XtremeGeo

“Pick-Free” Delay Time Statics

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Summary of Workflow

- Branch assignment using traces
- Shot/Receiver stack picking
- Generate picks using flattened gathers
- Run delay time analysis sequence
- Geometry/Pick QC
- Re-run delay time analysis sequence
- Create model
- Create statics

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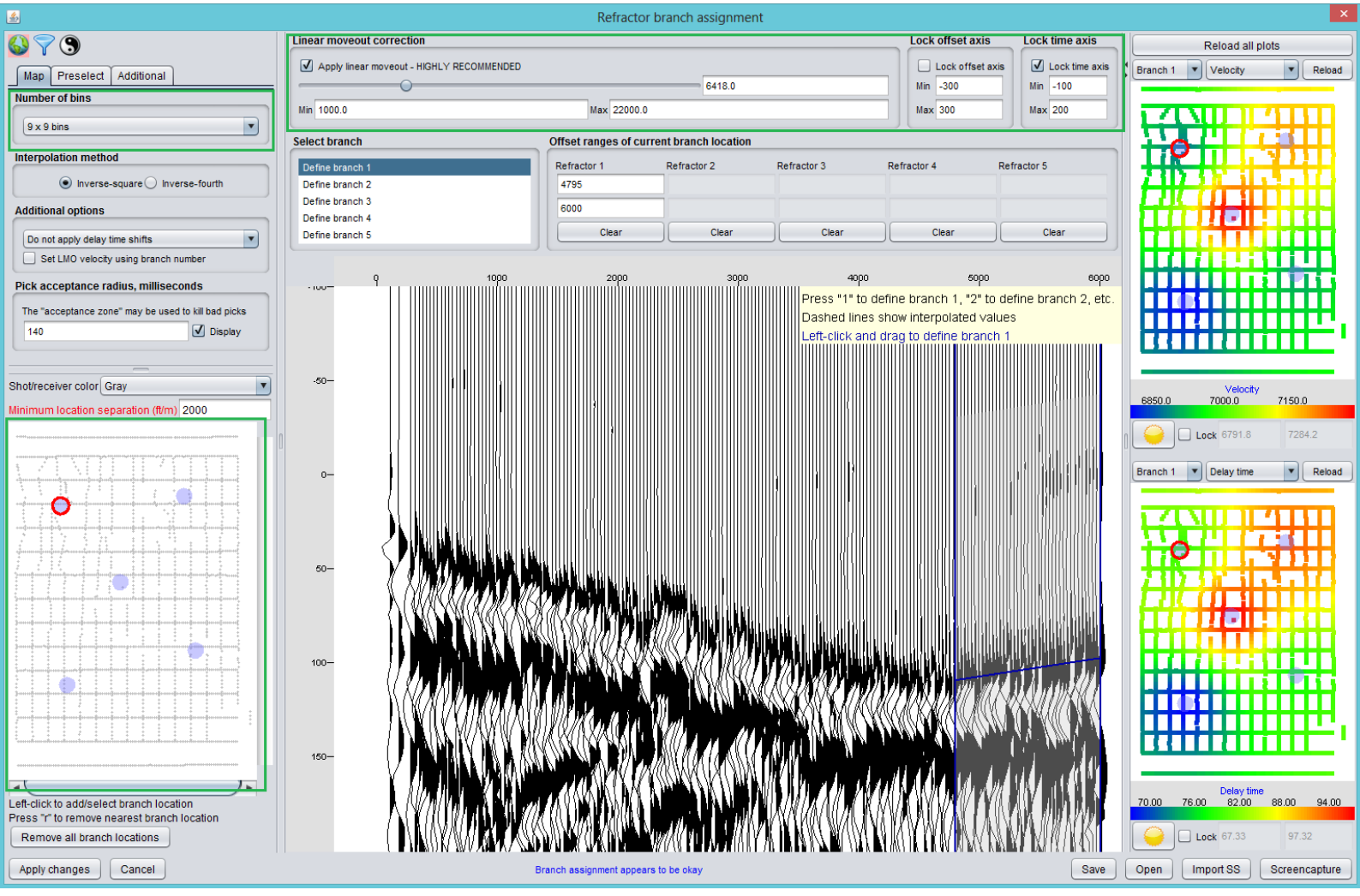
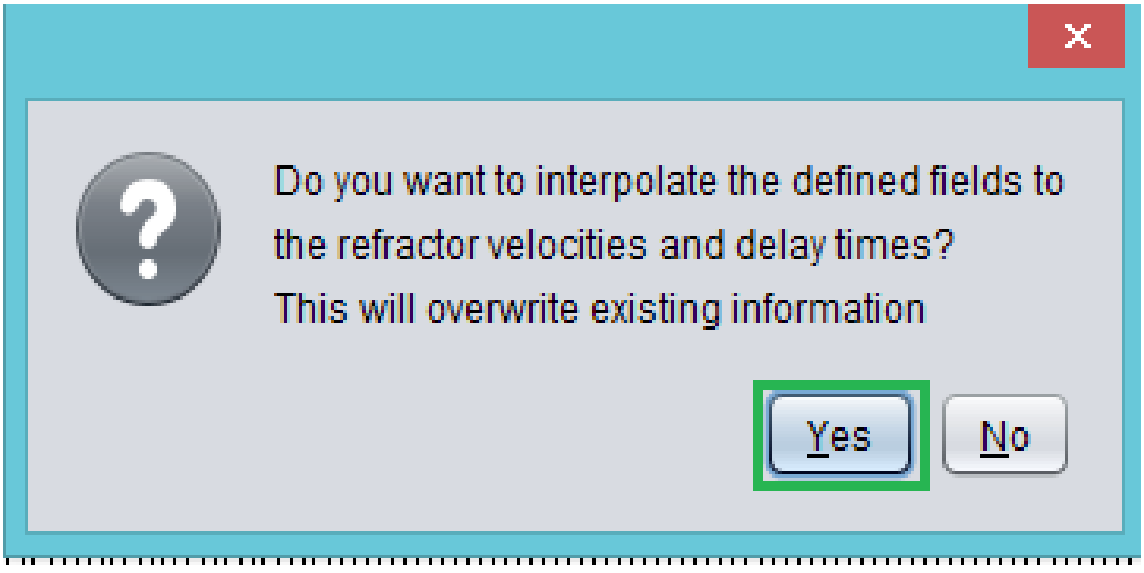
Branch Assignment

- DelayTime menu → Branch assignment using traces
- Set linear moveout, time window
- Track the refractor(s) across the survey (multiple locations)



Branch Assignment

- Click “Apply changes”
- Dialog will pop up asking if you should interpolate
- Click “Yes”



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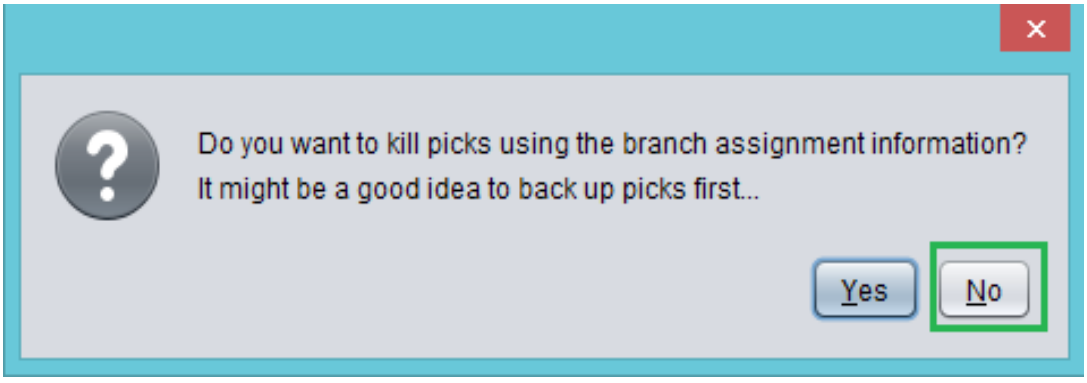
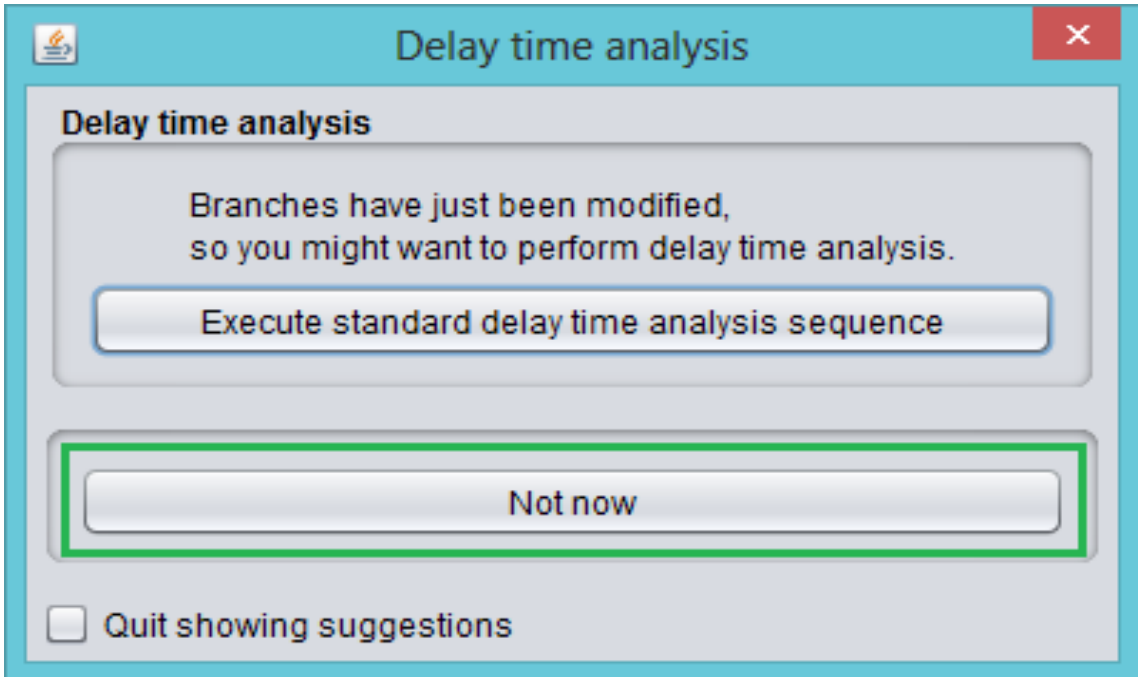
Branch Assignment

- Program will then ask to kill picks, click “No” since you have no picks
- Program will ask to run Standard Analysis Sequence, click “Not now”, since you have no picks





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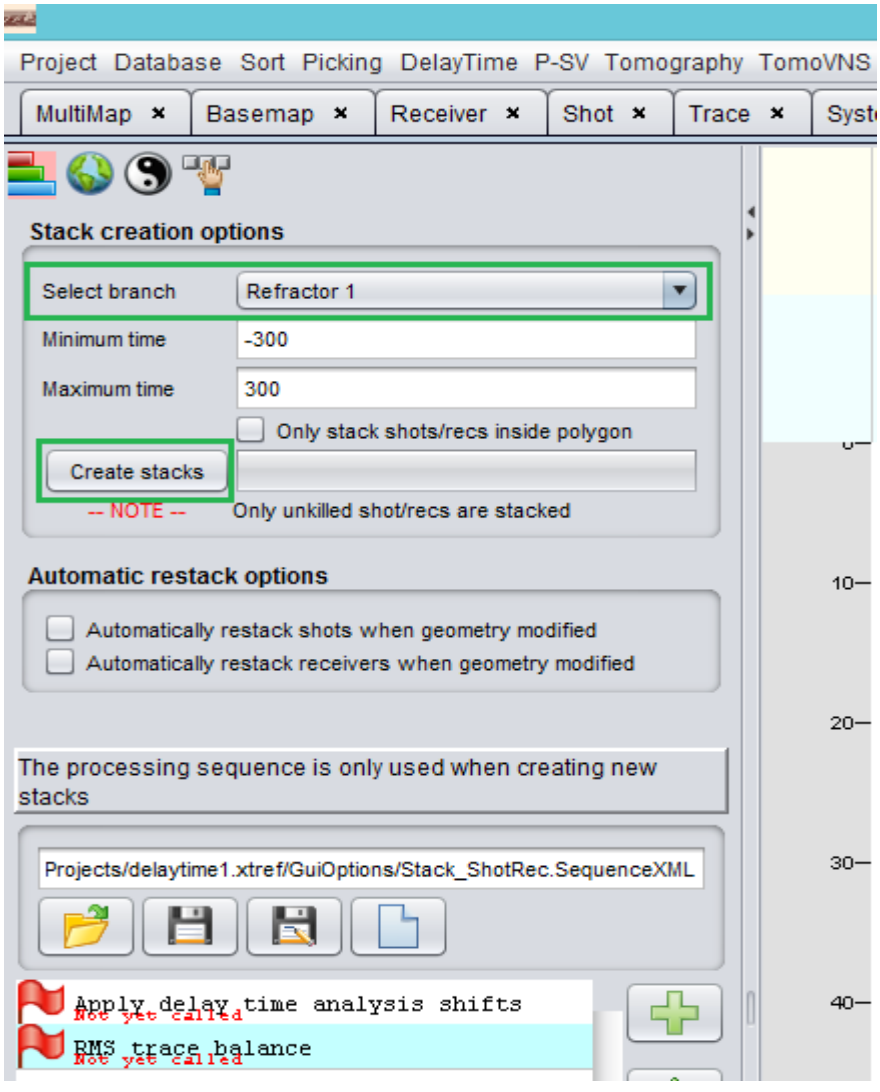
Shot/Receiver Stack Picker

- DelayTime menu → Shot/Receiver stack picker
- Select the refractor to work on, then click “Create stacks” - we'll work through one refractor at a time, but you'll need to do them all



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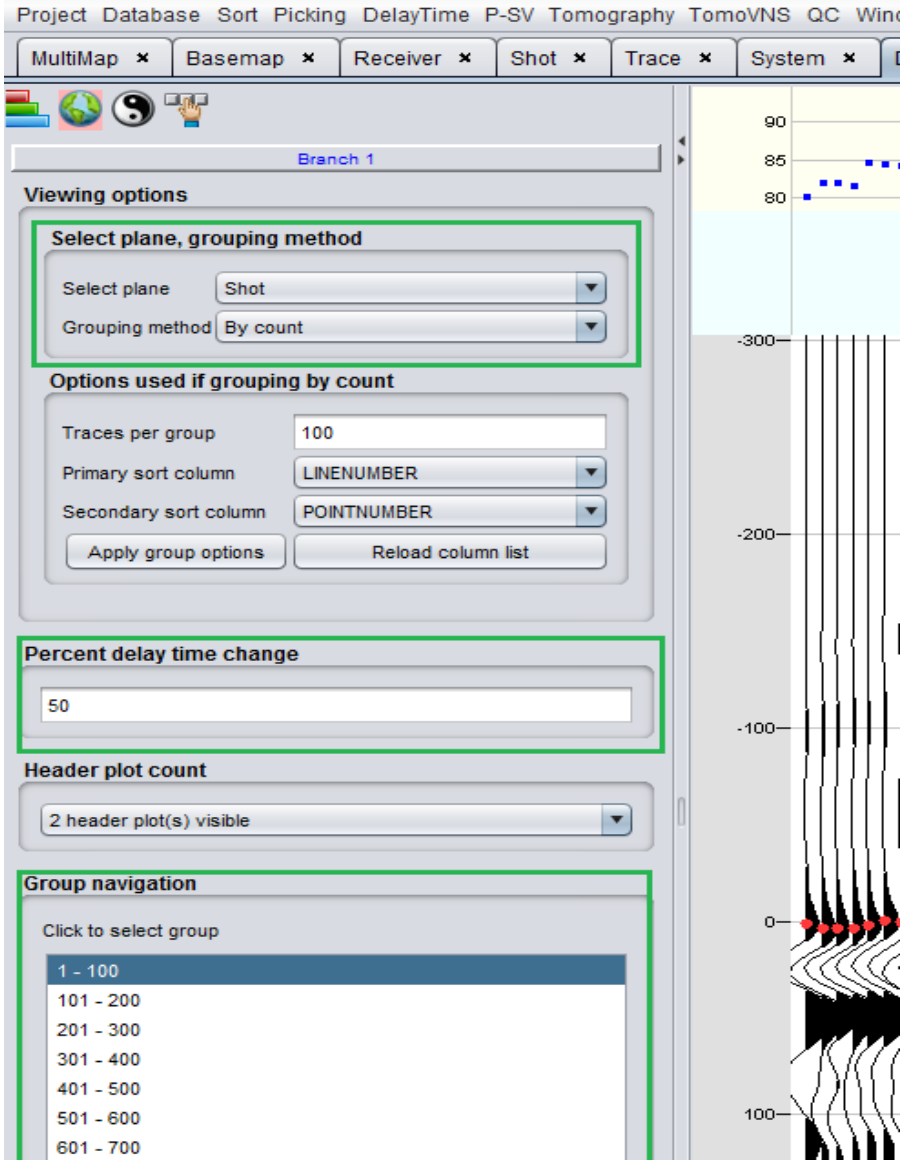
Shot/Receiver Stack Picker

