Filtering within REFLEXW

In the following the filtering within REFLEXW is described including single filtering (chapter II) and sequence processing (chapter III).

I. General overview

1. The filtering options can only be applied on REFLEXW formatted data - this means that other formatted data (like RAMAC, GSSI, SEGY,...) must be imported first using the option File/import. The imported data are stored under the subdirectory rohdata.

2. The filtered data are always stored on a separate file using the same filename and a special extension given by the processing label. Example: original file: profile1.dat; filtered file: profile1.00t (the processing label was set to 0). The filtered data are always stored under the subdirectory procdata.

3. Filtering can be done for a single dataprofile (see section II) or for a number of profiles (so called sequence processing, see section III).

II. Filtering of a single datafile

In the following the filtering of a single REFLEXW-formatted datafile is described step by step. The following filtering sequence is used:
subtract-mean(dewow)
static correction
manual gain(y)
background removal
This may be a standard filter sequence for GPR-data which are stored as raw data like RAMAC or PULSEEKKO data. For a detailed information about the individual filter steps please press F1 within the corresponding filtermenu.

1. enter the module **2D-dataanalysis**

2. **load** the wanted datafile into the primary window using the option File/Open/rawdata and then choose the wanted datafile.

3. The choosen datafile has been plotted into the primary window (Hor.Split activated). Depending on the settings of the split plot options (see option Plot/Options - options Ver.Split or Hor.Split activated) the screen is subdivided vertically or horizontally into two different windows (primary window and secondary window). If none of the two option is activated the screen is not subdivided.
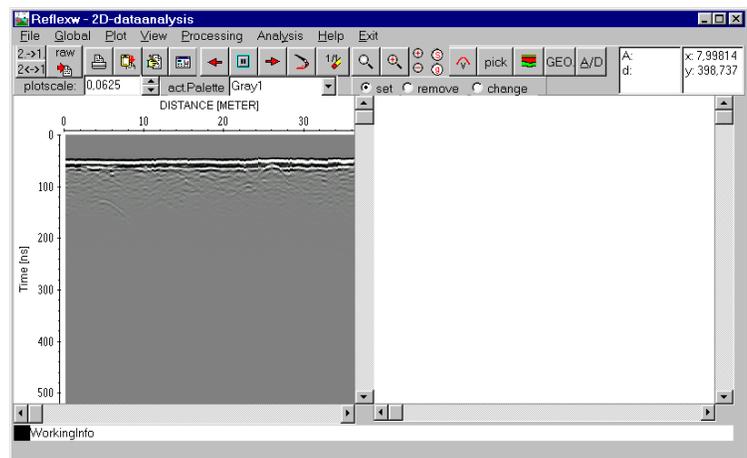
4. enter the **firs**t filter step using the option **Processing/1D-Filter**.

5. The **1D-filter window** appears. Enter the following parameters or options:
- activate the option **subtract-mean (dewow)**
- enter the filterparameter **timewindow**
- enter the wanted **ProcessingLabel**
- **start** the filtering

