Geogiga Seismic Pro 10.0 Release Notes

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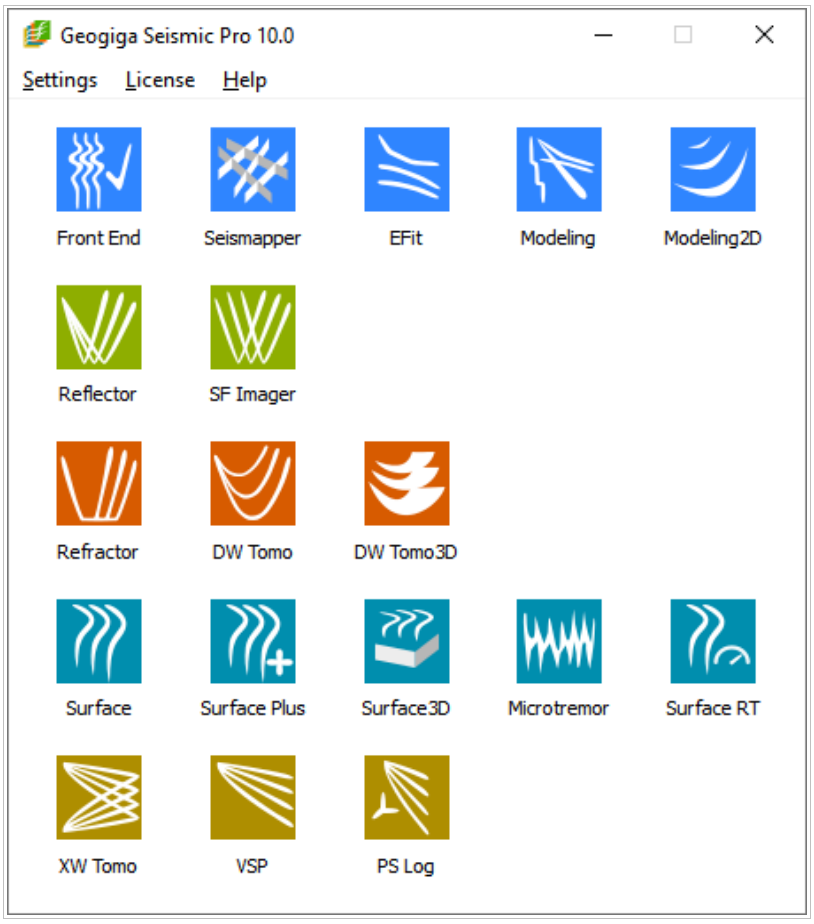
Introduction

This document introduces the release of **Geogiga Seismic Pro** ™ 10.0.

Geogiga Seismic Pro ™ is a complete seismic data processing and interpretation software package adapted for near-surface geophysics. It contains 18 standalone applications handling the full range of seismic survey methods, including Reflection, Refraction, Surface Wave, and Borehole Seismic. There are also utilities for wavefield modeling, velocity model plotting, and much more.



Geogiga Seismic Pro 10.0 Launchpad

Version 10.0 is a major release and includes new features, feature enhancements, and bug fixes. These release notes are provided in the following order:

- Feature updates
- Bug fixes
- List of figures

Feature Updates

The following section first lists the common feature updates to **Seismic Pro** 10.0, and then describes the updates to each individual module.

General Updates

The following updates apply to the majority of the modules in **Seismic Pro**:

1. The SEG-D format is supported when importing seismic data.

2. When seismic data is imported, the coordinates of all seismic records can be pasted at one time from the data copied in a spreadsheet or text editor. In the Geometry dialog box, the coordinates of all receivers can also be pasted at one time.

3. The display of geometry layout charts is optimized. A stacking chart can be plotted according to the shot number or index number to avoid an uneven display of arrays when shot numbers differ greatly.

4. A list of all seismic records is added to conveniently select any record.

5. Contour Plotting

   (1) Levels

   - Levels can be reset by interval or number of levels, given a level method and a plot range.

   (2) Colors

   - A colormap can be efficiently generated with defined key colors and related level scaling ratios.
   - The colormap is automatically updated once the number of levels is changed.
   - The defined key colors can be saved and loaded for future use.

   (3) Contours

   - Contour labels are automatically generated and reasonably distributed on a velocity section according to a specified label density.
   - Labels are properly inserted into contour lines according to the length of the labels, regardless of how sparse or dense the data points are.

