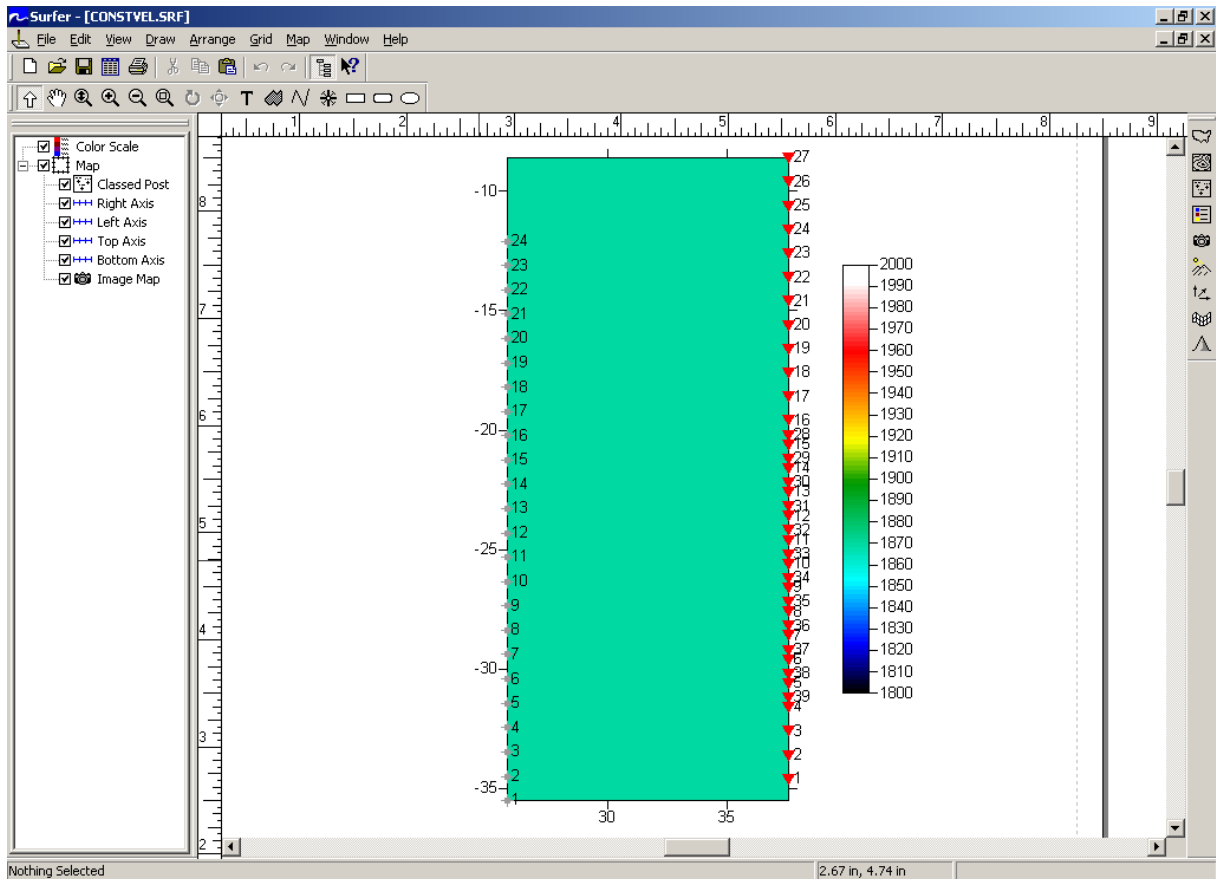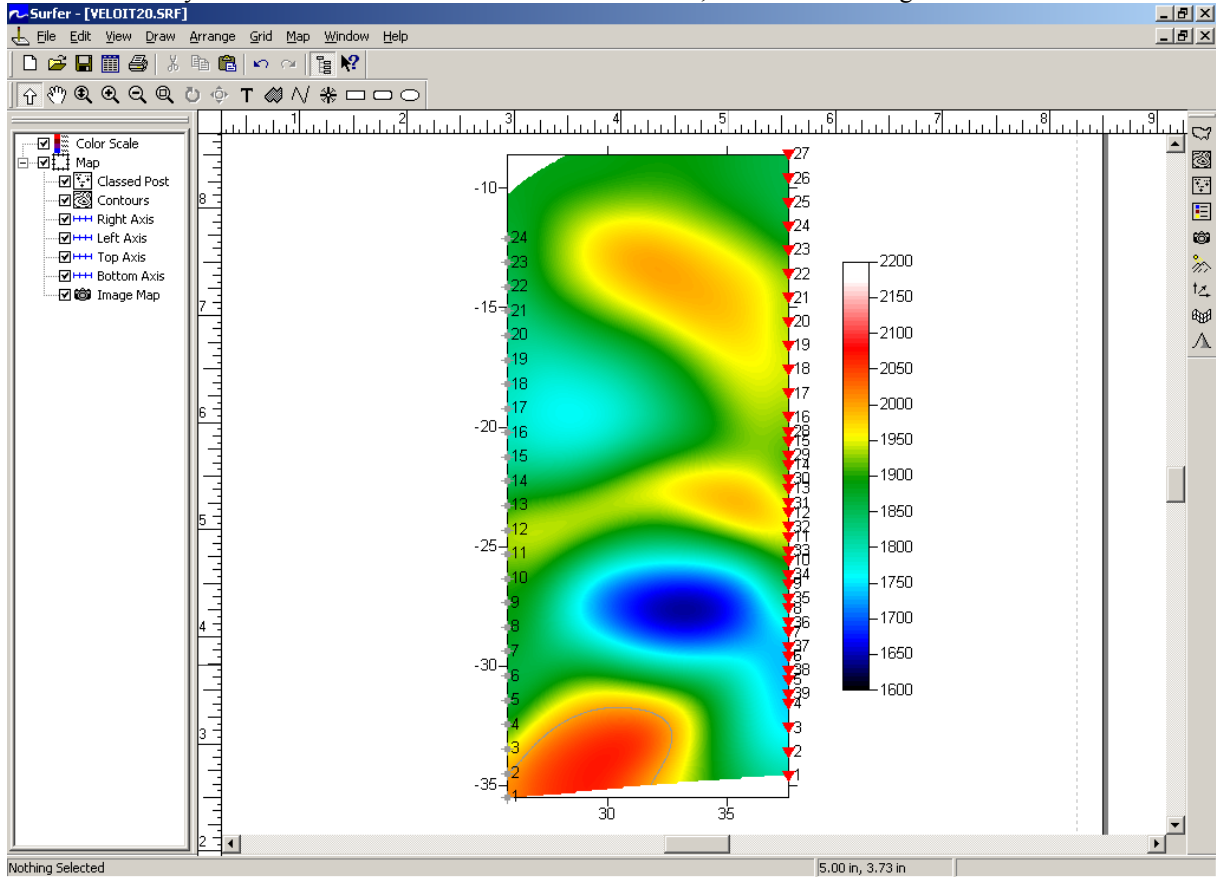Smooth inversion of IGT borehole survey IGTA13.3DD, with constant-velocity initial model


