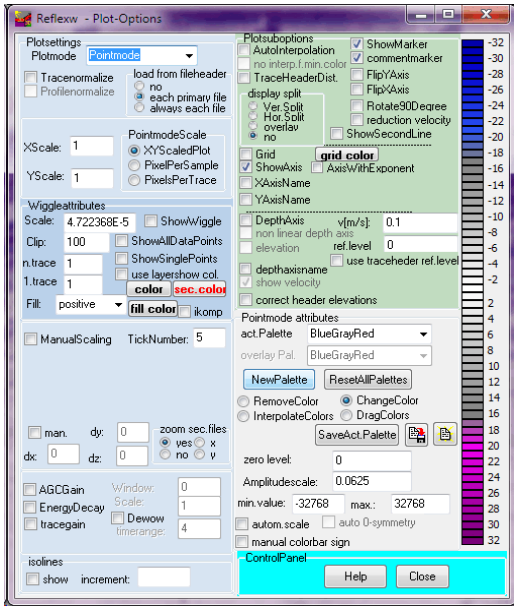
Main news of the REFLEXW version 7.0 from 01.12.2012

0. General



The program appearence has been changed. Now the new Windows themes are supported (see example on the right).

Now the pdf manual is available as A4 format and as A4 booklet format.

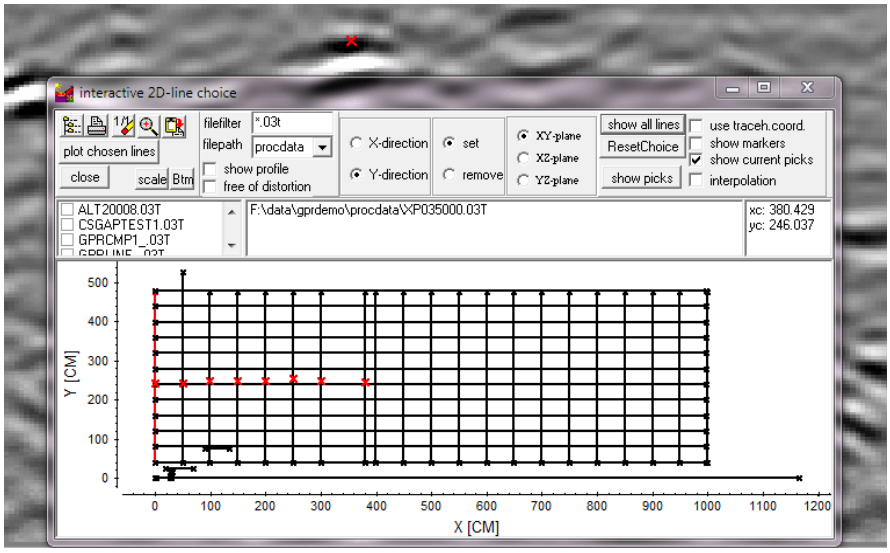
<u>plotoptions:</u>

new option **manual colorbar sign** which allows to enter any name for the colorbar sign.

New option **use traceheder ref.level** - if activated the reference level will be taken from the maximum value of the traceheader rec. z-coordinates and does not need to be entered manually.

I. 2D-dataanalysis

<u>1.interactive choice</u>



new option **interactive choice** under view which opens the interactive choice window without going through the option file/open/interactive choice.
new option **show current picks** within the interactive choice menu which allows to show the current picks. In combination with the options next or prev. you may easily follow a distinct reflector or diffractor (e.g. a pipe) from one 2D-line to the next and display the current position and the positions of the previous locations within the interactive choice map. Use for example the following sequence:

- load the first file using file/procdata filter and enter the name filter (e.g. *.03t)
- activate the option view/interactive choice
- within the interactive choice menu activate the option show current picks
- activate the pick option within the dataanalysis menu and pick your wanted arrival(s) (the current cursor position as well as the actual pick(s) are displayed within the interactive menu)
- click on next and choose the pick(s) of the same event (the interactive choice menu can be used for following e.g. a line diffractor)

2.update traceheaders

New option **national conversion** with:
RD-conversion (netherlands)
Swiss CH1903
Both conversions are also available within the dataimport menu.

GPS-times: a check for an empty string within the GPS-ASCII file has been included.

GPS-times spatial interpolation: new option corresponding to GPS-times but with a spatial interpolation instead of the default acquisition times interpolation.

