

Acoustic Anisotropy Processing in Techlog

This user guide provides a general overview of the steps to perform acoustic anisotropy processing in Techlog. For each step, advance users should investigate in greater detail the parameter settings that are available.

A. Data Preparation

1. Import the sonic logging dataset into Techlog.

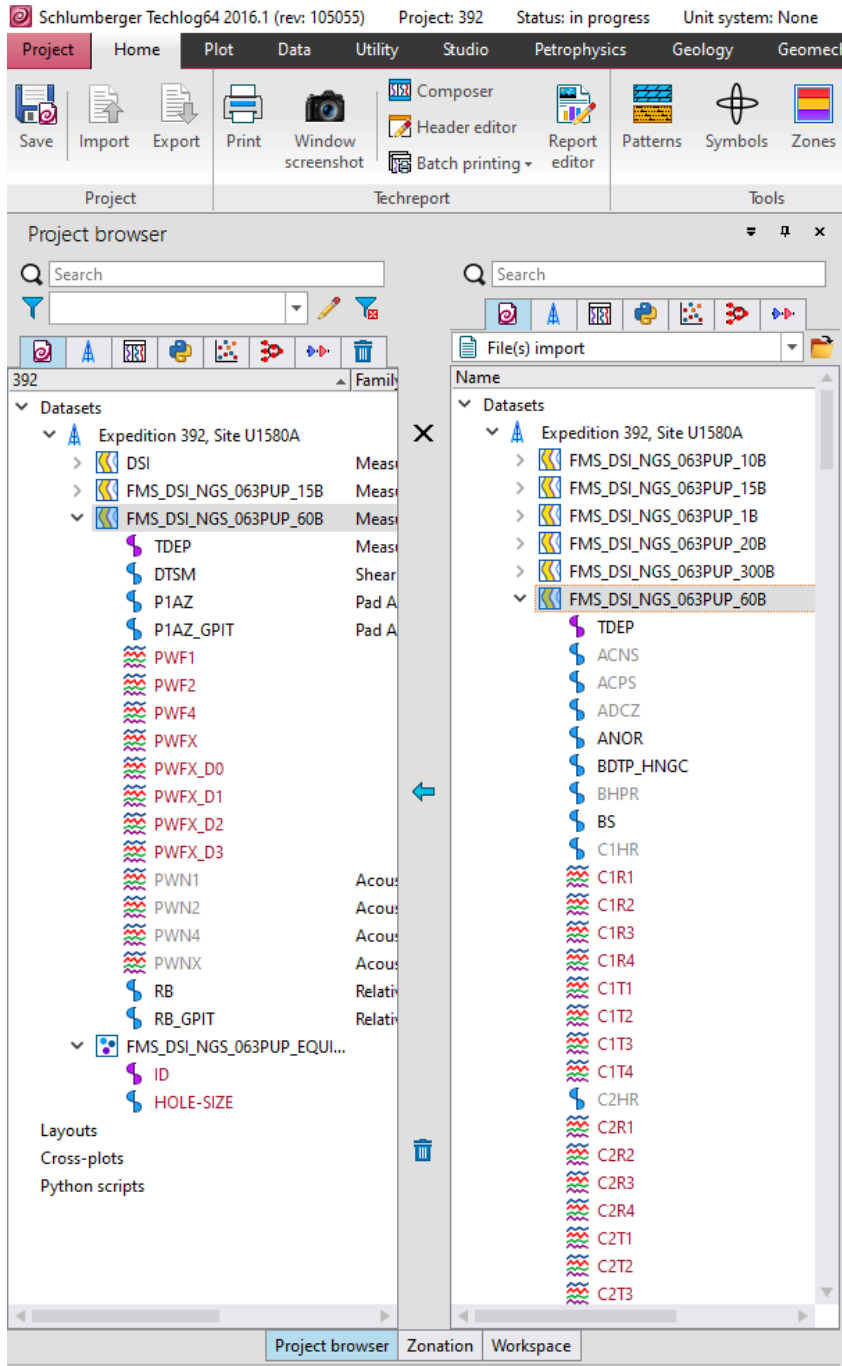


Figure A1: Data import set up.

2. Data Preparation

- i. In the Geophysics Toolbar, click on the Data Preparation button.

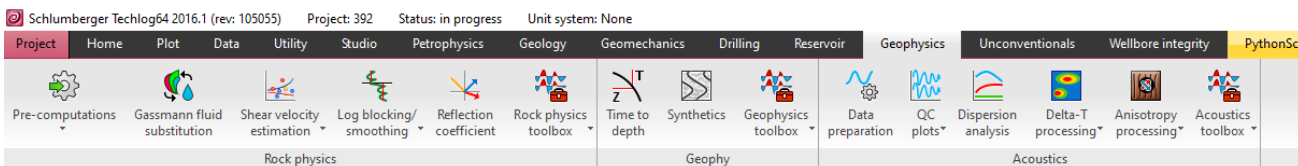


Figure A2: Geophysics toolbar

ii. A new window will appear, showing the Python script for Acoustic Pre-processing

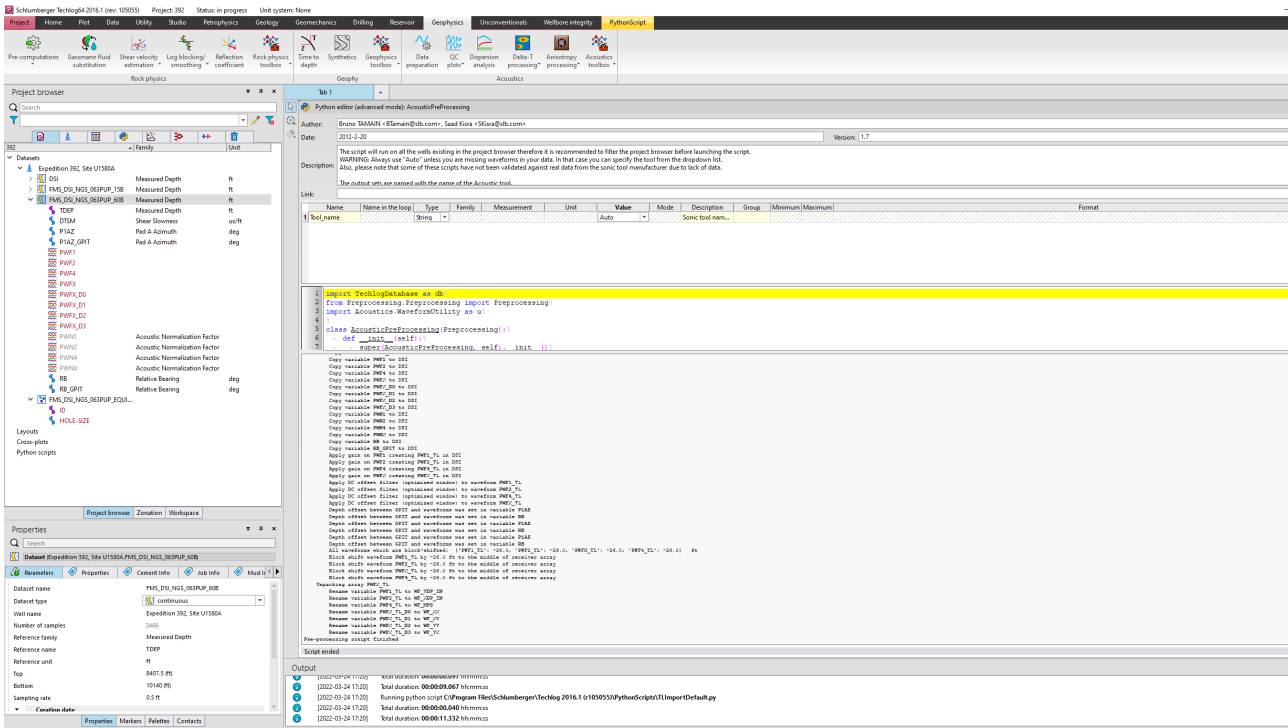


Figure A3: Data preparation window for acoustic pre-processing.

iii. Click-and-drag dataset into the lower empty middle part of the window, just above the panel containing the Python script. The cursor will change to an icon with a plus sign.

iv. Click on the PythonScript Toolbar and click on the blue Launch (play) button. This will create a new DSI dataset (Project browser panel to the left, under the well name imported)

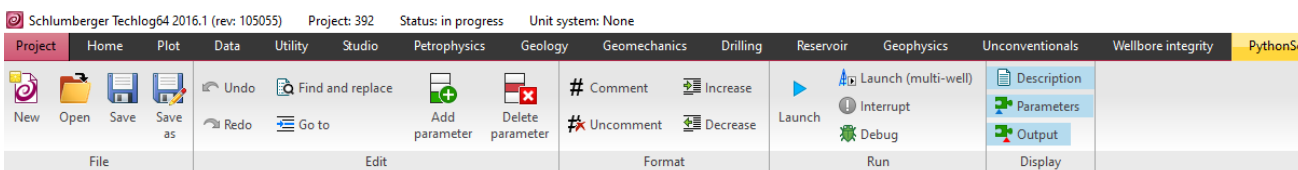


Figure A4: PythonScript toolbar. The Launch (play) button runs the active script.

