

Main news of the REFLEXW version 3.5

0. general:

max. number of characters for filenames (without path) extended to 40.

I. 2D-dataanalysis

1. plotoptions

load from fileheader: new radiobox which controls if the plotoptions stored within the fileheader of each profile (plotmode, wigglemode attributes and pointmode attributes) are used. With the suboption no activated the plotoptions stored within the fileheader will not be used. The actual plotoptions remain unchanged even if a new primary profile will be loaded or if the projectdirectory will be changed.

With the suboption each primary profile activated the plotoptions are always updated from the fileheader of the primary profile after a new primary profile has been loaded. These plotoptions are used for all profiles to be displayed.

With the suboption always each file activated the plotoptions stored within the fileheader of each profile are always used for the display. This might be useful for example if profiles with very different amplitudes shall be displayed simultaneously or if profiles shall be displayed both using the pointmode and the wigglemode.

pointmodeScale: with PixelPerSample or PixelsPerTrace activated the option xscale is enabled - allows a rescaling in x-direction.

timeaxis: automatic display in : s instead of ns and ms instead of : s and s instead of ms if the timerange is bigger than 10000 and no manual timeaxis is entered and AxisWithExponent is activated.

distanceaxis: automatic display in KM instead of METER if the distancerange is bigger than 10000 and no manual distanceaxis is entered and exponential display and AxisWithExponent is activated.

correct header elevations: if activated the traces are shifted based on the receiver and the shot elevation values stored within the traceheader of each trace and the entered elevation level. The shift levels are calculated from the difference of the entered elevation level and the individual traceheader elevation values. Based on the actual velocity the travelttime shift value is calculated from the sum of the shot and the receiver elevation differences.

The correct header elevations plot option is comparable with the processing option correct3Dtopography in the processing menu StaticCorrection/muting, if the static correction is done based on the shot and receiver elevations stored within the traceheaders (see below). But in contrast to that processing option the range of the timeaxis will not be changed using this plot option. Therefore it can happen, that - depending on the chosen elevation level - information of some traces is not plotted because it is shifted to times outside of the time range.

2. dataimport:

new option **fix endcoord.:** if activated the entered endcoordinate in profiledirection is fixed and the startcoordinate is changed based on the given endcoordinate and the given traceincrement.

NOTE: If the entered startcoordinate is bigger than the endcoordinate an automatic flipping is done in any case (also if the option meandering is activated for the conversion sequence parallel lines) and the startcoordinate becomes the endcoordinate and vice versa.

Therefore in the case of bigger startcoordinate the entered startcoordinate is fixed if the option fix endcoord. is activated and with deactivated option the entered endcoordinate will be fixed.

option **meandering** active for the import sequence “combine lines/shots”. The meandering performs a flipping of each second original line/shot starting at line/shot number 2 if the entered startcoordinate is smaller than the endcoordinate and starting at line/shot number 1 if the entered startcoordinate is greater than the endcoordinate. This corresponds to the processing option XFlip-3Dfile with the flipmode 1 or flipmode 2.

New **import format Radsys** for importing data from the Radsys GPR-unit.

SEG2-import:

new option **ps timeincr.:** if activated the segy-timeincrement is assumed to be in picosec if the timeincrement is set to ns.

New option **coord. in degree:** if activated the traceheadercoordinates given in arc secs within the SEG2-file are transformed into degree values

New option **use sweeplength:** if activated the sweeplength stored within the SEG2-fileheader is used instead of the sample number in order to determine the length of the output trace.

RADAN-import:

The **gain values** for the new SIR-3000 and SIR-20 are now read in into the Reflexw fileheader.

3. dataexport:

SEG2-export: shot- and receiver traceheadercoordinates are written out to the SEG2-traceheaders.

SEG2-export: new option **ps timeincr.:** if activated the segy-timeincrement within the exported data is assumed to be in picosec if the original timeincrement is in ns.

4. processing:

markerinterpol: 3. column with cumulated markerdistance.

