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Troubleshooting with the SBET EDITOR

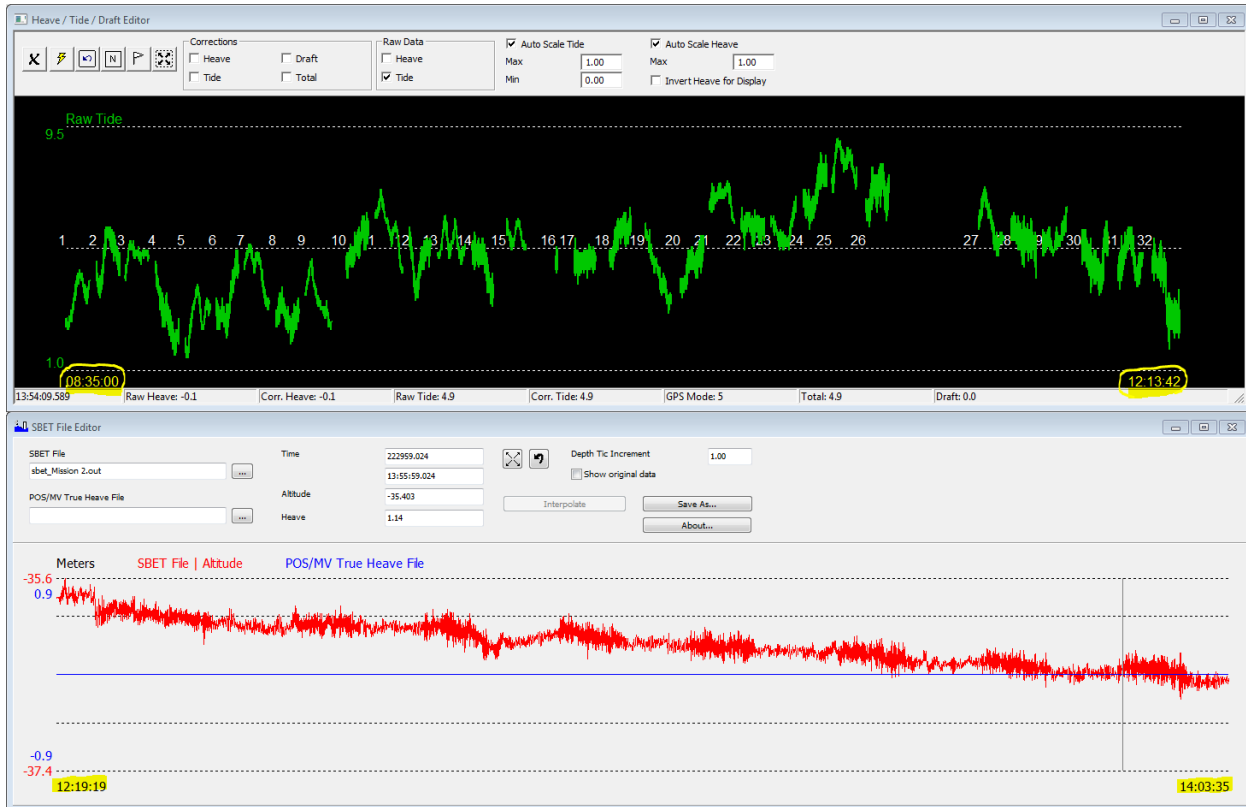
By John Lindberg

HYPACK® has the ability to load post-processed SBET (Smoothed Best Estimate Trajectory) files into MBMax (HYSWEEP® EDITOR) or SBMax (SINGLE BEAM EDITOR), replacing the real-time positions and/or RTK water levels with the post-processed data. While this can be an invaluable tool for the experienced surveyor, it can be quite difficult to troubleshoot if things just don't look the way you have expected!

While spending many years supporting the import of SBET (and True Heave) data into HYPACK®/HYSWEEP®, the most difficult part was to pull apart these files and try to figure out why they just don't look correct after importing. One issue is that these files are binary files, so it is not as easy as loading an ASCII file in a text editor and scanning through a file. With an SBET file you would need to convert the file to an ASCII format and compare values of the SBET file with the values in the HYPACK® files. Even after the conversion of binary to ASCII it is still not that easy! You have to compare XY (or lat-long) in the HYPACK® file with radians in the SBET file. In addition to that you have to compare time tags in the HYPACK® file (seconds past midnight) with the time tags in the SBET file (seconds of the week)! All this work can be quite tedious and use up a considerable amount of time. The new SBET EDITOR can make troubleshooting a lot easier!

Here is one example. Recently I was out doing some HYPACK® training and we were having trouble loading in an SBET file into MBMax. Once loaded we would lose all our positions and elevations in about half of our data. Enter the SBET EDITOR! Once we loaded the HYSWEEP® data into MBMax and the SBET data into the SBET EDITOR, we noticed that the start and end time for each data type was different. (Keep in mind that the HYPACK® data is local time and the SBET data is UTC time – in this case, 4 hrs ahead of local time.) In Figure 1, you will notice that the last 2 hours of the SBET file is missing some data when comparing the SBET graph with the MBMax tide graph.

