

# smartRefract - Quick start guide

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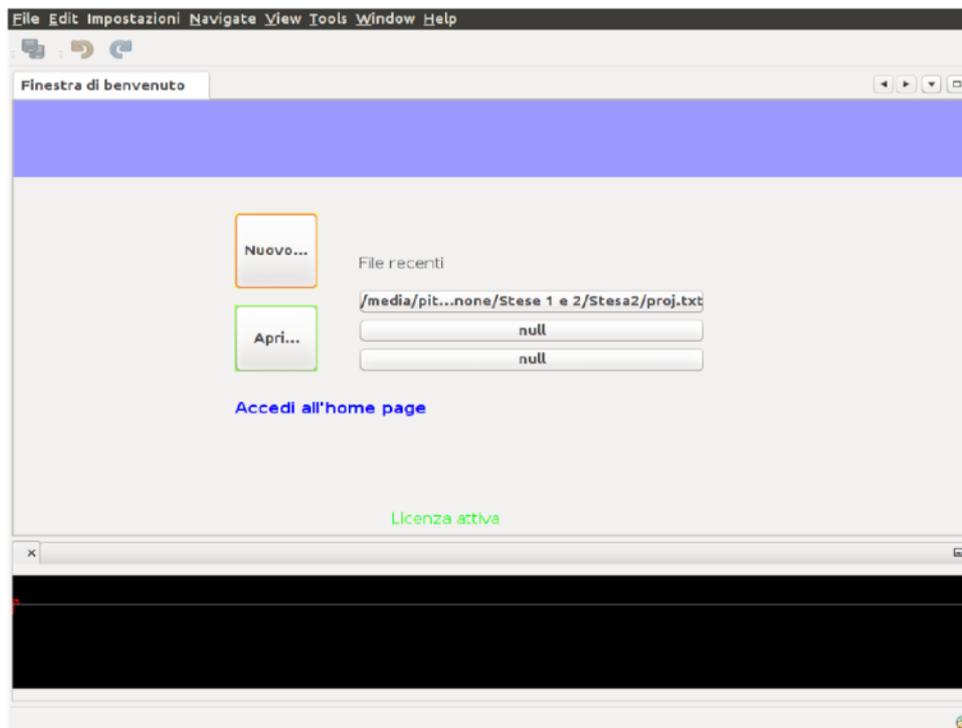
## Introduction

This tutorial will guide you through the interpretation of a refraction survey.

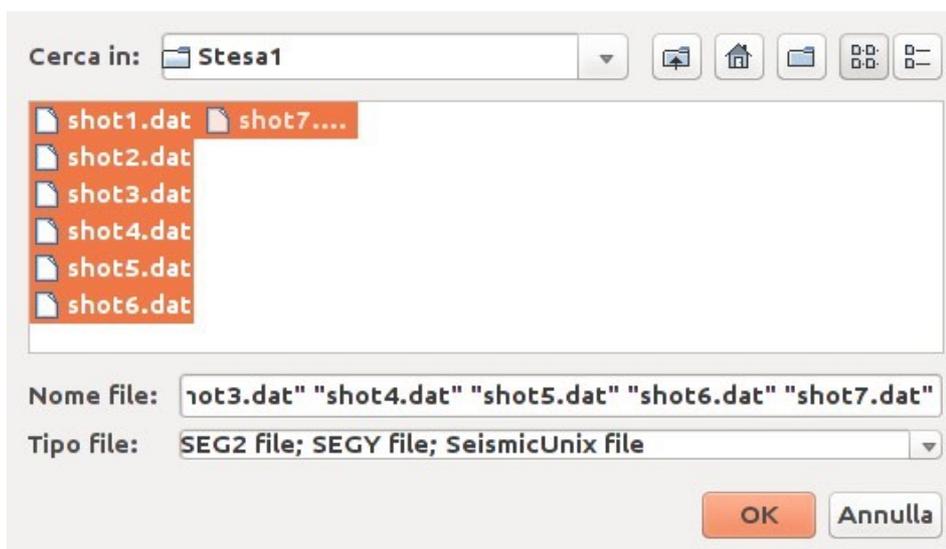
Seismic files must be in one folder in order to be uploaded all at once. You cannot add files to the project after it has been created.

