

Geometry and processing crosshole data S32

data acquisition:

24 receiver channels

shot x-pos in borehole 1: 0 m

receiver x-pos in borehole 2: 11.2 m

two fixed receiver lines from 1 to 46 m

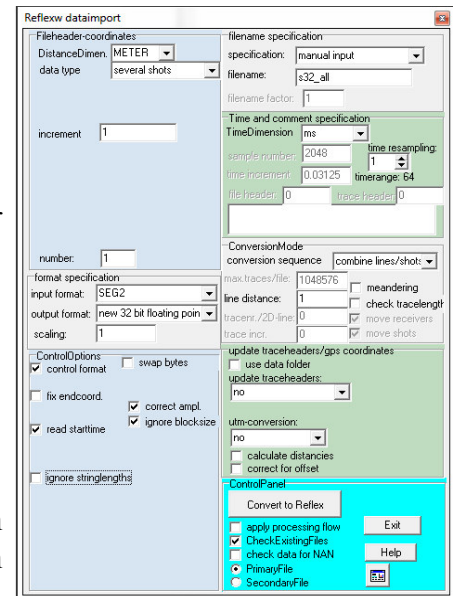
61 shots from 2 to 50 m with shots from 21 to 32 m for both receiver lines.

Import:

parameters: SEG2, combine lines/shots, increment set to 1,

datatype to several shots, swap bytes deactivated

Click on Convert to Reflex and choose all files



As the shots and the receivers have been acquired in opposite direction (from bottom to top) the data must be **x-flipped** after having been imported -> file S32_all.00t.

Geometry settings:

within the CMP-processing/geometry tool. The borehole direction is assumed to be in y-direction. After the geometry settings the shot and receiver y-coordinates contain the in-hole coordinates (depths).

