

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

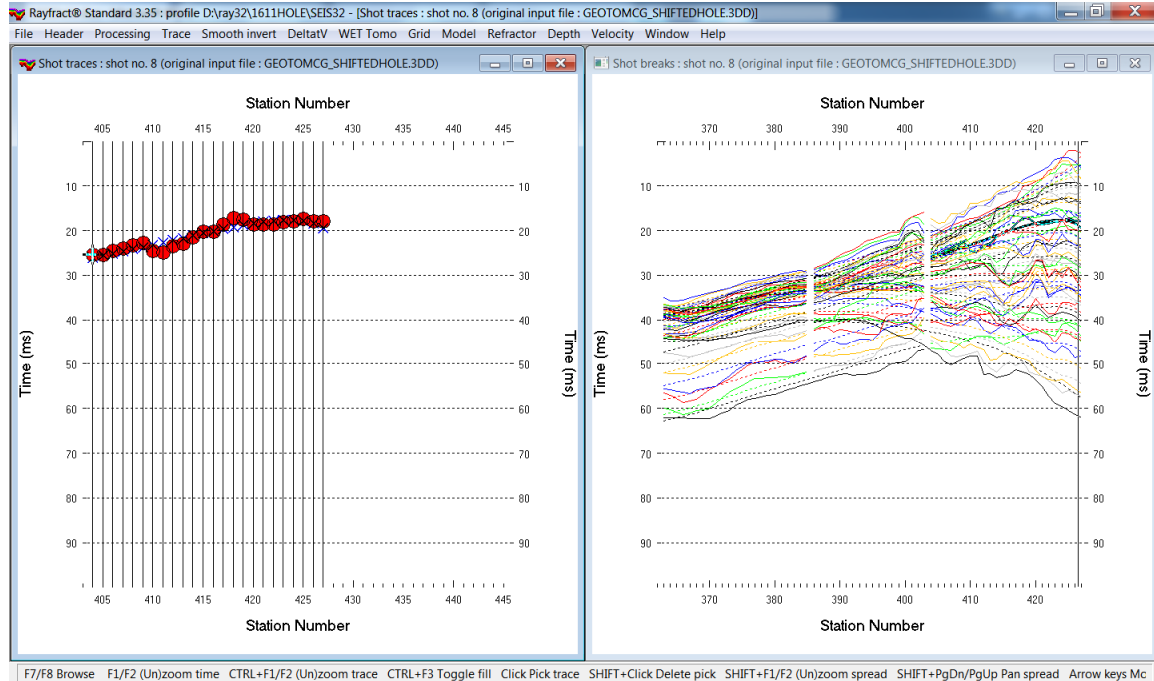


Fig. 1 : left : *Trace|Shot gather*, right : *Refractor|Shot breaks*. Shows fit between picked times (solid colored curves) and modeled times (dashed colored curves) obtained by forward modeling over Fig. 2b in tutorial [11REFR.pdf](#)

- *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 *Processing|Use red cross for picked first breaks*. Check *Processing|Solid color pick display & Picks always cover traces*.
- uncheck *Grid|Label shot points*. Check *Grid|Label receiver stations*.
- uncheck *WET Tomo|WET tomography Settings|Blank|Blank outside borehole tomogram*
- 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 and click *Start tomography processing* for 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*