- The position of contour labels can be adjusted by manually adding or deleting labels on a velocity section.
- The decimal places and font of contour labels can be changed.
- Contours can be quickly selected by a specified interval for plot and label.

(4) Colorbar

- Labels can be adjusted by the start and frequency of levels.
- Colors can be separated by ticks or separate lines.

6. Section Display

(1) Gridlines can be plotted on a velocity section.

(2) The vertical axis can be labelled as either elevation or depth.

(3) Some parameters of the display settings are automatically saved and restored.

7. The last displayed position and size of common dialog boxes are kept, so that they are not always shown in the middle of the main window when they are opened.

8. More shortcut keys are added for the main interface and dialog boxes.

Updates to Individual Modules

The following are the updates to each individual module in **Seismic Pro**:

Front End

(1) Seismic data files are sorted more naturally by record numbers in filenames.

(2) When traces recorded by nodal seismometers are assembled, simpler file list formats are supported to load all traces at one time. The nodal data information, including filenames and coordinates, can also be saved in a text file.

(3) The receiver coordinates in the geometry table can be saved in a text file.

Seismapper

(1) When a new project is created, the coordinates of all survey lines can be pasted at one time from the data copied in a spreadsheet or text editor.

(2) Some shortcuts are added for the 3D view.

Modeling

(1) The previously defined velocity model is automatically loaded.

(2) The parameters of a velocity model can be pasted at one time from the data copied in a spreadsheet or text editor.

Modeling2D

(1) Cavities can be added to a velocity model.

(2) Topography is supported.

Reflector

(1) Crooked lines are supported.

(2) CMP binning can be performed on straight lines with irregular spacing.

(3) Field static corrections can be applied to a survey line with 3D coordinates.

(4) When a crooked-line stack is saved, the 3D coordinates of stacked traces can be saved in a text file.

SF Imager

(1) 3D coordinates, such as GPS coordinates, are supported.

(2) Field static corrections can be applied to a survey line with 3D coordinates.

(3) A seismic section and/or coordinates can be horizontally reversed with the support of undo and redo.

Refractor

(1) When a TX curve file is opened, the corresponding seismic data file will be searched automatically.

(2) The calculation of surface velocities in segments is improved.

(3) The layer velocity is shown in the status bar while a layer is assigned.

(4) If the number of layers changes along a survey line, segments with the same number of layers can be interpreted separately.

(5) The distance between two points in a depth profile can be interactively measured.

DW Tomo

(1) The effect of local topographic variations can be removed in the inversion.

(2) The algorithm for creating concave envelopes is improved so that a velocity model can be properly trimmed according to the envelope of rays.

DW Tomo3D

(1) The method of creating surfaces based on elevations of shot points and receivers is improved for complex topographic variations.

(2) The picked and calculated travel-time curves can be hidden or shown.

(3) The Z coordinate values of the velocity model can be exported by depth or elevation.

Surface and **Surface Plus**

(1) When a dispersion curve file is opened, the corresponding seismic data file will be automatically searched.

(2) The main frequency of a wave can be measured by holding down the Ctrl key when testing the apparent velocity of a wave group.

(3) The seismic data's record number is displayed at the top of a dispersion image.

(4) The fonts for the axis labels and title in a dispersion image can be changed.

(5) When a dispersion curve is picked on a dispersion image, the position of a pick no longer depends on the specified frequency interval and can be arbitrarily adjusted, especially in the low-frequency range.

(6) The parameters of an initial velocity model can be pasted at one time from the data copied in a spreadsheet or text editor.

(7) An initial velocity model can be automatically built according to the specified number of layers.

(8) When building an initial model, any two variables of P-wave velocity, S-wave velocity and Poisson's ratio can be inputted to calculate another variable.

(9) The inversion is improved to better fit dispersion curves in the low-frequency range.

(10) Some parameters for initial model building and dispersion curve inversion are automatically saved and restored.

(11) The curve display settings in the inversion sub-windows can be adjusted.

(12) When results, such as Vs30, are exported, the output file is automatically named and the coordinates of dispersion curves are exported.

Surface Plus only

(1) A new, proprietary processing technique using common-zone (CMZ) gathers is introduced. With this technique, a 2D velocity section can be efficiently generated from active or passive surface wave data collected with fixed and/or roll-along arrays.

(2) Common-offset gathers can be displayed to check lateral velocity variations.

(3) The horizontal axis for seismic data views is automatically labelled according to 1D or 3D coordinates.