1. Fixed receiver line

from 1 to 24 m with 1 m increment

31 shots from 2 to 32 m with 1 m increment

start trace 1. End trace: 744

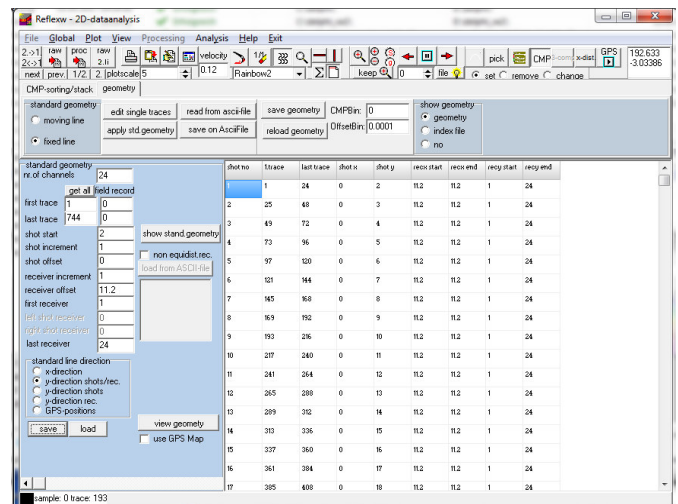
shot start set to 2 m

shot increment set to 1 m

receiver increment set to 1 m

first receiver at 1 and last receiver at 24

Click on apply std.geometry and save geometry



2. Fixed receiver line

from 23 to 46 m with 1 m increment

30 shots from 21 to 50 m with 1 m increment

start trace 745 end trace: 1465

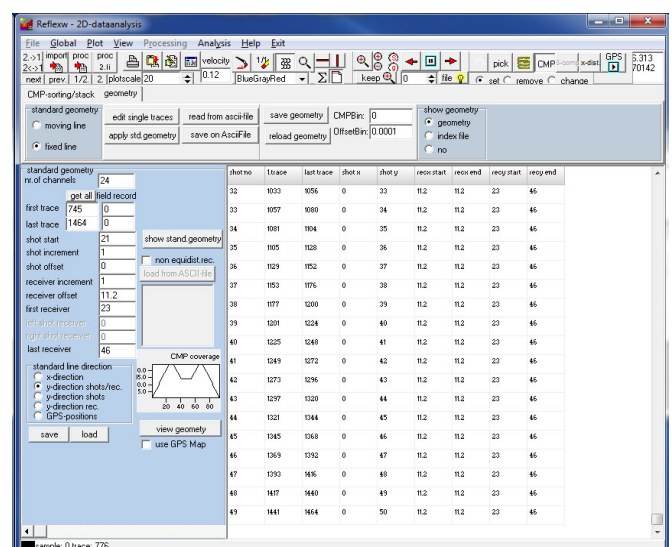
shot start set to 21 m

shot increment set to 1 m

receiver increment set to 1 m

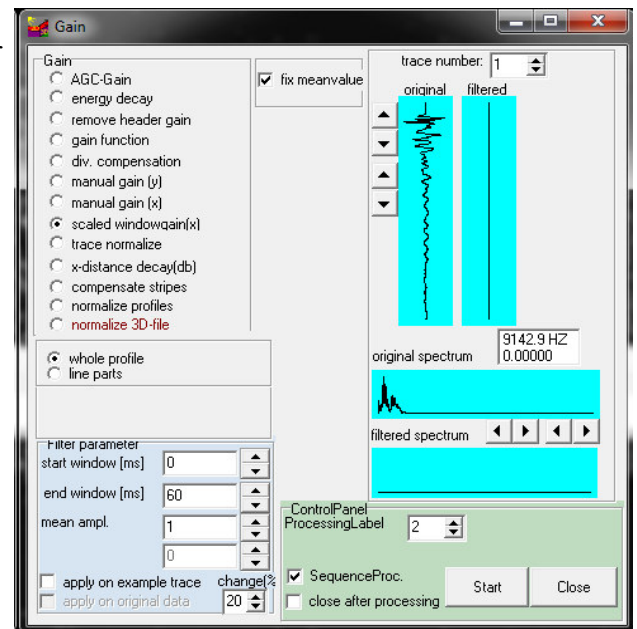
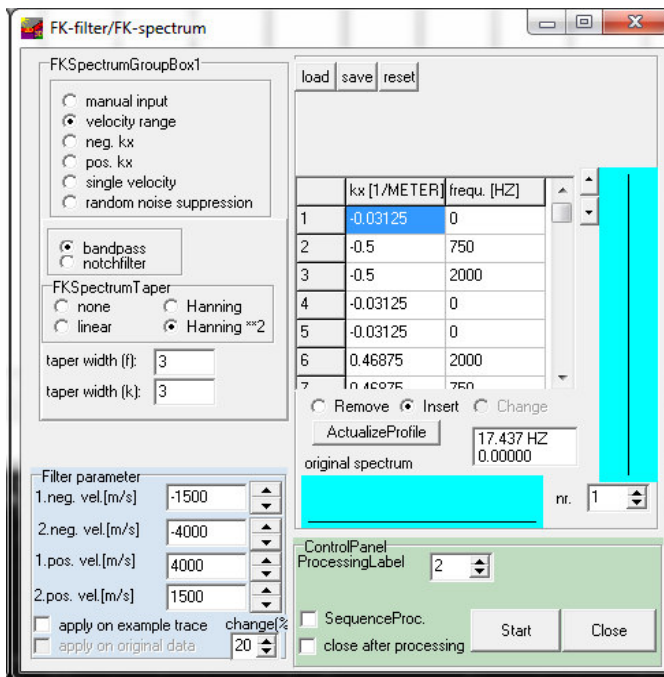
first receiver at 23 and last receiver at 46

Click on apply std.geometry and save geometry



Processing (optional):

