

# *Geogiga Seismic Pro 8.3*

## *Release Notes*



Copyright © 2017, All rights reserved.

# Table of Contents

Introduction.....	1
Part 1 – Utility Modules.....	2
Part 2 – Reflection Modules.....	4
Updates in SF Imager .....	5
Updates in Reflector .....	6
Part 3 – Refraction Modules.....	7
General Enhancements.....	8
Updates in Refractor.....	9
Updates in DW Tomo.....	11
Updates in DW Tomo3D.....	11
Part 4 – Surface Wave Modules.....	12
General Enhancements.....	13
Updates in Surface Plus.....	18
Updates in Surface3D.....	19
Updates in Microtremor.....	20
Part 5 – Borehole Seismic Modules.....	21
Technical Support.....	22

## Introduction

This documentation introduces the release of *Geogiga Seismic Pro* 8.3.

*Geogiga Seismic Pro* is a complete seismic data processing and interpretation software package adapted to near-surface geophysics. It contains 16 standalone applications handling the full range of seismic survey methods from Reflection, Refraction, and Surface Wave to Borehole Seismic. There are also Utilities for wavefield modeling, velocity model plotting, and much more.

The information on the new features of this release is provided in the following order:

- Part 1 – Utility modules including *Front End*, *Seismapper*, *EFit*, and *Modeling*.
- Part 2 – Reflection modules including *Reflector* and *SF Imager*.
- Part 3 – Refraction modules including *Refractor*, *DW Tomo*, and *DW Tomo3D*.
- Part 4 – Surface Wave modules including *Surface*, *Surface Plus*, *Surface3D*, and *Microtremor*.
- Part 5 – Borehole Seismic modules including *XW Tomo*, *VSP*, and *PS Log*.

## Part 1 – Utility Modules

There are four Utility modules in *Seismic Pro*:

- *Front End*
- *Seismapper*
- *EFit*
- *Modeling*

The updates in *Front End 8.3* include:

- A large seismic data file can be quickly separated into single shot records using the **Split** dialog box, as shown in figure 1-1.
- Multiple records saved in one file are treated as one record for data editing.
- Seismic data with the number of samples greater than 64 KB can be saved in SEG-2 rather than SEG-Y format.

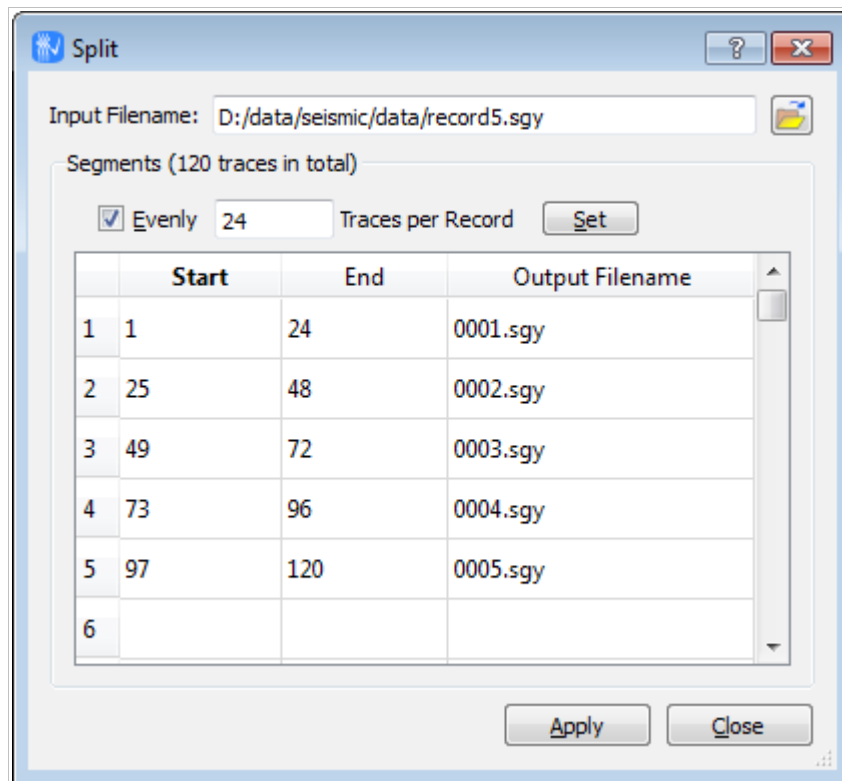


Figure 1-1: Splitting records saved in a large data file

The following are the updates in *Seismapper 8.3*:

- The path of project file is automatically set when only a project name is inputted.
- The scales of the x-axis and y-axis in the **Section Map** dialog box are balanced in order to avoid the survey range being misunderstood, as shown in figure 1-2.
- The gridlines and annotations for irregular coordinates are ensured inside the survey range for 3D fence plotting.

