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Signal Operations
Subtracting signals

Subtraction

This chapter shows how to subtract one signal from another. We will be using two signals for this particular project; one is an original depth signal with 144 points per day and the other is an average value per day signal with one point per day

Subtracting the average signal from the depth signal

Select the depth signal. Once the depth chart is active click the **Signal operation** button on the main toolbar and select **Subtract** (see figure 1):
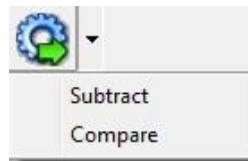

Figure 1 Subtract
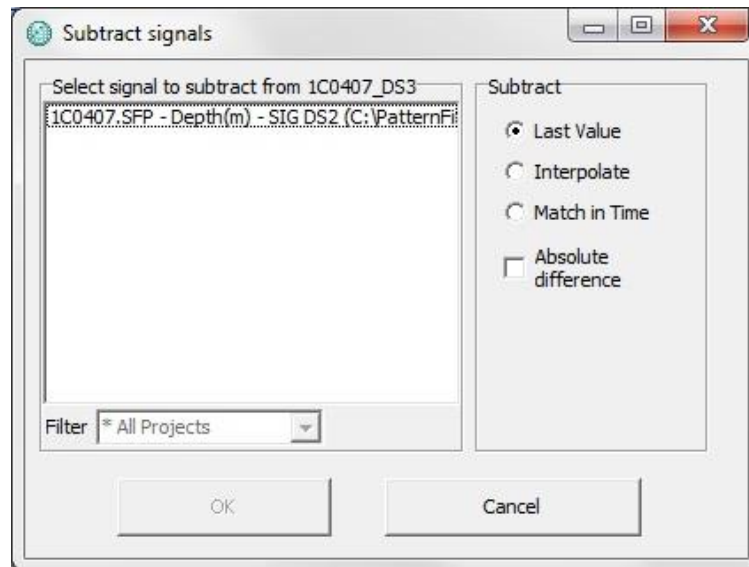
The following window appears:

Figure 2 Subtract signals

You can filter the signals by selecting one of the options in the drop-down list (see figure 2). Note that this option is not available when working with a SFP.

In this particular project you can choose between two different signals. Select **Mean 1 day** and click **OK**
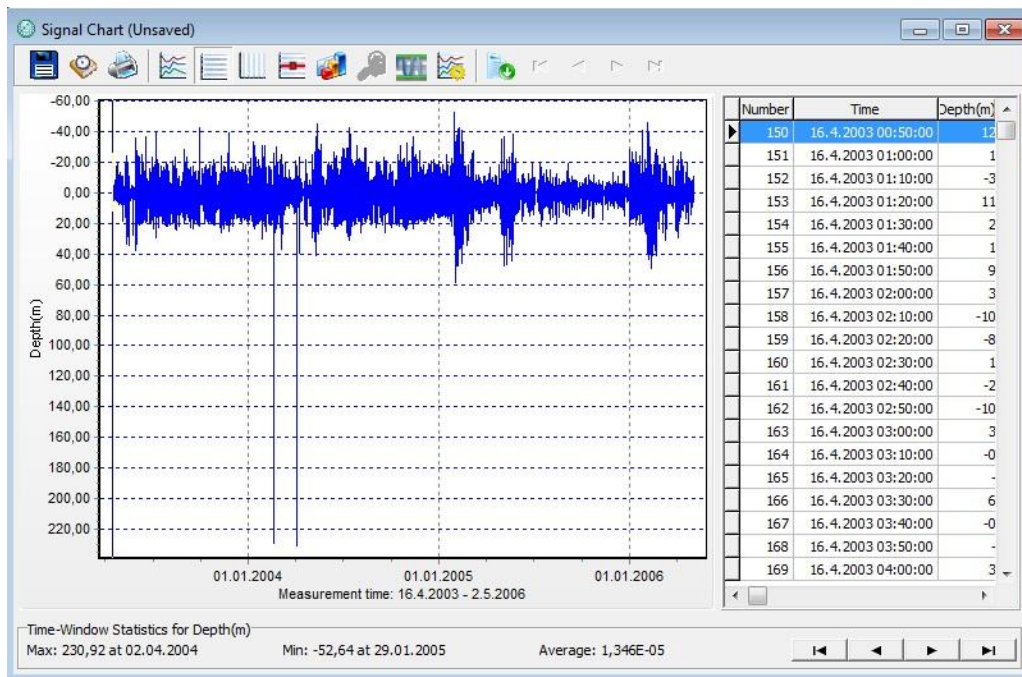
The following chart appears:

Figure 3 Signal Chart: Depth-Mean

The chart shows the depth signal (144 points per day) from which the mean value per day has been subtracted. The measurement values in the resulting signal oscillate around zero.

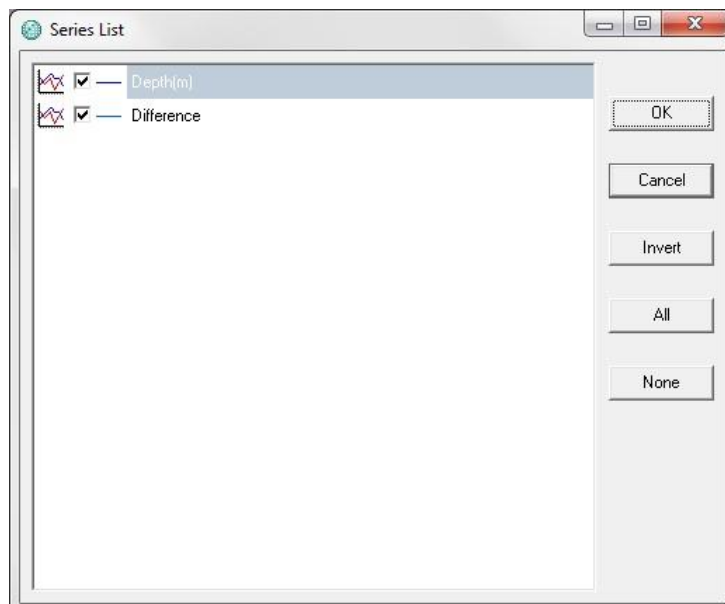Click on the **Active series** button on the chart bar and select **Difference** (see figure 4).

Figure 4 Series list

The **Difference** signal is the original signal minus the resulting signal.

Zoom in on the chart. As can be seen, the difference signal is exactly the same as the **Mean 1 day** signal except that instead of having one point per day, it now has 144 points per day (see figure 5).
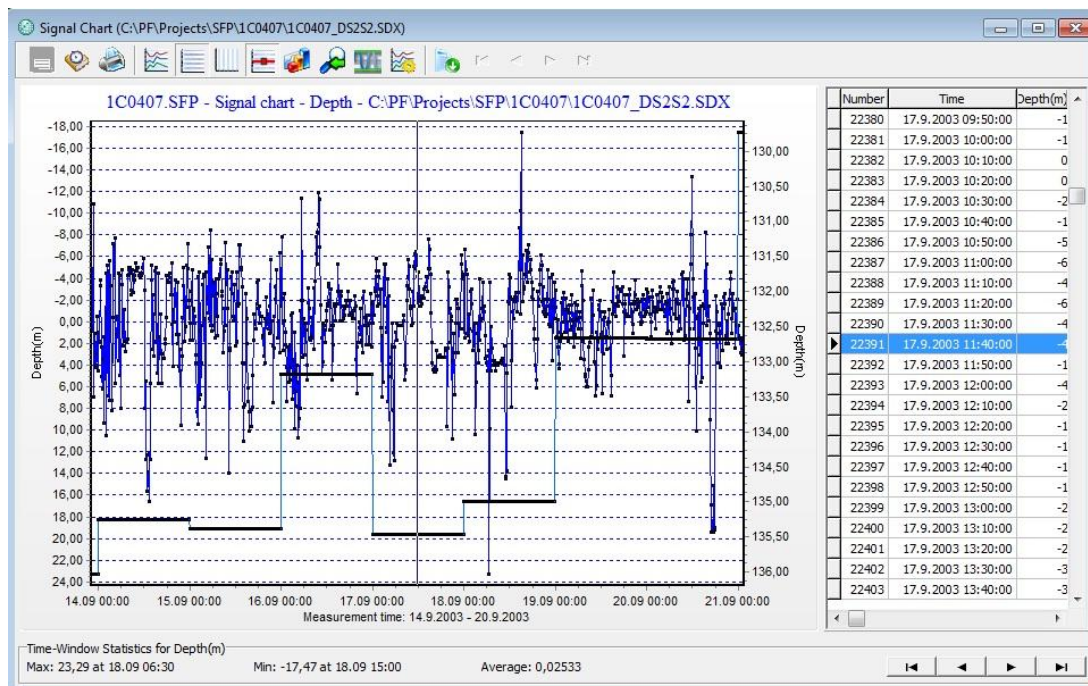