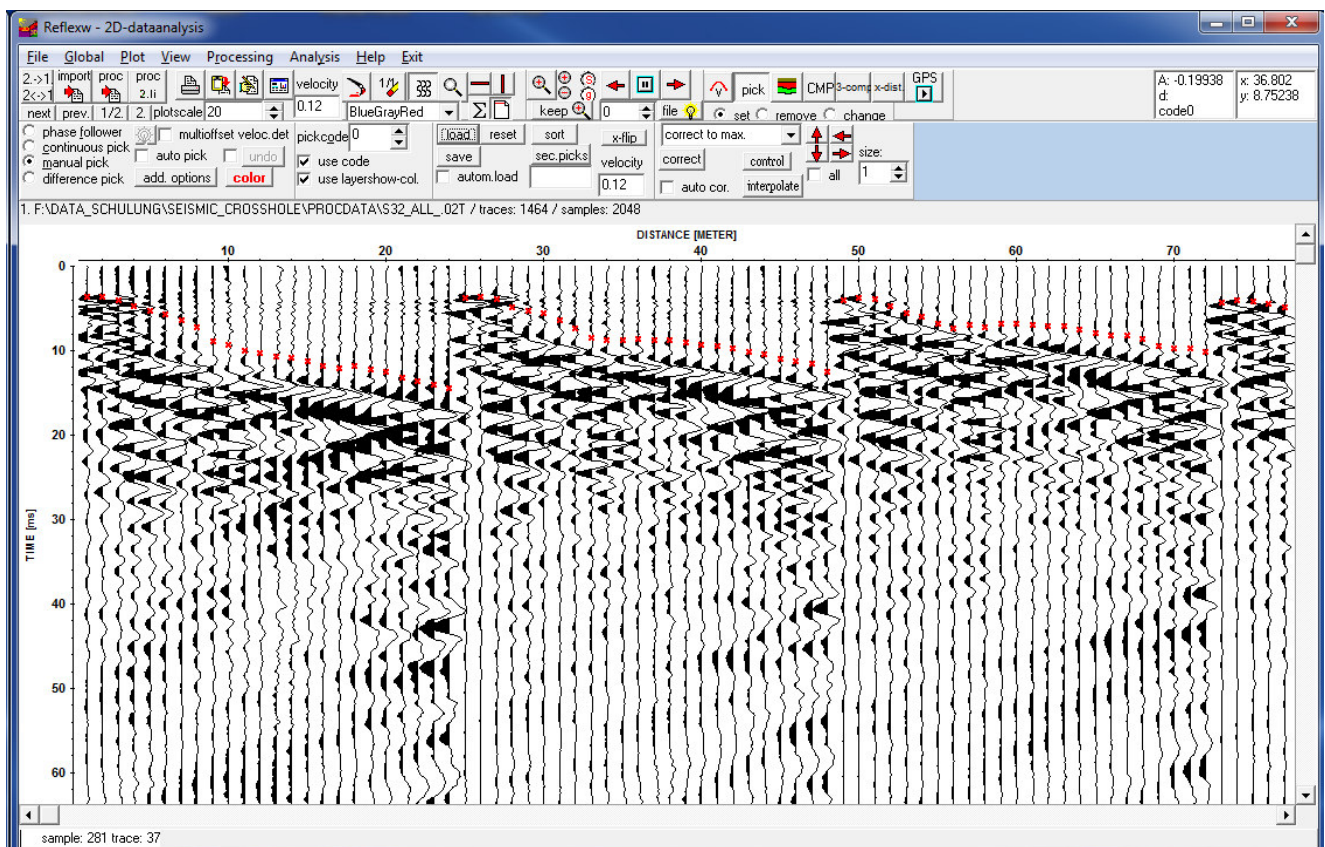
1. **scaled windowgain(x)** for an energy normalization under processing/gain



2. **fk-filter** for muting the s-waves and noise using a velocity range from 1500 to 4000 m/s