FIGURE 1. SBET EDITOR Shows Missing Data in the SBET File



In another troubleshooting example, a customer complained that applying the SBET shifted his RTK tides by about 5 meters. In order to troubleshoot this, I took a raw HYPACK® file into the SINGLE BEAM EDITOR, added GPS Elevation to the spreadsheet, and noted the GPS elevation at a specific time. In Figure 2, the elevation was 50.28 meters.

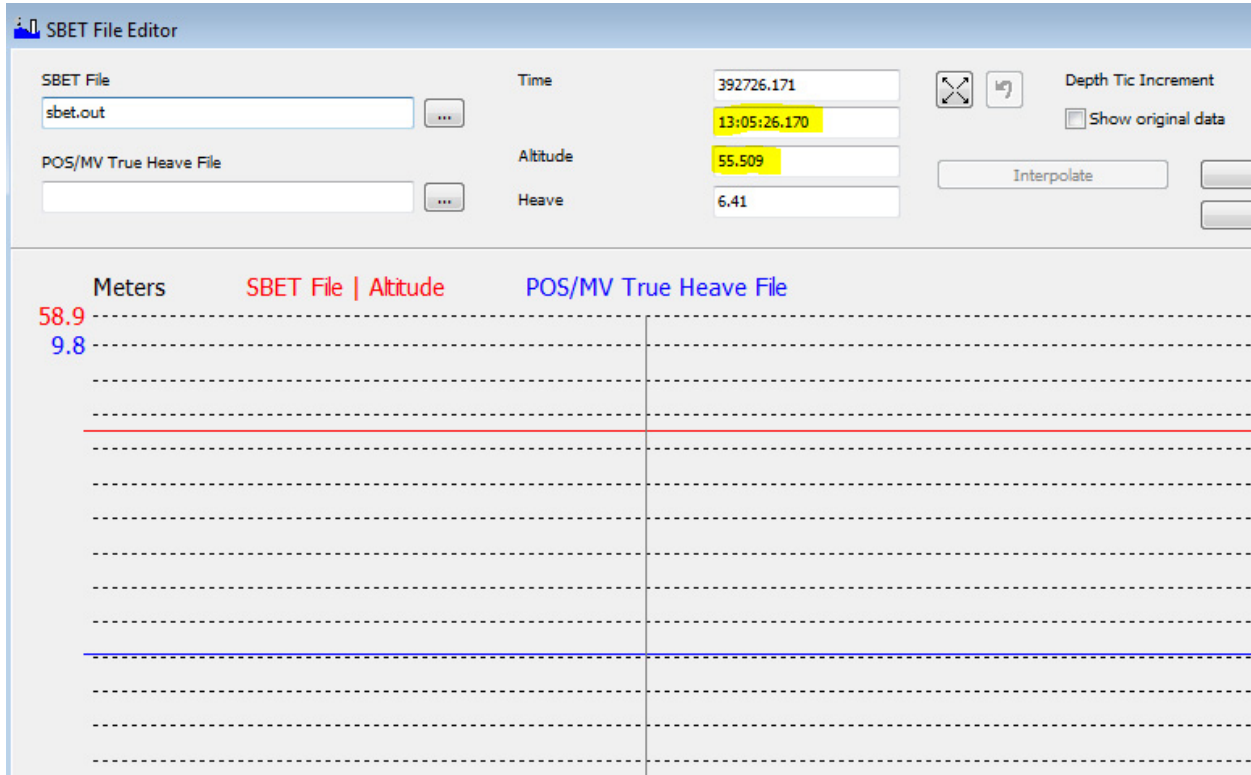
FIGURE 2. Checking the GPS Elevation in the SINGLE BEAM EDITOR

The figure shows a 'Spreadsheet' window with a table of data. The table has the following columns: Record, Time, GPS Elevation, Raw Depth 1, Raw Depth 2, Heave Corr, and Line No. The first row (Record 1) is highlighted in yellow, showing a Time of 13:05:26.17 and a GPS Elevation of 50.28. The subsequent rows show similar data points for records 2 through 7.

Record	Time	GPS Elevation	Raw Depth 1	Raw Depth 2	Heave Corr	Line No.
1	13:05:26.17	50.28	8.65	0.00	-0.00	2
2	13:05:26.18	50.28	8.65	0.00	-0.00	2
3	13:05:26.20	50.28	8.63	0.00	-0.00	2
4	13:05:26.27	50.28	8.64	0.00	-0.00	2
5	13:05:26.34	50.28	8.65	0.00	-0.00	2
6	13:05:26.35	50.28	8.65	0.00	-0.00	2
7	13:05:26.37	50.28	8.65	0.00	-0.00	2

Then I loaded the SBET file into the SBET EDITOR and noted the altitude at the same time (both HYPACK® and SBET files were collected using UTC time). The altitude in this case was 55.5 meters!

FIGURE 3. Checking the Altitude (Elevation) in the SBET EDITOR



So, in this example HYPACK® was using the value in the SBET file, and we came to the conclusion that the SBET data was improperly processed. Once the customer realized that, he was able to reprocess the SBET data and reapply the proper elevations in HYPACK®.

As you can see by the above examples, the SBET EDITOR can be a great troubleshooting tool for the surveyor!