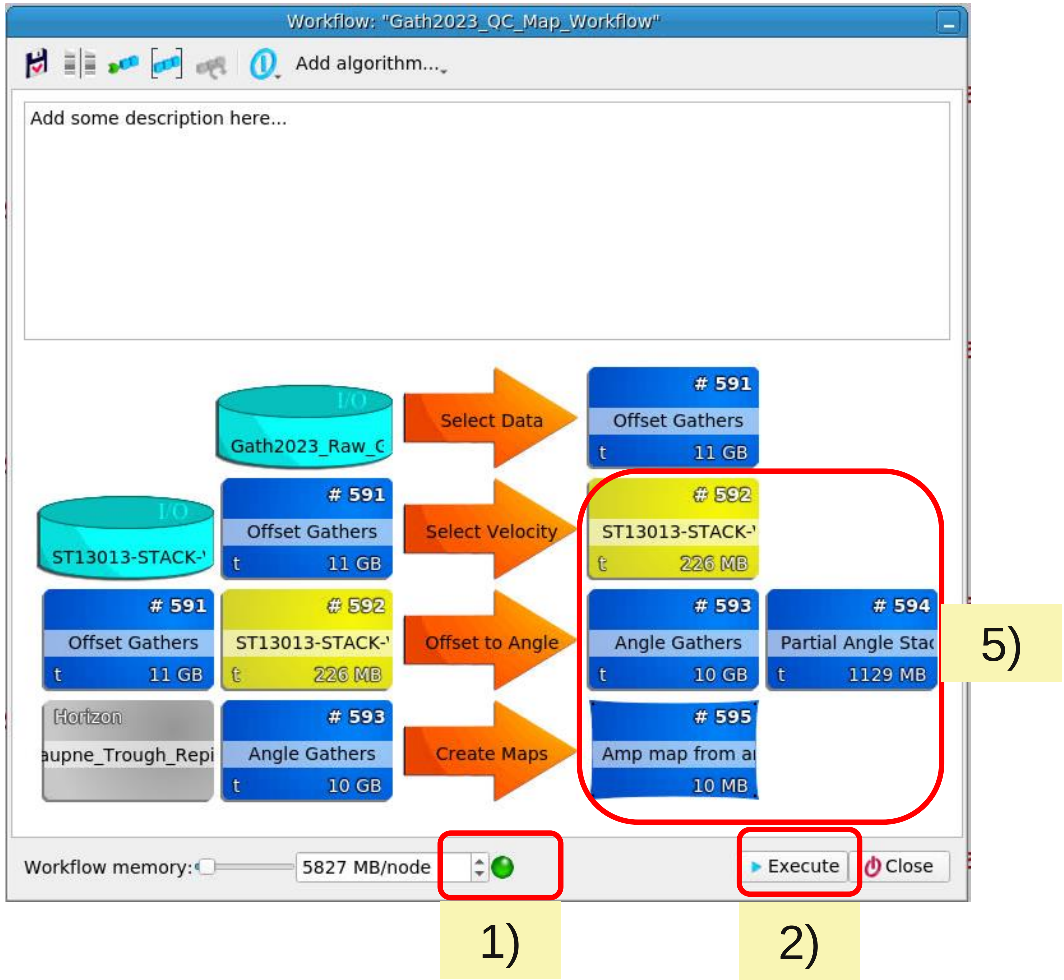






1) Ensure that the interactive LED is green.
2) Click the Execute button.
3) When it has finished, click the OK button on the pop-up window. Do not close the workflow!
4) It is recommended to insert a separator into the volume pool at this point.
5) One at a time, using LMB, drag the
   a) Velocities
   b) Angle gathers
   c) Partial angle stacks
   d) Angle map

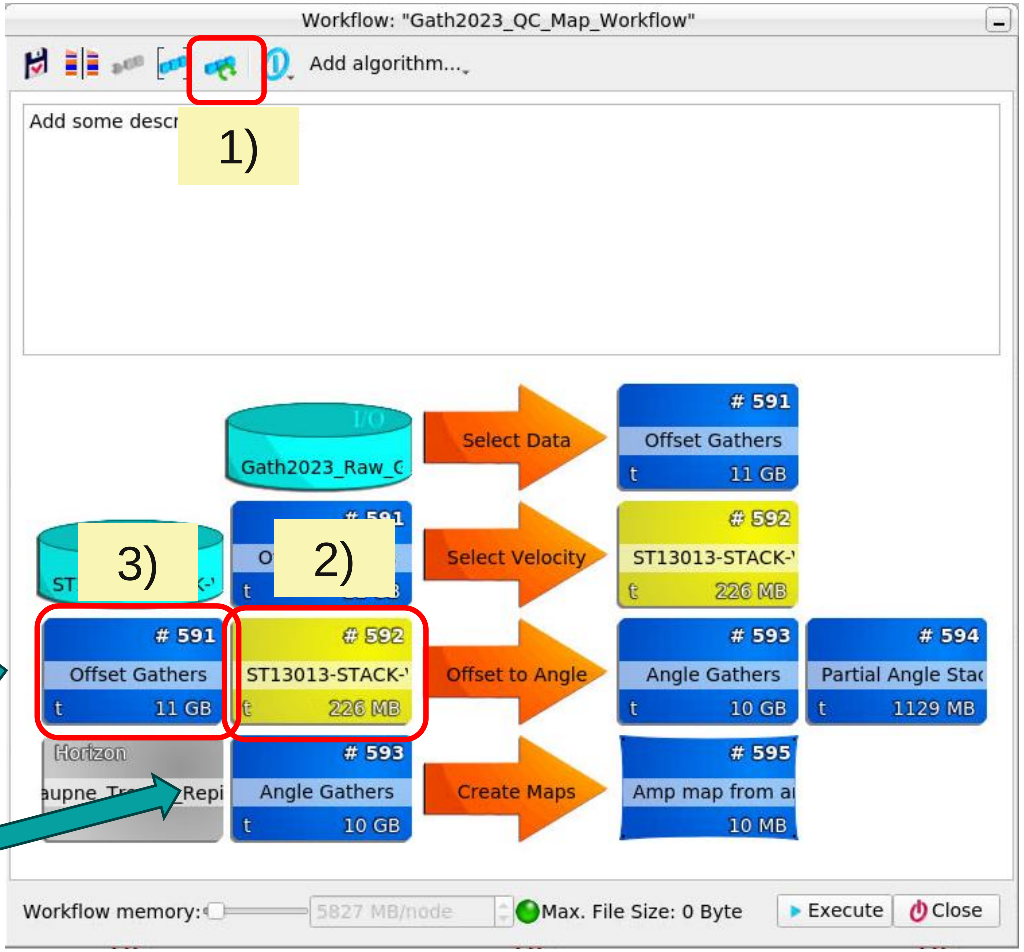
   from the workflow into the volume pool.