- Shots should be sorted by count
- Leave “Percent delay time change” at 50
- Group navigation shows the current shot range being displayed



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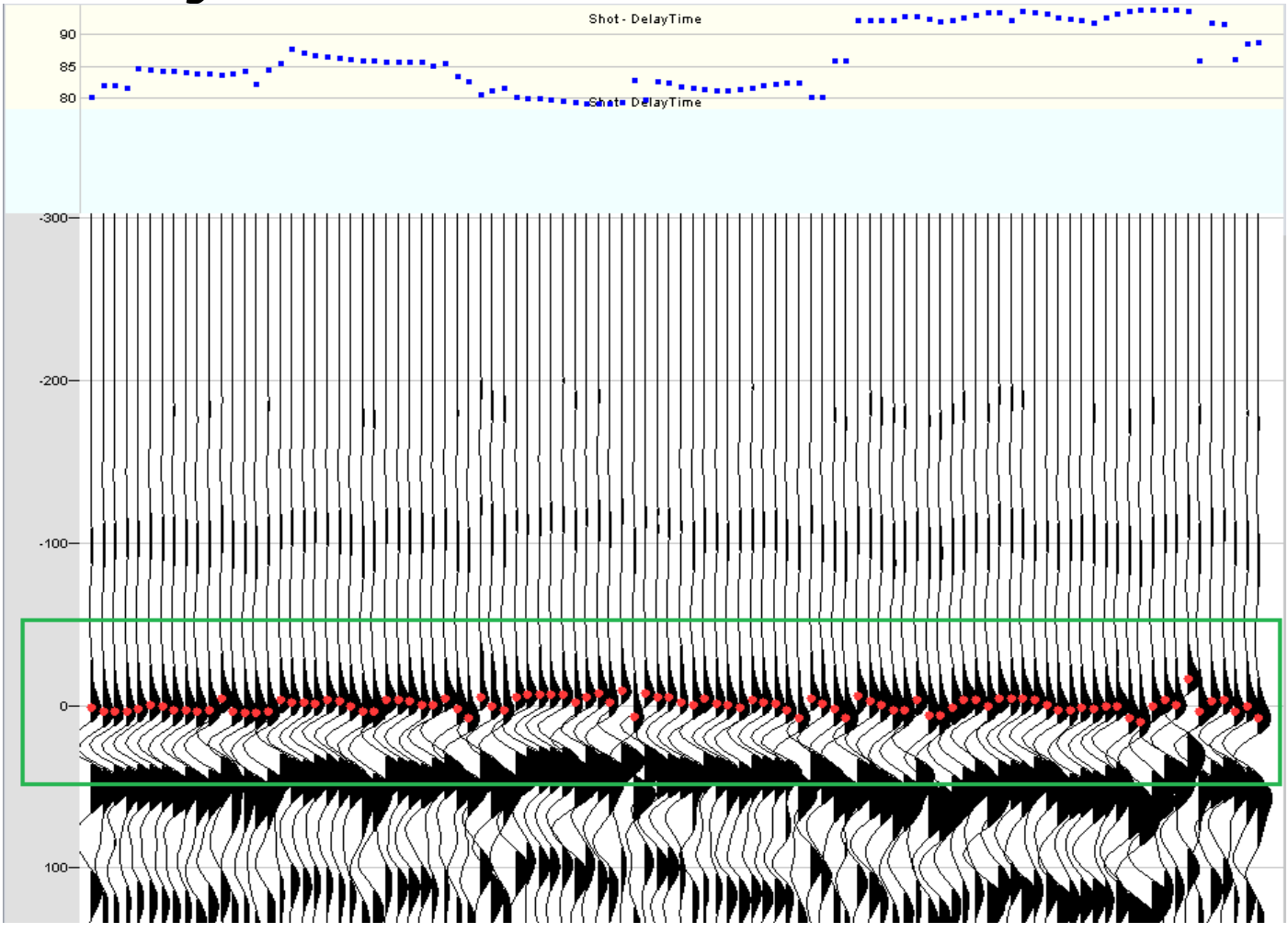
Shot/Receiver Stack Picker

- Each one of these “traces” is a stack representing an entire shot/receiver, made of all the corresponding traces in that branch
- ***You are not picking first breaks; you are picking changes to the delay time for that shot/receiver***



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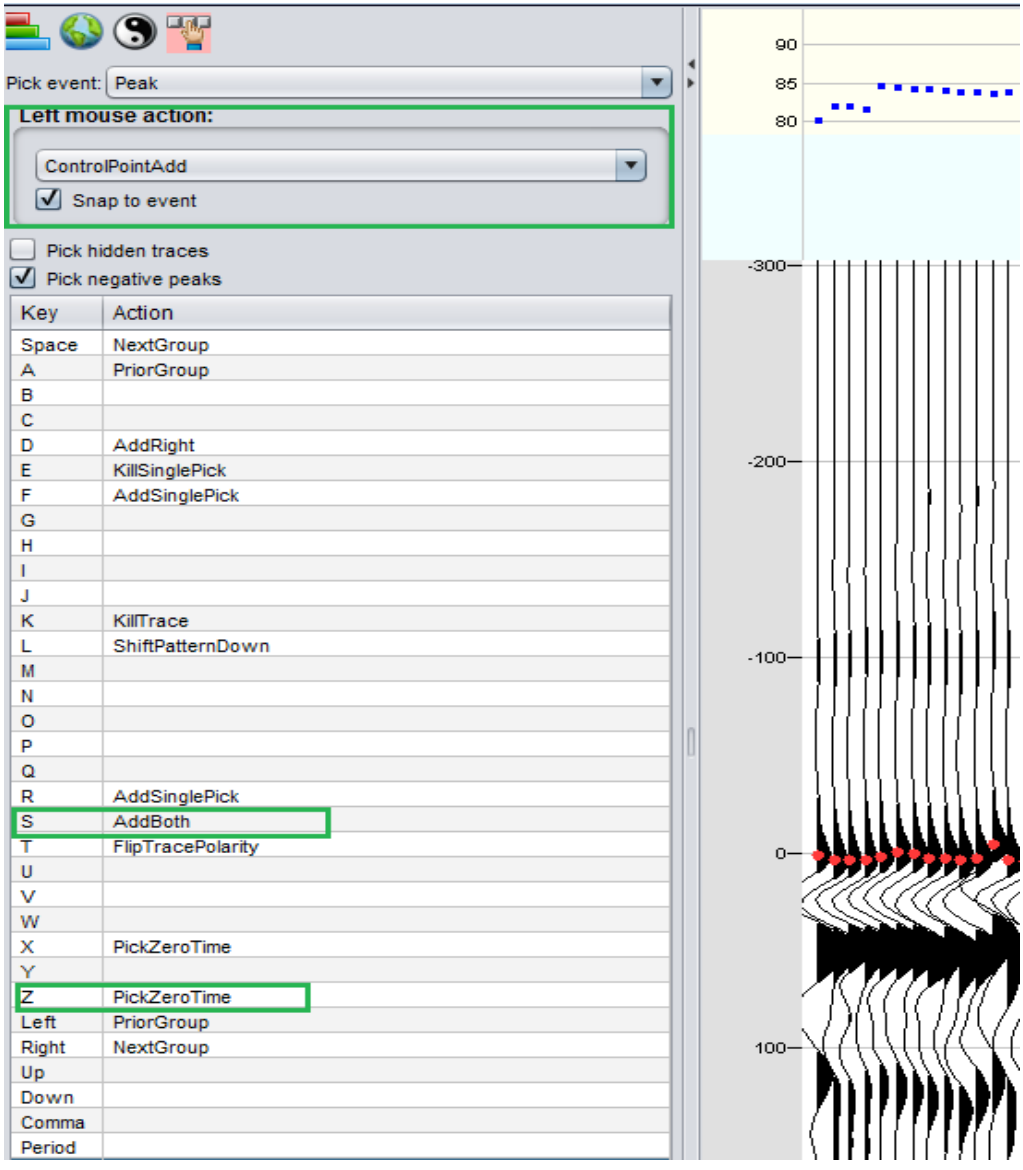
Shot/Receiver Stack Picker

- Some useful hotkeys: PickZeroTime (snaps to event closest to zero time), and AddBoth (combination of AddLeft and AddRight)



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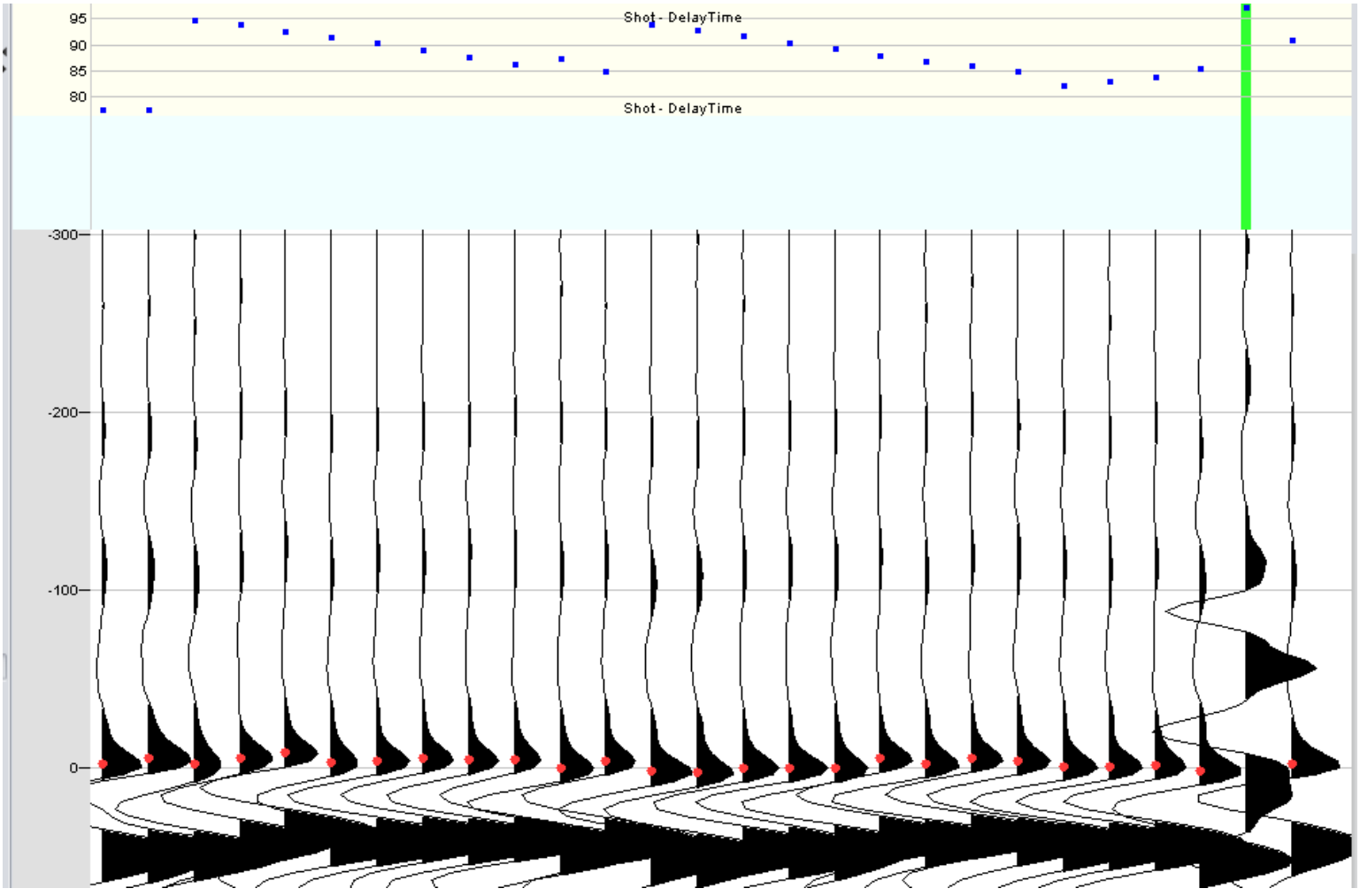
Shot/Receiver Stack Picker

- While in the Stack Picker, you can select a shot/receiver in the normal Picker Window by mousing over the shot/receiver stack and hitting the “Esc” key. A green bar will highlight over the shot/receiver in the Stack Picker.



