Main news of the REFLEXW version 8.0 from 01.04.2016

0. General

The max. length of the data filename has been increased to 80 characters.

The following file formats have been changed:

Parameterfile (extension PAR or ??R):
- now all floating point variables are stored as 64 bit values in order to ensure high precision especially for GPS-coordinates.
- The max. number of processing steps stored within the processing flow has been increased to 40.

Modelling file (extension MOD): The number of layer points per layer has been increased to 250.

Pick file (extension PCK): now all relevant floating point variables are stored as 64 bit values in order to ensure high precision especially for GPS-coordinates.

I. 2D-dataanalysis

1.plot options

The manual depth axisname together with the manual X- and Y-axisname will be saved within the Reflexw.ini file.

The max. number of color palettes has been increased to 50.

2. Dataprocessing:

Prestack migration:

Option has been expanded by a borehole borehole geometry. The program automatically controls the geometry and is able to perform the prestack migration for the following geometries:
- shots and receivers are located along the x-axis including a topography
- shots or receiers are located along the x-axis and shots or receivers are located along the y(z)-axis (borehole) - walk away vertical seismic profile (WVSP)
- shots and receivers are both located along the y(z) axis. The x-postion may be different but fixed for the shots and the receivers- crosshole.

New option **XY-exchange** under traceinterpolation: exchanges the x- (distance) and y-(time)sorting. After having applied this option the number of traces and number of samples have been exchanged.

Integration, Differentiation: New suboptions **degree of integr. (differ.)** and **norm. (0-yes, 1-no)**. The parameter degree defines the order - 1 means single integration and 1. derivative, 2 means double integration and 2. derivative, and ..... The parameter norm. defines whether a normalization of the amplitudes shall be done. I the parameter is set to 0 the amplitudes after the integration/differentiation will be normalized in order to ensure that the resulting amplitudes are within the same amplitude range as the original data. If set to 1 no normalization will be done and the amplitudes represent true values.

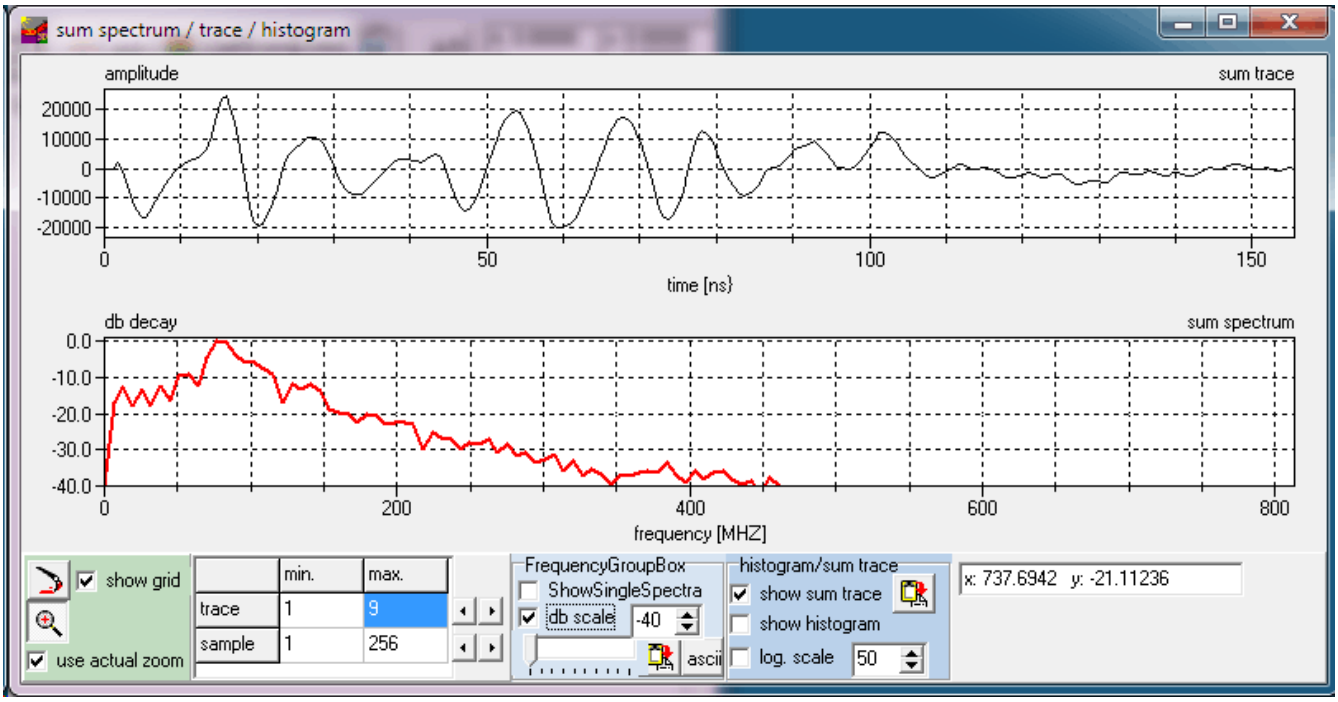
Stack traces: new option **number of tr./ensemble** - if greater 1 the stacking may not be done on successive traces but for common successive ensembles. Example: A stacking shall be done for shot ensembles which have been acquired four times at the same position. Each shot ensemble includes 48 traces. Then you have to enter nr. of traces 4 and nr.of tr./ensemble 48. The result are stacked shot ensembles stored sequentially. Another example: 3 constant offset profiles with 1000 traces each stored sequentially within one file. Enter 3 for nr.of traces and 1000 for nr. tr./ensemble. If nr.of tr./ensemble is greater than 1 the traceincrement will not be changed.
With the parameter **nr.of tr./ensemble** smaller/equal 1 (default) the stacking is based on successive traces.

Fk-filter: new filteroption **random noise suppression**. This option allows to suppress random noise by raising the amplitude spectrum to an exponential power. The higher the exponential power parameter the higher the filter effect. A value of 1 shows no effect. A default value is 1.5.

3. View:

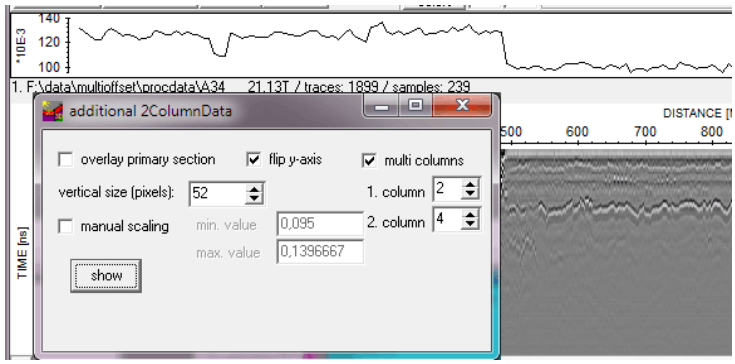
profile sum spectrum/histogram:

options has been extended by several options:
- option **show sum trace**: allows to view the actual sum trace within the upper window instead of the histogram
- option **db scale**: allows a decibel decay scale for the frequence spectrum. The max. db decay may be entered manually
- option **ASCII**: allows to copy the sum spectrum to an ASCII-file (csv extension).
- the number of traces and/or samples to be summed may also be entered within the trace/sample table. The larger/smaller arrows on the right of the table allow to increase or decrease the min./max. traces and samples. Using this option also allows to scroll through the whole profile by setting min./max. traces to the same value.



add. 2 colum data:

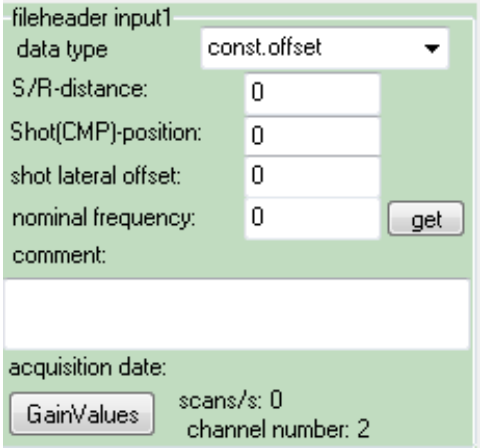
new option **multi colums**: allows to use multi colums text data. The option **1.colum** defines the colum position of the distance data and the **2.colum** defines the position of the data colum to be displayed.



profile line: new option s**how xy-data** which allows to display points wih xy-coordinates taken from an ASCII-file.