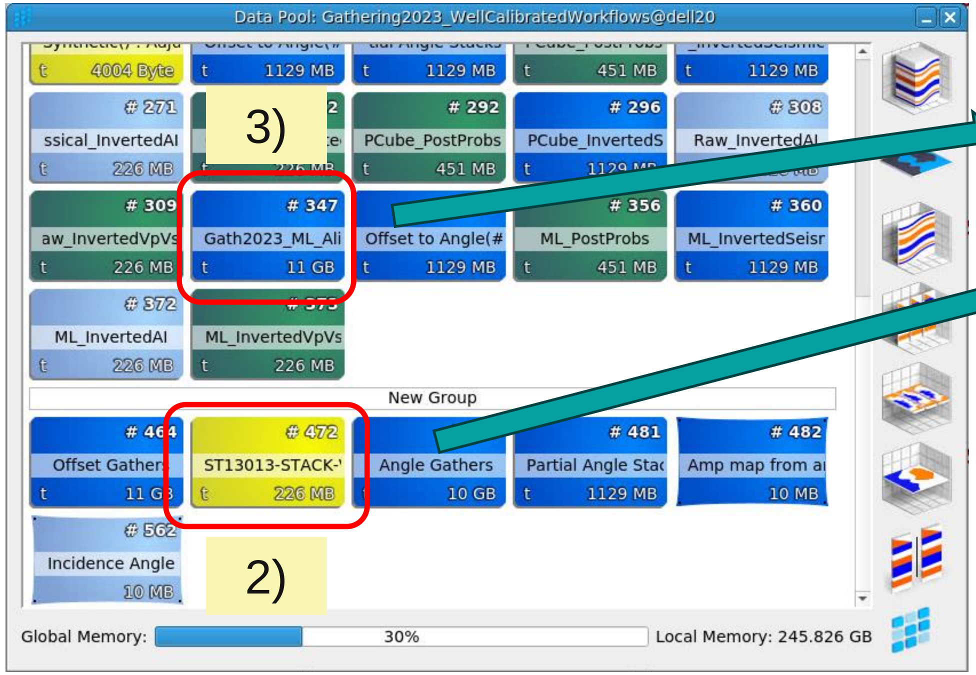


The first run is now complete. Keep the workflow window parked somewhere on your screen for later re-use.

The workflow must be edited to use data from the volume pool.

1) Click Discard volumes button.
2) LMB drag the velocity volume from the data pool onto the workflow velocity volume.
3) LMB drag the new set of offset gathers from the data pool onto the workflow gathers.