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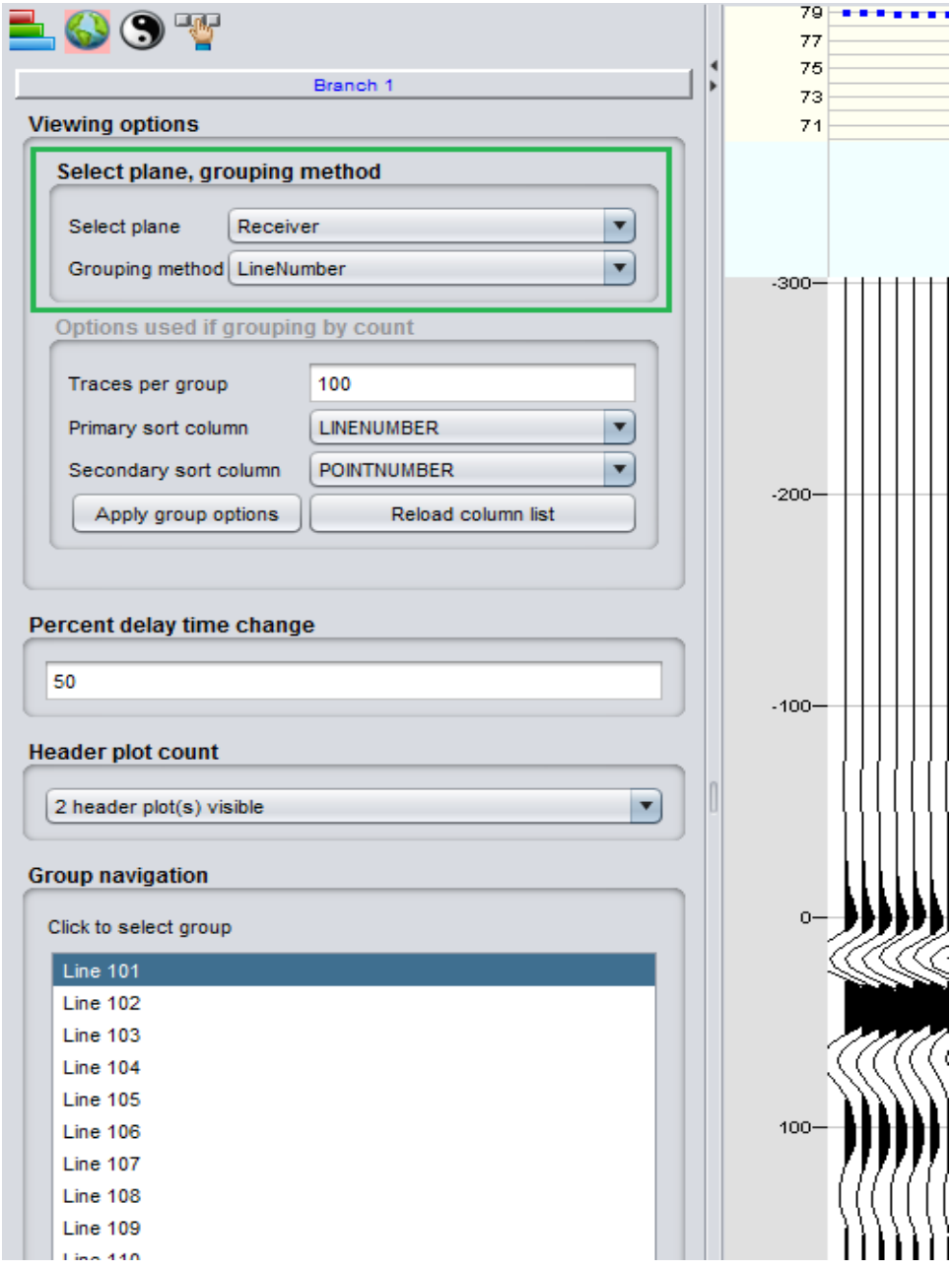
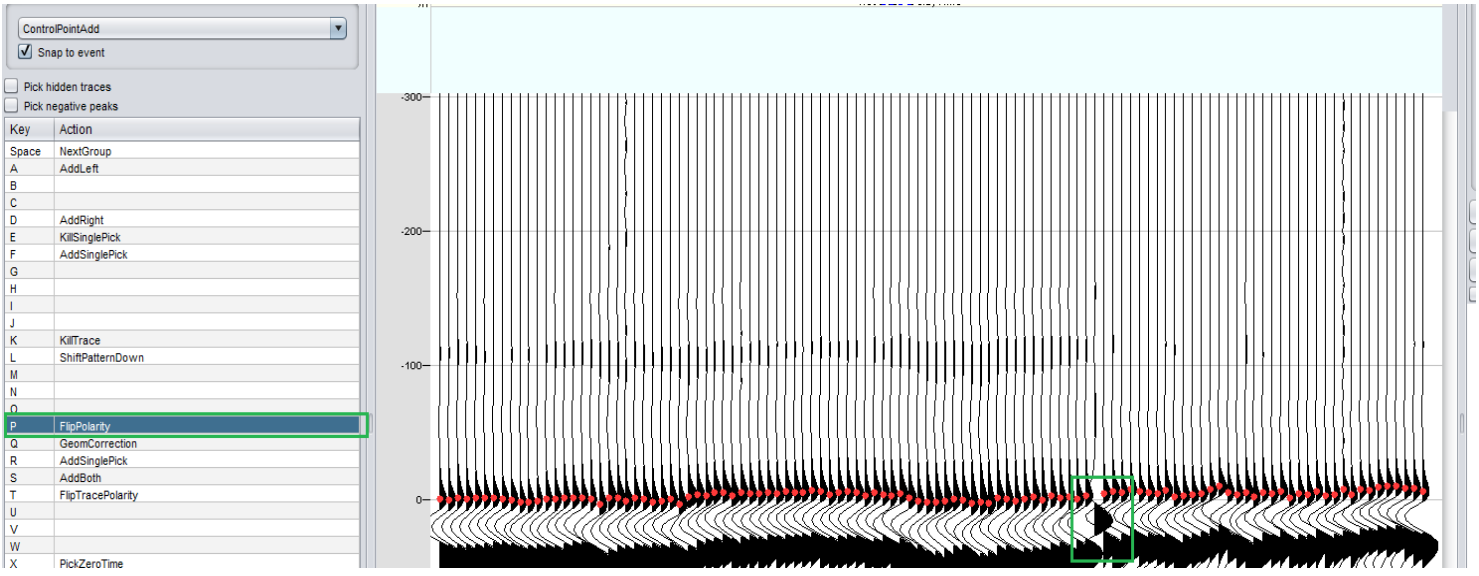
Shot/Receiver Stack Picker

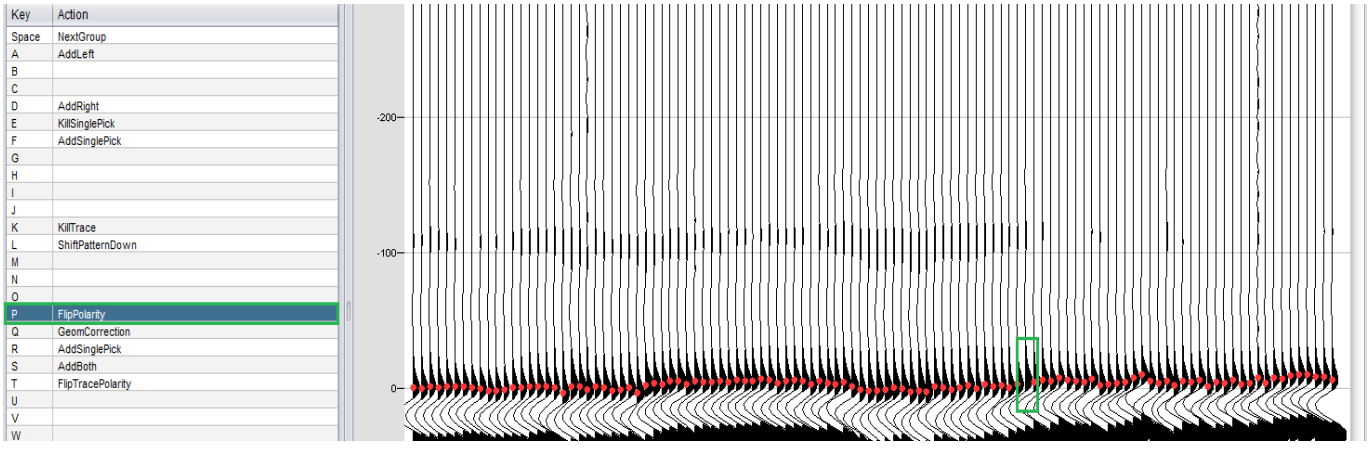
- Pick through all the shots. Then, switch to receivers...
- These should typically be sorted by "Line Number" rather than "Count"



Shot/Receiver Stack Picker

- You can flip the polarity of a receiver by setting a hotkey and mousing over the corresponding receiver stack:





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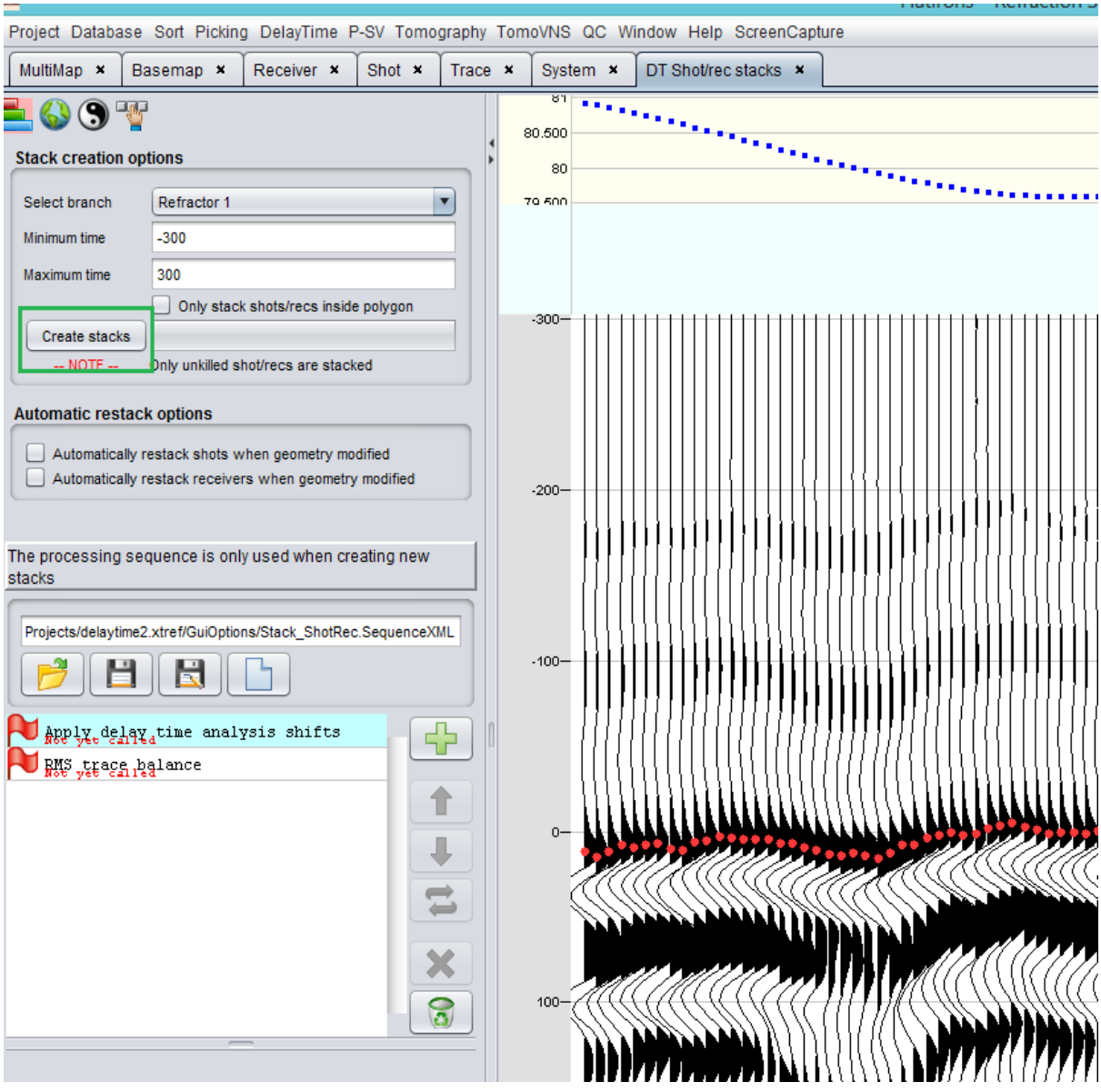
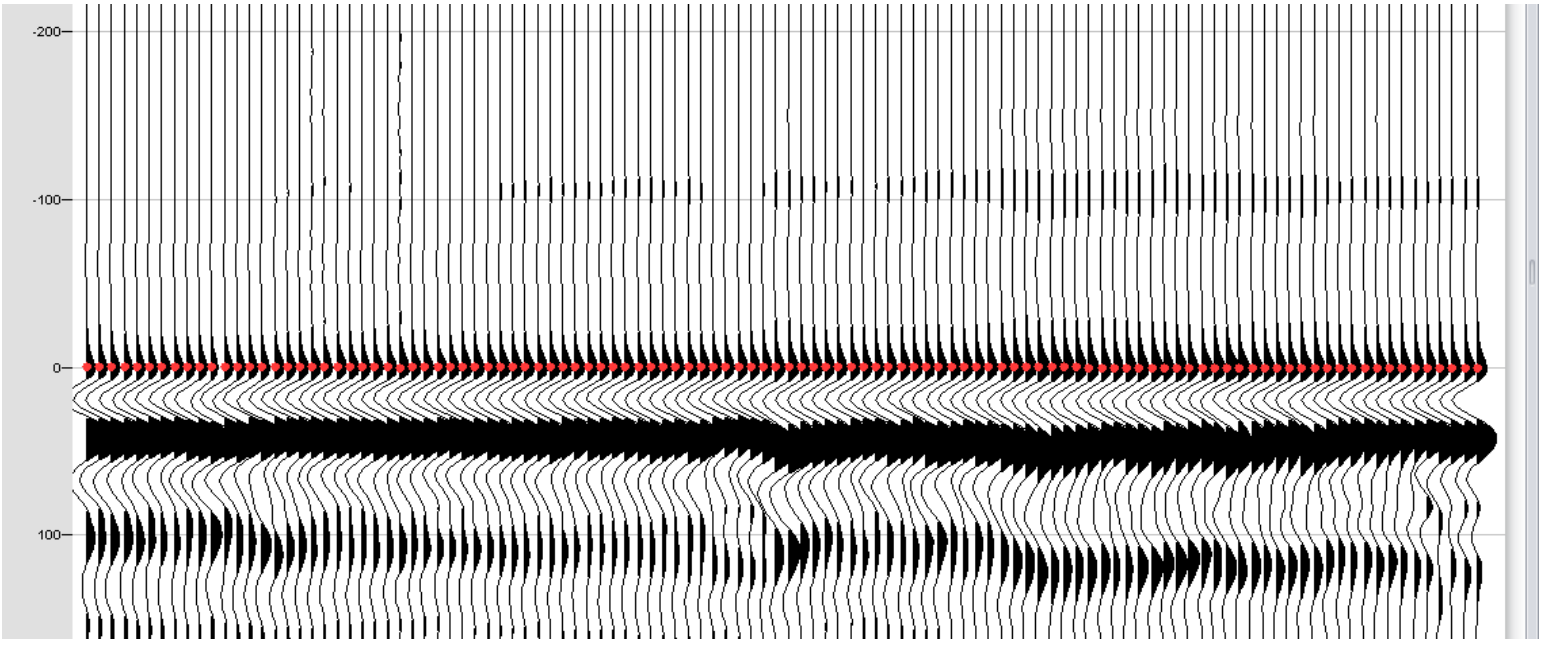
Shot/Receiver Stack Picker

- Once you have picked all Shots and Receivers, go back and click “Create stacks” again
- Go through and pick Shots and Receivers again



Shot/Receiver Stack Picker

- Go through this 3-4 times – pick all Shots and Receivers, then re-stack
- You want the picks to line up as close to zero as possible