Surface RT

(1) When monitoring passive surface wave data acquisition, the current dispersion image can be cleared anytime with the shortcut key Ctrl+R in order to only check the quality of data collected thereafter.

Microtremor

(1) The data file in SAF format is saved in SEG-2 format.

Bug Fixes

The following section first lists the common bug fixes in **Seismic Pro 10.0**, and then describes the bug fixes in each individual module.

Common Bug Fixes

The following bug fixes apply to the majority of the modules in **Seismic Pro**:

(1) When multiple seismic records were plotted, the display was incorrect after the trace display range was changed in the Trace Display dialog box.

(2) There was no prompt message when a seismic data file failed to be saved due to write protection.

(3) An abnormal exit occurred if traces in a SEG-2 file had different numbers of samples.

(4) An abnormal exit occurred when a SEG-2 data file in 20-bit floating point format was loaded.

(5) The automatically generated contour labels were too sparse.

(6) Sometimes, the color fills were partially wrong for sparse data points.

Bug Fixes in Individual Modules

The following are the bug fixes in each individual module in **Seismic Pro**:

Front End

(1) A file list of nodal seismic data was incorrectly loaded if the file name or directory contained a space.

(2) The time range of trigger delay corrections was incorrectly checked.

(3) Trigger delay corrections could not be preformed on ultra-long seismic records.

(4) Seismic data files in a text format could not be read if the sampling rate was too small.

Seismapper

(1) The program crashed when two parallel and close sections were merged.

(2) The GPS coordinates could not be correctly displayed in the map view of survey lines.

Reflector

(1) Common-receiver gather sorting was incorrect.

SF Imager

(1) The midpoint coordinates were always equal to zeros.

(2) The coordinates of picked horizons were set to the receiver coordinates, rather than the midpoint coordinates.

Refractor

(1) The TX curve file was not updated after the distance measurement option was changed.

(2) The shot points in both forward and reverse directions were always plotted, even though only one direction was selected to be displayed.

DW Tomo

(1) Sometimes, the values at the endpoints of a survey line were missing in the velocity model.

(2) The output blanking file was incorrect when the ground surface was not flat.

DW Tomo3D

(1) An initial velocity model could not be created if the original coordinate of geometry was set to (0,0).

Surface

(1) An abnormal exit occurred when the Trace Display dialog box was opened from the Trace menu bar.

(2) The output blanking file was incorrect after a velocity section was trimmed.

Surface Plus

(1) The CMPCC gathers were incorrectly generated if the coordinates of receivers decreased.

(2) After a seismic dataset was imported and CMPCC gathers were generated, creating CMPCC gathers from other data no longer worked.

(3) Certain time windows were missed in calculating SPAC functions.

(4) When dispersion images were combined, multiple files could not be selected in the secondary file list.

(5) The output blanking file was incorrect after a velocity section was trimmed.