ASCII-file/interpol: new option distancies instead of tracenos which controls if the tracenumbers or the distancies are used for the synchronization. With this option activated the distancies defined in column 2 are used together with the distance coordinates of the file header in order to update the traceheader coordinates.

3. Dataprocessing:

Expand 3d-file: now you may enter both the expand factor in line direction and perpendicular to it.

Merge files: For the case of all lines containing only 1 trace and an identical increment between the startcoordinates of the original files is given (e.g. a Finit Difference simulation of moving point sources and only one receiver) the traceincrement is automatically set to this increment.

conv. v to epsilon: new filter parameter - if set to 0 the conversion is done for v[m/ns] to epsilon, if set to 1 the conversion is done for epsilon to v[m/ns].

reciprocal (1/value): new filter - generates the reciprocal of each value. The filter might be used for example to create slowness from velocity values and vice versa.

Trace spectrum: new options max. frequency and frequency resampling.

Prestack migration: new suboption box topography which allows to take into account the topography during the migration process.

topography migration:
- new suboption adapt width - if activated the summation width will be restrcited. The parameter max. angle (theta in degrees) controls the max. angle for the summation. As a result the summation width becomes timedependent (linear increase with time).
- the surface values may be either depths or altitudes and may be taken either from an external ASCII-file or from the individual traceheader z-values.

Correct 3D-topography:
- new option **only project - no correct** - if activated no topographic correction will be done but only a projection either on the x- or y-axis (depending on the profile direction).
- new option **manual z-reference** - if activated the base level must be entered manually within the parameter z-reference. This allows you to define the same base level for different profiles, e.g. if a 3D-dataset shall be constructed later.

Fk-filter: Now the filter parameters will be kept after having performed the fk-filtering once.

Markerinterpol.: if used within the sequence processing together with the option read from profile markerfile now the tracenumbers which are stored within the mar files are used for the marker positions.

Background removal: new suboption external trace - if activated the reference trace which will be subtracted from all traces of the profile is loaded form an independent Reflexw datafile.

Extract: new option read marker which loads all traces including a marker. The table and profile image are automatically updated.

Sequence processing:
- new option replace proc. which allows to replace the marked processing step by the actual filter.

4. Print:

new option **get total print size** which allows to show the total print size in x- and y-direction.

5. Import:

new option **apply processing flow:** if activated the processing flow named importprocessingflow.pfl if existing under the actual project directory will be automatically applied during the import.

new **import format CSP** and **FREE 32BIT FP** and **FREE 64BIT FP**

import format IDS: the timeincrement of some IDS data could not be interpreted correctly because of a different format - therefore the import implementation has been generalized in order to be able to also read those data correctly.

import format RADAN - multichannel data:
- if different trace increments are given the start/end coordinates will be updated if the original file has bee splitted into different segments during the import.
- new option ignore 2.traceincr.- if activated the traceincrement of the first channel will be used for all channels.

SEGY: new option ignore group - if activated the source coordinates are also used for the receivers - the original group coordinates will be ignored.

Save As: new option for saving the report output on a choosable filename.

6. View:

core data: new option **use xy-traceh.coord.** within the global settings menu - if activated the traceheadercoordinates are used for determining the position of the core. Then the smallest difference between the xy-location of the core and the xy-traceheader coordinates of the actual profile is searched and the core will be plotted at this position.

Add.2 column data: Now it is also possible to use datafiles with more than 2 columns. It is possible to specify the column within the ASCII-file which shall be used for the second data value column.