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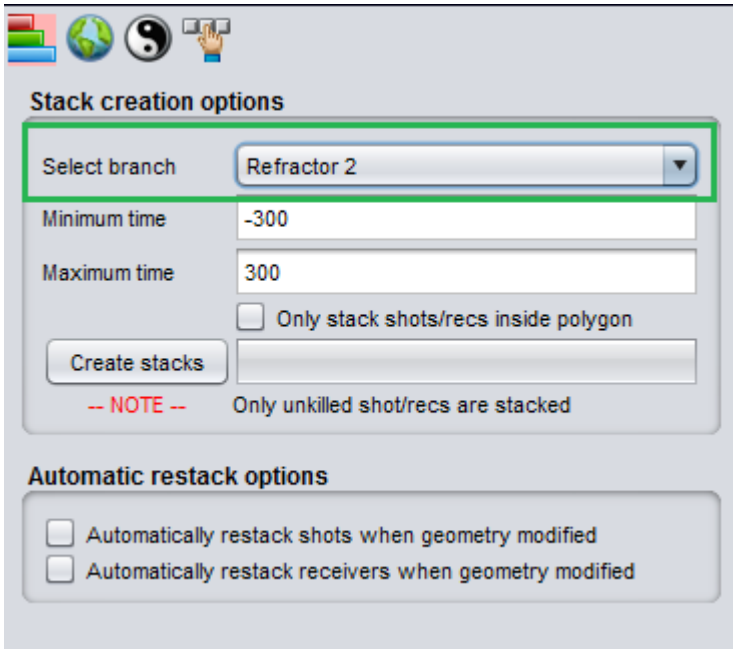
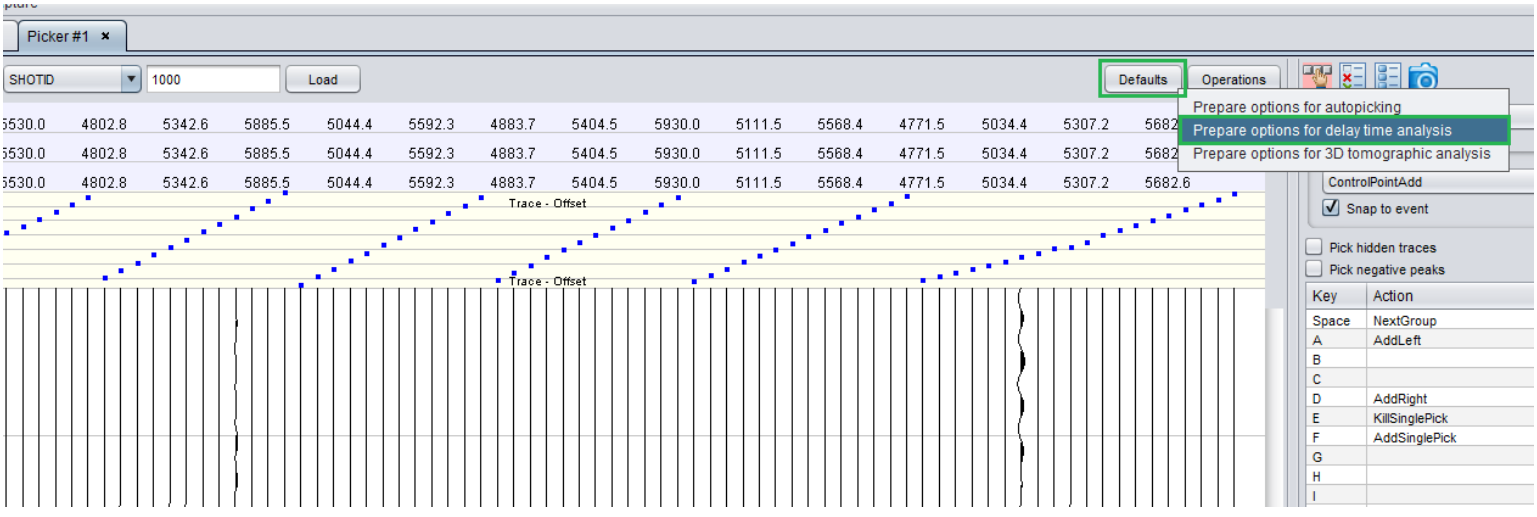
Shot/Receiver Stack Picker

- If you have more than one Refractor, repeat this enitre process for each one...



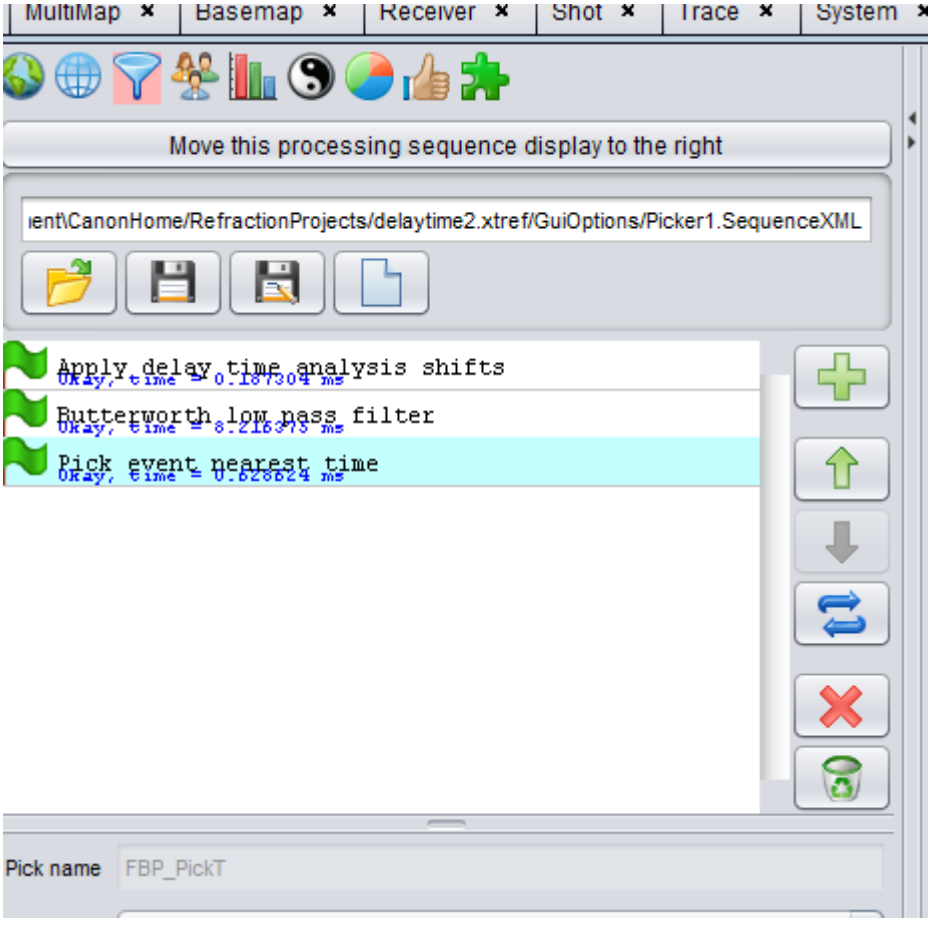
Generate Picks

- Open the Picker Window – Picking menu → New picker window (shot/receiver/bin plane)
- Click Defaults → Prepare options for Delay Time Analysis



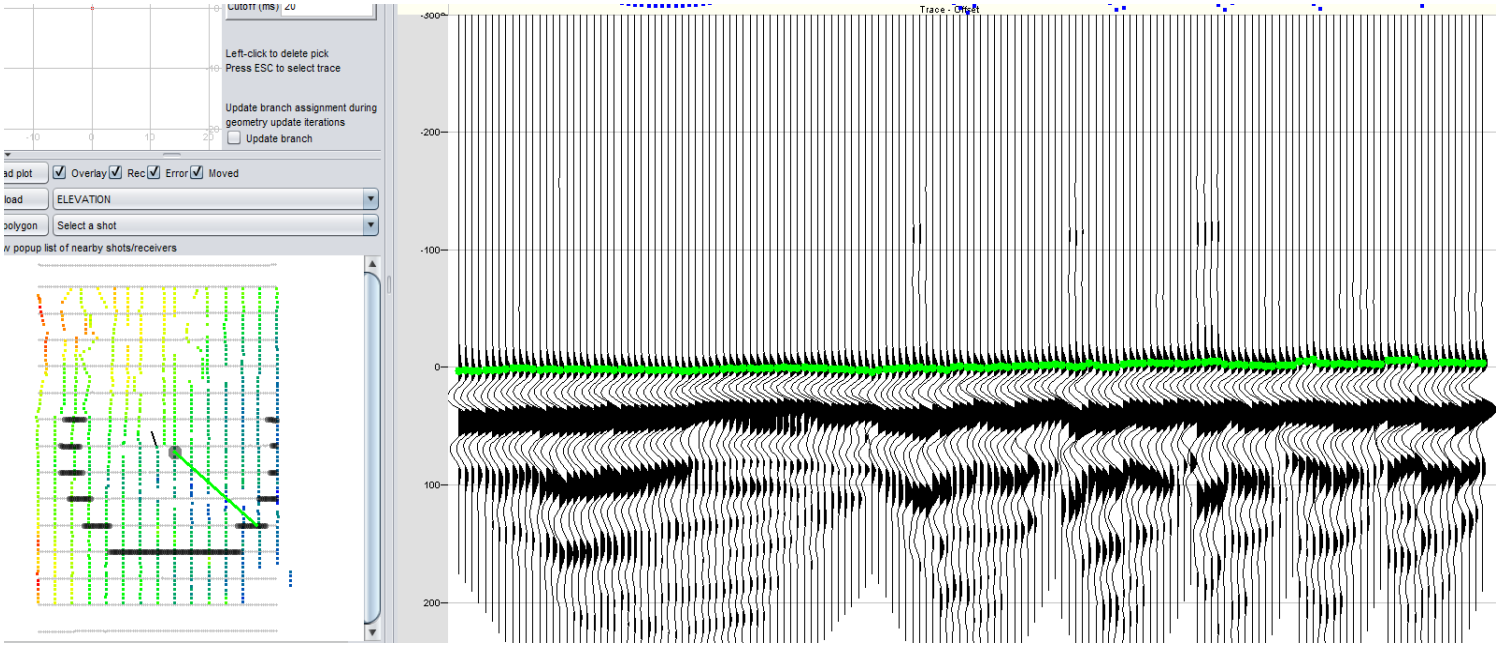
Generate Picks

- This sets up a processing flow, as well as some display setttings



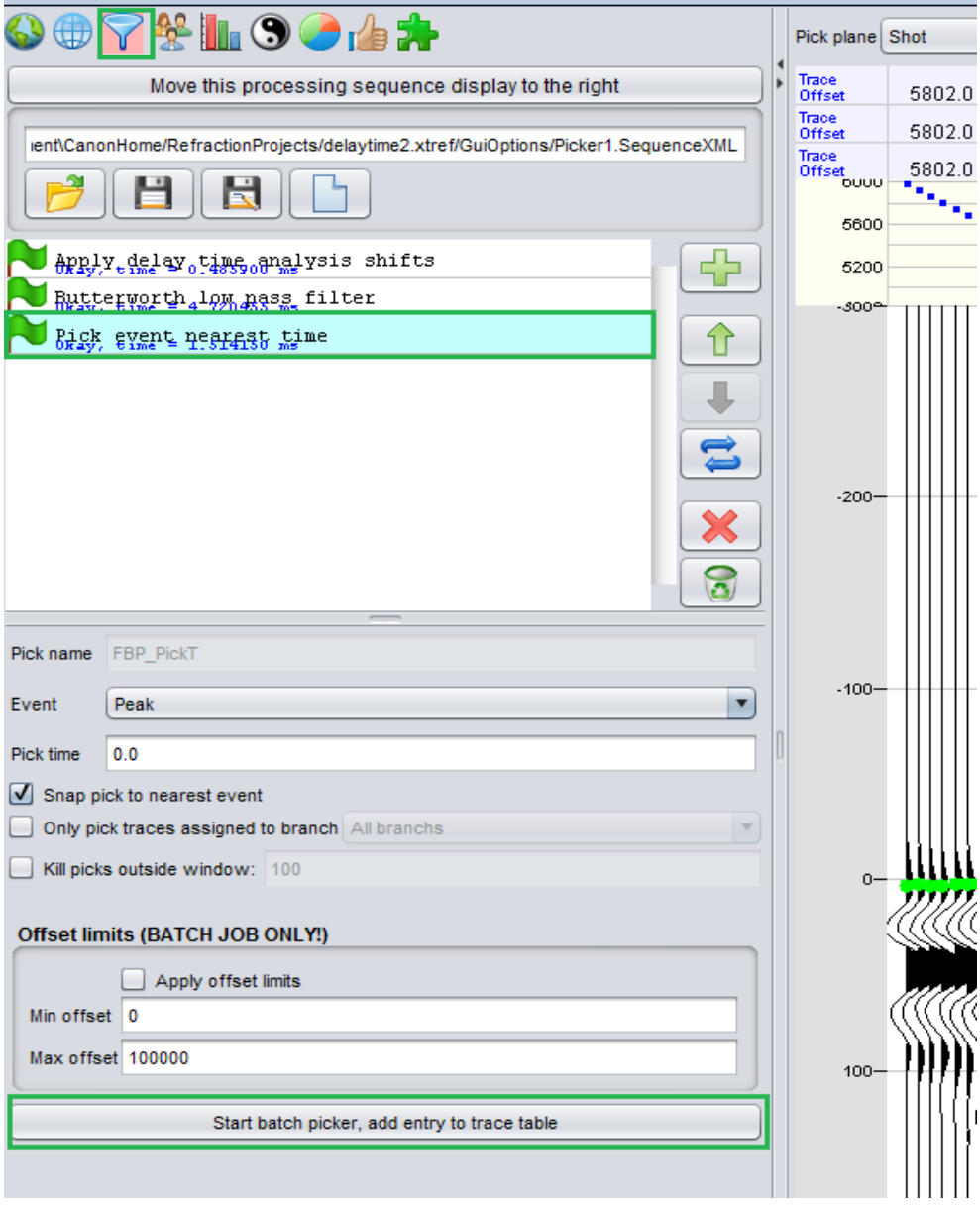
Generate Picks

- Click around the survey and make sure the predicted picks look OK



Generate Picks

- When ready to pick, go back to the processing flow (funnel icon), select the picker object, then click “Start batch picker” - ignore polygon limit dialog



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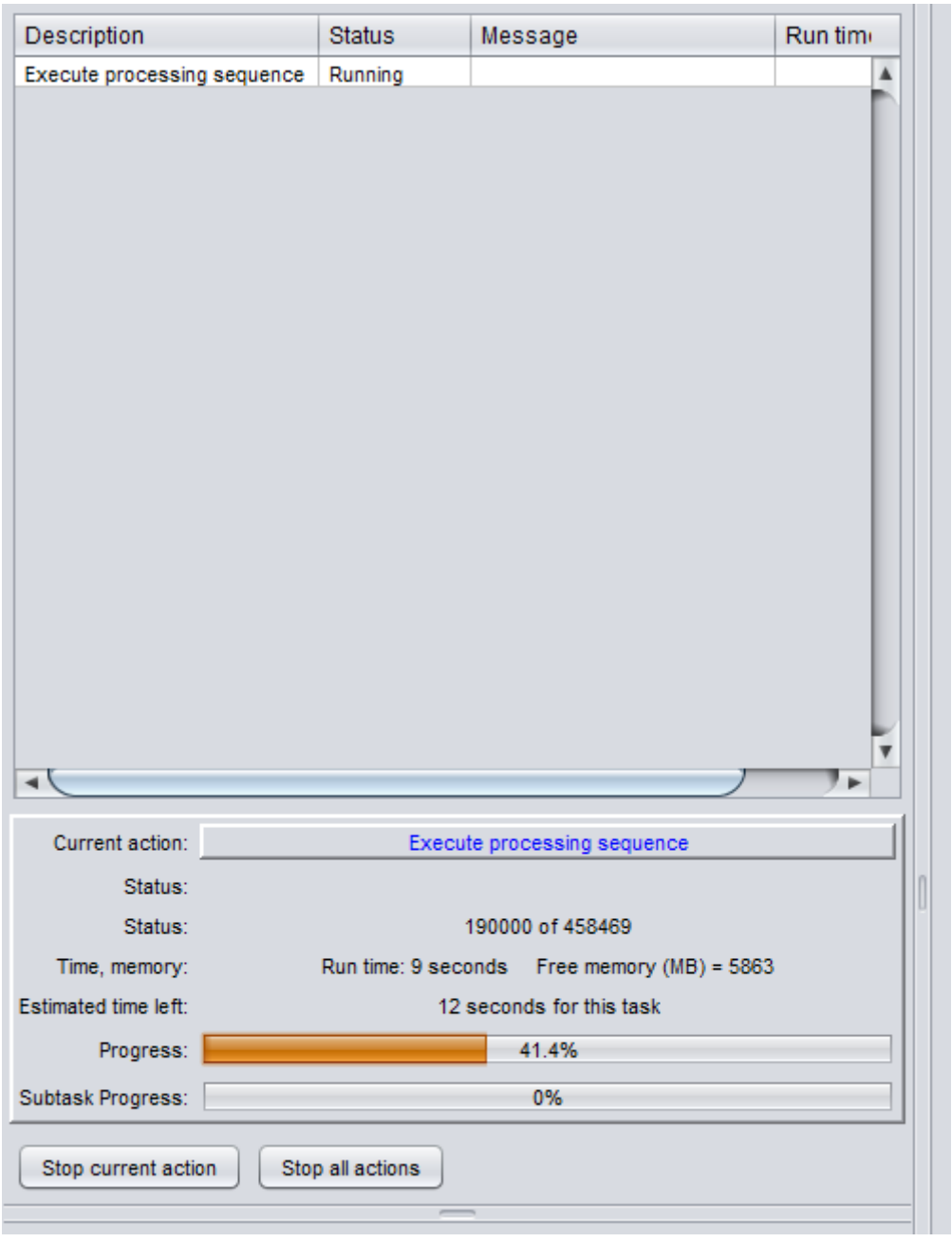
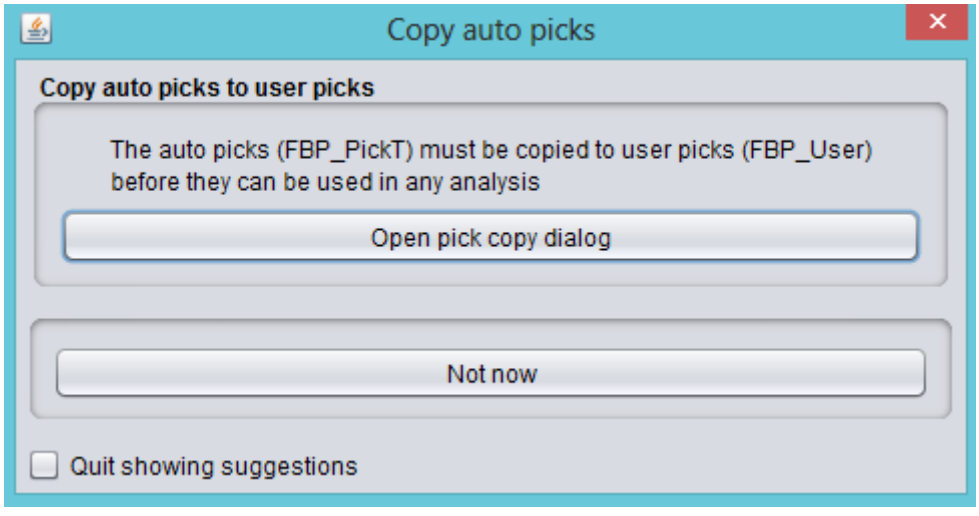
Generate Picks

- Autopicker will run and generate picks...



