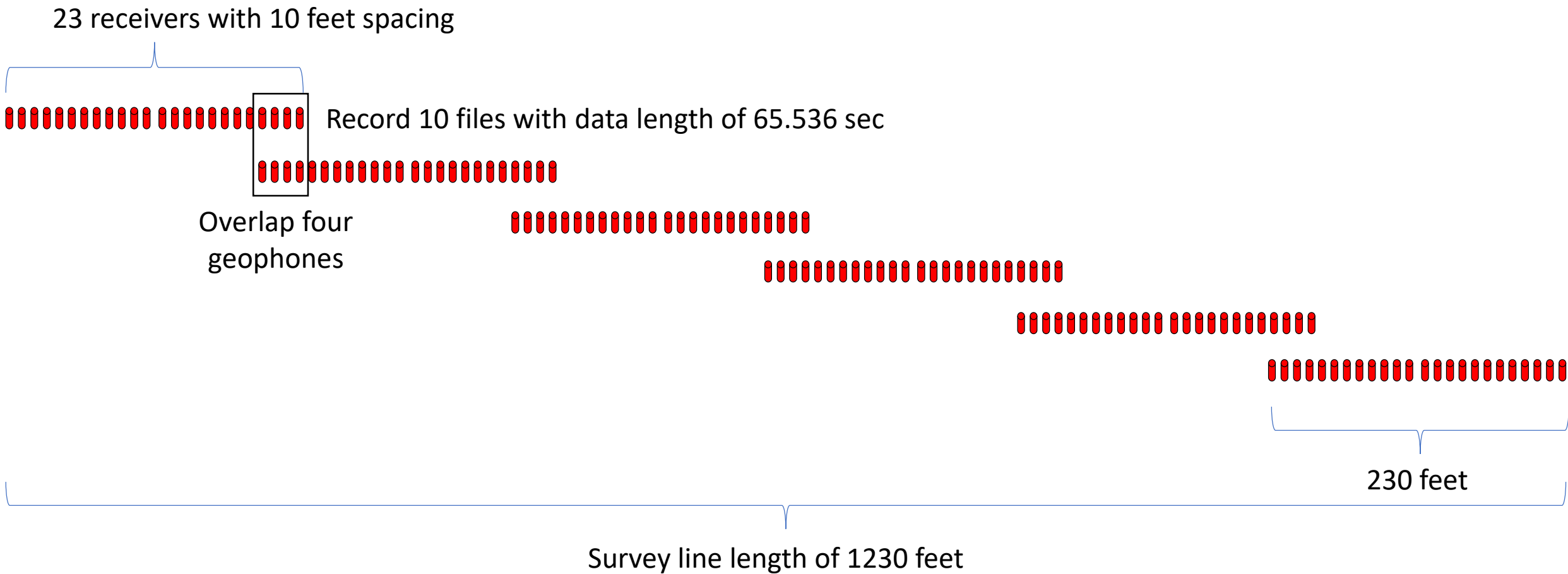


Analysis of 2D passive surface wave method
(process SEG2 files using Pickwin, WaveEq and GeoPlot)



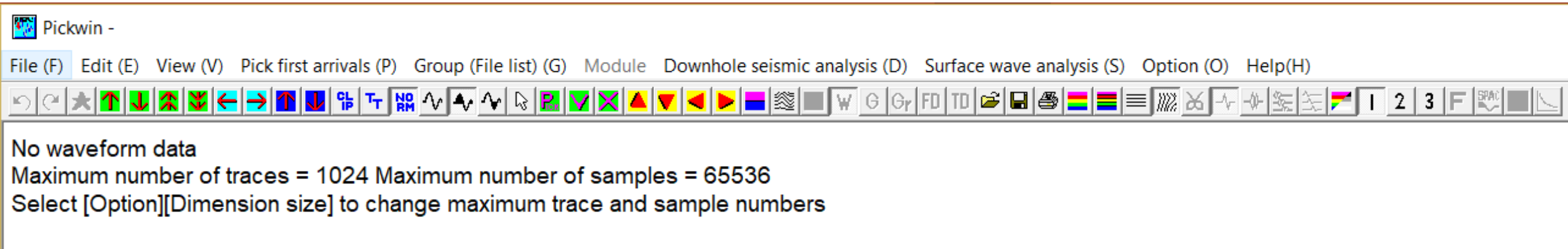
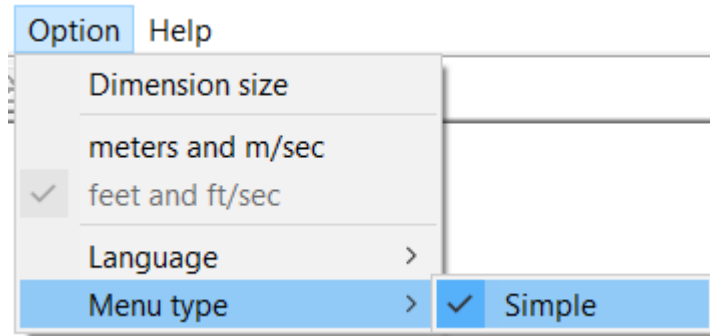
Example data used in the tutorial

Acquisition geometry



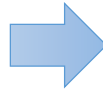
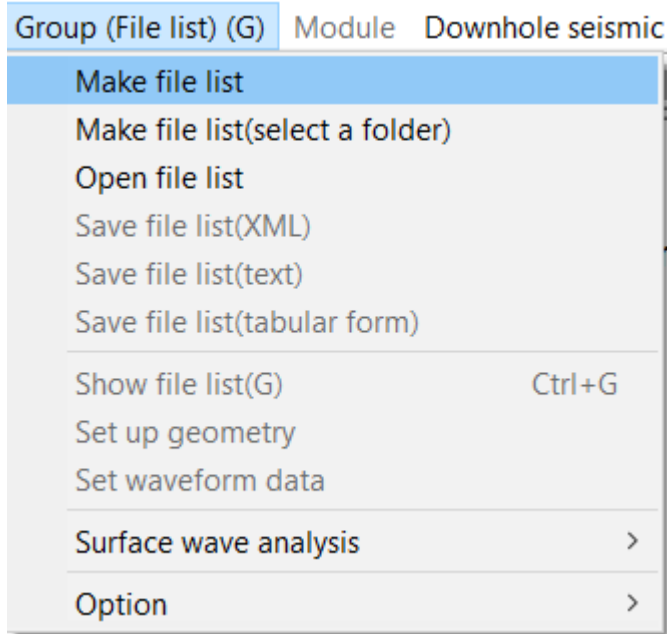
Change Pickwin menu from “Simple” to “Complete”

Uncheck “Menu type”, “Simple” and use the complete menu.