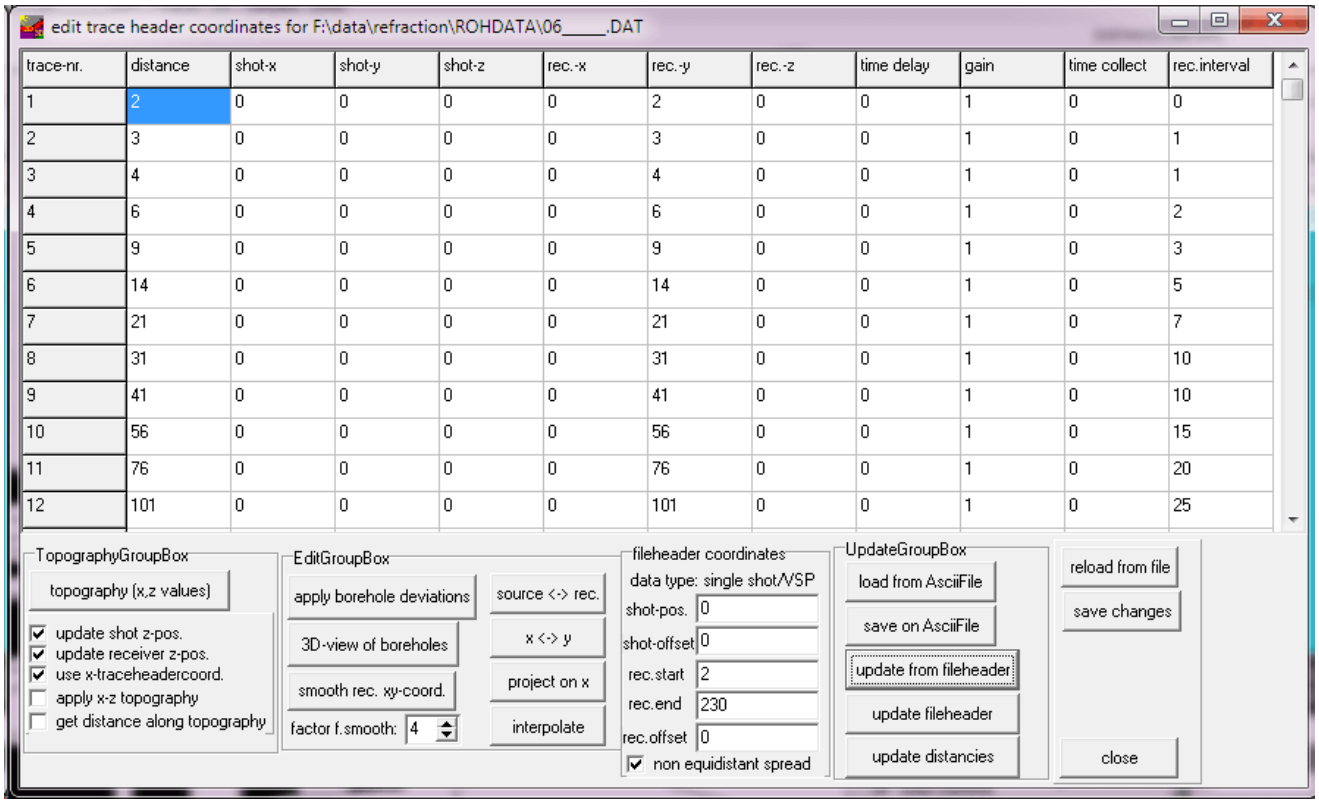
7. Traceheader tabella:

new option **get distance along topography** - if activated only the distance along the topography will be calculated and saved within the distance traceheader.

new option **apply borehole deviations** which allows to apply the borehole coordinates to the original relative traceheader coordinates of crosshole data.

New option **3D-view of boreholes** which allows a 3D-view of the shot and receiver xyz-coordinates. The cube may be interactively rotated using the left mouse key.

If entered from the import menu a new panel opens showing the overall fileheader coordinates which can also be edited. The option **non equidistant spread** allows to enter non equdistant receiver intervals within an additional column of the table. The first interval must be entered for trace-nr. 2, the rec.interval for trace-nr. 1 is always 0. After having entered these intervals together with the rec.start coordinate use the option update from fileheader in order to actualize the receiver coordinates. The distancies will be automatically updated and the rec.end coordinate will be set to the last receiver value.



8. Pick:

new picksymbol line which allows to plot the picks using an interpolated line between the picks.

9. Fileheader menu:

new option update from traceheader for the datatypes single shot, single shot/boreholes and single shot/VSP which allows to update the fileheader coordinates from the traceheader coordinates.

II. 3D-datainterpretation

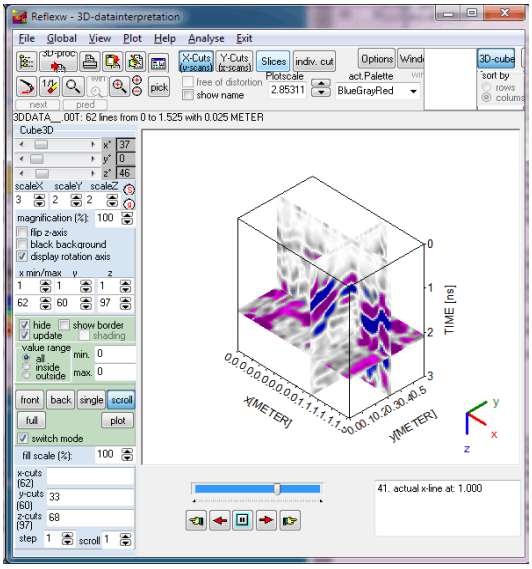
If switching form Scroll to 3D-cube mode the actual cut will be kept if the option scroll within the Cube3D option box is activated. This allows you a fast switch between scroll mode and cube 3D mode for the display of a single cut.