New suboption ignore tracenr. within the load panel - if activated the tracenumbers within the ASCII-file will not be read in. This might be useful for example if parallel lines have been acquired and the markers have been set at identical not equidistant positions within the profiles. The stored tracenumbers have always been ignored within the sequence processing when reading the markerincrements from the ASCII-file (since Reflexw version 2.5).

div. compensation: new processing step under gain; applies a compensation of the geometrical divergence losses either proportional t (spherical losses - 3D-point source) or proportional \sqrt{t} (2-dimensional losses - line source).

gain function: with the option "Apply on example trace" activated the resulting gain curve is plotted within the image next to the filtered trace.

auto correlation: new processing step under 1D-filter; generates the autocorrelation of the trace. Enter the timerange (options start time and end time) for which the autocorrelation will be generated. The max. value of the autocorrelation for each trace is set to the scaling factor.

correct 3Dtopography: new subradiogroup with ASCII-file and z-tracecoord.. With the option z-tracecoord. activated the static correction is based on the shot and the receiver elevations stored within the traceheader (see also new plotoption correct header elevations).

shift-3DFile: new processing step under traceinterpolation; allows to shift each or every 2. ensemble for a definable range. The shift mode defines which ensembles shall be shifted. Enter 0 if every ensemble shall be shifted. Enter 1 for shifting every 2. ensemble starting at ensemble number 2 and enter 2 for shifting every 2. ensemble starting at ensemble number 1. The shift range in the given distance dimension defines the range for the shift of each 2. (or each) ensemble.

For example the option may be useful if a systematic shift of the traces has been occurred during the meandering acquisition of a 3D-datafile.

correct max. phase: an automatic resampling in time direction for each trace has been included into the processing option in order to increase the resolution of the automatically determined phase.

New suboption first onset under polarity has been included which allows an automatic determination of the first arrival (independent from the polarity). The input parameter is a value threshold (absolute value). If the polarity of the automatically determined onsets has been changed for one or more traces a warning message appears.

merge files: new suboptions attach profiles and merge inline.

With the suboption attach profiles activated it is assumed that the profiles do not overlap and there might be gaps inbetween. The traceincrement of the resulting line will be the original traceincrement. The resulting profile starts at the smallest startcoordinate and ends at the largest endcoordinate of the original profiles. The non measured area will be filled up with zero traces. With the option merge inline activated it is assumed that the startcoordinates of the different lines only differ by a fracture of the traceincrement. The traceincrement of the resulting line will be the original traceincrement divided by the number of the merged profiles.

sequence processing: possibility to change the sorting of the individual processing steps by simply dragging one processing step to another place (pressed left mouse button).

5. edit comment markers:

option **create comment markers** expanded to:

- equidistant

With this option activated the option generates equidistant comment markers based on the distance markers and the entered increment. Each distance marker is the new starting point for generating equidistant comment markers in-between two successive distance markers.

- ASCII distance

with the option ASCII distance activated the positions and the marker texts of the new comment markers are read from an ASCII-file (one line equals one distance value) with the following format:

distance commentstring

To be considered: if the chosen ASCII-file has the extension TAB another format is used which corresponds to the format for saving the comment marker tabella on an ASCII-file (see also option save table):

tracenummer distance markerincrement comentstring

The tracenummer as well as the markerincrement are ignored. Use this possibility for example if you have acquired parallel lines with a multichannel system where the antenna have different start positions and therefore the comment markers are only correctly positioned for some files. Save the commentmarkers of the correct file on the tab-file using the option save table and load the other files, reset the existing comment markers if necessary and create the comment markers using this option.

- ASCII XY-coord.

With the option ASCII XY-coord. activated the comment markers are read from an ASCII-file with each line containing the XY-coordinates of the comment marker and the comment itself. The program searches the nearest traceheader coordinates (rec. x-pos. and rec. y-pos.) within the profile for the given XY-marker coordinates and determines the corresponding tracenummer and distance.

Two different formats of the ASCII-file are supported:

1. comment markers XY-coord. files:

X-coord. Y-coord. Commentstring

2. comment markers Hypack files:

latitude longitude Commentstring

The latitude is converted into the Y-coord.(rec. y-pos.) and the longitude is converted into the X-coord. (rec. x-pos.) both using the following formula (e.g. value: 422214.486):

a. 422214.486 -> this is 42 deg and 22.14486 minutes

b. 42 degrees to minutes -> 2520 minutes

Now the minutes of a. and b. are added and multiplied by a factor of 10000:

$(a.+b.)*10000 = (22.14486+2520)*10000=25421448.6$

save table: new option - allows to output the comment marker table to an ASCII-file (extension TAB under the directory ASCII under the projetdirectory). Such an ASCII-file may also be used for creating new comment markers for another file using the distance informations for the postions of the comment markers (see option create/ASCII-file).