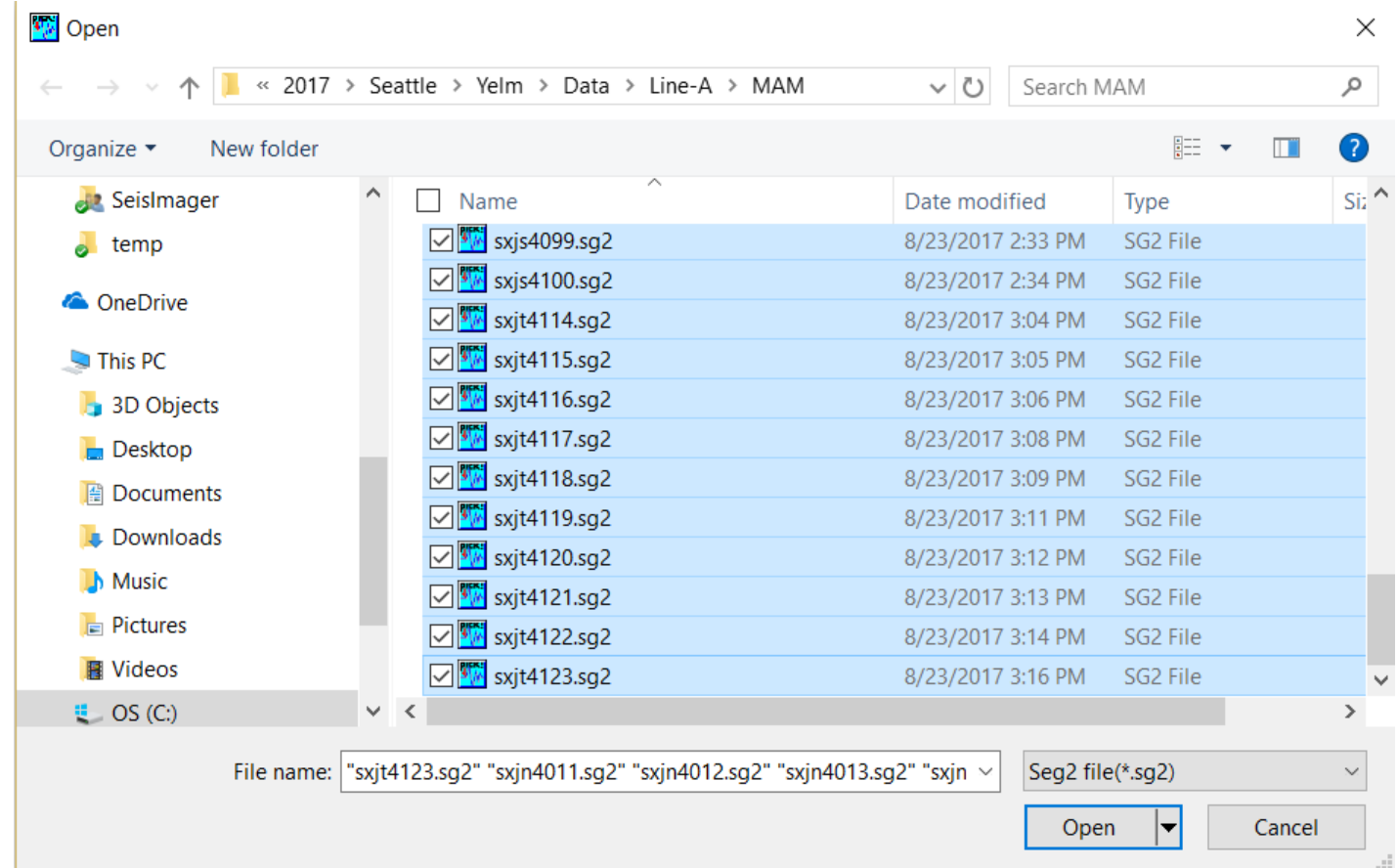


Make a file list

Select “Group”, “Make file list”.

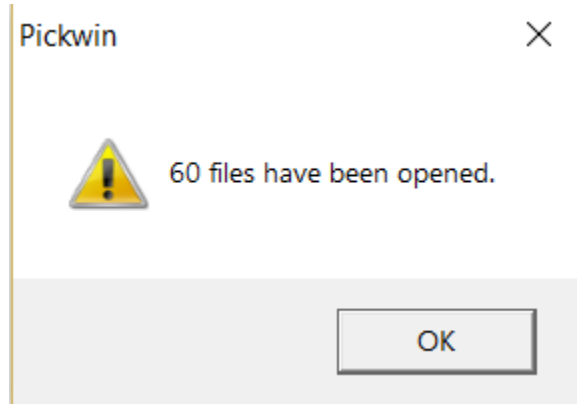


Select all files to be processed.

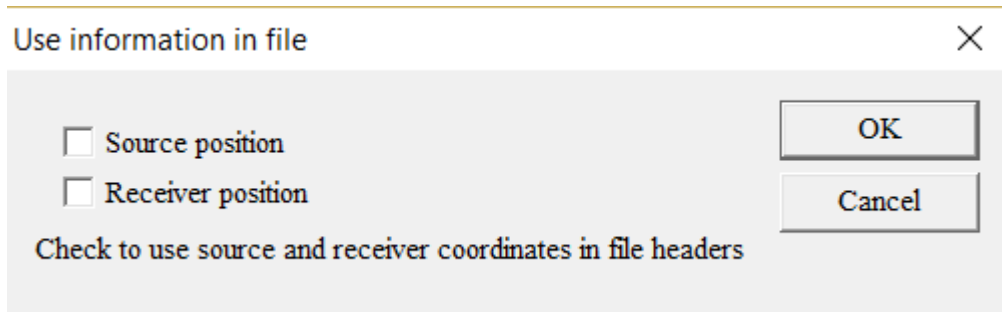


Make a file list

Confirm number of data files.



Check "Receiver position" if wave form files contain correct receiver positions.



Make a file list

Select “Passive data” and set up 1st receiver and receiver interval if wave form data files do not include correct receiver distance (“Apply receiver configuration from file header” is unchecked).

File list

Index	Edit	ID	Source (ft)	1st receiver (ft)	Receiver int. (ft)	# of aux.
0	<input type="checkbox"/>	4011		0	10	0
1	<input type="checkbox"/>	4012		0	10	0
2	<input type="checkbox"/>	4013		0	10	0
3	<input type="checkbox"/>	4014		0	10	0
4	<input type="checkbox"/>	4015		0	10	0
5	<input type="checkbox"/>	4016		0	10	0
6	<input type="checkbox"/>	4017		0	10	0
7	<input type="checkbox"/>	4018		0	10	0
8	<input type="checkbox"/>	4019		0	10	0
9	<input type="checkbox"/>	4020		0	10	0

☐ Apply source coordinates from file header ☐ Active data
☐ Apply receiver coordinates from file header ☒ Passive data

Number of files: 60

OK Cancel Next Back Set up Set # of aux. Delete Export Import

File list

Index	Edit	ID	Source (ft)	1st receiver (ft)	Receiver int. (ft)	# of aux.
50	<input type="checkbox"/>	4114		1000	10	0
51	<input type="checkbox"/>	4115		1000	10	0
52	<input type="checkbox"/>	4116		1000	10	0
53	<input type="checkbox"/>	4117		1000	10	0
54	<input type="checkbox"/>	4118		1000	10	0
55	<input type="checkbox"/>	4119		1000	10	0
56	<input type="checkbox"/>	4120		1000	10	0
57	<input type="checkbox"/>	4121		1000	10	0
58	<input type="checkbox"/>	4122		1000	10	0
59	<input type="checkbox"/>	4123		1000	10	0

☐ Apply source coordinates from file header ☐ Active data
☐ Apply receiver coordinates from file header ☒ Passive data