The information about the actual cut (activated opton show name) will be displayed at the lower left corner if the plotoption flip y axis has been activated.

Secondary 3D-file:

- **Automatic coordinate shift** if the secondary 3D-file has a different startcoordinate in profile direction.
- Now the number of points in x- or y-directions may differ and it is allowed that the data are sorted in a different manner (profile directions are different). In case of different points an automatic adjustment of the chosen two 3D-files will be performed. Then the option **adjust 2 3D-files** (option also available under analyse) will be automatically performed and two new 3D-files with the same number of x-cuts as well as of y-cuts will be created and loaded.

3D-cube option:



- scroll mode: new option **switch mode** for scrolling through the 3D-cube - if activated the last chosen cut will be kept if switched to another cut set (example swith from X-Cuts to Y-Cuts) . The option allows an easy detailed 3D-check with crossing cuts.

- **full mode:** new option **show processing box** for the full mode. If deactivated the processing status window indicating the status of the rendering will not be shown.

Scroll option:

KML export: allows to export the current timeslice to a KML file for a later use within Google Earth. Two different creating types are supported:
image overlay: using this type the complete timeslice image will be exported to a png-file. A clipboard scale factor is queried. A factor larger than 1 allows you to increase the size of the bitmap to be transferred and therefore to increase the resolution.
In addition a KML file will be created including the north/south and east/west corner coordinates and the name of the png-file. To be considered: the coordinates of the original 3D-file must be given

in degrees. The advantage of this type is the small resulting KML filesize. The disadvantage is that all data including the non measured area will be displayed.
Create single icons: using this type each point of the timeslice will be exported as a single icon including the coordinates and the colour corresponding to the actual colour settings. The icon size can be changed. The original coordinates can be given in degrees or in utm-coordinates. In the second case the option UTMToDegree must be activated and the corresponding UTM-zone must be entered. Activating the option ignore zero values zero values (e.g. data from the non measured area) will not be taken into account. The disadvantage of this method is the huge resulting KML filesize and that the icon size is independent from the Google Earth view point.
In both creating types the KML filename is automatically determined from the 3D-datafilename and the current cut. Example:
3D-datafilename: file01_3D.00t
current cut: sclice: 0.58
resulting kml-filename: file01_3Dt_ 0_58.kml
resulting png-filename: file01_3Dt_ 0_58.png

