# VSP survey used to constrain refraction tomography with Rayfract® version 3.35 :

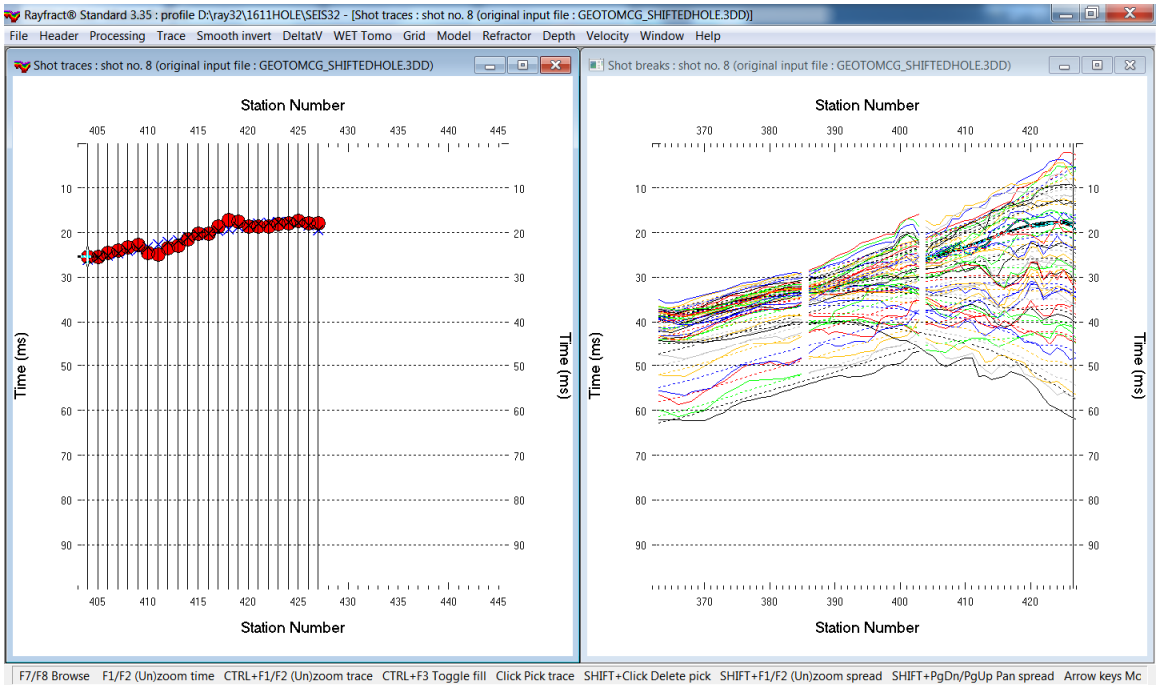


Fig. 1 : left : *Trace*|*Shot gather*, right : *Refractor*|*Shot breaks*. Shows fit between picked times (solid colored curves) and modeled times (dashed colored curves) obtained by forward modeling over Fig. 2b in tutorial 11REFR.pdf

- *File*|*New Profile…*, set *File name* to 1611HOLE and click *Save button*
- set *Station spacing* to 1.0m in *Header*|*Profile…* . Set *Line type* to `Borehole spread/line`.
- set *Cell size [m] to* 1.0 in *Header*|*Profile.*. Check box *Force grid cell size.*
- unzip `1611 hole shifted 3dd.rar` with `GEOTOMCG_ShiftedHole.3DD` in `C:\RAY32\1611HOLE\INPUT`
- check *File*|*Import Data Settings*|*X coordinate is corrected for topography already*
- select *File*|*Import Data…* and set *Import data type* to `Tweeton GeoTomCG .3DD`
- leave *Default spread type* at *10: 360 channels.* Set *Default sample count* to 2000
- click upper *Select button*, navigate into `C:\RAY32\1611HOLE\INPUT`
- select file `GEOTOMCG_ShiftedHole.3DD`
- click *Open button*, *Import shots button.* Dismiss *Update profile station spacing prompt* with *No button*.
- the *Import shot dialog* is shown for each shot in the `.3DD` file.
- for each shot leave *Layout start* and *Shot pos.* at shown values and click *Read button*
- select *Trace*|*Shot gather* and *Window*|*Tile* to obtain Fig. 1
- for each window click title bar, press ALT+P, set *Maximum time* to 100 ms and hit ENTER key
- for *Trace*|*Shot gather* click title bar. Uncheck *Display*|*Use red cross for picked first breaks*. Check *Display*|*Solid color pick display* & *Picks always cover traces*.
- uncheck *Grid*|*Label shot points*. Check *Grid*|*Label receiver stations*.
- uncheck all blanking options in *WET Tomo*|*WET tomography Settings*|*Blank* submenu
- check *WET Tomo*|*WET tomography Settings*|*Edit maximum valid WET velocity*
- select *Smooth invert*|*WET with constant-velocity initial borehole model* and confirm prompts for default interpretation in Fig. 2
- select *WET Tomo*|*Interactive WET tomography…*
- set *Number of WET tomography iterations* to 100. Set *Max. velocity* to 4500 m/s (Fig. 4) and click *Start tomography processing* to obtain Fig. 3
- for *WET parameters* used see archive `HOLE335 Width7% 100Iters.rar` with starting model files `CONSTVEL.GRD` & `CONSTVEL.PAR`, `VELOIT100.GRD` & `.PAR` and `.SRF` Surfer 11 plots