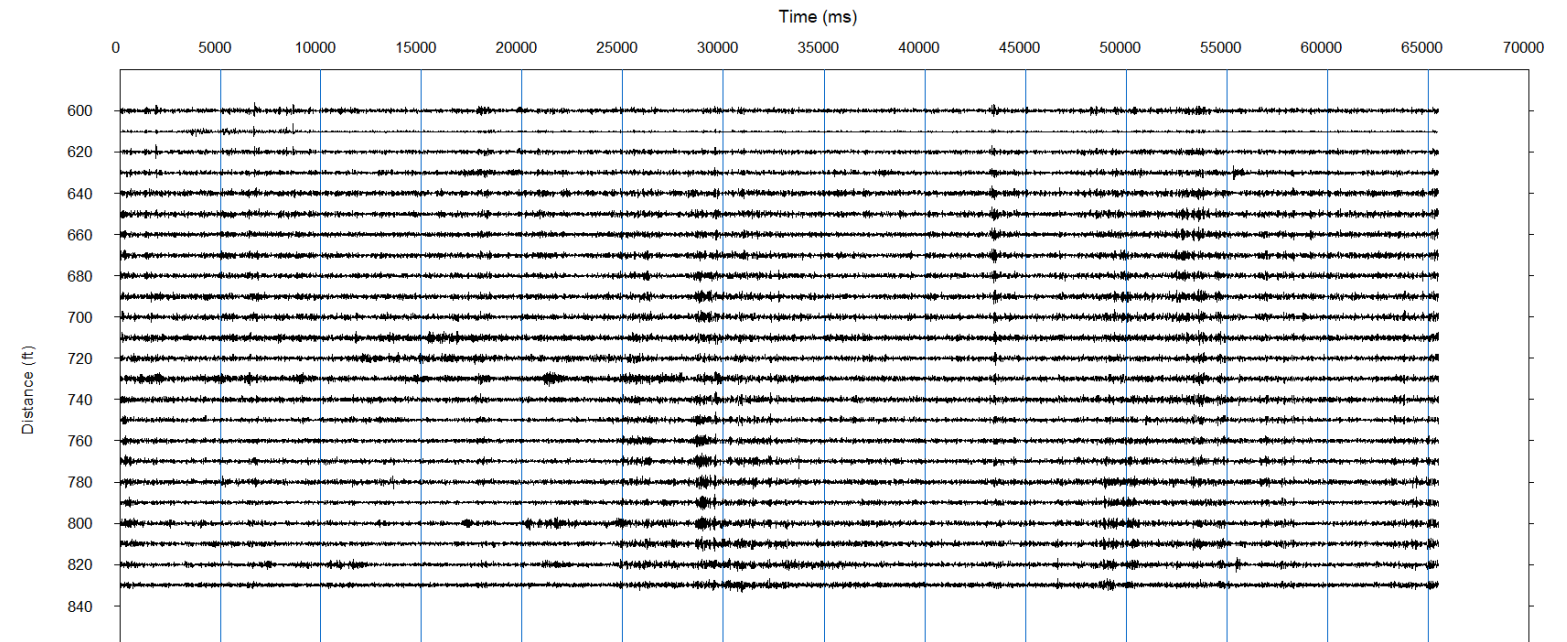
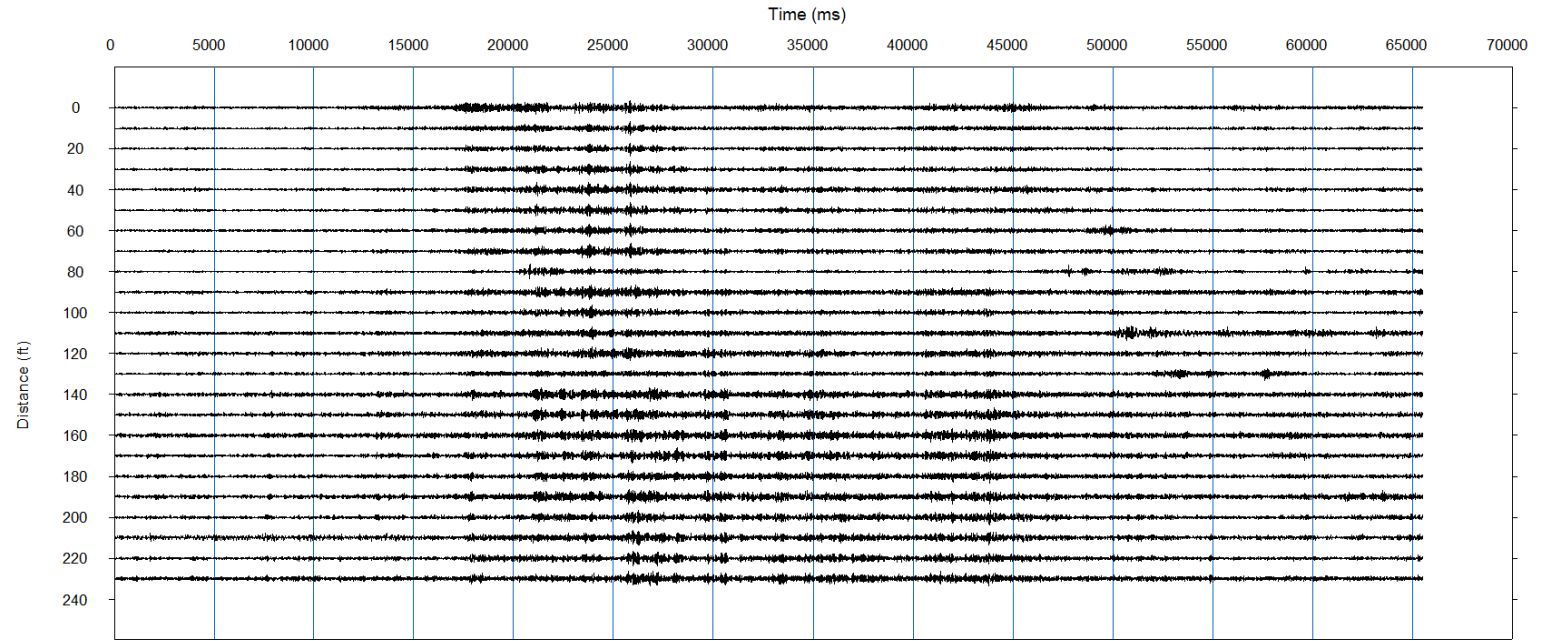
Number of files: 60

OK Cancel Next Back Set up Set # of aux. Delete Export Import



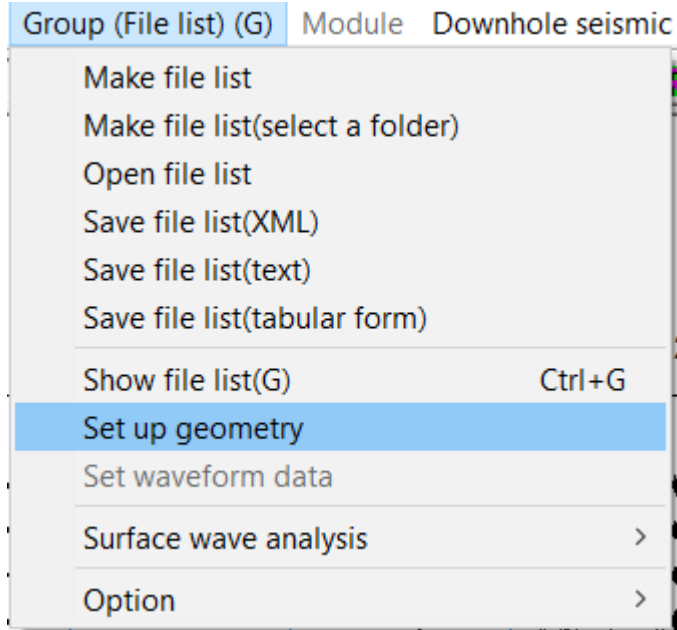
Raw waveform data

Use  to scroll waveform files.