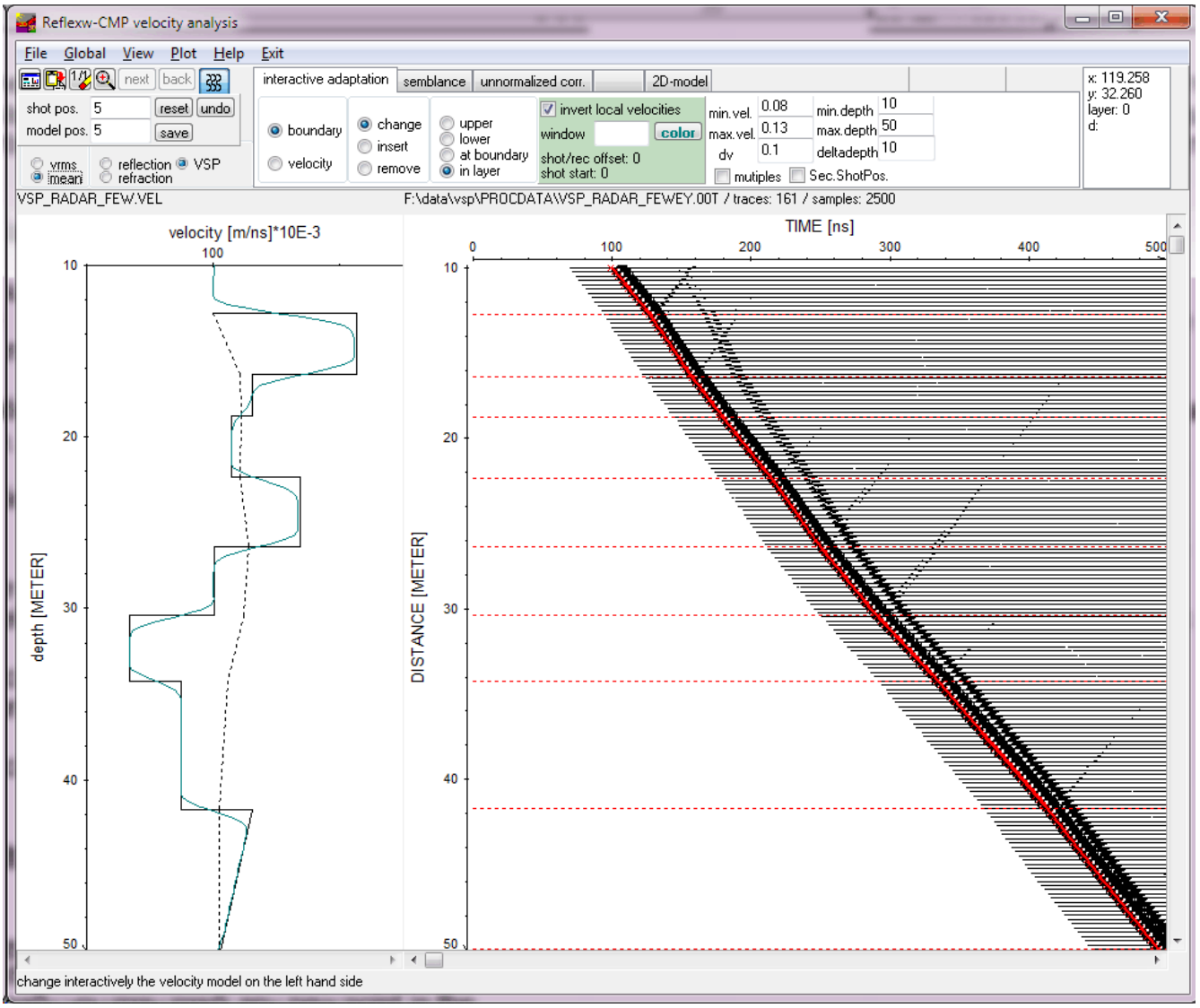
III. CMP velocity analysis

Now the **rotated 90 degree display** is supported.

undo: new button which allows to undo the last model changes.

VSP data analysis:

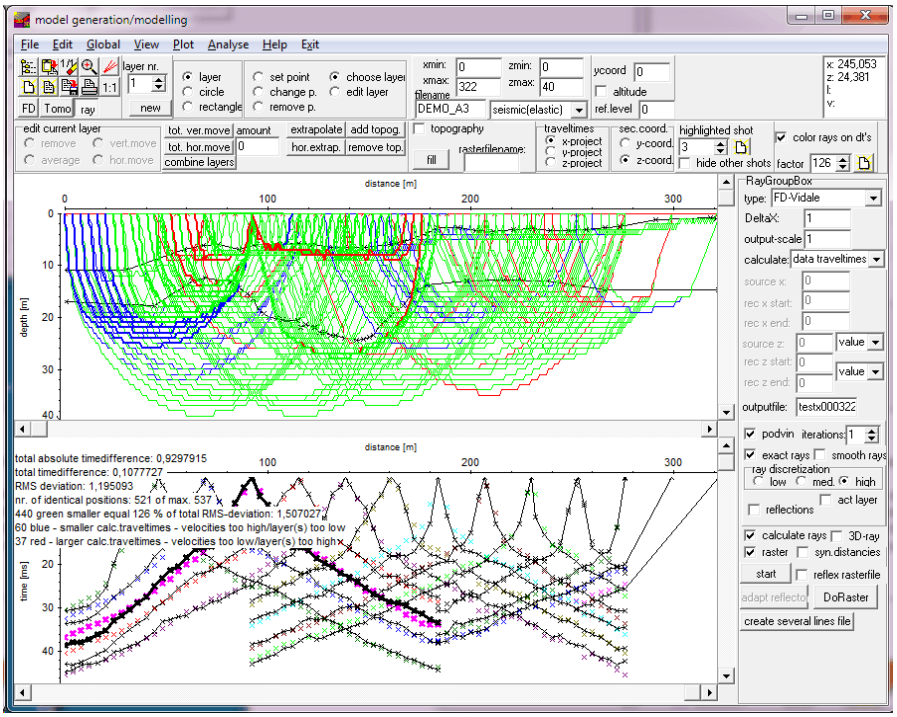
new velocity analyis possiblity for the adaptation of the first arrival traveltimes for a Vertical Seicmic Profiling geometry. In this method the source is located at the surface and the receivers are placed within the borehole or vice versa. the picked first arrival traveltimes or the raw data can be manually adapted by a 1D-depth velocity distribution. In addition to the interactive model adaptation the local velocities can also be directly inverted. The velocities are smoothed over a given depth window.