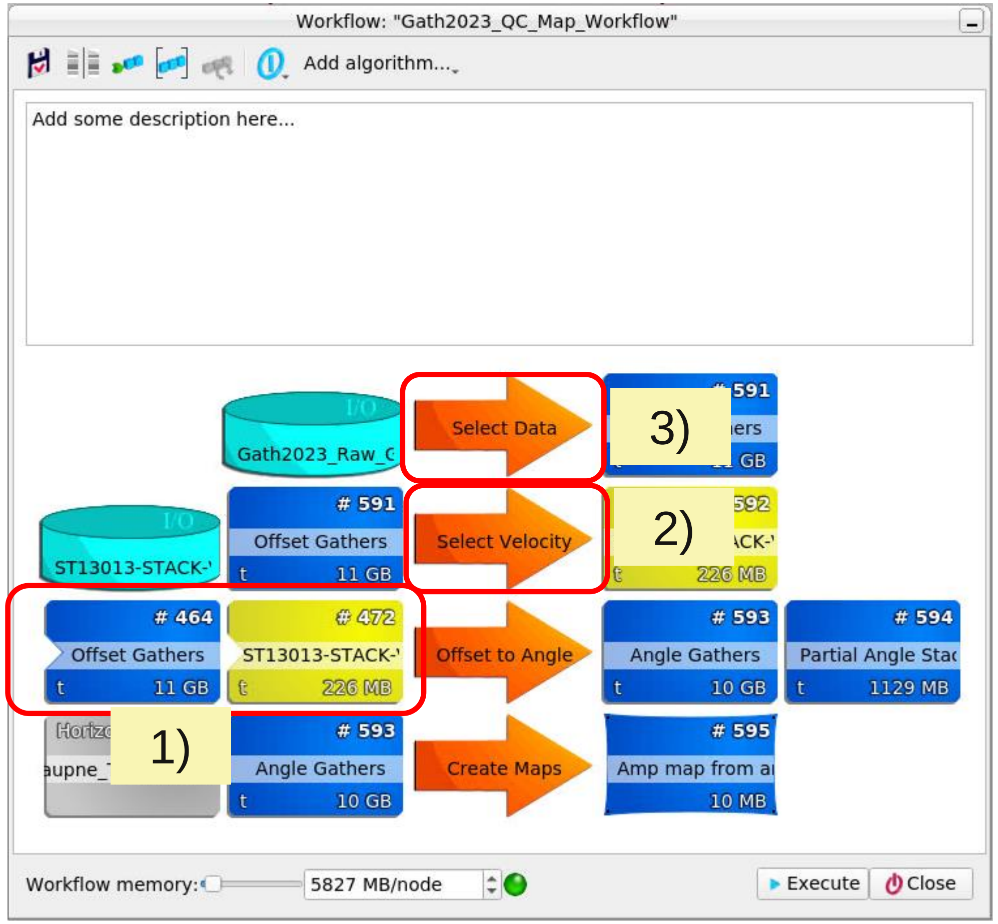


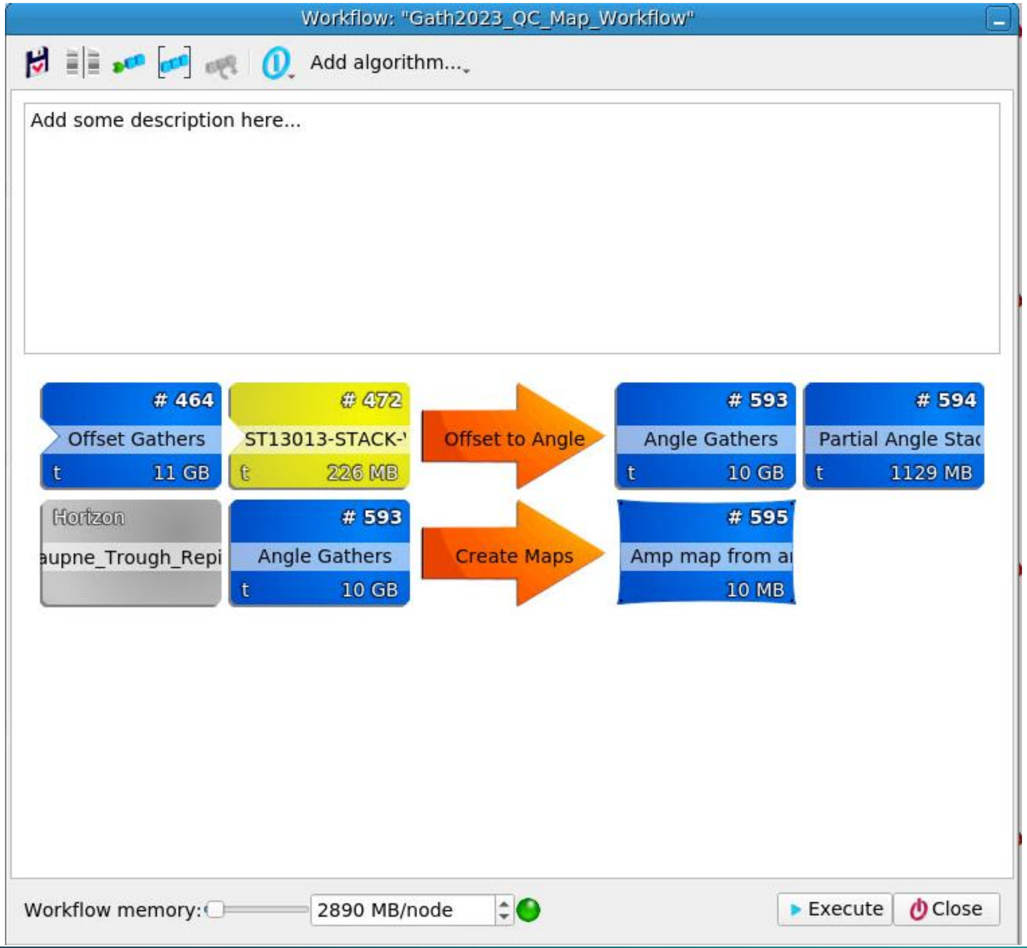


Your volume pool won't look exactly like this.

The first run is now complete. Keep the workflow window parked somewhere on your screen for later re-use.

1) The notch in the volumes shows that they come from the volume pool.
2) RMB click on the Select Velocity arrow and choose Remove this algorithm.
3) RMB click on the Select Data arrow and choose Remove this algorithm.





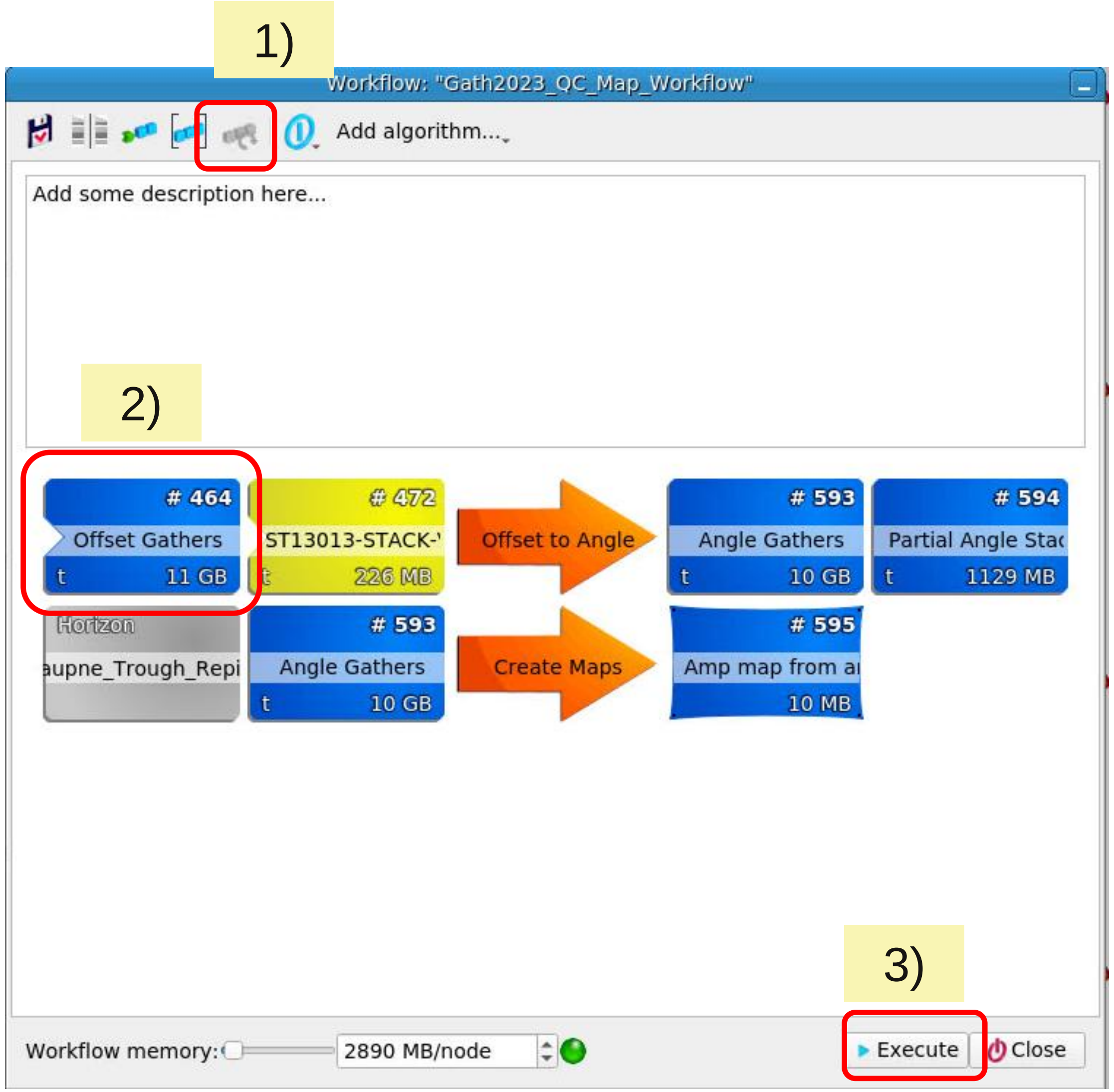
The final workflow should look like this. It can now be executed. All three output volumes should be dragged back to the volume pool after running it.

Keep the workflow window open.

In order to re-run the QC workflow

1) Click on the Discard volumes icon
2) LMB drag your desired offset gathers from the volume pool onto the gather input.
3) Click Execute.
4) Drag the output volumes back to the volume pool.

It is unnecessary to drag the velocities in again, as the ones that are already there have the correct geometry.



