Multiscale tomography of tunnel overburden, 36 shots into 24 receivers per shot :

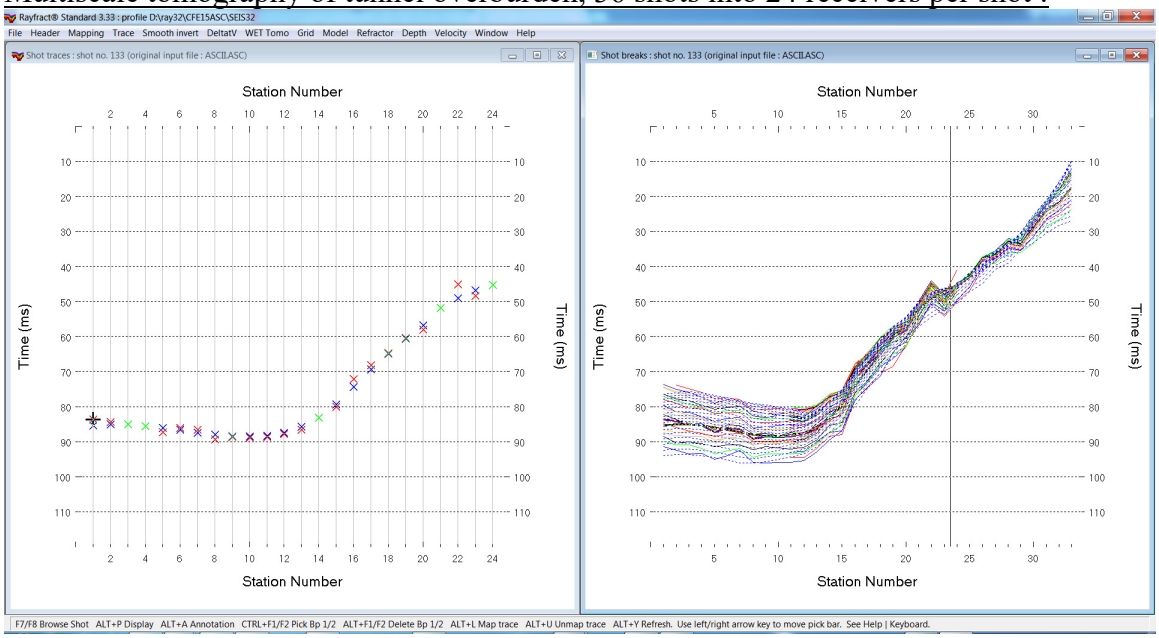

Fig. 1 : left : *Trace*|*Shot gather*, right : *Refractor*|*Shot breaks*. Shows fit between picked times (solid colored curves, red crosses) and modeled times (dashed blue curves, blue crosses) obtained with WET output shown in Fig. 3.

- *File*|*New Profile…*, set *File name* to `CFE15ASC` and click *Save button*
- set *Line type* to ***Borehole spread/line*** in *Header*|*Profile…*
- set *Station spacing* to 5m in *Header*|*Profile…*
- unzip `CFE15.ZIP` containing files `ASCII.ASC`, `COORDS.COR` and `SHOTPTS.SHO` in directory `C:\RAY32\CFE15ASC\INPUT`
- check ***Smooth invert*|*Smoooth inversion Settings*|*No shot position checking*** (new in version 3.33)
- check *File*|*Import Data Settings*|*Import horizontal borehole survey or .3DD refraction survey*
- select *File*|*Import Data…* and set *Import data type* to `ASCII column format`
- leave *Default spread type* at *10: 360 channels*
- click upper *Select button*, navigate into `C:\RAY32\CFE15ASC\INPUT` and select file `ASCII.ASC`
- click *Open button*, *Import shots button.* The *Import shot dialog* is shown for each shot in the .ASC file.
- for each shot leave *Layout start* and *Shot pos.* at shown values and click *Read button*
- *File*|*Update header data*|*Update Station Coordinates* with `C:\RAY32\CFE15ASC\INPUT\COORDS.COR`
- *File*|*Update header data*|*Update Shotpoint coordinates* with `C:\RAY32\CFE15ASC\INPUT\SHOTPTS.SHO`
- select *Trace*|*Shot gather* and *Window*|*Tile* to obtain Fig. 1 .
- for both windows click title bar, press ALT+P, set *Maximum time* to 120 ms and hit ENTER key.
- check *Grid*|*Stack shot labels at same offset*
- check *WET Tomo*|*WET tomography Settings*|*Blank*|***Blank outside borehole tomogram***
- select *Smooth invert*|*WET with constant-velocity initial borehole model* and confirm prompts for default interpretation. Select ***Grid*|*Surfer plot Limits***.
- click *button* ***Reset to grid*** and select `C:\RAY32\CFE15ASC\HOLETOMO\CONSTVEL.GRD`. Click *Open*.
- check *box* ***Plot limits active***. Set *Min. velocity* to 1,000 m/s and *Max. velocity* to 5,000 m/s. Click *OK*.
- select *WET Tomo*|*Interactive WET tomography.* Set ***Wavepath width*** to 20 % for more robust imaging.
- click *button* ***Start tomography processing*** to obtain Fig. 2
- select *WET Tomo*|*Interactive WET tomography…* and click *button* ***Iterate***
- check *box* ***WET runs active*** and click ***button OK***. Click *button* ***Edit velocity smoothing***.
- check *radio button* ***Manual specification of smoothing filter***
- set ***half smoothing filter width to 7 columns*** & set ***half smoothing filter height to 3 rows***
- click *buttons* ***Accept parameters*** and ***Start tomography processing*** to obtain Fig. 3

- for our new ***multiscale WET*** see our updated help file chapter ***WET Wavepath Eikonal Tomography***.