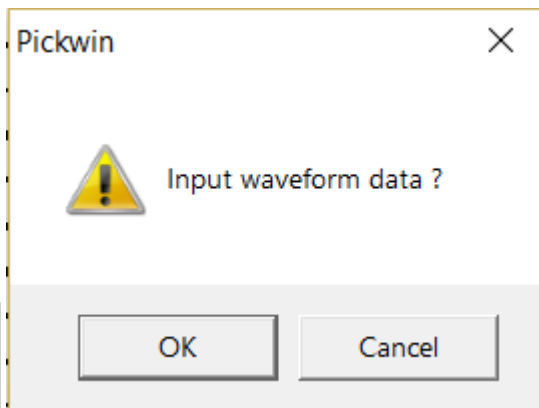


Set up geometry

Select “Group”, “Set up geometry”.



Click “OK” to continue.

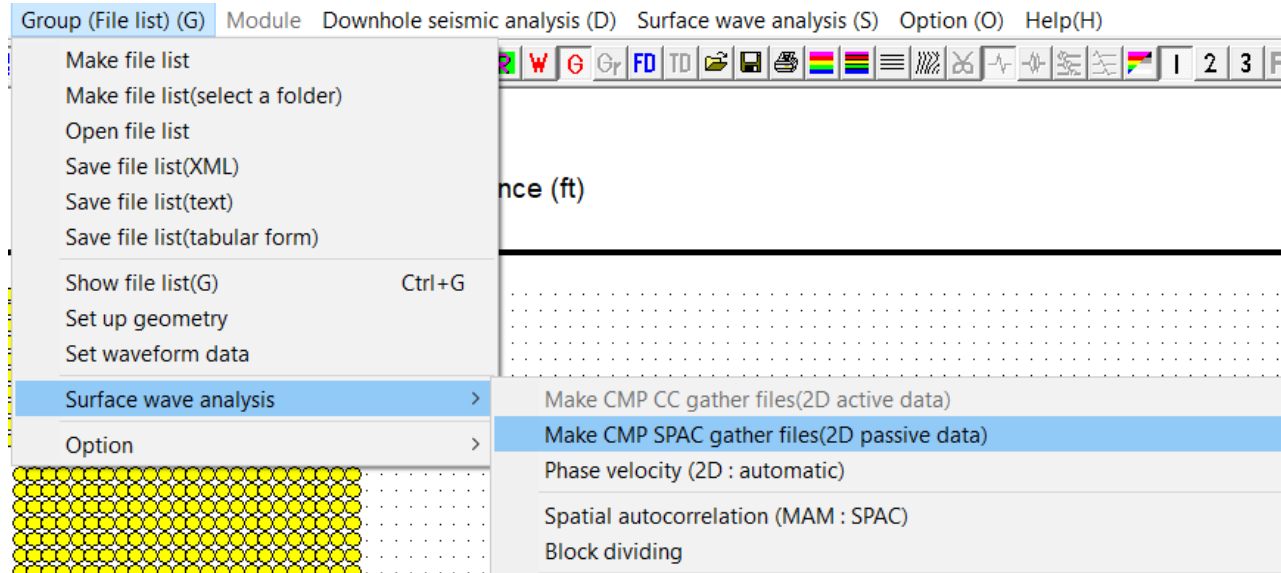


Data acquisition geometry appears.

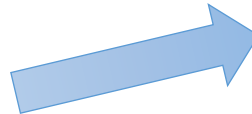
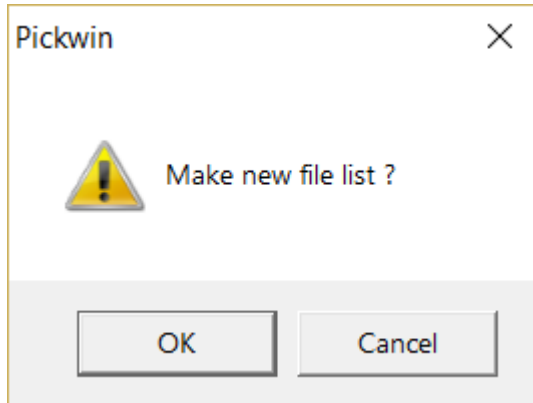


Calculate CMP spatial auto-correlation (CMP-SPAC)

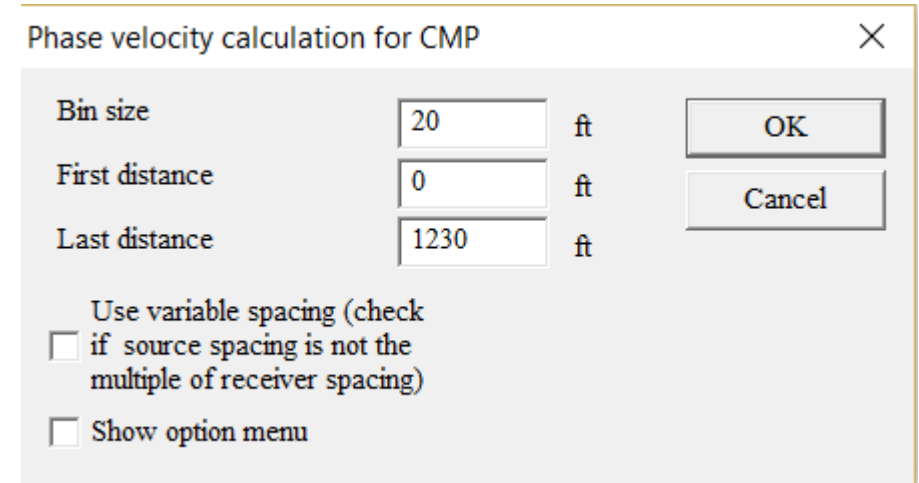
Select “Group”, “Surface wave analysis”, “Make CMP SPAC gather files (2D passive data)”.



Click “OK” to continue.