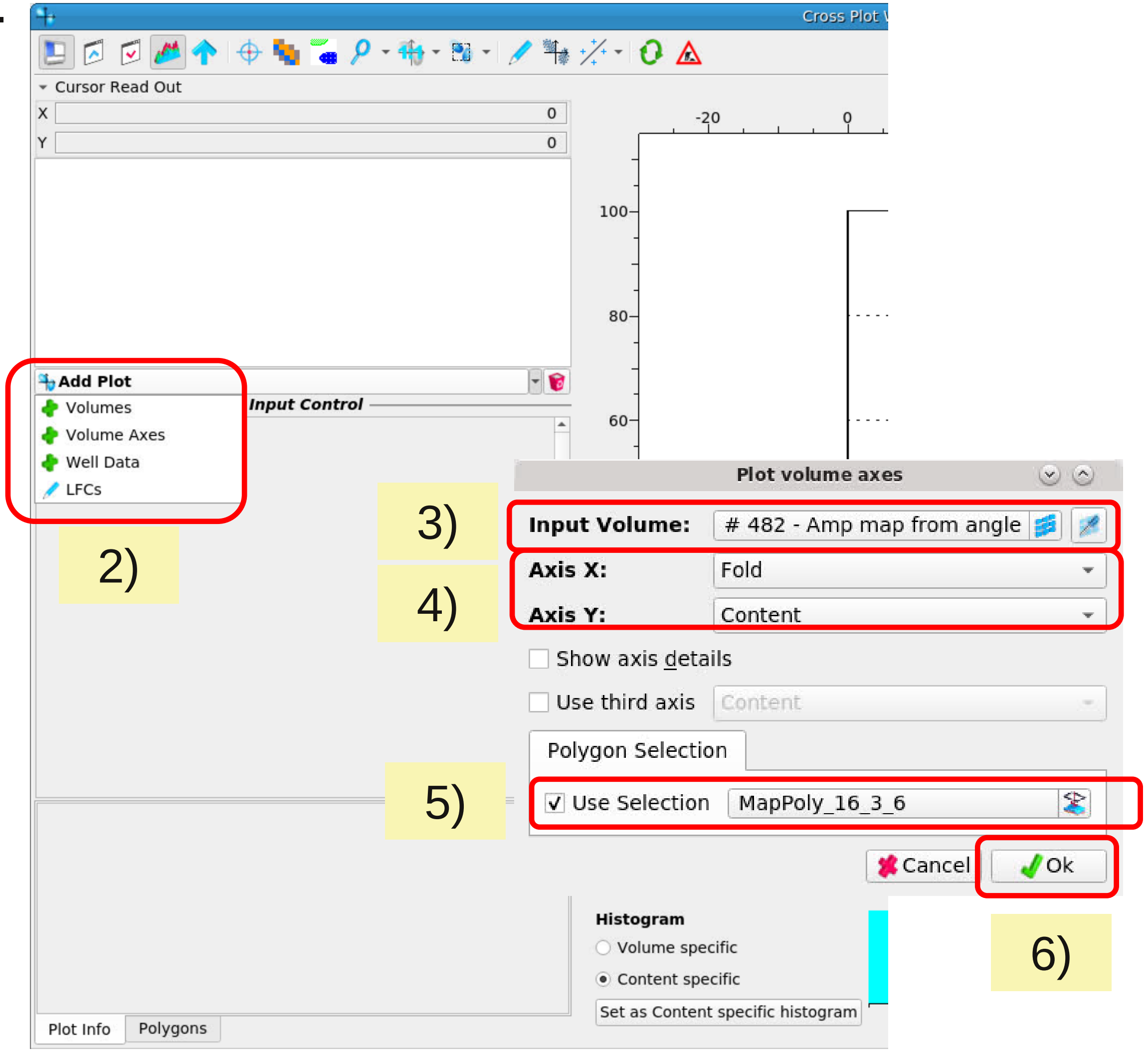
Appendix B: Amplitude v Angle Crossplots

This appendix describes how to make the amplitude v angle cross-plots around each well.
The idea is to make a separate cross-plot window for each well location. The appendix illustrates this using 16/3-6. The same steps should be followed using polygons around 16/3-8S and 16/2-21 (in separate cross-plot windows).

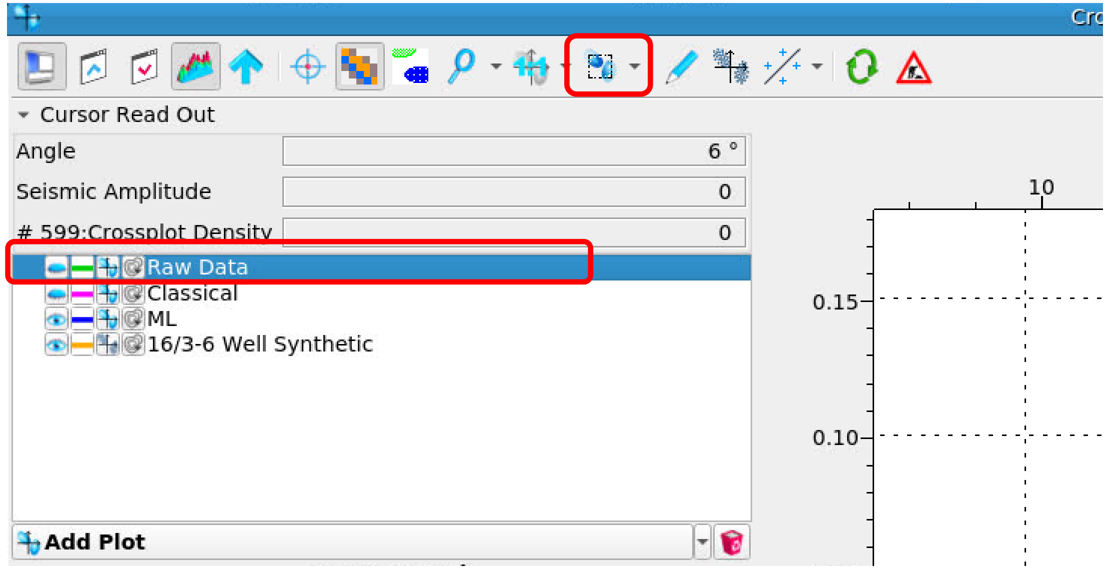
This appendix assumes that you already have the amplitude maps (output from the QC workflow) and have already made a small map polygon around the well (or else use the polygon supplied in the project).