## Starting a new project

At startup smartRefract is presented with the following window.



The buttons offer the possibility to create a new project, open an existing one or open one of the 3 most recently opened projects. Selecting the "New..." button with an orange border will open the window for selecting seismic traces.



To create the project you must select all files related to the seismic line to be processed, it is not possible to add additional files later. The file format is recognized according to its extension:

- SEG2 -> \*.dat, \*.sg2
- SEG Y -> \*.sgy
- SS -> \*.su

After selecting them, continue by pressing the OK button and the window for setting the acquisition geometry will be shown.

Distanza intergeofonica (m)

Posizione primo geofono (m)

Configurazione degli scoppi

Posizione degli scoppi

File sc...	Posizio...
shot1.dat	0.0
shot2.dat	0.0
shot3.dat	0.0
shot4.dat	0.0
shot5.dat	0.0
shot6.dat	0.0
shot7.dat	0.0

NaN NaN NaN NaN NaN NaN NaN

Ok  
Cancel  
Aiuto  
Avanzato ...  
Disegna

**If the seismic files contain geometry all fields are filled in automatically.**

Distanza intergeofonica (m)

Posizione primo geofono (m)

Configurazione degli scoppi

Posizione degli scoppi

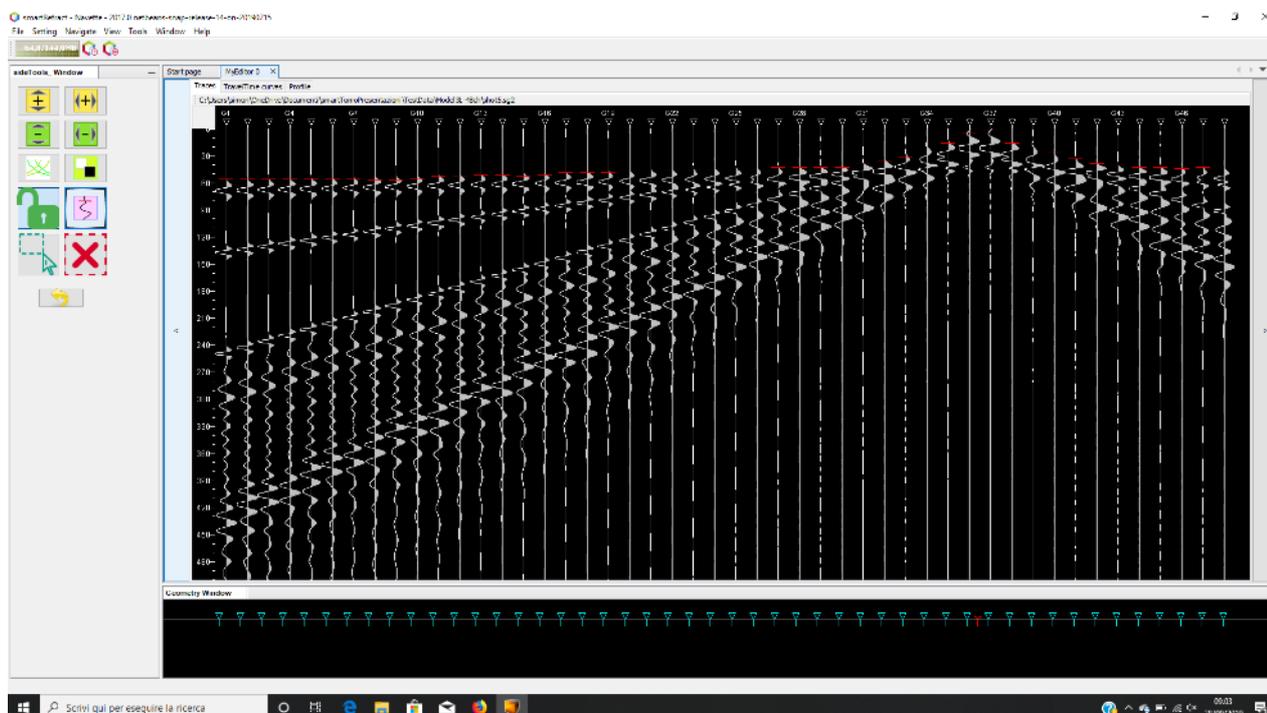
File scoppio	Posizio...
Stesa1\shot1.dat	-10.0
Stesa1\shot2.dat	-1.2
Stesa1\shot3.dat	11.25
Stesa1\shot4.dat	18.75
Stesa1\shot5.dat	26.25
Stesa1\shot6.dat	38.7
Stesa1\shot7.dat	47.5