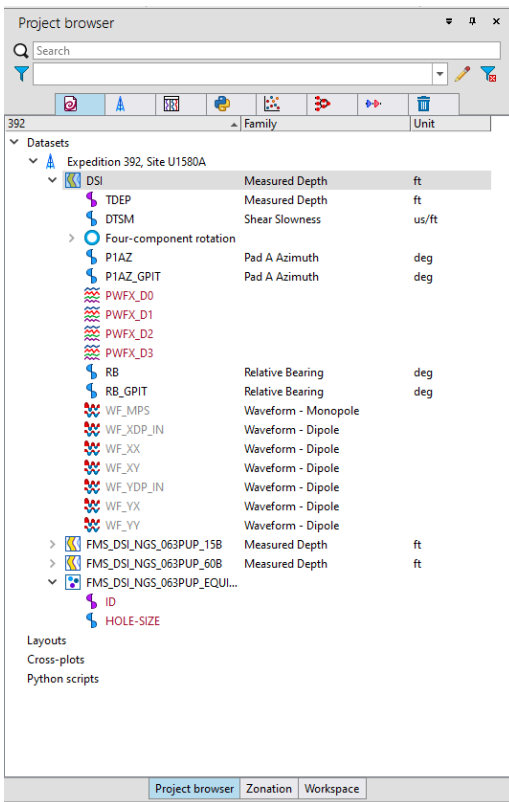


Figure A5: After a successful Data Preparation, a new dataset (DSI) is created in the Project browser.

B. Four-component rotation

(This is for a stand-alone four-component rotation. It can be skipped if the full Anisotropy Wizard will be run as it is also part of that workflow.)

- i. In the Geophysics Toolbar, expand the options for Anisotropy processing (click the inverted triangle on the lower right corner of the button)

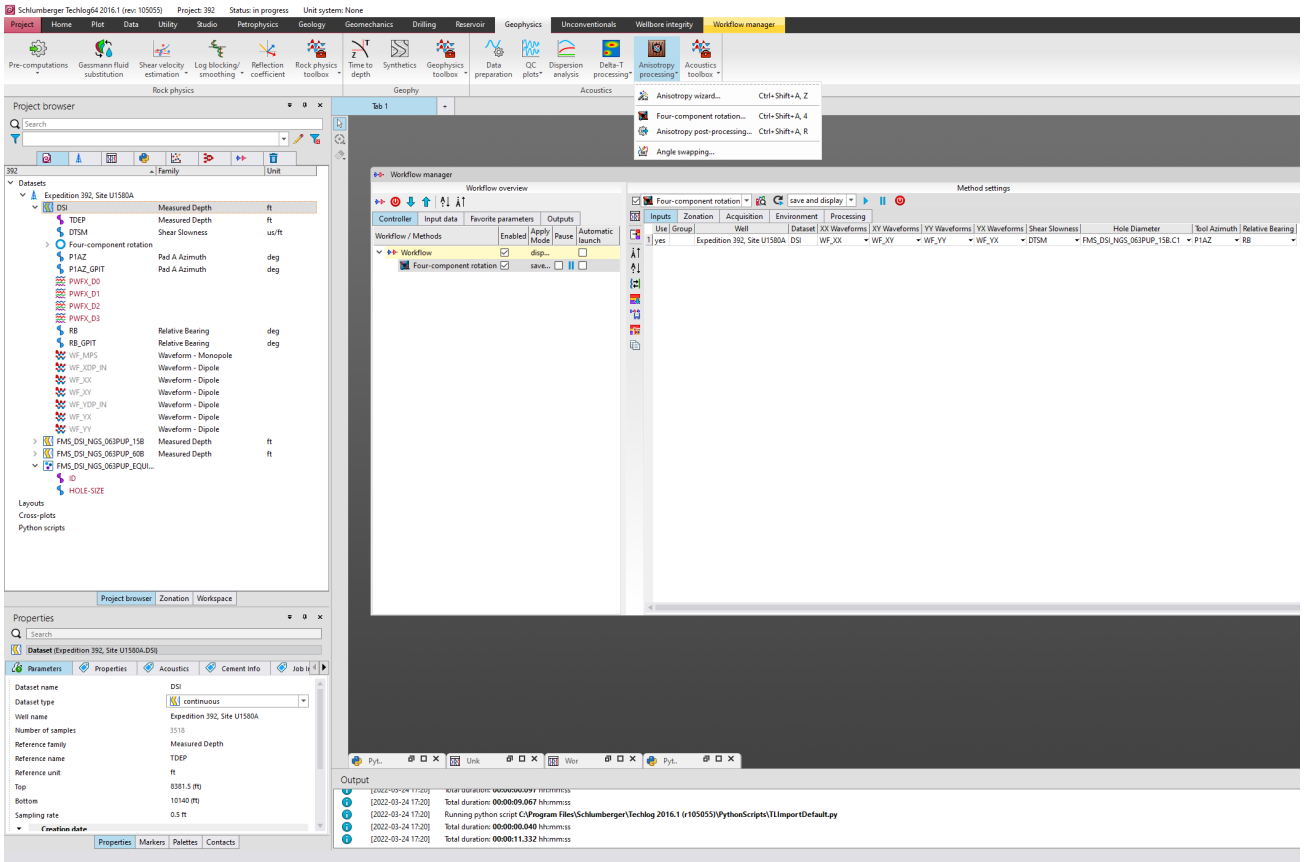


Figure B1: Window showing the Four-component rotation button in the Geophysics toolbar and the associated Workflow manager.

- ii. Select Four-component rotation. A new Workflow manager window will appear.
- iii. Click on the newly created DSI dataset and drag it into the Method settings panel to the right of the workflow window.
- iv. In the Method settings toolbar, replace “save” to “save and display” from the dropdown list.
- v. Click on the blue Play button. A Log Plot window will appear, displaying all the relevant curves resulting from the process.

