Import SEG-2 & interpret marine refraction line SR6_1000 with 3.36/4.01/4.03 using WDVS :

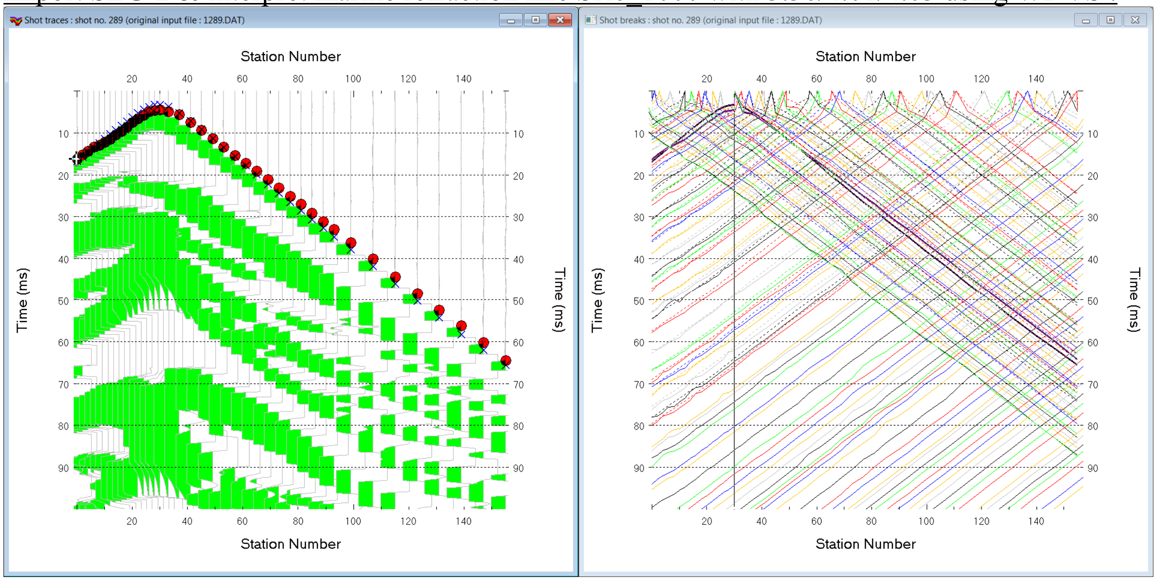


Fig. 1 : left : *Trace|Shot gather*, right : *Refractor|Shot breaks*. Shows fit between picked times (solid colored curves, red circles) and modeled times (dashed colored curves, blue crosses) obtained for Smooth invert output (Fig. 8)

To create the profile database and import the SEG-2 shots and header data:

- ***File|New Profile****...*, set *File name* to **`SR6_1000`** and click *Save button*
- in ***Header|Profile****...* set *Line type* to **`Refraction spread/line`** . Set *Station spacing* to 0.78125 m.
- check *box Force grid cell size* and set *Cell size[m]* to 0.2m. See Fig. 2.
- unzip archive [**`SR6_SEG-2.rar`**] with **`SEG-2 .DAT`** shot files & files **`SHOTPTS.SHO & BREAKS.LST`** in directory **`C:\RAY32\SR6_1000\INPUT`**
- unzip archive [**`SR6_blanking.rar`**] with **`.BLN`** blanking files in directory **`C:\RAY32\SR6_1000`**
- check *File|More import Settings|Flip sign of X coordinate for all sources and receivers.*
- check *File|More import Settings|Flip sign of Y coordinate for all sources and receivers*
- uncheck *File|Import data Settings|Adjust profile station spacing.* See Fig. 20.
- **uncheck *File|Import data Settings|Extrapolate receiver line coordinates***
- check *File|Import data Settings|Use bent line inline offset for shot pos. and layout start*
- check *File|SEG-2 import settings|Receiver Coordinates specified in .DAT or .SG2 file*
- select ***File|Import Data****...* and set *Import data type* to **`SEG-2`**. See Fig. 3.
- click *Select button* and navigate into **`C:\RAY32\SR6_1000\INPUT`**
- select any file e.g. **`1270.dat`** & click button *Open*
- click ***Import shots button*** . Click *Read button* or press RETURN key for each shot displayed in *Import shot dialog* to import all **`SEG-2 .DAT`** shots in selected directory **`C:\RAY32\SR6_1000\INPUT`** .
- *File|Update header data|Update Shotpoint coordinates* with **`SHOTPTS.SHO`**. Click *Open button*.
- select *File|Update header data|Update First Breaks*. Select file **`BREAKS.LST`** & click *Open button.*

To browse imported shots and configure the shot display :

- select *Trace|Shot gather* and select *Window|Tile* to obtain Fig. 1
- click on title bar of *Trace|Shot gather* window & press ALT+M. Check *Clip amplitude peaks*.
- edit *Trace clip [traces]* to 5 and click *OK button*
- press ALT+P & set *Maximum time* to 150 ms & press RETURN key to redisplay shot gather
- press CTRL+F1 to zoom trace amplitude
- press CTRL+F3 repeatedly to toggle trace display mode : fill left/fill right/wiggle trace display
- press SHIFT+Q to bandpass-filter traces. Check box *Filter active* and click *Filter button*.
- check option *Processing|Show picks on time axis*

- browse shots in *Trace|Shot gather* window with F7/F8 (Fig. 1 left)
- click on title bar of *Refractor|Shot breaks* window (Fig. 1 right)
- check *Mapping|Color picked traveltime curves*. Check *Mapping|Force solid picked curves*.
- uncheck *Mapping|Display raytraced traveltimes*
- press ALT+P. Edit *Maximum time* to 150 ms & press RETURN key to redisplay.

To configure and run *Smooth inversion* :

- select *Grid|Surfer plot Limits*. Edit fields as in Fig. 4. Click *OK button*.
- check *Grid|Receiver station ticks on top axis.* See Fig. 26.
- check *Grid|GS CENTERED font for receivers* to work around Surfer 11 issue with receiver display
- check *DeltatV|DeltatV Settings|Suppress velocity artefacts* & check *Smooth CMP traveltime curves*
- check *DeltatV|DeltatV Settings|Regard mapping for shot offset correction.* See Fig. 23.
- check *Smooth invert|Smooth inversion Settings|Extra-wide smoothing for 1D initial velocity profile*
- check *Smooth invert|Smooth inversion Settings|Extra-wide stack for 1D-gradient initial model*
- check *Smooth invert|Smooth inversion Settings|No shot position checking.* See Fig. 24.
- uncheck all blanking options in *WET Tomo|WET tomography Settings|Blank submenu.*
- check *WET Tomo|WET tomography Settings|Blank|Regard negative shot depth.* See Fig. 22.
- check *WET Tomo|WET tomography Settings|Scale wavepath width & Scale WET filter height*
- select ***Smooth invert|WET with 1D-gradient initial model***
- confirm prompt ***Bad velocity in grid*** with *OK button.* We need to blank the water layer with Fig. 5.
- wait for the 1D-gradient starting model to display as in Fig. 7
- cancel prompt to continue with WET tomography with *No button*
- select *WET Tomo|WET velocity constraints* & edit as in Fig. 5. Click *OK button*.
- select *WET Tomo|Interactive WET tomography*. Edit as in Fig. 6.
- click button *Start tomography processing* to obtain Fig. 8 & Fig. 9

