

Generate a 3D-dataset from data with gps-based coordinates

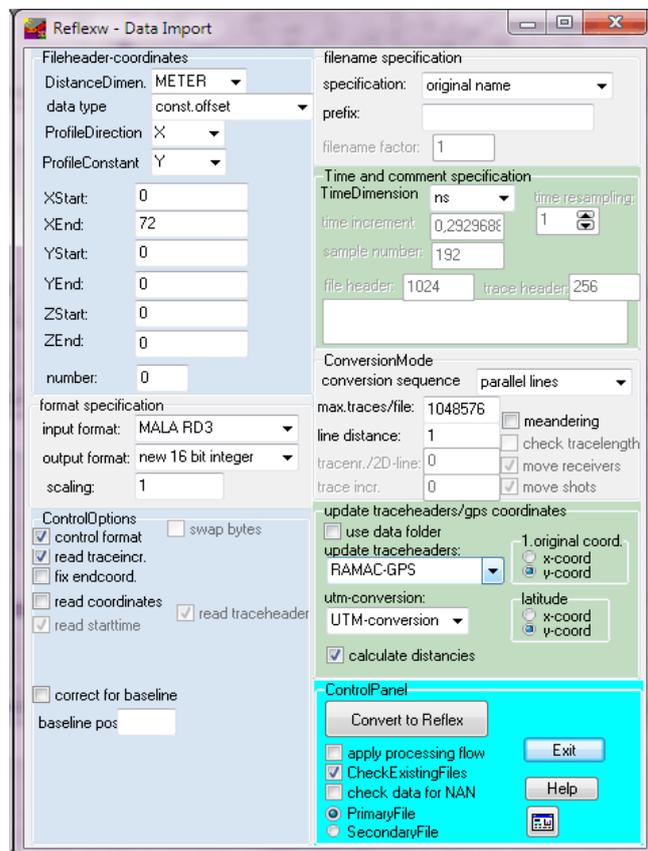
In the following GPR data which have been stored using the Mala rd3-format and cor gps-coordinates will be imported, processed and displayed as a 3D-datablock. The original Mala GPR data and the gps-coordinates are stored under the directory ASCII under the projectdirectory and the GPR data and gps-file have the same filename but different extensions (rd3, rad and cor).

1. Import the data

The import parameters have been set for original 2D-constant offset data.

- The output format must be set to new 16 bit integer or new 32 bit floating point in order to store the coordinates using double precision.
- set conversion sequence to parallel lines even if the profiles are not strictly parallel because the gps-coordinates will later be used in order to create the 3D-datablock. The line distance can be set arbitrarily.
- set update traceheaders to RAMAC-GPS
- the UTM-conversion is optional as well as the option calculate distancies

If UTM-conversion is activated the coordinates given in degree will be automatically converted into UTM-coordinates. The option calculate distancies allows to calculate the distance along the 2D-line based on these UTM-coordinates. This might be useful if no wheel has been used during the data acquisition in order to make the profile equidistant in distance at a later processing stage.



The cor-data normally contain the latitude coordinates as a 1. coordinates. With the settings shown here the latitude coordinates given as the 1. coordinate within the cor-file will be stored as the y-coordinate within the Reflexw traceheader.

- click on Convert to Reflex and choose all original datafiles which then will be imported within one step.

2. Geometry check and 2D-processing

The geometry of the 2D-lines may be controlled using the option “file/open/interactive choice”. Set the corresponding filefilter and activate “use traceh. coord.”. Using the option “show lines” displays all lines with the chosen filefilter.

Another possibility is given by the option “file/edit traceheader/edit traceheader tabella”.