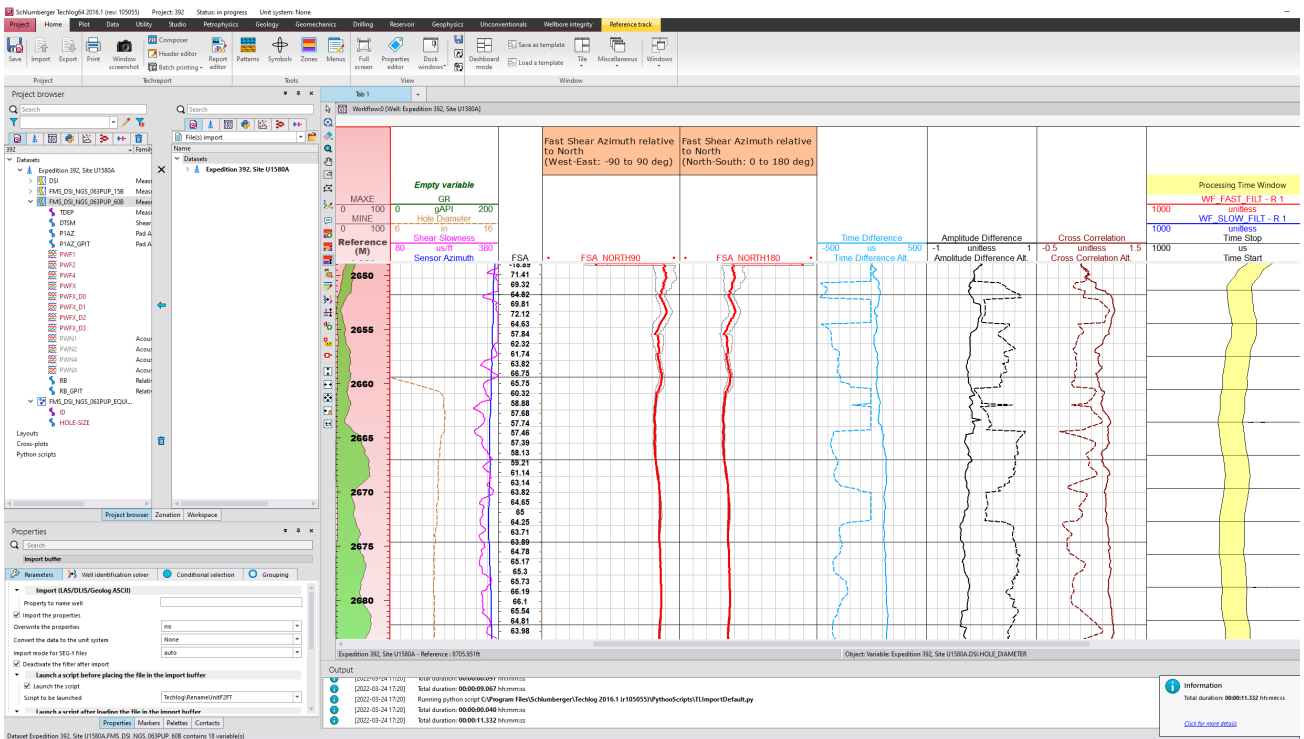


Figure B2: Resulting log plot from the four-component rotation processing.

C. Anisotropy Wizard

In the Geophysics tab, expand the Anisotropy processing button and select the Anisotropy wizard.

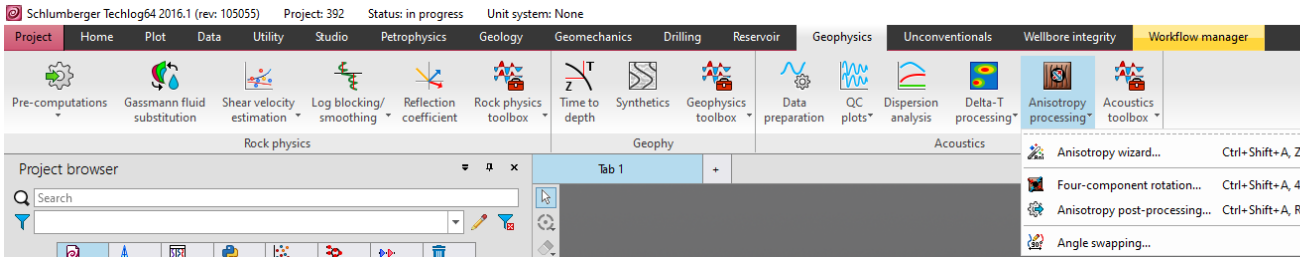


Figure C1: Techlog Geophysics toolbar tab showing the drop-down list of Anisotropy processing.

Step1: Input Data

A couple of pop-out windows will appear where you will need to select the well and dataset to use; select from the respective drop-down menu.

A log display will be automatically generated to show the input channels/parameters, especially the cross-dipole waveforms. Here, you can define the depth range that you would like to process. Save the plot and proceed to the next step.

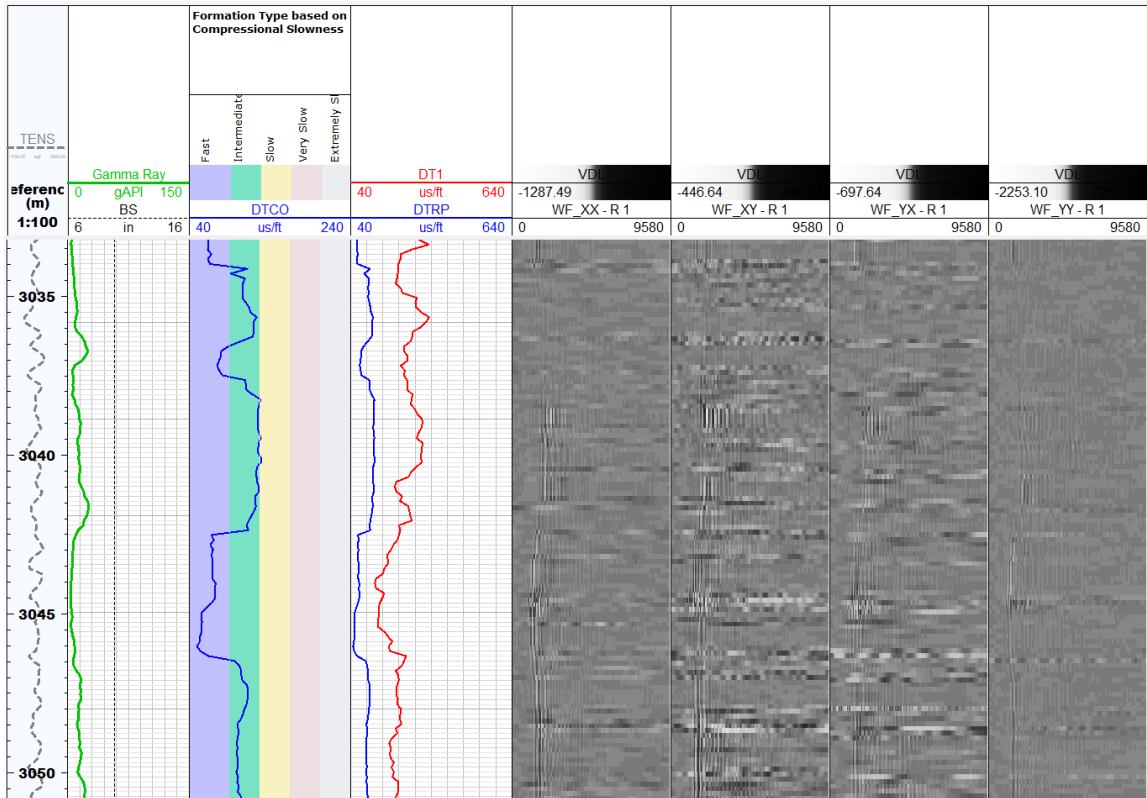
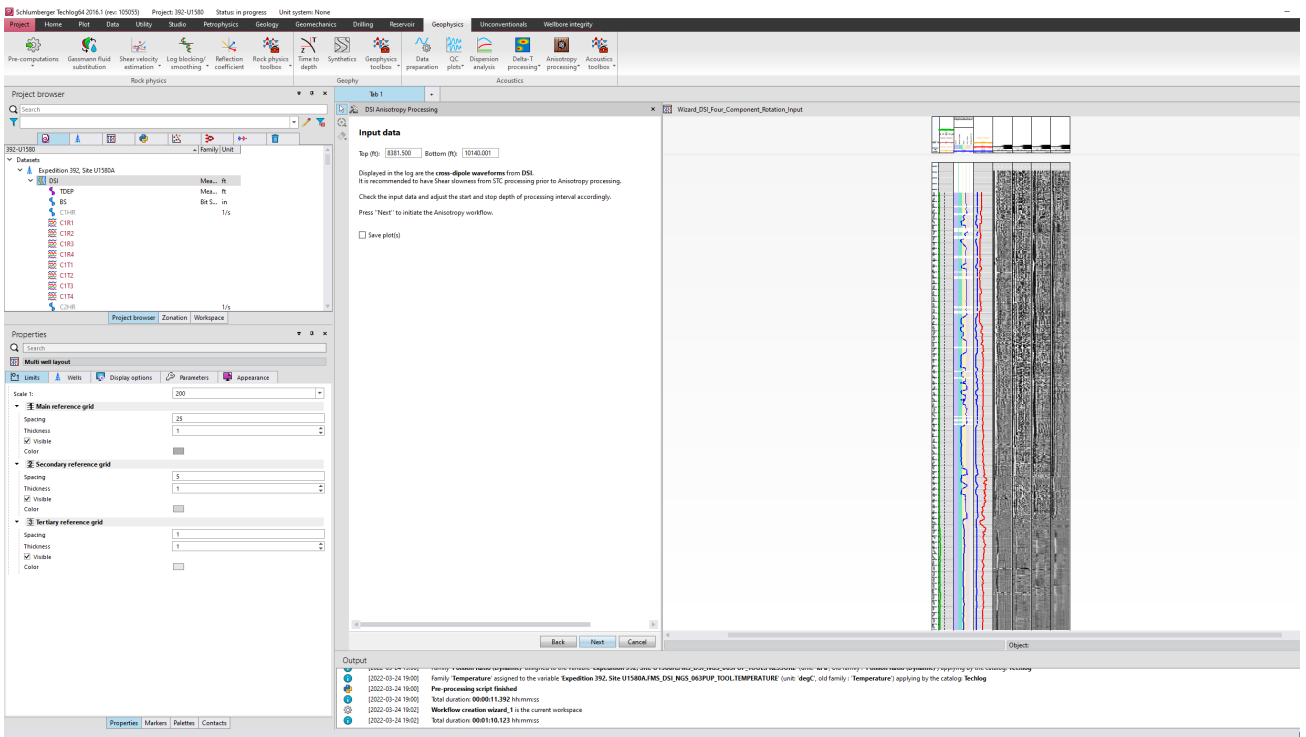