4.fileheader

The channel number for a multichannel system is automatically determined during the import. This channel number is listed within the fileheader.



5. traceheader menu

New traceheader parameter **scan direction** which defines the scan direction of the individual traces of a constant offset or 3D-constant offs. file. During the import the scan direction is set to 1 for a profile direction of "X" and is set to 2 for a profile direction of "Y". The parameter scan direction is used for the generation of a 3D-datafile (type "use independent interpolation scheme for pure x- and y-2D-lines") based on traceheader coordinates.

New Option **get ensemble/scandir.from coord.:** extracts both the scandirection and the ensemble number of a constant offset or 3D-constant offs.file from the given traceheader receiver coordinates. The scan direction will be set to 1 if successive y-coordinates do not change and set to 2 if successive x-coordinates do not change. The ensemble number will be updated if the profile constant coordinate changes.

Option **PULSEEKKO-GPS**: now also the gps-dta from the gp2-files are supported.

Option **IDS-times:** now the channel number defined within the first column of the info*.txt file will be taken into account.

Option **IDS-GPS:** new option **consider blank lines** - if activated blank lines within the gps-file will be considered to be associated with a GPS-mark within the radar datafile

*$GPGGA,212821.30,4621.65127093,N,00611.07161442,E,4,19,0.6,459.011,M,48.164,M,1.3,0439*42*
*$GPGGA,212821.40,4621.65103360,N,00611.07122060,E,4,19,0.6,459.016,M,48.164,M,1.4,0439*4F*
*$GPGGA,212821.50,4621.65079547,N,00611.07082498,E,4,19,0.6,459.024,M,48.164,M,1.5,0439*49*

*$GPGGA,212821.70,4621.65031574,N,00611.07002490,E,4,19,0.6,459.034,M,48.164,M,0.7,0439*45*
*$GPGGA,212821.80,4621.65007531,N,00611.06961940,E,4,19,0.6,459.040,M,48.164,M,0.8,0439*4F*

*$GPGGA,212822.10,4621.64934322,N,00611.06839377,E,4,19,0.6,459.063,M,48.164,M,1.1,0439*42*

*$GPGGA,212822.30,4621.64885284,N,00611.06756595,E,4,19,0.6,459.081,M,48.164,M,1.3,0439*44*
*$GPGGA,212822.40,4621.64860710,N,00611.06715036,E,4,19,0.6,459.093,M,48.164,M,1.4,0439*4F*

The program automatically controls if the number of GPS marks and the number of lines within the GPS-file correspond. If not a warning message appears and if blank lines within the gps-file exist it might be useful to activate the option consider blank lines.

Option **Marker-GPS**: new option M-Master format - if activated the old M-Master format will be used. If deactivated the program assumes that each marker corresponds to one line within the gps-datafile and the that first gps-coordinate line fits the first marker. The option is also available within the import menu and the project file header but only with deactivated option M-Master format.

Option **GPS-times** and **GPS-times spatial interpol.:** new option **max. deviation time of 1 sec** - if activated acquisition times and GPS times are not synchronized if the deviation between them is more than 1 sec. In this case these coordinates will remain zero and a succeeding linear interpolation at those positions will be done. The new option is also available within the dataimport (here the naming is max. deviation time) and the edit several FileHeaders menu.

Option **CopyCMPCoordToShotRecCoord**: new option which allows to copy the CMP-coordinates to the source and receiver coordinates.

A new option named "**offsets from file**" within the **correct for offset** panel allows to read the correct offsets (in profile direction - offset - and perpendicular to it - lat.offset) from an ASCII-file named CorrectOffset.txt which must have been stored under the subdirectory ASCII under the actual project directory. Each line of the file must contain the following parameters:
"channel number" "offset" "lateral offset"
Example of 3 channels with a symmetrical array:
1 0.5 0.5
2 0.5 0.0
3 0.5 -0.5
For a **3D-const.offset** file the channelnumber corresponds to the individual ensemble numbers of the 3D-file. Thereby the correct offset file must contain the complete geometry of the antenna array. This holds true for example for a 3D-file which has been acquired using an antenna array like 3D-radar.

National conversion: new options **Swiss CH1903+LV95** and **Swiss CH1903+LV03**. These conversions use the local reference system CH1903+ with its reference frame LV95. With the option Swiss CH1903+LV03 an additional transformation of the plane coordinates LV95 to LV03 will be done. The conversions are only available within the Reflexw "c" versions.
In order to use these options the free ReframeComDll_x86.msi from SwissTopo must have been installed.

Save on ASCII:
New parameter **dst fileformat** - if activated the dst fileformat is used for saving the traceheader parameters.

6. traceheader tabella menu

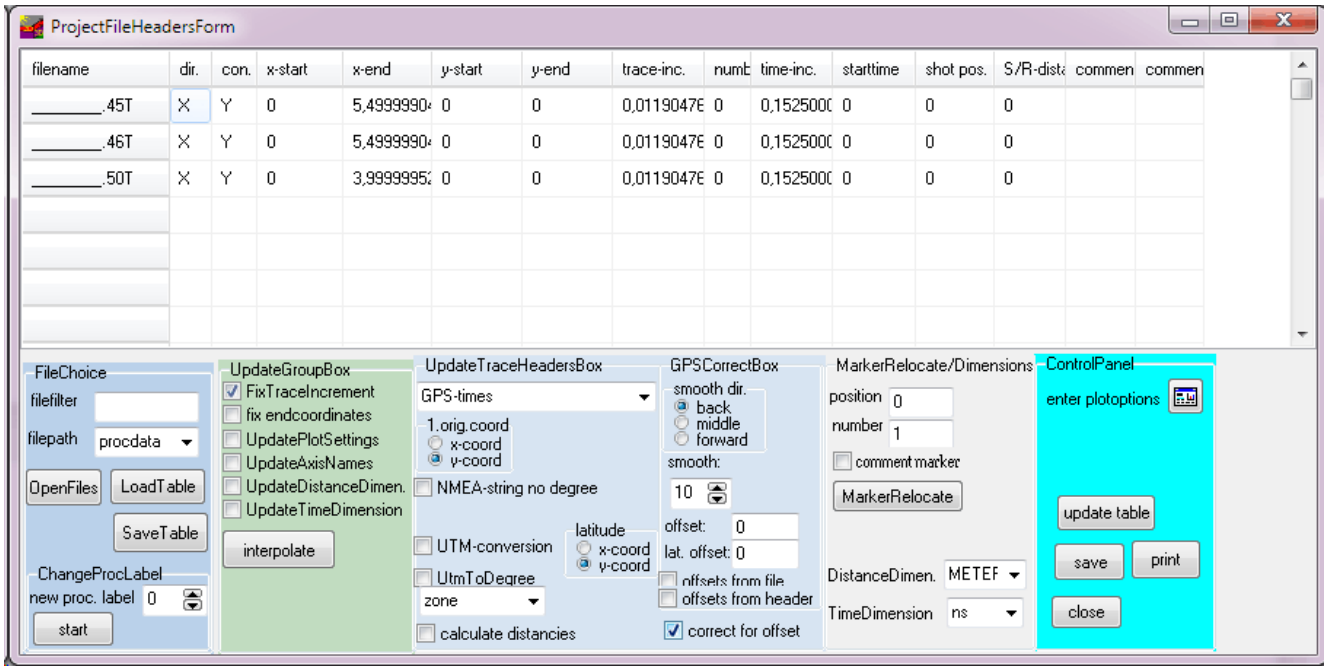
If the option **interpolate** and **interpolate all** are active it is possible to select the coordinates within the view profile image (option option **view rec. geometry**) by using the left mouse button. Click on the first coordinate and then on the second one (both are indicated by a blue cross) and the interpolation will be done automatically between these two positions for all coordinates.

New option **take over for all** for the manual change of a special column. The option allows to take over the actually set value for all values of the chosen column.

New option **correct lat.offset**: allows to correct a lateral shot offset (shot-y) which is different from the receiver lateral offset (rec-y). As a result the receiver x-positions will be changed according to the true distancies from the shot and the shot and receiver y-positions will be set to 0.

7. Edit several Fileheaders:

The **Update trace header** box has been redesignd and extended.