- also see Fig. 4 for *WET parameters* used
- for help on *WET inversion* parameters see updated .pdf reference chapter ***WET Wavepath Eikonal Traveltime tomography***

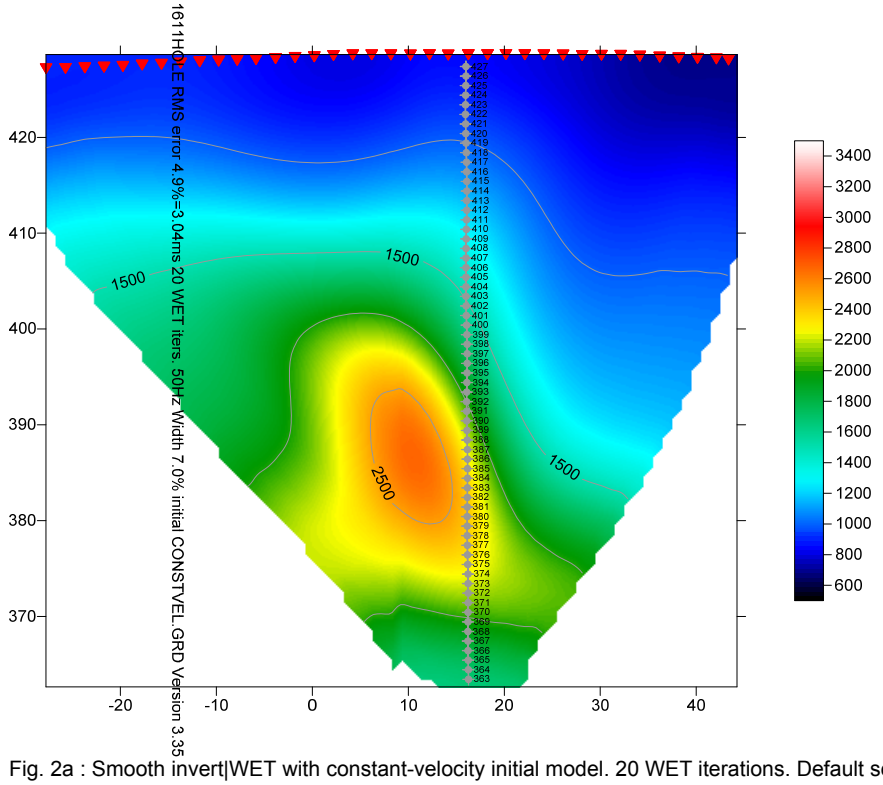


Fig. 2a : Smooth invert|WET with constant-velocity initial model. 20 WET iterations. Default settings.