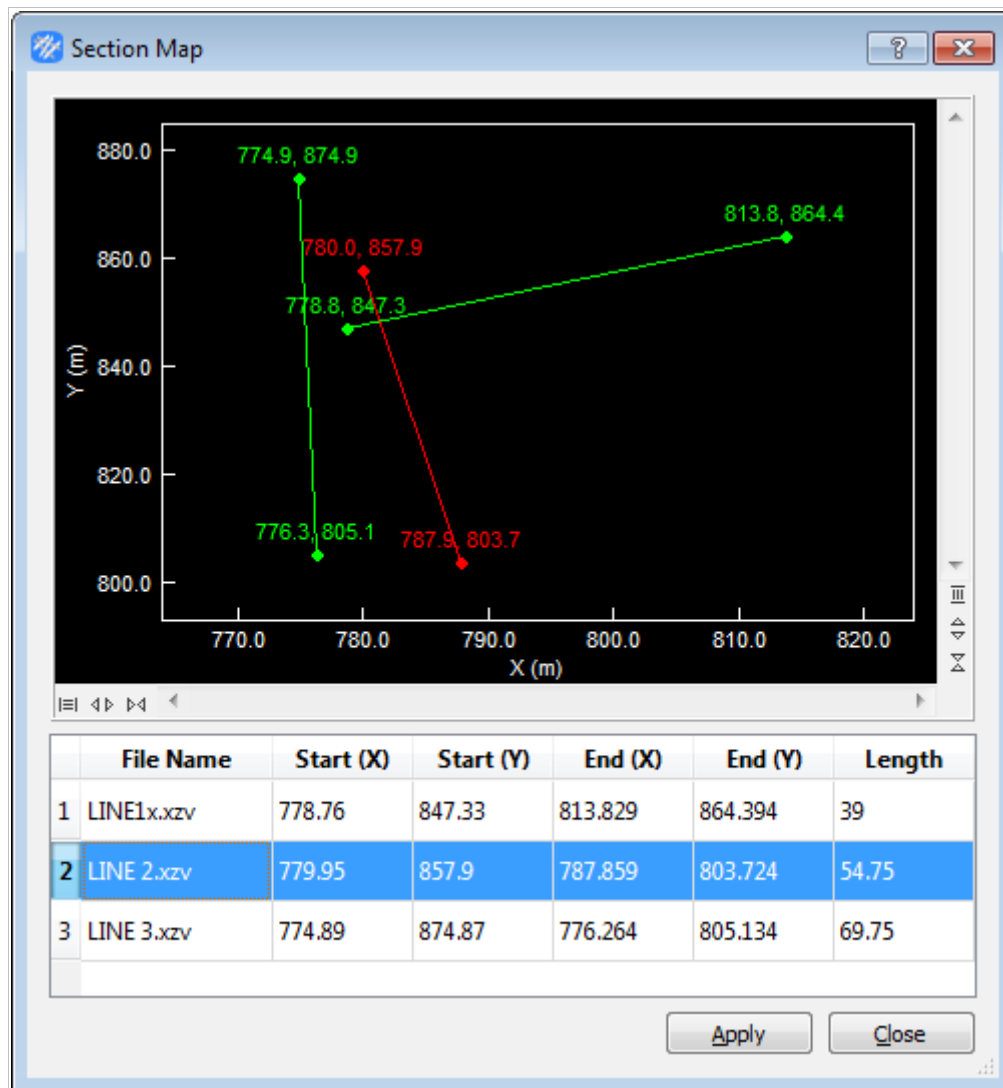


Figure 1-2: The balanced scales of x-axis and y-axis

## Part 2 – Reflection Modules

There are two modules for seismic reflection in *Seismic Pro*:

- *SF Imager*
- *Reflector*

The following lists the updates specific to *SF Imager* and *Reflector*.

## Updates in SF Imager

The updates in *SF Imager 8.3* include:

- Horizon picking is added. The picks can be automatically snapped to the peak, trough, or zero-cross of the waveform and saved in CSV format for efficiently importing into Microsoft Excel, as shown in figure 2-1.
- The data display can be vertically zoomed in/out for GPR data with a short sampling length.
- The annotation of timing lines is enhanced for the GPR data, which has a much smaller sampling interval than seismic data.
- The option of unsorting seismic traces is available, which is particularly useful for marine reflection data with irregular GPS coordinates.

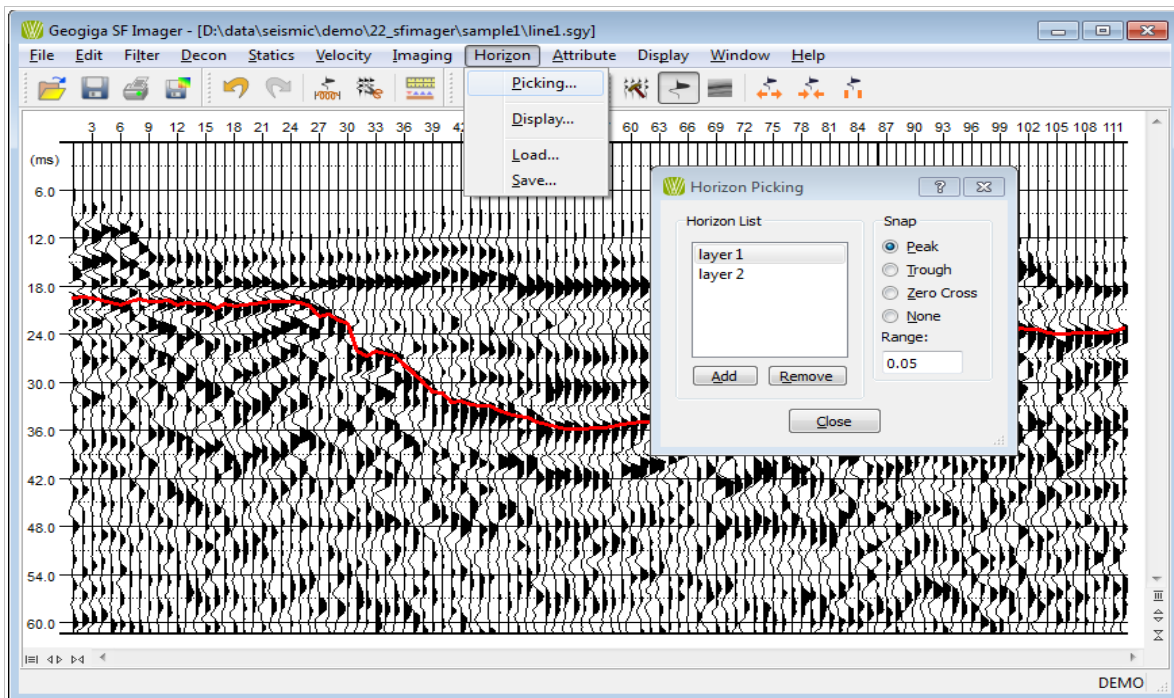


Figure 2-1: Horizon picking

## Updates in Reflector

The following are the updates in *Reflector 8.3*:

- The trigger delay times saved in trace headers are ignored in time to depth conversions.
- The time window is set as milliseconds(ms) instead of the number of samples in the random noise attenuation and the residual static correction, as shown in figure 2-2 and figure 2-3, respectively.
- A floating time window for the residual static correction is correctly initialized after a new dataset is loaded.

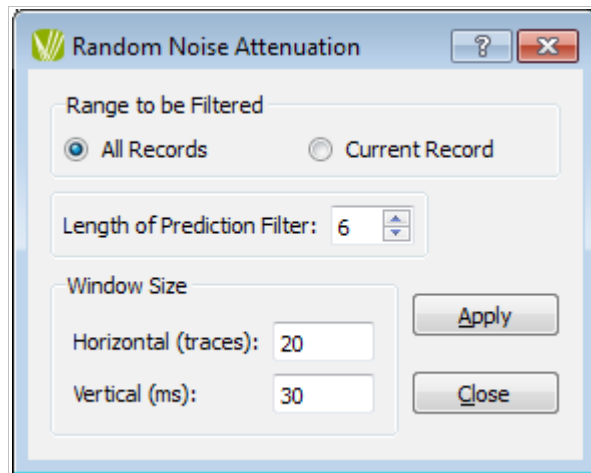


Figure 2-2: The **Random Noise Attenuation** dialog box

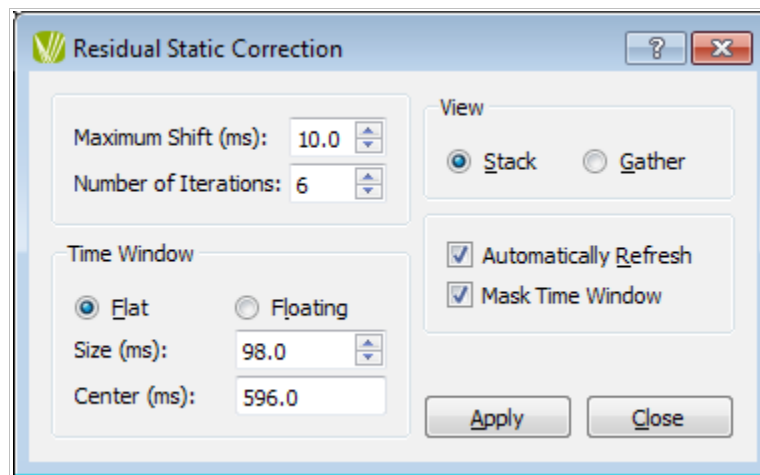


Figure 2-3: The **Residual Static Correction** dialog box



## Part 3 – Refraction Modules

There are three modules for seismic refraction in *Seismic Pro*:

- *Refractor*
- *DW Tomo*
- *DW Tomo3D*

The enhancements common to both *Refractor* and *DW Tomo* are listed below, followed by more updates specific to *Refractor*, *DW Tomo*, and *DW Tomo3D*, respectively.

## General Enhancements

The following new features are available in both *Refractor* and *DW Tomo 8.3*:

- The geometry can be inputted as slope distance or horizontal distance for seismic data collected across topography.

This option is available in the **Input Elevation** dialog box, as shown in figure 3-1, where the elevation is also plotted for QC.

- More 3<sup>rd</sup> party picks formats are supported.
- The geometry of TX curves can be checked without loaded seismic data.
- The fonts used for plotting velocity sections can be changed.

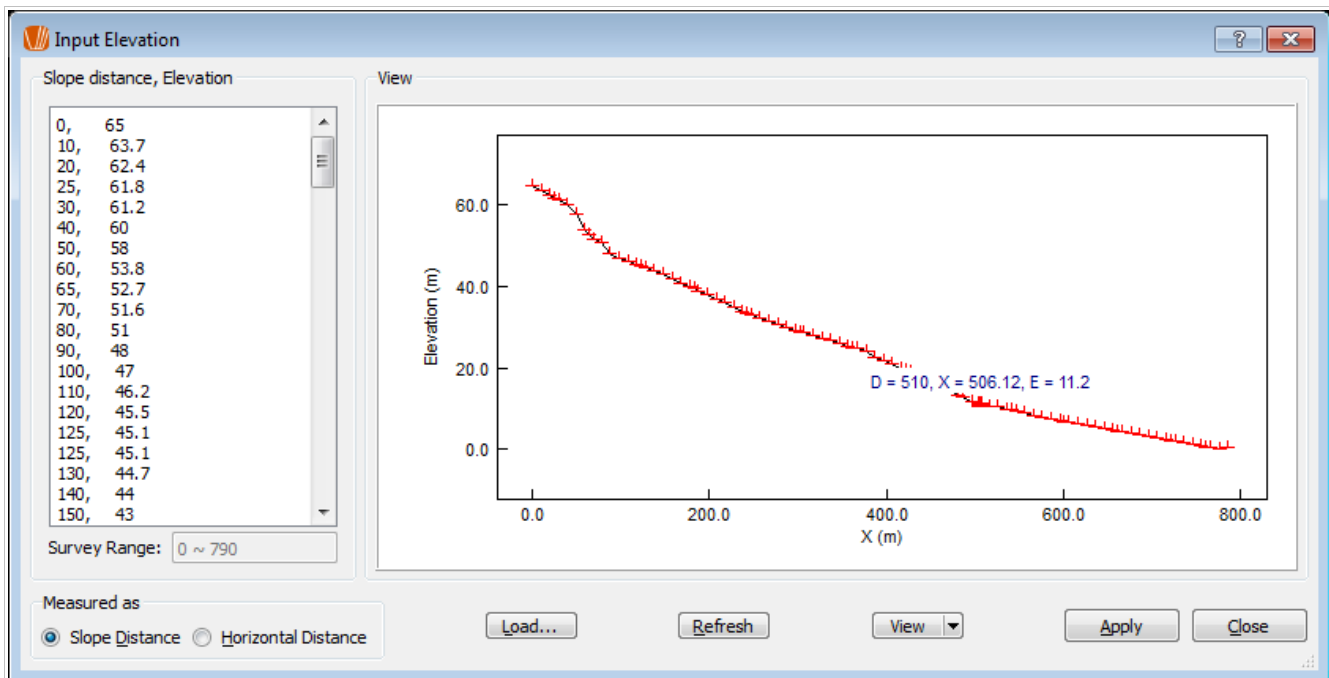


Figure 3-1: Selecting the type of measurement and plotting elevation

## Updates in Refractor

*Refractor 8.3* includes more new features:

- The shot depth correction is added to support the uphole refraction survey.
- The layer ID can be efficiently set using the number key '1', '2', etc. on the keyboard during the layer assignment.
- Layers can also be assigned in the **Trace View** window and in the **Intercept Time** dialog box, as shown in figure 3-2 and 3-3, respectively.
- Any shots near the end shot are allowed to be set as the base shot, and the target zone between the forward and reverse base shots are clearly marked, as shown in figure 3-4.
- The minimum irregular spacing is derived to correctly define the spacing in building the depth section. The depth of layers are properly extrapolated following the elevation to avoid the crossover of layers.
- The elevation is plotted in the **Depth View** window when elevation data is available and the color can also be changed.