With the option **Apply on example trace** activated the effect of the entered filterparameter(s) can be controlled interactively (filtered trace and filtered spectrum). Trace number controls which trace is shown.
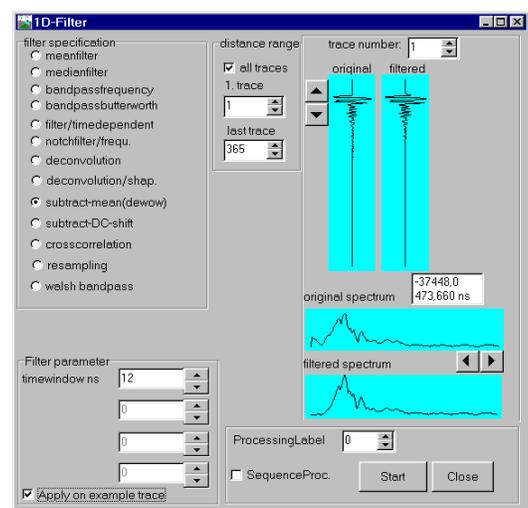
With the option **SequenceProc.** activated the SequenceProcessing menu opens in addition which allows you to add the actual filter step to the processing flow (see chapter III).
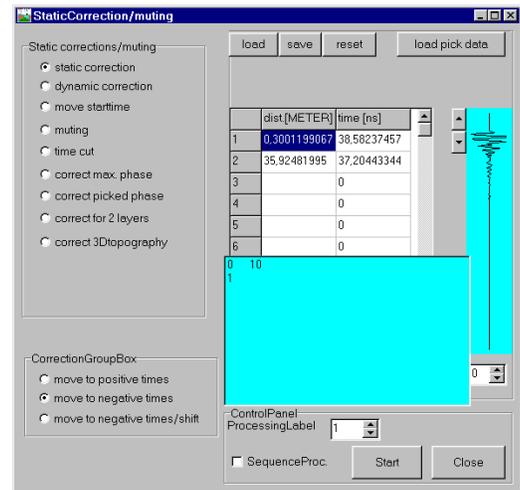
6. The filtered data have been plotted into the secondary window. Now **close** the filter window and you must enter the option **File/ChangeSecondToPrimary** in order to use the filtered dataset for the next desired filter step.
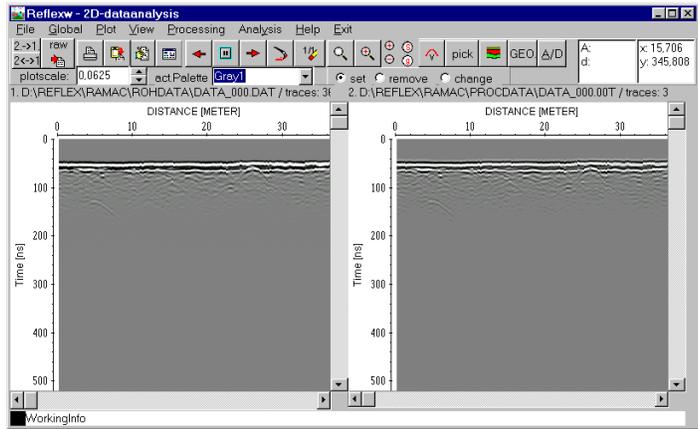
7.Enter the **second** filter step using the option **Processing/StaticCorrection/muting**.

8. Within the **StaticCorrection/muting window** activate the option **static correction** and the suboption **move to negative times**.

9. A table appears on the right side. You may either enter manually the correction values within this table or you may enter the values interactively using the left mouse button within the data. The option save allows to store the correction values on file for any later step.
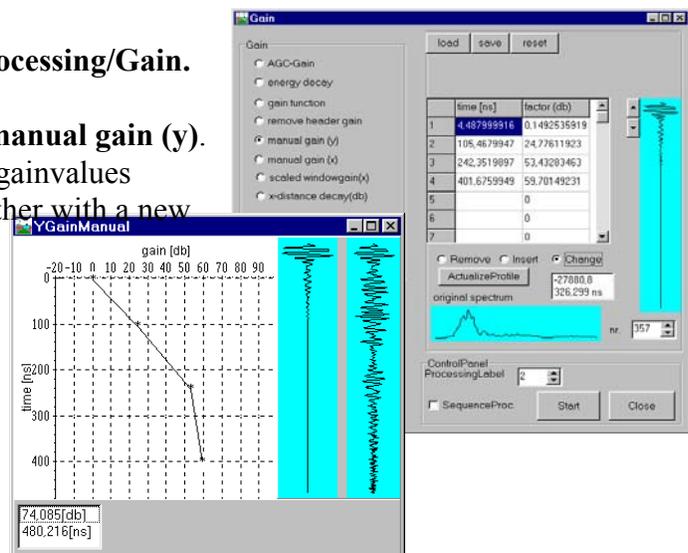
10. Enter the wanted **ProcessingLabel** and **start** the static correction. To be considered: the processing label must be different from that of the primary file because original and filtered datafile must not have the same filename.

11. The static corrected data have been plotted into the secondary window. **Close** the static correction window and use the option **File/ChangeSecondToPrimary** in order to use the filtered dataset for the next desired filter step.
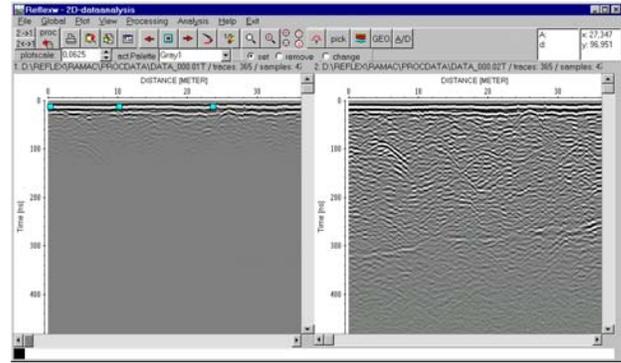
12. Enter the **third** filter step using the option **Processing/Gain.**

13. Within the Gain window activate the option **manual gain (y)**. A table appears on the right side for entering the gainvalues (analogous to the previous static correction) together with a new window which allows to interactively enter the gainvalues.