The image shows two windows from a geophysical software package. The top window, titled "interactive 2D-line choice", displays a plot of several parallel lines on a coordinate system. The x-axis is labeled "X [METER]" and ranges from 461500 to 461750. The y-axis is labeled "E [METER]" and ranges from 5427240 to 5427270. The plot shows a series of lines that are slightly curved and parallel to each other. The bottom window, titled "edit trace header coordinates for F:\data\3D_withgps\ROHDATA\SYN_0001.DAT", contains a table with 12 columns: trace-nr., distance, shot-x, shot-y, shot-z, rec.-x, rec.-y, rec.-z, time delay, gain, and time collect. The table lists 12 traces with their respective coordinates and parameters. Below the table are several control panels: "TopographyGroupBox" with checkboxes for "update shot z-pos.", "update receiver z-pos.", "use x-traceheader.coord.", "apply x-z topography", and "get distance along topography"; "EditGroupBox" with "apply borehole deviations", "3D-view of boreholes", "smooth rec. xy-coord.", and "factor f. smooth: 4"; "CheckGroupBox" with "check rec. coordinates", "factor f. check: 10", and "view rec. geometry"; and "UpdateGroupBox" with "load from AsciiFile", "save on AsciiFile", "update distances", "reload from file", "save changes", and "close".

trace-nr.	distance	shot-x	shot-y	shot-z	rec.-x	rec.-y	rec.-z	time delay	gain	time collect
1	0	461771.3624	5427264.858	125.9999999	461771.3624	5427264.858	125.9999999	0	1	0
2	0.099953691	461771.3870	5427264.761	126.0042318	461771.3870	5427264.761	126.0042318	0	1	0
3	0.199907381	461771.4116	5427264.664	126.0084636	461771.4116	5427264.664	126.0084636	0	1	0
4	0.299861073	461771.4362	5427264.567	126.0126954	461771.4362	5427264.567	126.0126954	0	1	0
5	0.400001947	461771.4615	5427264.471	126.0170158	461771.4615	5427264.471	126.0170158	0	1	0
6	0.500142823	461771.4868	5427264.374	126.0213361	461771.4868	5427264.374	126.0213361	0	1	0
7	0.600543217	461771.5110	5427264.276	126.0256163	461771.5110	5427264.276	126.0256163	0	1	0
8	0.700943611	461771.5352	5427264.179	126.0298966	461771.5352	5427264.179	126.0298966	0	1	0
9	0.800897303	461771.5597	5427264.082	126.0339923	461771.5597	5427264.082	126.0339923	0	1	0
10	0.900850994	461771.5843	5427263.985	126.0380881	461771.5843	5427263.985	126.0380881	0	1	0
11	1.000440623	461771.6151	5427263.890	126.0430283	461771.6151	5427263.890	126.0430283	0	1	0
12	1.10003025	461771.6459	5427263.796	126.0479686	461771.6459	5427263.796	126.0479686	0	1	0

Perform any 2D-processing, e.g. bandpassfiltering, migration,

If the elevations have been defined within the cor-file it is also possible to perform a topographic correction. The data shown here have a simple topography.

The image shows the "Reflexiv - 2D-dataanalysis" software interface. The main window displays a seismic data plot with a distance axis from 30 to 70 meters and a time axis from 0 to 150 milliseconds. The plot shows several traces with a color scale on the right ranging from -32 to 32. Overlaid on the plot are several windows: "StaticCorrection/muting" with options for "static correction", "dynamic correction", "move starttime", "muting", "surgical muting", "time cut", "correct max. phase", "cor. max phase/unwrap", "correct picked phase", "correct for 2 layers", "correct 3D topography", and "suppress multiples"; "Reflexiv - Plot-Options" with settings for "Plotmode", "Pointmode", "XScale", "YScale", "Wiggleattributes", "Grid", "DepthAxis", "Pointmode attributes", and "ManualScaling"; and "ControlPanel" with "AGCGain", "Energy/Decay", "tracegain", "Dewow", "isoline", and "show increment" options.

3. Create the 3D-block

- enter the 3D-datainterpretation
- enter file/generate 3D-file from 2D-lines

A new menu opens.

- activate the option use interpolation scheme.... as type of interpolation
- enter time end
- specify the filepath for the 2D-lines
- load the 2D-lines
- click on min/max xy coord. - the xstart....yend parameters will be updated.
- enter a new rasterincrement in x- and y-direction
- enter the interpolation range in x- and y-direction. The interpolation range should be big enough in order to cover the biggest gap between the original 2D-lines
- enter any 3D-filename and start the 3D-block building
- enter processing and activate envelope timeslices only
- now you may use any of the 3D-display possibilities within the 3D-datainterpretation

