SonarWiz Quick Guide
Sub-Bottom Processing

Revision 1, 2020-02-03

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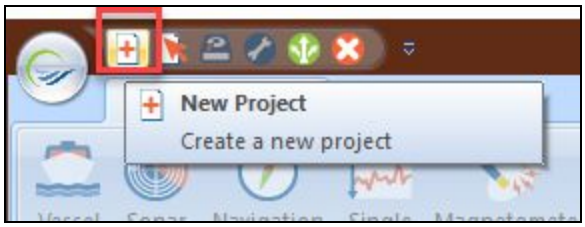
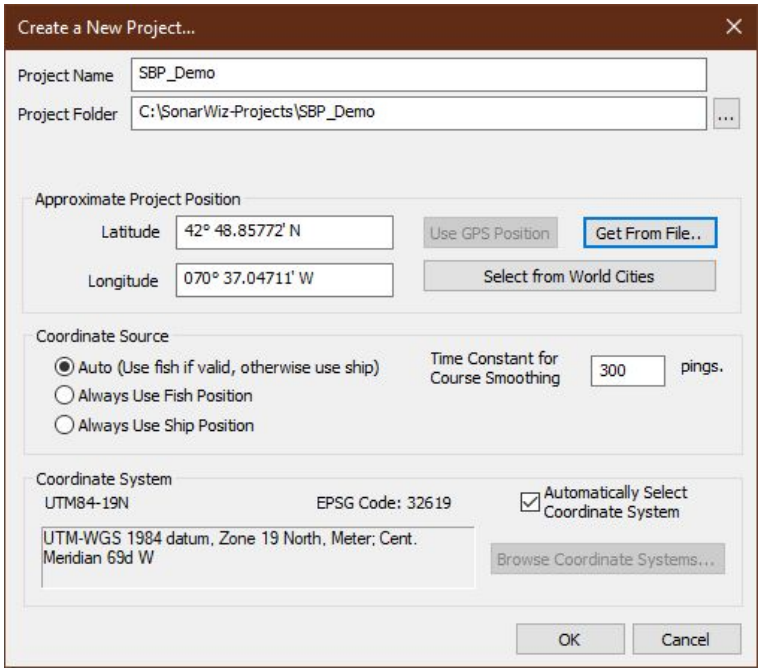
1. Click the **New Project** Icon to open the **Create New Project Dialog**

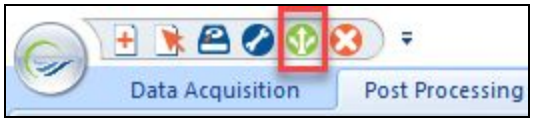


2. Enter a **Project name** and **Project Folder**, then set the approximate position of the data. This can be done either by entering in a known location or **Get from File** – navigate to a single file from the project (note: at this point, only one file is needed to set the geodesy, regardless of the number to be processed). Double-check that SonarWiz selects an appropriate Coordinate System for your project.

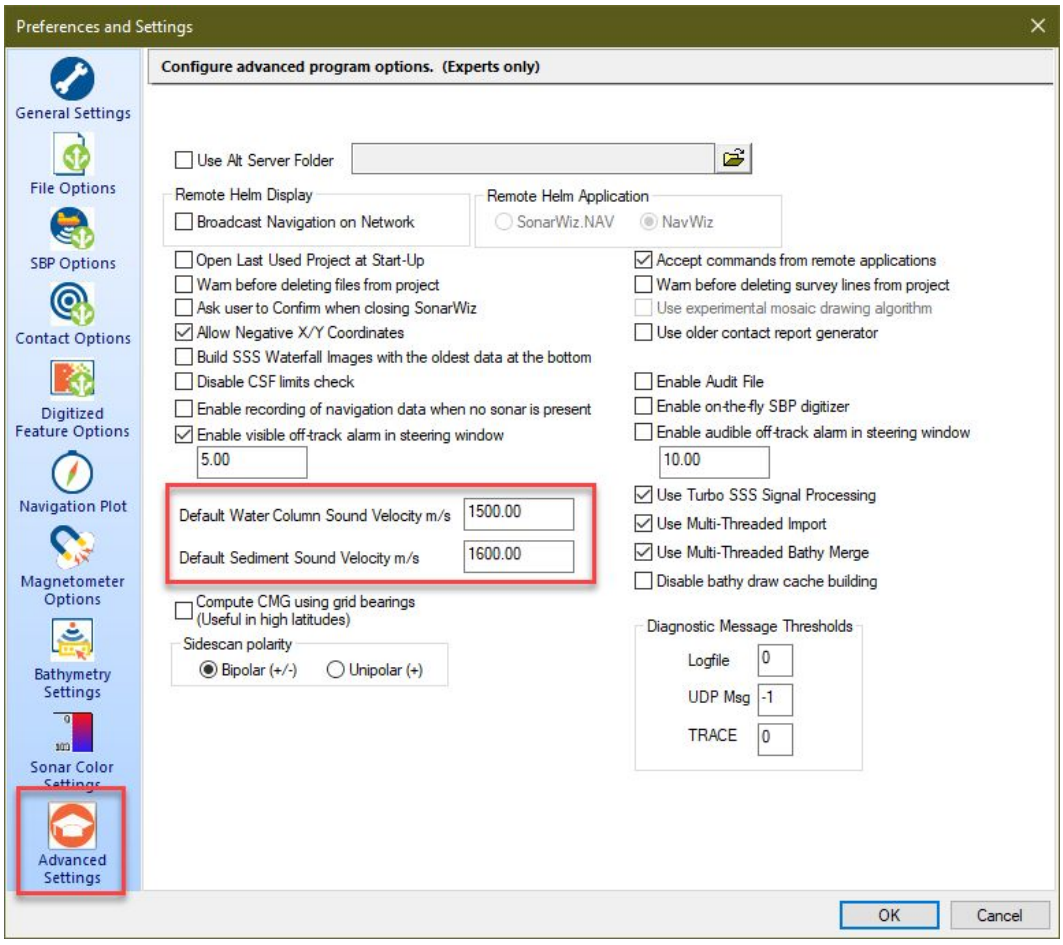


It is important to set the **Coordinate Source** properly. If the navigation in your files has already had layback applied, then you should use the **Always Use FIsh Position** option. Otherwise, you should select **Always Use Ship Position** and then you will set up the layback computation in SonarWiz after the files are imported.

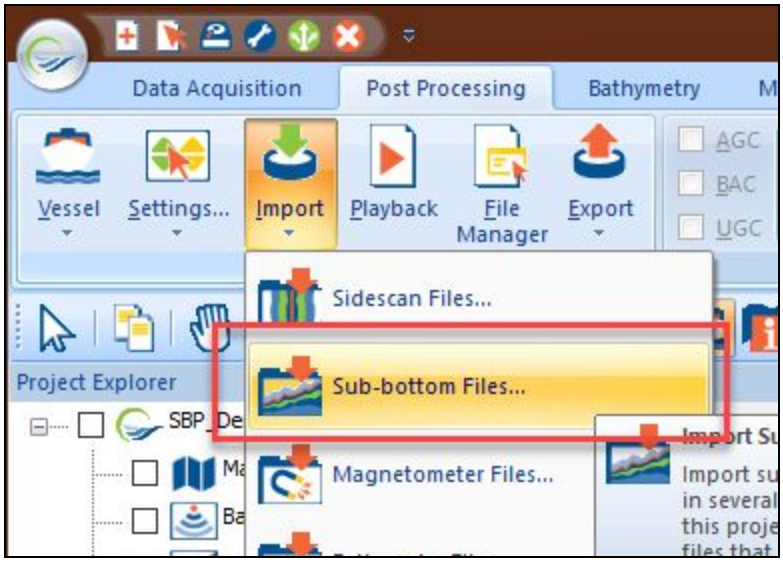
3. Open the **Program Properties** (click the green “chicken-foot” button)



4. Select the **Advanced Settings** page and review the **Default Water Column Sound Velocity** and **Default Sediment Sound Velocity**.

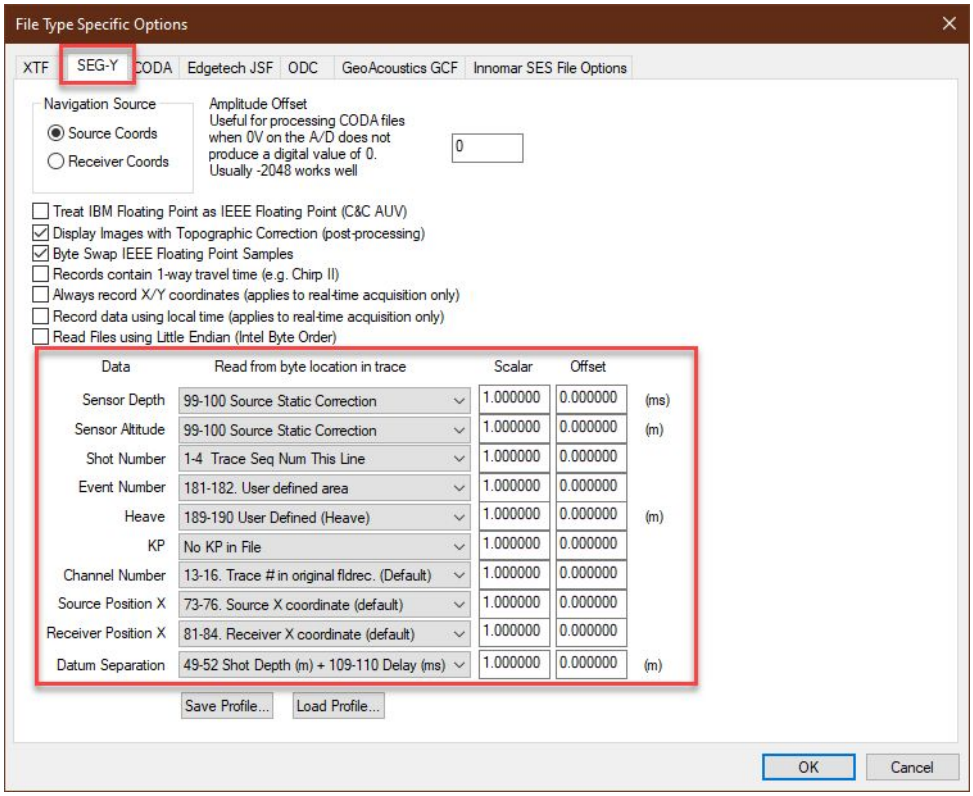


5. In the program, go to the second tab -- Post Processing -- and select **Import | Sub-Bottom Files**.

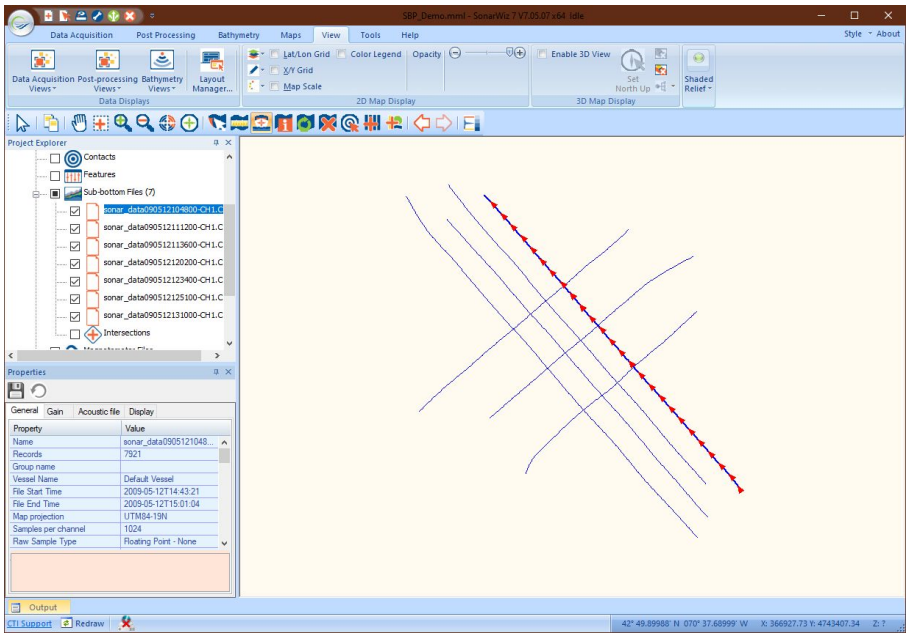


6. Select data files to import. Multiple files can be selected at once.

7. In the **File type Specific Options**… button, you can select particulars to your file format and system. This is often necessary for SEG-Y import to properly extract position and depth.