Figure 5 Signal chart: Difference

Subtracting the depth signal from the average signal

This operation is exactly the same as the one described above except that you start by selecting the **Mean 1day** signal and then subtract the **Depth** signal.

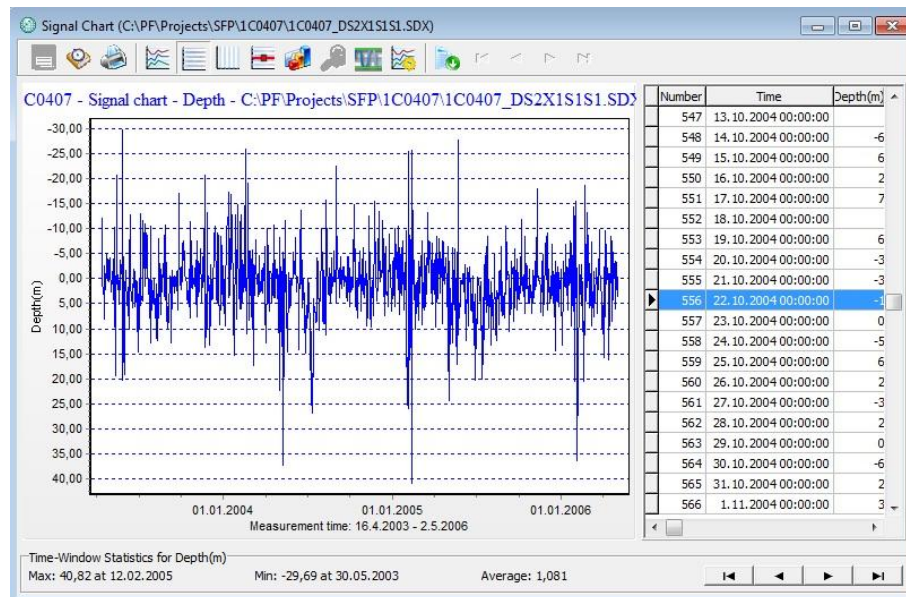The following window shows the resulting signal chart:

Figure 6 Signal Chart: Mean-Depth

By checking the **Absolute difference** box (see figure 2) only the positive values are displayed on the chart.
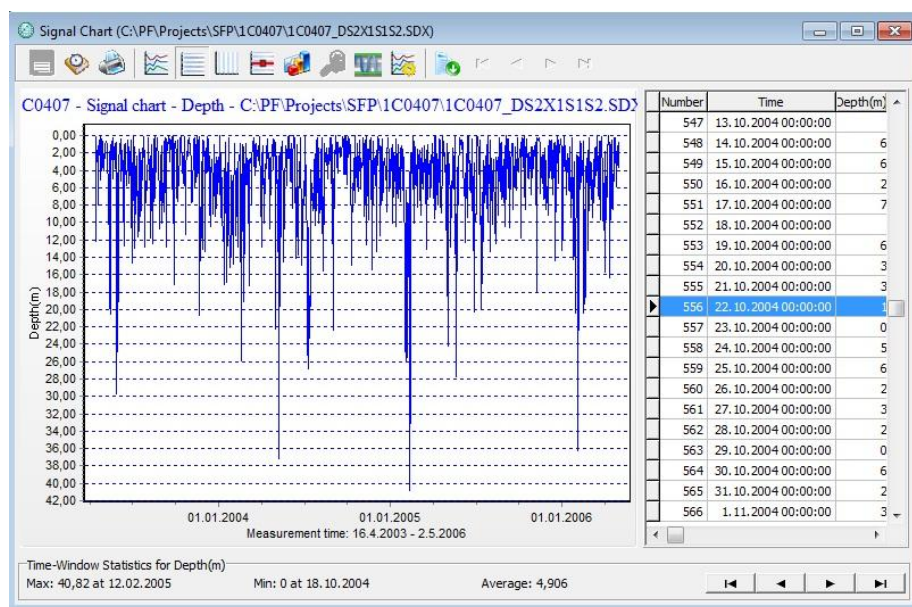

Figure 7 Signal Chart: Absolute values

Click on the **Active series** button on the chart bar to view the **Difference** signal (see figure 8).

The **Difference** signal is the original signal minus the resulting signal. Zoom in on the chart. As can be seen, the difference signal has the same number of points as the original **Mean 1 day** signal (see figure 8).
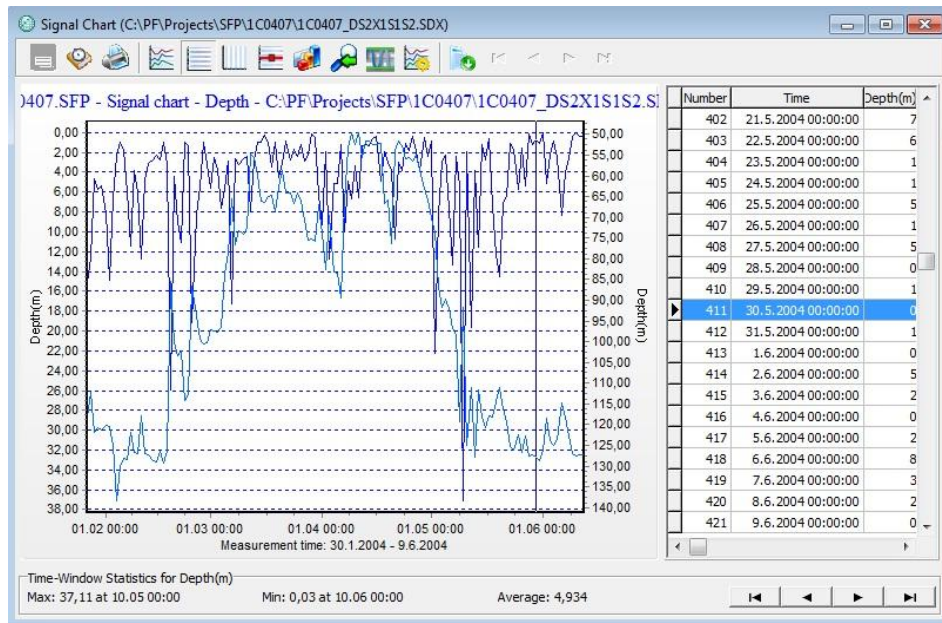

Figure 8 Signal Chart: Absolute difference

Compare

The **Compare** option allows the user to compare two signals to check if their values match.