Figure C2: Data input (left) and resulting log plot (right).

Step 2: DSI BCR or Four-component rotation

Anisotropy processing will be performed on the cross-dipole waveforms from the DSI. Re-adjust the processing interval depth if needed, and check the processing parameters. Dispersion Analysis on the input waveforms can be used to help determine the filter limits, or to assess the coherency.

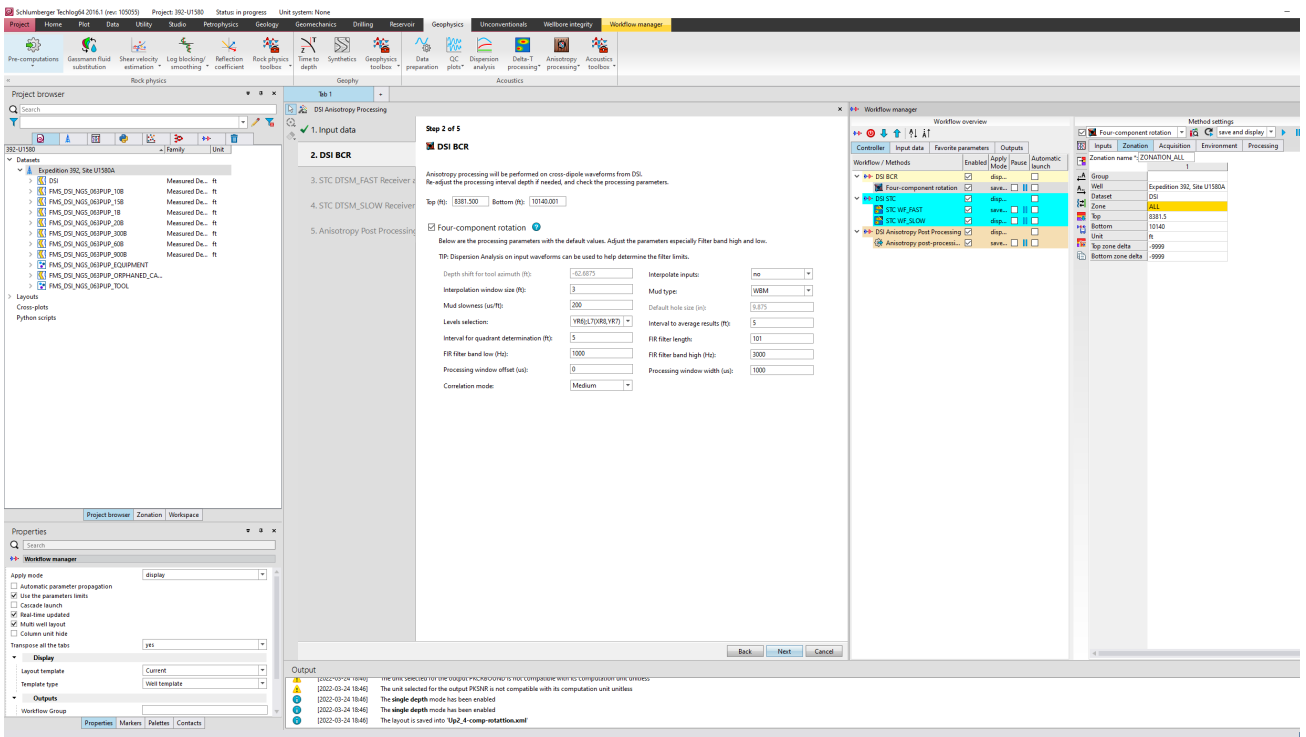


Figure C3: Step 2 (Four-component rotation) definition and parameter adjustments, including the workflow manager.