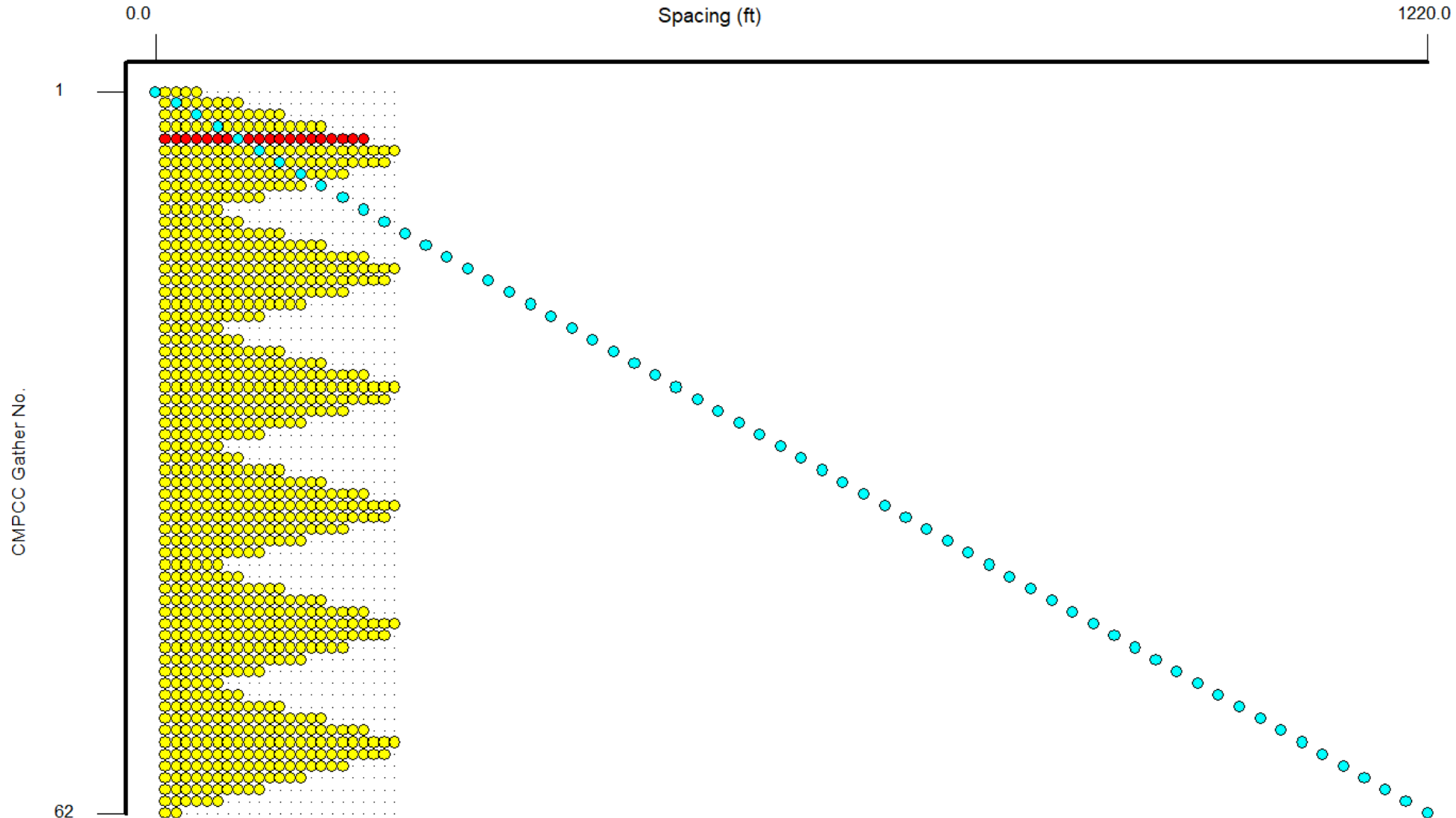


Set bin size (CMP interval).



CMP spatial auto-correlation (CMP-SPAC)

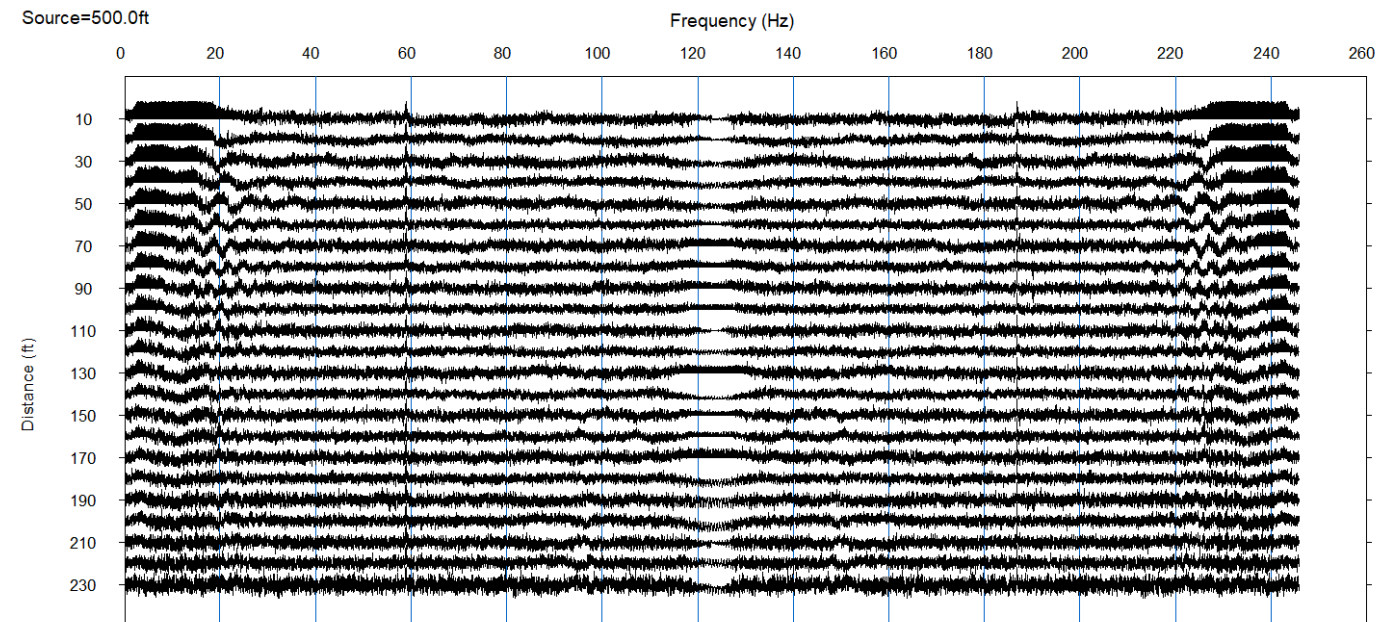
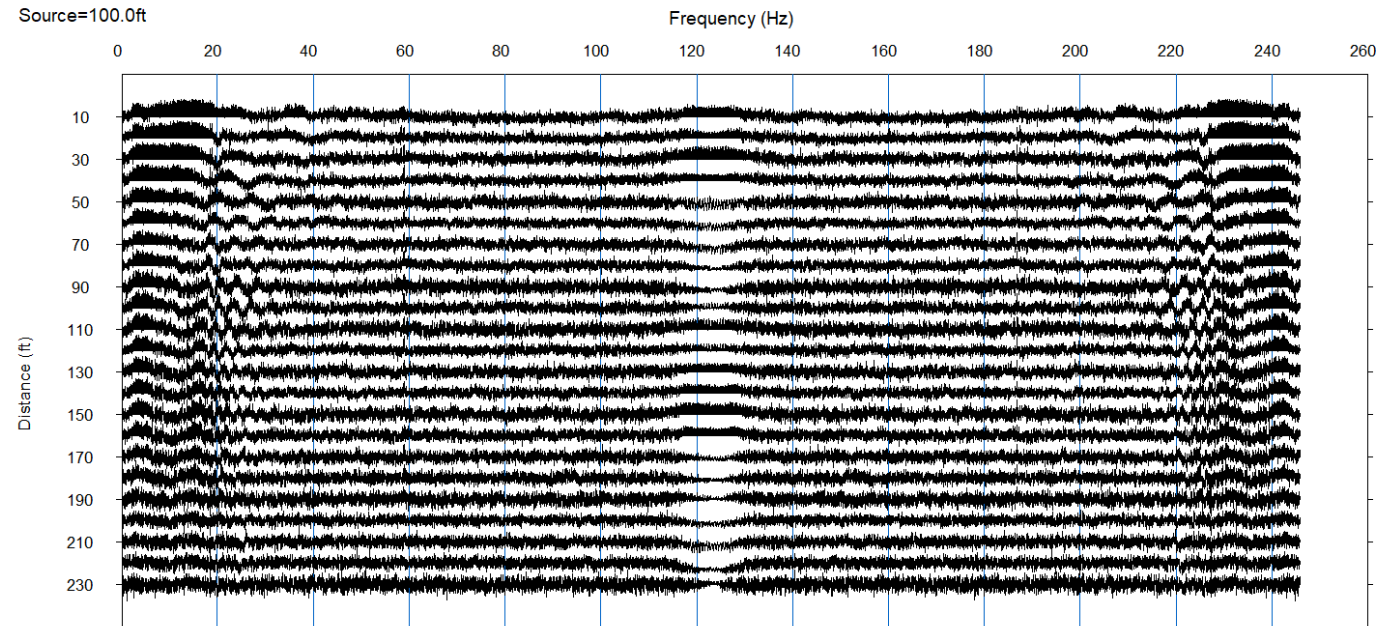
Number of CMP-SPAC traces appears after calculation completed.