6. interactive choice:

some smaller extensions concerning the handling between show profile line and interactive choice.

- new option **scale:** allows an manual scaling of the axis and the coordinate range to be shown. If activated the coordinate range window is shown and with the option manual scaling activated a manual scaling is enabled.

7. picking:

load picks - automatic control if the tracenumbers stored with the picks corresponds to the profile tracenumber. If not a warning message appears and a query if the pick tracenumbers shall be updated. The tracenumber ar used for continuous picking and for the phase follower. Therefore the tracenumbers should be updates if one of these options shall be used.

set picks - new options arrow left and arrow right in addition to arrow up and down - allow to move the last set pick or all picks one trace to the left or to the right. To consider: the xy-coordinates of the picks are not updated when using this option. This must be done during saving the picks with activated option xy-coordinates.

save picks - ASCII-columns: additional option original datafilename - if activated the original datafilename (without) path is output in addition within the first column.

sec.picks - secondary picks are also shown on the second profile

zero crossing correction: option has been improved in such a way that the zero crossing will not only be done to the nearest data point but to the interpolated values between the two datapoints of the zero crossing.

change pick code: new option - allows to change the codes of the picks with the actual code. After having activated the option the new code is queried. The option is only enabled if use code is activated.

printing picks: With the options "use code" and "use layershow-col." activated the picks are printed in color now.

8. layer-show:

new option **fill layers** - if activated the layer above the boundary is filled using the actual layershow color. Option is also available for printing. The color for the lowermost layer underneath the lowermost boundary is always white. To be considered: if the boundary is not continuous the color of the lower boundary will be used.

report output:

- new option statistic summary: If activated a statistic summary is added at the end of the report or at the end of each block defined by a marker comment (option marker comments activated). The summary contains the following information:

1. line: statistics for comment marker

2. line: length of section

3.- n. line: statistic summary for each layer. Each line contains the information for one layer:

average absolute amplitude

average amplitude

average thickness

standard deviation of the average thickness

max. thickness deviation between two adjacent picks

number of cores

max. deviation in % between the core thickness and the thickness of the picks

- new option mm output for depths: if activated the depths or the thicknesses are output in mm

- summary comment data: option replaces the old option summary construction data. If activated all picks between two comment markers are averaged. In addition the comment will be output in the first column of the report. The start position will be rezeroed at a new comment position if the option rezero at comment is activated (exception: a construction change marker has been found).

To consider: the number of characters within one report column is restricted by the option number of digits. Therefore you must adapt this number to the max. size of the comments if you do not want to lose any information of the comments.

- new option rezero at comment: if activated the start position will be rezeroed at the new comment position except a construction change has been found.

- new option xy-coordinates: if activated the xy-coordinates of the receivers stored in each trace header of the actual profile are written out within the 2. and 3. column (see also trace header Edit menu - chap. 1.9.6). This allows you for example to write out non equidistant xy-coordinates or the xy-coordinates, if the profile is not orientated into one direction (x or y).

9. velocity adaptation:

core data adaptation - now also available for the second profile

10. view:

- core data are also shown on the second profile

-new option **TraceHeader axis**: if activated the xy-receiver traceheadercoordinates are displayed along the distance axis in addition. The option is only available for the primary profile and with deactivated plotoptions Rotate90degree and FlipXAxis. The number font is used. The number of places and the number of decimal places may be entered within the global settings menu within the pick parameters panel. The option transp.comm.marker within the global settings menu controls if the text will be transparent or if a white box will be underlied.

- new option **add. 2column data**: option allows to display any 2 colum ASCII-data (e.g. the topography) along the profile (distance) axis within a separate image at the top of the profile (option overlay primary section deactivated - size of the vertical axis is given by the spin edit vertical size (pixels) or within the actual primary section (option overlay primary section activated). The horizontal size is connected to the size of the profile distance axis. The plotoptions FlipXAxis and Rotate90Degree are not supported and will be automatically deactivated.

After having activated the option show within the Add2ColumData menu you are asked for the ASCII-file with each line containing two values - the distance and the parameter value. These parameter data may contain for example any informations (e.g. topography, moisture, ...) along the profile. The max. number of datavalues is restricted to 32768. The program automatically determines the max. data range and displays a vertical axis (option overlay primary section deactivated). The data are plotted as a polygonial line. The line color as well as line thickness is taken from the symbol font. The option is not available for the printing.