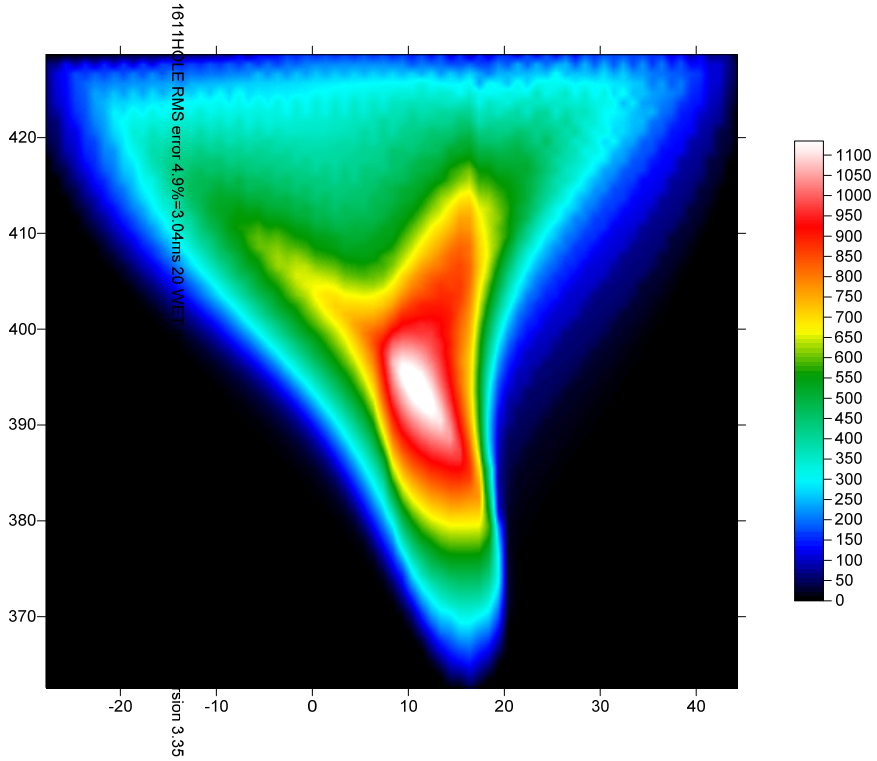


Fig. 2b : WET wavepath coverage plot obtained with Fig. 2a. Unit is wavepaths per pixel.

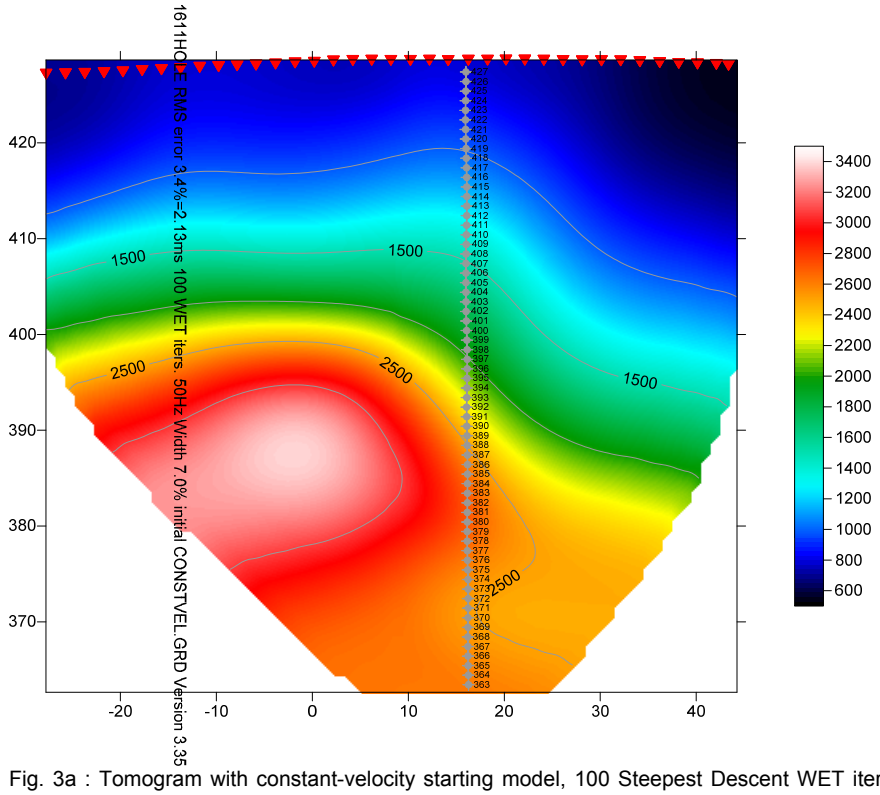


Fig. 3a : Tomogram with constant-velocity starting model, 100 Steepest Descent WET iterations, default WET settings. Wavepath width 7%, Max. velocity 4,500 m/s. WET settings as in Fig. 4.