IV. Modelling

highlighted shot: new option **fade out other shots** - if activated all the shots except the highlighted one will not be displayed.

calculate traveltime differences: new option **color ray for dt's** which allows to colour the rays based on the actual traveltimedifferences. Three colours are used: green is used if the difference is smaller than the total RMS deviation, red is used for larger and blue for smaller calculated traveltimes. A factor (in % of the RMS deviation) can be entered in order to change the crossover from green to red/blue. The picture on th right cleary indicates too small traveltimes on the left hand side obviously due to a too low layer boundary between 0 and 20 m.



Model input: The max. number of layers has been increased to 500.

<u>FD-modelling:</u>
The max. number of points in z-direction has been increased to 32000.

<u>FD-modelling/signal type:</u>
- new signal type **Klauder** wavelet which is the autocorrelation wavelet of a linear sweep signal. In this case the parameters min. and max. frequency define the frequency range of the original sweep signal (input in the same dimension like for frequency). The duration of the original sweep signal is fixed to the max. time range. The length of the Klauder wavelet is determined from the parameter frequency (signallength = 1/frequency).
- a new implementation of the signal type **Ricker** has been introduced.

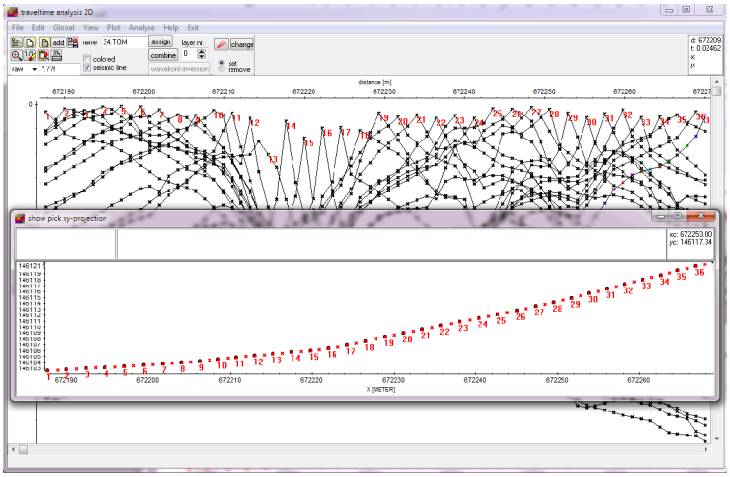
<u>Tomography:</u>
now the z-values within the traveltime data may also represent altitude values.

now the inf-file contains in addition the total absolute timedifference, the total timedifference and the RMS deviationare.

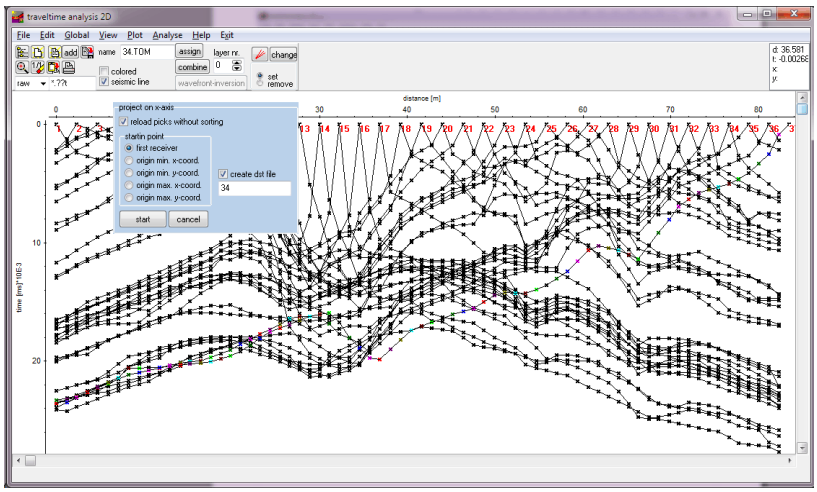
New option **create topography from data**: if activated the first layer of the start model will be automatically modified based on the topographic z-values contained within the traveltime data loaded for the tomographic inversion. If altitude is activated the z-values must represent altitude values and will be transformed into depth values using the entered reference level.