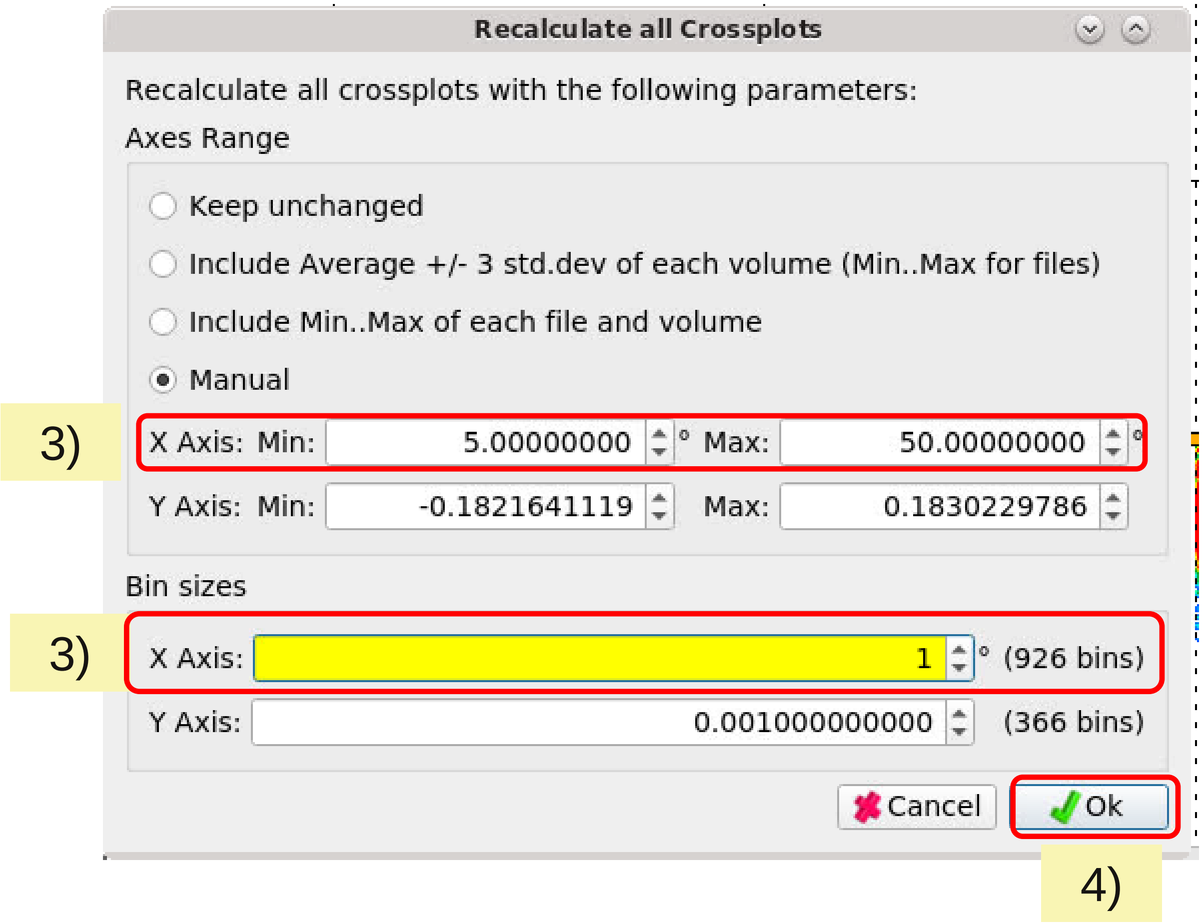
In the window, we display amplitude v angle at the Top Draupne surface for each raw & conditioned volume. The graph is also displayed for the well synthetic.

1) Open the Cross Plot tool from the Interpretation-Processing menu.
2) Click on the Add Plot drop-down and select Volume Axes.
3) Select one of the amplitude maps (output from the QC workflow) as Input Volume.
4) Choose Fold as X axis and Content as Y axis.
5) Click on Use Selection and select a map polygon around 16/3-6.
6) Click Ok.
7) To add another map to the same plot, repeat steps 2) to 7) selecting the desired map in step 3).