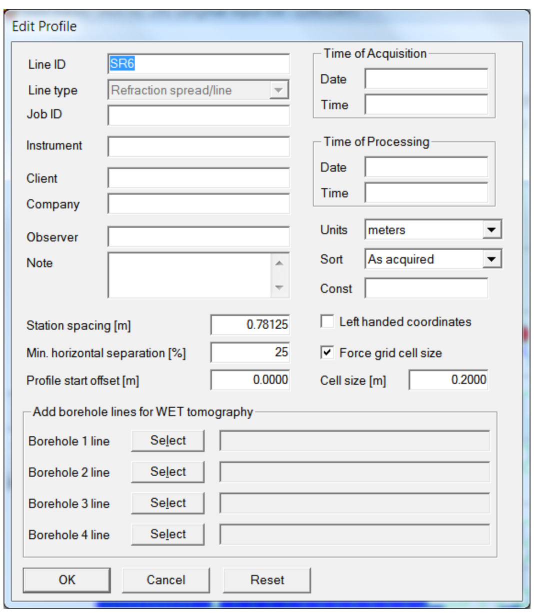


Fig. 2 : *Header|Profile*

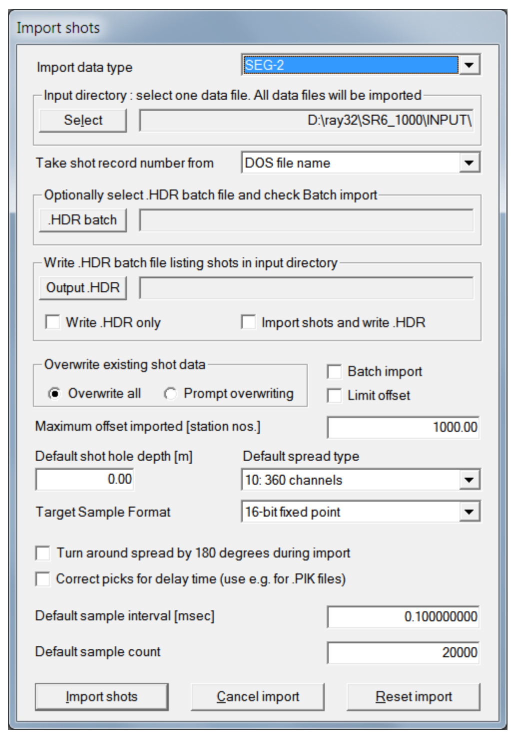


Fig. 3 : *File|Import Data*

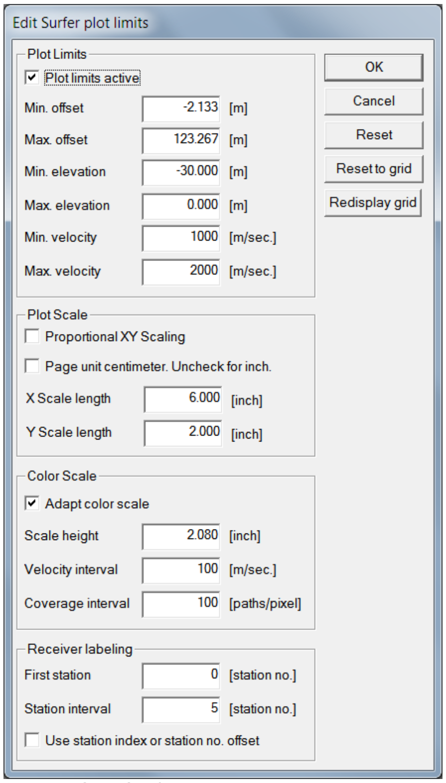


Fig. 4 : *Grid|Surfer plot Limits*

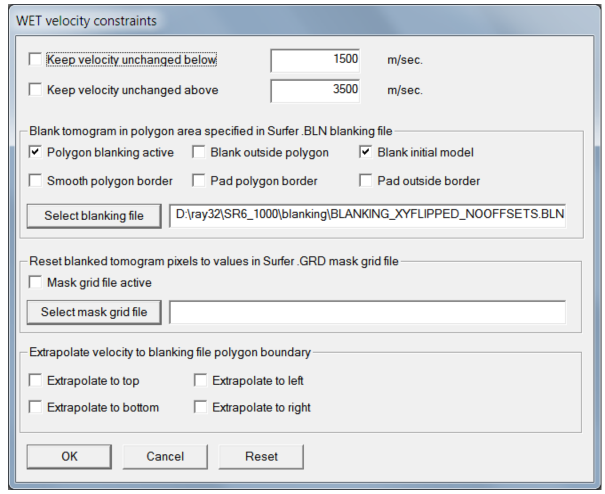


Fig. 5 : *WET Tomo|WET Velocity constraints*

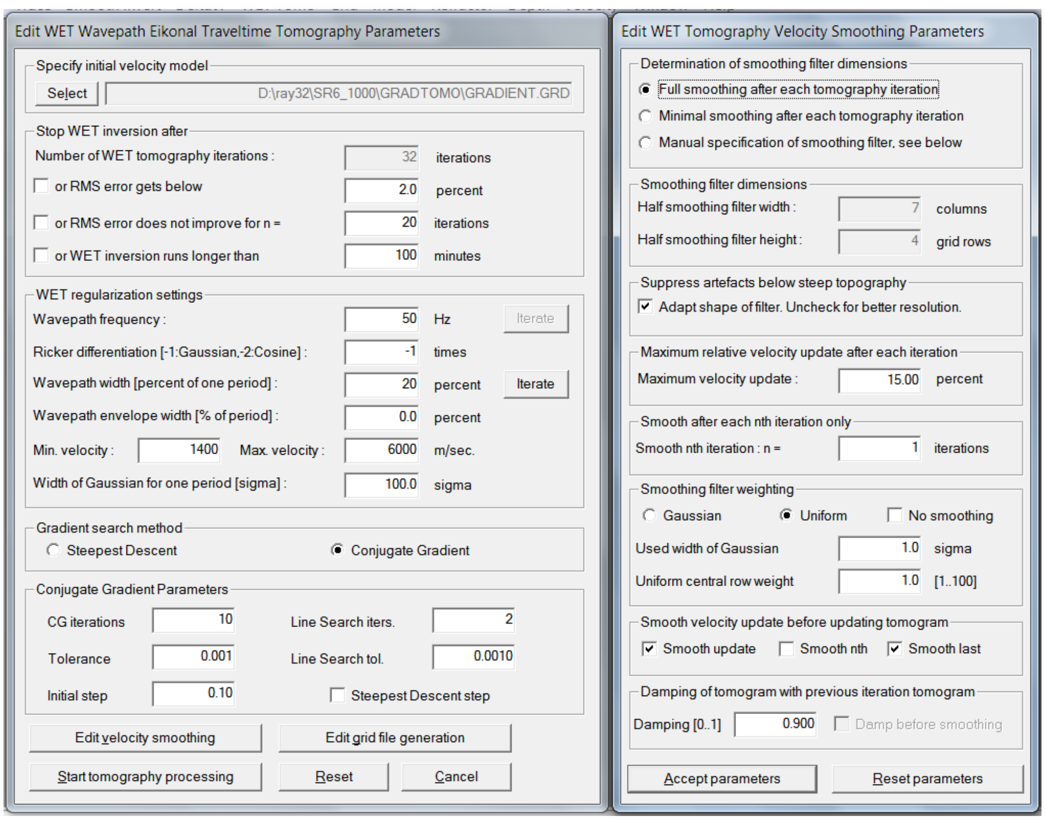


Fig. 6 : *WET Tomo|Interactive WET tomography*

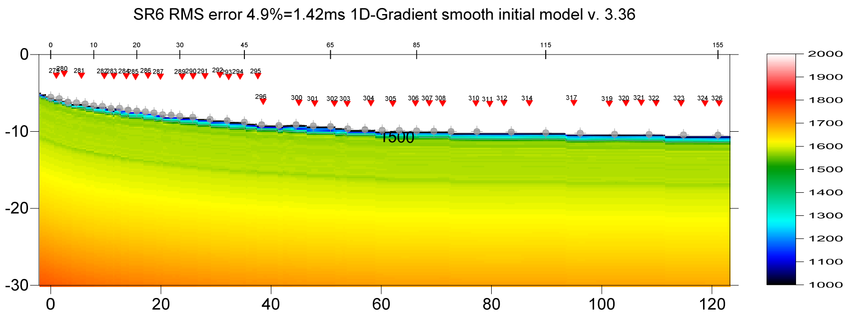


Fig. 7 : 1D-gradient starting model obtained with *Smooth invert|WET with 1D-gradient initial model*

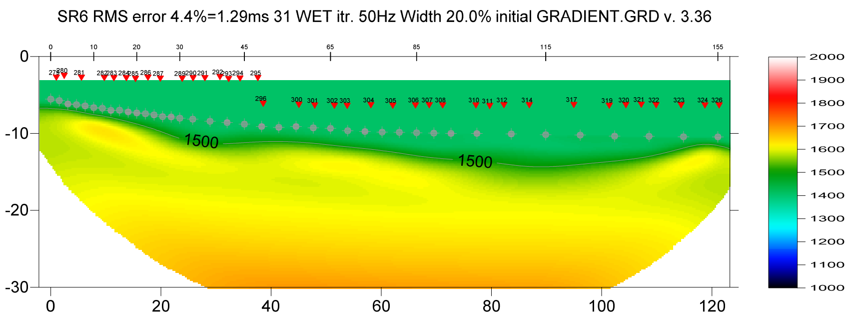


Fig. 8 : 2D WET output obtained with *WET Tomo|Interactive WET tomography* & starting model shown in Fig. 7. 32 WET iterations using Conjugate Gradient search method & Gaussian update weighting & full WET smoothing. See Fig. 6.

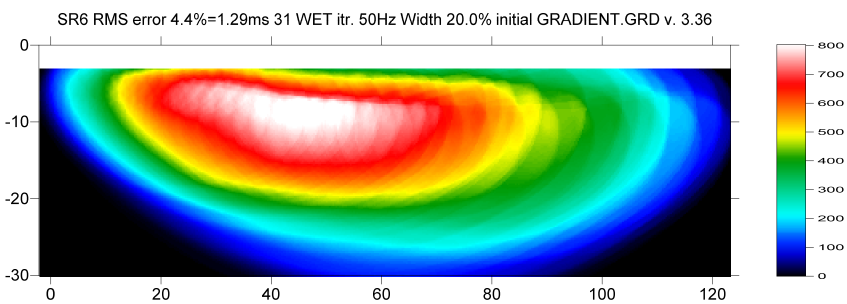


Fig. 9 : WET wavepath coverage plot obtained with Fig. 8. Unit is wavepaths per pixel.

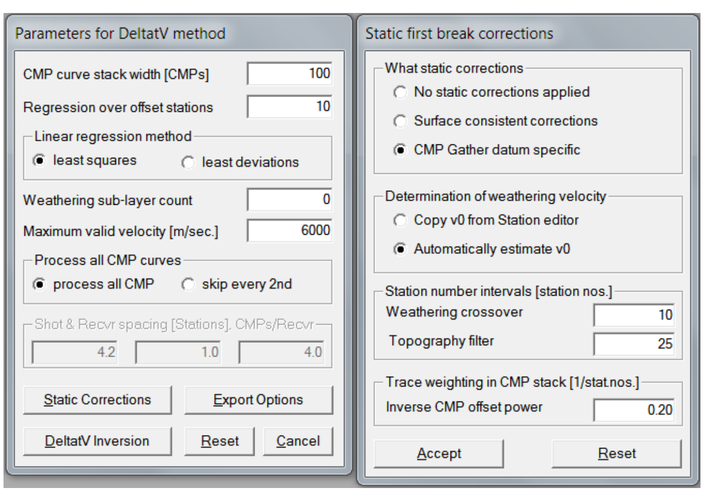


Fig. 10 : *DeltatV|Interactive DeltatV*. Set *CMP curve stack width* to 100. Set *Regression over offset stations* to 10. Click button *Static Corrections*. Set *Inverse CMP offset power* to 0.20. Click buttons *Accept & DeltatV Inversion*.

Surfer plot limits shown in Fig. 4 are used for WET inversion output (Fig. 8&9) only and not for the 1D-gradient starting model (Fig. 7). To display the starting model using these plot limits :

- select ***Grid|Image and contour velocity and coverage grids***
- navigate into directory `C:\RAY32\SR6_1000\GRADTOMO`
- select file `GRADIENT.GRD`

Next we generate the pseudo-2D DeltatV starting model :

- select *DeltatV|Interactive DeltatV*. Edit *CMP curve stack width [CMPs]* to 100. See Fig. 10.
- edit *Regression over offset stations* to 10
- change *Weathering sub-layer count* from default 3 to 0. See Fig. 10.
- click button *Static Corrections*. Decrease *Inverse CMP offset power* from default 0.5 to 0.2.
- decrease *Topography filter* from default 100 to 25 stations. See Fig. 10.
- click buttons *Accept* & *DeltatV Inversion* to obtain DeltatV inversion output
- in prompt ***Save DeltatV output*** (Fig. 11) click on yellow folder icon and name new folder `Stack100Regr10`. Press RETURN. Double-click new folder `Stack100Regr10` to open it.
- edit *File name* to `Stack100Regr10.TXT`. Click *Open button* to save the file into folder `Stack100Regr10`.
- select *Model|Forward model traveltimes*
- navigate into directory `C:\RAY32\SR6_1000\Stack100Regr10`
- select file `STACK100REGR10.GRD` & click *Open button*
- select *Grid|Surfer plot Limits* & click *button Redisplay grid*
- re-select above `STACK100REGR10.GRD` & click *Open button* to obtain Fig. 12

Now we rerun WET inversion using this alternative DeltatV starting model :

- select *WET Tomo|Interactive WET tomography*
- *click Select button* & navigate into directory `C:\RAY32\SR6_1000\Stack100Regr10`
- select file `STACK100REGR10.GRD` and click *Open button*
- edit other WET main dialog parameters as in Fig. 6
- click button *Edit velocity smoothing*. Set *Maximum velocity update* to 25 percent and *Damping* to 0.0.
- click buttons *Accept parameters* & ***Start tomography processing*** to get WET output shown in Fig. 13.

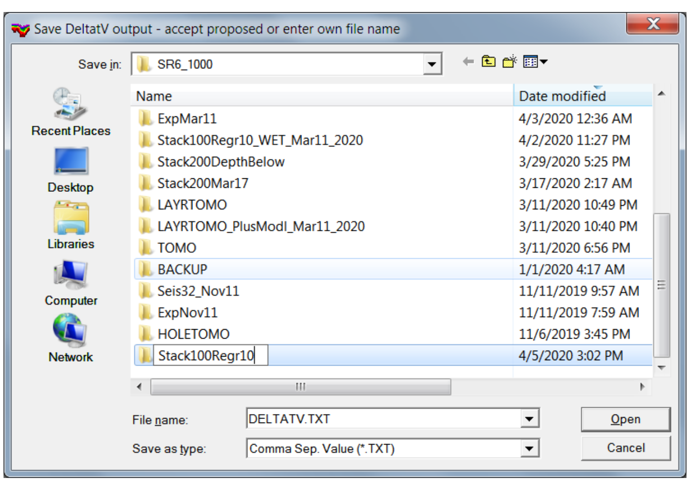


Fig. 11 : prompt to save DeltatV output. Click on yellow folder icon to create new folder in C:\RAY32\SR6_1000 profile directory. Name new folder Stack100Regr10 and press RETURN. Double-click Stack100Regr10 folder. Edit File name to Stack100Regr10.TXT . Click Open button to save into Stack100Regr10 folder.