CMP spatial auto-correlation (CMP-SPAC)

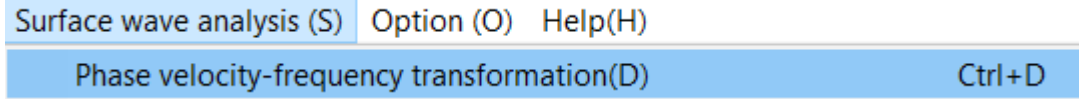
Click  to show CMP-SPAC files.

Use  to scroll waveform files.



Taking a look phase velocity images for several CMP-SPACs

Press “Ctrl+D” or select “Surface wave analysis”,
“Phase velocity-frequency transformation.”



Set up parameters.

Phase velocity-frequency transformation

Phase velocity

Start 0 ft/s

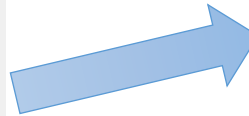
☒ End 2400 ft/s Up Down

OK Cancel Advanced menu

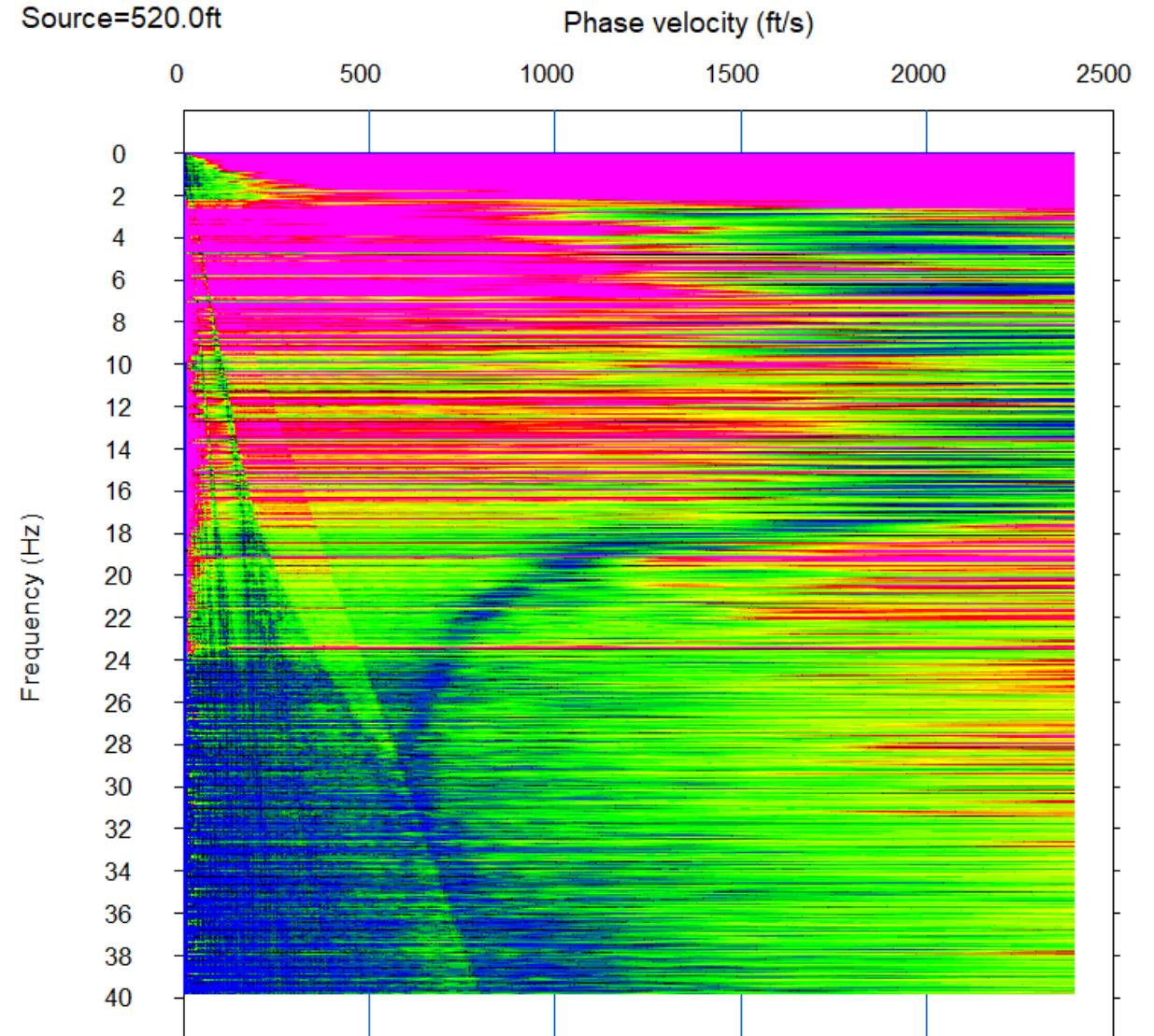
Frequency

Start 0 Hz Up Down

☐ End 40 Hz



A phase velocity image appears.



Calculate dispersion curves for all CMP-SPACs

Select “Surface wave analysis”, “Phase velocity-frequency transformation and picking (2D/3D)”

Set up parameters.

Set up parameters.

The workflow is as follows:

- Menu Selection:** The "Phase velocity-frequency transformation and picking (2D/3D)" option is selected in the "Surface wave analysis (S)" menu.
- Phase velocity-frequency transformation Dialog:** Parameters are set for Phase velocity (Start: 0 ft/s, End: 2400 ft/s) and Frequency (Start: 0 Hz, End: 40 Hz).
- Min. and Max. frequency Dialog:** Parameters are set for Minimum Frequency (2 Hz) and Maximum Frequency (40 Hz). The "Use median filter" checkbox is checked, and the "# of sample for median filter" is set to 5.
- Setup min. and max. phase velocity Dialog:** The "Minimum phase velocity" is set to 350 ft/s, which is circled in red. The "Maximum phase velocity" is set to 2400 ft/s.