-10.0m -1.2m 4.5 7.5 10.5 +1.2m +10.0m

Ok  
Cancel  
Aiuto  
Avanzato ...  
Disegna

## Picking

After you have finished setting up the project geometry, the trace view window opens. From this view you can sample (pick) the first arrivals. Editing is enabled by unlocking the lock on the left. The procedure can be carried out either automatically or manually.



Traces and picking first breaks

Sampling can be completed, if the signal has a good signal-to-noise ratio (if you have hammered well), in automatic mode by selecting the Autopick button that appears in the Sidebar on the left. The selection of first arrivals can also be done manually by simply clicking on the track at the point where you want to pick the first arrival.

From the tools panel it is also possible to select the zoom level, either horizontal (track width) or vertical (time).

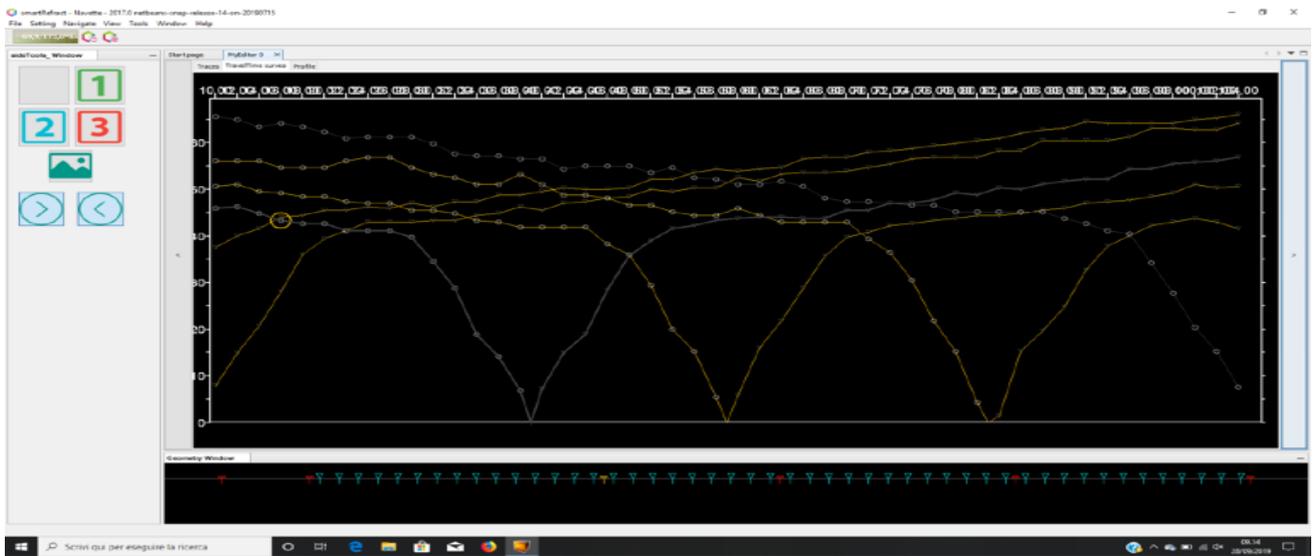
The arrows positioned to the right and left of the view allow you to move from one group of tracks to the previous and next.

## Set travel times to layer

From the "Travel times" tab you can access the dromochrone display. The dromochrone are colored according to the layer to which they are assigned by the user.