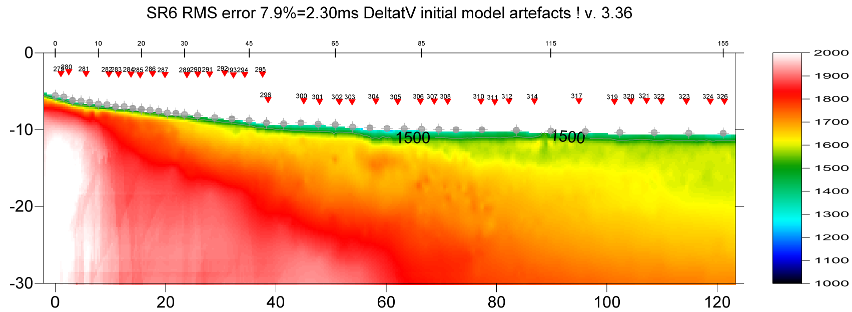


Fig. 12 : *DeltatV|Interactive DeltatV* obtained with settings as in Fig. 10

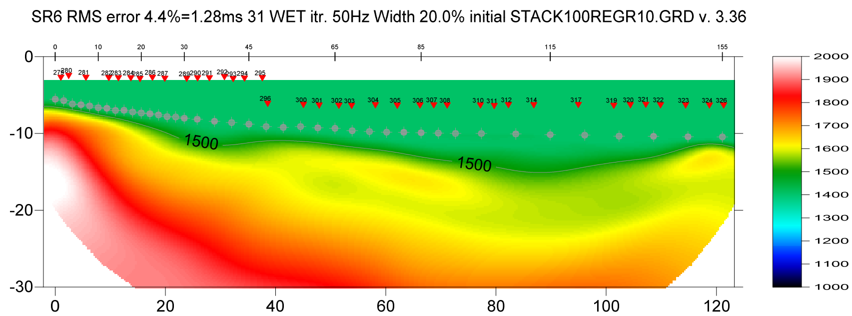


Fig. 13 : 2D WET inversion using DeltatV starting model shown in Fig. 12. Otherwise same WET parameters as in Fig. 6. Compare with Fig. 8 obtained with 1D-gradient starting model shown in Fig. 7.

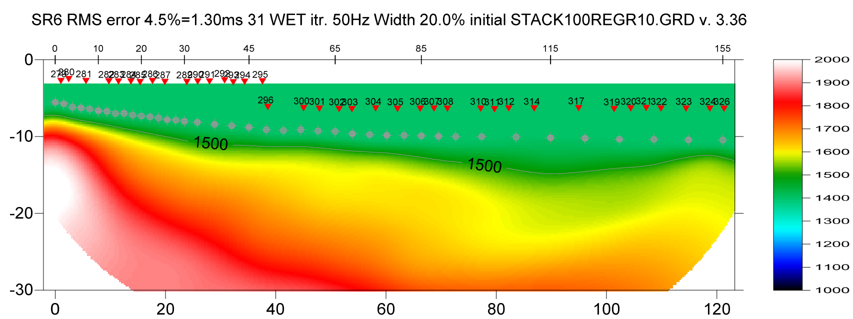


Fig. 14 : 2D WET inversion using DeltatV starting model shown in Fig. 12. Other WET parameters as in Fig. 6. Compare with Fig. 13 obtained with WET wavepath width scaling & filter height scaling enabled.

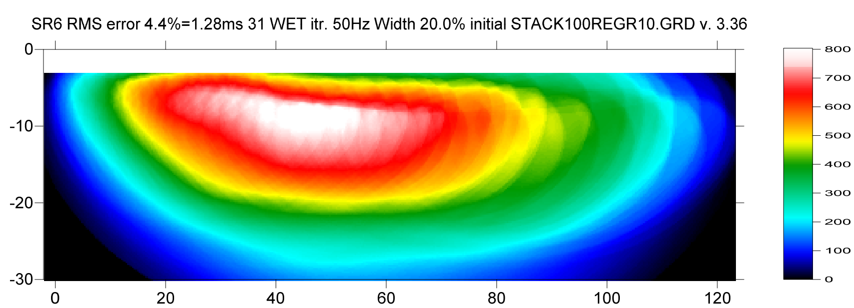


Fig. 15 : WET wavepath coverage plot obtained with Fig. 13. Unit is wavepaths per pixel.

- compare Fig. 13 with Fig. 8. These WET interpretations are similar except at bottom of tomogram where Fig. 13 shows slightly increased velocities. So WET inversion is not strongly dependent on the starting model (Fig. 7&12) except at tomogram bottom where the wavepath coverage is low (Fig. 15).

Here is profile database archive for Fig. 13 :
http://rayfract.com/tutorials/SR6_Stack100Regr10_seis32.rar
Here is WET subdirectory archive Fig. 13 :
http://rayfract.com/tutorials/SR6_Stack100Regr10_WET.rar

Next we try to suppress the “layering” artefact in Fig. 13 with associated velocity inversion :

- uncheck *WET Tomo|WET tomography Settings|Scale wavepath width.* See Fig. 22.
- uncheck *WET Tomo|WET tomography Settings|Scale WET filter height*
- select *WET Tomo|Interactive WET tomography* with settings as in Fig. 6 except different starting model **STACK100REGR10.GRD** (Fig. 12)
- click button *Start tomography processing* to obtain Fig. 14
- compare Fig. 14 with Fig. 13. The velocity inversion in center of profile has disappeared. Also the high-velocity artefact at end of profile (just below last two receivers) is suppressed.

To obtain the .BLN file used for water layer blanking in Fig. 5 :

- select ***Grid|Generate blanking file between sources and receivers***
- optionally change *File name* from default **BLANKING.BLN** to your own preference
- optionally create new subdirectory with *Create New Folder* yellow box icon. Name e.g. Blanking.
- navigate into subdirectory and click *Save button*
- use Windows Notepad to edit water layer velocity in 3rd column of first line of this **.BLN** file. This is 1,500 m/s per default.
- edit top elevation of blanking layer in 2nd colum of .BLN. We edited this to -3m for all shots listed in reversed order at end of our blanking file BLANKING_XYFLIPPED_NOOFFSETS.BLN (Fig. 5).

Next we try layered refraction starting model for WET inversion :

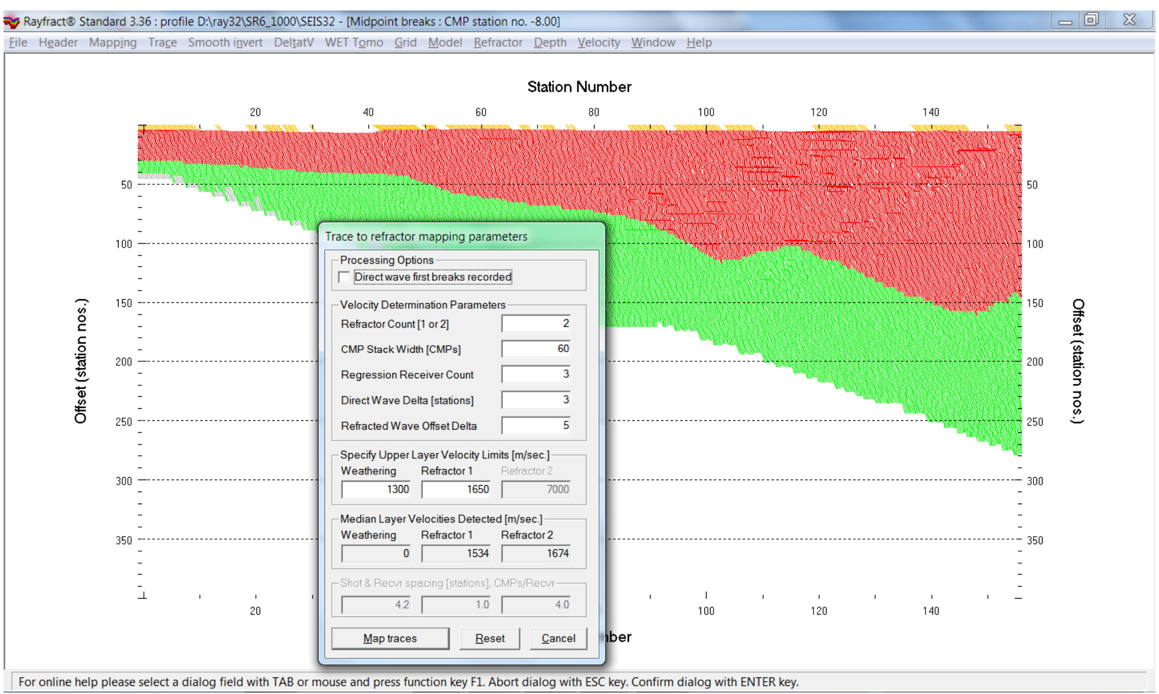


Fig. 16 : select Refractor|Midpoint breaks. In Mapping menu uncheck option Automated updating of station V0. In Header|Station click button Reset v0 (Fig. 25). Next edit v0 to 1,400 m/s and click button Interpolate v0 only. Unmap traces in Refractor|Midpoint breaks with ALT+U. Map traces to refractors with ALT+M in Refractor|Midpoint breaks. Next press ALT+G to smooth crossover distances (Fig. 21) : set Overburden filter to 20 stations & Basement filter to 50 stations. Press Accept button. Select Depth|Plus-Minus to obtain Fig. 17 & Fig. 18.

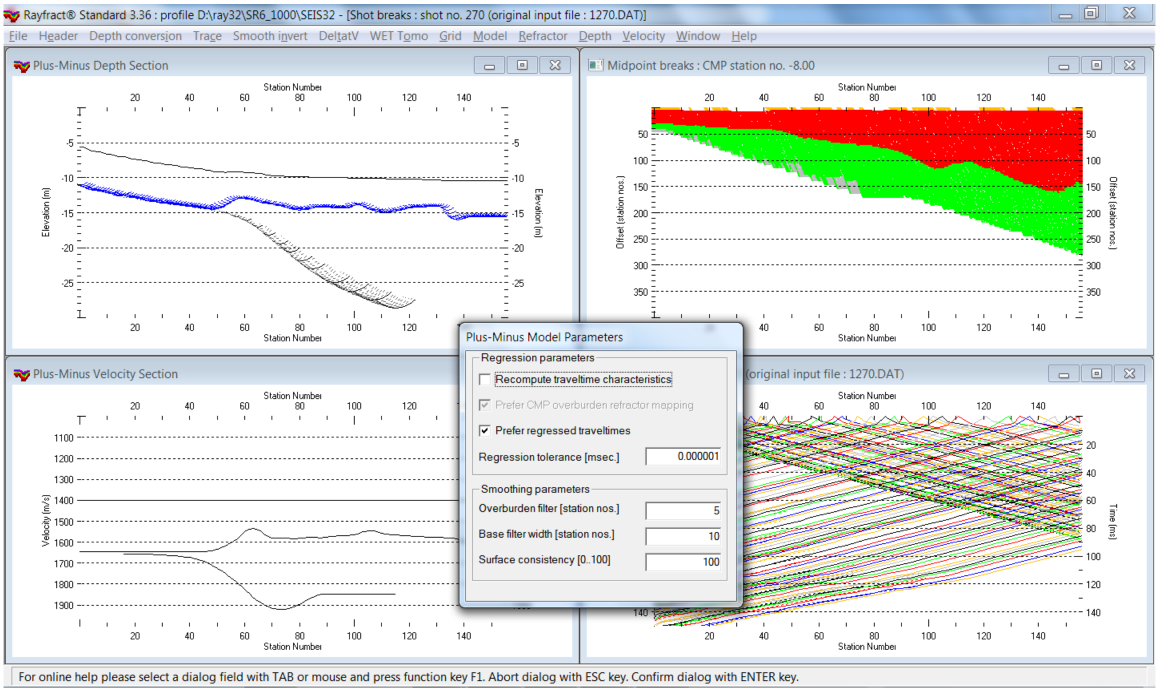


Fig. 17 : Plus-Minus method interpretation : after mapping traces to refractors & smoothing crossover distances (Fig. 16) select Depth|Plus-Minus to obtain Fig. 18 Surfer plot showing layered refraction starting model.