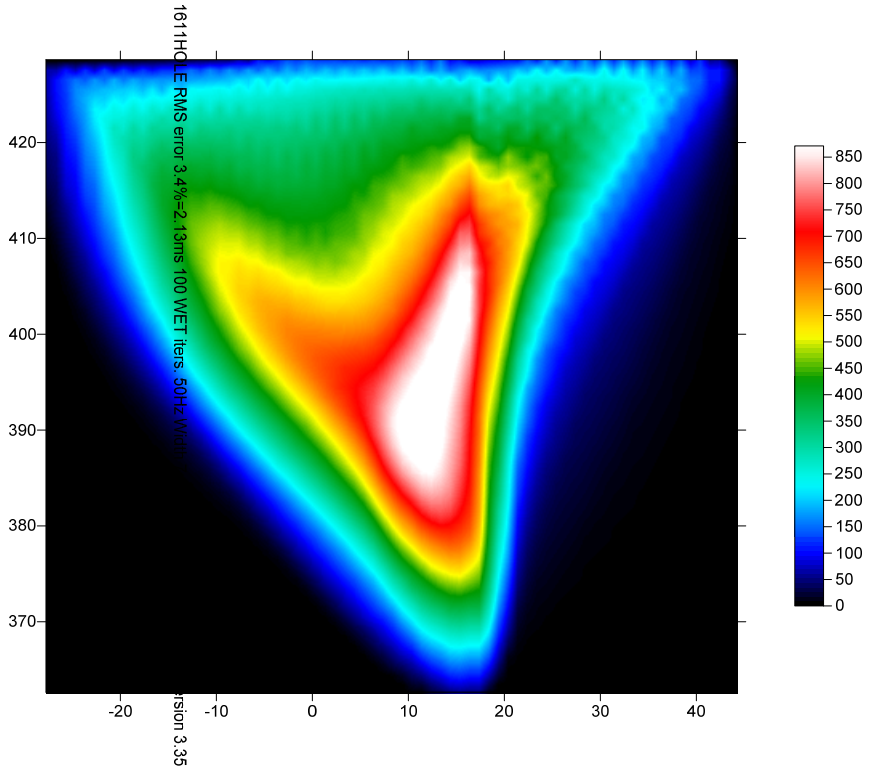


Fig. 3b : WET wavepath coverage plot obtained with Fig. 3a. Shows number of wavepaths per pixel.

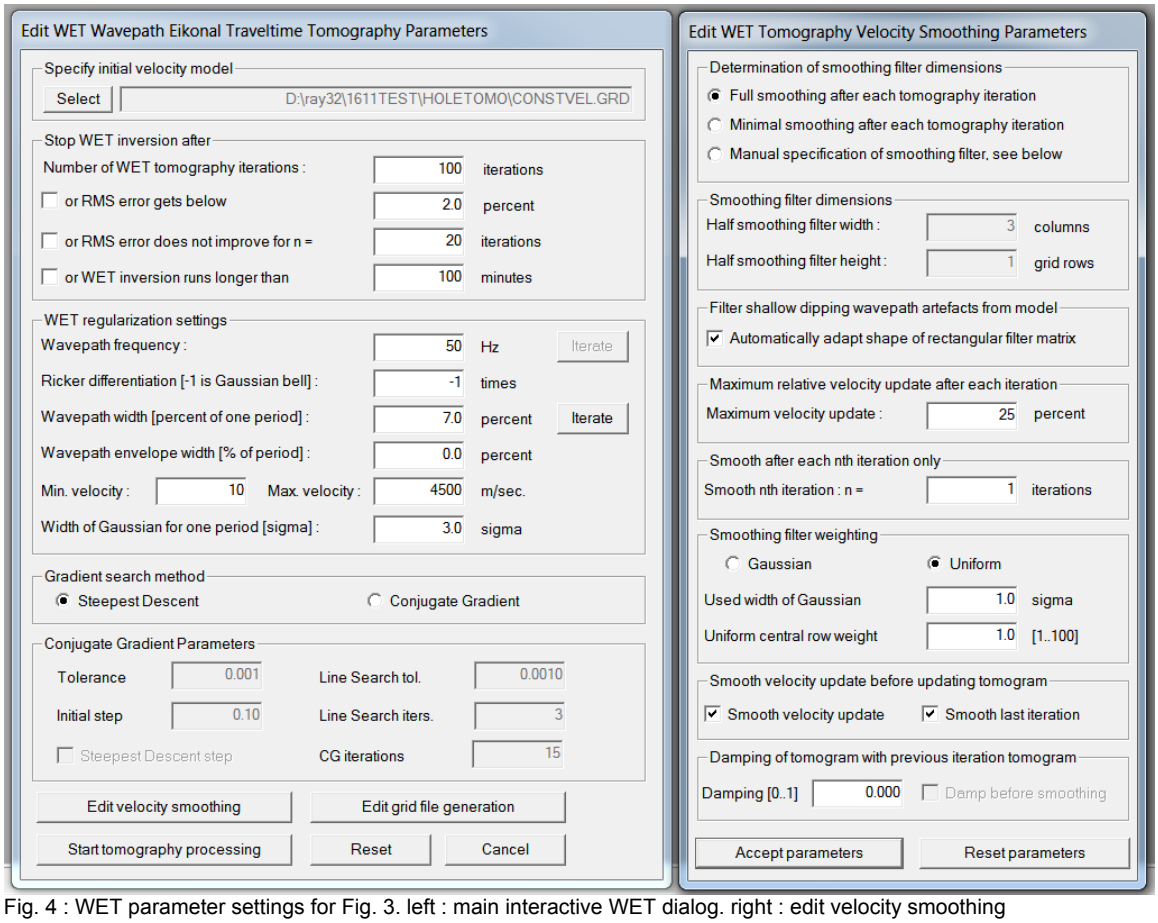

Fig. 4 : WET parameter settings for Fig. 3. left : main interactive WET dialog. right : edit velocity smoothing

In tutorial 11REFR.pdf we show how to constrain surface-based refraction tomography with above VSP shots.