List of Figures

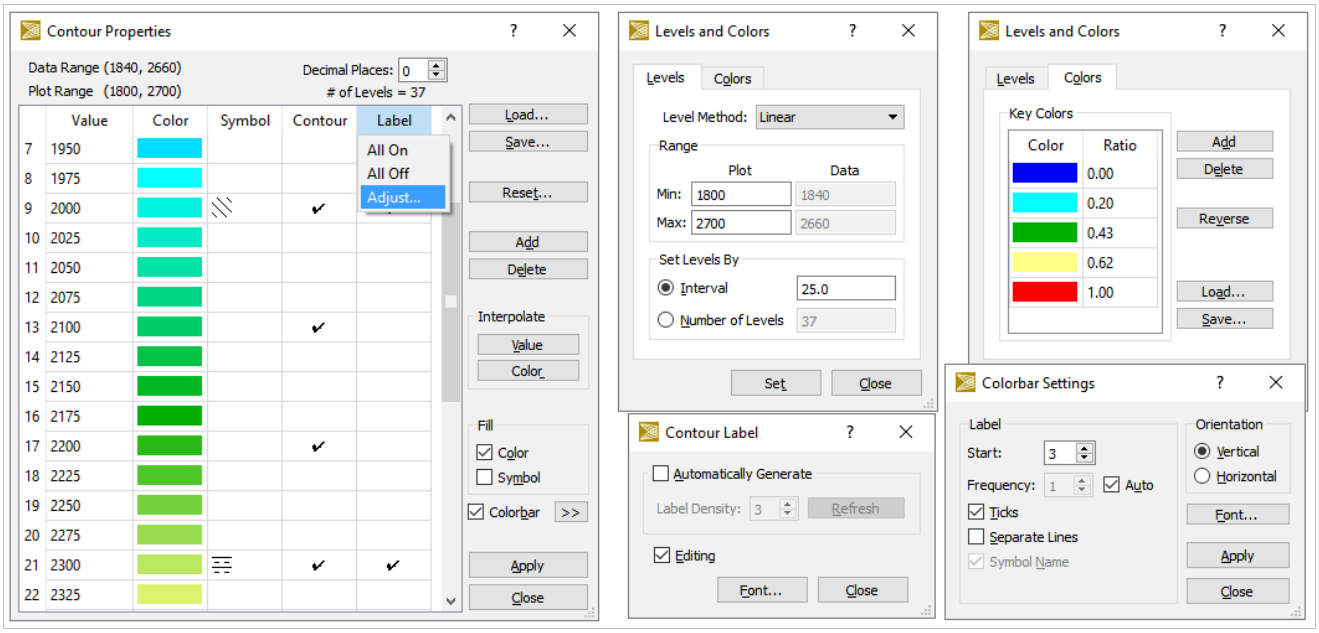


Figure 1: Enhanced contour settings

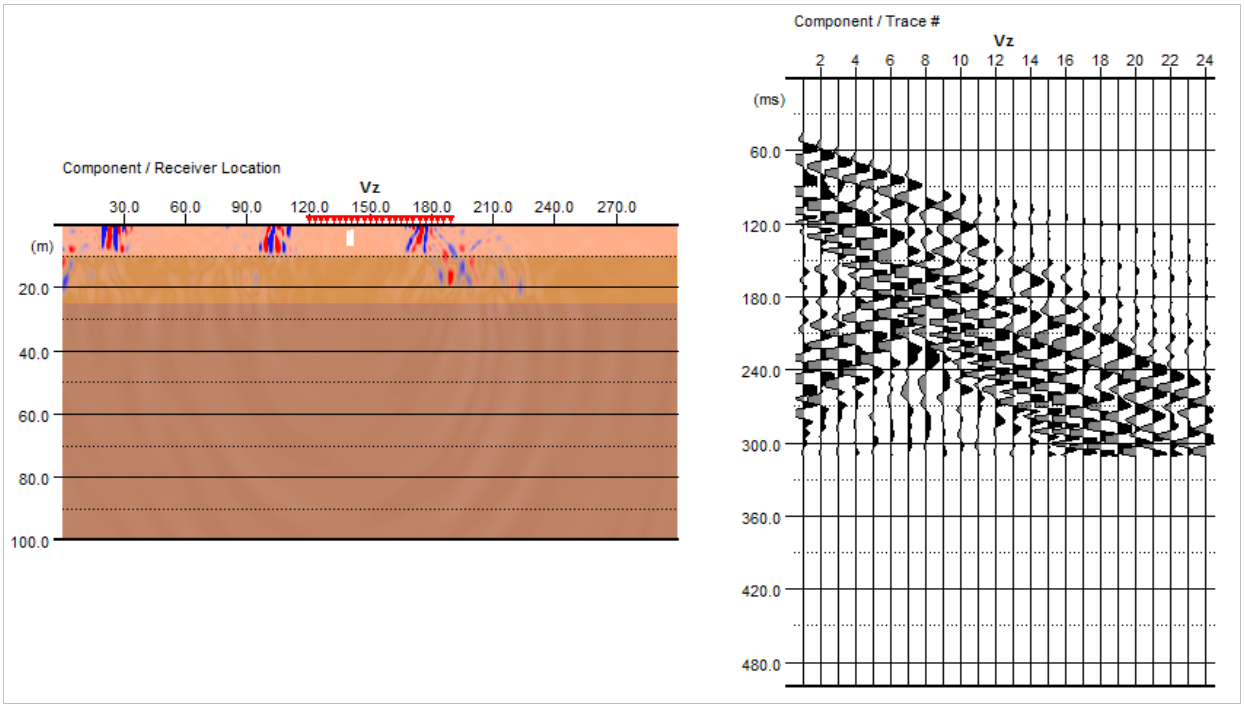