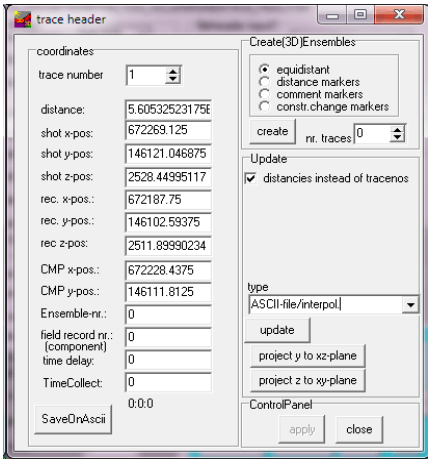
V.Traveltime analysis

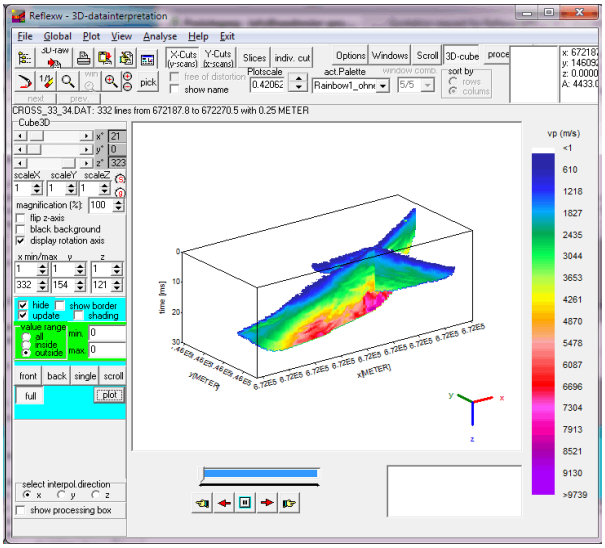
New options **project on x** and **showxyprojection** which have been designed in order to use GPS coordinates for the seismic refraction interpretation. Precondition is that the refraction line has been acquired on a nearly straight line. Small deviations (see below) or undulations are maintainable and do not affect the interpretation result very much. The option **showxyprojection** to be found under view can be used in order to check the pathway and the direction of the acquisiton line.



Normally Reflexw requires that the x-traceheader coordinates define the positions of the shots and the receivers for a sesmic refraction interpretation. The y-coordinates will be ignored. If xy GPS coordiantes are present the coordinates must be projected on the x-axis. This is done using the option **project on x-coord.** to be found under edit. The **starting point** for the acquisition line must be entered manually. It is possible to choose between first receiver, min. x coordinate, min. y coordinates, max. x coordinate and max. y coordinate. As the loaded data have been automatically sorted with ascending coordinates the option **reload picks without sorting** allows to use the original sorting of the data (important if the starting point first receiver has been chosen). As a result the x-coordinates contain the distancies along the acquisition line starting at the **entered start distance** for the chosen starting point. With the option **create dst file** an ASCII dst file will be created which contains the original xy GPS coordinates together with the calculated distancies along the line. This file can be used after the inversion in order to reconstruct the original GPS coordinates for the inversion result (done within the traceheader menu using the type ASCII file/interpol. with activated option distancies instead of tracenos). This result must represent a 2D-Reflexw file, e.g. a tomographic inversion file or when using the option fill within the modelling menu.





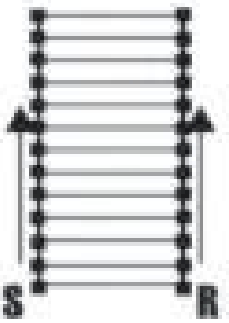


In a final step the results can be viewed within the 3D-datainterpretation or exported as an ASCII-file.