11. traceheader menu:

Create(3D)ensembles: new radiogroup which controls how the ensembles are created.

With the option equidistant activated the actual profile will be subdivided into different equidistant lineparts. The option nr. of traces defines the number of traces per linepart (ensemble).

With the option constr. change markers activated the actual profile will be subdivided into different lineparts at the given construction change markers positions.

Activate the option create to generate the lineparts (the Ensemble-Nr. within the traceheaders will be actualized). This option allows you to redefine the individual ensembles (2D-lines) of a 3D-file or of a 2D-file consisting of different parts. One application for the second case is that some filter (e.g. background removal, migration, option lineparts activated) use this subdivision.

traceheader actualization:

The GPS-coordinates are stored within the x- and y-receiver traceheader positions (rec-x and rec-y). In the case of the datatype "constant offset" the shot and the CMP-coordinates are set equal to the receiver positions. In the case of the datatype "single shot" the shot coordinates are set to the entered shot position and shot offset defined within the fileheader. The CMP-coordinates are always calculated from the receiver and shot positions.

The formats **RAMAC-GPS** and **WSKTRANS-GPS** (utm-conversion of RAMAC-GPS) have been generalized a little bit. Now the separator between the different values may be either comma, blank or tab. In addition the orientation within the RAMAC-GPS file (cor-file) may follow the coordinate value separated by a comma, blank, tab or nothing (e.g.53.5891830N or 53.5891830,N).

new option GPS-times: allows to actualize the traceheader coordinates based on the acquisition times (in secs after midnight) stored within the line traceheader and an ASCII-file containing the GPS-coordinates and the GPS-time. The format of the ASCII-file is as following:

Easting	Northing	MSL	GPS Date	GPS Time
638434.601	7215215.236	143.227	19.05.02	07:32:12
638434.573	7215215.253	143.191	19.05.02	07:32:13

The program performs an automatic interpolation or extrapolation if the times are not matching.

new option calculate distancies: allows to update the traceheader distancies based on the x- and y-receiver traceheader coordinates. The start distance is taken from the fileheader but can be changed manually (option start distance).

new option IDS-GPS: With the type IDS-GPS activated it is possible to read the GPS coordinates using the format of the IDS-GPS software. Two files must exist. The file with the extension gps contains the GPS-coordinates and the file with the extension gpt contains the tracenumbers. The filenames of the two files without the extension must be the same. There might be a header within the gps-file but the first line containing the first GPS-coordinates corresponds to the first tracenummer stored within the first line of the gpt-file. The next line corresponds to the second tracenummer and so on.

One lines of the gps-file contains the following informations:

\$GPGGA,123015.00,5141.607563,N,00439.680658,E,2,04,2.3,2.74,M,47.21,M,2.8,0000*40

whereby the following fields will be interpreted:

field 3: 5141.607563 - geographic latitude in ddmm.mmmmmmm format (51 degrees and 41.607563 minutes)

field 5: 00439.680658 - geographic longitude in dddmm.mmmmmmm format (4 degrees and 39.680658 minutes)

field 10: 2.74 - antenna height above MSL (mean sea level) reference (2.74 m)

The latitude and the longitude are stored in degress within the x- and y-receiver traceheader positions.

REFLEXW stores the latitude, the longitude and the altitude into the traceheaders using a 32 or 64 bit floating format depending on the output format during the import of the data. An interpolation or extrapolation is done where no coordinates are defined (missing tracenumbers) or if the GPS-coordinates are not defined.

new option UTM-conversion: allows to convert GPS traceheader coordinates (longitude in degrees in shot x-pos., rec x-pos. and CMP x-pos and latitude in degrees in shot y-pos., rec y-pos. and CMP y-pos) to local cartesian coordinates using the so called Universal-Transverse-Mercator(UTM)-conversion.

The conversion can be done automatically (default) or by using a distinct zone. If the automatic conversion is used, the UTM-zone for the whole profile is determined using the GPS traceheader coordinates of the first trace. So the coordinate origin is fixed for the whole profile not regarding, that the profile may lie in different UTM-zones.

If a distinct zone shall be used for the conversion, it can be chosen from a list if the option

'distinct zone' is chosen. This zone is also fixed for the whole profile.