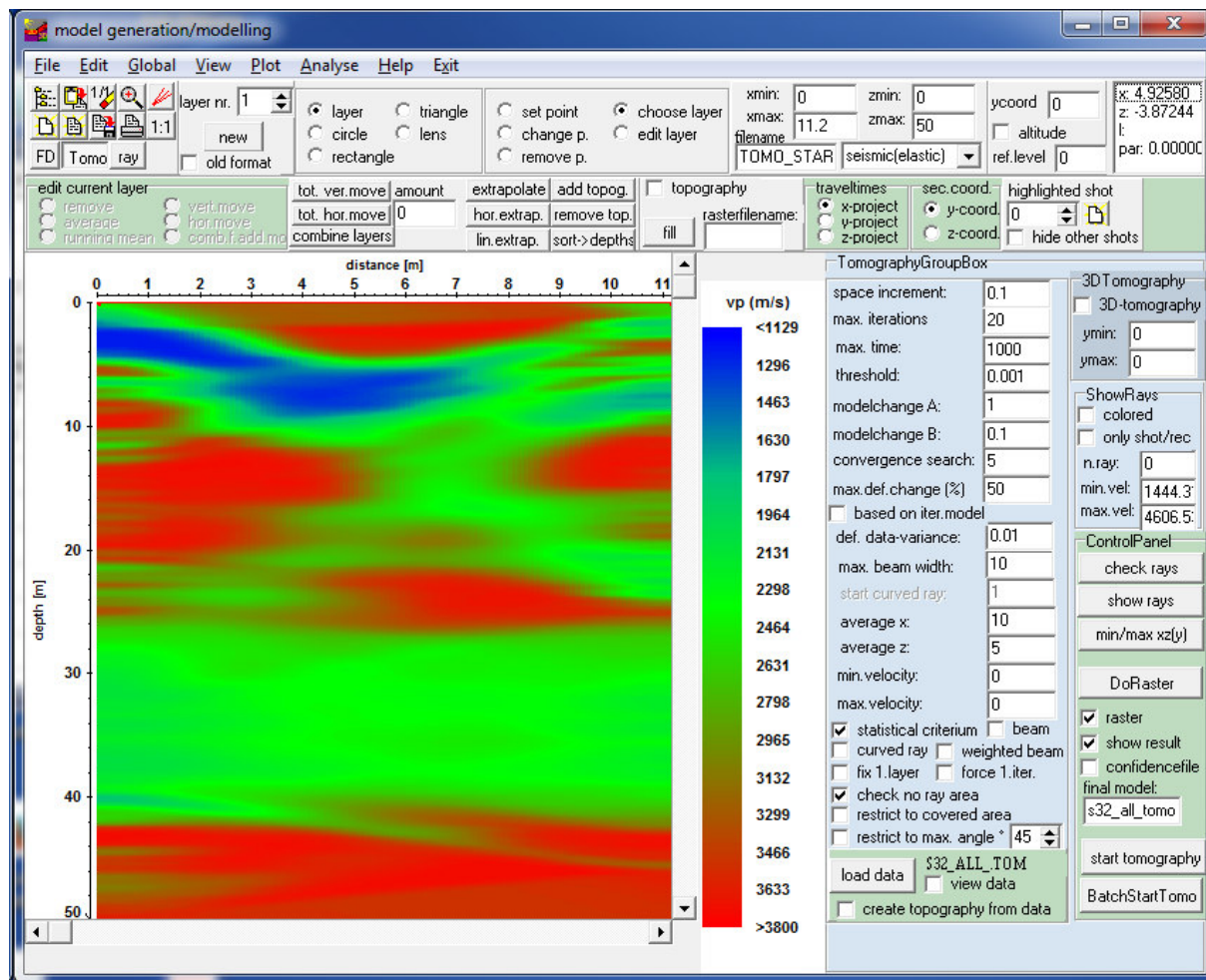
Picking:

Pick the first arrivals for a subsequent tomographic inversion

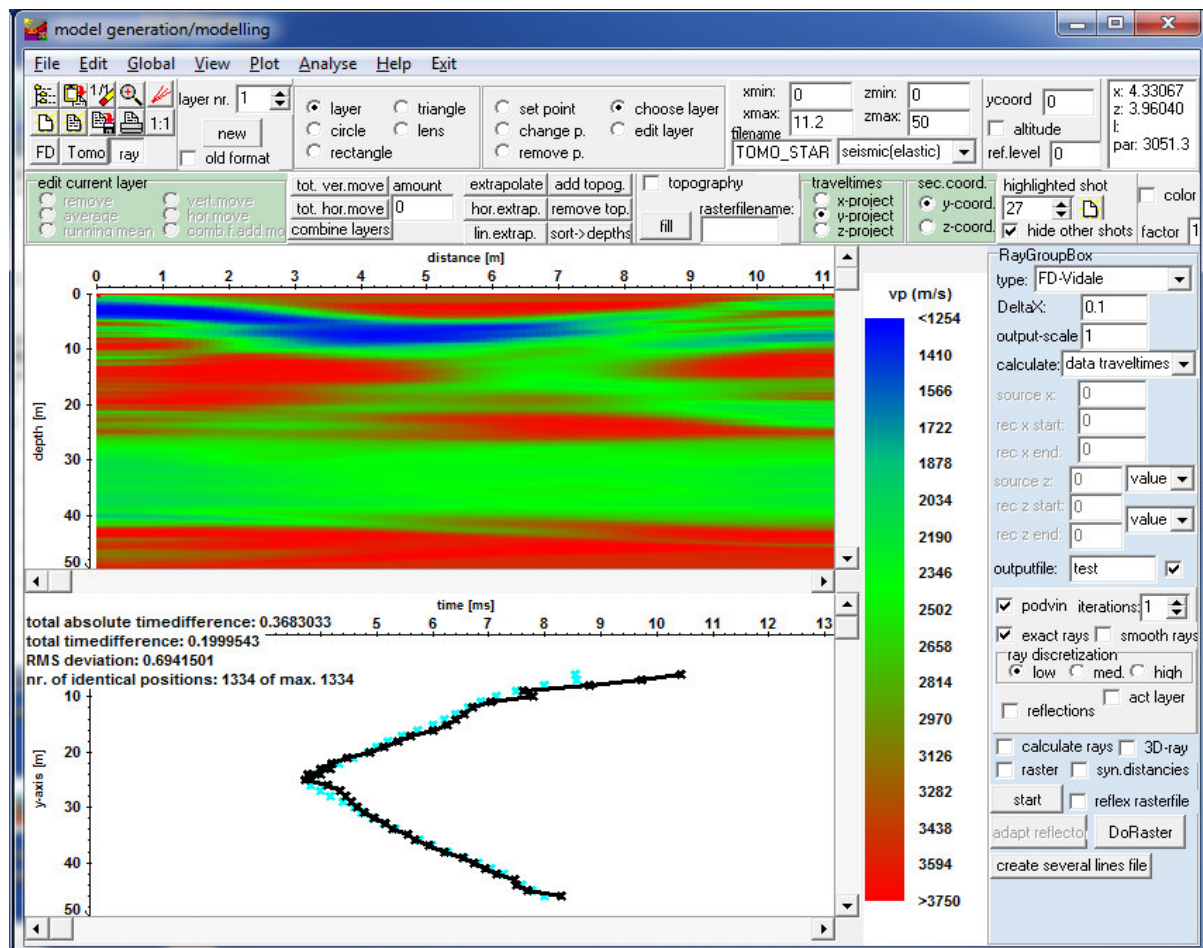


Save the picks using the format Reflex Win and ASCII-3D tomography

tomographic inversion of the first arrivals:



control using forward raytracing:

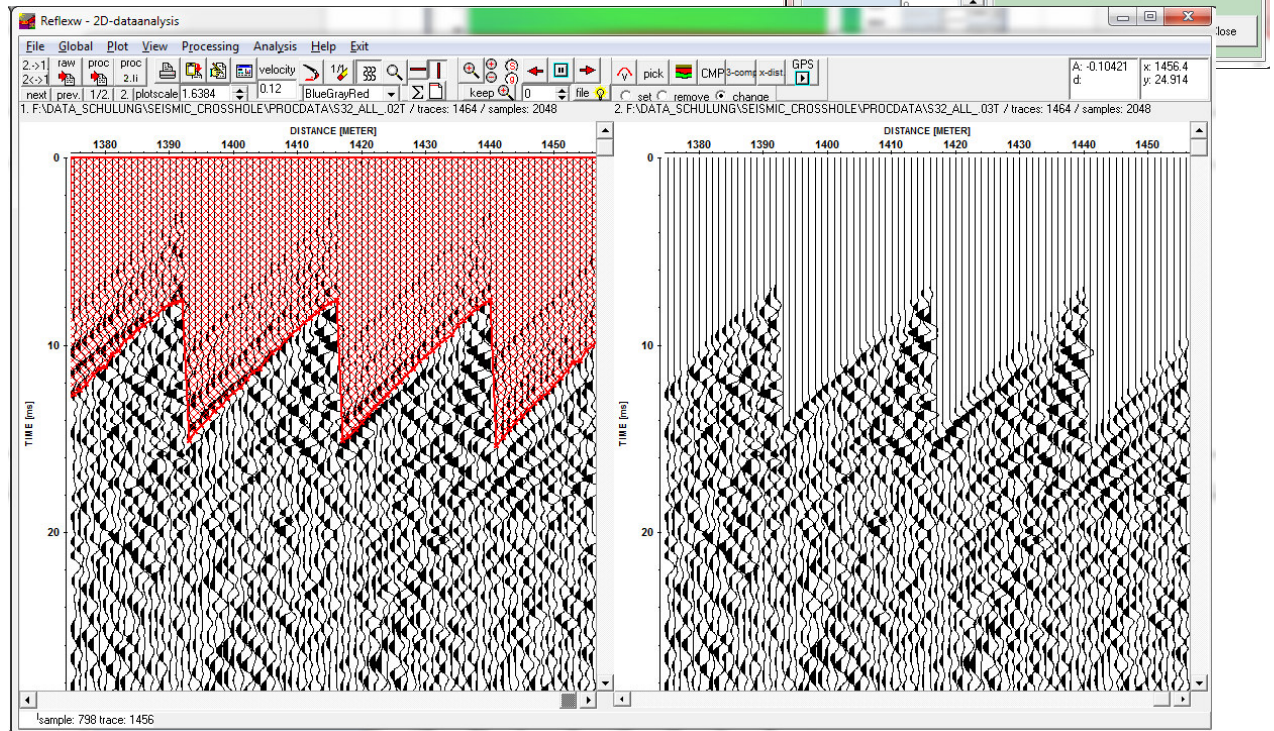


migrate the reflection from the crosshole data:

1. Mute the direct wave using the shifted picked traveltimes.

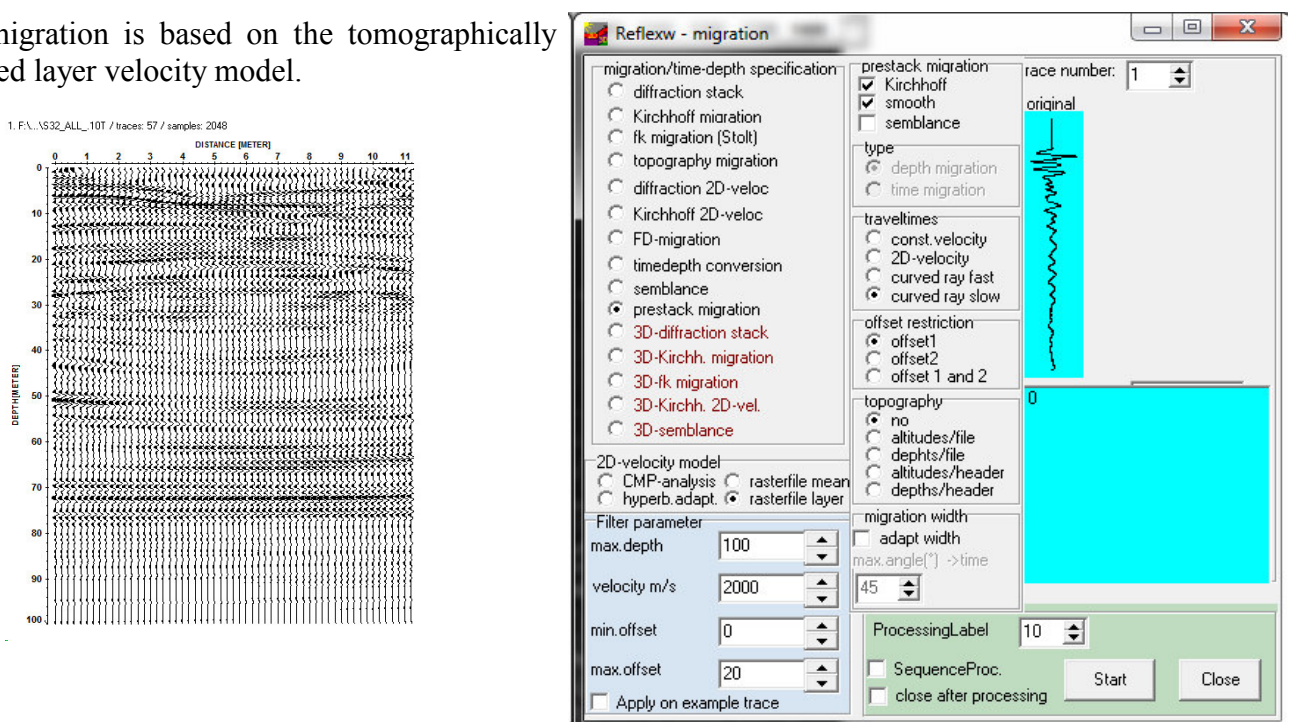
- Shift the picked first arrivals by the amount of the direct wave (in this case about 5 ms)