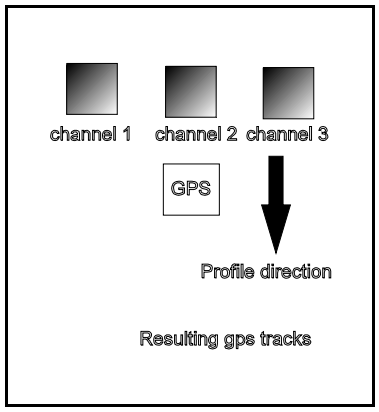
New option **exchange xy-coordinates** which allows to exchange the x- and y-shot and receiver coordinates.

Now the option **IDS-times** is also available within the edit several Fileheaders menu.

The option **1. orig. coord.** allows you to specify where the first original coordinates shall be stored when importing GPS-data - either on the x-traceheader coordinates or on the y-traceheader coordinates.

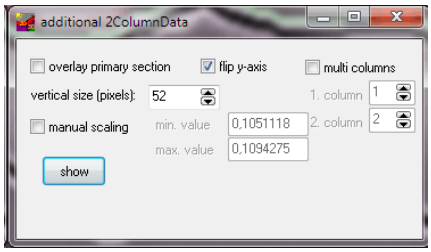
The option **correct for offset** has been included in order to use it in addition to a GPS import.
A new option named "**offsets from header**" to read the correct offsets offset and lat.offset from the fileheader of each file. Offset will be set to the fileheader startcoordinate in profile direction and lat. offset will be set to the fileheader startcoordinate in profile constant direction.
A new option named "**offsets from file**" allows to read the correct offsets (in profile direction - offset -

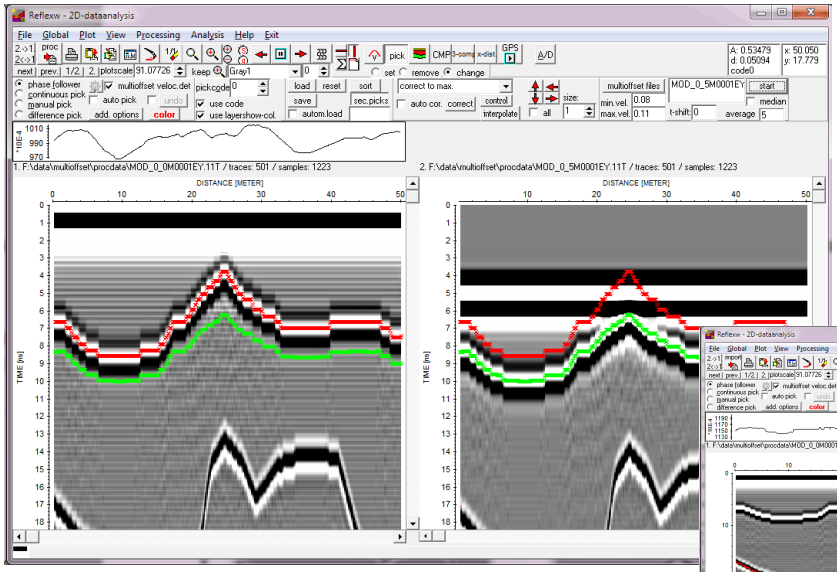
and perpendicular to it - lat.offset) from an ASCII-file named CorrectOffset.txt which must have been stored under the subdirectory ASCII under the actual project directory. Each line of the file must contain the following parameters:
“channel number” “offset” “lateral offset”
Example of 3 channels with a symmetrical array:
1 0.5 0.5
2 0.5 0.0
3 0.5 -0.5
The **offset** in profile direction will be subtracted from the distances in profile direction (this means a negative value must be entered if the GPS unit is located behind the receivers in profile direction and a positive value must be entered if the GPS unit is located before). A positive **lateral offset** results in a shift to the right of the profile direction, a negative lateral offset results in a shift to the left.
Channel number defines the channel number of a multichannel device. The number may be any number beween 1 and 64. The option has been introduced in order to autmatically correct the gps-coordinates for a multichannel system (up to 64 channels). The corresponding channelnumber of the datafile has been taken from the original filename during the import and stored within the fileheader. This is in general the last two characters of the filename (exception for IDS-data: here the third and forth digits are used for the definition of the channel number). For GSSI-data the channelnumber is automatically determined from the multiplexed order of the original data.



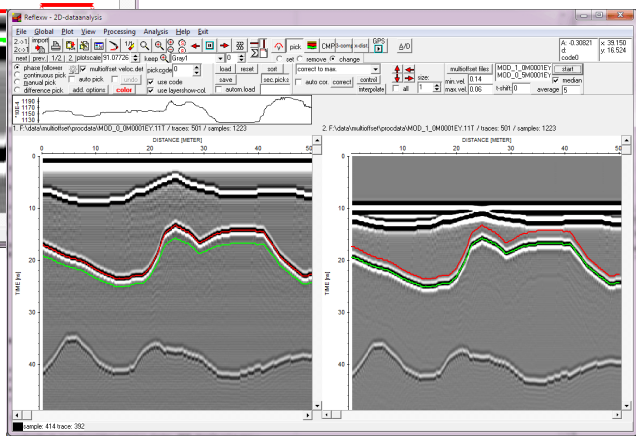
9. Pick:

Now the **velocity** may be stored with each pick, either manually by entering a velocity or using the option **"multioffset veloc.det."** which allows a fast determination of the 2-dimensional velocity distribution from multioffset data.
Precondition are Constant Offset lines with the source-received distance stored within the fileheader (option S/R-distance). A Zero Offset profile must be present or it must be created from a Constant Offset line using the processing option dynamic correction. All multioffset lines must be corrected for the start time. The following options are available:
multioffset files: Choose the multioffset files from which the velocities shall be determined
min. vel./max. vel.: defines the velocity range
average: defines the range in the given distance dimension for an averaging
median: if activated the median velocity within the average range is determined - otherwise the mean velocity
t-shift: enter a time shift if the data had not been corrected for the picked phase. In the following example time zero has been chosen for the extremum of the first positive phase and the reflection (which has a positive reflection coefficient) has also been picked for the positive (white) phase. Therefore a time shift is not necessary.
Start: starts the automatic velocity distribution. Dependent on the picked interface within the Zero Offset lines the program automatically detects the reflector within the other multioffsets lines. For this purpose each pick will be shifted based on the entered velocity range and the S/R distance and the best fit (identical polarity, highest amplitude value) gives the mean velocity for this pick. A control of the method is given if one of the multioffset files has been loaded as a secondary file and the option sec.picks has been activated. Then the found picked interface will be plotted in addition (lines in green).
The calculated mean velocities will be saved with the picks and are shown in an additional window (option view/add. 2. Colum data will be automatically acvtivated). The following pictures show the result for two reflectors.





remark: for the 2. layer the black (negative) phase has been picked because of a phase shift of this reflection due to a negative velocity contrast (high to low velocities).



New option **“x-flip”** which allows to flip the actual picks in x-(distance) direction.

Option **sort:** If use code has been activated now the sorting first will be done based on the code and then based on the tracenumber.

AutoPick:

New option **use overall max. value** for the type **first arrivals** - if activated the overall maximum value for all traces within the given time range is used instead of the max. value for each trace.