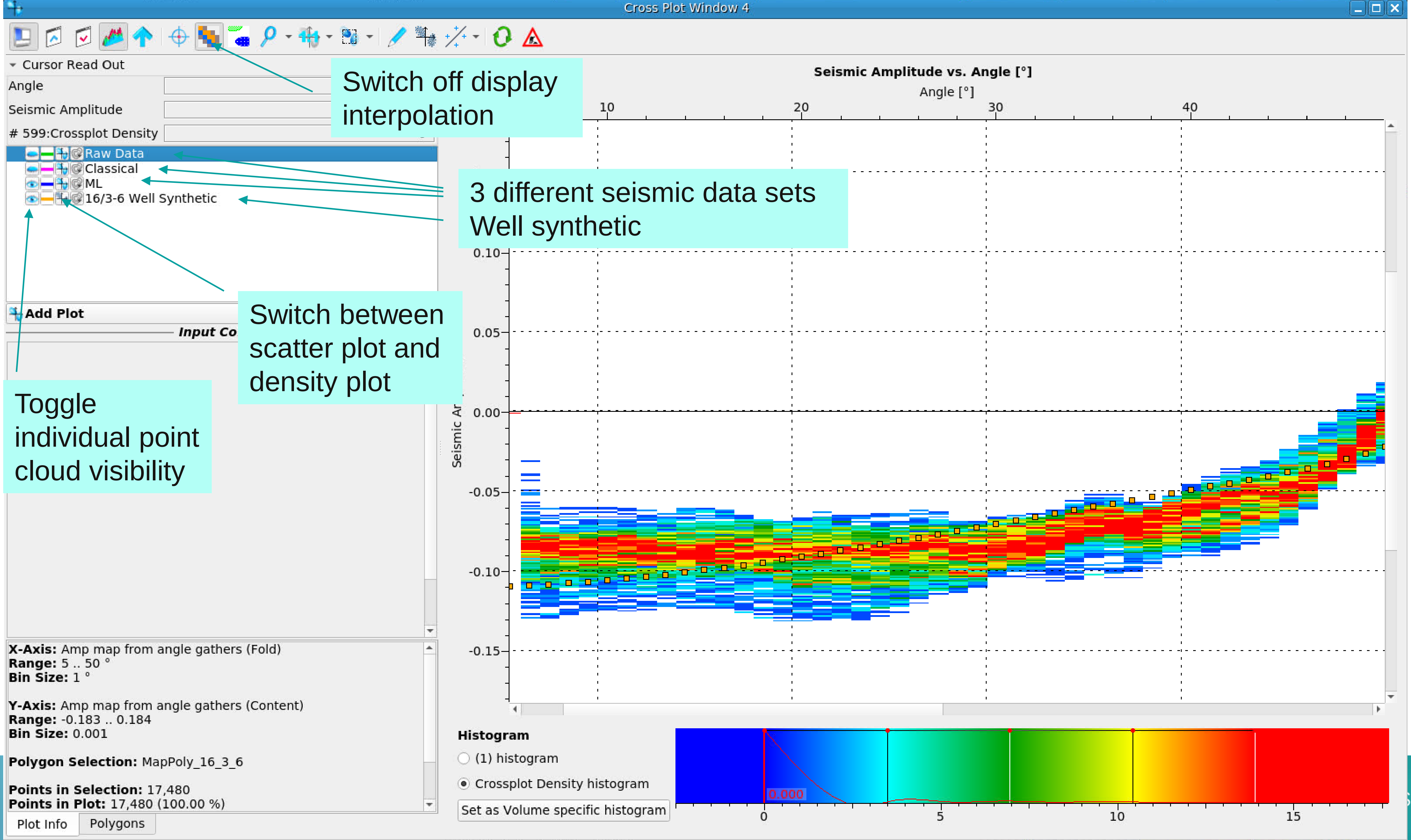


1) The individual plots may be renamed by RMB on the name in the list and select Rename from the menu.
2) The binning of the plots is too fine in the X axis. Click on the arrow to the right of the Recalculate plots icon and select Recalculate all plots with custom settings.
3) Set the X axis min to 5, max to 50, and bin size to 1.
4) Click OK.
5) After rebinning, it will be necessary to adjust the colour bar.





   SHARP REFLECTIONS

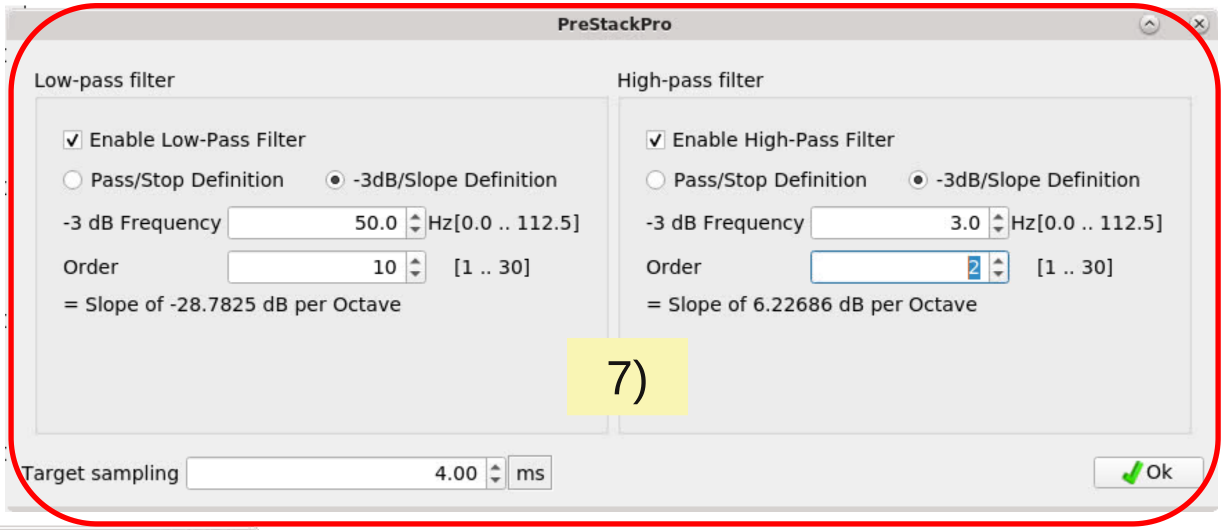


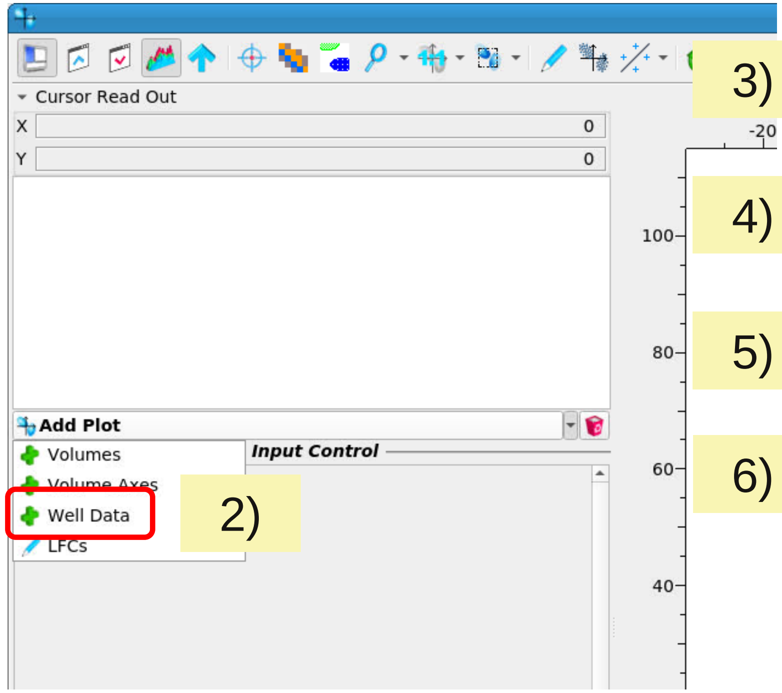
Cross Plot Window 4
Cursor Read Out
Angle
Seismic Amplitude
599:Crossplot Density
Raw Data
Classical
ML
16/3-6 Well Synthetic
Add Plot
Input Co
Switch off display interpolation
3 different seismic data sets
Well synthetic
Switch between scatter plot and density plot
Toggle individual point cloud visibility
Seismic Amplitude vs. Angle [°]
Angle [°]
10
20
30
40
0.10
0.05
0.00
-0.05
-0.10
-0.15
Seismic Ar
X-Axis: Amp map from angle gathers (Fold)
Range: 5 .. 50 °
Bin Size: 1 °
Y-Axis: Amp map from angle gathers (Content)
Range: -0.183 .. 0.184
Bin Size: 0.001
Polygon Selection: MapPoly_16_3_6
Points in Selection: 17,480
Points in Plot: 17,480 (100.00 %)
Plot Info
Polygons
Histogram
(1) histogram
Crossplot Density histogram
Set as Volume specific histogram
0.000
0
5
10
15