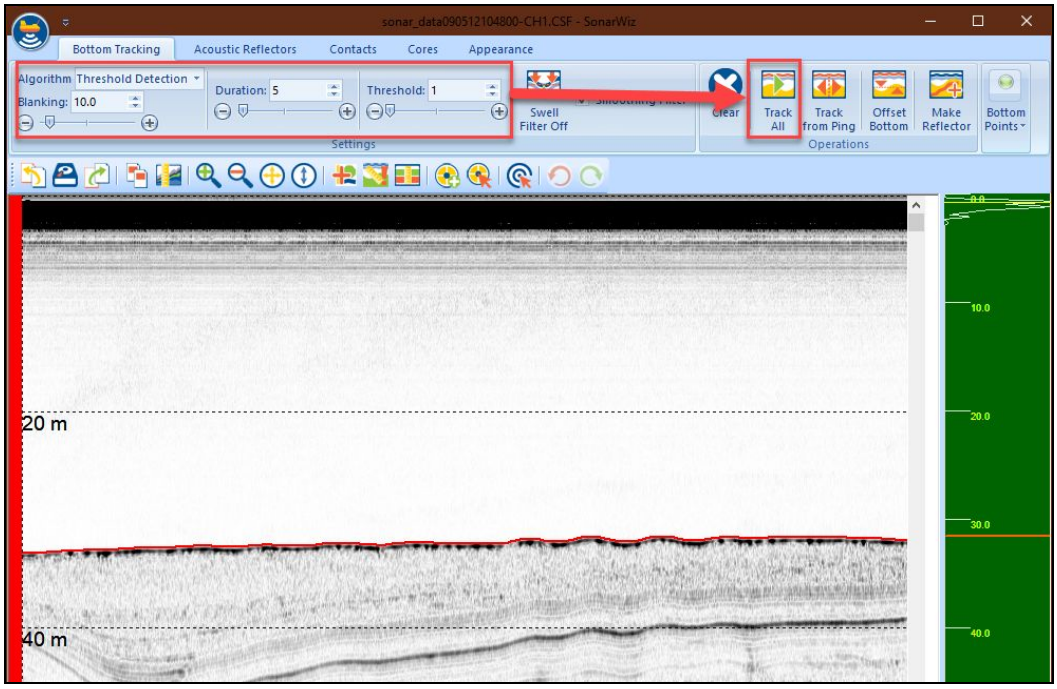


8. The sub-bottom data will be loaded into the program. The next few steps get the data adjusted with gains, bottom track and other tools to create a nice image.



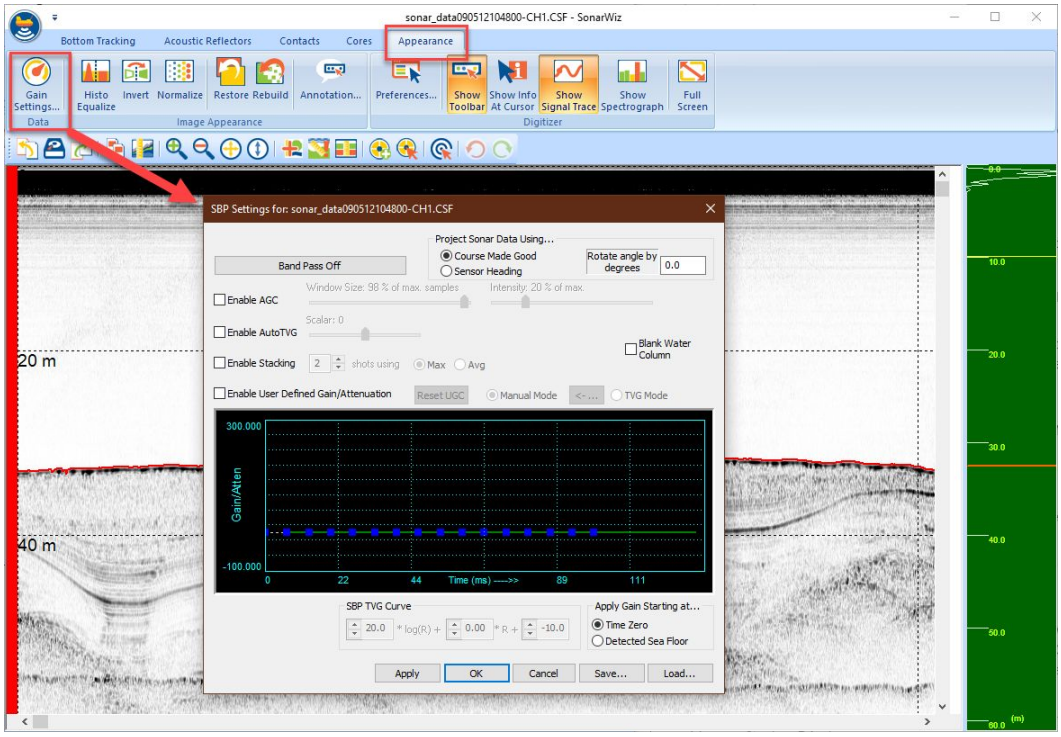
9. Bottom track. **Right click** on a file and select the **Bottom Track...** option. Set the blanking zone (distance from ping to an area below any apparent noise) and threshold (a

value of change detection) then click the **Track All** button. Typically the lower number finds smaller changes, and could track noise/fish, etc in the water column. A number too high will go past the bottom into the data. In this example, I use a blanking of 10 and threshold of 1.



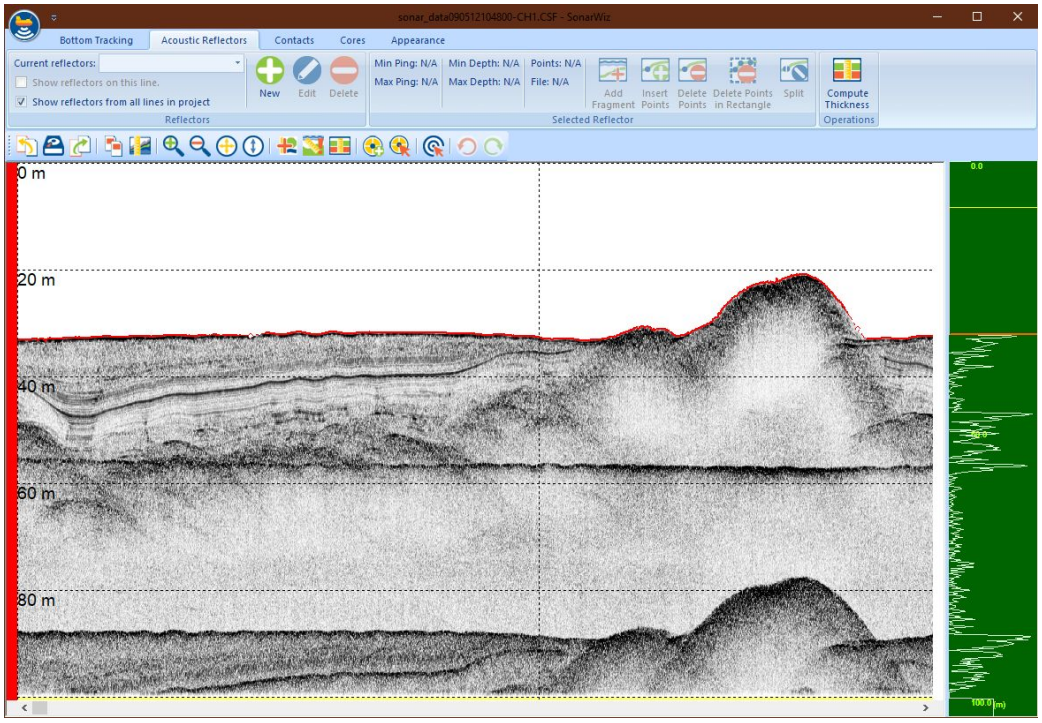
10. Go through all of the files, using the **next** and **previous** buttons until you reach the end of the files. (See also the **Batch Bottom Track** command)

11. Gain controls. Select the **Appearance Tab** in the SBP Analysis Window and click on the **Gain Settings Icon**. This will bring up the gain control window. Note: you only need to do these settings on a single file, as we will use the “Make Like Others” option to copy over the settings later.

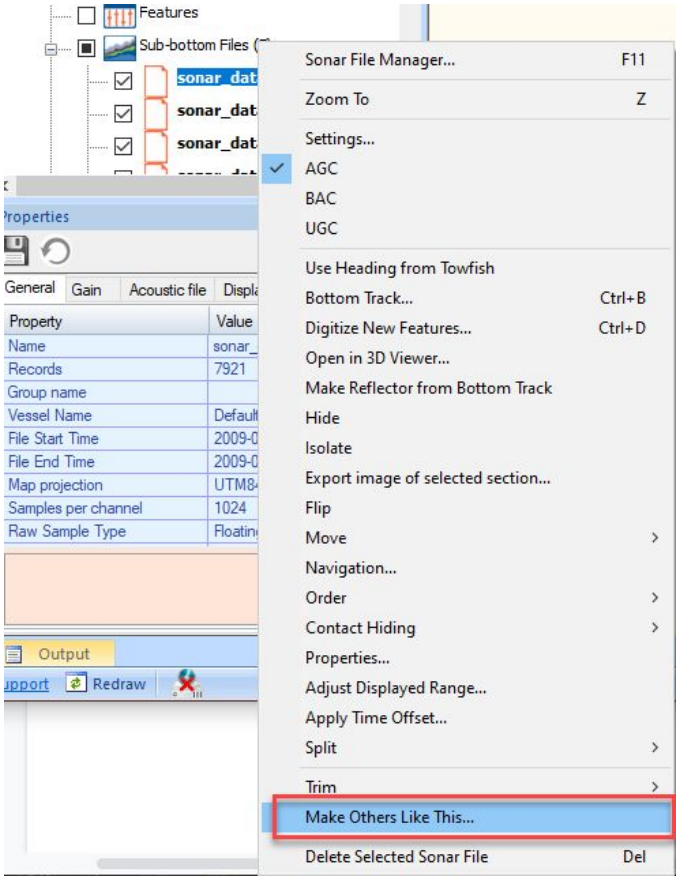


Here you will find the Bandpass filter, Ping Stacking, Water Column Blanking option and AGC. Try different settings to see which makes the image look best.