Save picks:

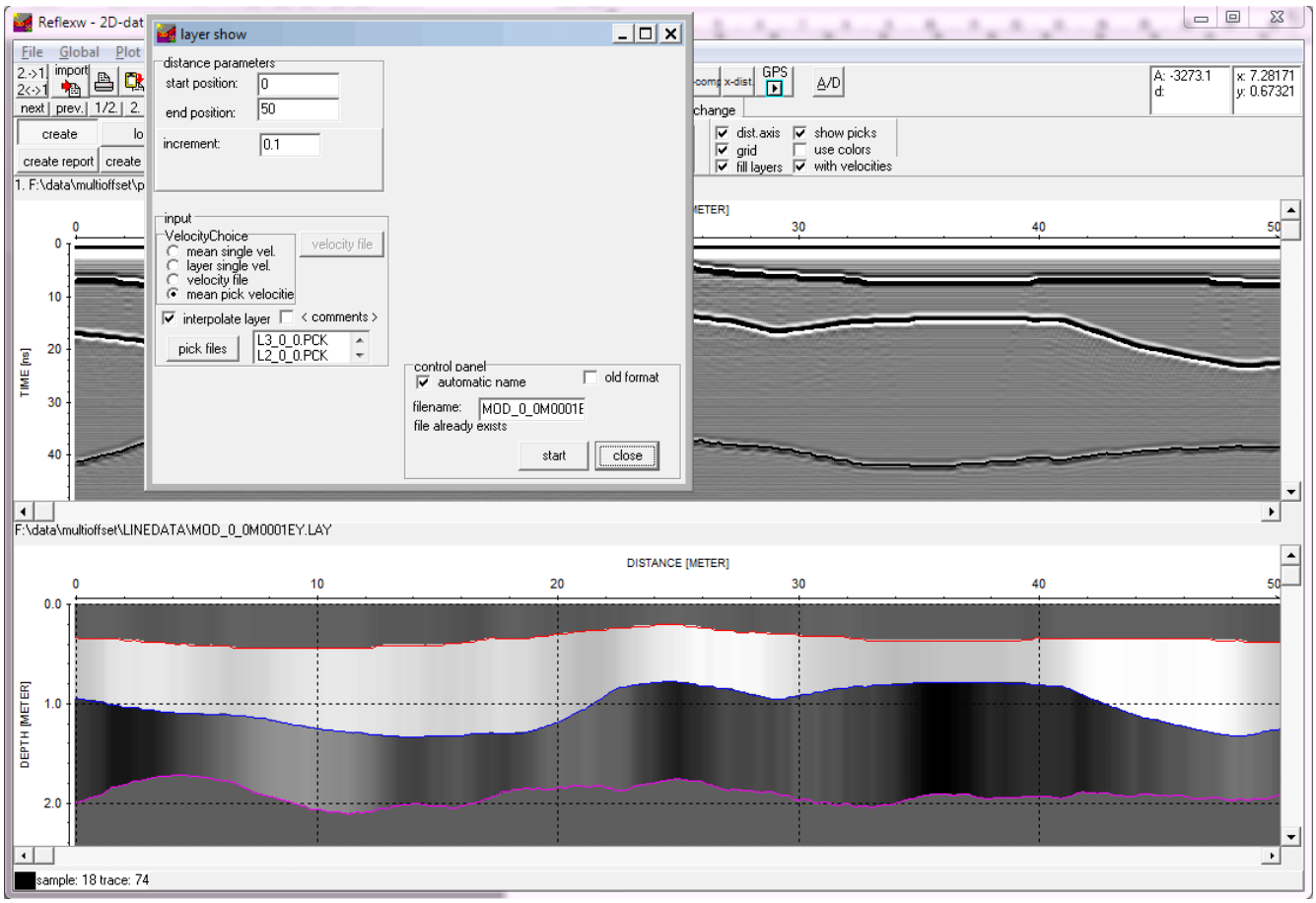
new option **use pick velocities** for the ASCII-output of the picks. If activated the velocities stored with the picks are used in order to transform the traveltimes into depths.

New option **old format (up to ver. 7.5)**: allows to store the picked data using the pck-format which has been used by older Reflexw versions (up to version 7.5).

9. Layershow:

create: New option **mean pick velocities** for the generation of the layershow.

If the options **"fill layers"** and **"with velocities"** have been activated the resulting layershow will be filled using the pick mean velocities.

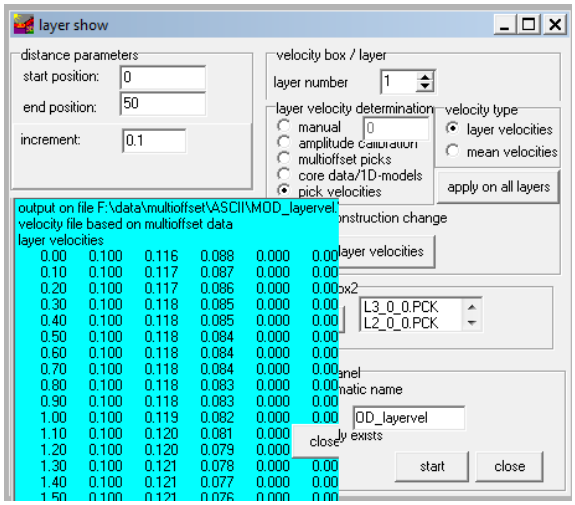


create report:

New option **Separator** which allows to define the separator type. If comma has been selected the file extension of the report will be csv.

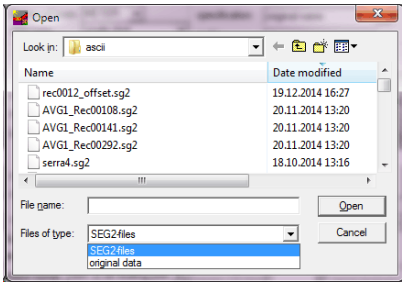
create velocity:

New option pick velocities for the generation of the 2D-velocity field. If layer velocities is activated (see figures on the right) the mean pick velocities will be automatically transformed into layer velocities. Remark: the velocities for the 1. layer are identical for layer and mean velocities.



10 Dataimport:

general:



now for most import formats an automatic **filefilter** will be used (see picture on the right). If another fileextension for the original data is given you may select original data within files of type instead.

A new parameter named **"channel number"** has been introduced for multichannel data. The channel number is taken from the original filename during the import and is in general the last two characters of the filename (exception for IDS-data: here the third and forth digits are used for the definition of the channel number). For GSSI-data the channelnumber is automatically determined from the multiplexed order of the original data. The resulting channel number is stored within the Reflexw fileheader and may be viewed within the fileheader menu. The channel number may be used for a correction of the gps coordinates (see option below).

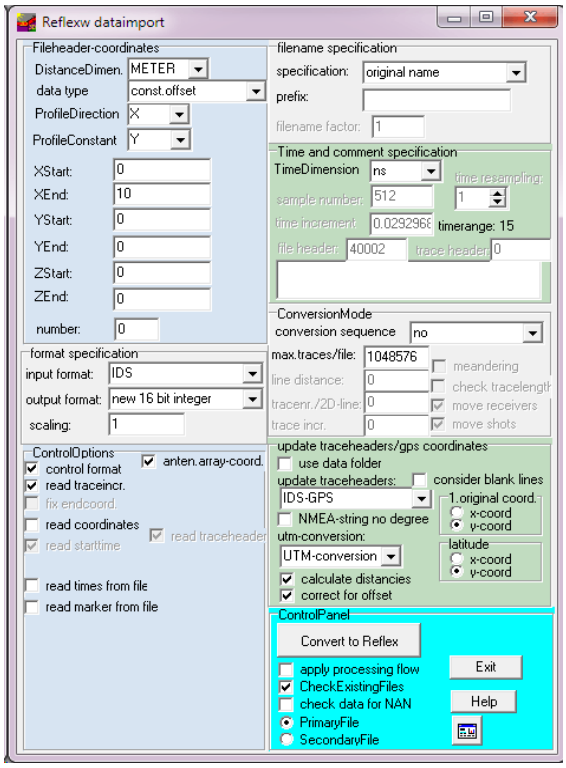
GEOSCANNERS_GSF: new format for the data acquired with the Geoscanners GPR system.

3D-Radar: new format for 3D-Radar data. Now the volume-data (extension vol) coming from the 3dr Examiner program are supported.

SEGY-data:
New parameter **"use sweeplength"** - if activated the sweeplength stored within the SEGY-fileheader is used instead of the sample number in order to determine the length of the output trace

GeoScan32-data:
The import of the 3D-data with the extension prd has been included. This 3D-files consists of 2D-cuts acquired in y- and x-direction. Reflexw automatically recognizes the individual 2D-scan and the scan-direction and sets the corresponding traceheader parameters (ensemble nr. and scan direction).

IDS-data:
new parameter **"read marker from file"** which allows to read the user markers from an external file named markxxx.txt with xxxx corresponding to the filenumber which is identical to the last 4 digits of the datafile.
new parameter **"read times from file"** which allows to read the gps synchronized times from an external file named infoxxx.txt with xxxx corresponding to the filenumber which is identical to the last 4 digits of the datafile.
If the IDS-data have been acquired using the Stream software the secondary channels do not contain any informations about the gps-markers. If the conversion sequence has been set to multichannel the gps-markers will be taken over from the first channel data in this case.



VIY-data:
new format for the data acquired with the VIY-GPR devices from Transient Technologies LLC (extension spgr).