14. Enter the wanted **ProcessingLabel** and **start** the manual gain (y) processing step. Again the processing label must be different from that of the primary file.

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15. The manual gain (y) corrected data have been plotted into the secondary window. **Close** the gain window and enter the option **File/ChangeSecondToPrimary** in order to use the filtered dataset for the next desired filter step.


16. Enter the <u>**last**</u> filter step using the option **Processing/2D-filter**.

17. Within the **2D-filter window** activate the option **background removal**. In this case the complete datarange is used for determining the filtertrace (suboption whole line activated). Enter the wanted **ProcessingLael** and **start** the background removal filter. Again the processing label must be different from that of the primary file.
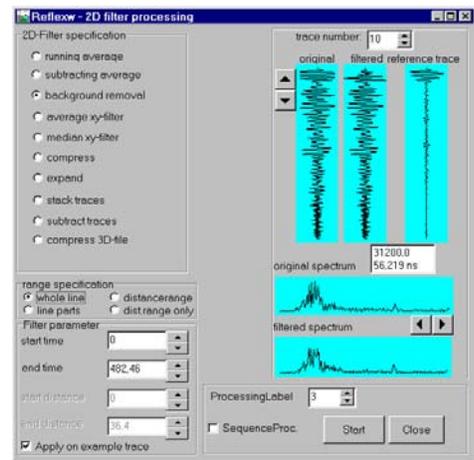
18. The filtering is finished. You may use the option **File/ChangeSecondToPrimar**y and deactivate the option **Hor.Spli**t within the **plotoption** menu in order to only view the finally filtered dataset. The complete processing flow can be displayed using the option F**ile/ProcessingFlow**. The processing flow of the actual file may also be saved on a separate file and be used for a further sequence processing (see section III).

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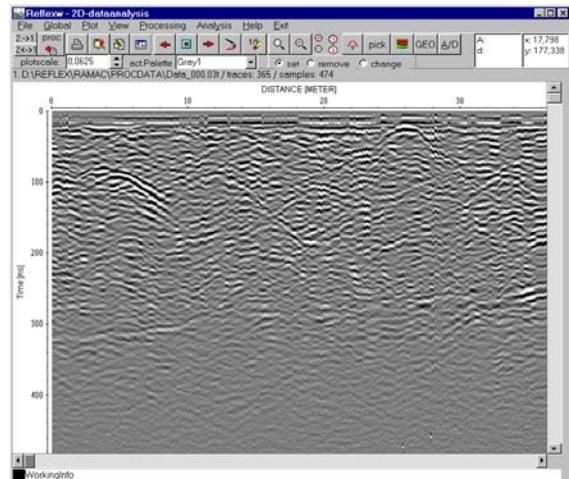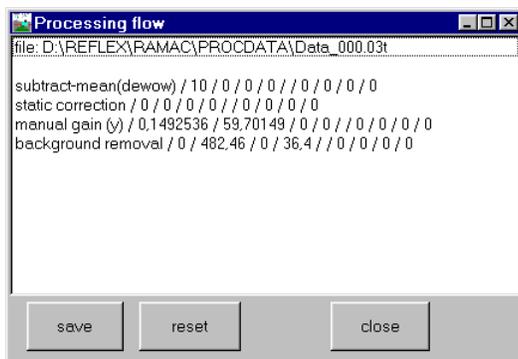
III. Filtering different 2D-lines using the same filter sequence (sequence processing)

The sequence (batch) processing facilitates a completely automatic sequence of processing steps for a choosable number of profiles. For this you have to define a sequence of processing steps before, then select the data lines and then start the sequence processing.

1. Defining the sequence during the filtering of a single example file (see section II).

For that purpose you must always activate the option **SequenceProc.** when entering any of the filter menus. Then the **SequenceProcessing menu** opens in addition and you are able to add the actual filter step to the processing flow using the option **AddActualProc.** The step AddActualProc. must be done after having specified the filter parameters and before closing the actual filter menu (e.g. between step 5 and step 6 within chapter II).

After having done all wanted filter steps for the example file including adding to the sequence processing you may save the actual sequence processing on a separate file using the option **SaveSequence**.

Such a processing sequence file may be loaded at any time using the option **LoadSequence**.

Normally the actual processing step is added at the end of the processing sequence but it is also possbile to inlcude it at any position. For that purpose you must click on the wanted processing step (a tick appears) the actual step shall be included before.