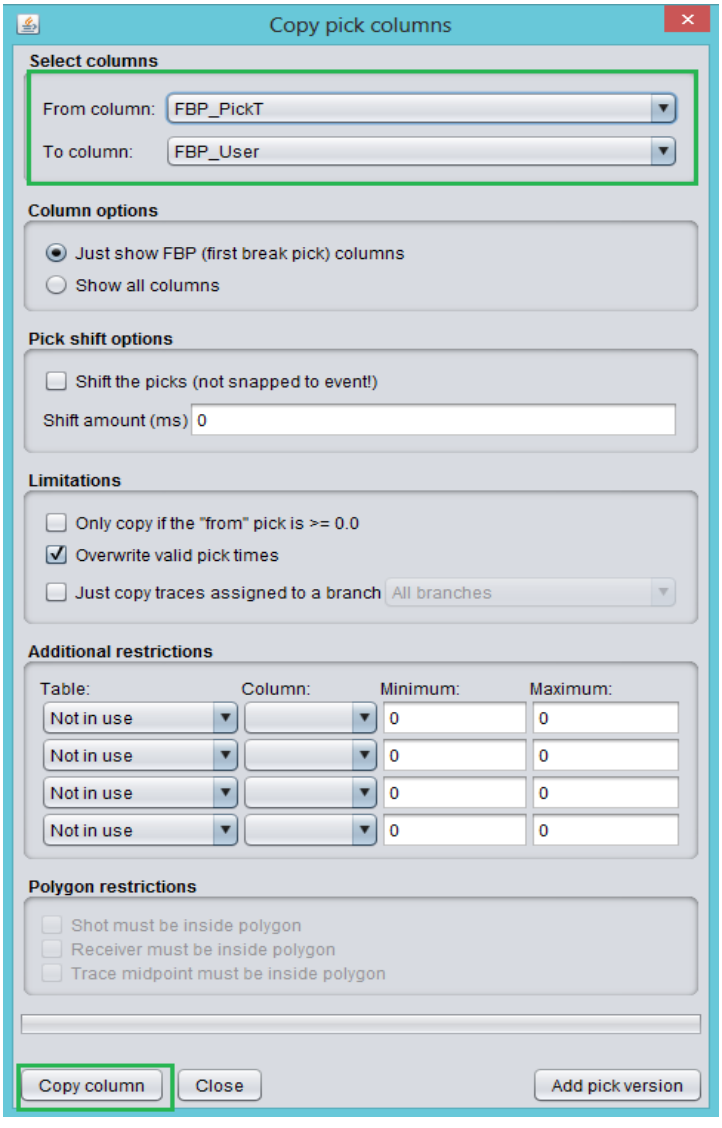
Pick Copy

- Dialog will pop up asking to copy picks
- The picks generated by the autopicker are saved in the FBP_PickT column
- They must be copied to FBP_User column in order to be used in analysis



Pick Copy

- Check the columns (they should be set already)
- Click “Copy column”
- Picks will copy very quickly, see progress bar at bottom
- Click “Close” when done



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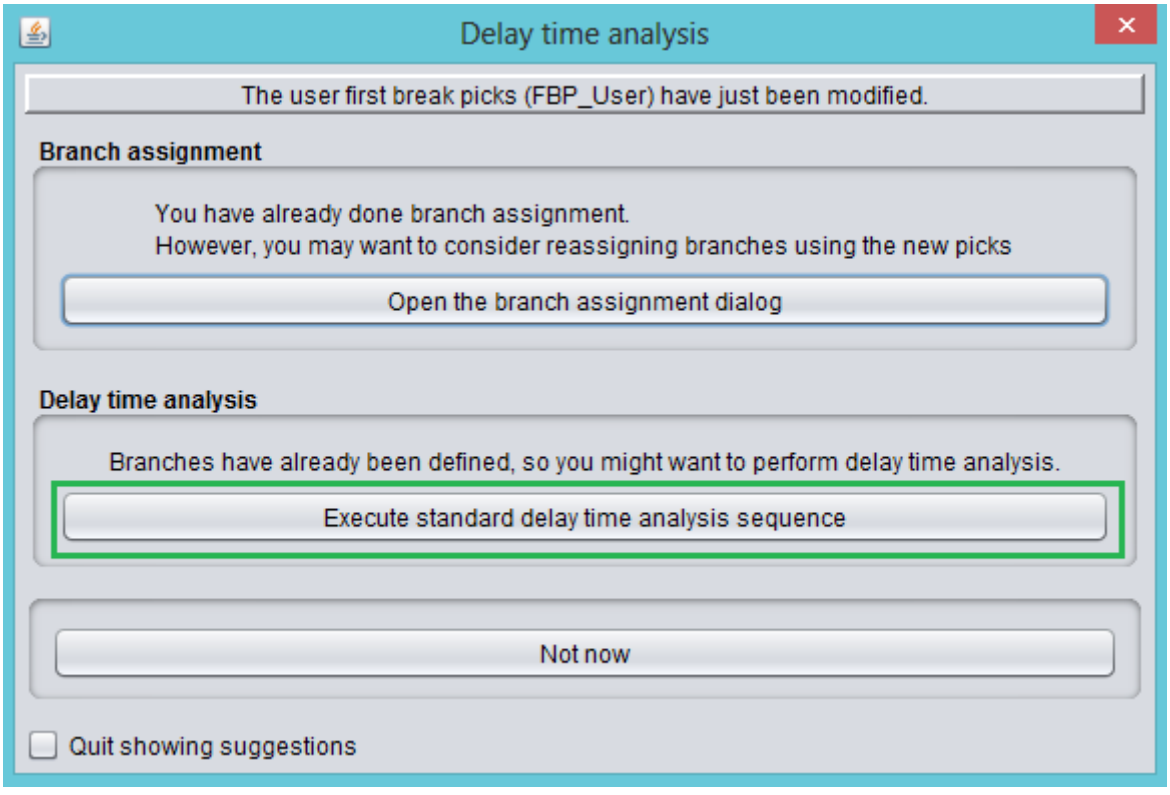
Delay Time Analysis

- Dialog will pop up suggesting Standard Delay Time Analysis sequence
- You may check your Branch Assignment and refine it based on picks (optional)



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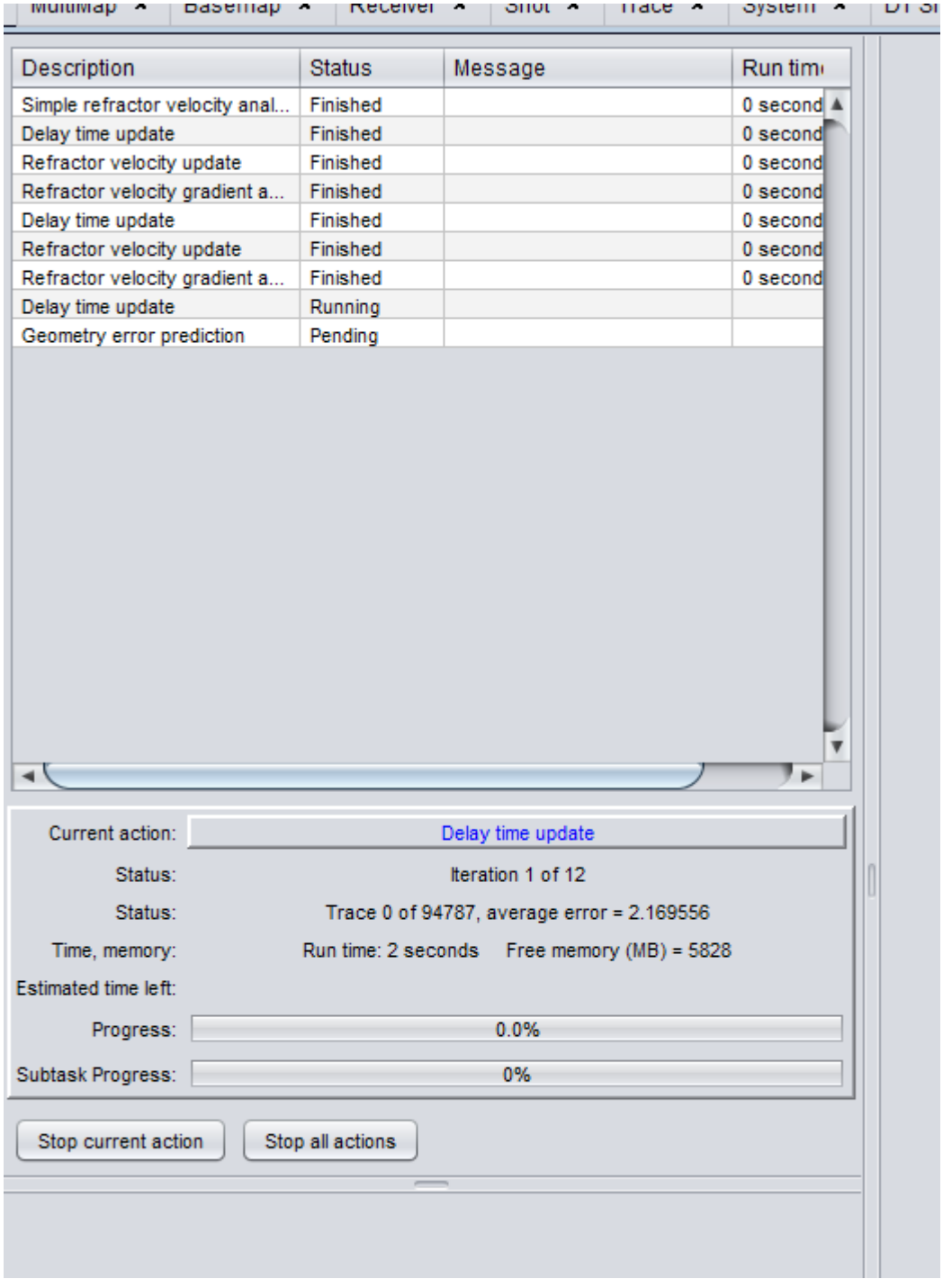
Delay Time Analysis

- Standard Delay Time Analysis sequence will run...



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Delay Time/Pick/Geom QC

- Open Picker Window, click “Ensemble navigation” icon (second from left)
- Change the primary navigation order to “DTA_Error_1” - this is the Delay Time error term for Refractor 1
- Check the “Descend” box
- Click “Apply options”
- Shots are now ordered by highest error

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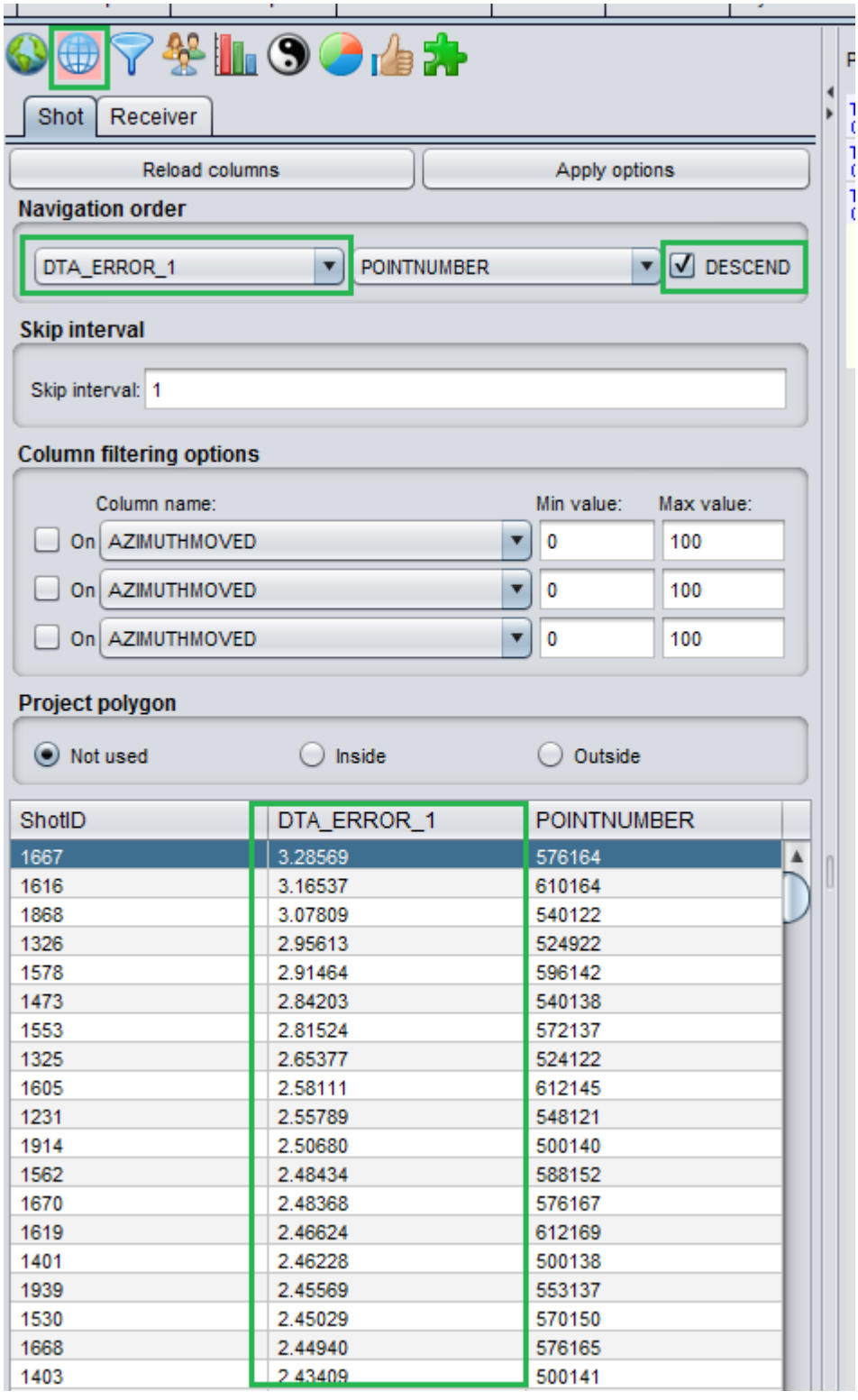
Delay Time/Pick/Geom QC



ShotID	DTA_ERROR_1	POINTNUMBER
1667	3.28569	576164
1616	3.16537	610164
1868	3.07809	540122
1326	2.95613	524922
1578	2.91464	596142
1473	2.84203	540138
1553	2.81524	572137
1325	2.65377	524122
1605	2.58111	612145
1231	2.55789	548121
1914	2.50680	500140
1562	2.48434	588152
1670	2.48368	576167
1619	2.46624	612169
1401	2.46228	500138
1939	2.45569	553137
1530	2.45029	570150
1668	2.44940	576165
1403	2.43409	500141

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Delay Time/Pick/Geom QC

- Fix any bad picks you see
- Generally, we want error term to be less than 5 if possible
- You might catch some geometry errors here, if so...