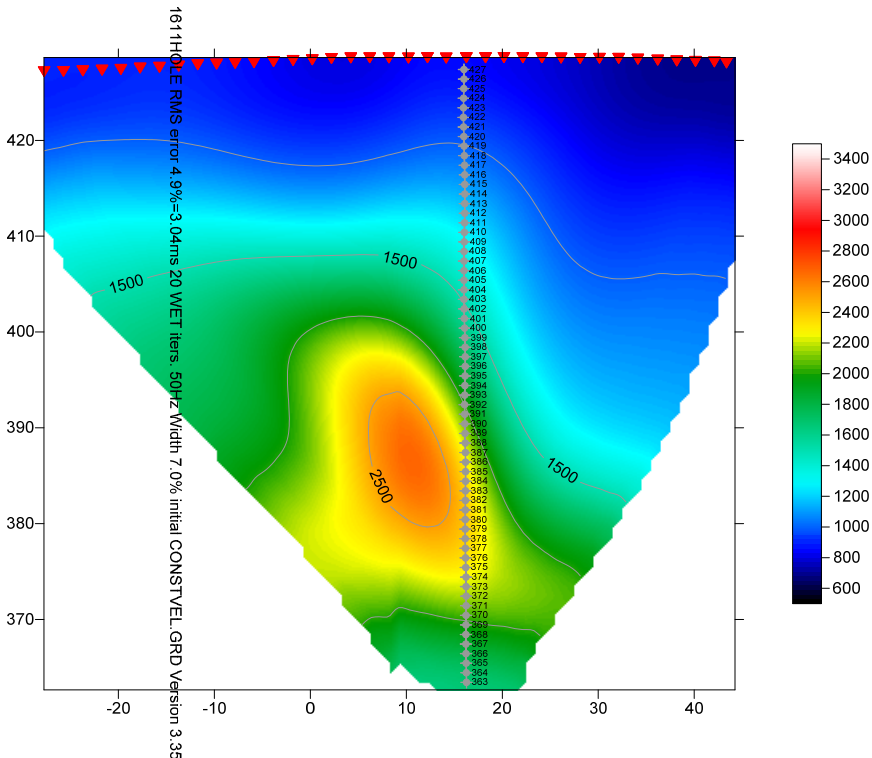


Fig. 2a : Smooth invert|WET with constant-velocity initial model. 20 WET iterations. Default settings.

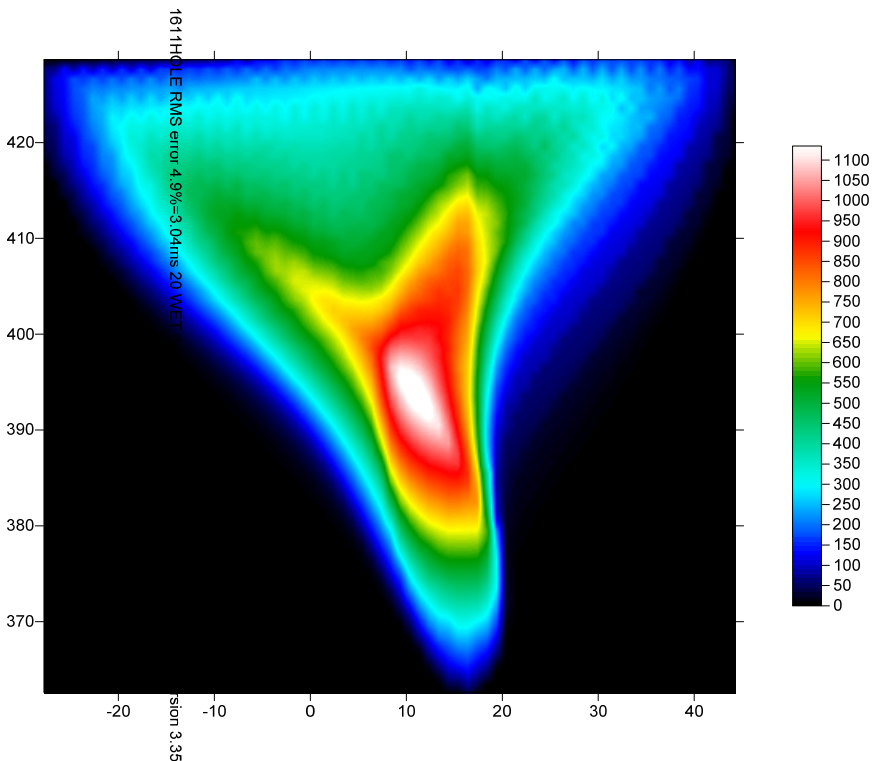


Fig. 2b : WET wavepath coverage plot obtained with Fig. 2a. Unit is wavepaths per pixel.