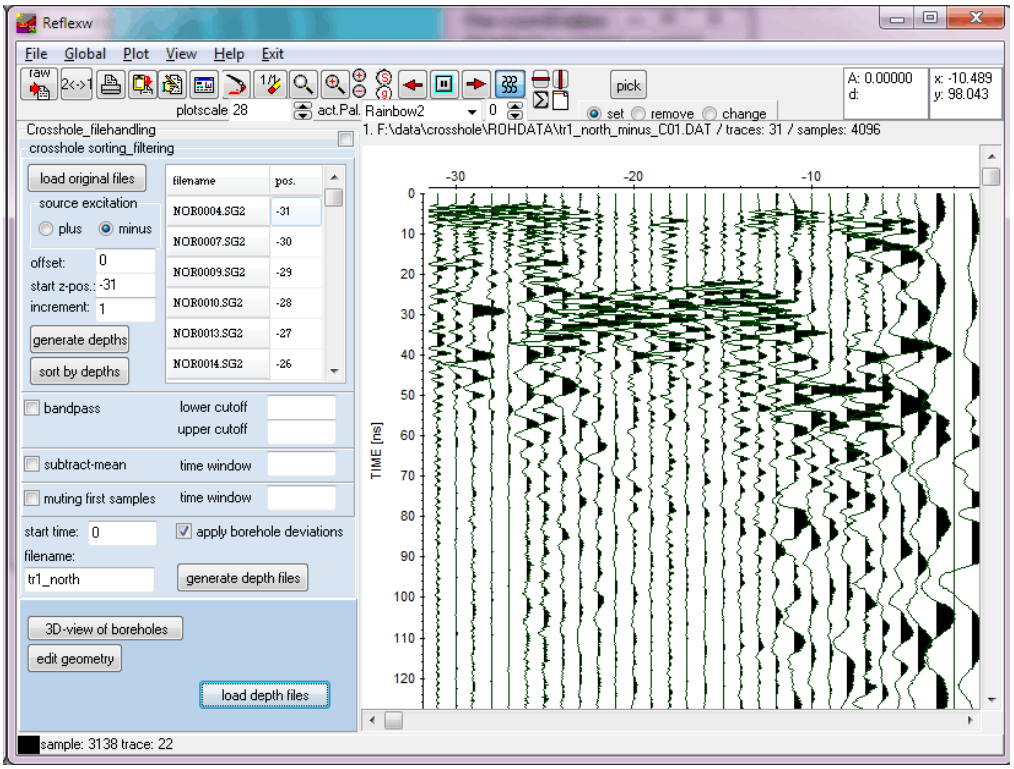
VI.Seismic crosshole testing

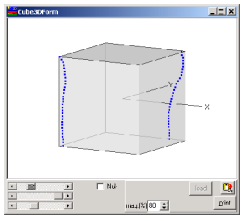
New module which has has been designed for a fast interpretation of crosshole test data.

A **crosshole test** known as **Crosshole Sonic Logging (CSL)** requires that p- or s-wave source and receivers are placed always on the same depths/elevation during recording. In order to benefit from the polarisation characteristics of the s-wave the excitation can be performed in two directions

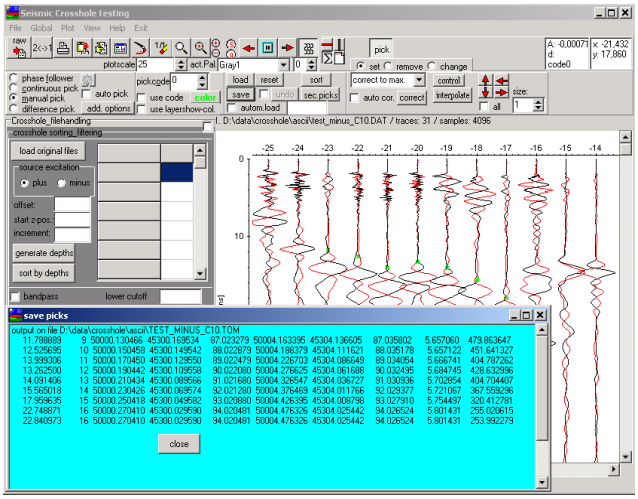


The acquisition software should be able to generate one (stacked) data file per depth and excitation direction stored using the SEG-2 format.





A multi-directional receiver array is supported. The **deviation of the boreholes** (true xyz-coordinates) can be taken into account. The **picking** of the first arrivals can be done by different automatic methods or manually or by a combination of both. If a shear wave source with 2 different orientations has been used the raw data can be overlaid for a more accurate picking.



The traveltimes of the first arrivals are transformed into **p- and or s-velocities** which represent average values between the boreholes.