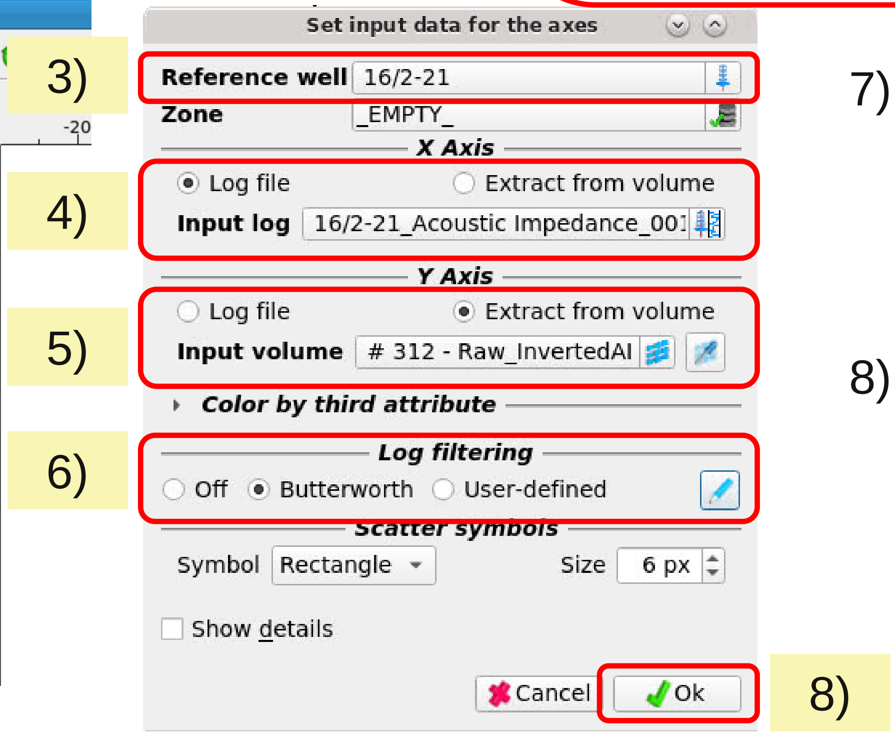
Appendix C: Cross-plotting well logs against volumes

This appendix describes how to cross-plot volume data (eg inversion results) against filtered well logs.

1) Open the cross-plotter.
2) From the Add Plot drop down list, select Well Data.
3) Choose the desired well.
4) On the X axis, choose Log file and the acoustic impedance log.
5) On the Y axis, choose Extract from volume and the inverted AI volume.
6) Select Butterworth in the Log filtering options.