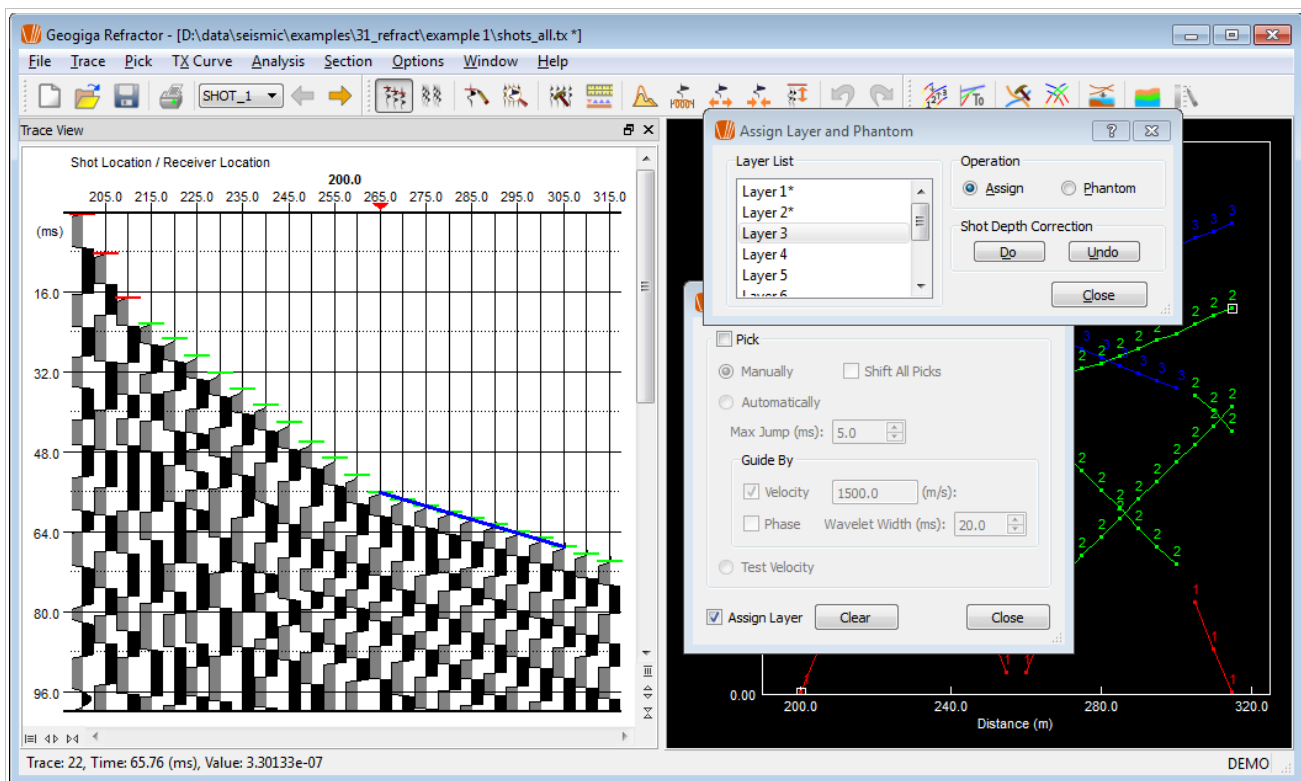


Figure 3-2: Assigning layers in the **Trace View** window

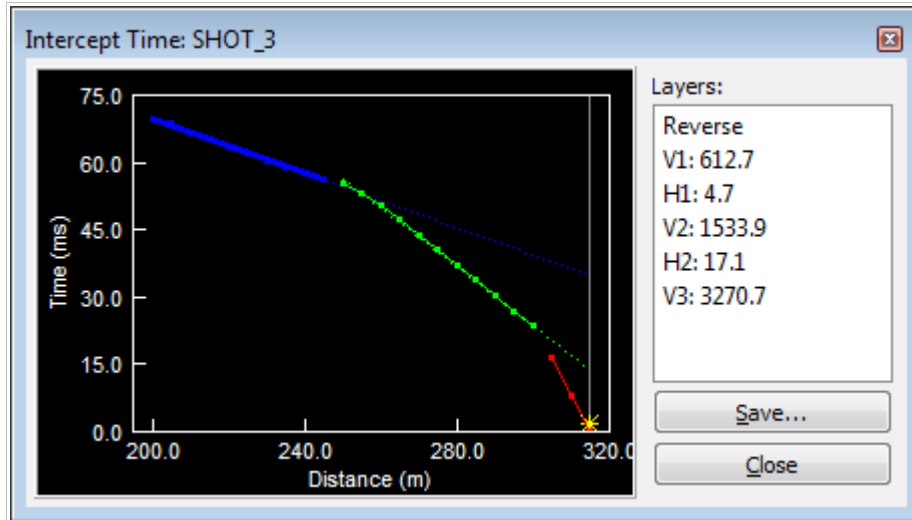


Figure 3-3: Assigning layers in the **Intercept Time** dialog box

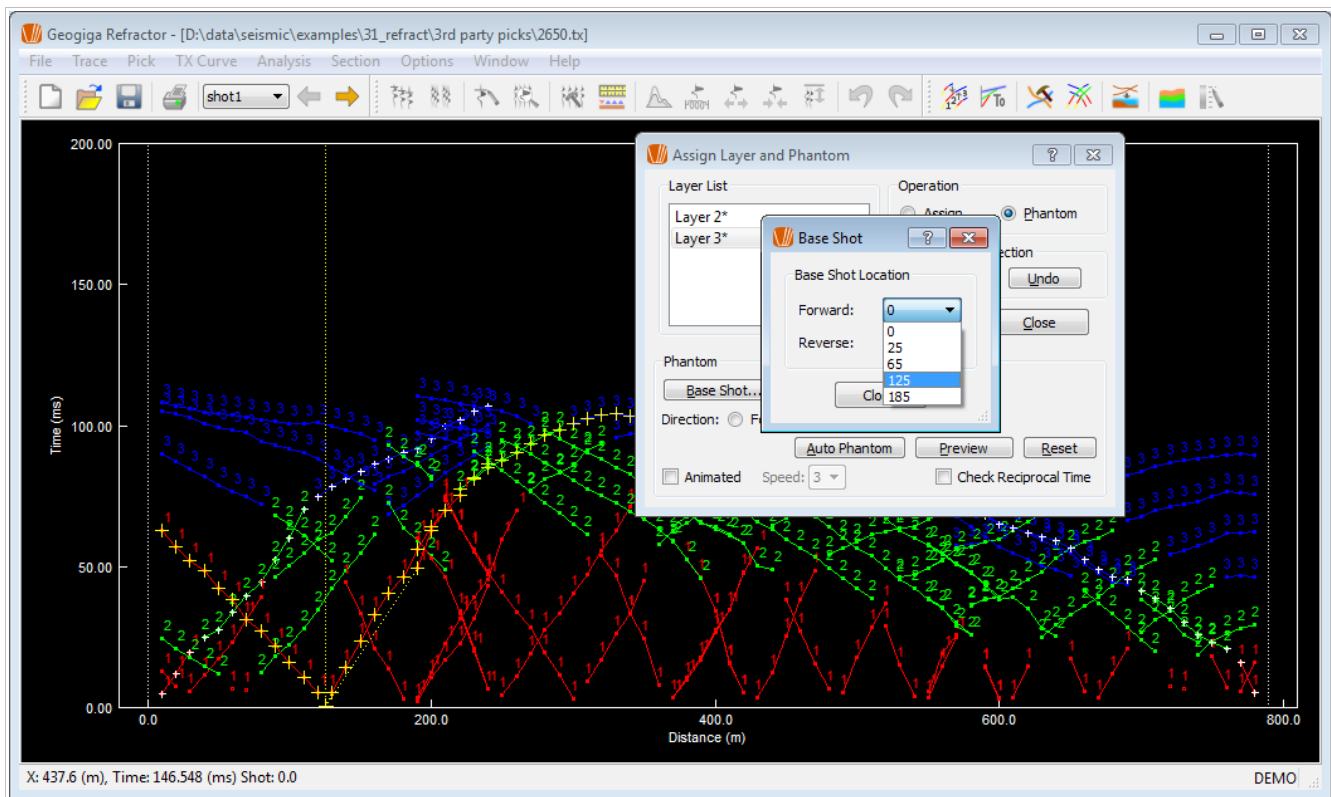


Figure 3-4: Selecting base shot

## Updates in DW Tomo

There are a few bug fixes in *DW Tomo 8.3*:

- Occasionally, the geometry of traveltimes curves were not updated when the geometry of seismic data was changed.
- The initial velocity model loaded from a XZV file was unable to be smoothed.
- The shot depth was not saved in the traveltimes curve file.