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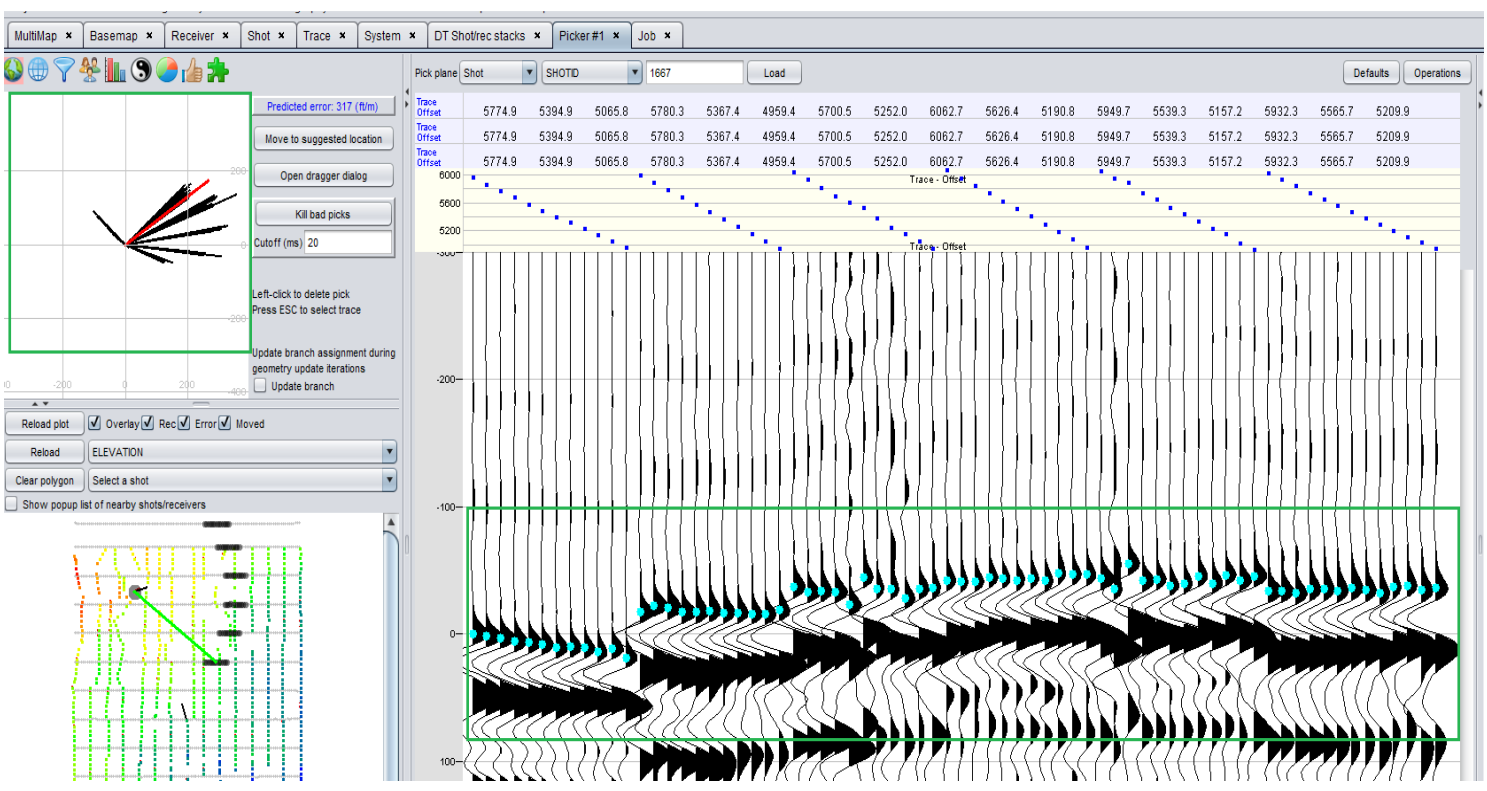
Delay Time/Pick/Geom QC

- The spider plot in the left hand corner shows suggested move vectors
- In the case shown below, the shot is picked well – but picks are not lined up and it's clear from spider plot that we should move it



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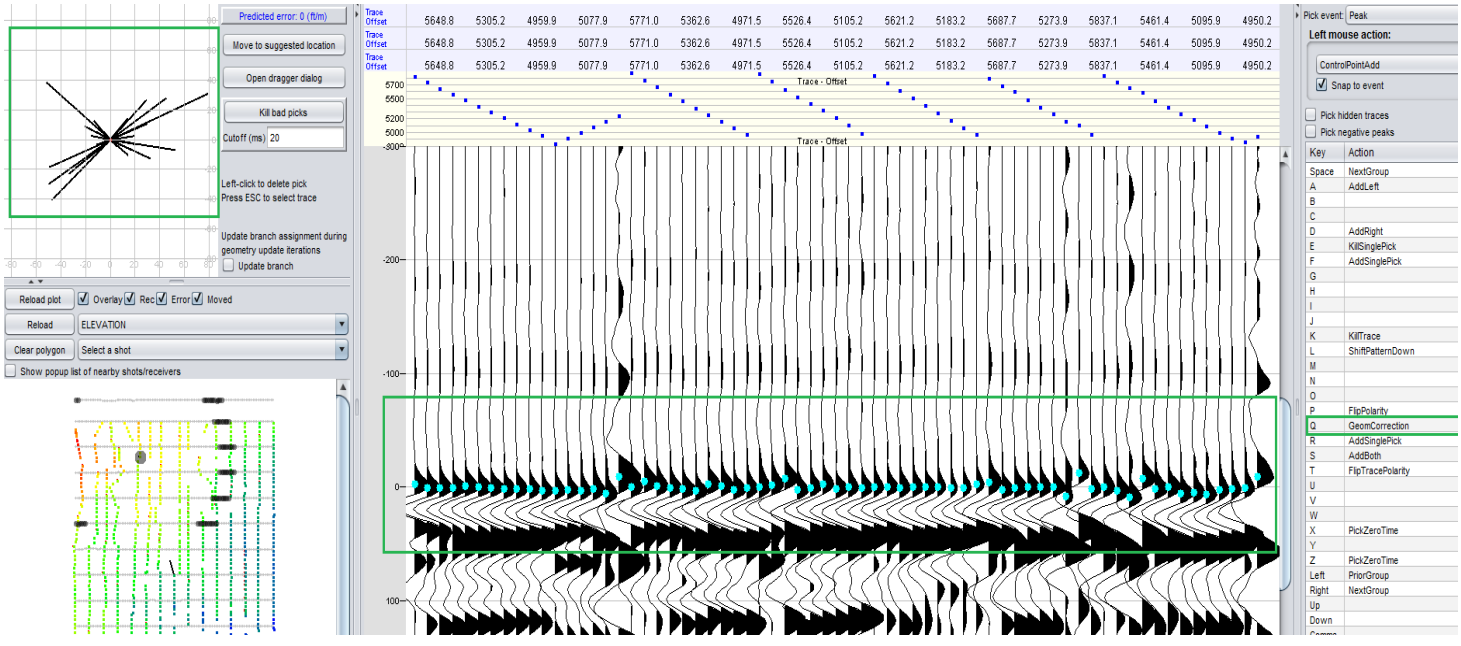
Delay Time/Pick/Geom QC

- Set a hotkey for “GeomCorrection” - we use “Q”
- Mouse over trace display, then hit the hotkey – program will move shot
- You may have to do it several times, while fixing picks in between



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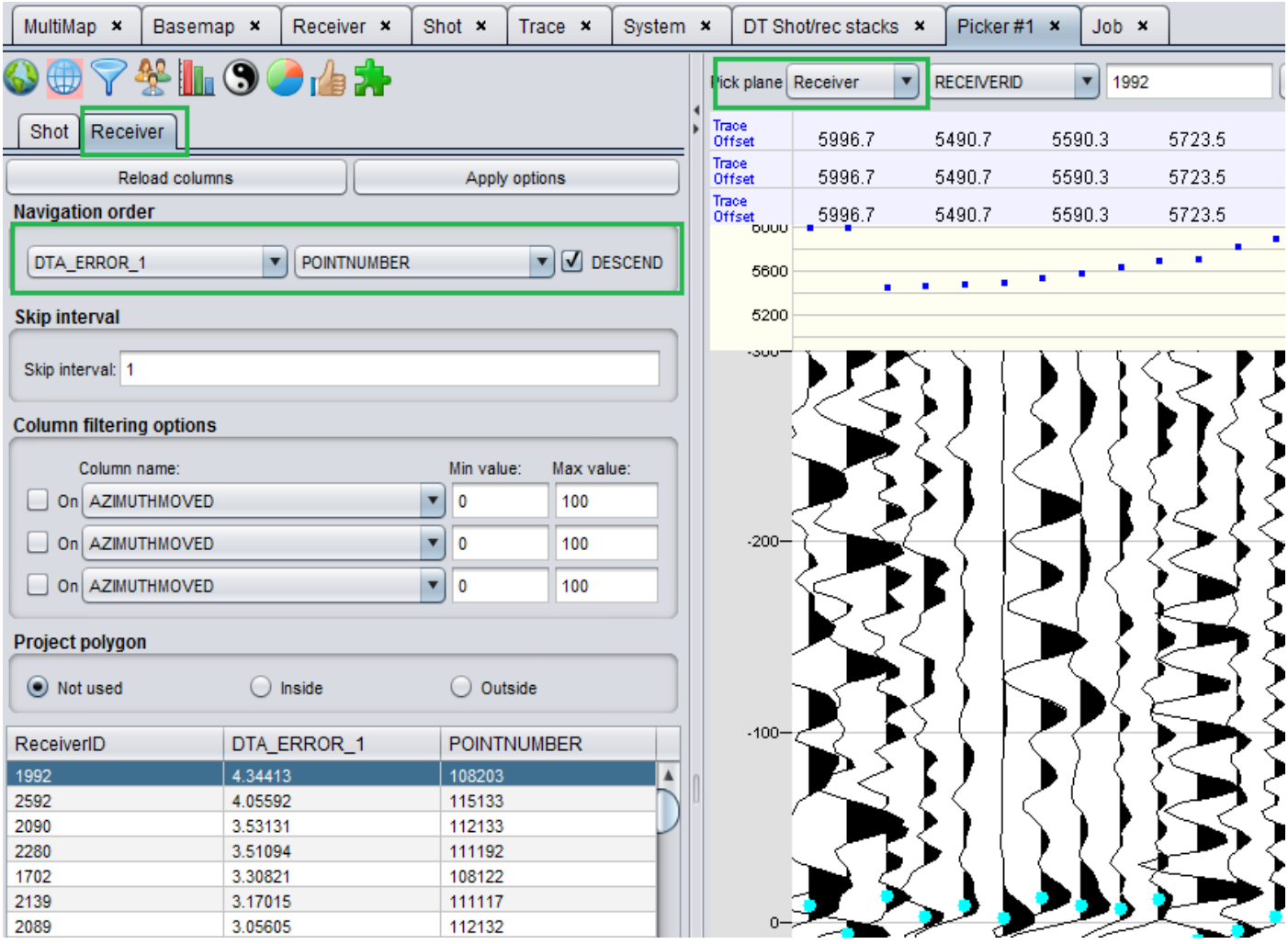
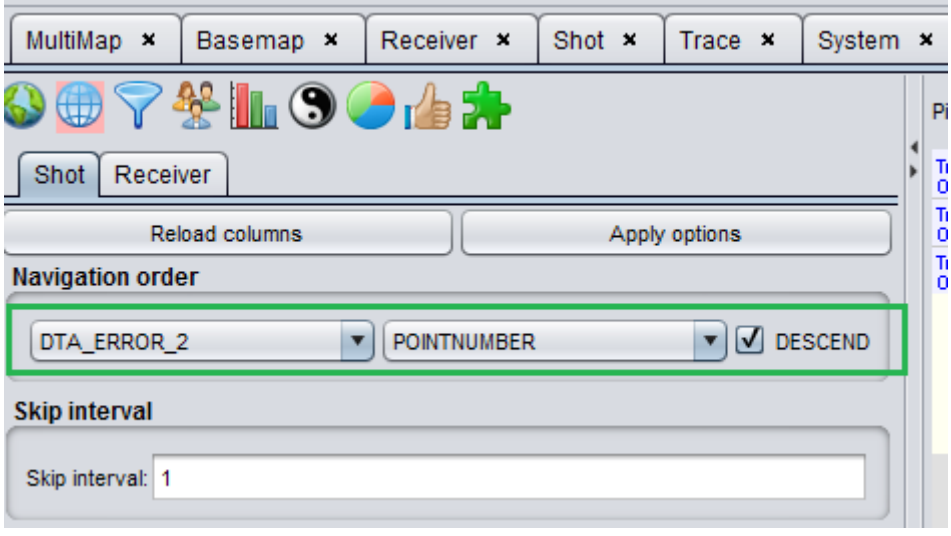
Delay Time/Pick/Geom QC

- When done QC'ing Shots, switch to Receivers, and repeat
- Set navigation order, etc.
- In order to display Receiver gathers, you need to switch to “Receiver” plane in the trace display:



Delay Time/Pick/Geom QC

- If you have more than one Refractor, repeat everything with the rest of your Refractors – use “DTA_Error_2”, etc.