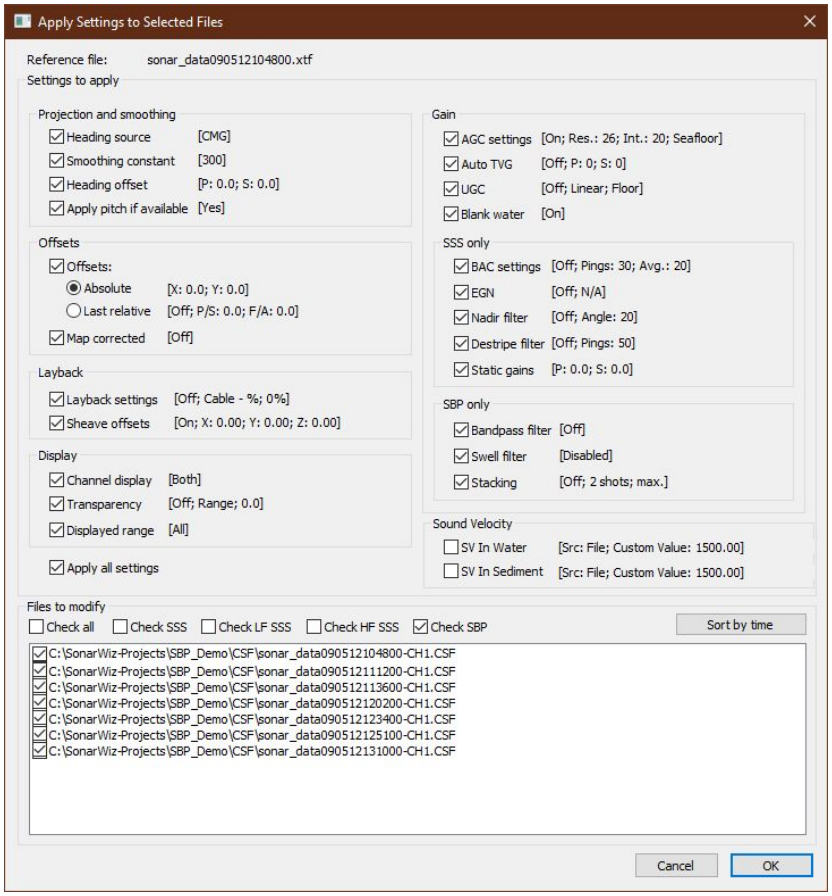
Result:



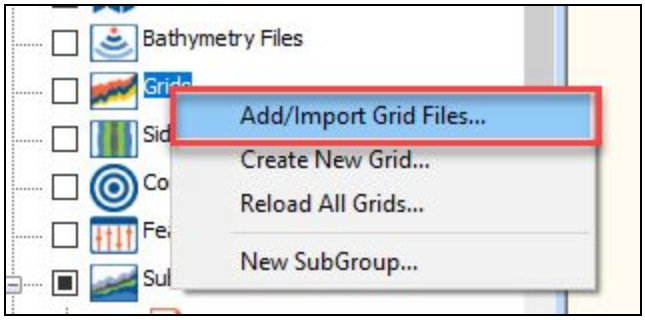
12. If this is the setting that is to be used, then we will make the others just like this one. Select the file, and go to **Make Others Like This**.



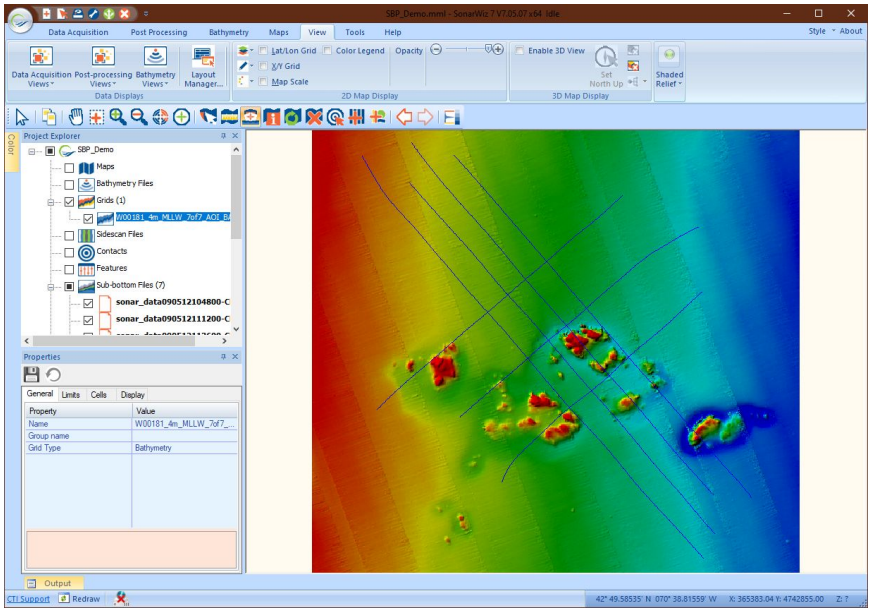
A dialog box will show which files to use, and which settings to make. You can select ALL files and Apply All settings, which will take in the gain and other changes made to the first file. Bottom track is not an option, which is why we did that initially.



13. The next step is to vertically align the sub-bottom data to a bathymetric surface. Right-click the **Grids** branch of the **Project Explorer** and select **Add/Import Grid Files…** to load your grid into the program.

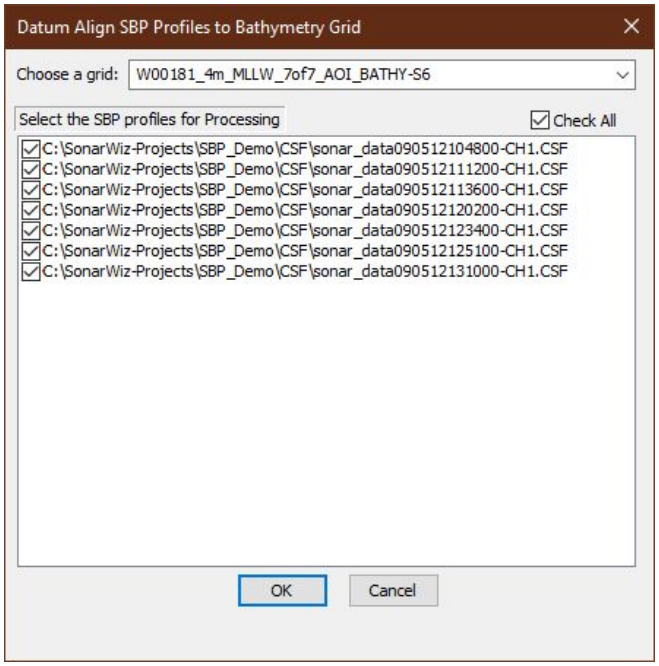


You can adjust the shaded relief effect of the grid in the **View menu**.



14. Click on the **Post Processing tab | Datum Align to Bathy Grid…** command

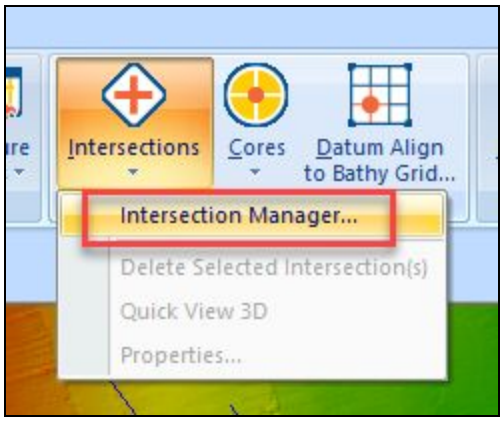
Select the bathymetry grid from the drop-down menu and select all of the sub-bottom files as shown.



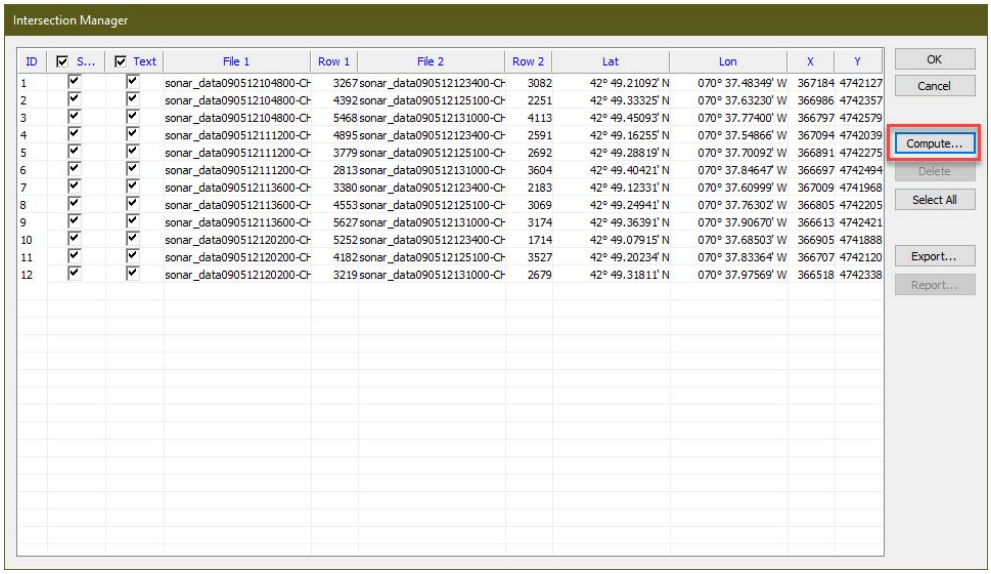
Click **OK**.

15. The next step is to **Compute Intersections** between our SBPs. This allows SonarWiz to visualize intersecting profiles and their feature markers in the digitizer. It also sets up navigation jumps between the intersecting lines (double-click the intersection line in the digitizer).