## Updates in DW Tomo3D

*DW Tomo3D 8.3* includes the following new features:

- A 3<sup>rd</sup> party format of TX curve is supported.
- The trimmed velocity model can be exported in the XYZV format.

## Part 4 – Surface Wave Modules

There are four modules related to surface waves in *Seismic Pro*:

- *Surface*
- *Surface Plus*
- *Surface3D*
- *Microtremor*

The enhancements common to both *Surface* and *Surface Plus* are listed below, followed by more updates specific to *Surface Plus*, *Surface3D*, and *Microtremor*, respectively.

## General Enhancements

The following new features are available in both *Surface* and *Surface Plus 8.3*:

- The elevation of a survey line is inputted and plotted, as shown in figure 4-1.
- The **Dispersion Analysis** dialog box is simplified, where the F-V, F-K, and F-P domains are clearly labeled.
- The amplitude or power spectrum displayed in the **Frequency Spectrum** dialog box can be saved in a file.
- The dispersion curve is automatically picked with a predefined frequency interval, and the picks can be decimated later if required.
- The plotting color of dispersion picks for different modes can be changed.
- An initial model of inversion can be automatically built based on either the curvature of dispersion curve or thickness of layers, as shown in figure 4-2.
- The initial velocity is constrained by the apparent Vs when a model is automatically built or a layer is manually inserted.
- Poisson's ratio and density can be defined for each layer of an initial model, and the search range in the inversion can also specified for each layer, as shown in figure 4-3.
- The default values of Poisson's ratio, density, and search range can be modified and restored for daily use.
- The initial velocity model of the current record is automatically saved when a different record is chosen.
- The **Inversion Settings** dialog box is reorganized and simplified, as shown in figure 4-4.
- All dispersion curves can be sequentially inverted with a single click using the auto-built, current, or defined initial model.
- The **Inversion View Options** dialog box, as shown in figure 4-5, is added to configure the display of inversion related views. The misfit of inversion can also be calculated as either RMS error or normalized RMS error.
- The higher-mode dispersion curves are also plotted for output.
- The velocity section can be trimmed based on the depth of the deepest layer above the half-space, as shown in figure 4-6.

- Results including the inversion misfit can be optionally exported in CSV format for efficiently importing into Microsoft Excel.

There are also a few bug fixes in both *Surface* and *Surface Plus 8.3*:

- Automatically building an initial model crashed when a dispersion curve had too few points.
- The inversion crashed if all layers of the initial model were fixed.

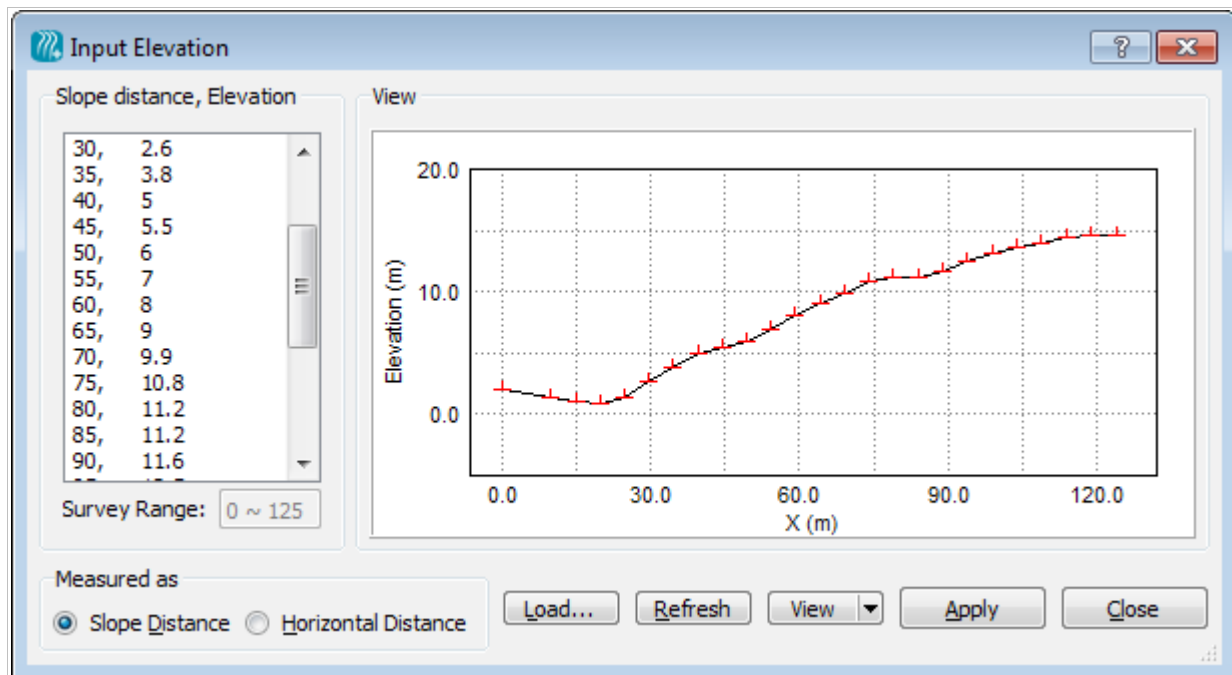


Figure 4-1: Inputting elevation data for a survey line



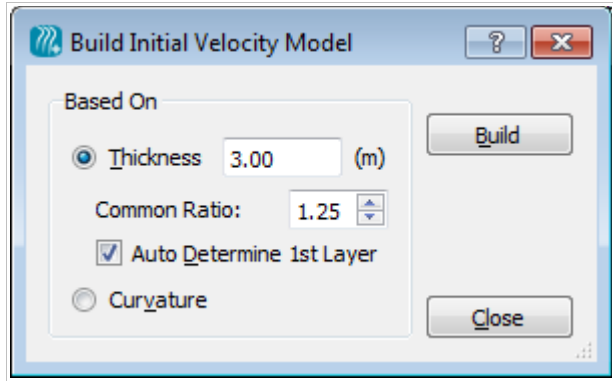


Figure 4-2: Options for automatically building an initial model

Initial Model					
	Depth (m)	Vs (m/s)	Range (%)	$\sigma$	$\rho$ (t/m <sup>3</sup> )
1	1.6	126	5	0.32	1.7
2	5.3	150	20	0.3	1.8
3	9.5	185	0	0.35	2
4	16	230	20	0.35	2
5	33	370	20	0.35	2