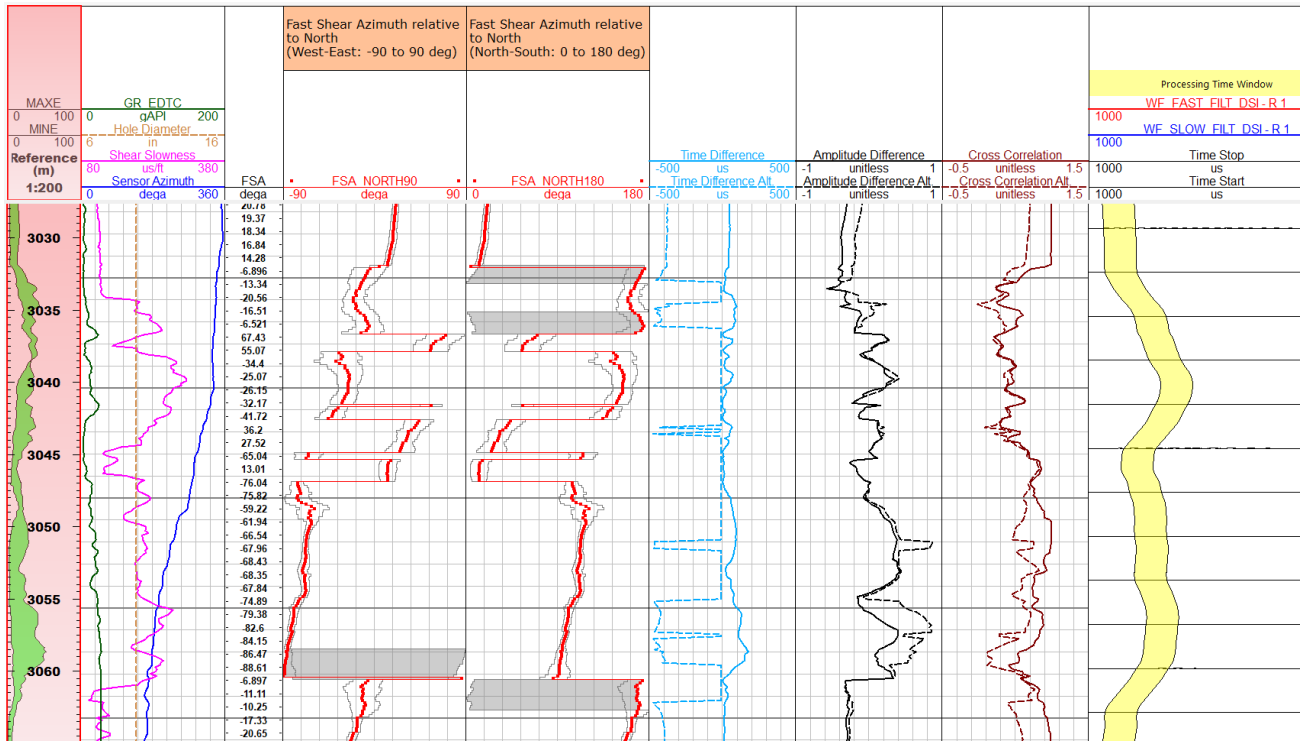
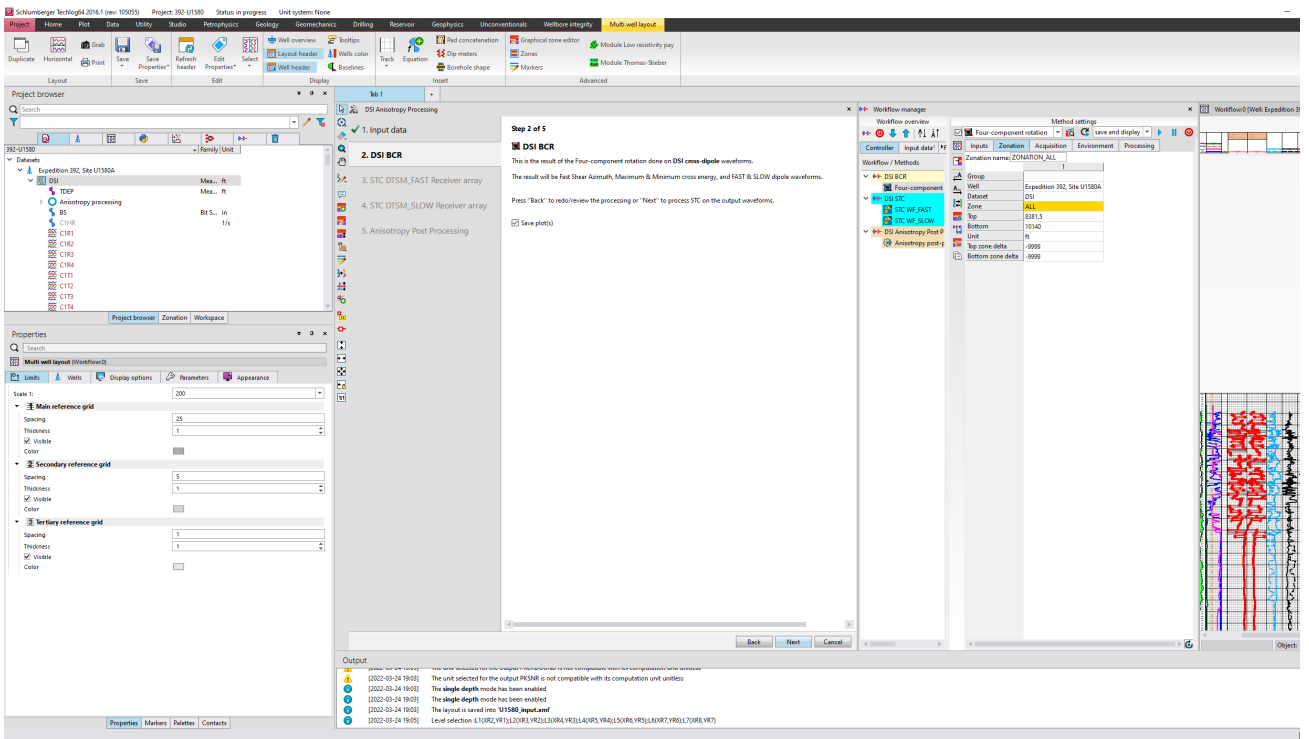


Figure C4: Step 2 of the Anisotropy Wizard and the Four-component rotation result shown as a log plot (full detail to the right).

Step 3: STC DTSM_Fast Receiver Array

Slowness Time Coherency (STC) processing of the DTSM_Fast Receiver Array waveform that resulted from the preceding 4-component rotation in Step 2.

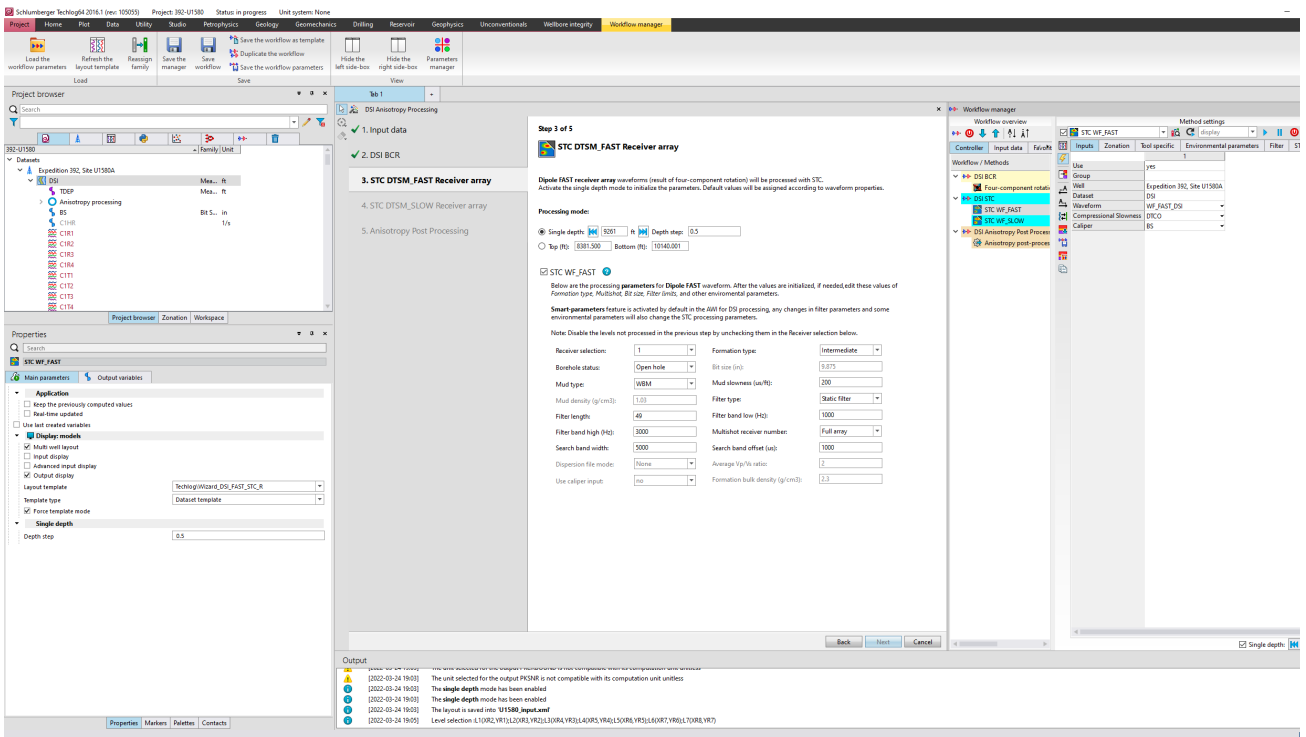


Figure C5: Anisotropy Wizard Step 3 window.