There exist 120 different zones which cover nearly the whole globe: 60 zones cover the northern part of the world ($0 \text{ deg} \leq \text{lat} \leq 84 \text{ deg}$), the rest the southern part ($-80 \text{ deg} \leq \text{lat} < 0 \text{ deg}$).

The zones of every half sphere are determined as following:

Zone 1: $-180 \text{ deg} \leq \text{lon} \leq -174 \text{ deg}$ (if $\text{lat} \geq 0$ this is zone utm1n, otherwise utm1s)

Zone 2: $-174 \text{ deg} < \text{lon} \leq -168 \text{ deg}$

..

Zone 60: $174 \text{ deg} < \text{lon} \leq 180 \text{ deg}$ (if $\text{lat} < 0$ this is zone utm60s, otherwise utm60n)

For the regions near the poles ($\text{Lat} > 84\text{deg}$ or $\text{Lat} < -80\text{deg}$) the Universal-Polar-Stereographic(UPS)-conversion is performed instead the UTM-conversion.

12. CMP-processing:

new option **corr.residuals** within the NMO-stack/correct panel. With this option activated an automatic correction of the residual statics is applied for the NMO-stack and the NMO-correction. The procedure is as following:

1. A stack trace is created for each ensemble based on the given 2-dimensional velocity distribution.
2. A crosscorrelation is performed for each NMO-corrected trace within each ensemble and the corresponding stack trace.
3. From this crosscorrelation a timeshift value is derived for each trace. The max. allowable shift is defined by the parameter range (enter in the given timedimension).
4. The NMO-corrected traces are shifted by the corresponding timeshift values and the stacking (NMO-correction) is performed.

13. 3-component analysis

New option: allows the interpretation of 3 component data. Precondition is that the traceheader items component (identical to the item field record no.) and Ensemble-nr. are set. The x-component (component =1) is assumed to be orientated to the north and the y-component (component =2) to the east. The z-component is stored under component =3.

Construct 3-component data within the import menu: set the sequence processing to multi components. The final REFLEXW 3component datafile will be constructed from several original datafiles containing multicomponent data. Each original datafile must contain one single multicomponent dataset. An ASCII-file under the path ASCII under the projectdirectory (filename multicomponent.*) must exist with each line containing the following informations:

filename(without path) declination/north inclination nr.ofcomponents angle1 angle2 angle....

One z-component must exist. The angle of this component must be set to -90° . The order of the components within the original file is defined by the angles.

The max. total number of components (incl. the z-component) is restricted to 9. The program searches those 2 components with the angles next to the north and to the east and a rotation of these components into exact north and exact east will be done. The same holds true for the z-component which will be rotated exactly to z.

Example of a 3-component original dataset consisting of two files, which will be finally combined to one ReflexW 3 component datafile:

```
xp040000.sg2 20.0 0.0 3 -90.0 0.0 90.0
xp050000.sg2 30.0 1.0 3 -90.0 0.0 90.0
```

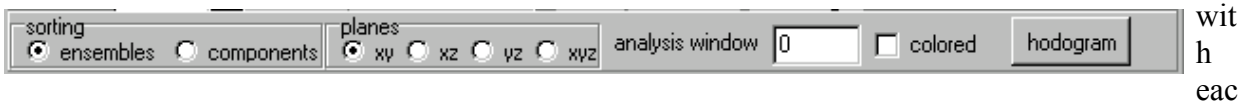
Example of a 7-component original dataset consisting of two files, which will be finally combined to one ReflexW 3 component datafile:

```
xp060000.sg2 40.0 0.0 7 0.0 30.0 60.0 90.0 120.0 150.0 -90.0
xp070000.sg2 50.0 1.0 7 0.0 30.0 60.0 90.0 120.0 150.0 -90.0
```

It is also possible to combine files with different number of components into one single file.

If a 3-component file exist it is possible to interpret it within the 3-component analysis panel within the 2D-datanalysis.

The option sorting controls the display of the data. With the option ensembles activated the data are plotted into one window with each ensemble after the next. Each ensemble consists of the 3 different components. With components activated the data are plotted into 3 different windows



h window containing all traces of one single component (x, y and z).

The particle motion and the actual polarization angle can be displayed. In order to do so, one has to choose firstly one of the four possibilities of the option planes and secondly the length of the travelttime window (option analysis window).