Depth   

Figure 4-3: Specifying search range, Poisson's ratio, and density for each layer

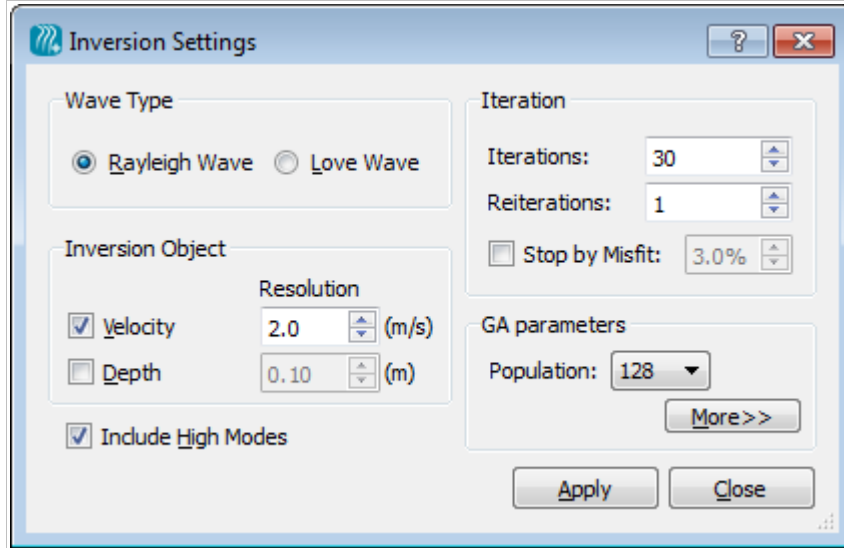


Figure 4-4: The simplified **Inversion Settings** dialog box

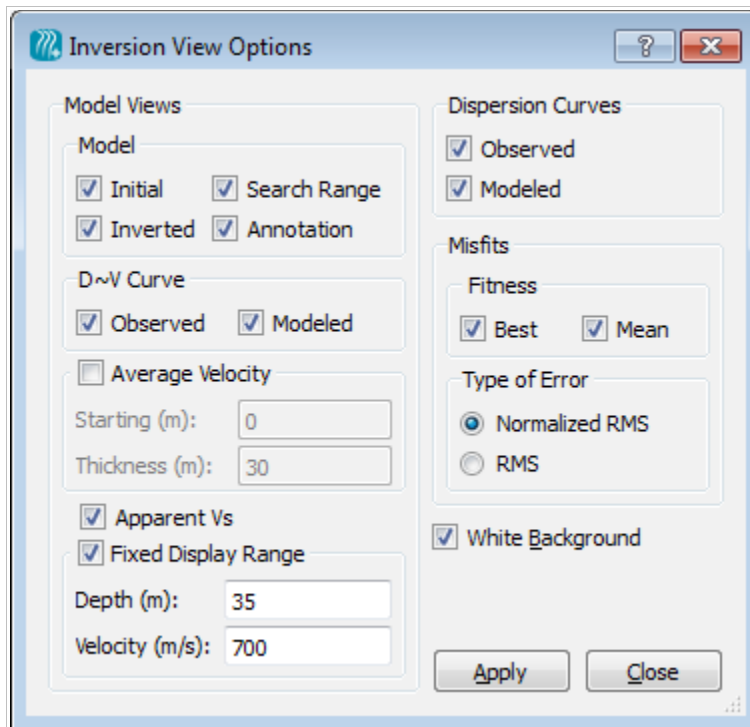


Figure 4-5: The **Inversion View Options** dialog box

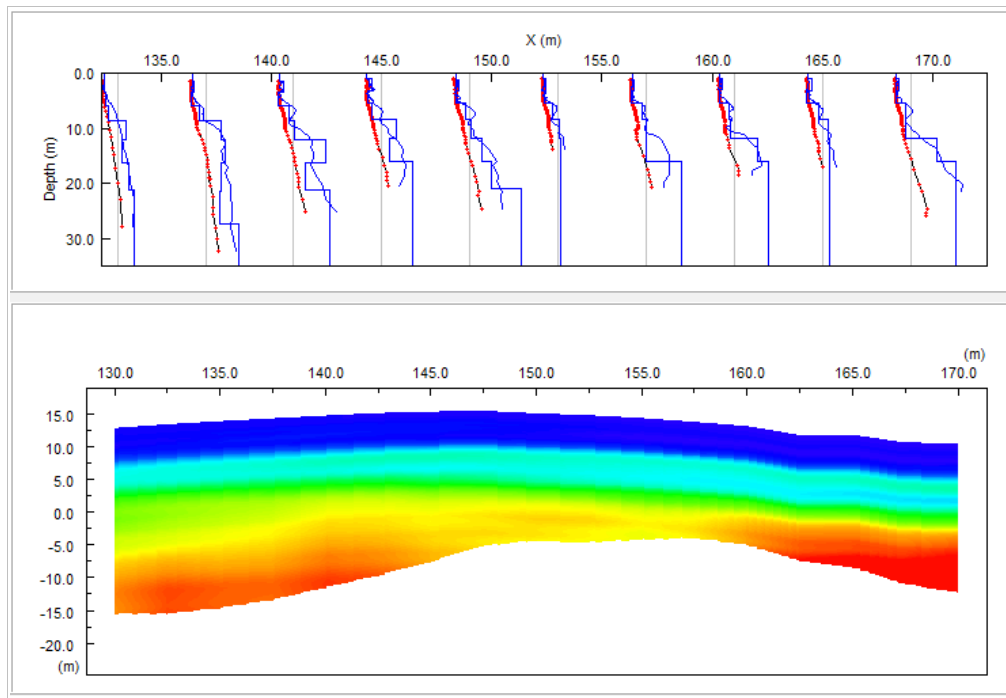


Figure 4-6: Trimming velocity section based on the depth of the deepest layer

## Updates in Surface Plus

Surface Plus 8.3 includes more new features:

- The implementation of ESPAC has been improved for greater depth of investigation.
- The length of time segment is set in the **Dispersion Analysis** dialog box instead of the **Time Segmentation** dialog box.
- The lower frequency limit of active surface waves and the upper frequency limit of passive surface waves can be simultaneously defined, as shown in figure 4-7, in order to conveniently combine the dispersion images of active and passive surface waves.