In this tab, we assign the first arrivals dromochrone to the corresponding layer. The assignment is done in a few steps

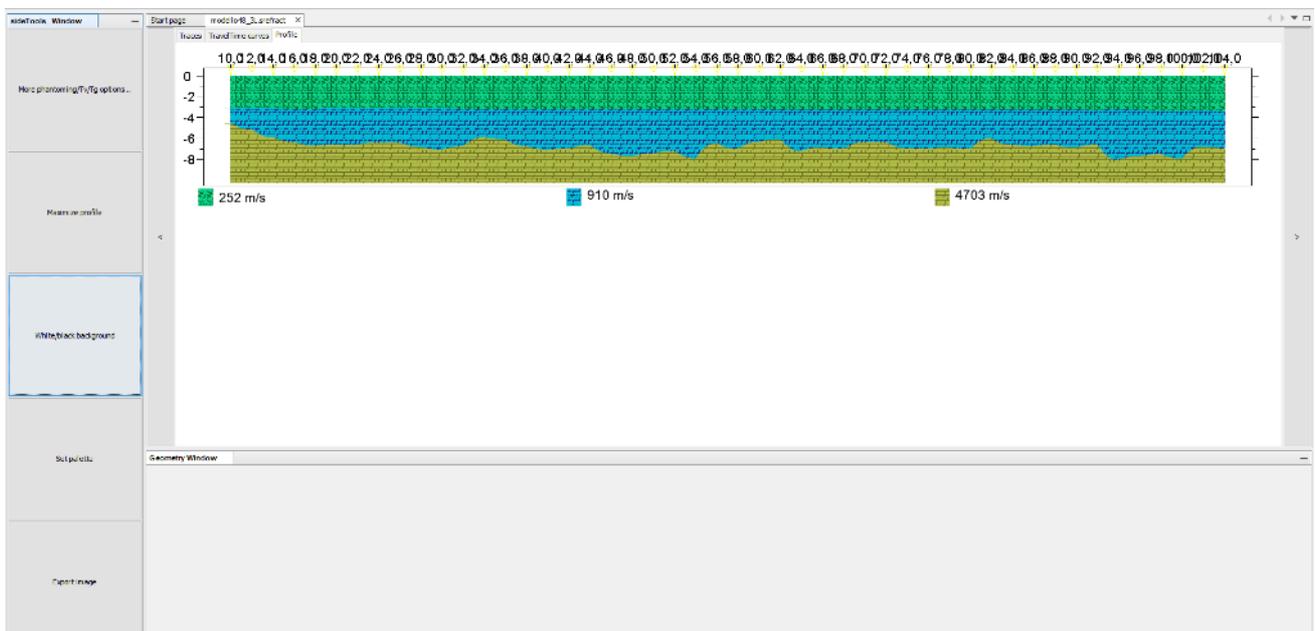
- you select the layer from the side menu, for example "1" for the first layer, the slowest one;
- drag the mouse while holding down the left button on the portion of dromochrone to be assigned to the layer;



Travel-times visualization and editing

To be allowed to visualize the section it is necessary that at least one layer has been selected in addition to the surface layer.

The calculation of the seismic section is done by applying the GRM method; In order to calculate the section, it is necessary that at least one energization is present at both ends of the instrumented line.



Seismic profile

After concluding the dromochrone assignment, in the "Profile" tab the seismic section will be drawn with the GRM method (Palmer, 1980). From the toolbox on the left you can access some useful functions.



#### More phantoming/Tv/Tg options

This button opens a dialog box that allows you to choose some options on how to calculate the topographic profile.

#### Maximize profile/proportional profile

Allows you to display the profile with the same scale on the vertical and horizontal axis or to maximize the profile to fill the whole screen.

#### White/black background

It changes the background color from black to white and vice versa. It is useful to export the image to file.

#### Set Palette

Opens a dialog box that allows you to define the color and pattern of the layer fill.