    Open the **Intersection Manager** from the **Post Processing** ribbon



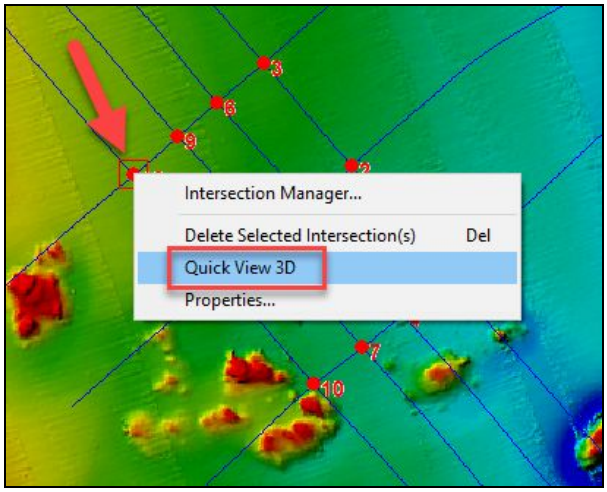
    Click the **Compute** button



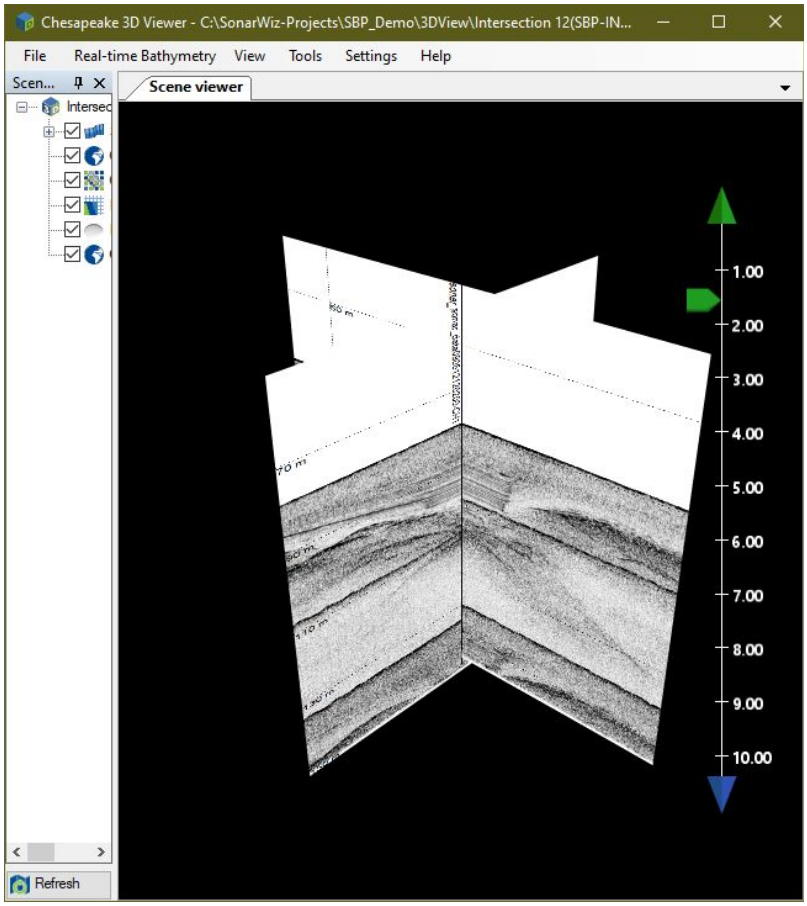
ID	S...	Text	File 1	Row 1	File 2	Row 2	Lat	Lon	X	Y
1	☑	☑	sonar_data090512104800-Ch	3267	sonar_data090512123400-Ch	3082	42° 49.21092' N	070° 37.48349' W	367184	4742127
2	☑	☑	sonar_data090512104800-Ch	4392	sonar_data090512125100-Ch	2251	42° 49.33325' N	070° 37.63230' W	366986	4742357
3	☑	☑	sonar_data090512104800-Ch	5468	sonar_data090512131000-Ch	4113	42° 49.45093' N	070° 37.77400' W	366797	4742579
4	☑	☑	sonar_data090512111200-Ch	4895	sonar_data090512123400-Ch	2591	42° 49.16255' N	070° 37.54866' W	367094	4742039
5	☑	☑	sonar_data090512111200-Ch	3779	sonar_data090512125100-Ch	2692	42° 49.28819' N	070° 37.70092' W	366891	4742275
6	☑	☑	sonar_data090512111200-Ch	2813	sonar_data090512131000-Ch	3604	42° 49.40421' N	070° 37.84647' W	366697	4742494
7	☑	☑	sonar_data090512113600-Ch	3380	sonar_data090512123400-Ch	2183	42° 49.12331' N	070° 37.60999' W	367009	4741968
8	☑	☑	sonar_data090512113600-Ch	4553	sonar_data090512125100-Ch	3069	42° 49.24941' N	070° 37.76302' W	366805	4742205
9	☑	☑	sonar_data090512113600-Ch	5627	sonar_data090512131000-Ch	3174	42° 49.36391' N	070° 37.90670' W	366613	4742421
10	☑	☑	sonar_data090512120200-Ch	5252	sonar_data090512123400-Ch	1714	42° 49.07915' N	070° 37.68503' W	366905	4741888
11	☑	☑	sonar_data090512120200-Ch	4182	sonar_data090512125100-Ch	3527	42° 49.20234' N	070° 37.83364' W	366707	4742120
12	☑	☑	sonar_data090512120200-Ch	3219	sonar_data090512131000-Ch	2679	42° 49.31811' N	070° 37.97569' W	366518	4742338

    Click **OK** to close the Intersection Manager

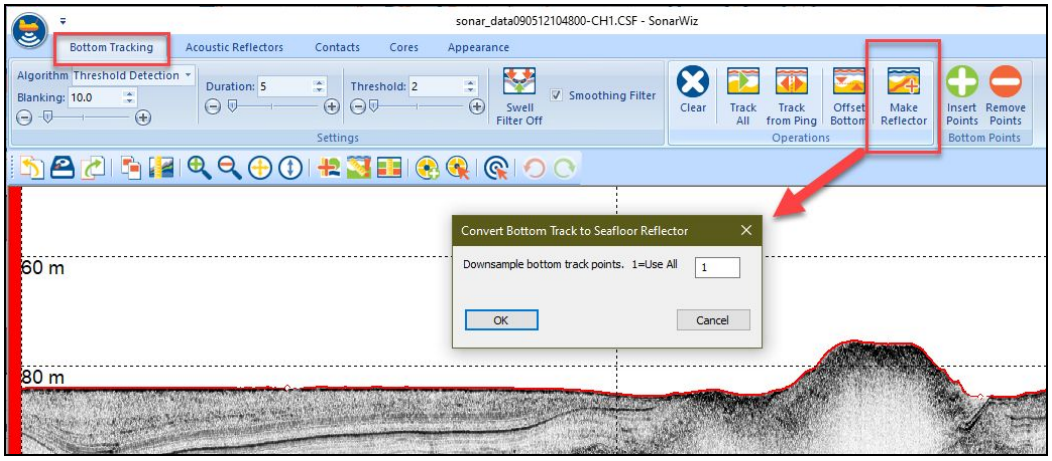
16. To visualize how your datum alignment worked, **Right-Click** an **intersection marker** in the map view (or in the Project Explorer) and select **Quick View 3D** command



This will open the 3D viewer in intersection mode where you can examine the vertical alignment of your intersecting profiles.



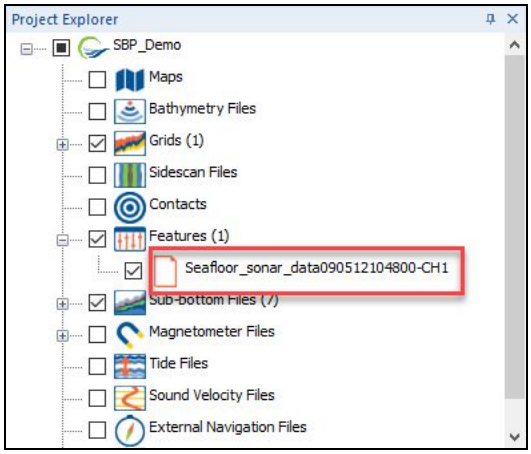
17. In the **Sub-bottom Analysis** window, select the **Bottom Track** tab and convert the bottom track to a seafloor reflector by clicking on the **Make Reflector** button.



Set the **Downsample bottom track points** value to **1 (All)** and click **OK**.

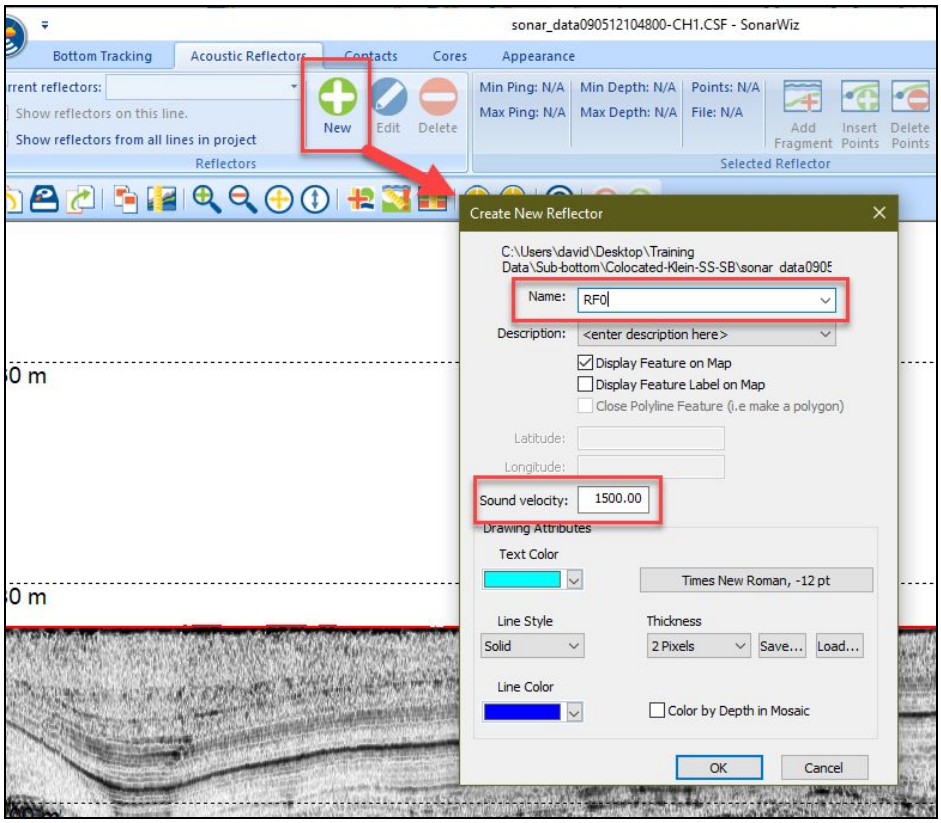
18. Switch to the **Acoustic Reflectors** tab and note that the new seafloor reflector has been added to the drop down list:

It is also listed in the **Project Explorer** under the **Features** branch:

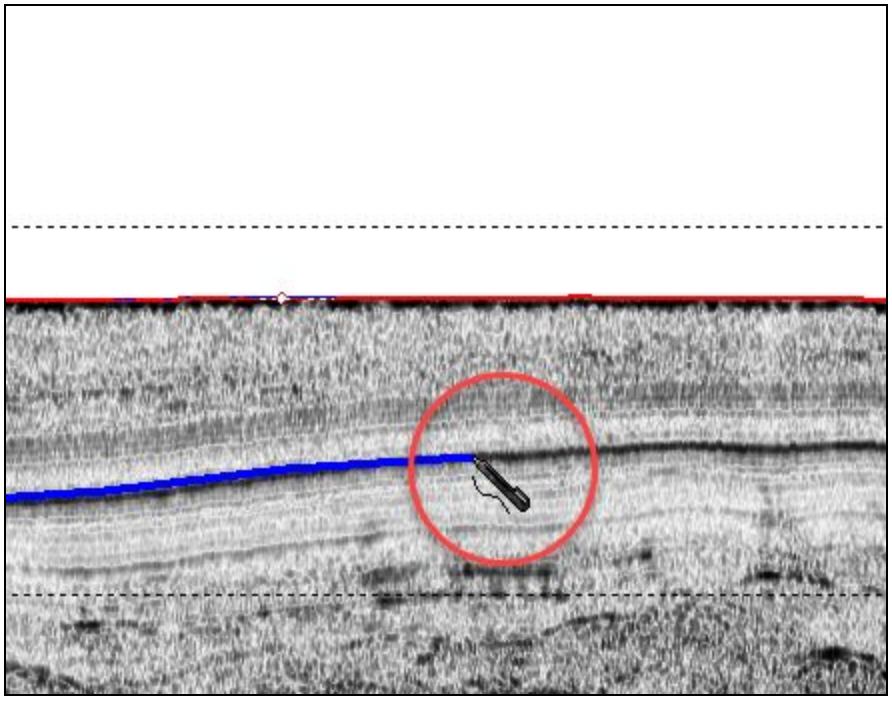


19. To digitize an **Acoustic Reflector** in the sub-bottom analysis window, click the **New** button. This will open the **Create New Reflector** dialog where you can set the Name, sound velocity and line properties of the reflector. The sound velocity entered here is used to compute the depth of this reflector below the seafloor.