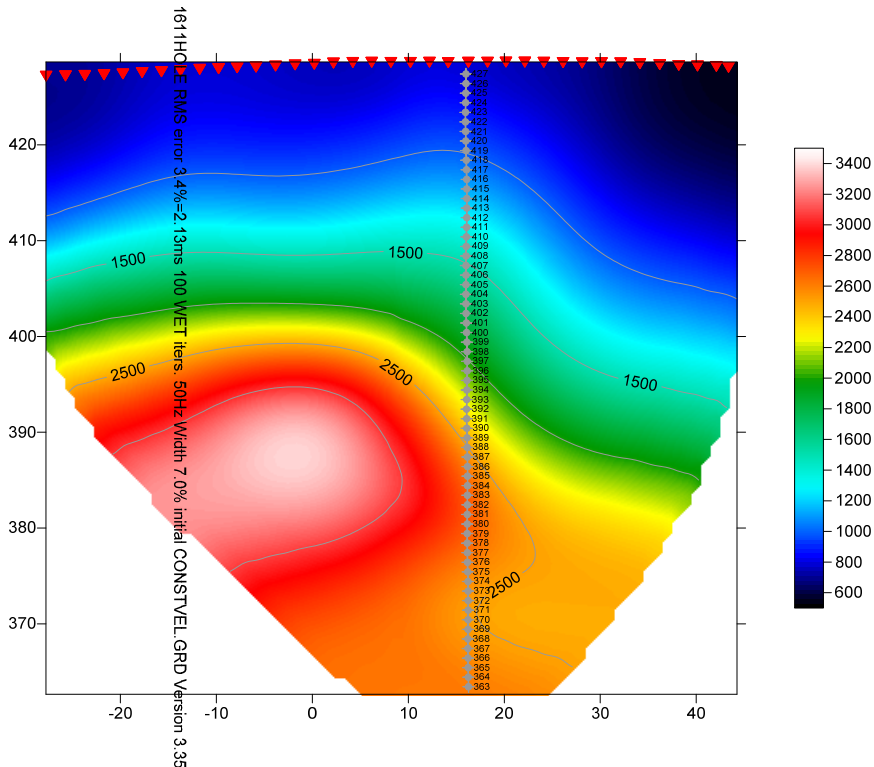


Fig. 3a : Tomogram with constant-velocity starting model, 100 Steepest Descent WET iterations, default WET settings. Wavepath width 7%, Max. velocity 4,500 m/s. WET settings as in Fig. 4.