Figure 2: Adding cavities to a velocity model in **Modeling2D**

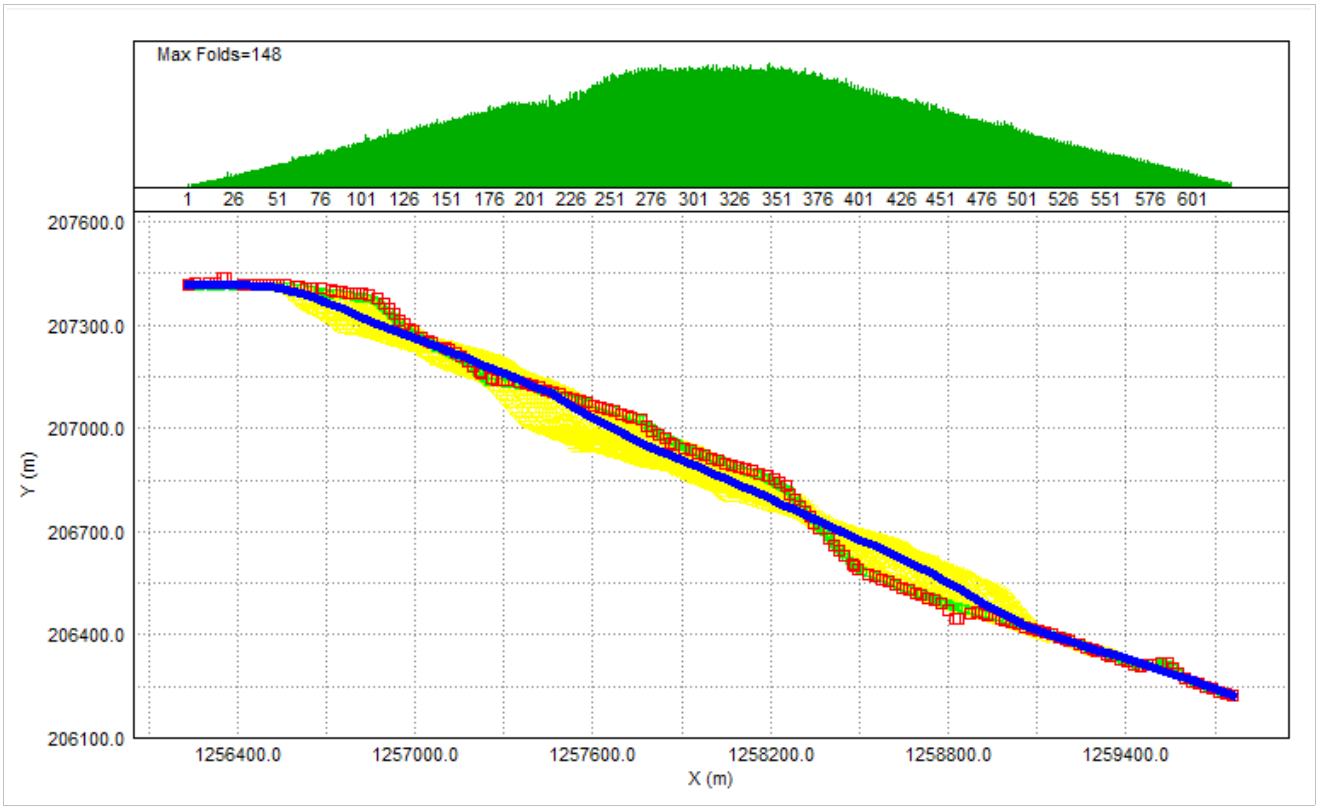


Figure 3: Crooked-line data processing in **Reflector**