Click the **Signal operation** button [icon] on the main toolbar and select **Compare** (see figure 9):
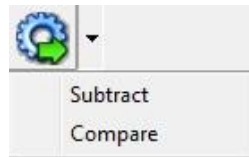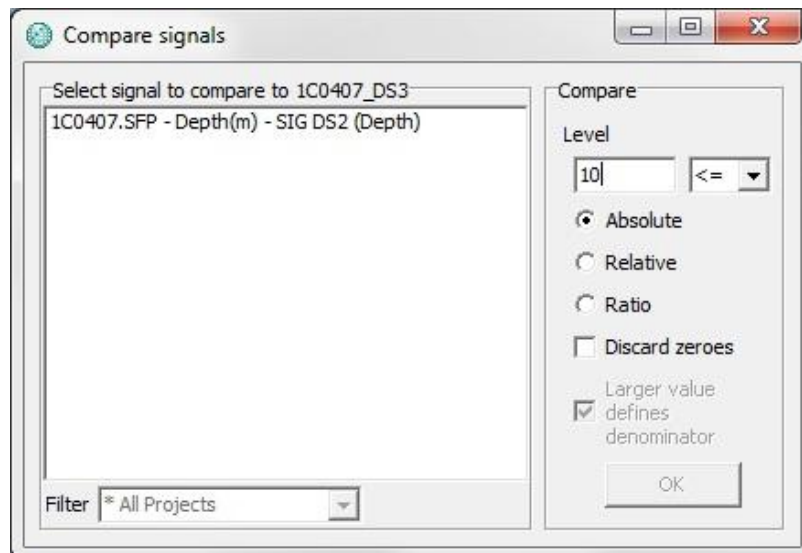

Figure 9 Compare

The following window appears:

Figure 10 Compare signals

Level: The level (L) determines the value that each pair is compared with, default is less than one.
Absolute: The absolute difference of the pair compared to the level.
(If |a-b|<L then c=1 else c=0).
Relative: The relative absolute difference of the pair compared to the level.
(If a≠0 ^ |(a-b)/a|*100<L then c=1 else c=0).
Ratio: The ratio of the pair compared to the level.
(If a≠0 ^ |b/a|*100<L then c=1 else c=0).
Discard zeroes: If either point is zero then the comparison is false (0).

Larger values defines denominator: If using Relative or Ratio then the division will use the larger absolute value as denominator, and the smaller as numerator.

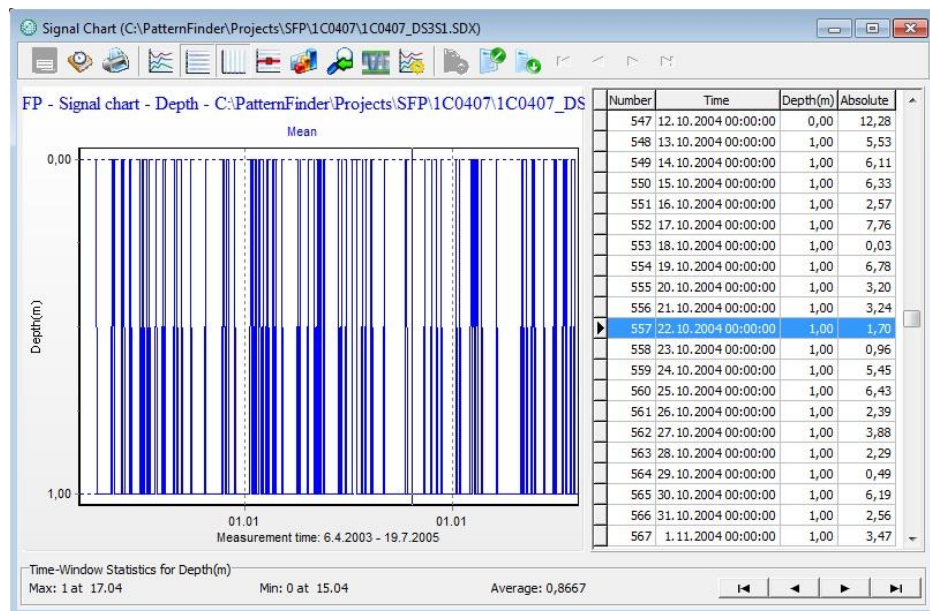Select the signal and click **OK**. A signal chart appears:

Figure 11 Compare

The result is always either zero or one.