ASCII-GEOTOMCG - data:
new format from the GoTomCG software. The file has a header of 8 lines whereby the 7. line contains the number of samples and of scans (in this case 22 and 55).
ZONE I = 22 J = 55 F = POINT
After one additional header line the data follow with each line for each datapoint:
0 -38 3599.6 49.0469 1 0.0191
Column 1 defines the distance, Column 2 the y-axis (flipped) and column 3 the amplitude. The other values will be ignored.

A new option named **correct for offset** has been included.
The option corresponds to the option "correct for offset in profile direction" within traceheader menu or the edit several fileheaders menu with activated option read from file and allows to correct the xy-GPS coordinates for an offset in profiledirection and perpendicular to it. The two correct offsets (in profile direction - offset - and perpendicular to it - lat.offset) are read from an ASCII-file named CorrectOffset.txt which must exist under the subdirectory ASCII under the actual project directory. Each line of the file must contain the following parameters:
"channel number" "offset" "lateral offset"
Channel number defines the channel number of a multichannel device (see above).
The smooth direction and the smooth size are taken from the values defined within the traceheader menu (update option "correct for offset in profile direction").

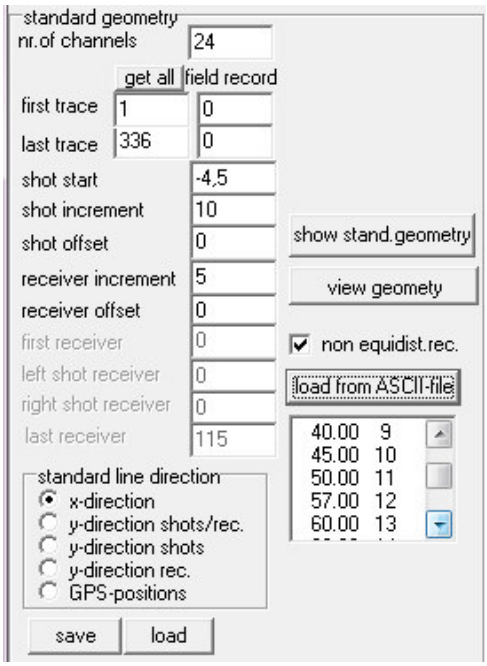
UTM conversion: new options **Swiss CH1903+LV95** and **Swiss CH1903+LV03**. These conversions use the local reference system CH1903+ with its reference frame LV95. With the option Swiss CH1903+LV03 an additional transformation of the plane coordinates LV95 to LV03 will be done. The conversions are only available within the Reflexw "c" versions.

11. Dataexport:

Bitmap export: new option **georeferenced tfw** - if activated the bitmap export is done together with a tfw world file. A world file file is a plain ASCII text file consisting of six values separated by newlines. The format is the same as for the GeoTiff export within the 3D-datainterpretation.

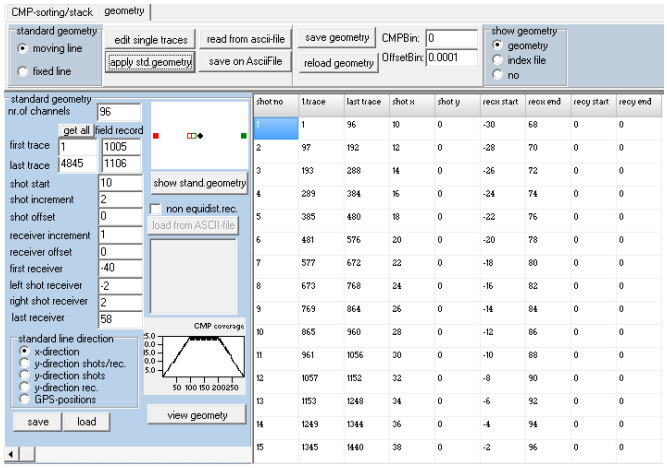
12. CMP processing:

standard geometry:



New option **non equdist.rec**.: if activated the relative receiver line is assumed to consist of non equdistant receivers - the geometry must be loaded from an external ASCII-file with each line containing the relative receiver position. Of course the ASCII-file may also contain equdistant receiver positions.
This freely definable receiver line may be applied both to a moving and to a fixed line.

The **CMP coverage** will be displayed in a separate window when clicking on view geometry. The display may be enlarged by clicking on the coverage graph.

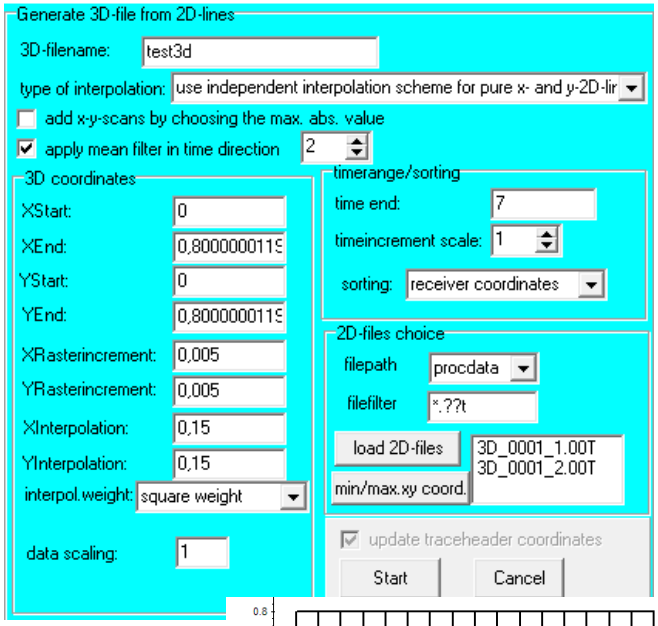


NMO-stack/correct:

New option **inverse** which allows to perform an inverse NMO correction. The option might be useful if you had performed some filter operations for nmo corrected data and you wish to go back to the non corrected form (e.g. for a stacking,....).

II.3D-datainterpretation

1. Generate 3D-file from 2D-lines:

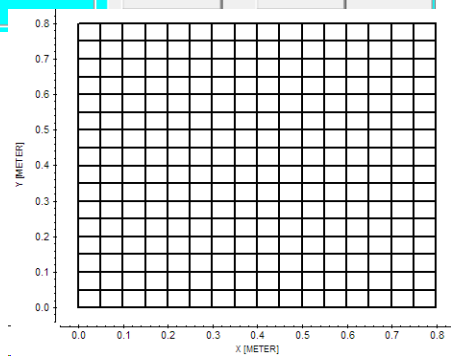


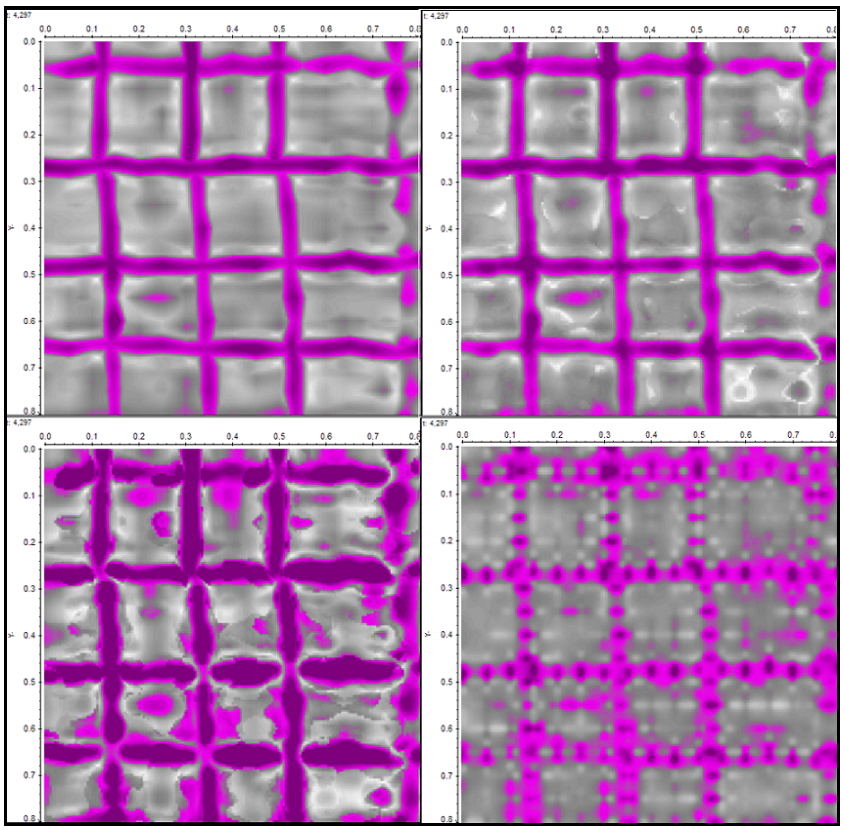
new type "**use independent interpolation scheme for pure x- and y-2D-lines**". Using this option the 3D-file will be created independently from the x- and y-scans and after interpolation the two datasets are automatically added. It allows a much better generation of a complete 3D-file from crossing lines. Precondition is that the 2D-lines are purely or nearly purely distributed in x and y-direction.