Step 3A: First, go through the single depth processing mode for the entire depth range in order to initialize the parameters. To automatically step through the entire depth, click on the blue fast forward button (Fig. C5)

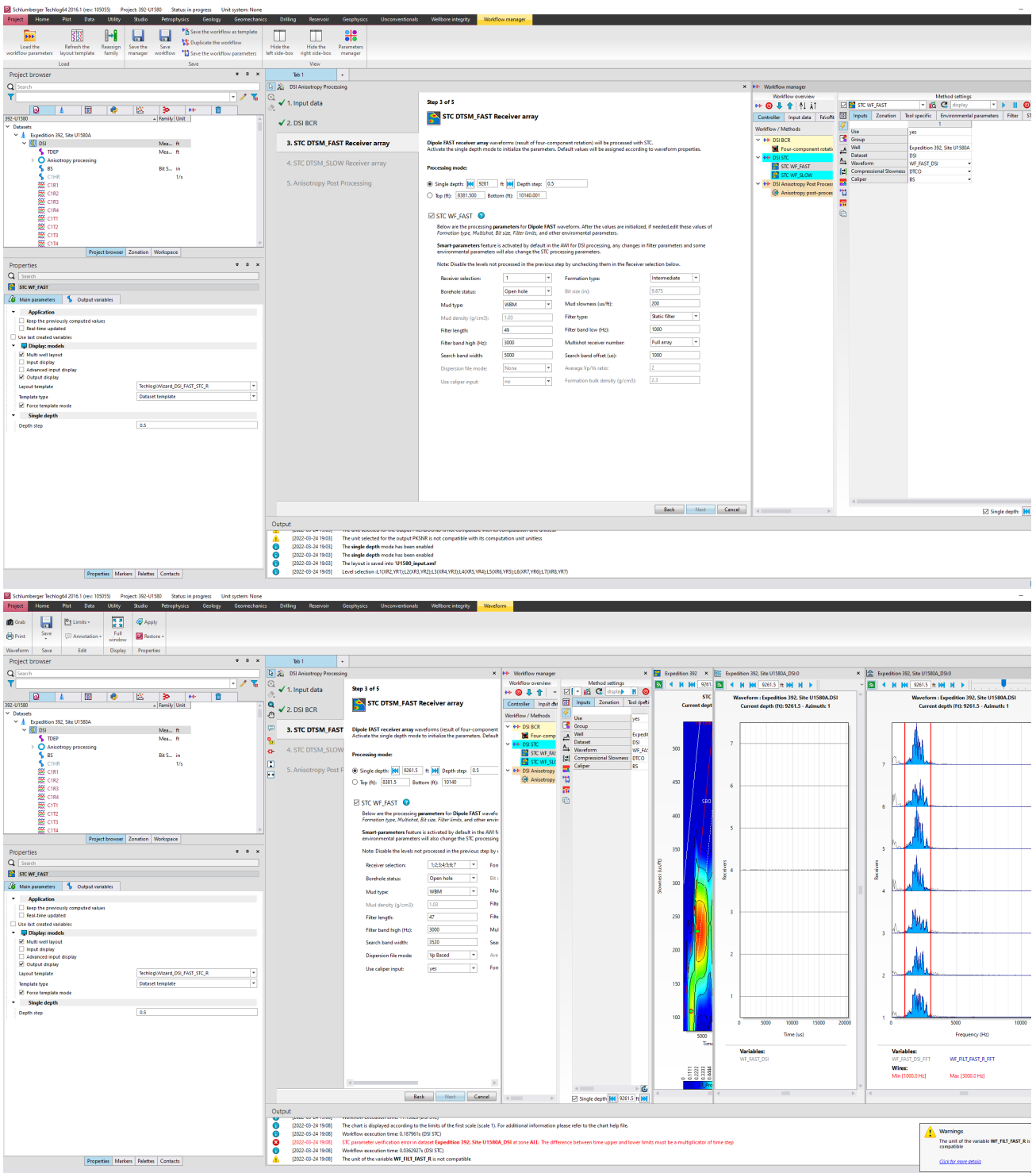


Figure C6: Step 3A Single depth mode window and (right) resulting STC and waveform plots.

Step 3B: Once the parameters are initialized, select the (entire) depth range processing mode (radio button below the Single depth processing mode). The resulting STC plot can be saved and

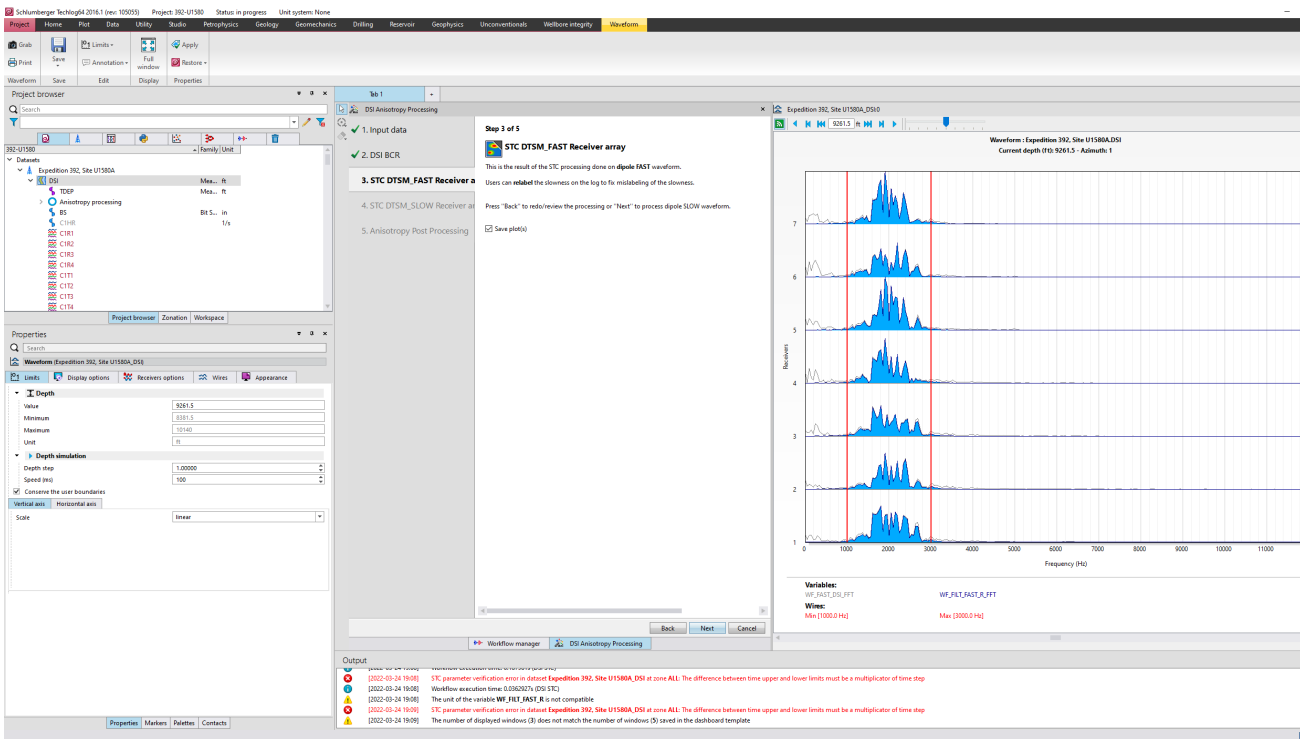


Figure C7: Step 3 resulting waveforms and STC_Fast plot.

Step 4: STC DTSM_Slow Receiver Array

Slowness time Coherency (STC) processing of the DTSM_Slow Receiver Array waveform that resulted from the preceding 4-component rotation in Step 2. Similar to Step 3, First activate the single depth mode to initialize the parameters, and then for the (entire) depth interval.