It is also possbile to remove a special processing step from the processing flow. For that purpose you must click on the wanted processing step (a tick appears) and then use the option **DeleteProc.** in order to remove this processing step.

To be considered: for some processing steps where you have to enter the processing values by the mouse or within the table these values have to be saved on an ASCII file before defining/starting the sequence processing. For the following processing steps the edit values are read from a file: manual gain (y), manual gain (x), static correction, muting and fk-filter.

Therefore when you are adding for example the processing step static correction to the sequence processing flow first you must enter the wanted static correction values and then you must press the option save within the static correction menu. The option save stores the actual edit values on an ASCII file under the procject directory with the name correct and a freely choosable extension. This datafile is asked when you are starting the sequence processing which includes the static correction (see item 2).
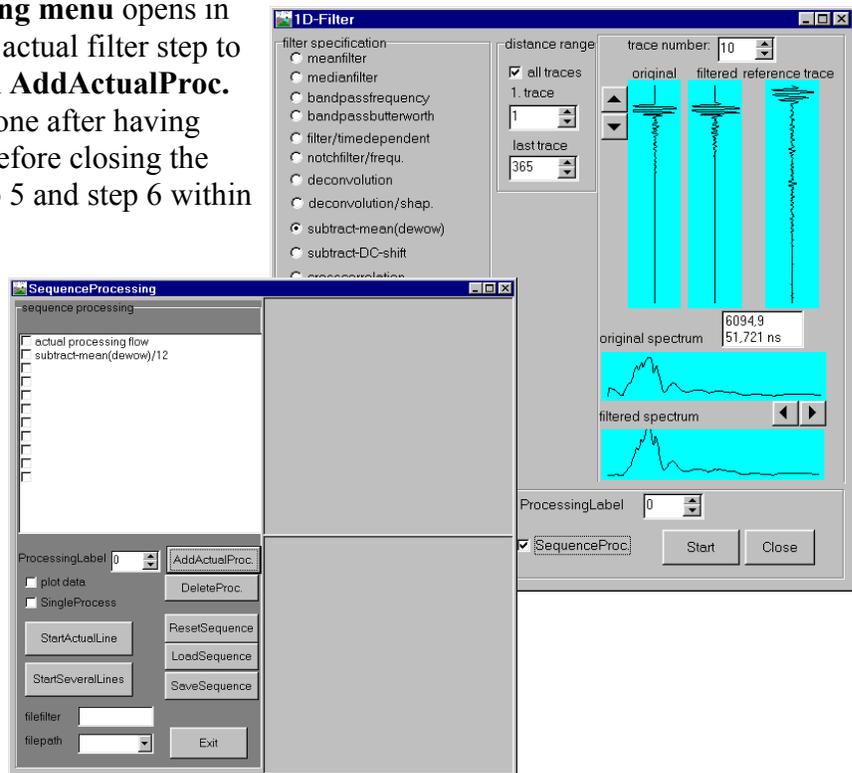
2. Start the sequence processing

The sequence processing menu is entered either during filtering a single example file or by the option **Processing/SequenceProcessing**.
After having defined the processing flow you must specify the **ProcessingLabel** and then start the sequence processing.
Activating the option **StartActualLine** applies the processing flow on the actual primary file.
Activating the option **StartSeveralLines** applies the processing flow on a number of files to be choosen. The option **filefilter** allows to enter a filter for the multi file choice. **Filepath** specifies the path for loading the files to be processed. The multifile choice is done using the Shift or Strg-key.
Activating the option **plotdata** allows you to display original and filtered file simultaneously, whereby a direct control of the result is given.
You may choose between the so-called sequence mode and the single processing mode (option **SingleProcess** activated) with the possibility of applying the processing steps individually on the original file(s).

Flow for the option **StartSeveralLines:**

1. After having defined the sequence processing (see item 1.) activate the option filepath and choose rohdata if the files to be processed are the original date or procdata if the files have been processed before.
2. Enter the wanted processing label.
3. activate the option plot data in order to plot the processed files during the sequence processing.
3. Click on StartSeveralLines and choose the wanted files - multifile choice using the shift or the ctr-key.
4. the sequence processing is started and after having finished the processing a report menu is shown.

To be considered: For the following processing steps the edit values are read from an ASCII file which is asked for after having choosen all wanted files (item 4):
manual gain (y), manual gain (x), static correction, muting and fk-filter.
The program uses the correction (processing) values for each profile within the sequence processing. Therefore it must be ensured that the precondintion for that holds true (especially for the processing step static correction).

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