The option **apply mean filter in time-direction** allows a smoothing in time direction. The smoothing value is given in samples (+- samples symmetric around actual point). This smoothing prevents the destroy of the smoothed signal form when adding two traces at the crossing points.

The following example shows the comparison of different 3D-datasets:

- upper left: overlay of two 3D-datasets which have been created only from x- and y-scans
- upper right: 3D-data created from both x- and y-scans using the type "use independent interpolation scheme for pure x- and y-2D-lines" with activated option apply mean filter with a size of 4 samples
- lower left: 3D-data created from both x- and y-scans using the type "use independent interpolation scheme for pure x- and y-2D-lines" with deactivated option apply mean filter
- lower right: 3D-data created from both x- and y-scans using the type "use interpolation scheme for freely distributed 2D-lines". For the input x- and y-scans the envelope data had been used.

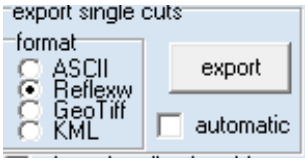




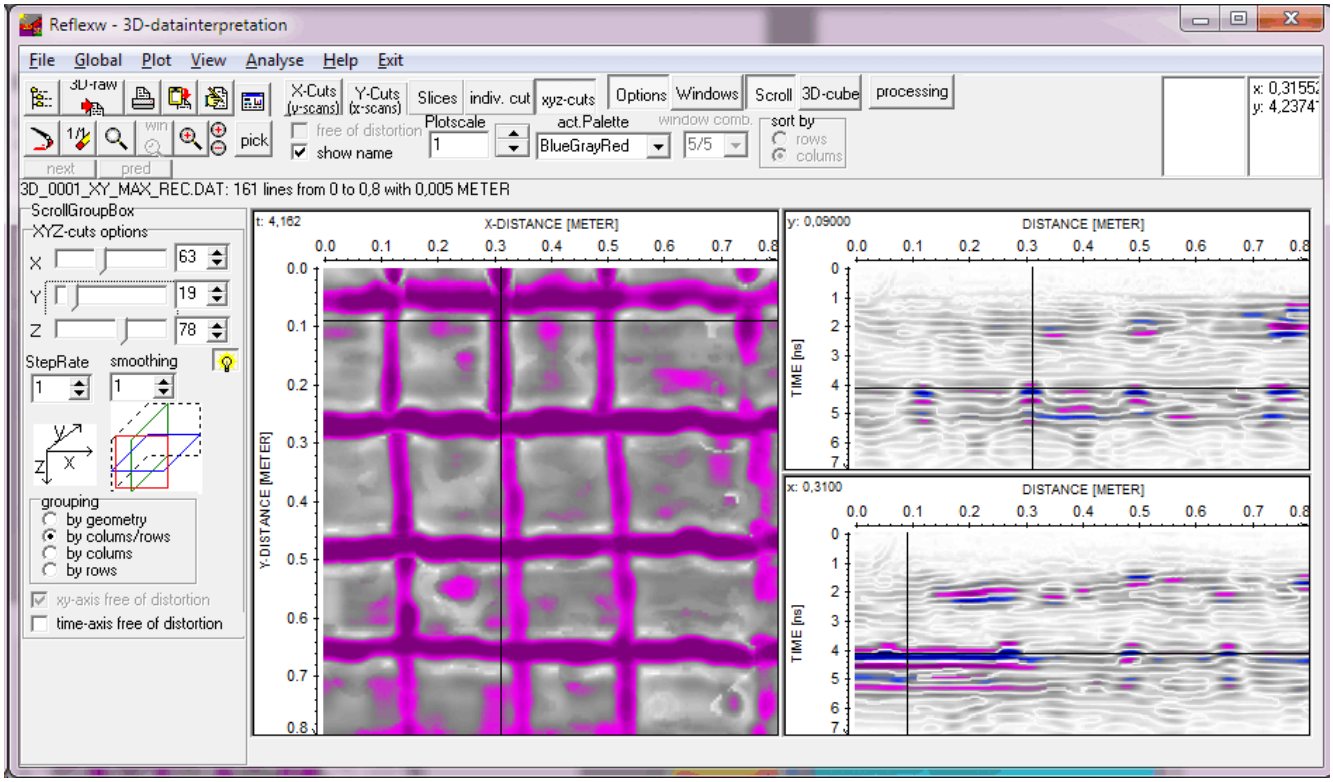
The comparison shows that the 3D-file created using the type "use independent interpolation scheme for pure x- and y-2D-lines" with activated option apply mean filter is comparable to the overlaid independent 3D-datasets which serves as the reference (upper pictures). A smoothing in time direction is necessary (lower left panel without smoothing). The overall interpolation not taken into account the original profile direction (lower right panel) gives a much worser result even it the original data are available as envelope data.

2. Scroll option:

The export of single cuts has been redesigned. 4 different formats are supported:
ASCII, Reflexw, GeoTiff, KML
The option **export** allows an export of the actual cut into the chosen format. With the option **automatic** activated the export is always done if a new cut will be displayed,. For this possibility the formats ASCII, Reflexw and PNG are supported.



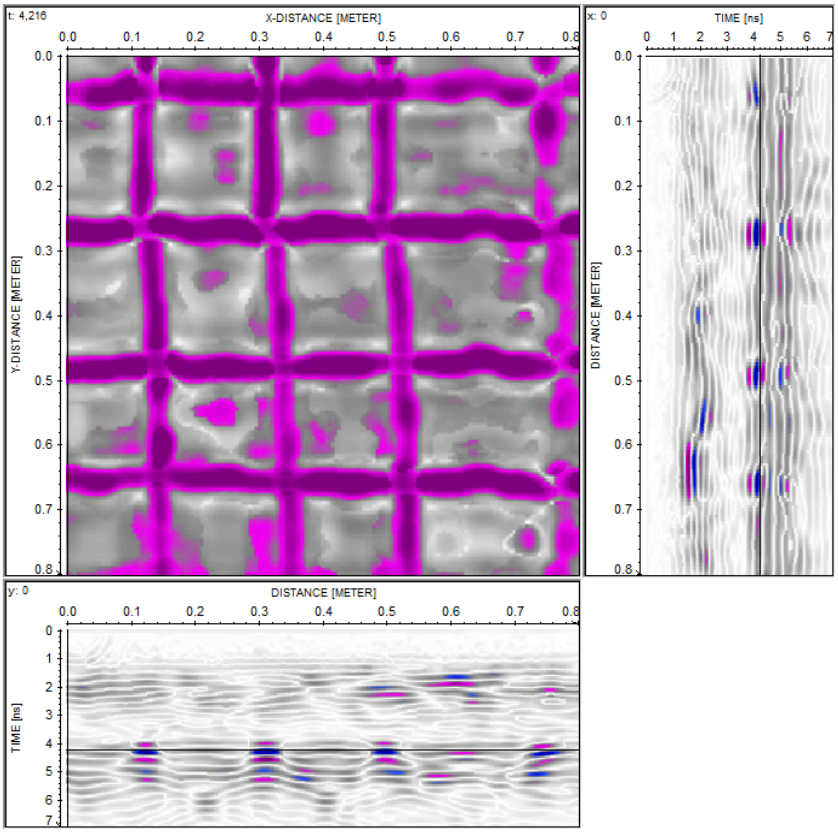
New cut option **xyz-cuts** which allows different simultaneous display possibilities of the 3 cuts. The actual positions of the other cuts are indicated by a large cross within each cut.
A fast interactive change of the cuts is done by several mouse actions:
- the mouse wheel can be used in order to go through any of the cuts
- pressing the left mouse button allows to control the other cuts within any cut.