    Note: One or more features that have the same **Name** are implicitly considered observations of the same horizon. Later, you can export features by name and all of the observations will be collected together and treated like a single unit.

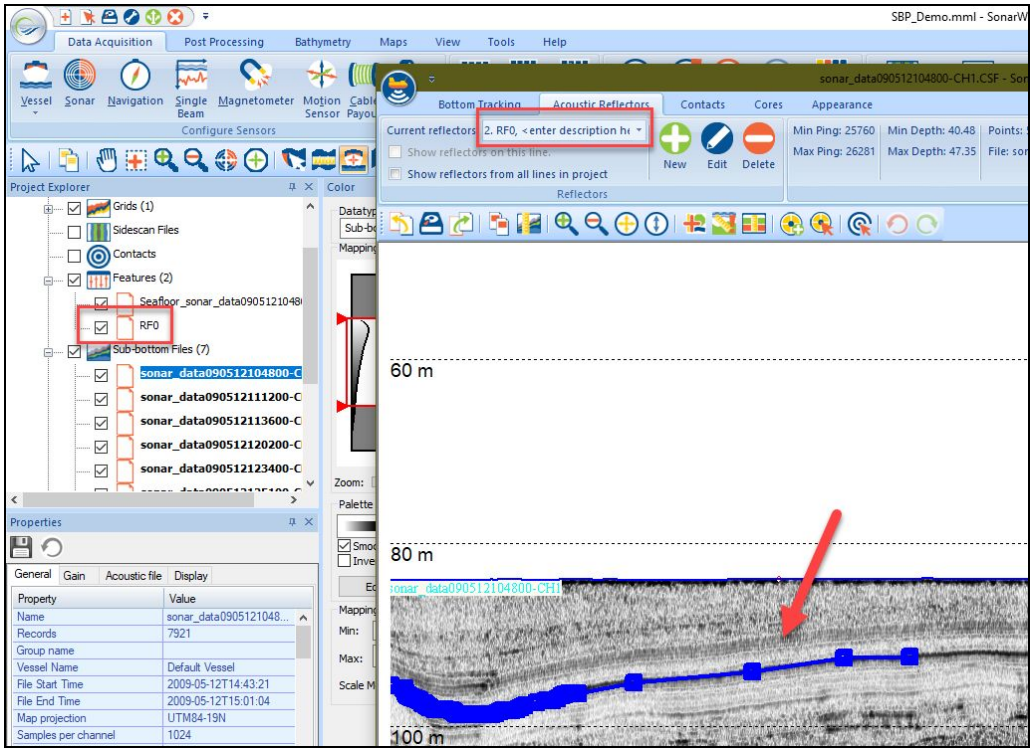


Click **OK** to start digitizing the new reflector.



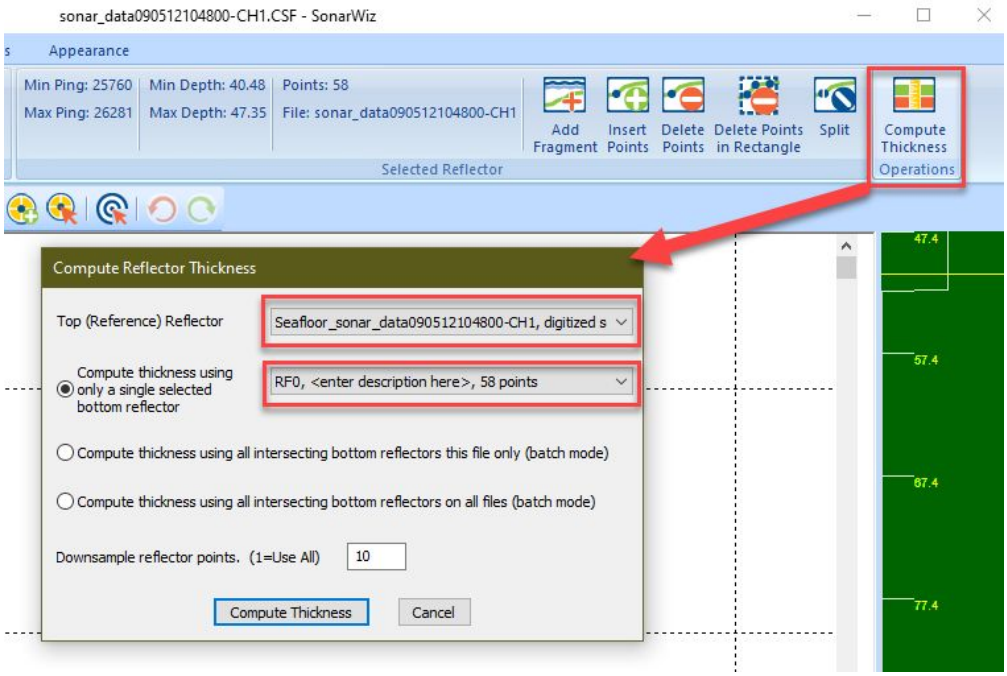
Your cursor will turn into a pen and you use the **left mouse button** to trace the reflector in the profile. **Right-Click 1 time** to lift the pen and move to a new location to start tracing the same reflector again. **Right-Click 2 times** to finish drawing and close the feature.

When you close the feature drawing (**Right-Click 2 times**), you will see your feature drawn in the display. The feature will also be listed in the **Features** branch of the **Project Explorer** and in the **Feature drop-down** list of the **SBP Analysis Window**.

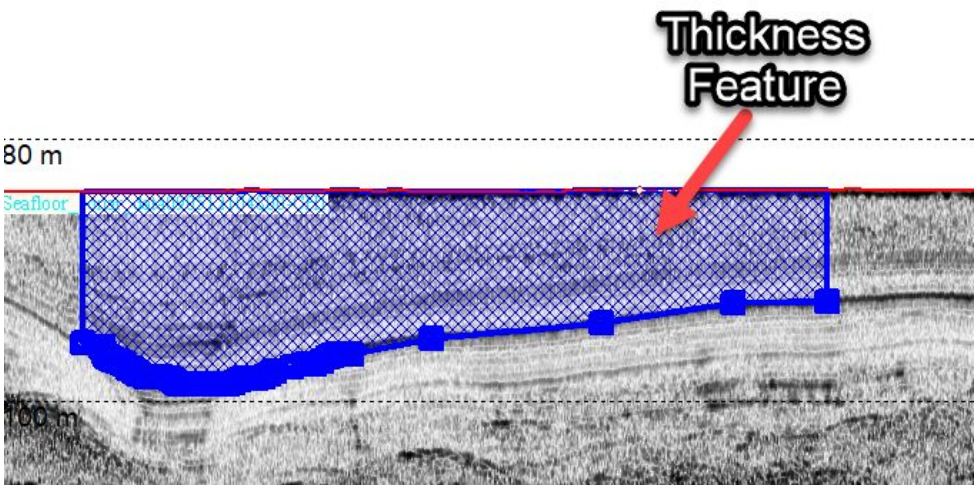


20. **To Edit a feature**. Select the feature with the mouse and use the toolbar icons in the Acoustic Reflector ribbon menu to modify the vertices.

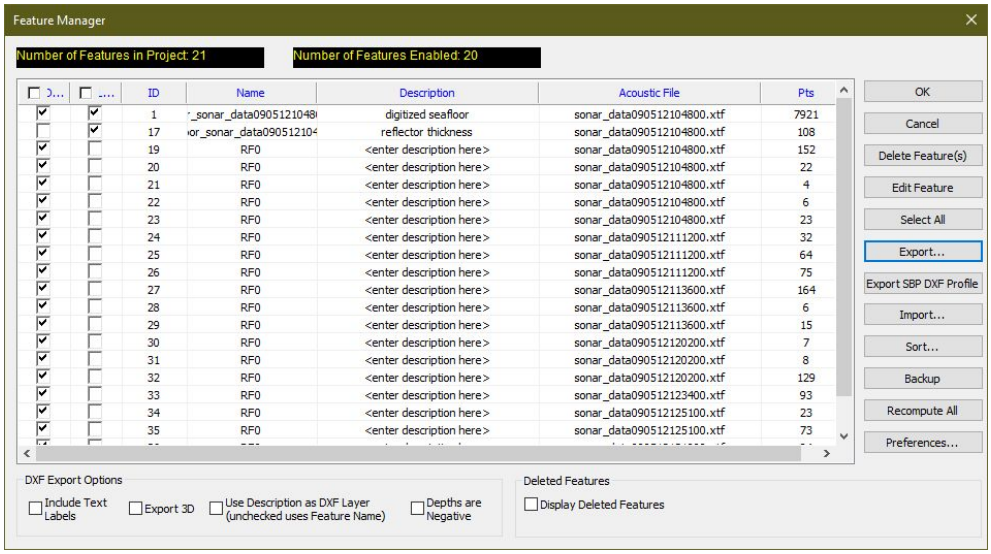
21. **To Compute the Thickness between two features**. Select the **Compute Thickness icon** in the **Acoustic Reflector** ribbon menu. Then specify the **Top** and **Bottom** reflectors. Remember you can convert your bottom track to a reflector (See Step 17 above).