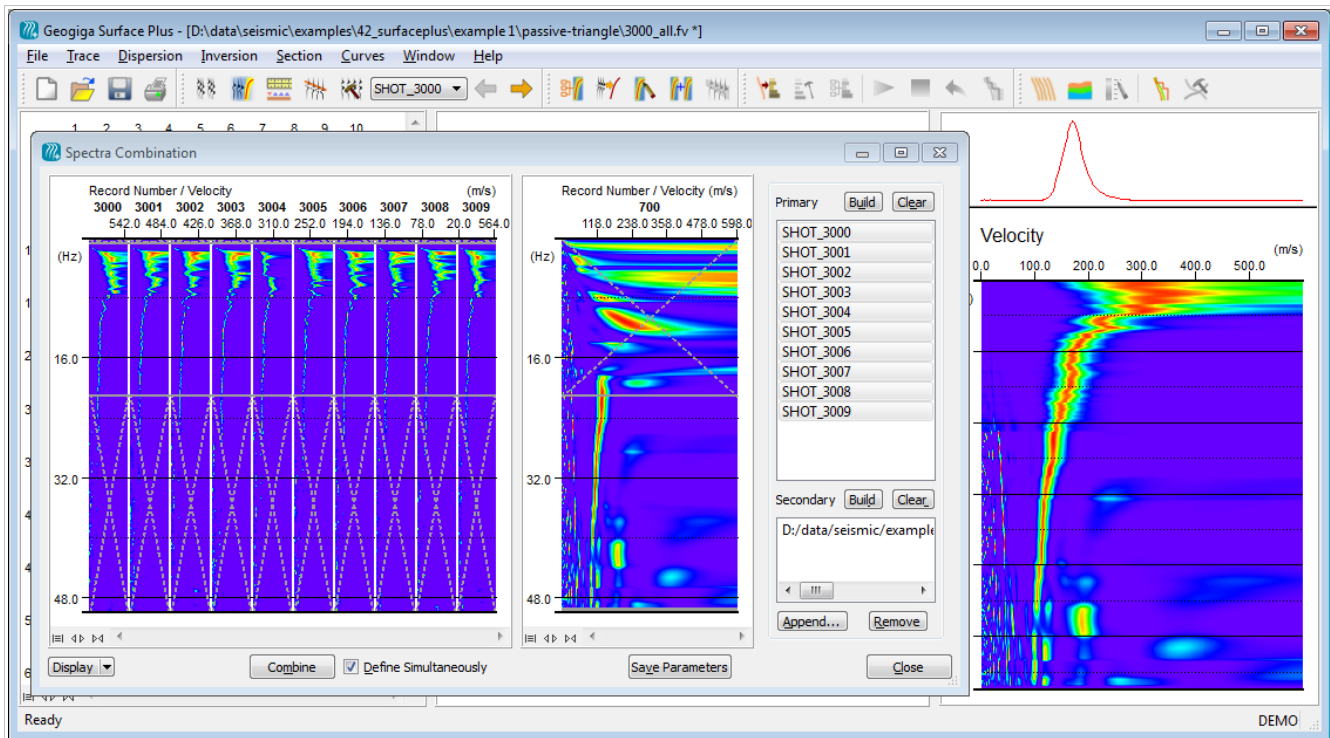


Figure 4-7: Combining the dispersion images of active and passive surface waves

## Updates in Surface3D

Surface3D 8.3 has the following new features:

- The velocity volume can be built based on the dispersion curve, inverted model, or apparent Vs, as shown in figure 4-8.
- The built volume can be saved in a SEG-Y file.

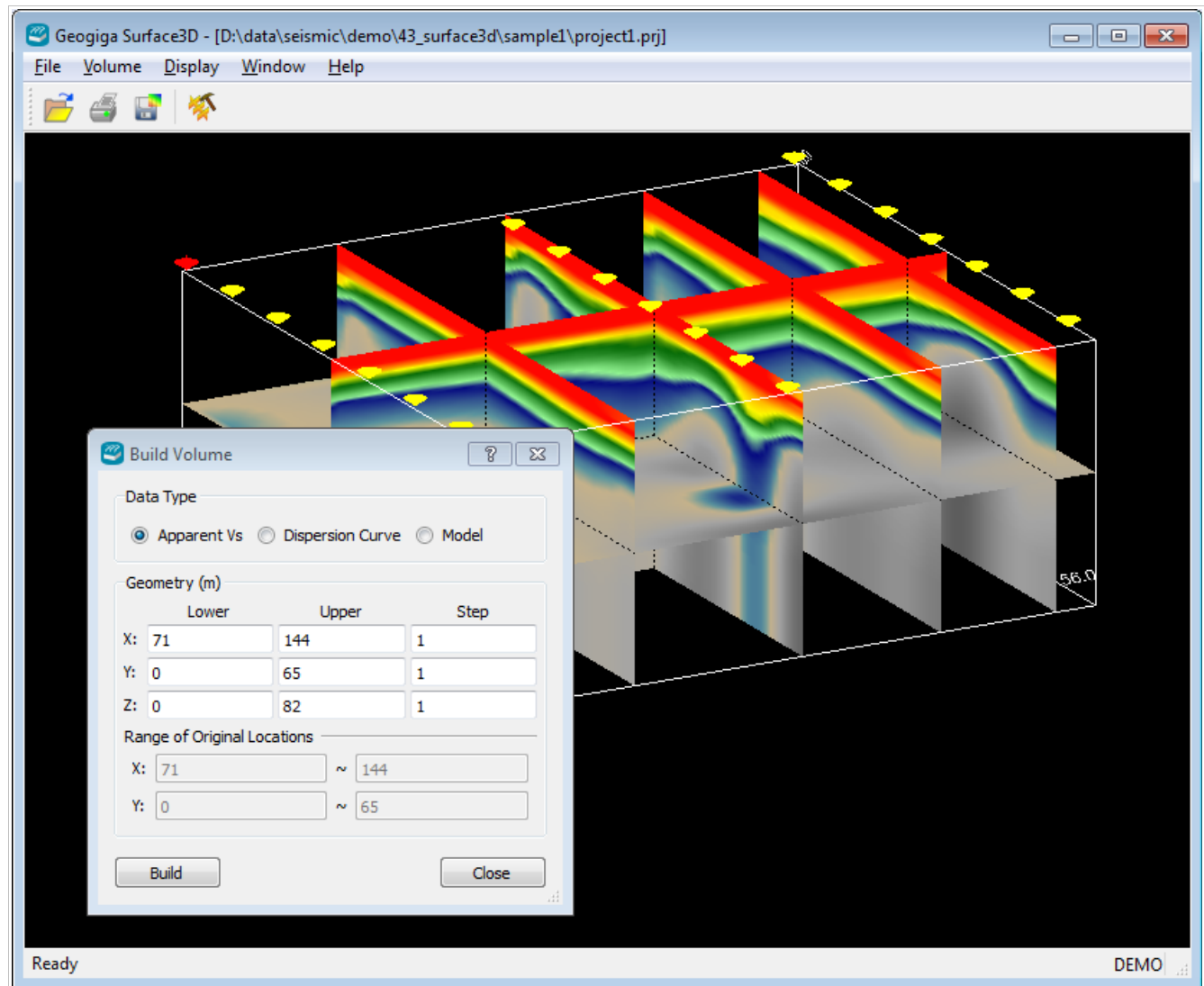


Figure 4-8: Selecting the type of data to build a velocity volume

## Updates in Microtremor

*Microtremor 8.3* has the following new features:

- The lengths of time windows are set in either time or number of samples.
- A time window can be deselected on the spectrum graph.
- The predominant frequency is determined within a manually defined frequency window, as shown in figure 4-9.
- The frequency axis can be plotted with a logarithmic or linear scale.
- The SAF data format is supported.