The option hodogram allows you to continuously display the particle motion within the chosen plane when moving the mouse cursor in the data. The linearity factor (1 - completely linear, 0 - circular) and the dominant angle are also determined and displayed when you have chosen one of the 2-dimensional planes. The option analysis window determines the length of the travelttime window for the display and the polarization analysis. If the plane xyz has been chosen, a 3D-cube display of the particle motion is shown.

The option colored allows to color the wiggles based on the actual polarization angle. Again the option analysis window determines the length of the travelttime window for the polarization analysis. The option is disabled when you have chosen the plane xyz.

II. 3D-datainterpretation:

general: The 3D-data loading and the display has been fastened especially for the 3D-cube display.

new option **enter Scan3D** under File: enters the module Reflex 3D-Scan which allows to import and to analyse automatically rectangular 3-dimensional GPR-data which have been acquired along 2D-parallel lines in one or two perpendicular directions.

Precondition is that the data have been acquired along equidistant parallel 2D-lines on a regular rectangular grid. This means that the traceincrement in one direction (x or y), the

number of traces into this direction, the start- and endpositions of the 2D-lines and the scan increment between the 2D-lines must be equal.

The traceincrement must be given within the original data.

In addition if the data have been acquired in two perpendicular directions the increment between the parallel lines (scan increment) must equal the traceincrement.

The original data may be stored on individual 2D-files or on one 3D-file with the 2D-lines sequentially stored.

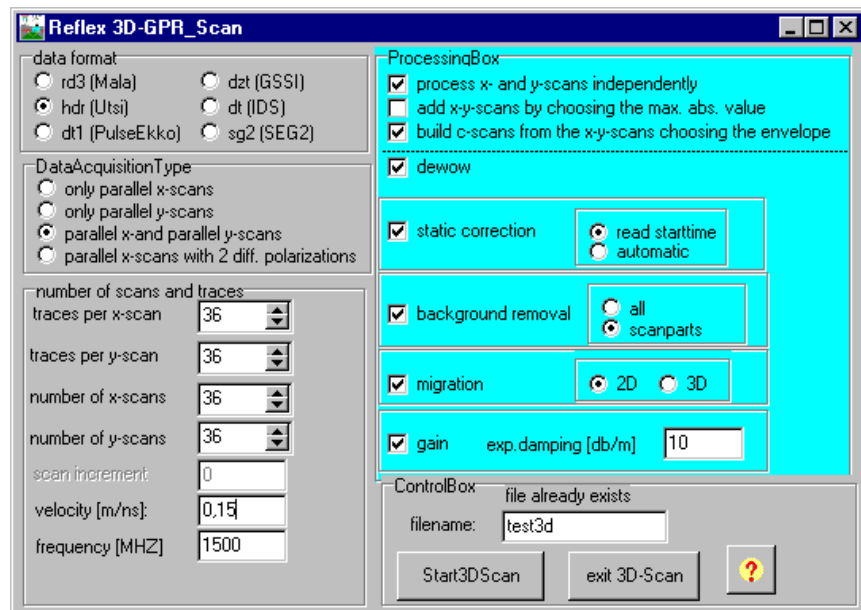
Optionally some filter steps are automatically performed. They are: *dewow*, *static correction*, *background removal*, *migration (2D and 3D)* and *gain* in timedirection.

If you have acquired both x- and y-scans you also may choose if the x- and y-scans may be processed independently and how the adding of the x- and y-scans shall be done. Activating the option *add x-y scans by choosing the max. abs. value* means that the x- and y-scans are not simply added but the max. absolute value will be determined and this value is taken as the sum value. This has the advantage that no information will be lost when the two different scans are added.

Activating the option *build c-scans from the xy-scans choosing the envelope* means that the c-scans(timeslices) are built independently choosing the envelope of the original data.

new option **envelope timeslices only** within the Ref3DProcessingForm: with this option activated the envelope of each trace of the 3D-file is calculated and shown for the timeslices (option slice activated). For the other cuts (x-cuts and y-cuts) the “normal” traces will be shown. The option is not available for a secondary 3D-file and will also be automatically deactivated for the primary 3D-file if a secondary 3D-file has been loaded.

new option **ShowTimeSliceInAddition**: if activated the actual timeslice depending on the



mouse position is shown in a second window for the scroll mode. The timeslice is shown based on the envelope data. The actual cursor position is marked by a cross within the timeslice. The screen is either split vertically or horizontally depending on the settings within the plotoptions. The option will be automatically deactivated if one switches to the windows or the 3D-cube mode. The left mouse button allows to scroll one cut forwards and the right mouse button to scroll backward (precondition: pick option deactivated).