Pay attention to “Minimum phase velocity”



Show dispersion curves in WaveEq

Select “Surface wave analysis”, “Show phase velocity-frequency curves (2D/3D)”

Surface wave analysis (S) Option (O) Help(H)

Phase velocity-frequency transformation(D) Ctrl+D

Pick phase velocity(1D)

Show phase velocity curve(1D)

Calculate Shot Cross-Correlation (SCC) gathers

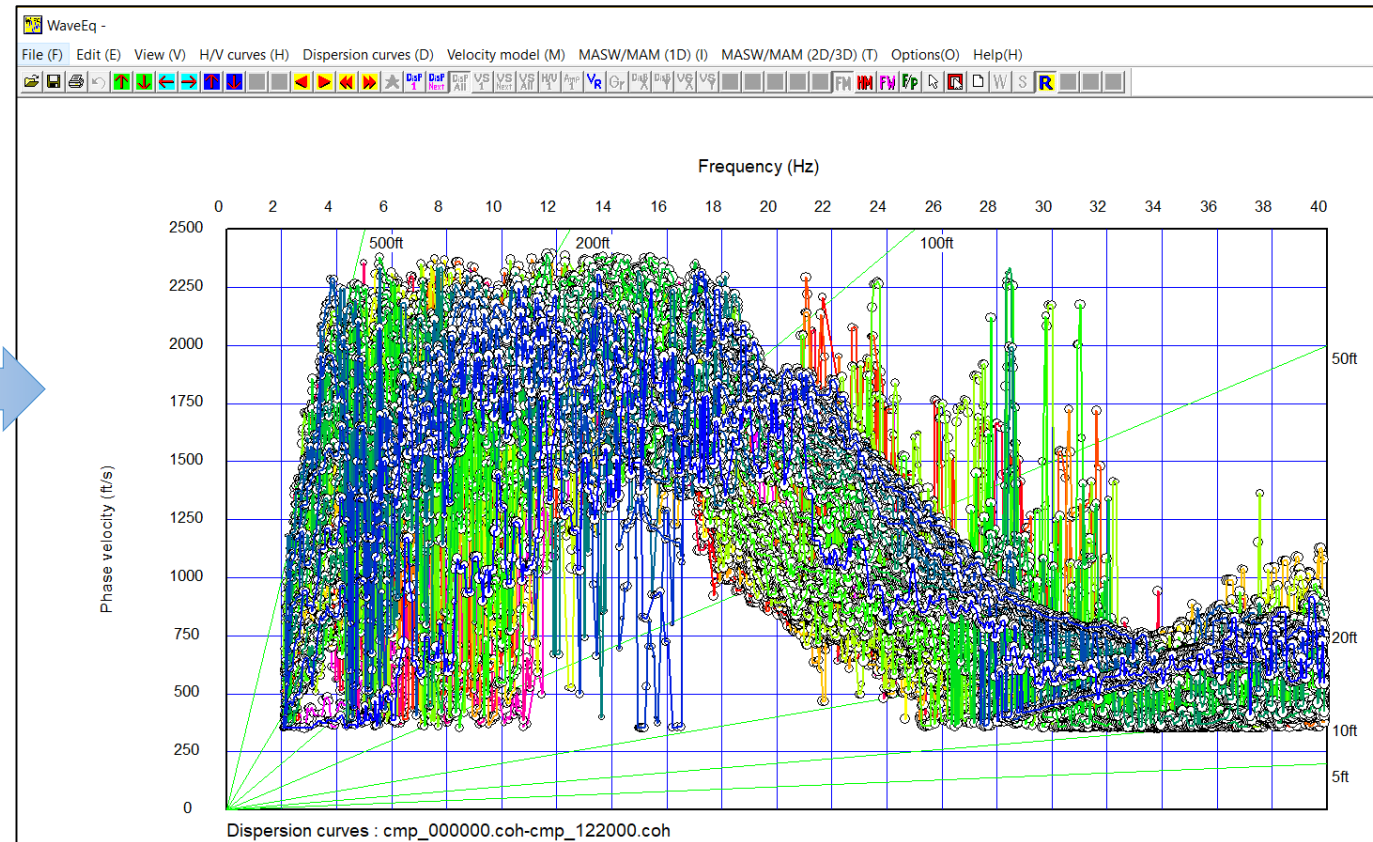
Spatial autocorrelation (MAM : SPAC)

Make CMP CC gather files(2D)


Phase velocity-frequency transformation and picking (2D/3D)

Show phase velocity curves (2D/3D)

WaveEq launches and dispersion curves appears.



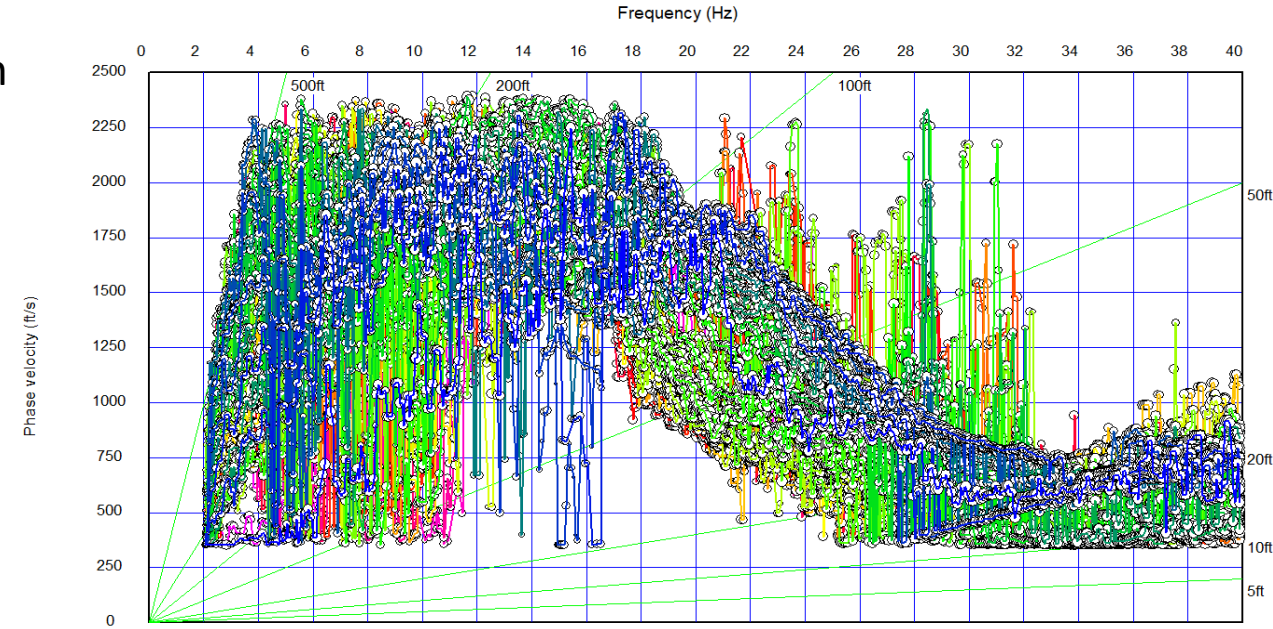
Edit dispersion curves in WaveEq

Use  to show single, adjacent or all dispersion curves.