- perform the muting using these picks

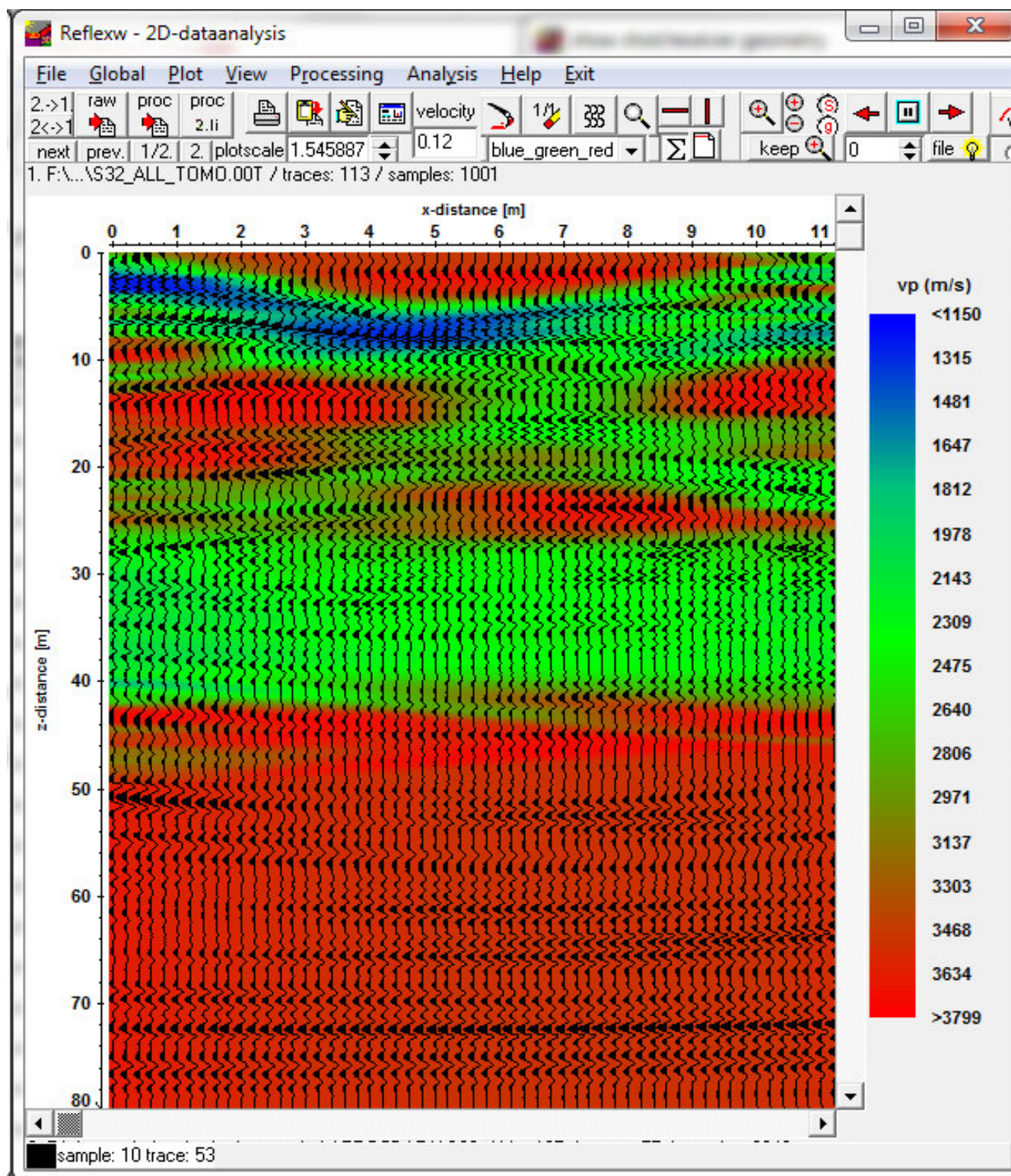


2. Perform the prestack migration:

The migration is based on the tomographically inverted layer velocity model.



The tomographic result may be overlaid with the migrated section.



For this purpose the tomographic result (it has been extrapolated to 80 m) must be loaded first and the plotoption load from fileheader “always each file” must be activated.

Include borehole deviations:

If the boreholes exhibit deviations from the pure vertical the option apply borehole deviations within the **edit traceheader tabella** allows to easily define these. Precondition is:

- the borehole z-values must have been stored within the z-traceheader coordinates
- the z-values must be negative and relative to the borehole top level (elevation).