#### Export Images

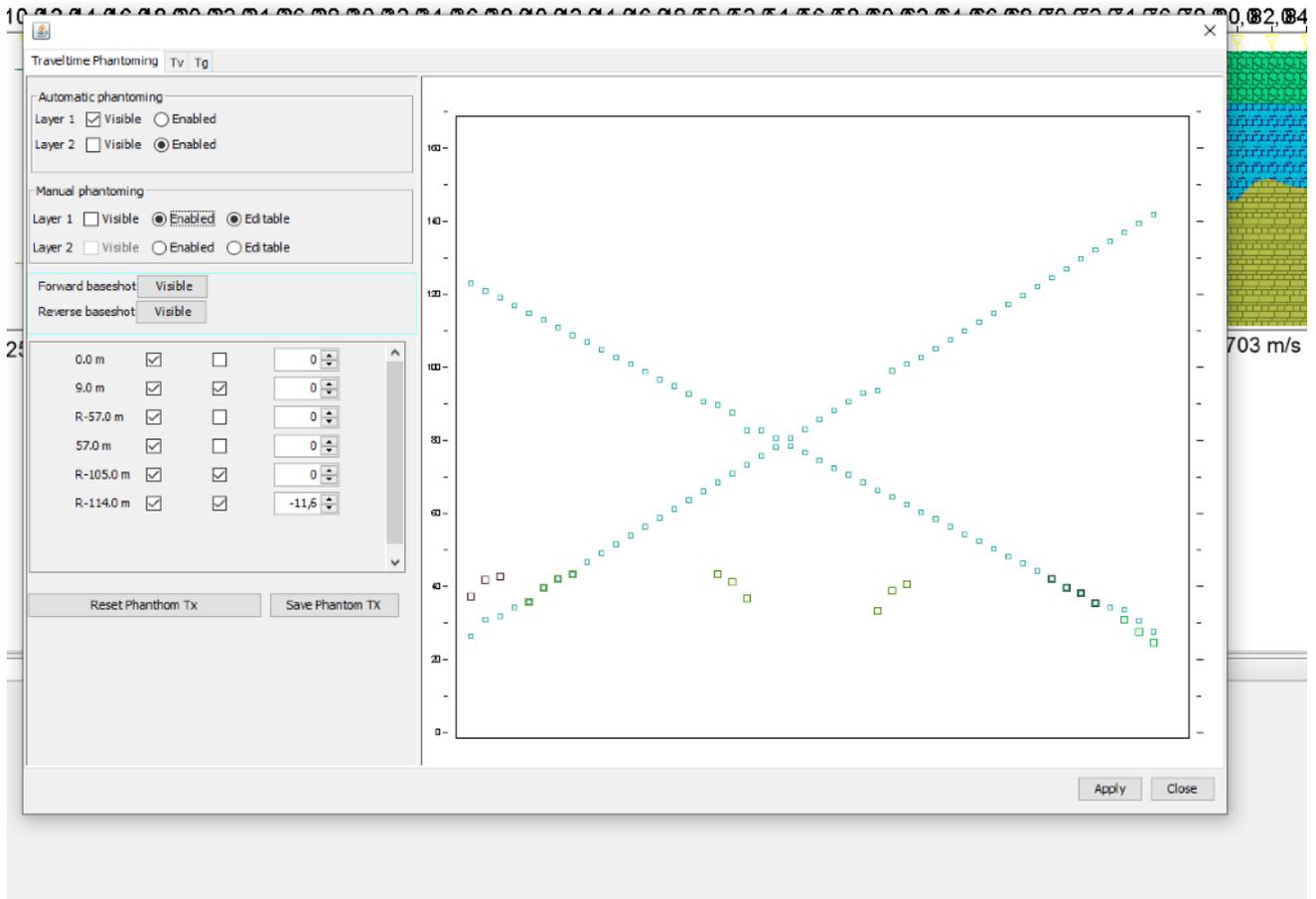
Allows to export the profile image to a PNG file.