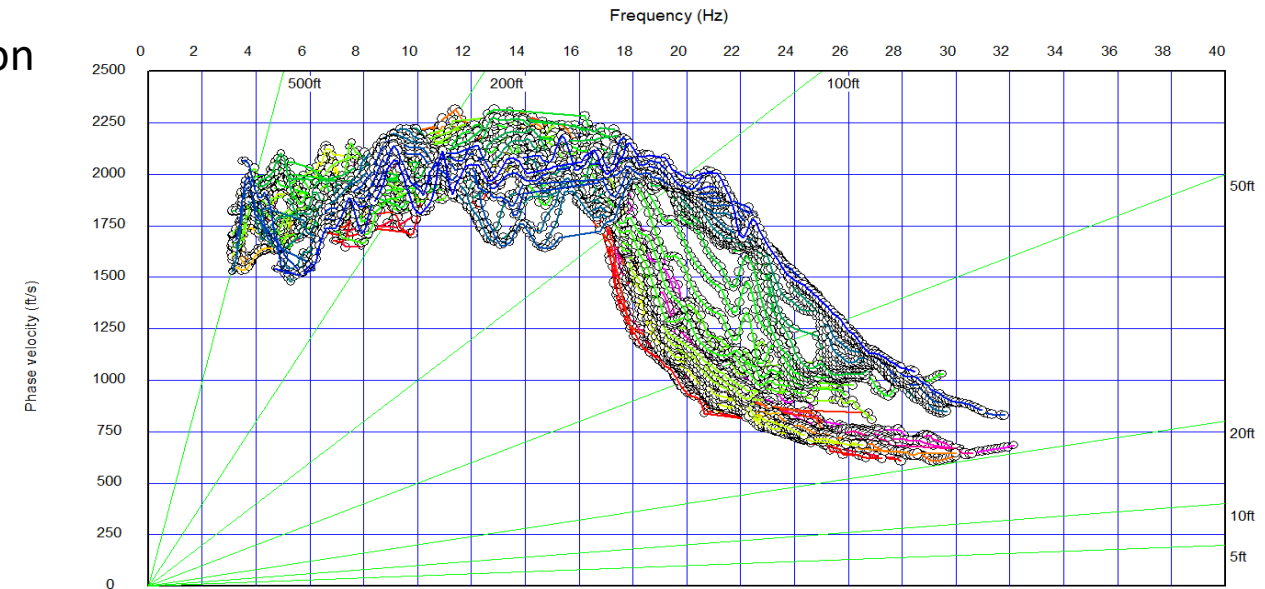
Use  to select phase velocities.

Press “Delete” key to delete selected phase velocities.

Raw dispersion curves

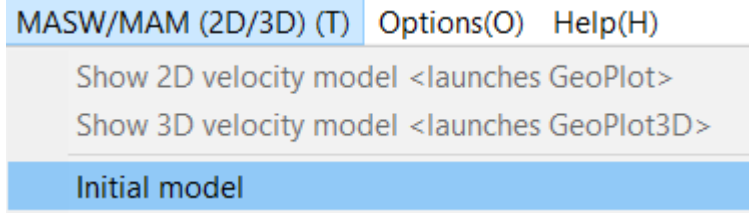


Edited dispersion curves

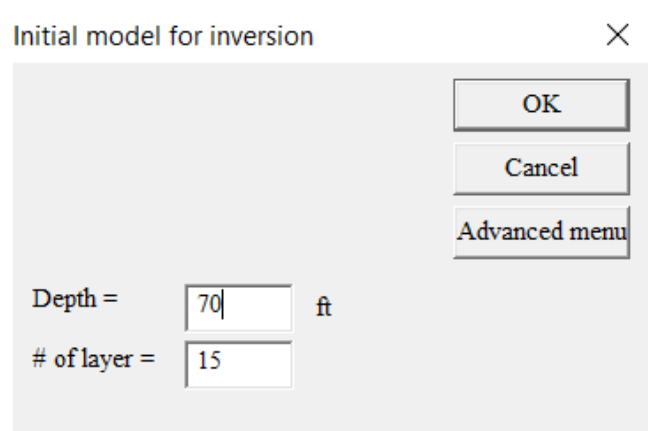


Make an initial velocity model

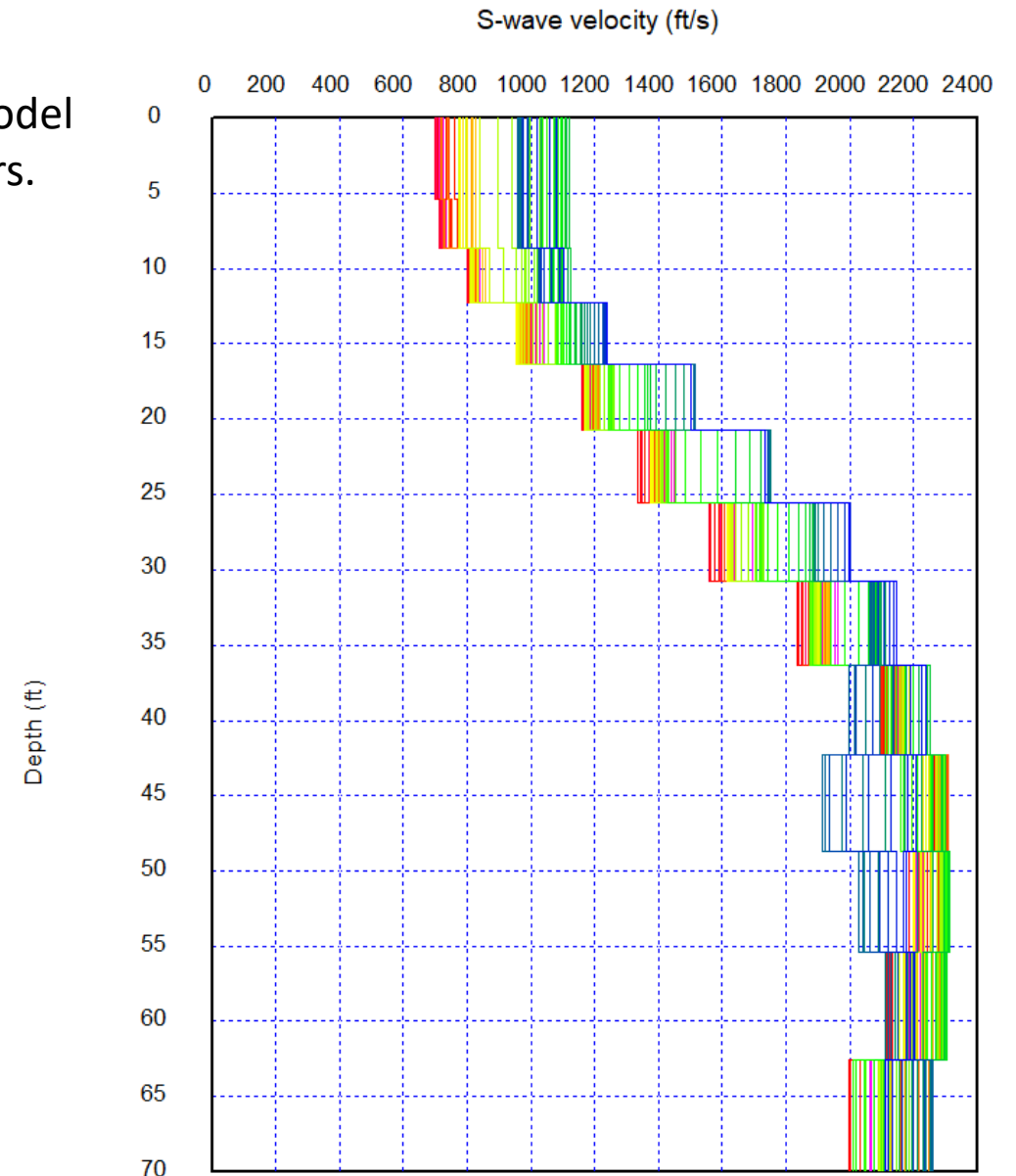
Select “MASW/MAM (2D/3D)”, “Initial model” to make an initial model.



Set up parameters.



Initial model appears.

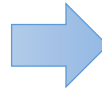


Show a cross section by GeoPlot

Select “MASW/MAM (2D/3D)”, “Show 2D velocity model <launches GeoPlot>” to show a 2D cross section of S-wave velocity model.

MASW/MAM (2D/3D) (T) Options(O) Help(H)

Show 2D velocity model <launches GeoPlot>



GeoPlot launches and a 2D cross section curves appears.