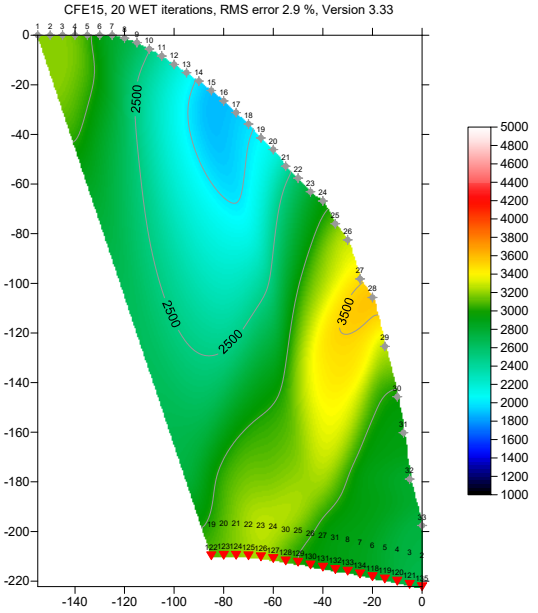

Fig. 2a : Smooth inversion, 20 WET iterations in one run. Default WET settings, wavepath width 20%, adapted smoothing filter size. P-wave velocity in m/s

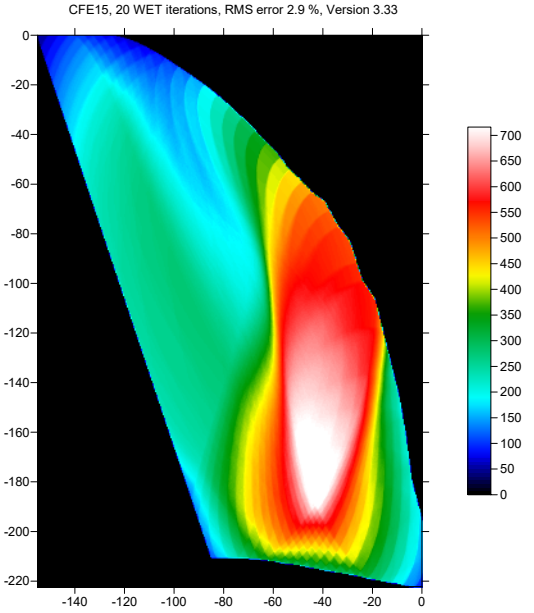

Fig. 2b : WET wavepath (aka Fresnel volume) coverage plot obtained wit Fig. 2a. Shows number of wavepaths covering each pixel.

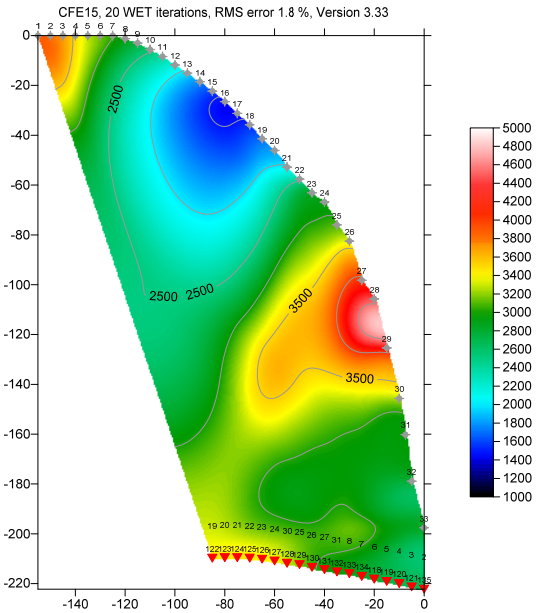

Fig. 3a : Multiscale tomography, WET tomogram obtained with last run of 8 runs using decreasing wavepath width. Default WET settings except adapted smoothing filter size. P-wave velocity in m/s

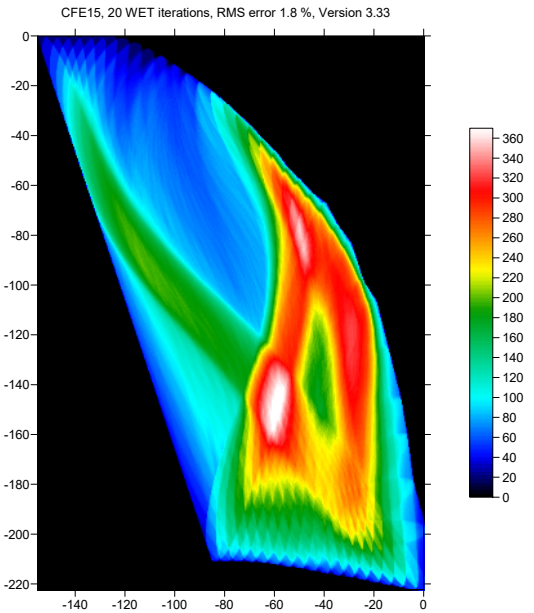

Fig. 3b : WET wavepath (aka Fresnel volume) coverage plot obtained with Fig. 3a. Shows number of wavepaths covering each pixel.

We thank our client CFE for making available this high-quality data set including the SEG-2 trace files.