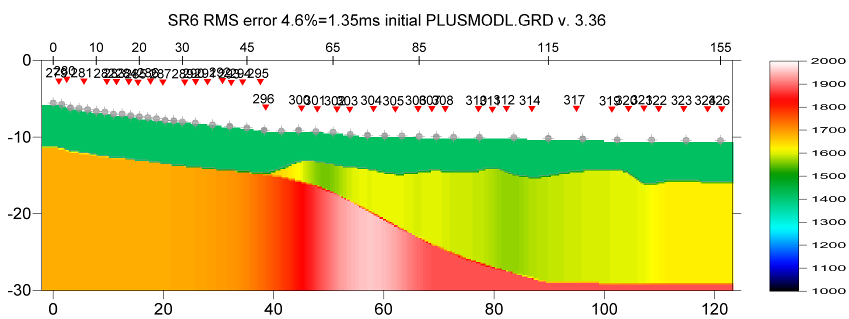


Fig. 18 : layered refraction starting model obtained in Fig. 16 & 17 with classical Plus-Minus refraction method.

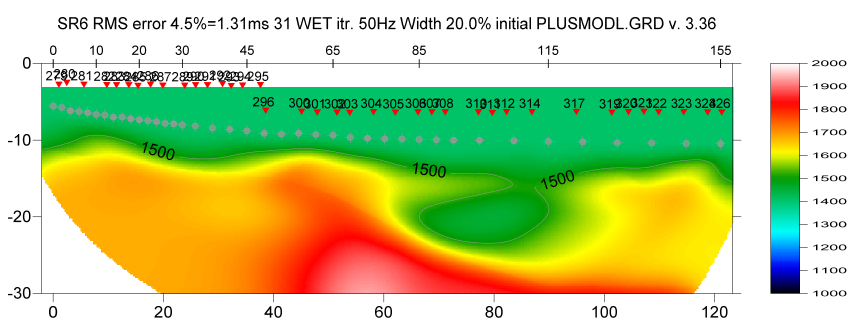
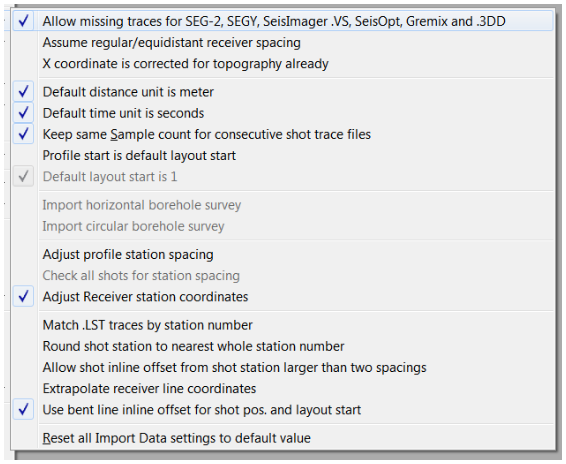


Fig. 19 : WET inversion using Conjugate-Gradient search method and …\LAYRTOMO\PLUSMODL.GRD starting model from Fig. 18. Other WET parameters as in Fig. 6.

Here is the LAYRTOMO subdirectory archive for Fig. 19 with **PLUSMODL.GRD** starting model and WET inversion results : http://rayfract.com/tutorials/SR6_LayrTomo_WET_Apr11.rar

Here is profile database archive for Fig. 19 : http://rayfract.com/tutorials/SR6_LayrTomo_seis32_Apr11.rar



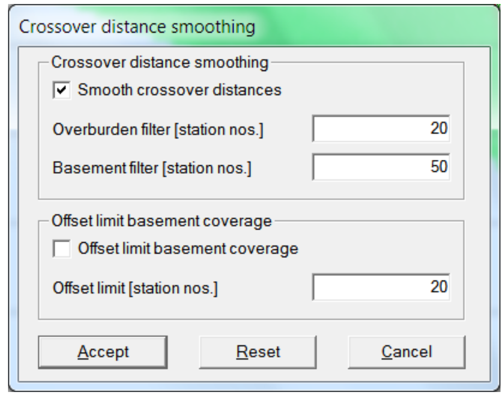


Fig. 20 : File|Import data Settings. Fig. 21 at right.

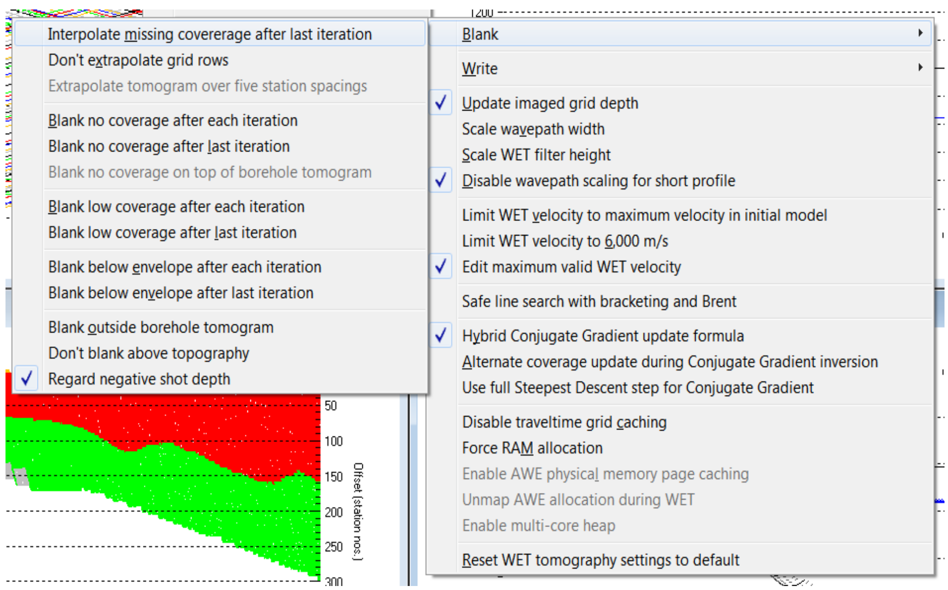


Fig. 22 : WET Tomo|WET tomography Settings (right) & Blank submenu settings (left).

- ***add source and receiver geometry to SEG-2 trace headers*** with [SEG2_EDIT] utility and .TXT files. See INPUT directory for …_3D.TXT files e.g. 1270_3D.TXT for SEG-2 shot file 1270.DAT .
- open Windows command prompt and use the following command line for each SEG-2 .DAT file :
- SEG2_EDIT –set_keywords –infile 1270.DAT –outfile 1270_OUT.DAT <1270_3D.TXT

- interactive WET inversion with 32 iterations (Fig. 8 and Fig. 13) takes about two minutes on a MacBook Air 2017 laptop using Intel Core i5-5350U with two hyper-threaded CPU cores / 4 threads at 1.8 GHz running Windows 7 64-bit Pro in Parallels desktop. This allows for a fluent workflow.
- we also fully support running our software under Windows 10 64-bit Pro. Fig.

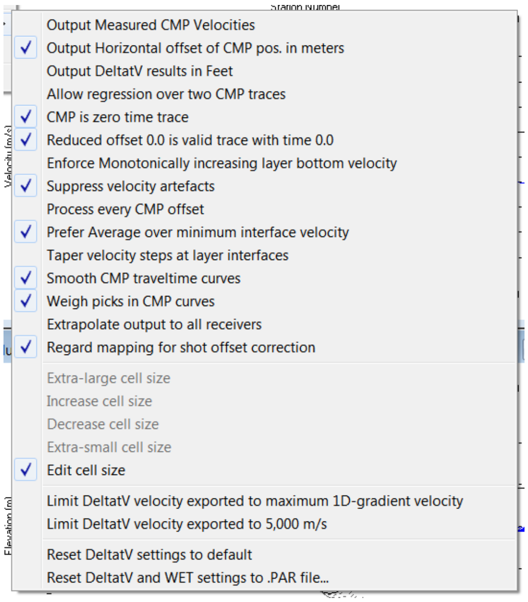


Fig. 23 : DeltatV|DeltatV Settings .

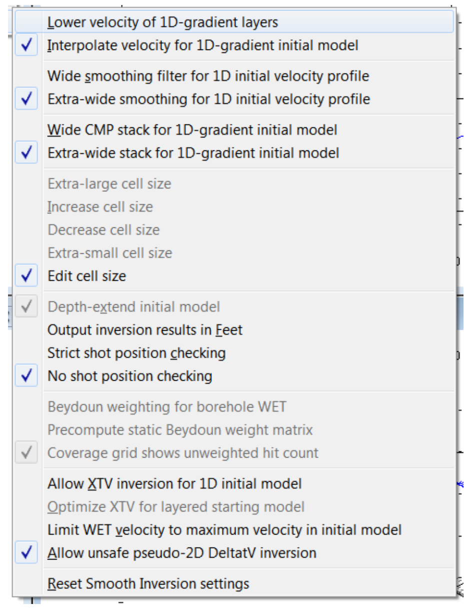


Fig. 24 Smooth invert|Smooth inversion Settings

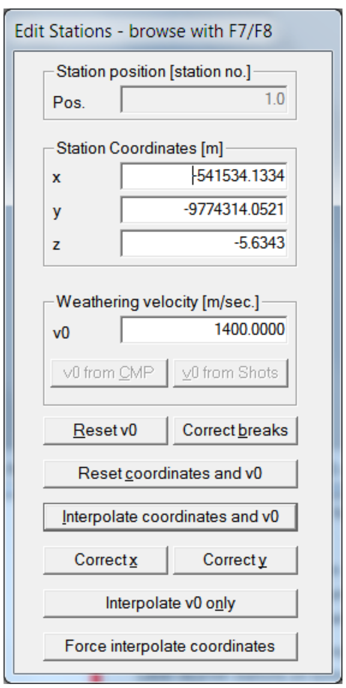


Fig. 25 : Header|Station

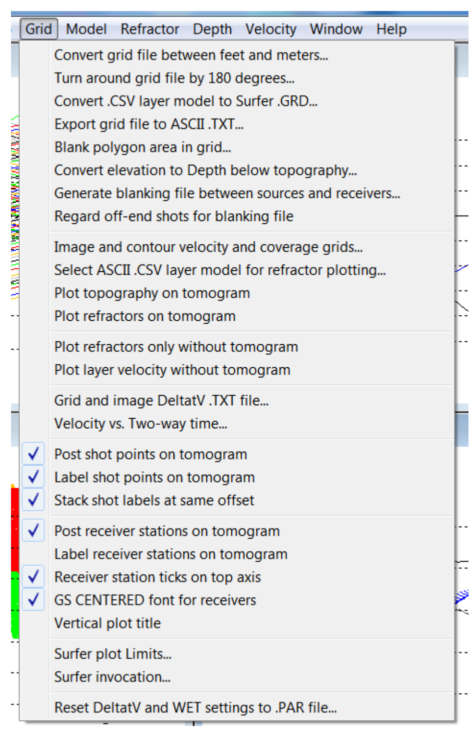


Fig. 26 : Grid menu

Below we show reprocessing of this line with our version 4.01 software with WDVS (Zelt and Chen 2016) enabled, as done in March 2021. WDVS (Wavelength-Dependent Velocity Smoothing) is described in