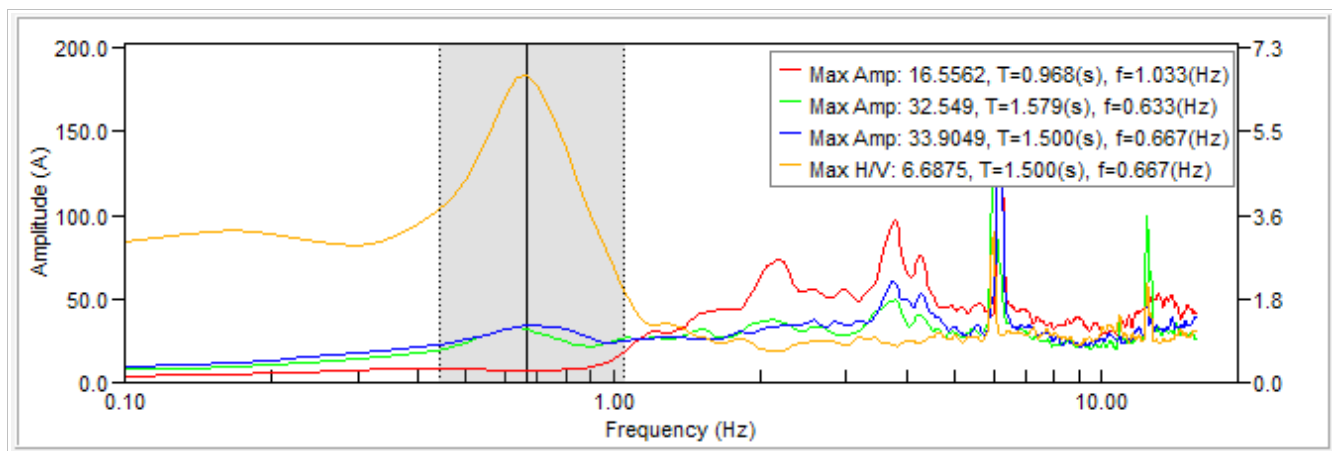


Figure 4-9: Determining the predominant frequency within a defined window

## Part 5 – Borehole Seismic Modules

There are three modules for borehole seismic in *Seismic Pro*:

- *XW Tomo*
- *VSP*
- *PS Log*

The following are the updates in *XW Tomo 8.3*:

- The lithologic symbol file applied in plotting velocity sections are loaded from the local user directory to properly restore the user-defined symbols.
- When a different seismic record is selected, the trace plotting in the **Trace Magnifier** window is updated without a click in the **Trace View** window.
- The display of a seismic trace in the **Trace Magnifier** window is consistent with that in the **Trace View** window, as shown in figure 5-1.

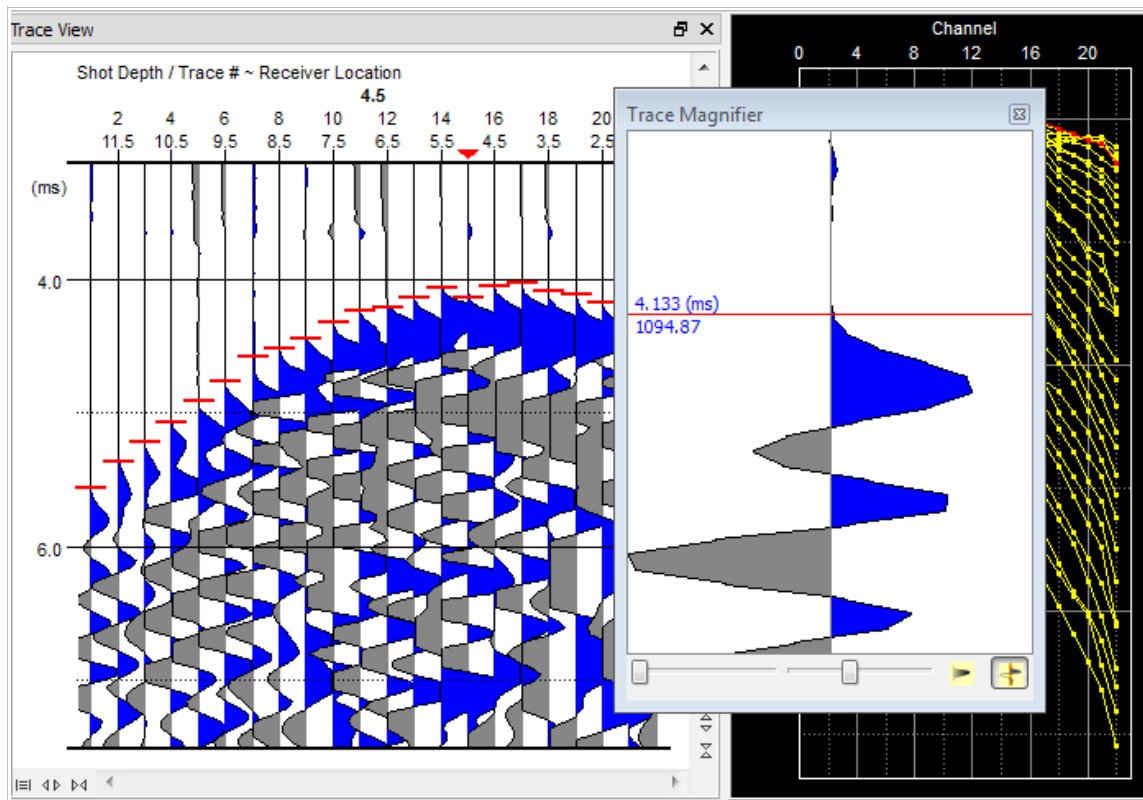


Figure 5-1: Consistent trace display in the **Trace Magnifier** and **Trace View** windows

## Technical Support

If you have questions or need technical assistance, please contact us using the information given below:

- Telephone: 1-403-4514886
- Email: [support@geogiga.com](mailto:support@geogiga.com)
- Web: [www.geogiga.com](http://www.geogiga.com)