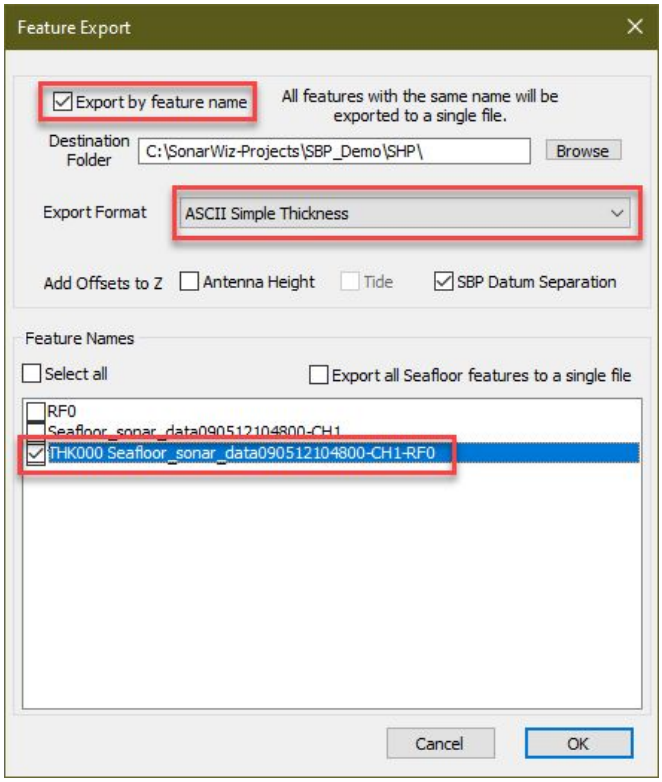
This will produce a **Thickness** feature which you can export later in the workflow.



22. Once you have digitized all of your acoustic horizons and computed thicknesses between horizons, you can export these features to spreadsheets and 3D vector files from the **Feature Manager**. Open the **Feature Manager** from the **Post Processing Ribbon menu**.



23. **To Export a Thickness feature** as a table of positions and thickness values click the **Export** button from the **Feature Manager**.



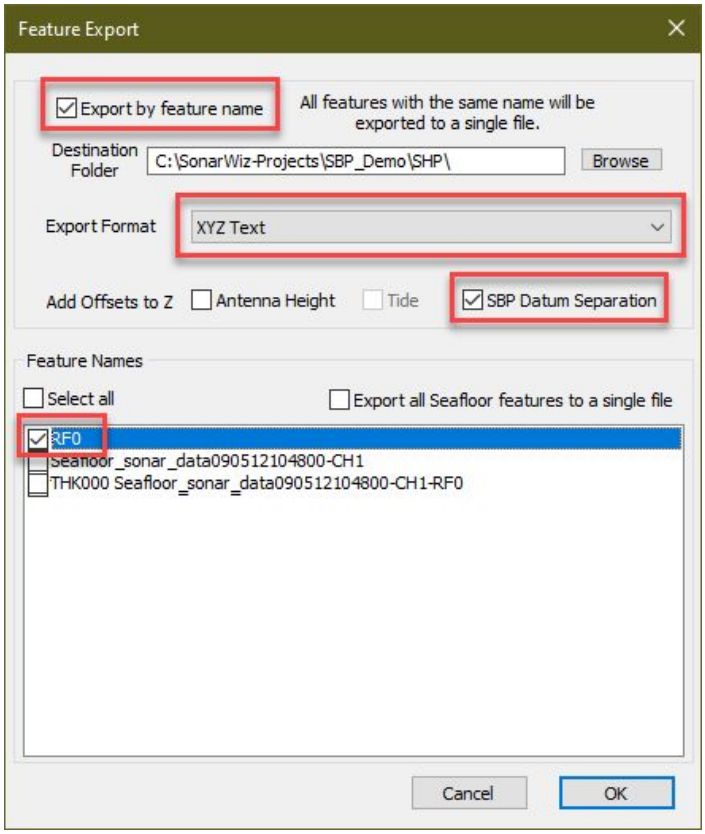
- Select **Export by Feature name**
- Export Format: **ASCII Simple Thickness**
- SBP Datum Separation **Checked**

Then **Select the THK (thickness)** feature you want to export. Make a note of the output location.

The program will export a CSV file containing the thickness estimate down the profile.

	A	B	C	D	E
1	X	Y	Thickness	Line #	
2	367757.2	4741474	12.25	sonar_data090512104800	
3	367756.7	4741475	12.34	sonar_data090512104800	
4	367755.1	4741477	12.62	sonar_data090512104800	
5	367753.5	4741479	13.72	sonar_data090512104800	
6	367751.8	4741481	14.34	sonar_data090512104800	
7	367750.2	4741483	14.99	sonar_data090512104800	
8	367748.5	4741486	15.03	sonar_data090512104800	
9	367746.9	4741488	15.26	sonar_data090512104800	
10	367745.3	4741490	15.63	sonar_data090512104800	
11	367743.6	4741492	15.65	sonar_data090512104800	
12	367742	4741494	15.66	sonar_data090512104800	
13	367740.3	4741496	15.6	sonar_data090512104800	

24. **To Create a Depth Grid of an Acoustic Horizon** click the **Export** button in the **Feature Manager**.



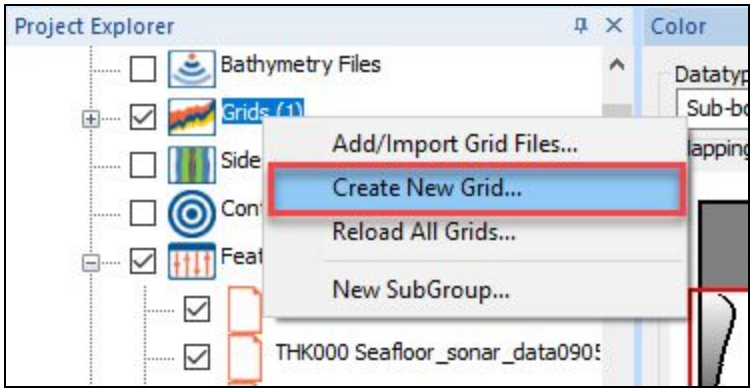
- Select **Export by Feature name**
- Export Format: **XYZ Text**
- SBP Datum Separation **Checked (This is important because we adjusted the depth of our profiles using a datum grid)**

Then **Select the horizon feature** you want to export. Make a note of the output location.

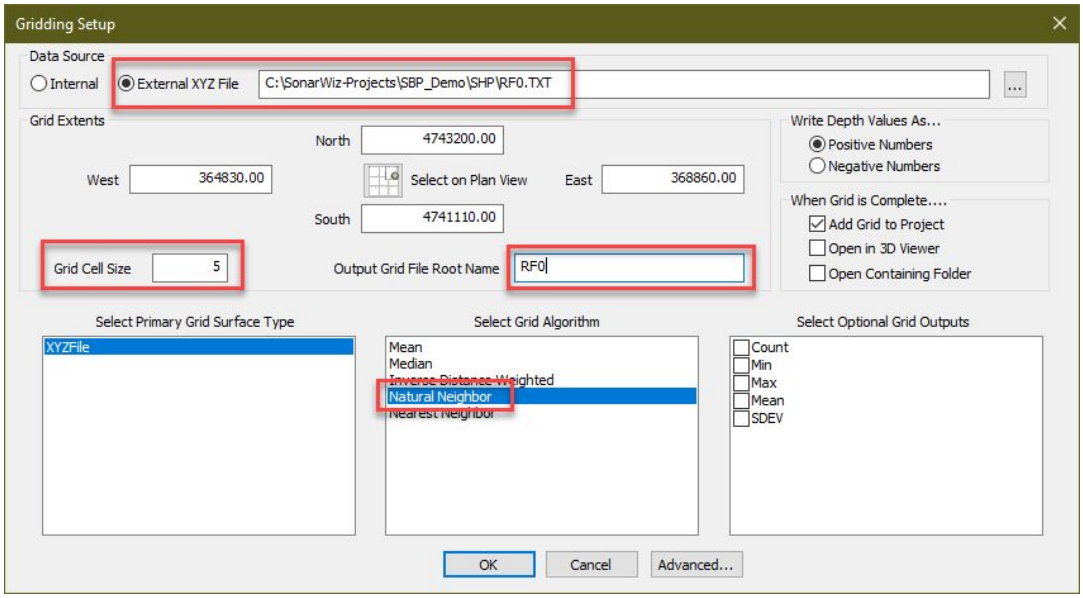
The program will export a CSV file containing the (easting,northing,depth) coordinates of the horizon observations along all profiles where it was recorded.

```
1   367765.81,4741462.50,100.33
2   367758.99,4741471.66,102.30
3   367753.78,4741478.63,104.61
4   367748.21,4741486.01,106.46
5   367739.62,4741497.20,107.96
6   367729.89,4741509.53,107.39
7   367719.77,4741521.84,105.65
8   367711.32,4741531.64,105.65
9   367705.41,4741538.27,107.96
10  367697.24,4741547.20,107.39
11  367687.48,4741557.61,105.31
12  367674.83,4741570.92,106.12
```

25. **To Create a Grid from the XYZ file. Right-Click Grids** in the **Project Explorer** and select the **Create New Grid…** command.