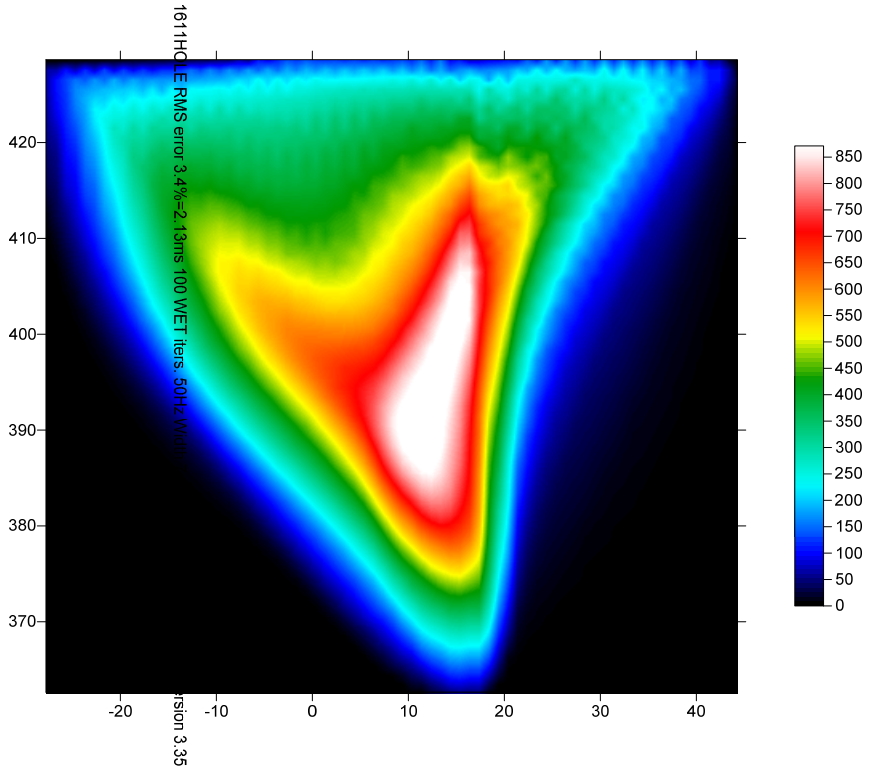


Fig. 3b : WET wavepath coverage plot obtained with Fig. 3a. Shows number of wavepaths per pixel.

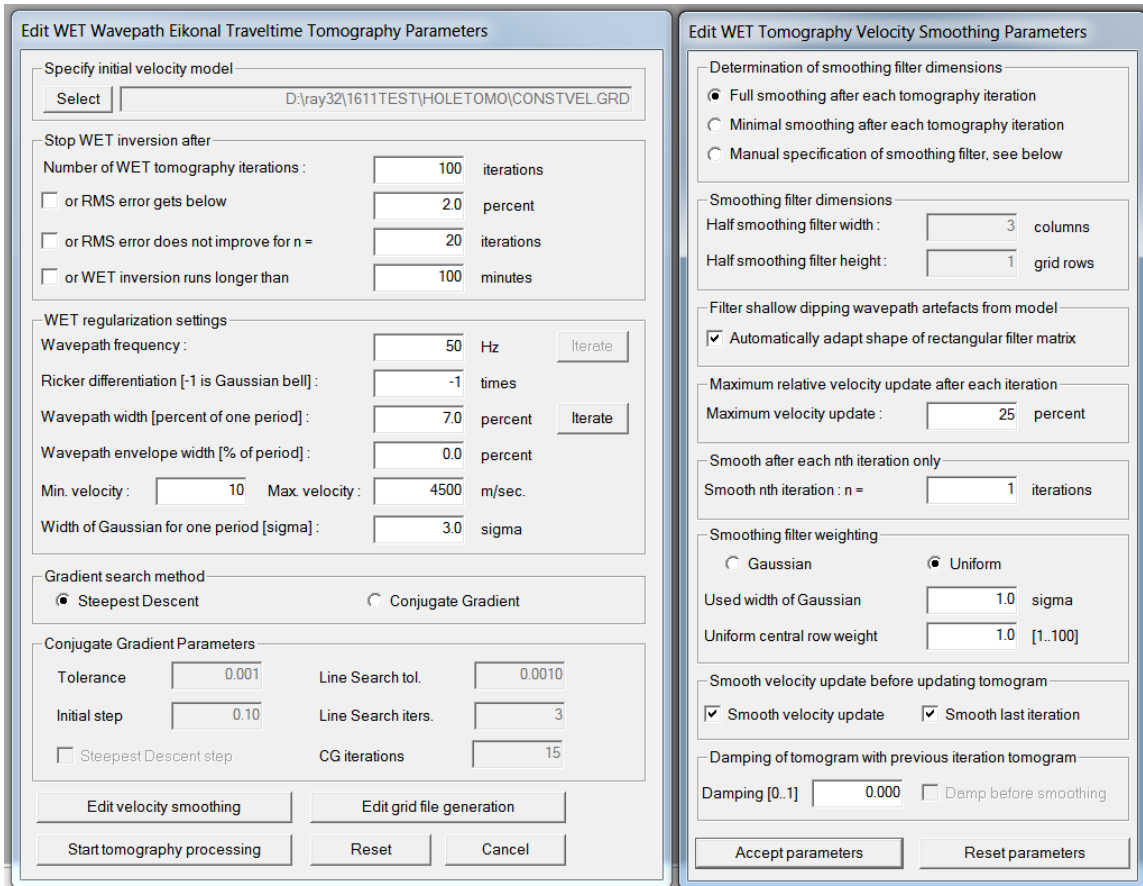


Fig. 4 : WET parameter settings for Fig. 3. left : main interactive WET dialog. right : edit velocity smoothing

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