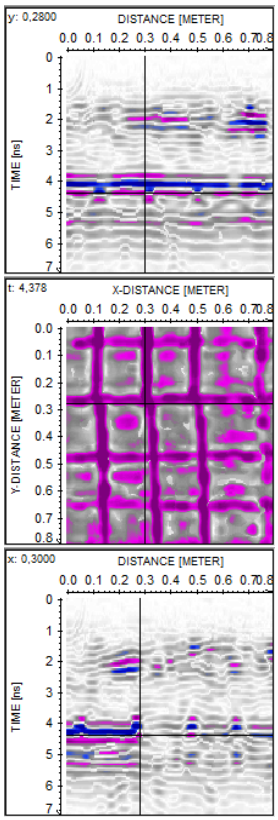


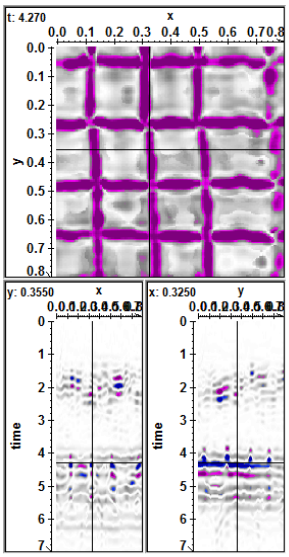
The grouping box allows the following display types:
- by geometry (see picture below). The z-cut (slice) is displayed on the top/left surrounded by the x- and y-cut using a free of distortion scale and using a time axis scale which automatically takes into account the velocity entered for the depth axis within the plotoptions menu
- by colums/rows (see picture above). The xy-cuts are displayed right to the z-cut (slice). The time axis scale of the xy-cuts may be adjusted to the xy-scale activating the option time axis free of distortion
- by rows/colums. The xy-cuts are displayed below the z-cut (slice). The time axis scale of the xy-cuts may be adjusted to the xy-scale activating the option time axis free of distortion
- by colums: all three cuts will be displayed within one row with the z-cut (slice) in the middle
- by rows: all three cuts will be displayed within one column with the z-cut (slice) in the middle

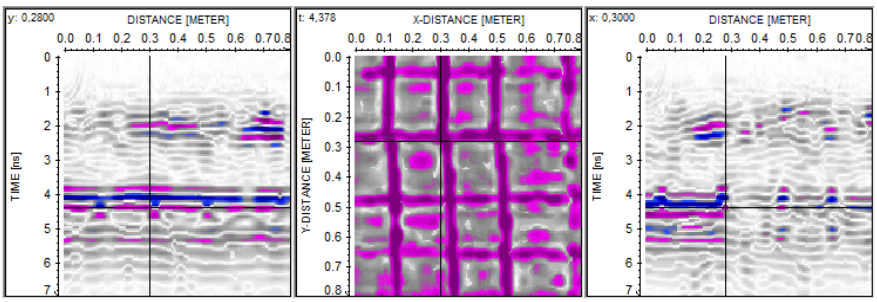
Two options control the scale:

xy-cuts free of distortion: if activated the xy-scales are the same. The option is alway activated for the grouping “by geometry” and “by colums/rows”.
time axis free of distortion: if activated the time axis scale is calculated from the timerange and the velocity entered for the depth axis within the plotoptions menu. The option is always activated for the grouping “by geometry”.
It is possible to change the point of view within all 3 cuts. A large cross shown within each cut defines the actual positions of the other 2 cuts. In addition a 3D-sketch is shown within the option panel. Moving the mouse with pressed left button allows to change the view position of the other 2 cuts. Using the mouse scroll bar allows to go through the actual cut.
With the yellow light option activated the cut automatically gets the focus when entering it. Otherwise the wanted trackbar (X, Y or Z) must be chosen or the left mouse button must be clicked within the wanted cut and the corresponding cut will get the focus.



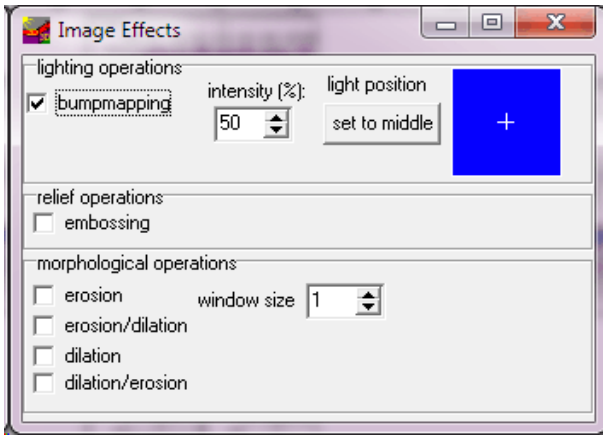






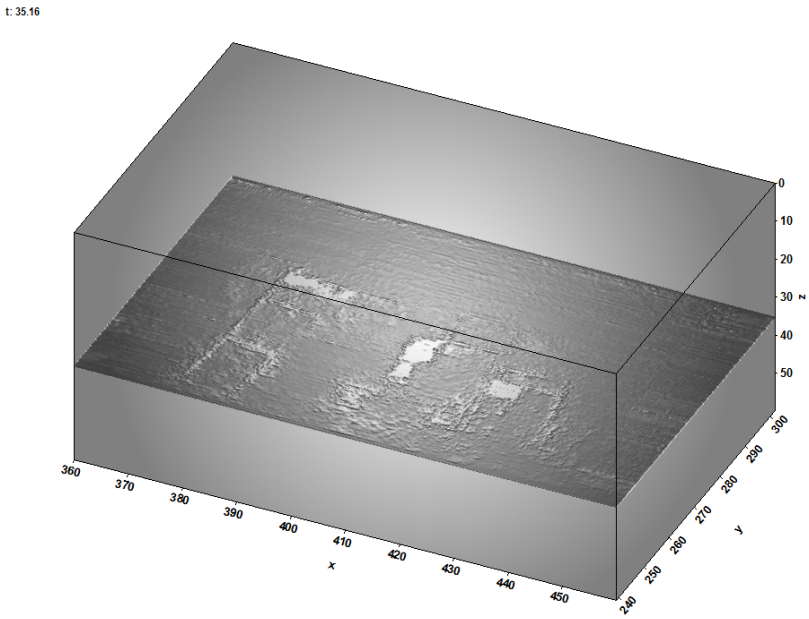
3. Display:

New display possibilities have been included within the option **Effects**. These new possibilites act both on the scroll and the windows option as well as on the 3D-cube display. The display rotuines may be applied on all cuts but they are mainly developed for the display of the timeslices.

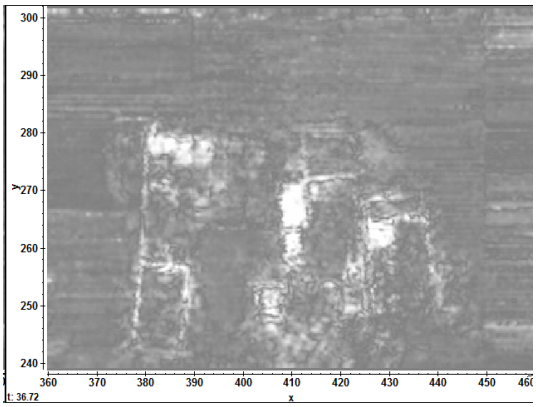


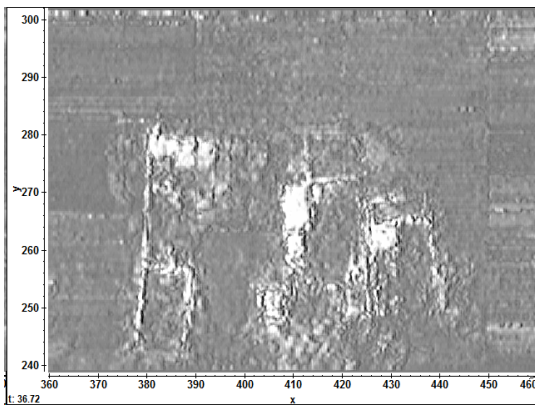
Activating this option opens a new window where the following image effects may be chosen:

bumpmapping: this is a method to simulate lightened rough surfaces by introducing small displacements of the surface. The modified surface normal is then used for lighting calculations. The option intensity (in percent) gives the strength of the modification. The light position may be interactively changed within the blue window using the left mouse button. An example of the bumpmapping for the 3D-cube display is shown on the right.