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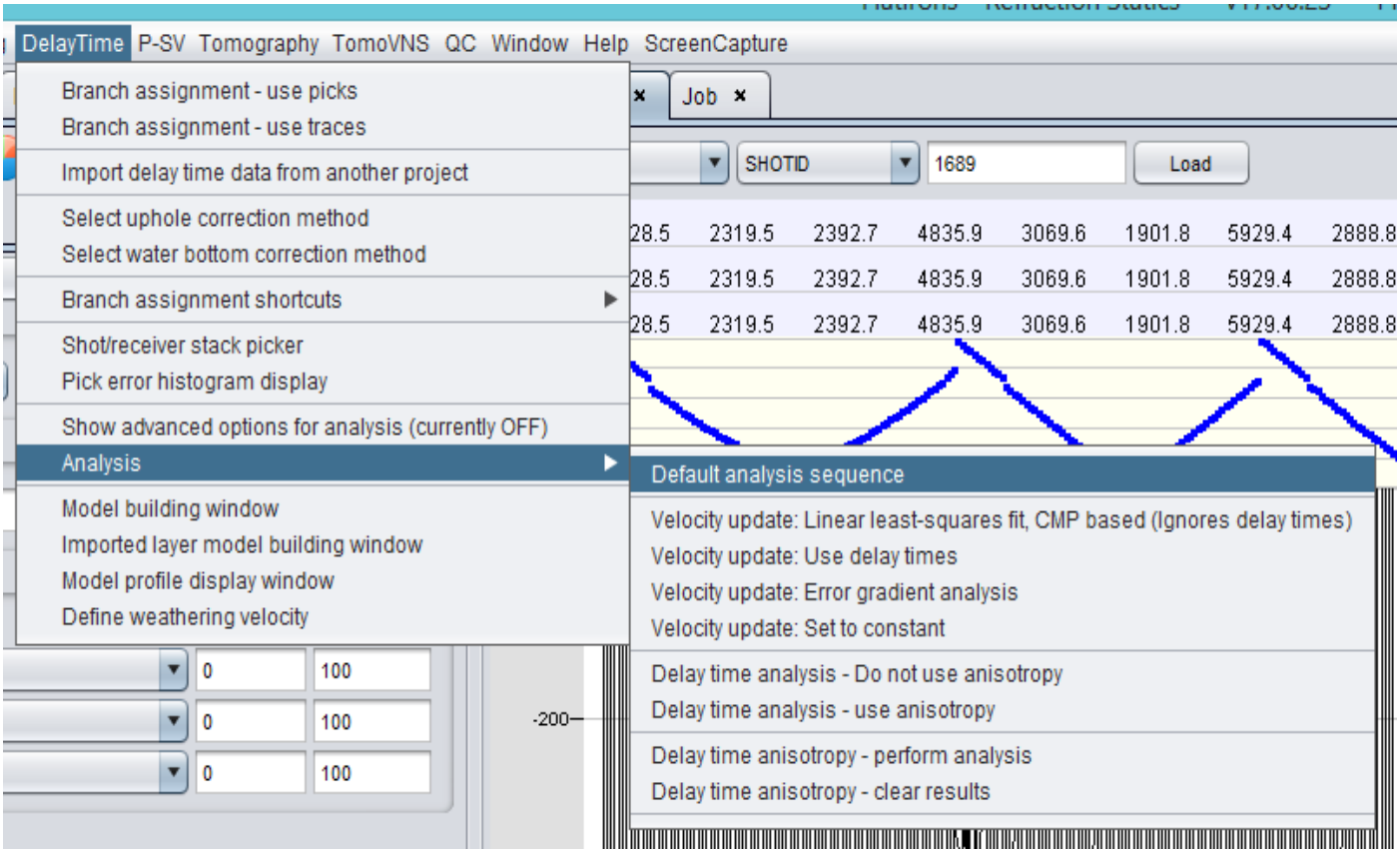
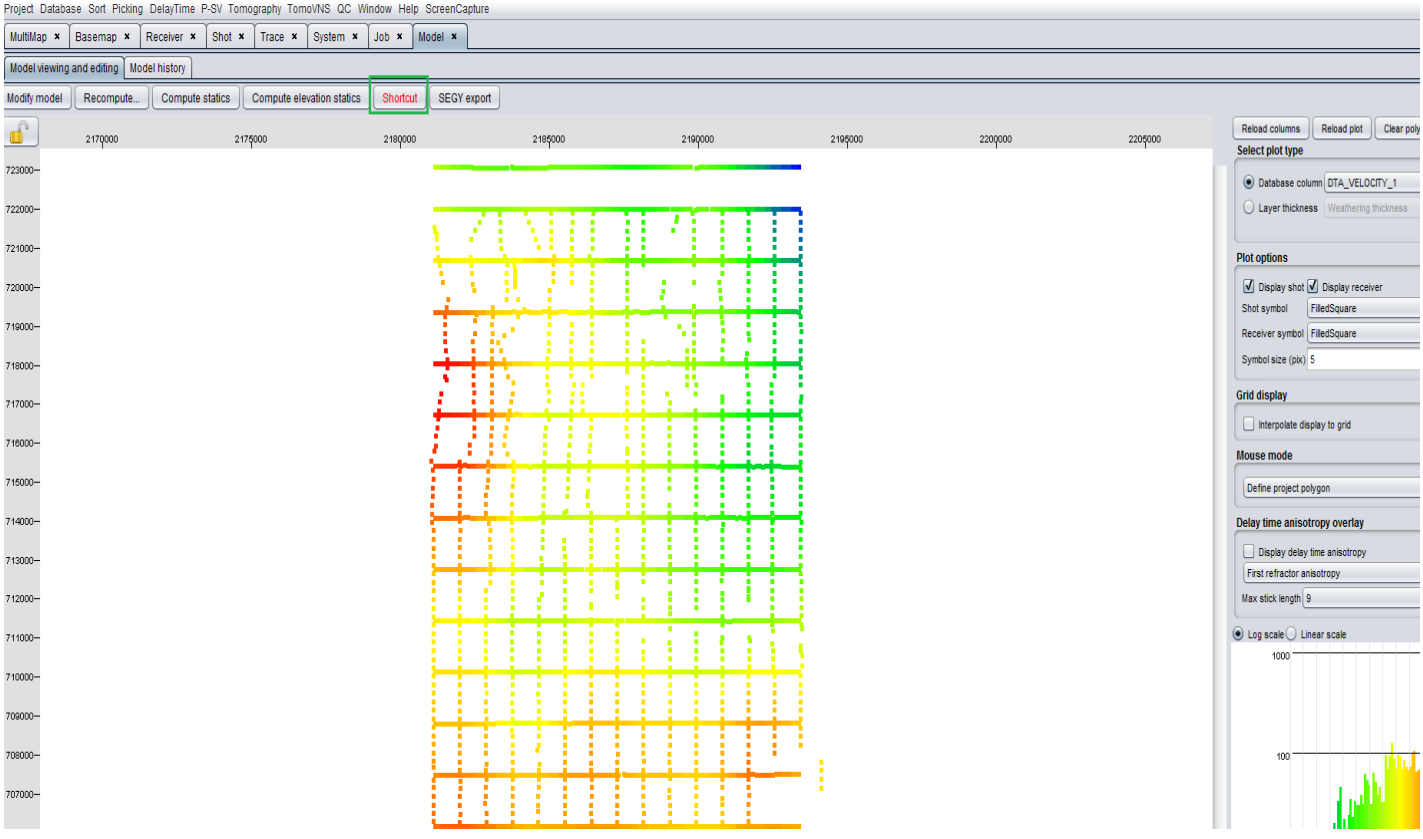
Delay Time Analysis

- If picks and geometry have been modified, then Delay Time Analysis sequence needs to be run again
- DelayTime menu → Analysis → Default analysis sequence



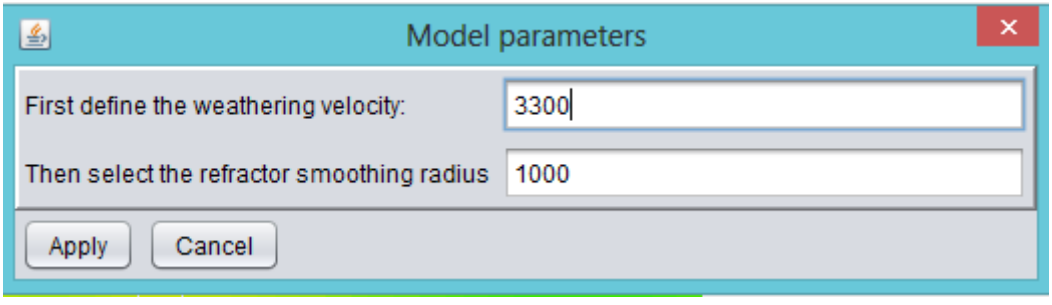
Model Building

- DelayTime menu → Model building window
- Click “Shortcut” key – this will handle everything automatically



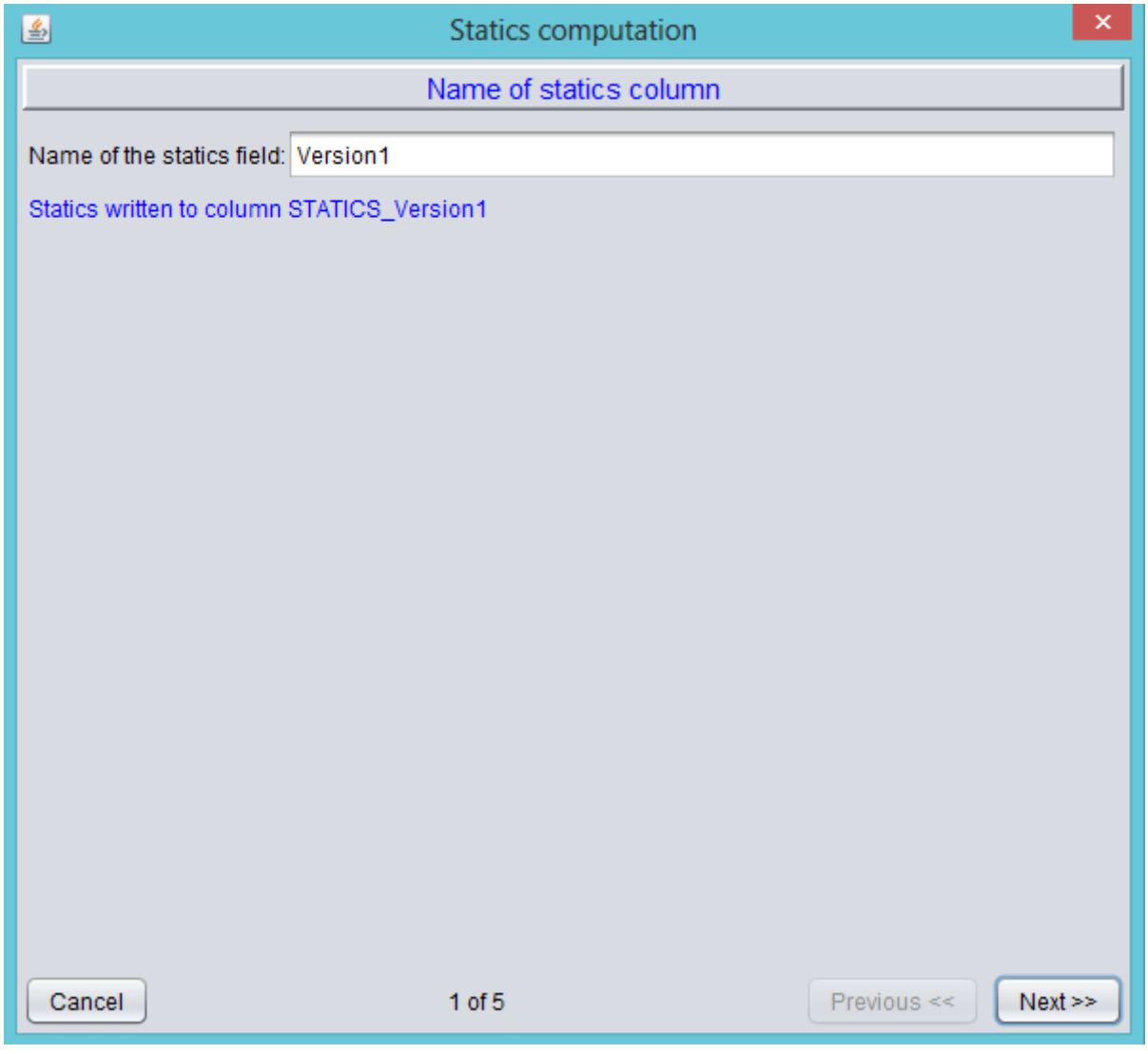
Model Building

- Enter your desired weathering velocity (this needs to be lower than the first refractor velocity, which can be viewed under “DTA_Velocity_1”)
- Set smoothing radius – lower value means less smoothing (default is recommended



Statics Computation

- In Model Building Window, click "Compute statics"
- Select a name for your set of statics



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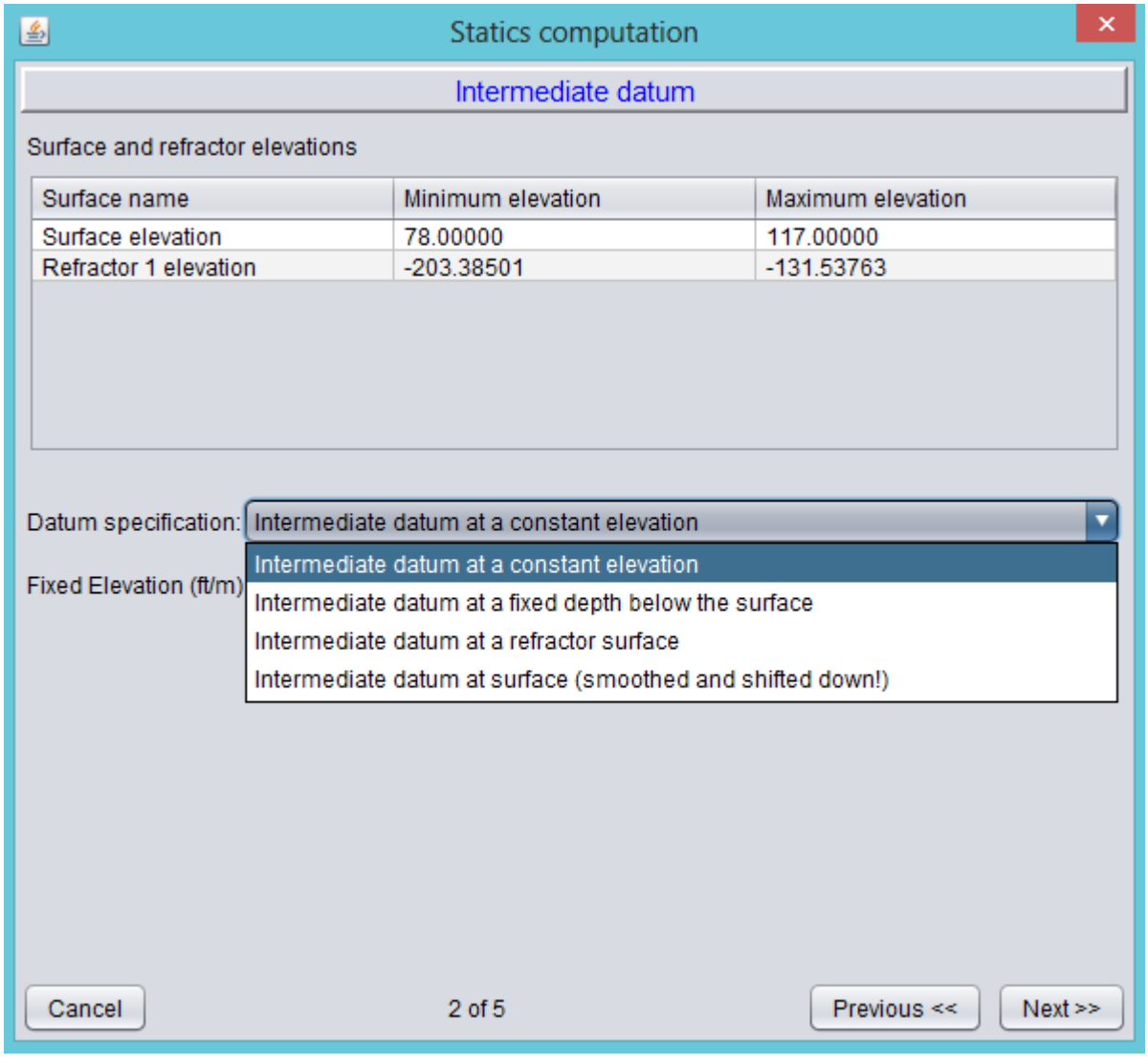
Statics Computation