Zelt, C. A. and J. Chen, Frequency-dependent traveltime tomography for near-surface seismic refraction data, Geophys. J. Int., 207, 72-88, 2016

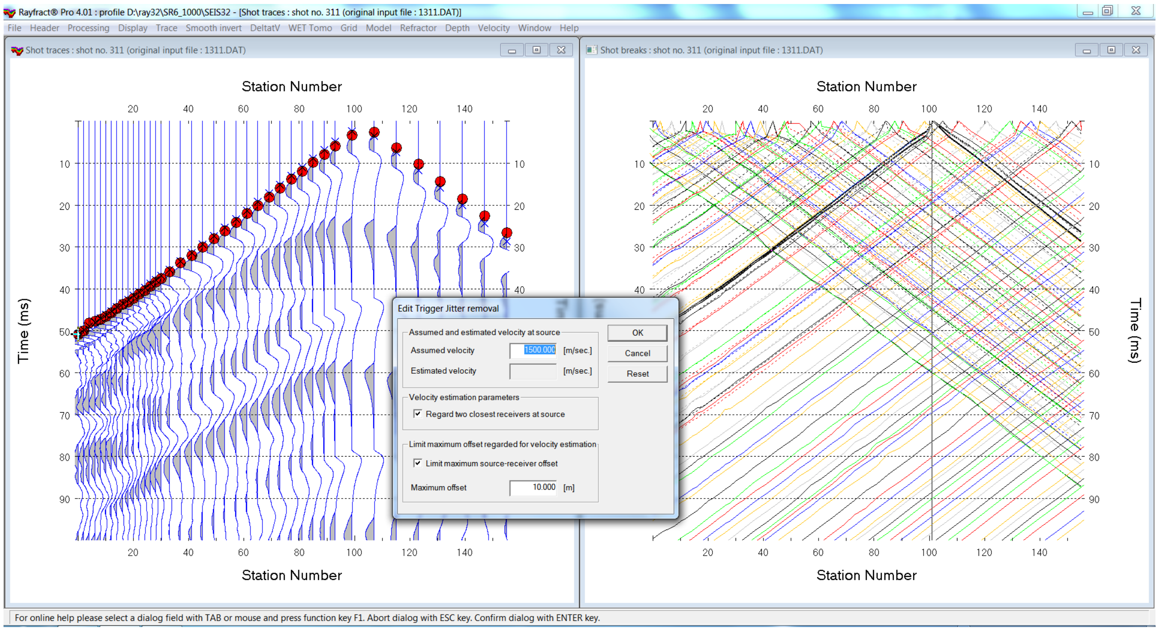


Fig. 27 : Trace|Shot gather|Processing|Edit trigger jitter removal

- remove trigger jitter with dialog ***Trace|Shot gather|Processing|Edit trigger jitter removal*** (Fig. 27).
- configure ***WDVS parameters*** as in Fig. 28.
- configure ***interactive WET and WET velocity smoothing*** as in Fig. 29
- click *Start tomography processing* (Fig. 29) to obtain ***Conjugate-Gradient WET*** output (Fig. 31)

Fig. 31 shows a good match with our earlier Fig. 14 but shows more detail and lower RMS error, due to removal of trigger jitter, WDVS smoothing and Gaussian WET smoothing (Fig. 29 at right).

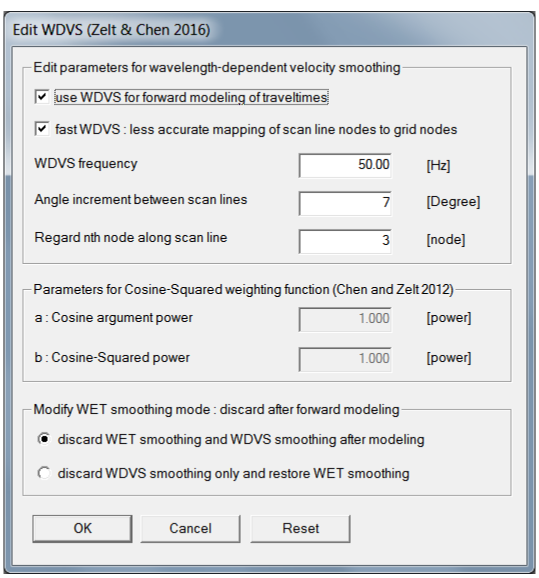


Fig. 28 : *Model|WDVS Smoothing*

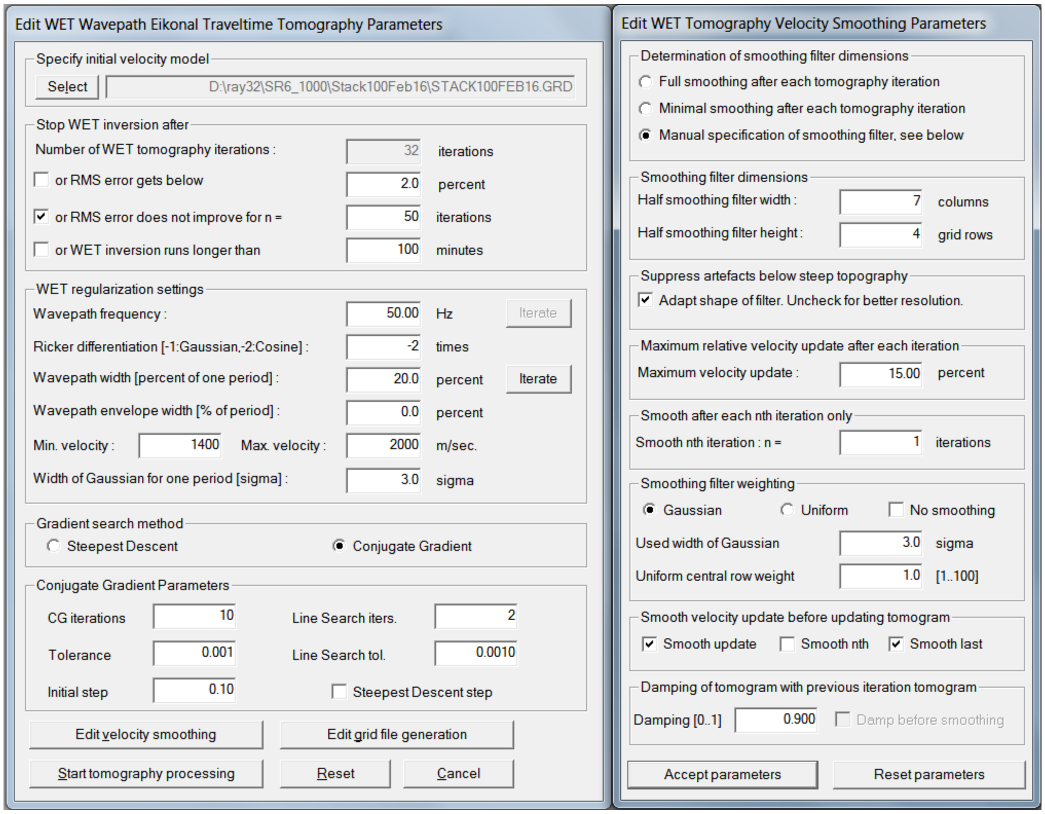


Fig. 29 : *WET Tomo|Interactive WET* main dialog (left). Edit velocity smoothing (right).

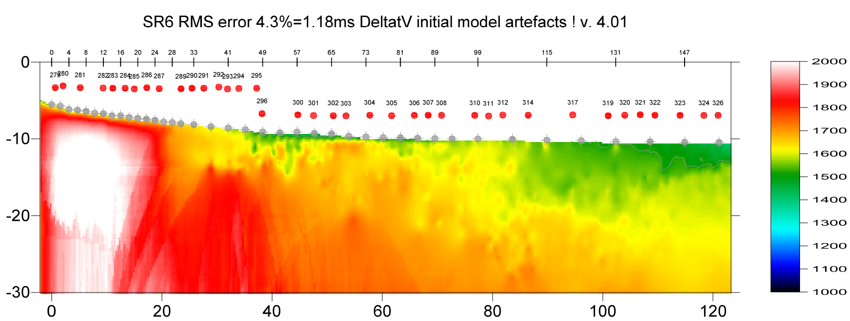


Fig. 30 : pseudo-2D DeltatV starting model used for Fig. 31. Grid cell size forced to 0.2m in Header|Profile. See Fig. 12.

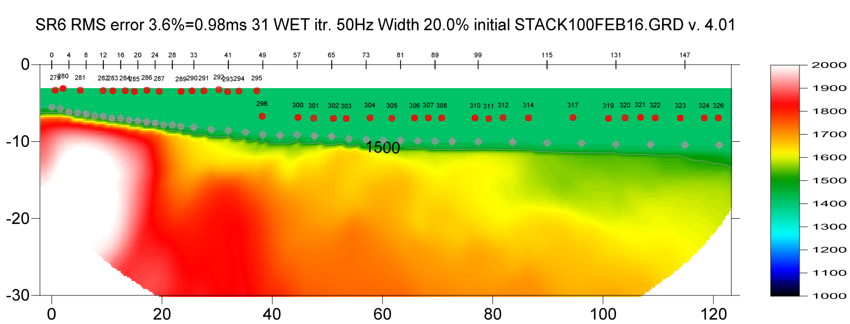


Fig. 31 : Single-run Conjugate-Gradient WET inversion (Fig. 29) with WDVS enabled (Fig. 28). Starting model shown in Fig. 30. Red dots are source locations in water column. Grey dots are receiver locations positioned on sea floor.

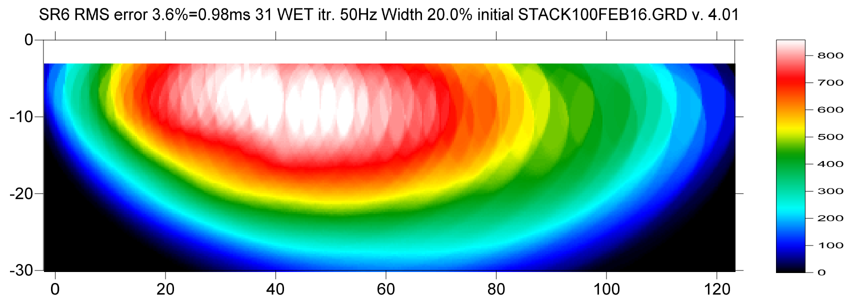


Fig. 32 : WET wavepath coverage plot obtained with Fig. 31. Unit is wavepaths per pixel.

Here is the WET subdirectory archive for Fig. 31 including Surfer 11 .GRD files and .SRF files and .PAR files :

http://rayfract.com/tutorials/Stack100Feb16_CGWET_WDVS@50Hz_Mar1_2021.rar

Interactive WET inversion with 10 Conjugate-Gradient WET iterations (Fig. 29 and Fig. 31) took about 3 minutes on 2017 iMac using 2.3 GHz Intel Core i5 processor with 2 hyper-threaded CPU cores running Windows 7 64-bit Pro in Parallels desktop version 16.