clipboard: option increased - now the secondary 3D-file is also included. New option copy to file analogous to the option within the 2D-dataanalysis

3D-cube display: buttons for saving the actual 3D-cube display parameters (angles and scaling values) and to read them from the disk (filename cube3Dpar.txt under the REFLEXW program directory).

new option **create MPEG-file** under analysis: option allows to create a MPEG moviefile for the later use with a MPEG-player. The MPEG moviefile may only be created for the Scroll and the Cube3D mode. After having activated the option a new window named create MPEG-file opens which stays on the top. First you must enter the filename (without extension). The MPEG-file will be stored under the actual projectdirectory with the extension mpg.

The compression is controlled by the trackbar and the checkbox MJPEG. The trackbar allows you to either increase the quality (trackbar to the left) or to increase the compression (to the right). With the highest compression the filesize will be decreased by a factor of about 4 compared to the highest quality. With the option MJPEG deactivated an additional encoding is used which again reduces the filesize by about 50 %. In this case the computertime for constructing the MPEG-file will be significantly increased and the quality as well will be decreased.

In the frequency Radio Group box you may set the frequency, with which the certain pics of the mpeg-file will be shown (8 Hz means 8 pics per sec, e.g.).

Start the recording by pressing the record button. Now the other 3 buttons (play, pause and stop) are enabled. The play button will be automatically activated and the first slide is added to the MPEG movie. As long as the play button is activated each new slide will be added (e.g. when using the scroll bars or when using the plot option). The actual slide number is shown. If you want to interrupt the MPEG-construction use the button pause. The button stop finishes the construction and the MPEG-file will be closed.

To be considered: the bitmap size must not be changed. Therefore an error message appears and the MPEG construction will be stopped if the bitmap size, e.g. after having resized the 3D-datainterpretation window, has been changed. The bitmap size is determined when pressing the record button.

New option **interpolate actual 3D-file:** the option allows a reinterpolation of the actual 3D-file into the different directions. After having entered the options you must specify the interpolation factors into the 3 different orientations. The number of points into the individual orientations increases accordingly.

new option **flipXYsorting 3D-file:** the option allows to change the internal sorting of the traces of the actual 3D-datafile. A 3D-datafile consists of several parallel 2D-lines which are orientated into either x- or y-direction (defined within the fileheader - profile direction). After having applied this option the parallel 2D-lines of the 3D-datafile are orientated into the other direction (e.g. original x - after the option they orientated into y). The option may be useful in order to compare two different 3D-datafiles which are measured into 2 different directions (crossing

orientation) because the program only allows to compare 2 different 3D-datafiles which have the same number of traces/2D-lines and of 2D-lines and which internal sorting is the same.

generate 3D-file from 2D-lines: warning message if the traceincrements of the 2D-lines do not match

III. modelling:

0. general

1. When entering the model parameters an automatic check will be done and default values will be assumed if necessary (e.g. mue will be set to 1 if equal 0).
2. plotoption reduction velocity now supported for traveltimes shown within the lower window.

1. analyse

new option **generate pickfile (2-way traveltimes)**: the option allows to generate a pickfile consisting of the 2-way reflection traveltimes generated from the layer boundaries of the actual model (except the uppermost layer boundary). The vertical gradients are taken into account. The 2-way reflection traveltimes are calculated up to the uppermost layer (corresponds to the model top in case of no topography). The number of the layer boundary is stored within the pick code. Example of application: conversion of a model taken from refraction data into 2-way traveltime data for a comparison with a seismic reflection section.

2. FD

new option **BatchStartFD**: batch start for different models. After having activated the option the model filenames for the FD-calculation are queried.

elastic modelling: now 2 different absorbing boundary conditions possible: A1 and REY. The absorbing boundary condition A1 does not show the problems with the instability at the model borders when a discontinuity is present.

3. tomography

new option **confidencefile** - if activated a Reflex formatted confidence file is generated which may be displayed for example within the 2D-dataanalysis - the filename is queried after having finished the tomography.

The confidence is a measure for the number of rays within one cell. With the beam option activated the beamrange around the ray is taken into account in addition.

IV. traveltime analysis 2D:

1. plotoption reduction velocity now supported