Embossing: This is a technique for creating a raised pattern. The lower picture shows an example (left original,





right using the embossing method).
Morphological operations: These methods **erosion**, **dilation** and a combination of them are the same as given within the Scroll/Windows filter option menu. Here they also act on the 3D-cube display.

4. Processing option:

new option **square**: if activated the data are squared when loading. This allows a higher contrast. High amplitude objects will be emphazised in comparison to small amplitude reflections/diffractions.

III. modelling

The number of layer points per layer has been increased to 250. The max.number of layers remained 500.

New option **old format** (max. number of layer points 100) which allows to save the model using the old format (for version up to 7.5).

New option **running mean** for **edit current layer** which allows to average the chosen layer using a running mean over a choosable number of points.

New option **sort->dephts** which allows to sort the layernumbers after depth. Activating this option might be useful if the layer numbering is not ascending and the option export to csv tabella is wanted.

New option **csv tabella** under file/export to ASCII: allows to export the actual model into a CSV tabella with each line containing position, depth, velocity and optionally altitude of each layer (see example below for a 3 layer model with activated altitutde, dimension in ft):

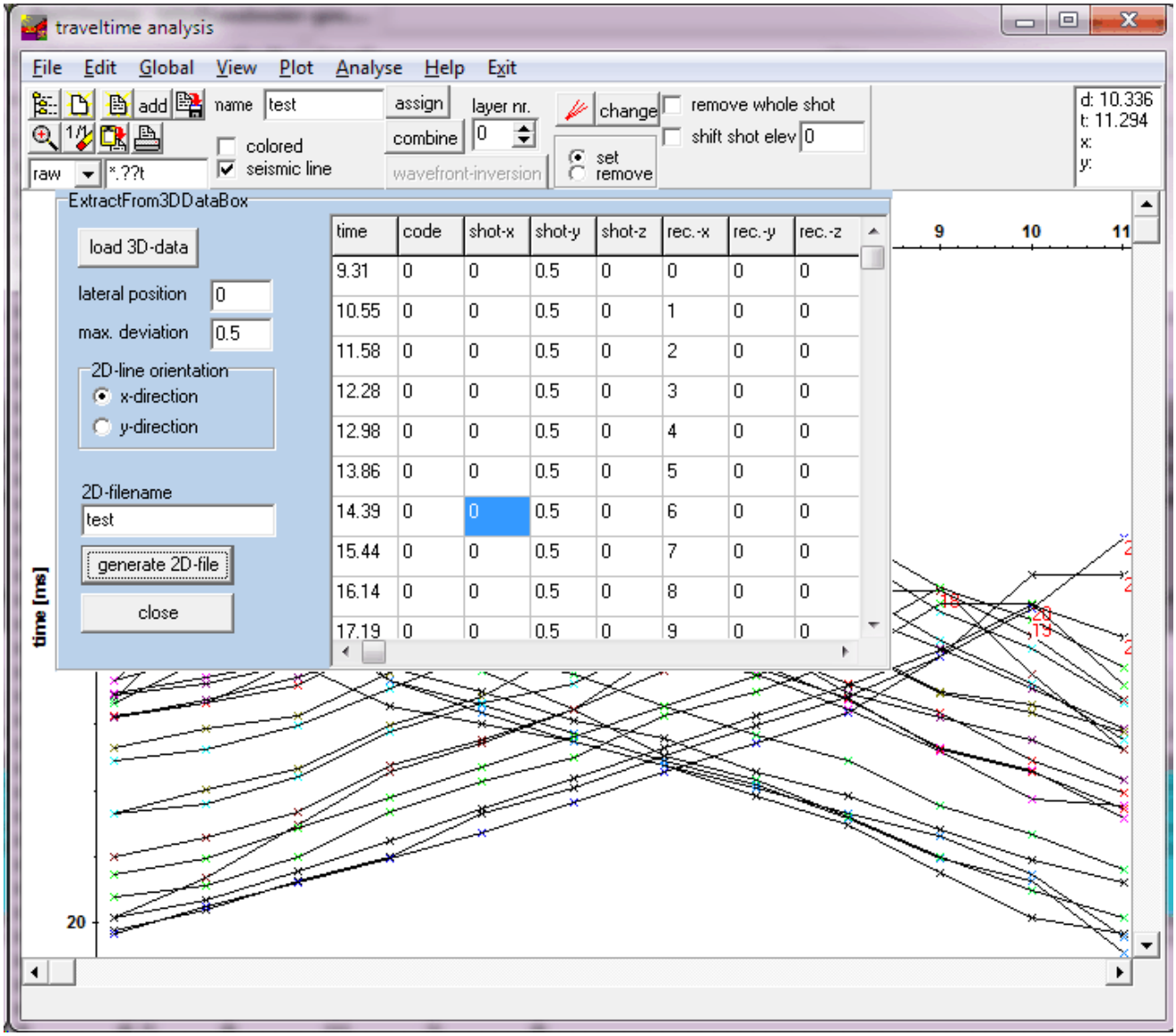
position	depth surface	altitude surface	velocity layer 1	depth layer 1	altitude layer 1	velocity layer 2	depth layer 2	altitude layer 2	velocity layer 3
0.00	0.00	522.50	1122.87	6.42	516.08	4104.55	28.63	493.87	14000.00
6.00	0.00	521.95	1131.51	6.32	515.62	4104.55	28.63	493.31	14000.00
12.00	0.00	521.48	1140.15	6.34	515.13	4104.55	28.76	492.72	14000.00
18.00	0.00	520.86	1148.79	6.60	514.26	4104.55	28.95	491.91	14000.00
24.00	0.00	520.28	1157.43	6.87	513.41	4104.55	28.82	491.47	14000.00
30.00	0.00	519.67	1166.07	6.98	512.69	4104.55	28.30	491.37	14000.00
36.00	0.00	519.02	1163.29	6.88	512.15	4104.55	28.12	490.90	14000.00
42.00	0.00	518.33	1152.37	6.60	511.73	4104.55	28.19	490.14	14000.00
48.00	0.00	517.71	1148.01	6.56	511.15	4104.55	28.72	488.99	14000.00
54.00	0.00	517.22	1152.84	6.47	510.74	4104.55	29.69	487.53	14000.00
60.00	0.00	516.68	1157.66	6.47	510.21	4104.55	30.65	486.04	14000.00
66.00	0.00	516.19	1162.49	6.18	510.01	4104.55	31.13	485.06	14000.00
72.00	0.00	515.56	1165.41	5.96	509.60	4104.55	31.12	484.45	14000.00
78.00	0.00	515.10	1147.40	6.04	509.06	4104.55	30.91	484.19	14000.00

The increment of the positions may be freely entered. The naming is automatic (modelfilename plus extension csv, stored under the subdirectory ASCII).

IV. Traveltime analysis

New option **exchange source receiver** under edit. The option exchanges the source and the receiver coordinates. This option is useful if the source coordinates do vary more than the receiver coordinates. In this case the sorting of the data using e.g. the raytracing based on data traveltimes is more time consuming and less neatly arranged.

New option **extract from 3D-data** under file.



time	code	shot-x	shot-y	shot-z	rec.-x	rec.-y	rec.-z
9.31	0	0	0.5	0	0	0	0
10.55	0	0	0.5	0	1	0	0
11.58	0	0	0.5	0	2	0	0
12.28	0	0	0.5	0	3	0	0
12.98	0	0	0.5	0	4	0	0
13.86	0	0	0.5	0	5	0	0
14.39	0	0	0.5	0	6	0	0
15.44	0	0	0.5	0	7	0	0
16.14	0	0	0.5	0	8	0	0
17.19	0	0	0.5	0	9	0	0

The option allows to extract 2D-lines from a 3D-dataset. The 3D-dataset must have the tomo-3D-coordinates dataformat.
The wanted 2D-lines may be orientated in x- or y-direction. The option lateral position defines the coordinate perpendicular to the entered orientation. All data lying on this line will be taken when a 2D-line is generated. The option max.deviation allows to enter a deviation value for the lateral shot position. This means the shots may be located outside the 2D-line orientation. The sign of the max. deviation is taken into account. In the example above the shots having a shot-y coordinate between 0 and 0.5 m will be used for the generation of the 2D-line.