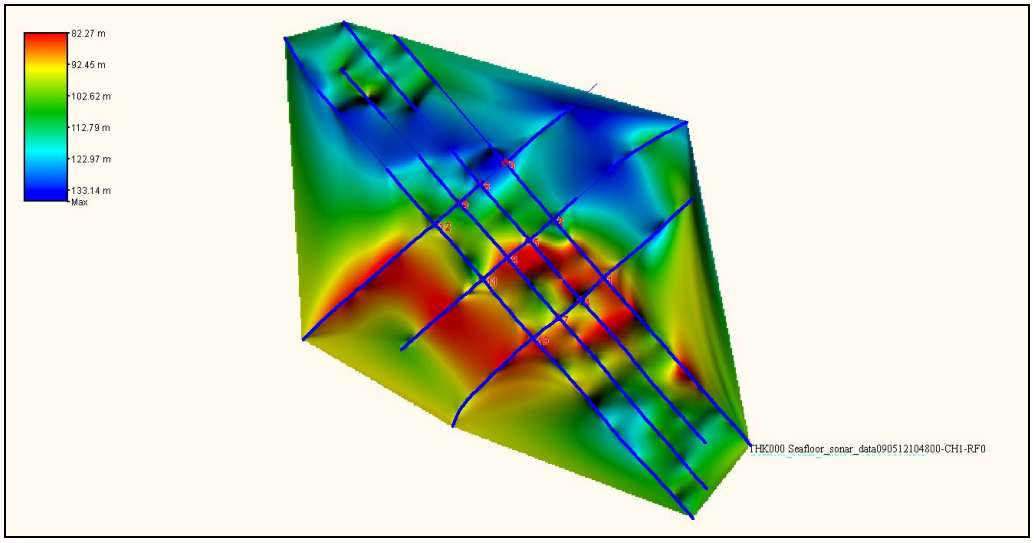


26. In **Gridding Setup** dialog:

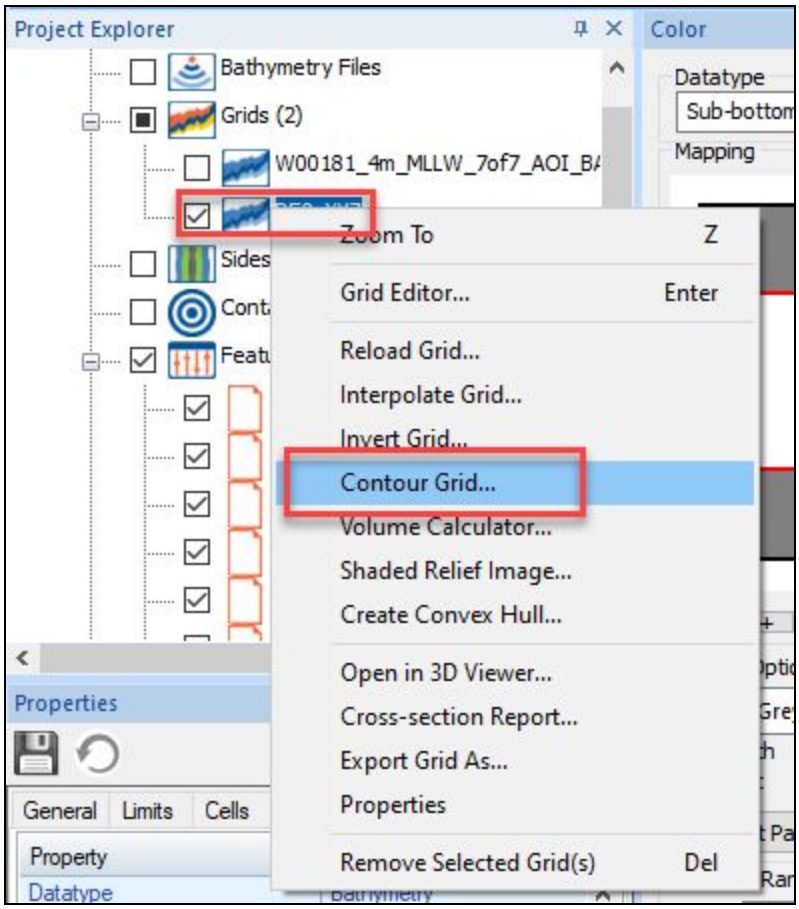


- Select **External XYZ File**, then enter the path to the XYZ file you exported above.
- Select **Grid Cell Size** fairly large. (I recommend a spacing about 1/10th the distance between tracklines to start)
- Select **Natural Neighbor** as the gridding algorithm. This is best for smooth interpolation. But it is very slow, so adjust the cell size accordingly!

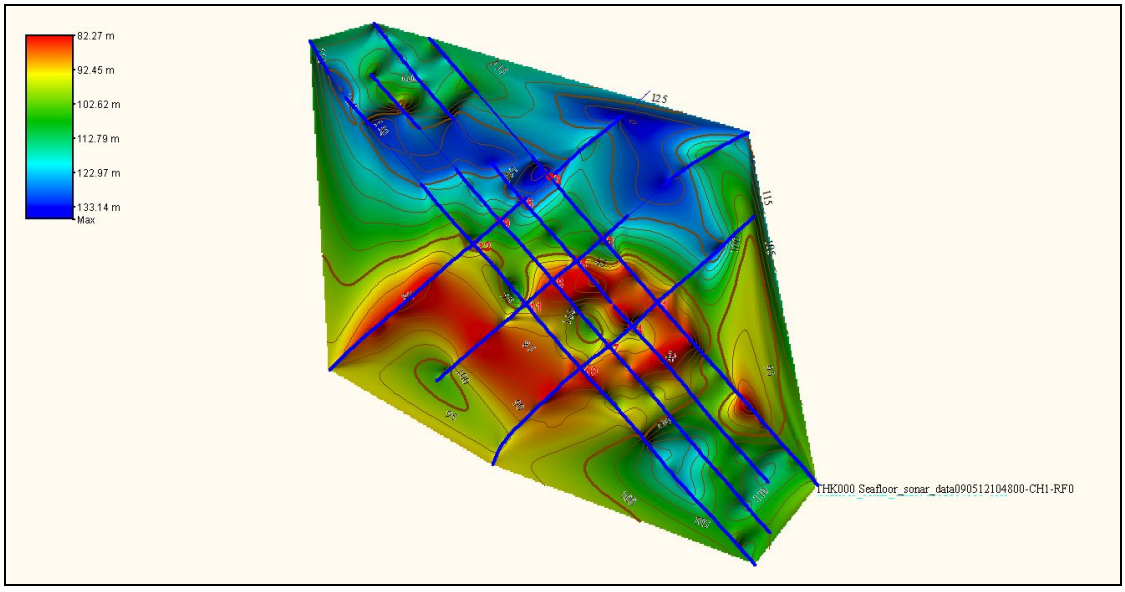
The resulting grid of the horizon is added to the project:



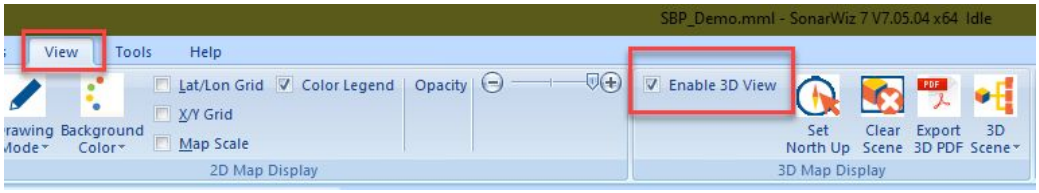
27. Create contours of the depth horizon grid by **Right-Clicking** the grid and selecting the **Contour Grid…** command



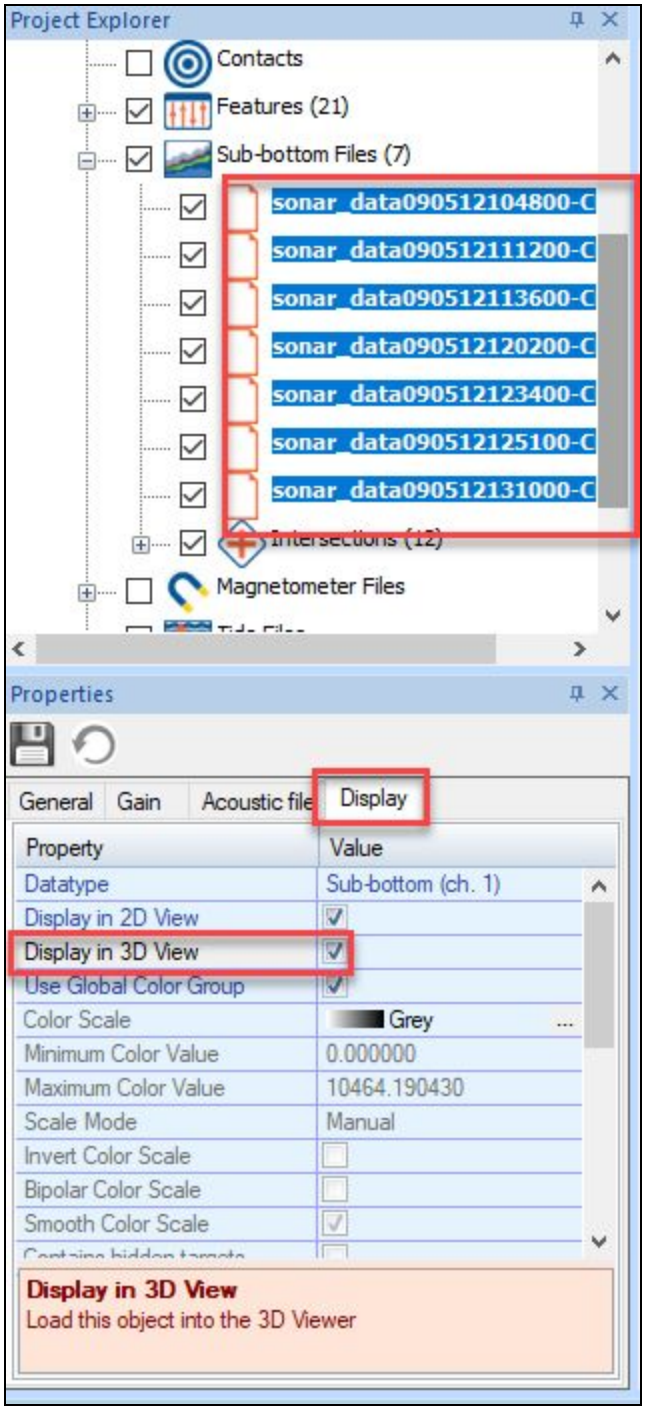
The resulting vector map is overlayed on top of the grid:



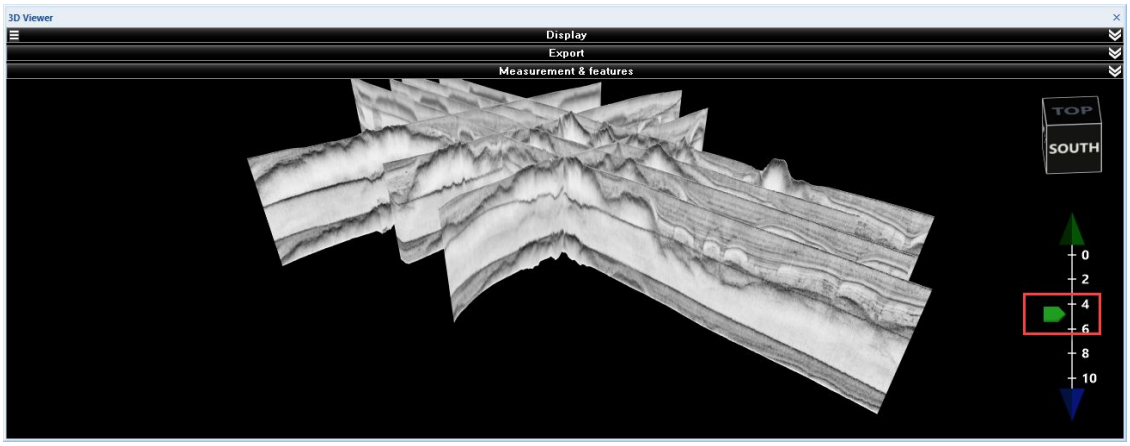
28. **To Visualize your SBP and Horizon grids in the 3D Viewer** first enable the 3D Window in the **View Ribbon Menu**.



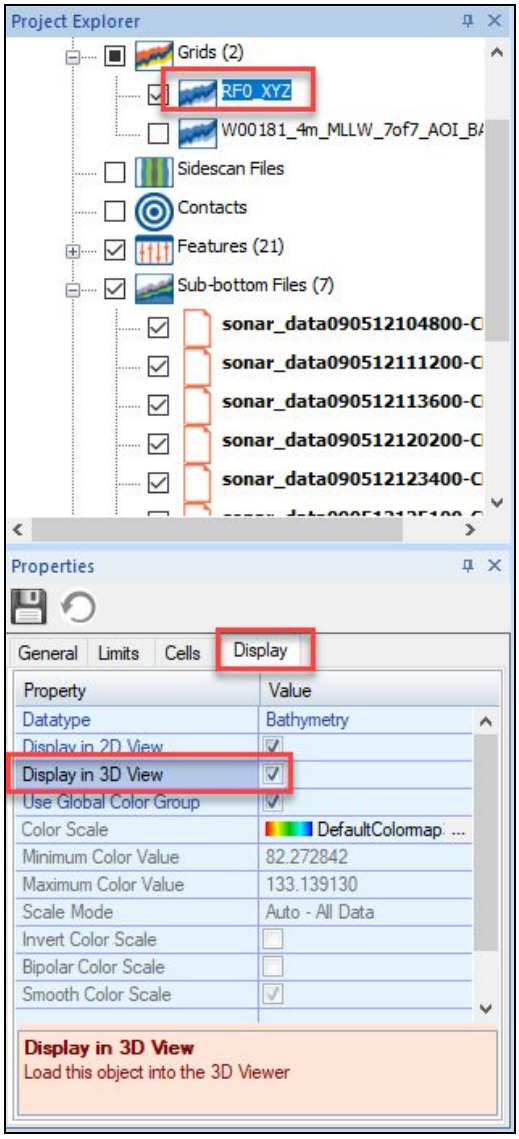
29. Select one or more of the SBP profiles you want to visualize in 3D and check the **Display in 3D View** option found in the **Display** property of the profiles.