We also fully support running our latest version 4.03 software under latest Windows 10 64-bit Pro version. Fig. 33 and higher were obtained under Windows 10 22H2 64-bit Pro.

For long lines with homogeneous overburden and without strong lateral velocity variation in overburden such as above shallow marine refraction survey (with water layer as overburden) our 1.5D DeltatV and XTV inversion method can work well to obtain a realistic starting model (Fig. 30) which is close to the final WET tomogram (Fig. 31). See also our tutorials OT0608 and GEOXMERC and 3016 .

In general we recommend using our 1D-gradient starting model to avoid DeltatV and XTV artefacts in the initial model due to strong lateral velocity variation in overburden (Sheehan, 2005) or due to strong topography. See our EPIKINV tutorial.

For latest synthetic modeling showing detection of small buried rectangular cavity using WDVS-enabled WET inversion (Parsa Bakhtiari Rad, NCPA 2021) see

https://rayfract.com/pub/final.pdf

On the following pages we show reinterpretation of above refraction data using our latest version 4.03 Standard software released in Mar 2023. We extrapolate starting models and tomograms over 60 stations (Fig. 38) for higher WET coverage regarding off-end shots and for deeper subsurface imaging. Also we lower the *WDVS frequency* to 5Hz (Fig. 39) and increase WET parameter *Width of Gaussian for one period* to 50 SD (Fig. 40 left) for more robust WET inversion.

- unzip archive **SR6_blanking.rar** with **updated .BLN** blanking file in directory **C:\RAY32\SR6_1000**
- we updated file **XYFLIPPED_NOOFFSETS_1400m.BLN** to extrapolate the water overburden layer over the whole extrapolated offset range of 60 station spacings (Fig. 38)
- select this updated **XYFLIPPED_NOOFFSETS_1400m.BLN** in *WET Tomo|WET Velocity constraints* dialog (Fig. 42)

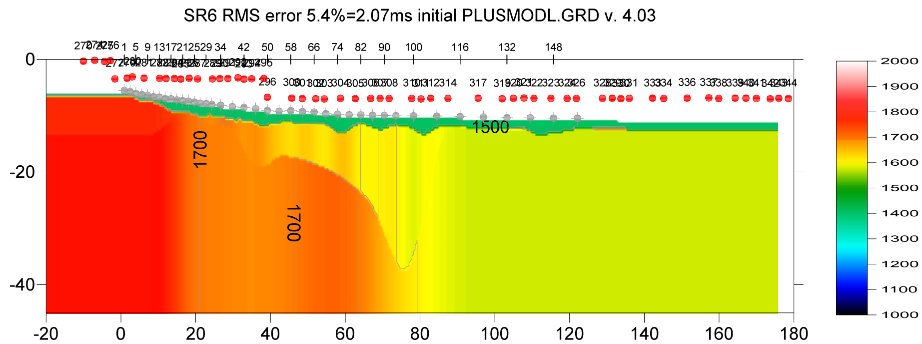


Fig. 33 : Plus-Minus layered refraction starting model. Extrapolate tomograms over 60 station spacings (Fig. 38).

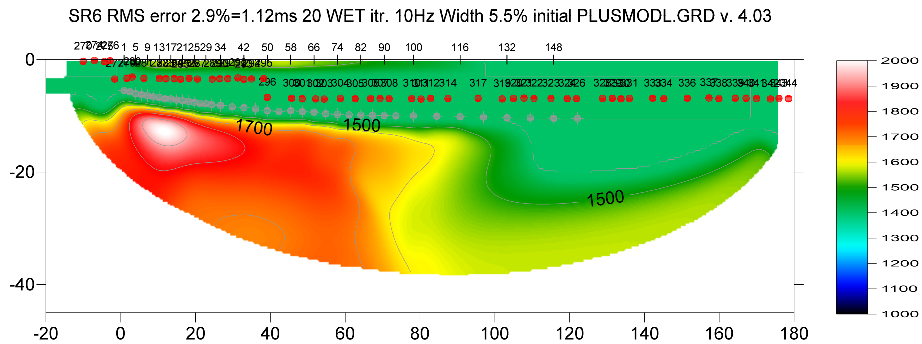


Fig. 34 : 20 Steepest-Descent WET iterations using starting model Fig. 33. WDVS@5Hz. Don't discard WET smoothing after WDVS (Fig. 39). WET frequency 10Hz. Width of Gaussian for one period : 50 SD (Fig. 40 left). Minimal WET smoothing (Fig. 40 right). WET tomography Settings : Fig. 45 & 46.

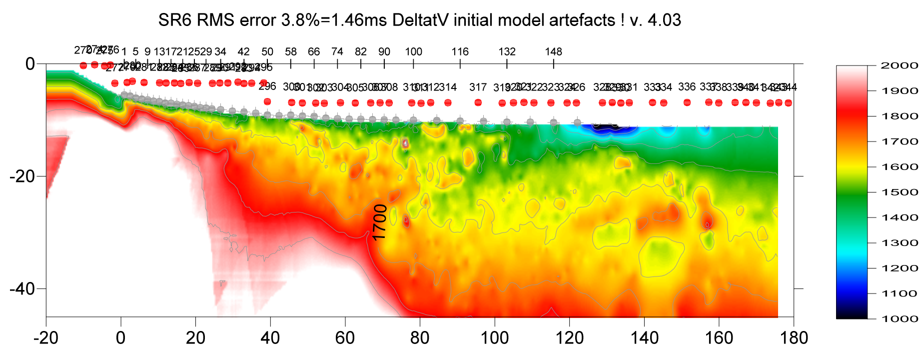


Fig. 35 : Peusdo-2D DeltatV starting model obtained with *DeltatV|Automatic DeltatV.* Extrapolate tomograms over 60 stations (Fig. 38) with *DeltatV|DeltatV Settings* shown in Fig. 43.

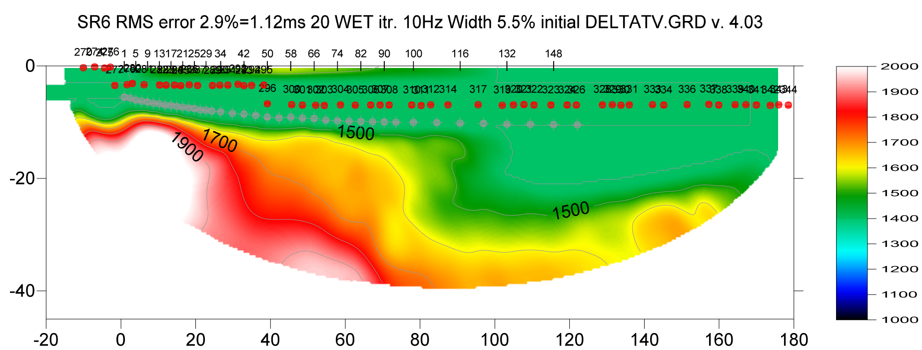


Fig. 36 : 20 Steepest-Descent WET iterations using starting model Fig. 35. WDVS@5Hz. Don't discard WET smoothing after WDVS (Fig. 39). WET frequency 10Hz. Width of Gaussian for one period : 50 SD (Fig. 40 left). Minimal WET smoothing (Fig. 40 right). *WET Tomo|WET tomography Settings* as in Fig. 45. *WET Tomo|WET tomography Settings|Blank* shown in Fig. 46.

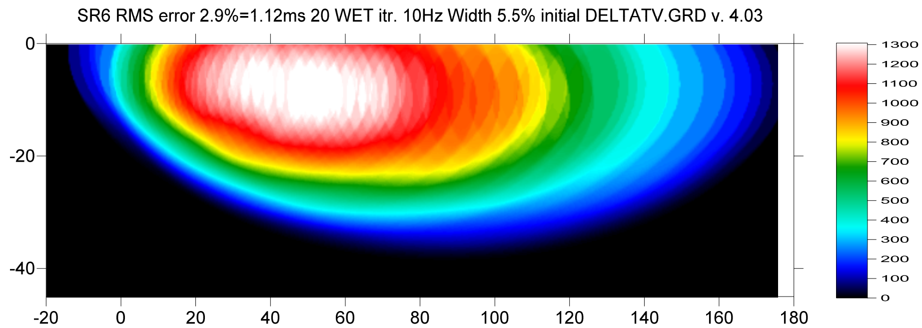
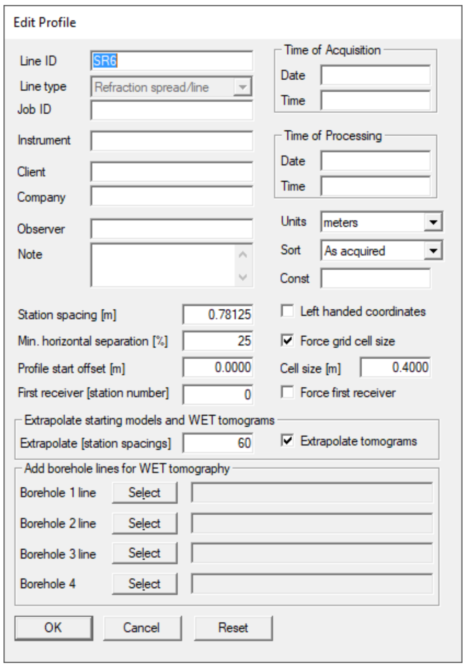


Fig. 37 : WET wavepath coverage plot obtained with Fig. 36. Unit is wavepaths per pixel.



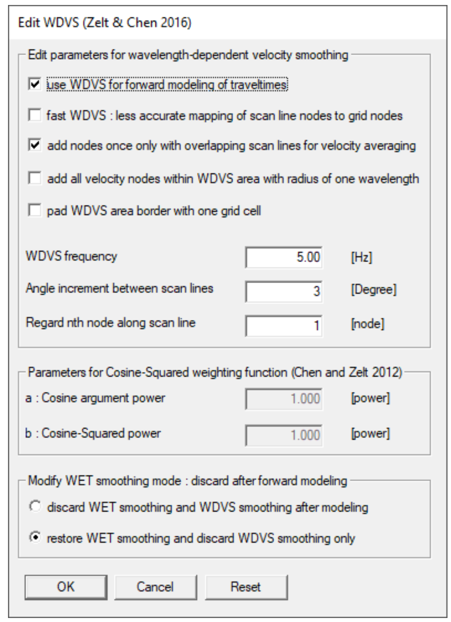


Fig. 38 : *Header|Profile*. Extrapolate tomograms. Force *Grid cell size* to 0.4m .

Fig. 39 : *Model|WDVS Smoothing* . WDVS@5Hz.