The borehole deviations are read from two ASCII-files containing the xyz-coordinates for the shot and the receiver borehole. The z-coordinates are given in elevations:

example for shot borehole (simple deviation of 2 m at 50 m depth)

0.0 0.0 100.0

2.0 0.0 50.0

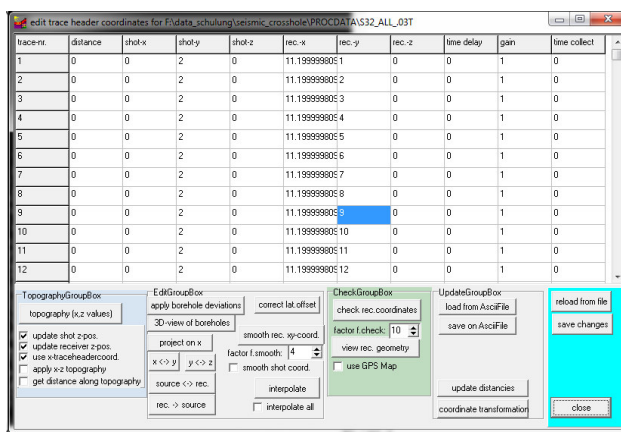
example for receiver borehole (simple deviation of 0.2 m at 50 m depth)

11.2 0.0 100.0

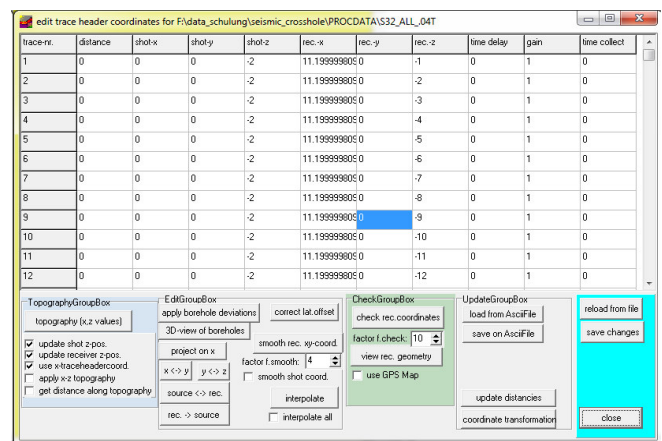
11.0 0.0 50.0

In order to fullfill the preconditions the traceheader coordinates must be changed first using

- option y <-> z because the inhole coordinates had been saven on the y-traceheader coordinates
- multiply by -1 for both the shot-z and rec-z coordinates using the right mouse button for shot-z and rec.z
- save the changes



->



Now click on apply borehole deviations and choose the shot borehole (borehole1.txt) and then the receiver borehole (borehole2.txt).