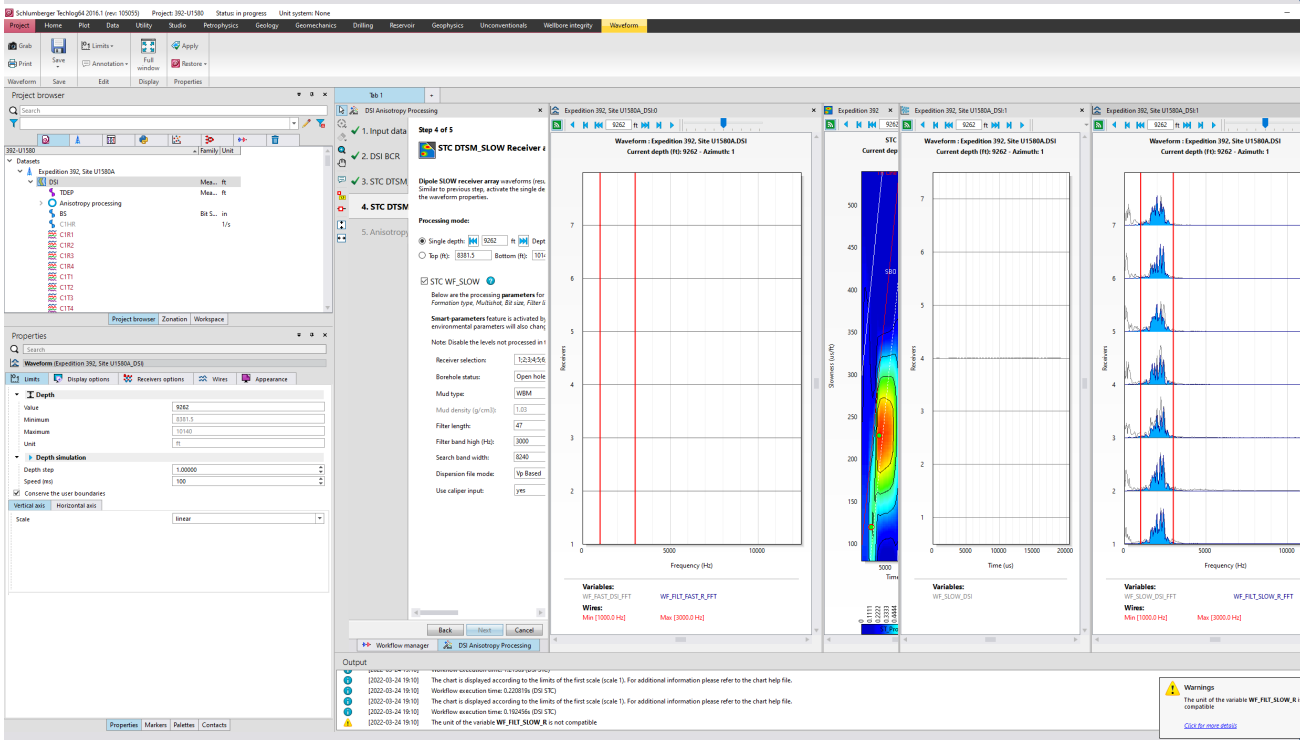
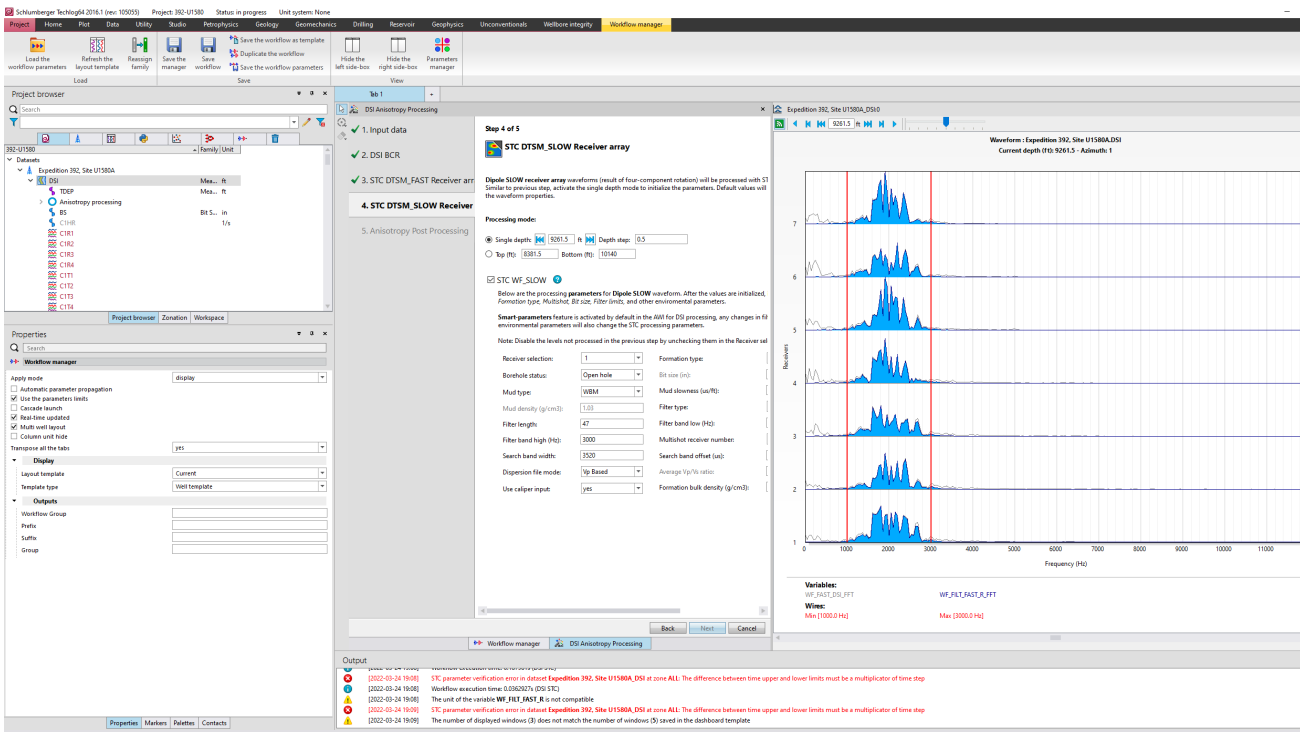


Figure C8: Step 4A STC DTSM_Slow receiver array waveform processing in single depth mode.

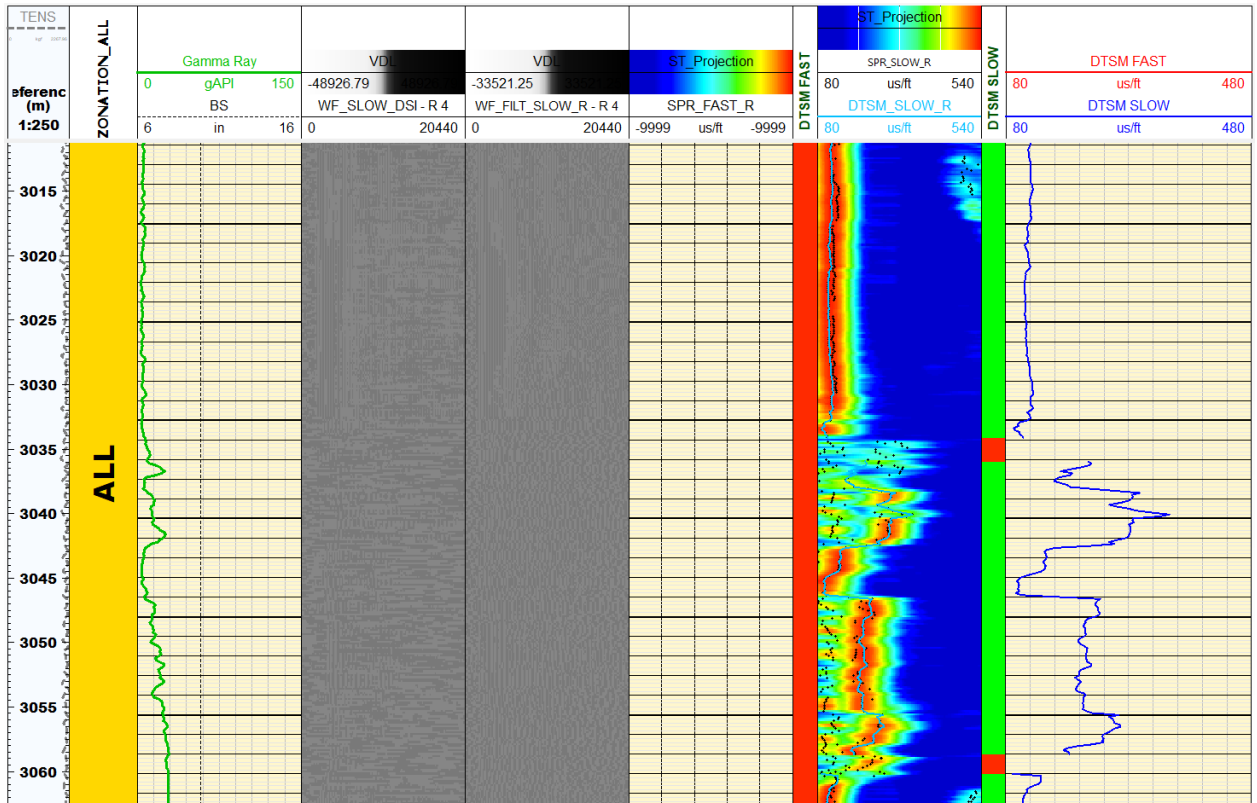
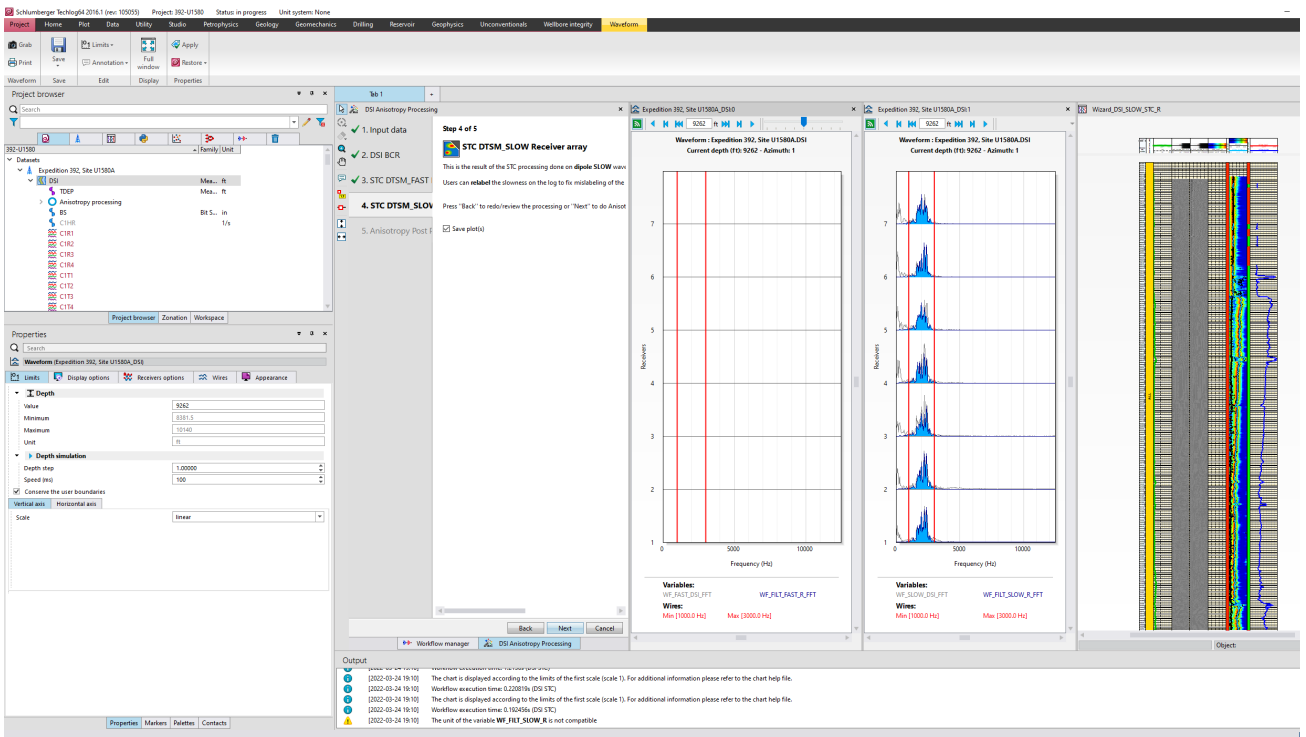