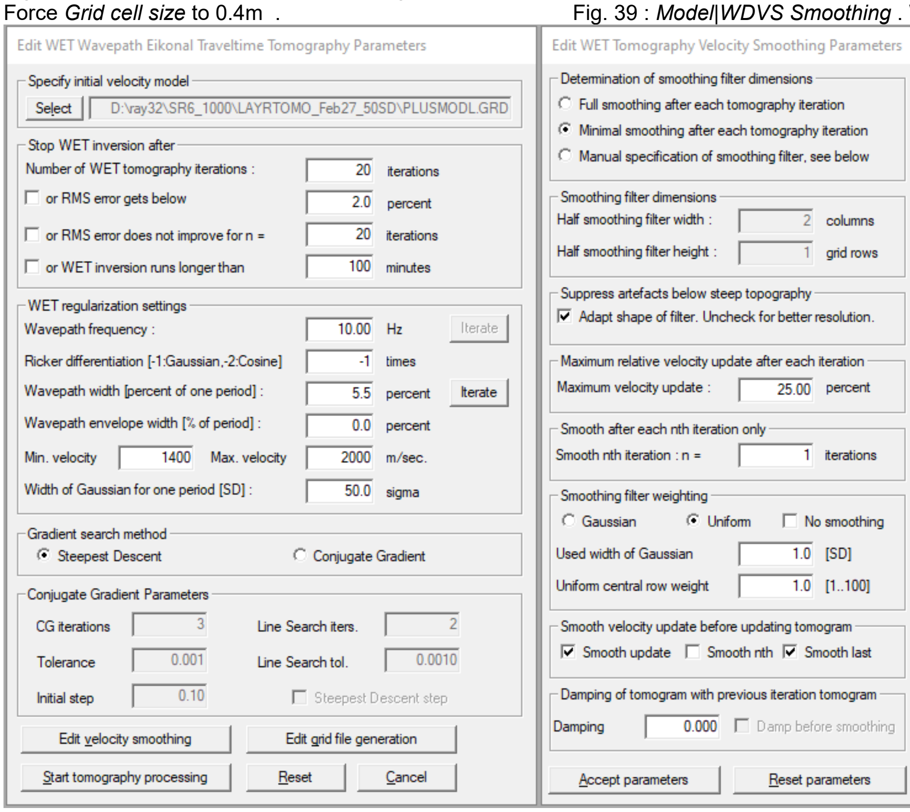
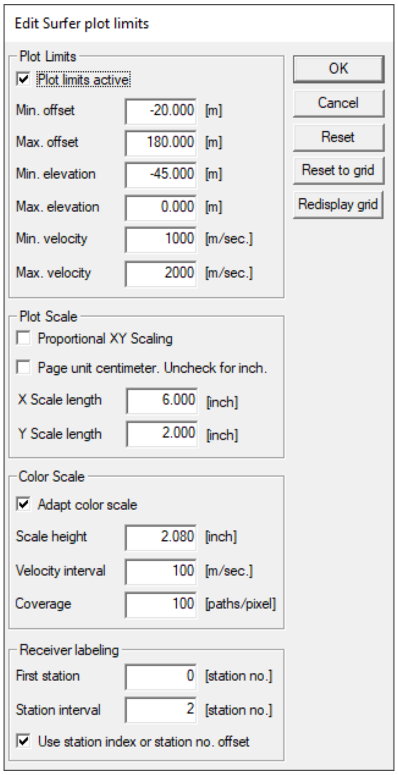


Fig. 40 : *WET Tomo|Interactive WET* main dialog (left). Wavepath frequency 10Hz. Width of Gaussian for one period : 50 sigma [SD].

Edit velocity smoothing (right). Use minimal smoothing.



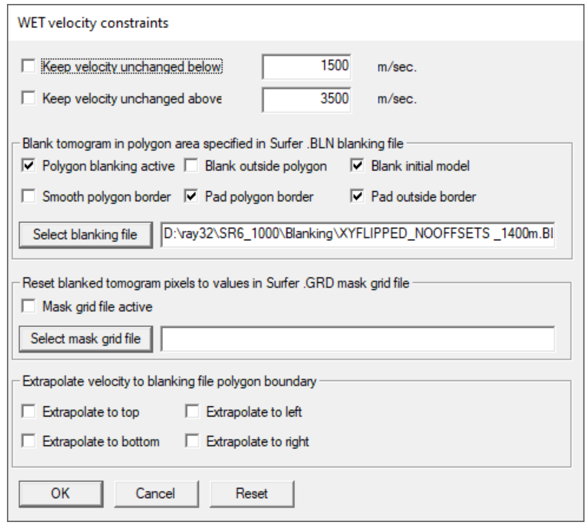
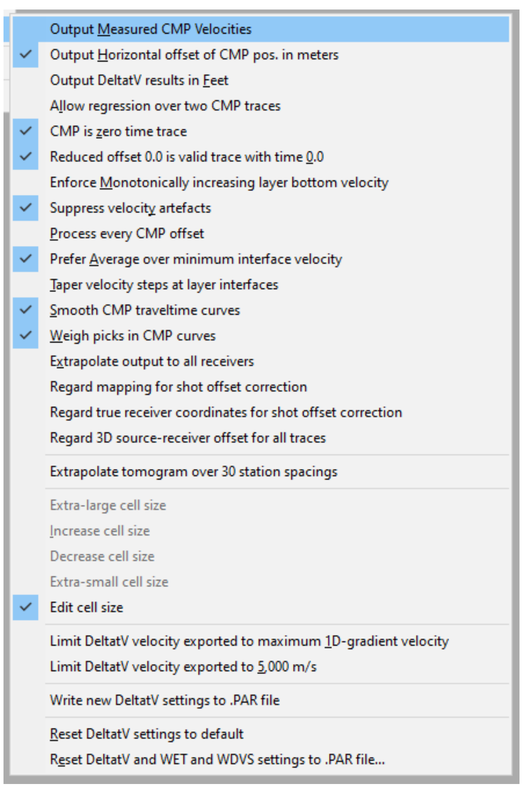


Fig. 41 : *Grid|Surfer plot Limits* (left)

Fig. 42 : *WET Tomo|WET Velocity constraints* (right)



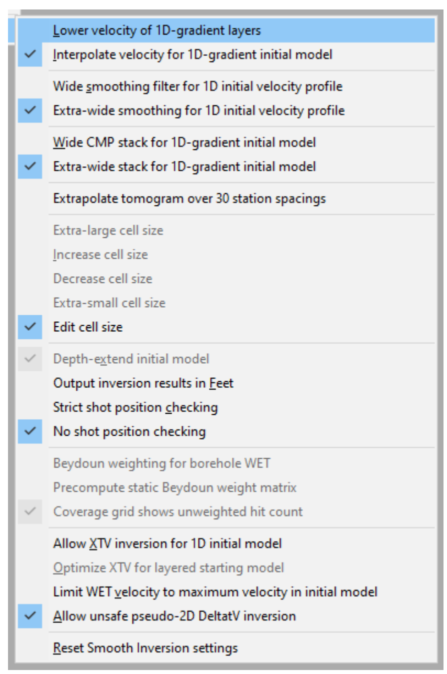
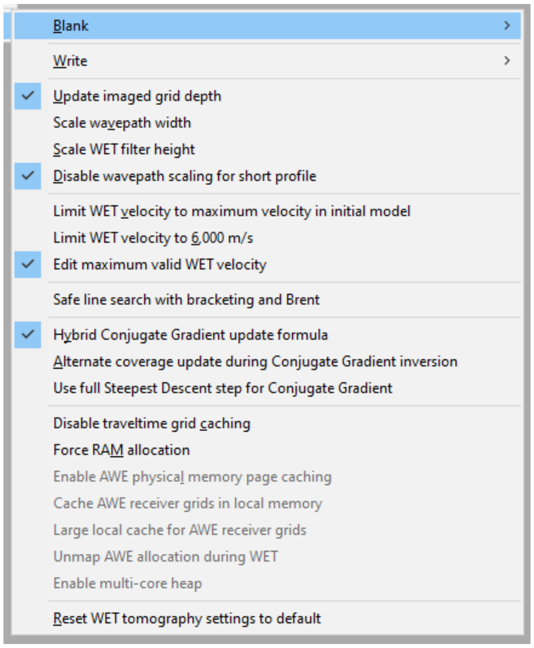


Fig. 43 : *DeltatV|DeltatV Settings* (left).

Fig. 44 : *Smooth invert|Smooth inversion Settings* (right).



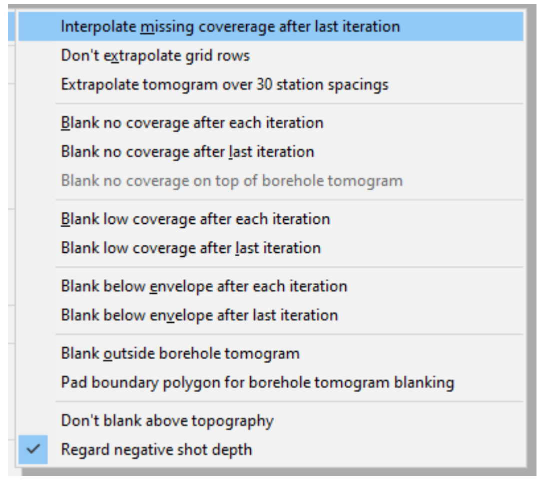


Fig. 45 : *WET Tomo|WET tomography Settings* (left).

Fig. 46 : *WET Tomo|WET tomography Settings|Blank* (right).

Here is the .rar archive with 20 WET runs for Fig. 34
Here is the .rar archive with seis32.* profile database files for Fig. 34

Here is the .rar archive with 20 WET runs for Fig. 36
Here is the .rar archive with seis32.* profile database files for Fig. 36

Next we show using our default 1D-gradient starting model with *WDVS Smoothing frequency* 50Hz. Also we use more/default *WET blanking* and different WET inversion parameters with Standard version 4.03 of our software, to obtain an alternative interpretation when using off-end shots for WET inversion.

Here is the .rar archive with 20 WET runs for Fig. 48
Here is the .rar archive with seis32.* profile database files for Fig. 48

Here is a .rar archive with DEBUG subdirectory in profile folder **\RAY32\SR6_1000**. It contains WDVS debug grids **WDVSTIME.GRD** and **WDVSVELO.GRD** and corresponding **.SRF** plots obtained with Surfer 11 *Map|New|Image Map*. See our 3016 tutorial showing how to image these .GRD grids using Surfer 23 *Map Wizard* feature.

These WDVS debug grids are written to DEBUG subdirectory in your profile folder if option *WET Tomo|WET tomography Settings|Write|Write blanked and mask grids and WDVS debug grids* is checked. See Fig. 54 for sample **WDVSTIME.GRD** plot and Fig. 55 for matching **WDVSVELO.GRD** plot.

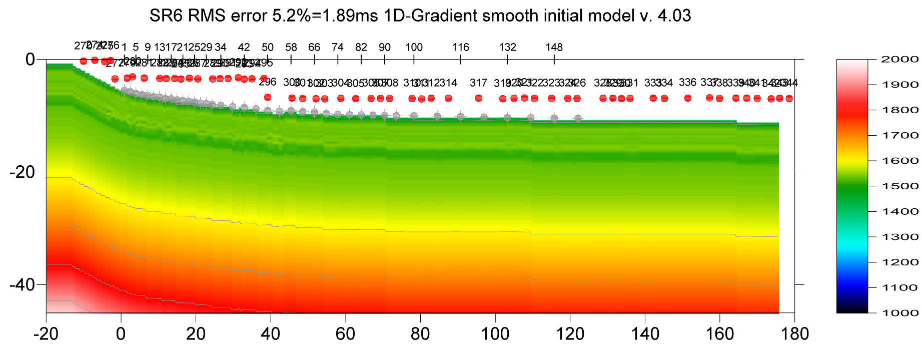


Fig. 47 : 1D-gradient starting model obtained with *Smooth invert|WET with 1D-gradient initial model.*. Extrapolate tomograms over 60 stations (Fig. 38) with *DeltatV|DeltatV Settings* shown in Fig. 43. *Smooth invert|Smooth inversion Settings* shown in Fig. 44.