## More phantoming/Tv/Tg options

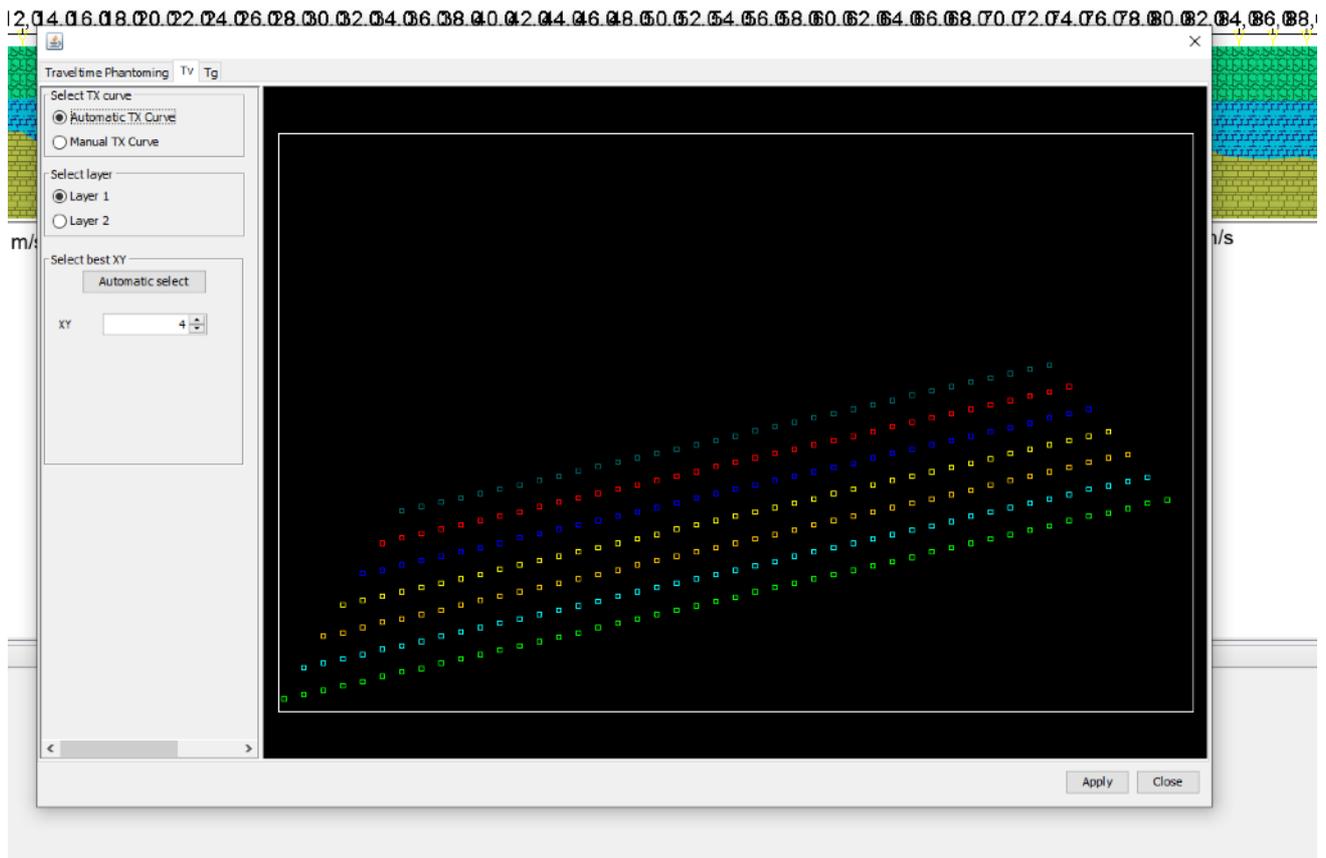
### Phantoming

"Phantoming" refers to the procedure of combining dromochrone parts related to the same seismic-layer from different energizations to form a continuous dromochrone on all receivers for each layer.

In smartRefract this process is done automatically but in some situations it may be useful to perform manual editing.



In the traveltime phantoming tab you can view the automatic result or perform manual editing. The manual editing is enabled by clicking on Editable and modifying the translation value in the list of energizations. The goal is to reconstruct a dromochrone as continuous as possible that follows the dromochrone relative to the studied layer generated by the shot closest to the end of the line. The dromochrone should also ensure reciprocity of times. That is, the round-trip times should be (approximately) the same.



The Tv and Tg tabs allow you to choose the optimal XY value for the construction of the section. The optimal value is the one that makes the Tv function as straight as possible and the Tg function less straight.