Constant-velocity initial model. Receivers 1 to 24 are in left hole, shots 1 to 39 in right hole.

Smooth inversion output after 20 WET iterations. Compare with IGT crosshole tomography example (airport).

To invert the data, please proceed as follows :

- create a new profile database named IGTA13 with a *Station spacing* of 1m in *Header|Profile*. See our manual at http://rayfract.com/help/manual.pdf , chapter 1.1 .
- specify *Line type* Borehole spread/line, in *Header|Profile*, before importing any shots.
- download the original IGT survey file from http://rayfract.com/tutorials/igta13.zip
- copy IGTA13.ZIP into \RAY32\IGTA13\INPUT and unzip to obtain IGTA13.3DD input file
- import the first breaks and geometry data as described in our manual, chapter 1.2. Specify *Import data type* Tweeton GeoTomCG .3DD . Leave *Default spread type* at 10: 360 channels. Leave all other import parameters at their default settings.
- click on *Import shots* and then *Read* to import all crosshole shots. Leave all parameters at shown values.
- review traveltimes with *Refractor|Shot breaks* as usual. See our manual, chapter 1.3.
- check Post…and Label… menu items at bottom of Grid menu, to show sources and receivers on tomogram
- select *Smooth invert|Precompute static Beydoun weight matrix* , for conservative weighting . See http://rayfract.com/help/release_notes.pdf , notes for versions 3.02 and 3.03 .
- select *Smooth invert|WET with constant velocity initial borehole model* to invert the data.
- click on *Image Map* in Surfer VELOIT20.SRF plot, and on *Colors* color bar. Set *Minimum* to 1600, *Maximum* to 2200 and click on OK twice, to use full color spectrum for encoding of velocity.
- compare WET output after 20 iterations (see above) to second IGT crosshole tomography example (Aeropuerto de Barajas) shown at http://www.igt-geofisica.com under algunos ejemplos / Tomografía sísmica Cross-Hole .
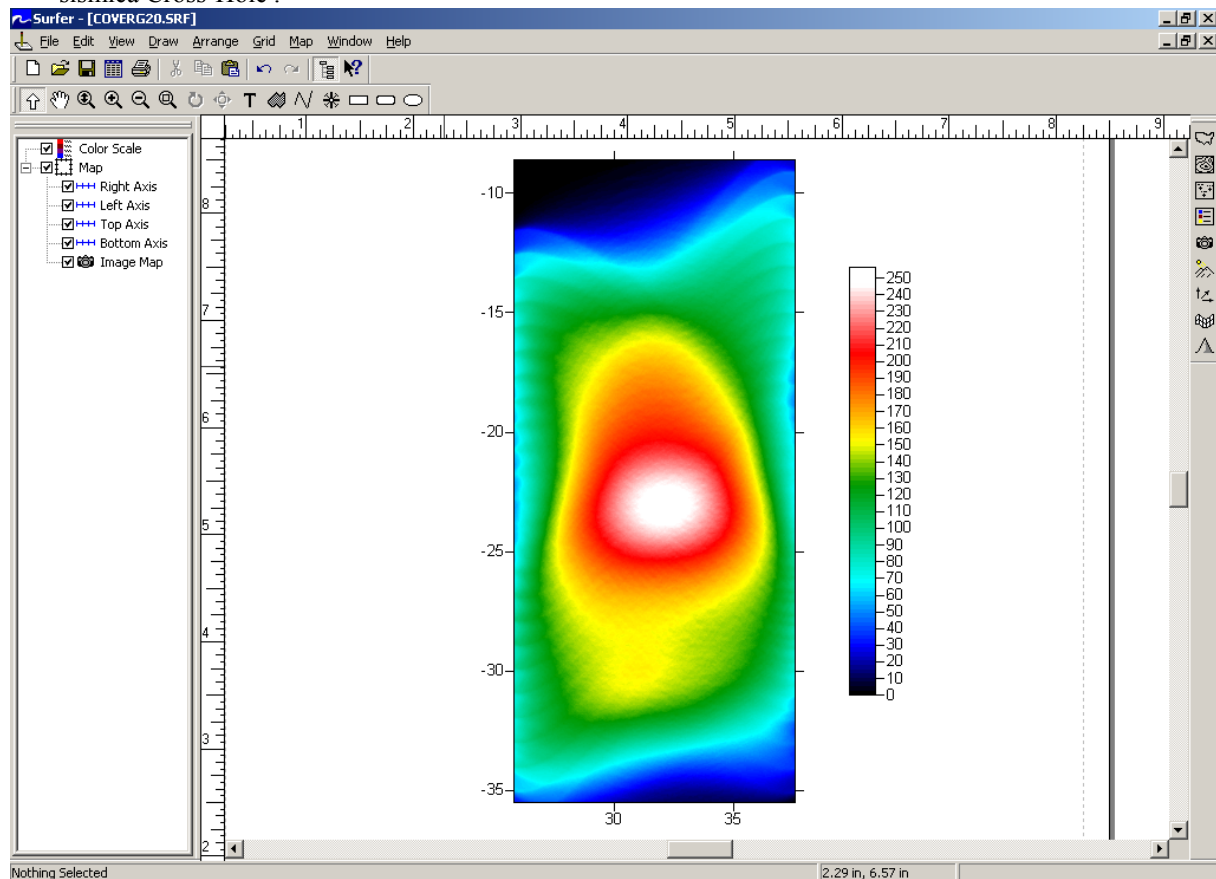
Coverage of IGTA13 grid cells with wavepaths, scaled with static Beydoun weighting .

- select *File|Export header data|Export first breaks…* to generate BREAKS.LST with picked times.
- we have built a synthetic model for IGTA13 to estimate WET lateral and vertical resolution. Download http://rayfract.com/samples/swiss.zip and unzip into \RAY32\IGTA13\INPUT .
- do *File|Update header data|Import synthetic breaks from .LST* with \RAY32\IGTA13\INPUT\SWISS.LST.
- select *Smooth invert|WET with constant velocity initial borehole model* to invert the synthetic data .
- vary WET smoothing parameters and compare output with \RAY32\IGTA13\INPUT\SWISS.SRF .
- do *File|Update header data|Update First Breaks… with BREAKS.LST* to restore the original picked times .