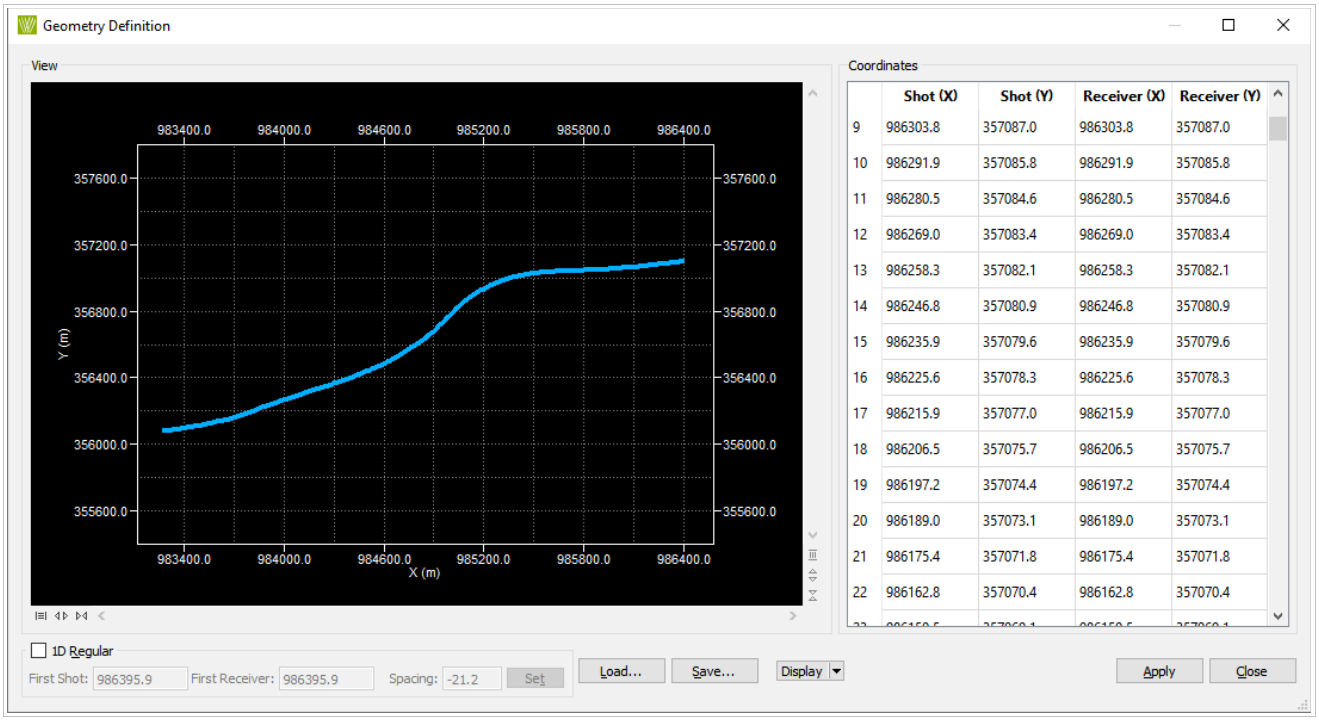


Figure 4: 3D coordinate support in **SF Imager**

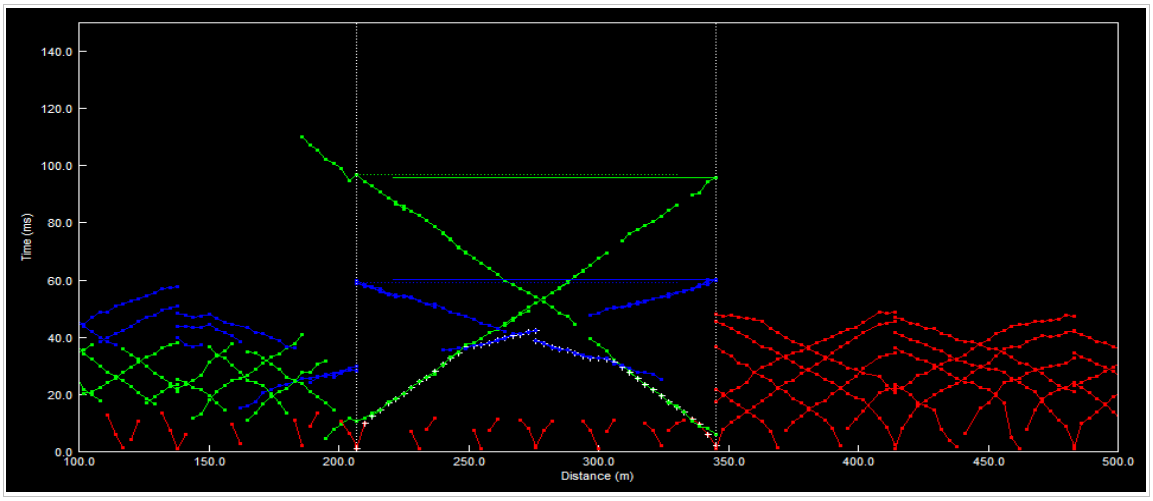


Figure 5: Interpreting a