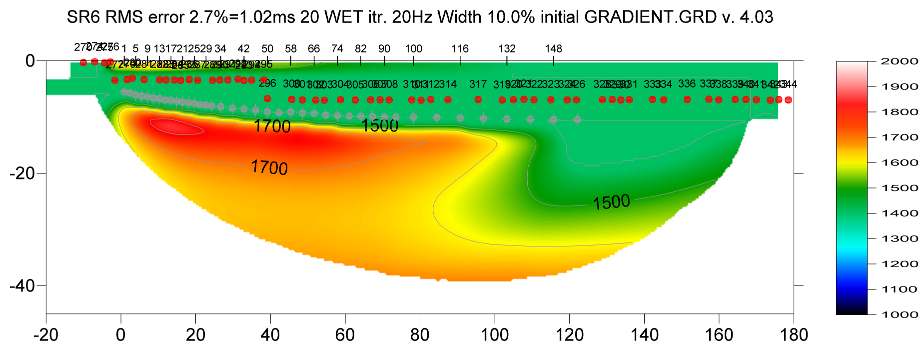


Fig. 48 : 20 Steepest-Descent WET iterations using starting model Fig. 47. WDVS@50Hz. Don't discard WET smoothing after WDVS (Fig. 52). WET frequency 20Hz. WET wavepath width 10 percent. Ricker differentiation -2 meaning Cosine-Squared WET update weighting (Fig. 53 left). Minimal WET smoothing (Fig. 53 right). *WET Tomo|WET tomography Settings* as in Fig. 45. *WET Tomo|WET tomography Settings|Blank* shown in Fig. 51.

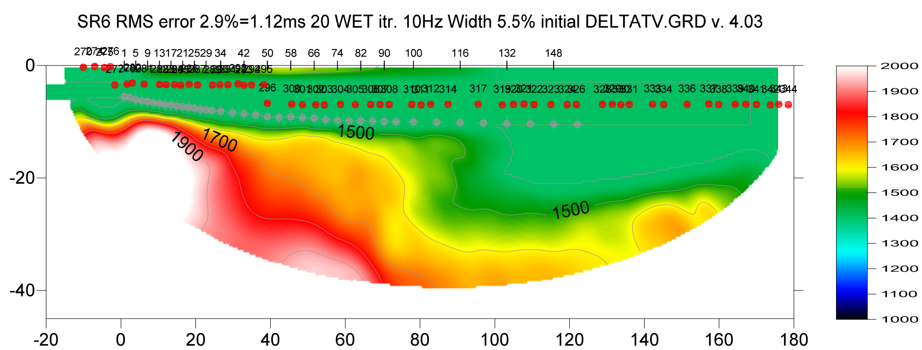


Fig. 49 : same as Fig. 36. 20 Steepest-Descent WET iterations using starting model Fig. 35. WDVS@5Hz. Don't discard WET smoothing after WDVS (Fig. 39). WET frequency 10Hz. Width of Gaussian for one period : 50 SD (Fig. 40 left). Minimal WET smoothing (Fig. 40 right). *WET Tomo|WET tomography Settings* as in Fig. 45. *WET Tomo|WET tomography Settings|Blank* shown in Fig. 46.

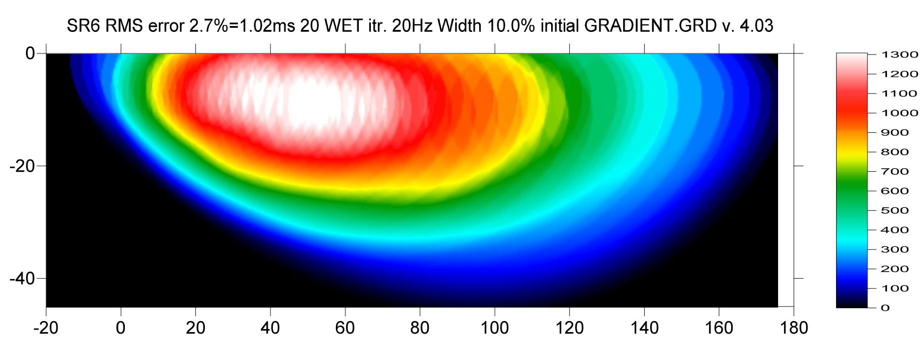


Fig. 50 : WET wavepath coverage plot obtained with Fig. 48. Unit is wavepaths per pixel.

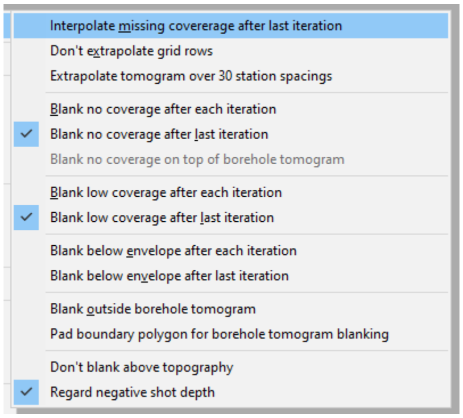
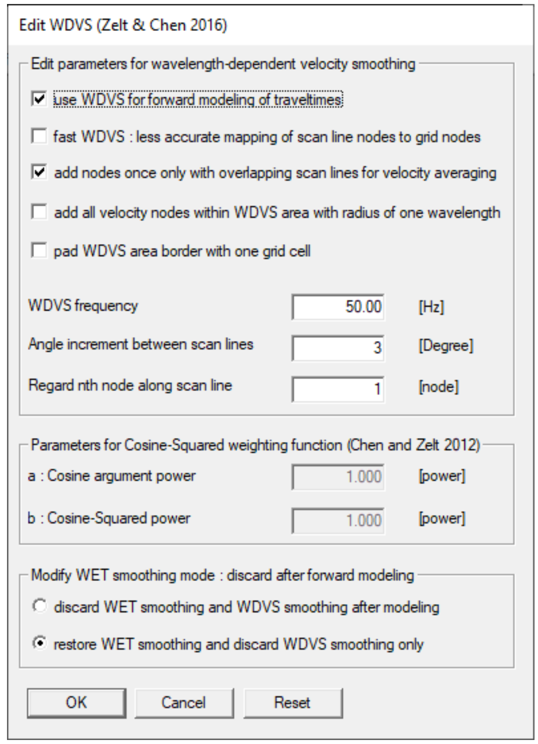


Fig. 51 (above) : *WET Tomo|WET tomography Settings|Blank* used for Fig. 48.

Fig. 52 (right) : *Model|WDVS Smoothing* used for Fig. 48. *WDVS frequency* 50Hz.



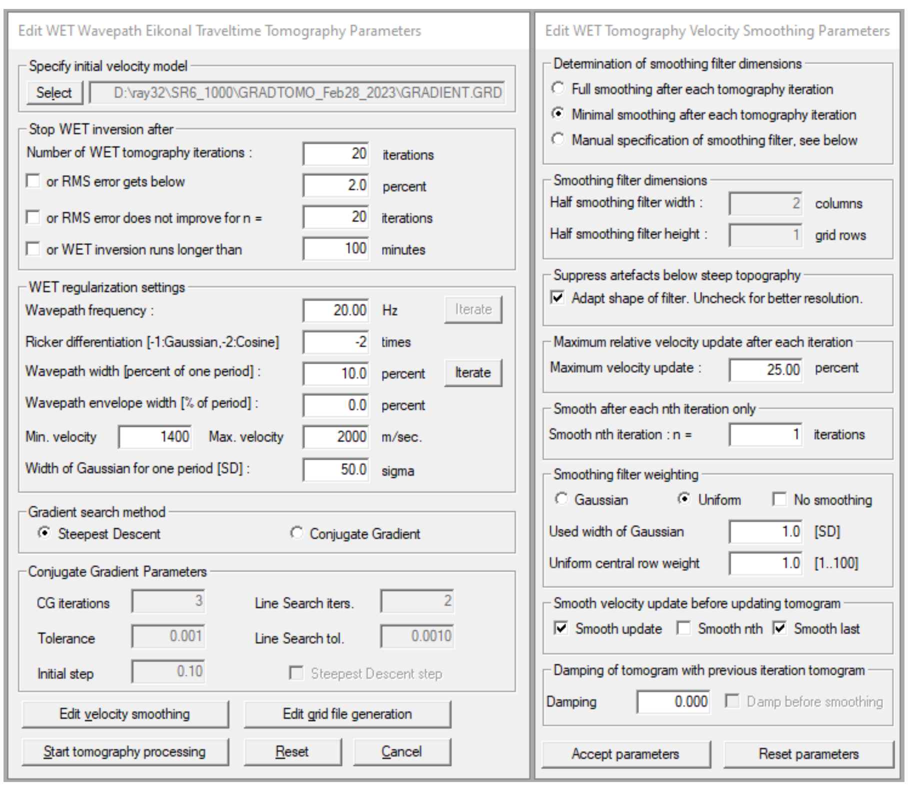


Fig. 53 : *WET Tomo|Interactive WET* main dialog (left). Edit velocity smoothing (right). WET inversion parameters used for Fig. 48.

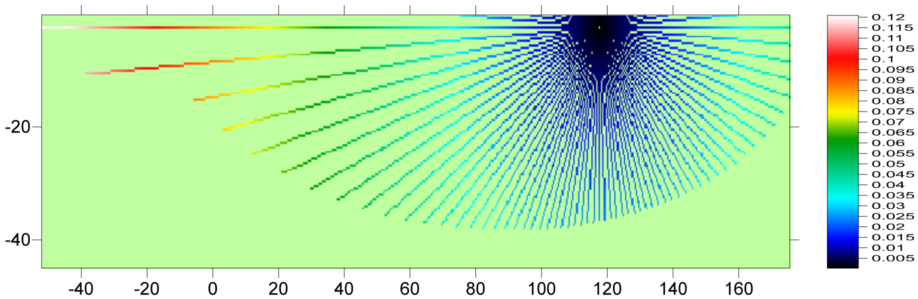


Fig. 54 : sample WDVSTIME.GRD written to **\RAY32\SR6_1000\DEBUG** with option *WET Tomo|WET tomography Settings|Write|Write blanked and mask grids and WDVS debug grids* checked. Unit is time in seconds incurred along WDVS scan lines. *WDVS frequency* is 5Hz so one WDVS period equals 0.2s. *Angle increment between scan lines* is 3 degrees (Fig. 39).

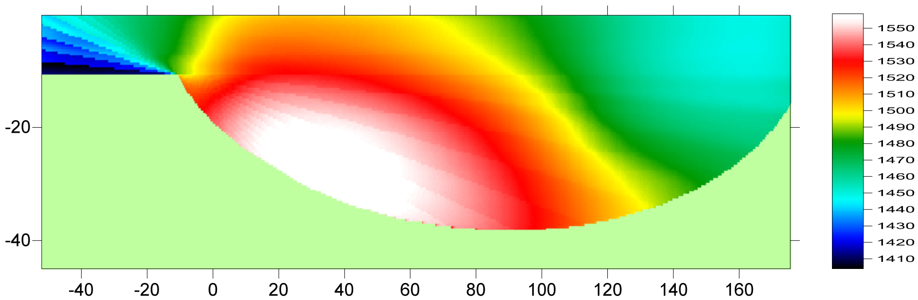


Fig. 55 : WDVSVELO.GRD determined from VELOITXY.GRD obtained with previous WET iteration. Unit is velocity in m/s.