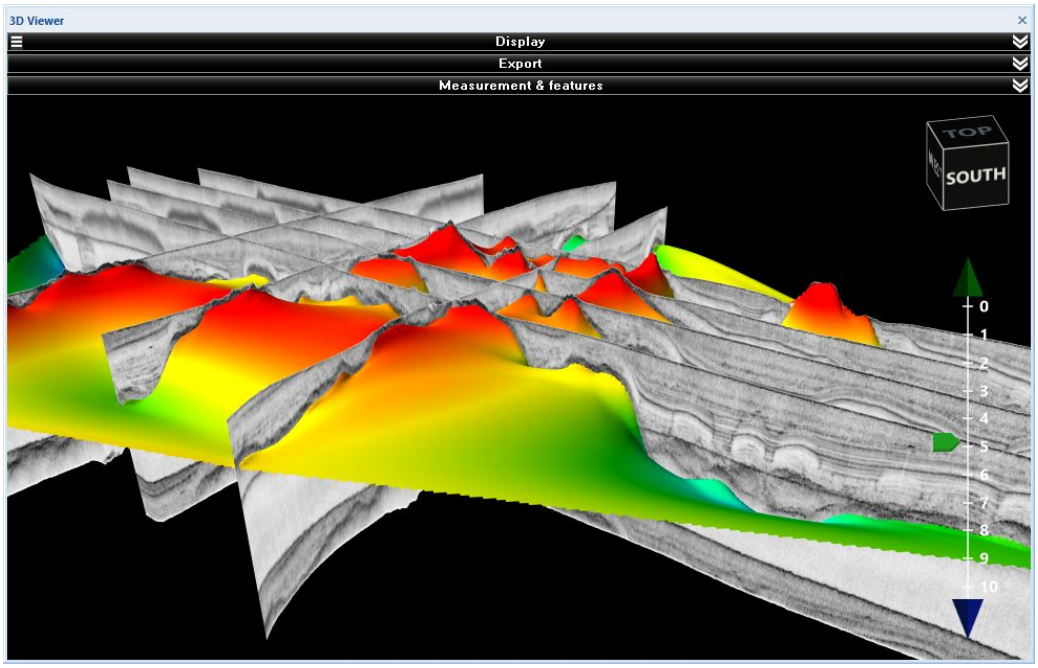
The profiles will appear in the 3D View. Use the Green Handle to control the vertical exaggeration.



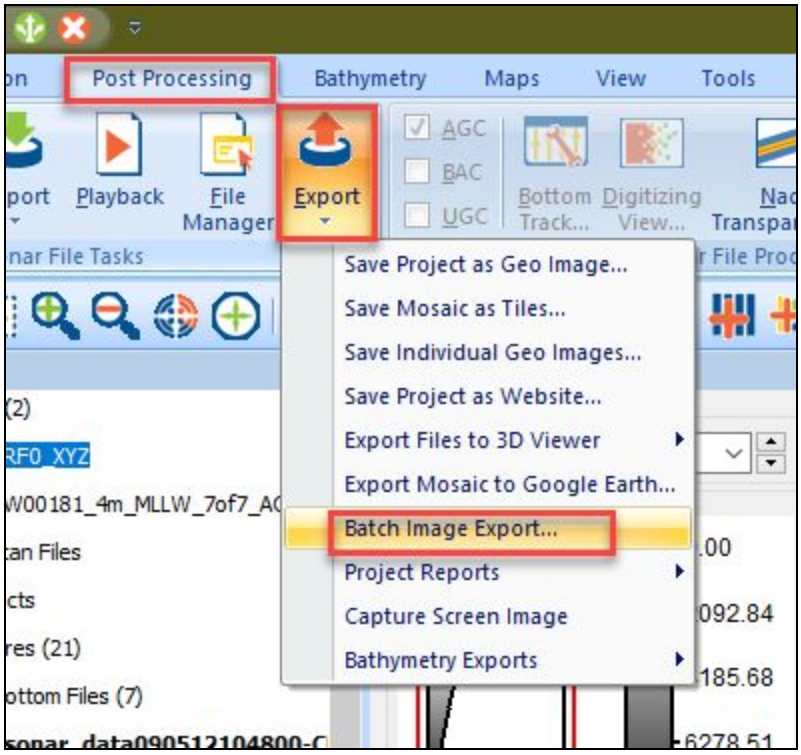
30. You can add elevation grids to the 3D display as well, including the Acoustic Horizon grid we made earlier. **Select the grids** you want to add to the 3D display, and check the **Display in 3D View** property found on the **Display** tab in the **Properties Window**.



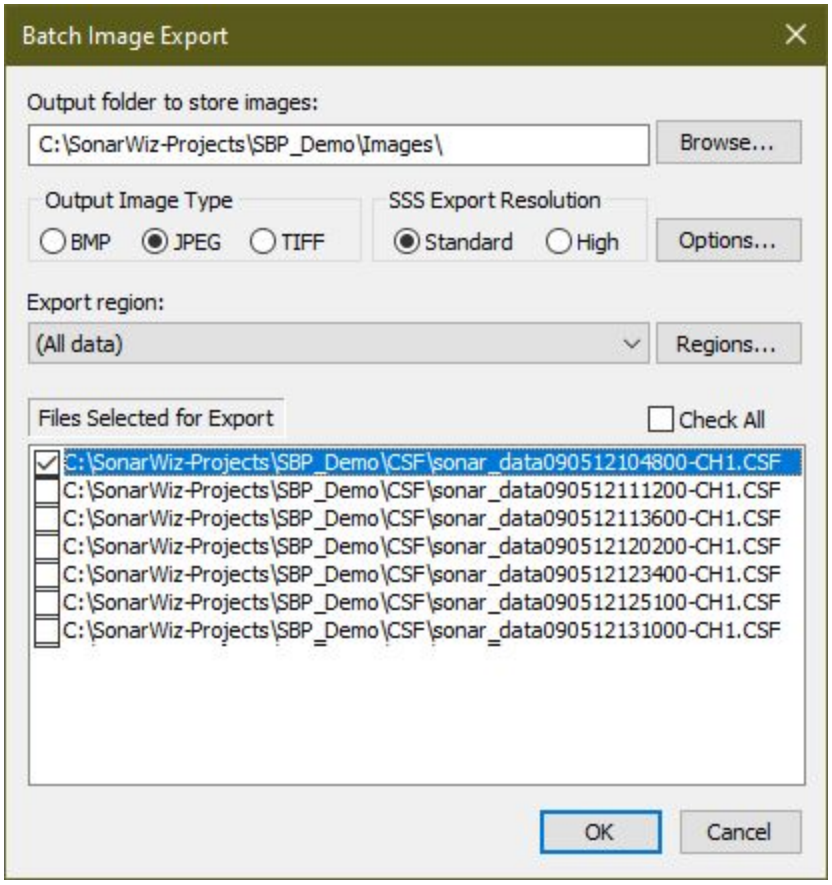
The grid will appear vertically aligned with the sub-bottom profiles



31. **To export sub-bottom profiles as images** use the **Post Processing | Export | Batch Image Export** command.

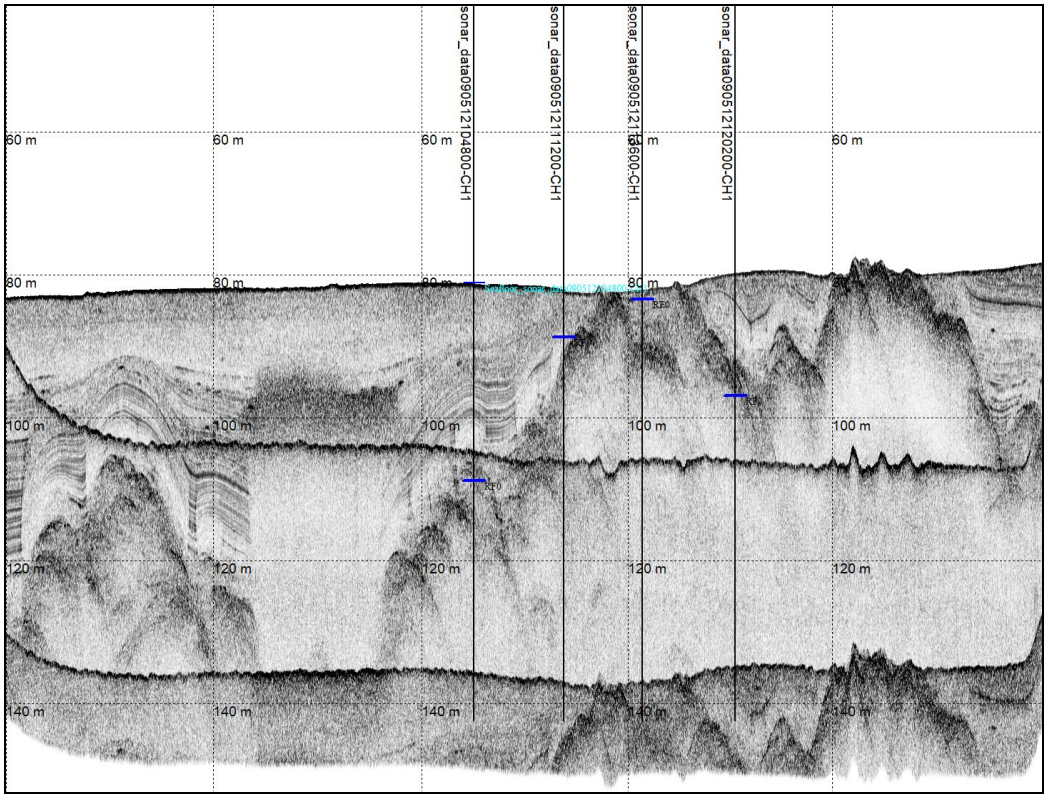


This opens the Batch Image Export dialog where you can set the output format and resolution of the profiles.



Note that you control the vertical and horizontal resolution of SBP Images in the **Program Properties | SBP Options page** which can be accessed from the **green chicken-foot menu** or from the **Preferences** icon in the **Appearance** tab of the **SBP Analysis window**.

The resulting images (here scaled with 10x VE)


sonar_data090512104800-CH1
sonar_data090512111200-CH1
sonar_data090512113600-CH1
sonar_data090512120200-CH1
60 m
80 m
100 m
120 m
140 m
RF0