partial section in **Refractor**

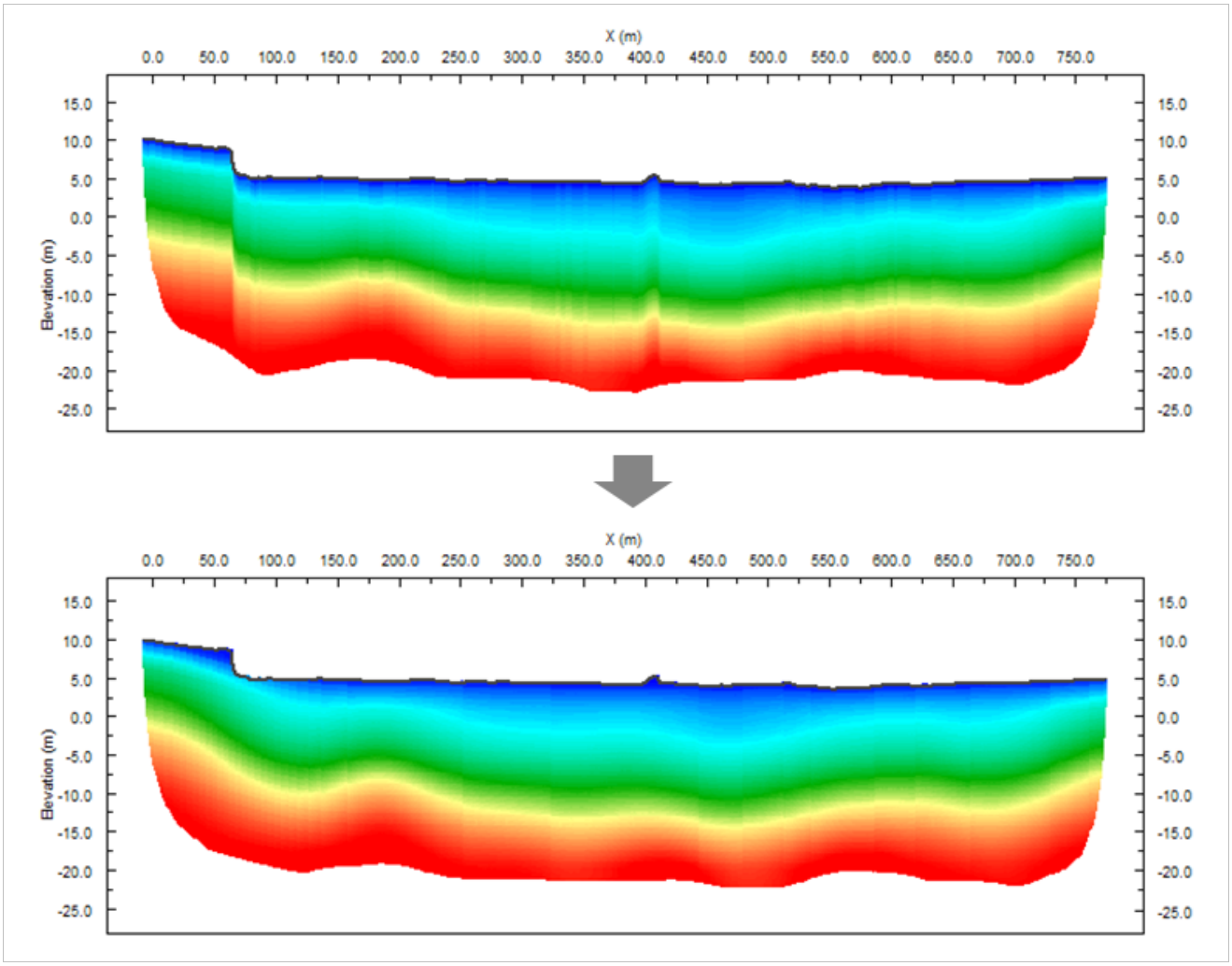
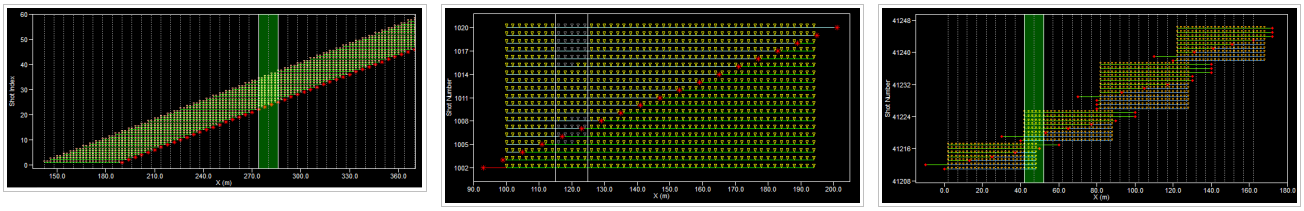
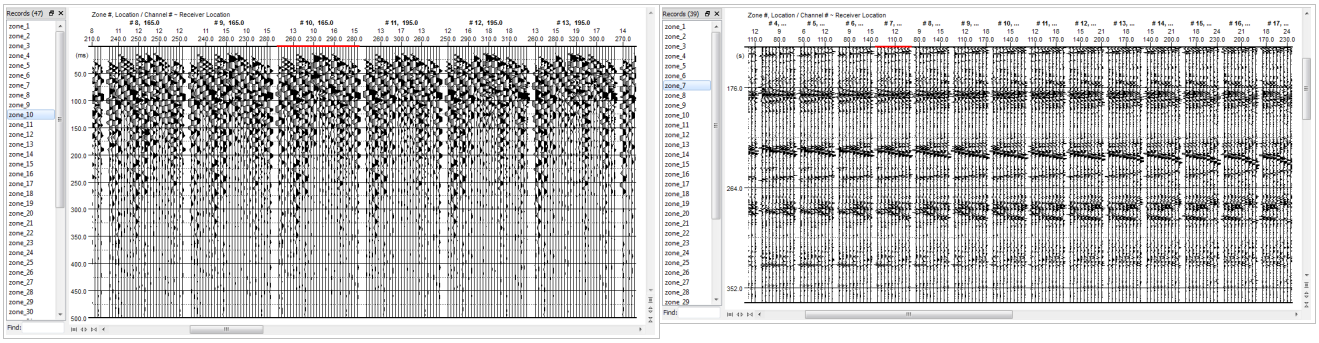