History

Click the **History** button ⬙ on the chart bar to add comments and view information on the origin of the signal and the progress of the project (see figure 12). Click **Print** to print out the information (see figure 13).
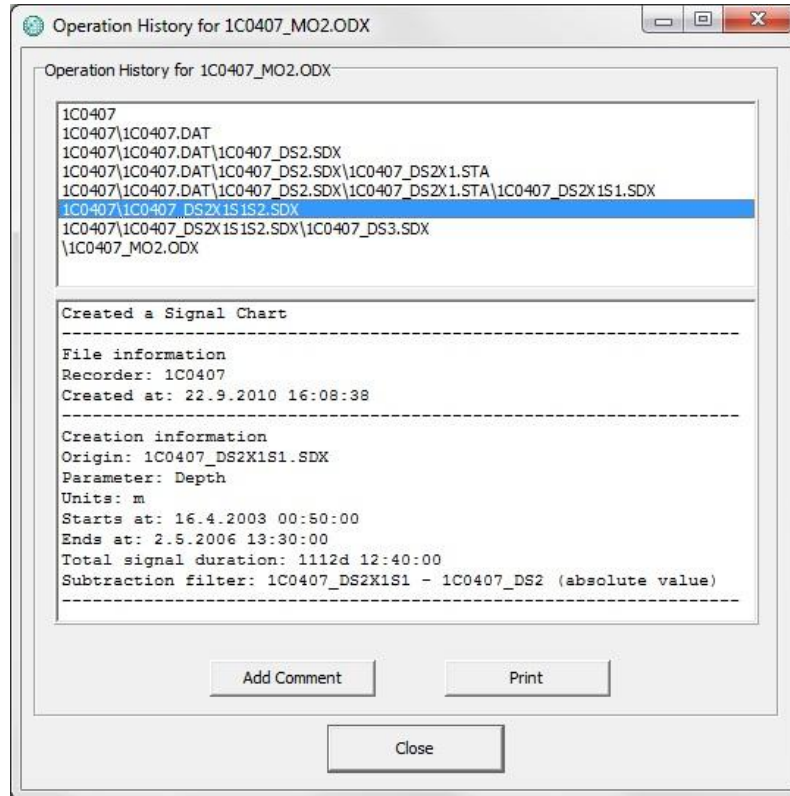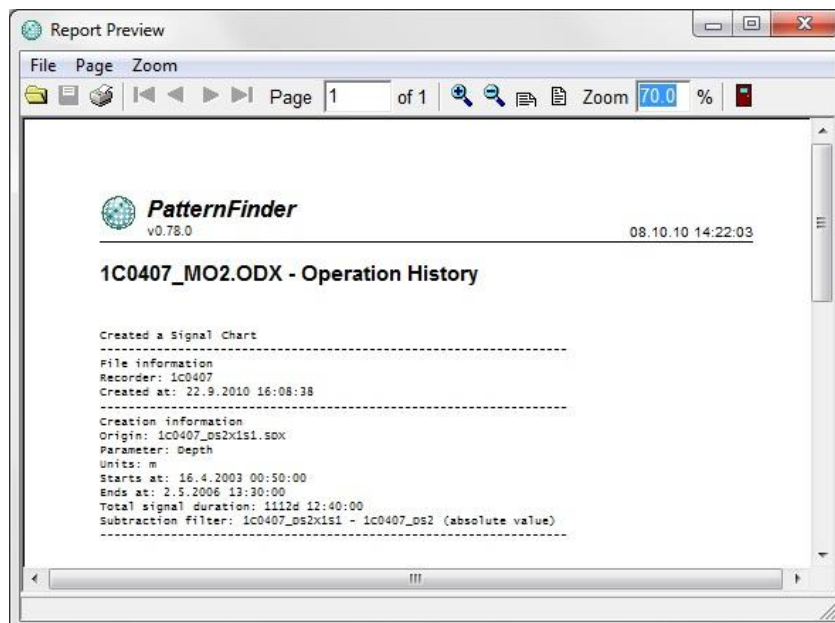

Figure 12 History

Figure 13 Print preview