Figure C9: Step 4B STC DTSM_Slow receiver array full depth processing and resulting log plot (full detail to the right).

Step 5: Anisotropy Post Processing

Final result of the Anisotropy processing as shown in a log plot, defining the degree of acoustic anisotropy for each interval.

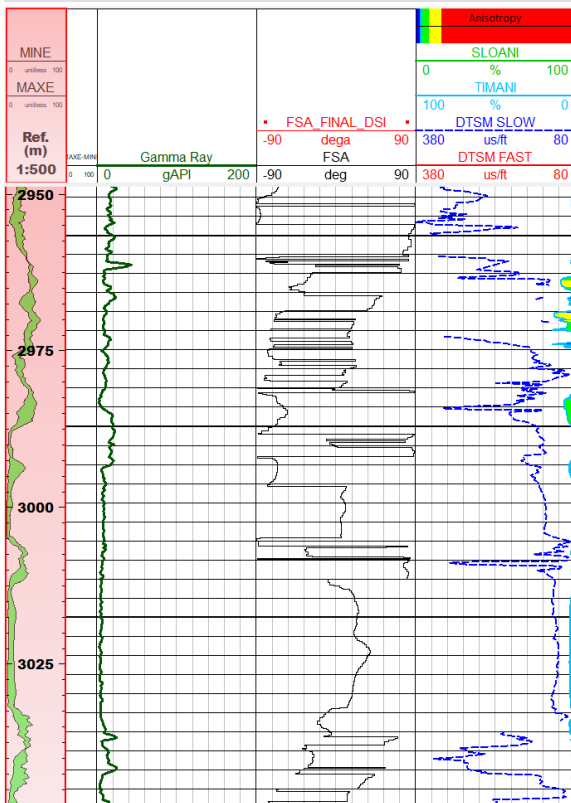
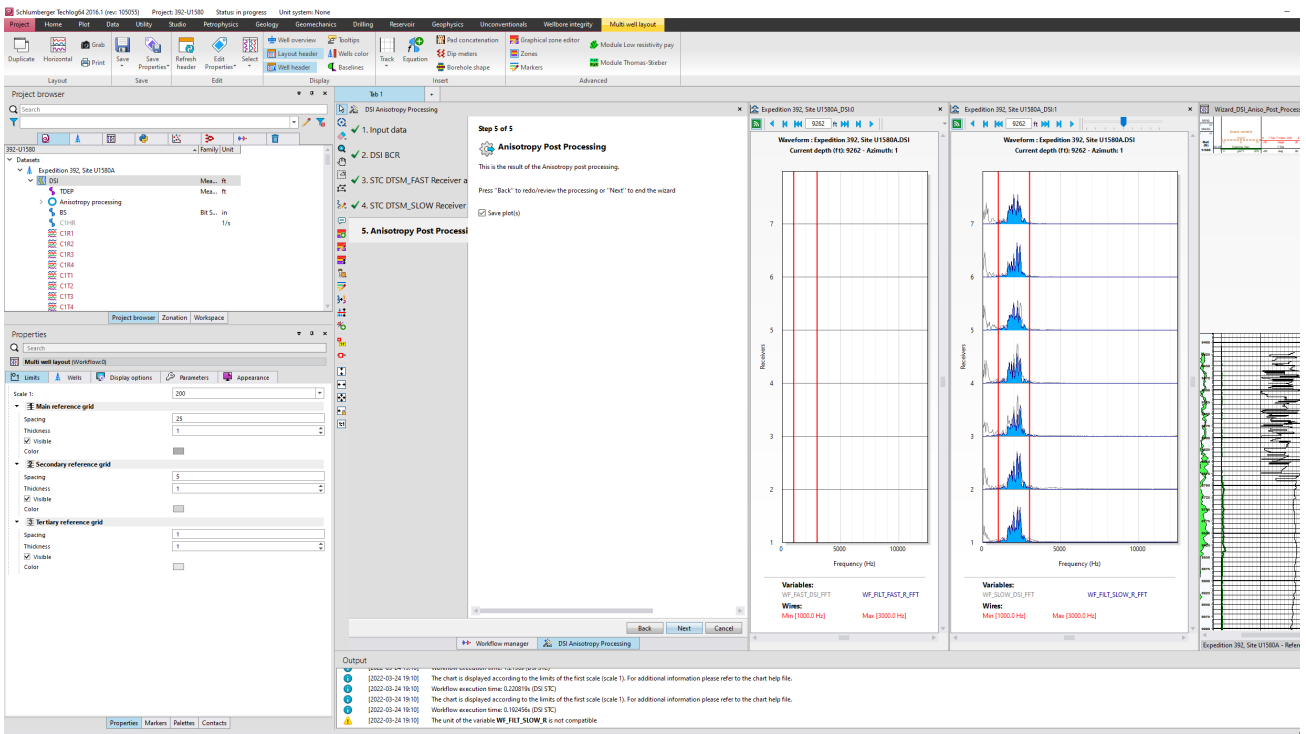


Figure C10: Anisotropy post processing and resulting log plot.

Acknowledgement

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