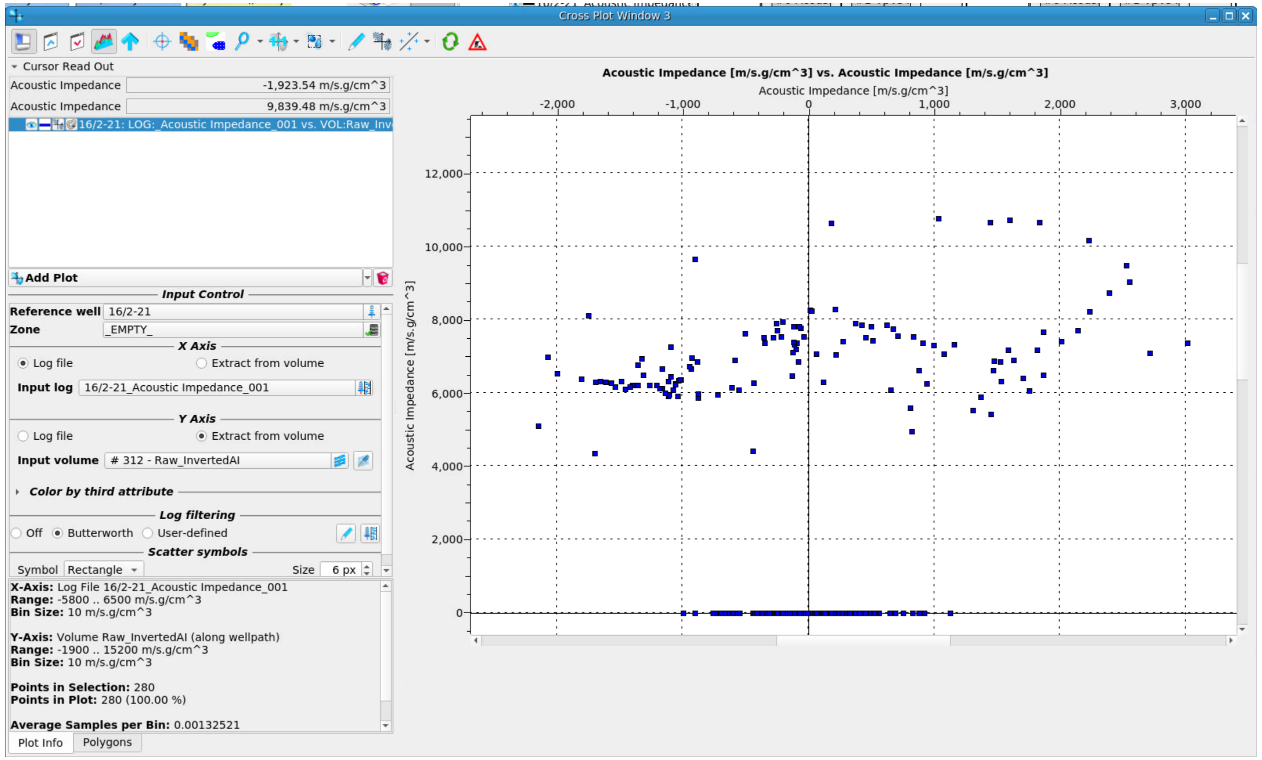


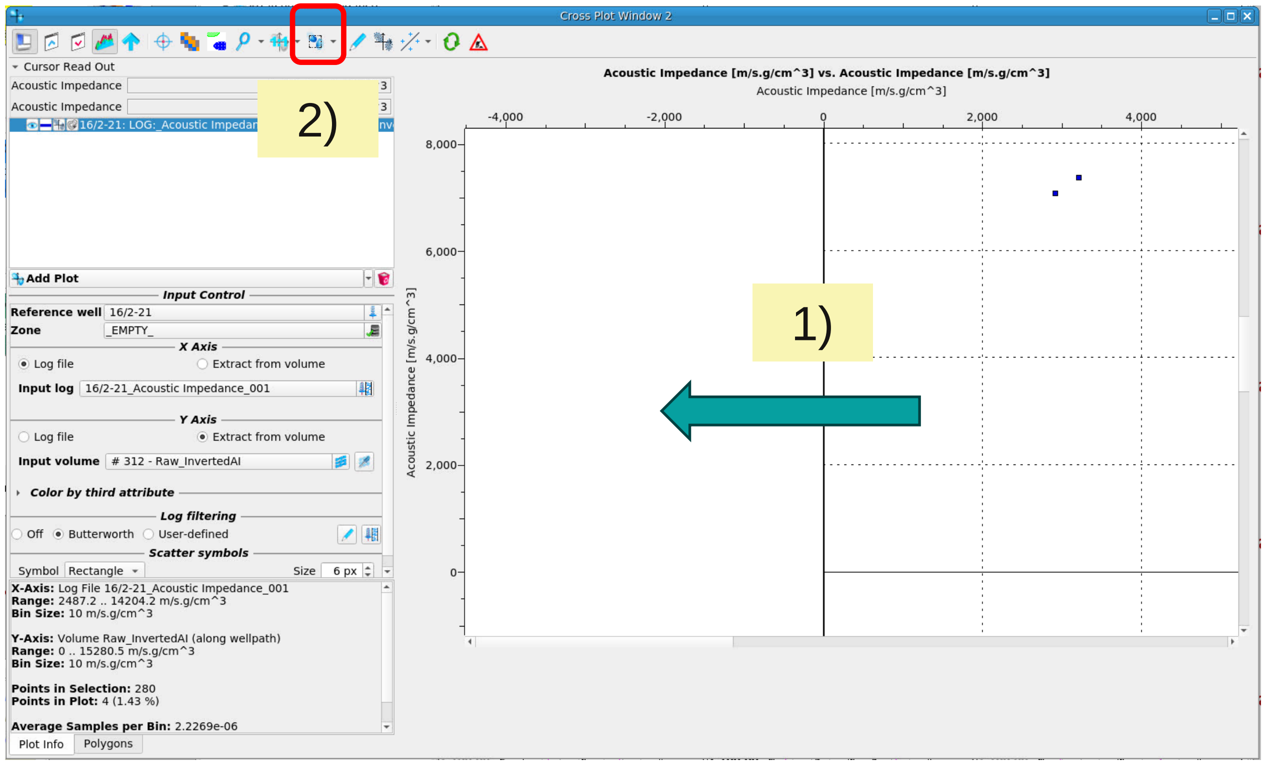


7) Choose the desired filter parameters and click Ok in the filter parameter window. The target sampling should be the same as the seismic sample interval.
8) Click Ok in the input selection window.

The filtered well log has zero mean (as the high pass filter was applied). We have to adjust the axes accordingly.

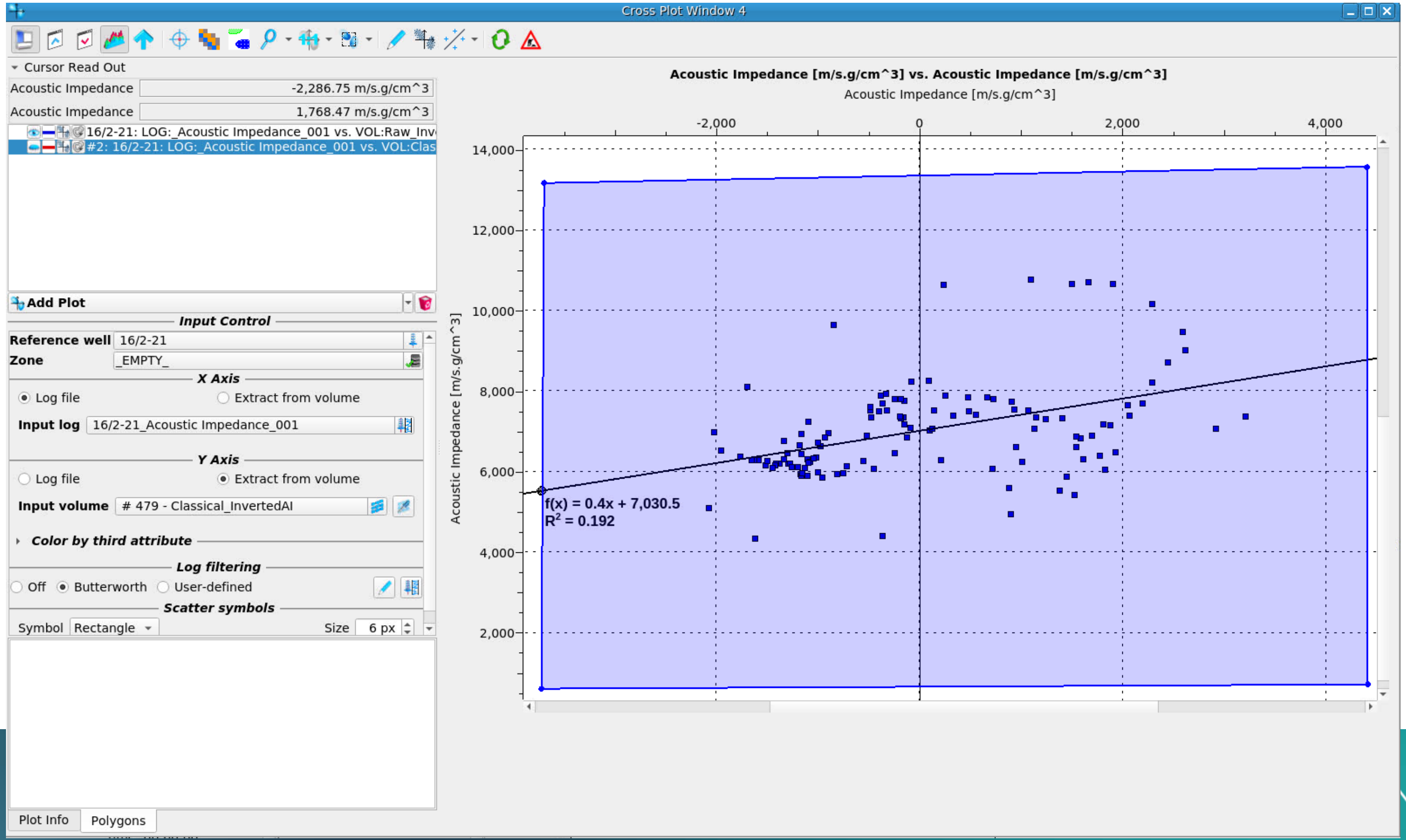
1) Using LMB in the white space of the cross-plot, drag the view until the X axis is centred on zero.
2) Click on the Recalculate plots icon.
3) You may have to adjust the zoom (roll the mouse wheel and reclick the Recalculate plots button) to ensure that all data points are displayed.





We add a regression line to show the relationship between the filtered log and the inversion result.

1) Use RMB in the white space of the cross-plot and select Create a regression polygon.
2) Ensure that only the point cloud of interest is visible.
3) Move the polygon corners to capture all of the live data points (not the ones along the zero axis at the bottom).
4) RMB inside the polygon and choose Calculate Polynomial Fit (1st order).



The

GATHERing

Knowledge Exchange

SHARP REFLECTIONS