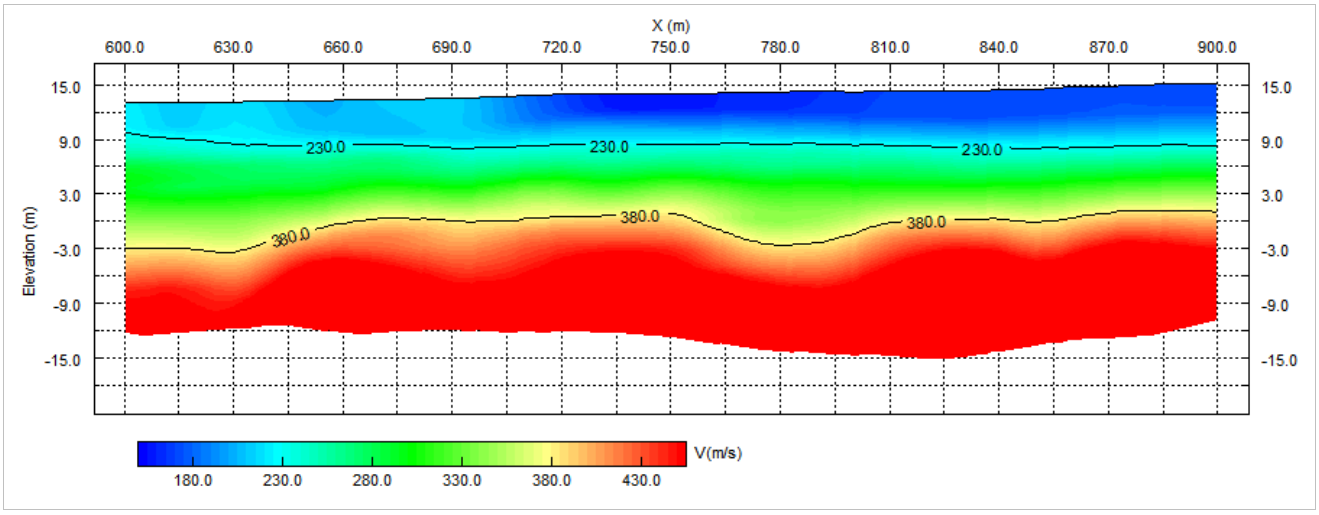
Figure 6: Removing the effect of local topographic variations in **DW Tomo**



(a) Roll-along and/or fixed arrays



(b) Common-zone (CMZ) gathers (Left: active data, right: passive data)



(c) 2D velocity section generated from CMZ gathers

Figure 7: Data processing based on CMZ gathers in **Surface Plus**