- Select intermediate datum type, and set datum



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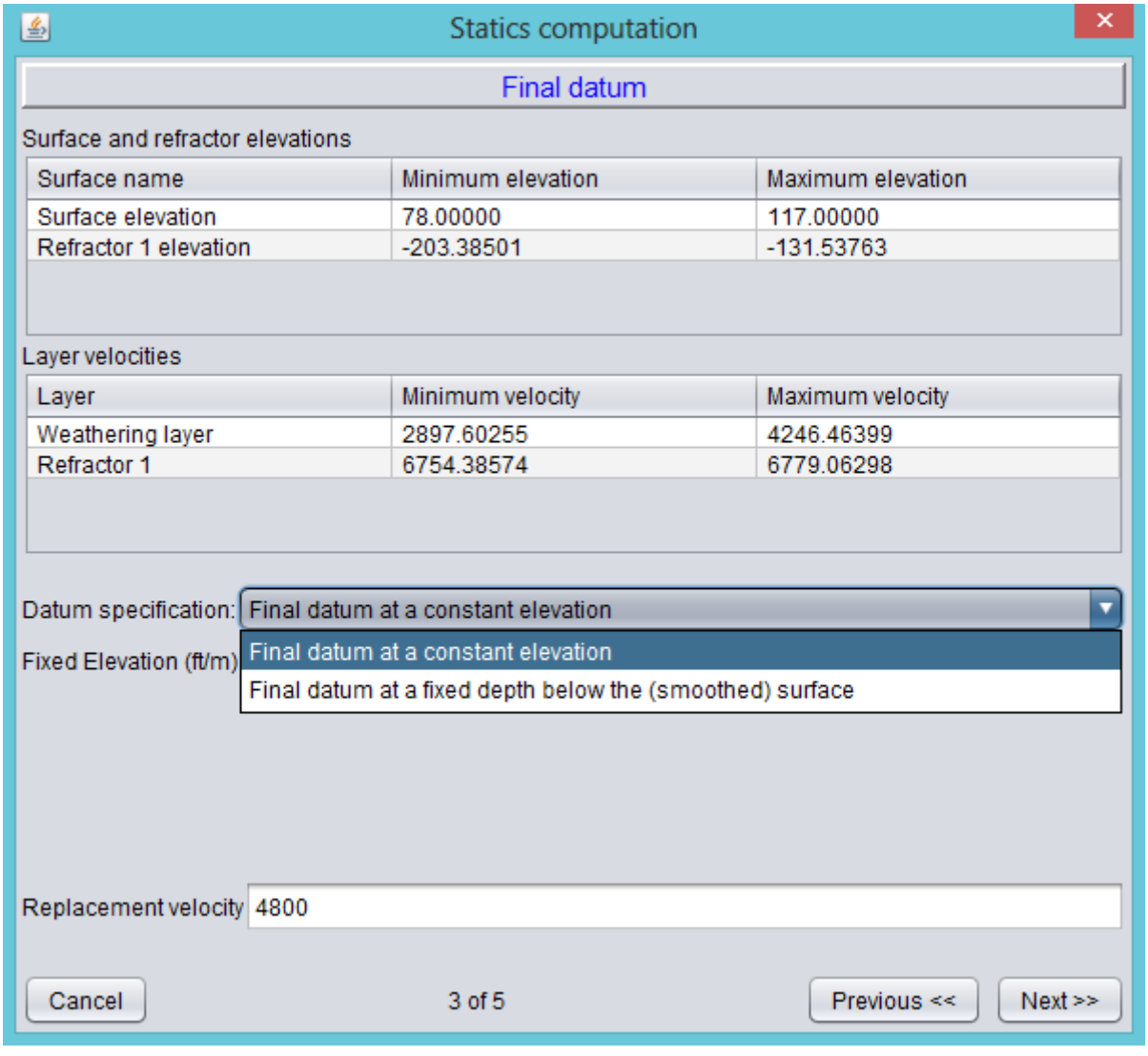
Statics Computation

- Set final datum and replacement velocity



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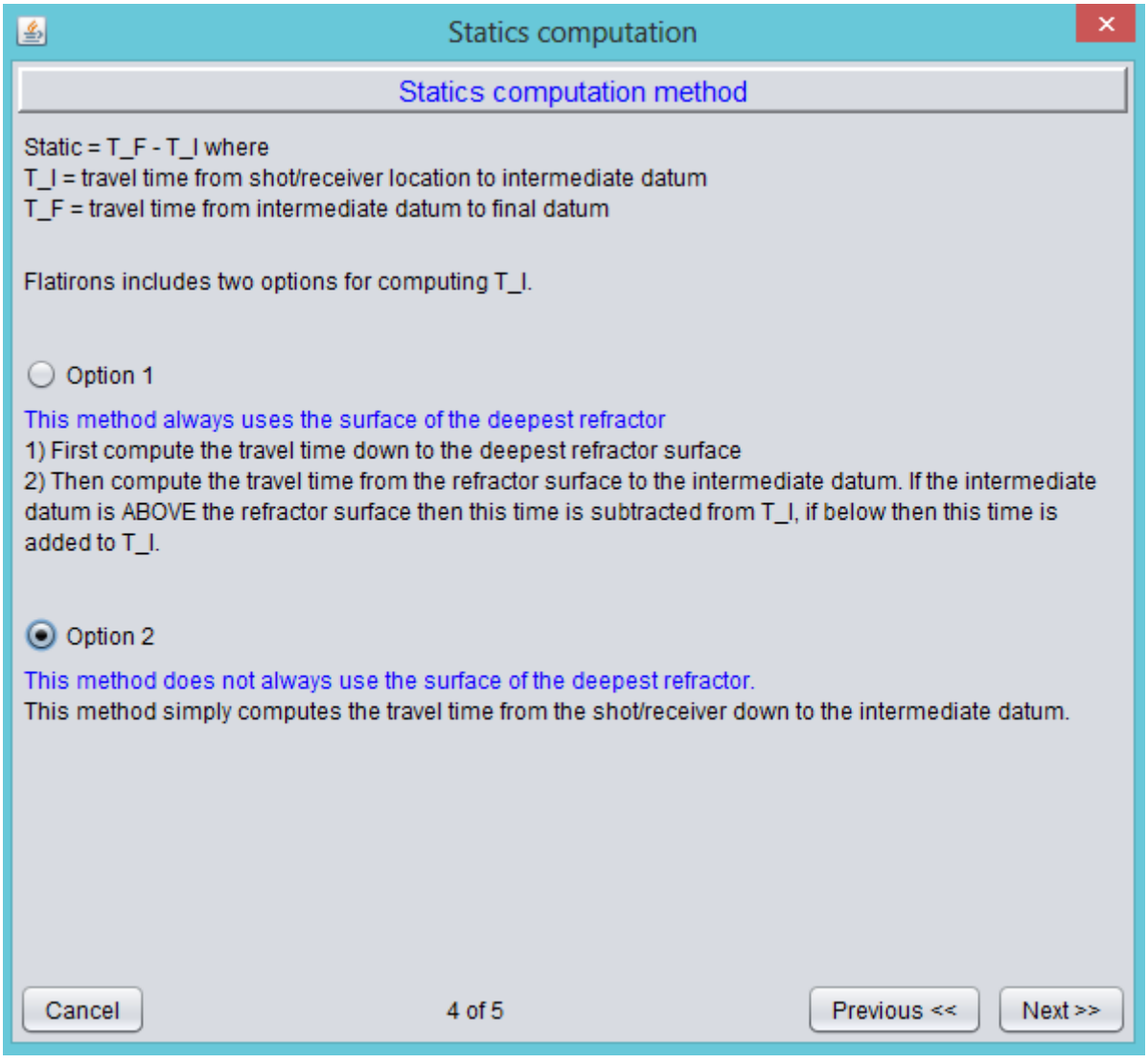
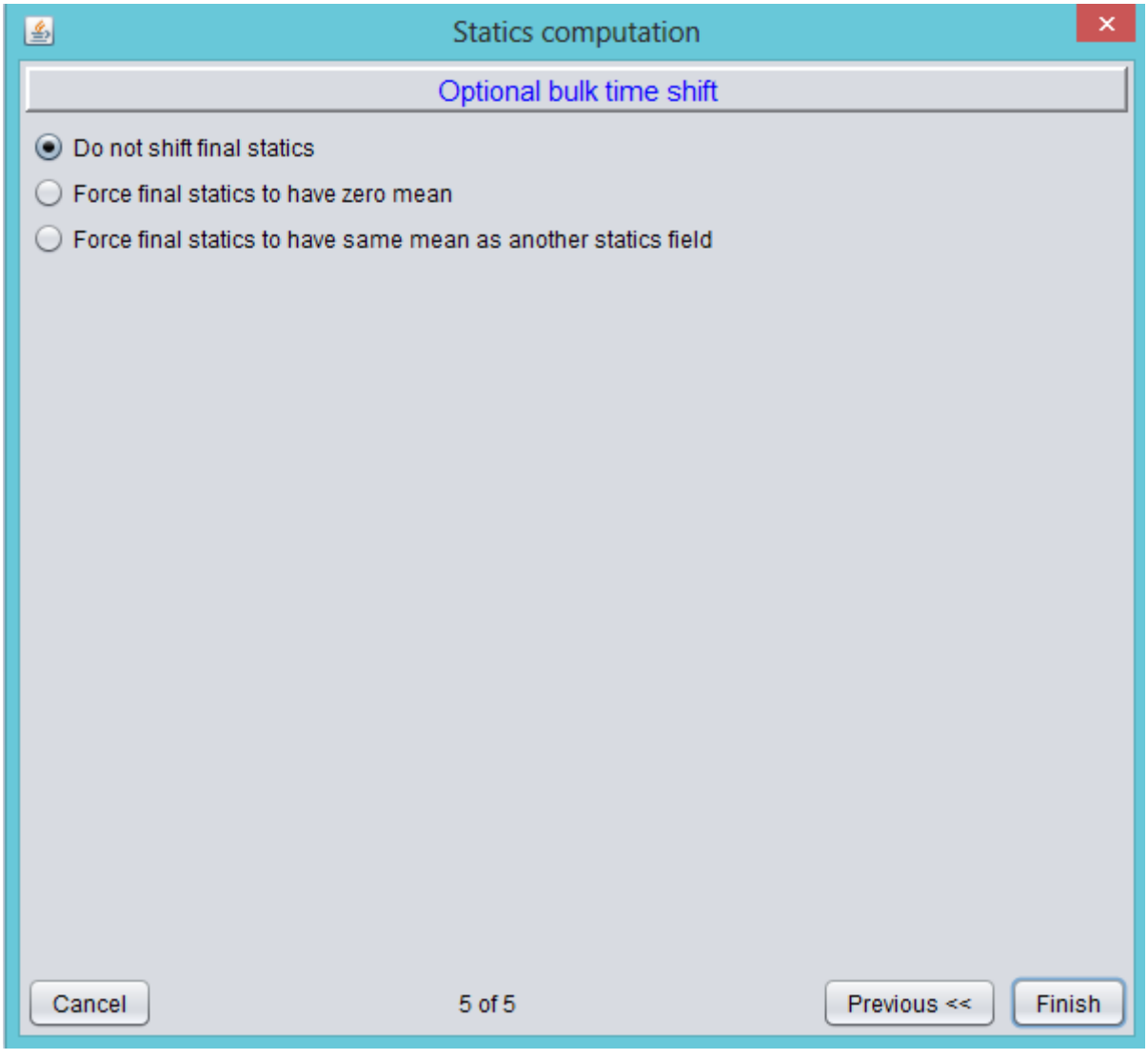
Statics Computation

- Set computation method – differences between the methods are explained in the dialog box



Statics Computation

- Select optional bulk shift – this is explained in further detail in the Stack QC tutorial



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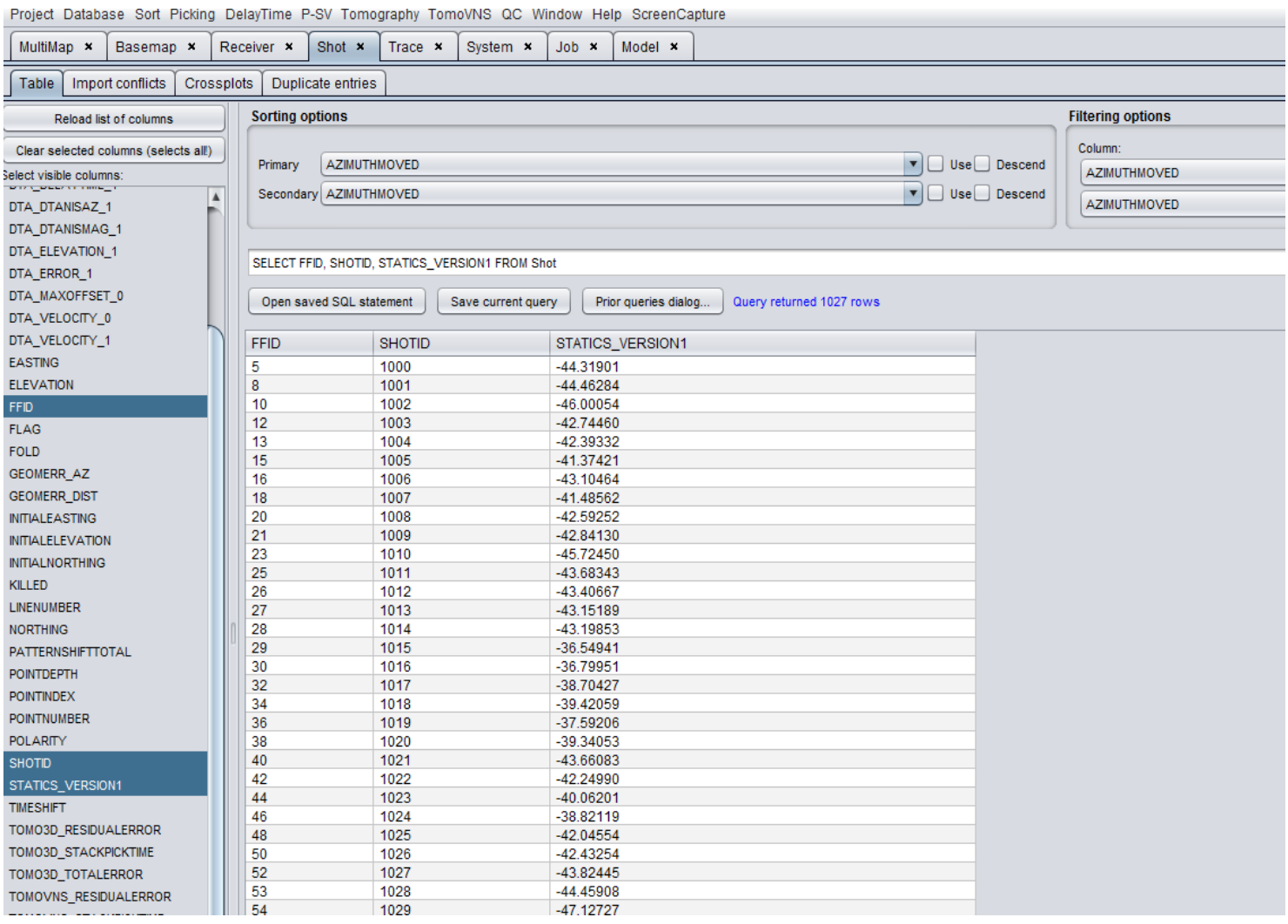
Statics Computation

- Statics will then show up in Shot/Receiver tables (you may need to reload list of columns) under the name “Statics_” with the name you provided



FFID	SHOTID	STATICS_VERSION1
5	1000	-44.31901
8	1001	-44.46284
10	1002	-46.00054
12	1003	-42.74460
13	1004	-42.39332
15	1005	-41.37421
16	1006	-43.10464
18	1007	-41.48562
20	1008	-42.59252
21	1009	-42.84130
23	1010	-45.72450
25	1011	-43.68343
26	1012	-43.40667
27	1013	-43.15189
28	1014	-43.19853
29	1015	-36.54941
30	1016	-36.79951
32	1017	-38.70427
34	1018	-39.42059
36	1019	-37.59206
38	1020	-39.34053
40	1021	-43.66083
42	1022	-42.24990
44	1023	-40.06201
46	1024	-38.82119
48	1025	-42.04554
50	1026	-42.43254
52	1027	-43.82445
53	1028	-44.45908
54	1029	-47.12727