

SonarWiz Magnetometry Post-Processing Reference

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Table of Contents

1	Magnetometry Post-Processing Feature - Tutorial	4
1.1	Generating a MAG File	6
1.2	Importing a MAG File - Example	8
1.2.1	Imported MAG Lines - Representation in MML file	13
1.3	Editing Your MAG file - Example	13
1.3.1	Mag-data decimation (down-sampling) to 1hz rate - 5.07.0012 and earlier	14
1.3.2	Mag-data Down-sampling - 5.07.0013 and beyond	14
1.3.3	Identifying Anomalies	15
1.4	Adding Layback to a Mag Line	16
1.4.1	Setting Mag Layback - Example	16
1.4.2	Set Cable Out and Offset Cable Out	20
1.5	Controlling Mag Editor Presentation - Raw, Smoothed, Ambient	21
1.6	Computation of Anomaly Amplitude, and Z export in XYZ export	23
1.7	Auto-Detection of Anomalies	23
1.7.1	Anomaly amplitude (peak-to-peak RAW difference) measurement	24
1.8	Manually Picking, or Editing Anomalies	28
1.8.1	Anomalies - Storage in the ANO file	30
1.9	Creating Grid and Contour Exports of your Mag data	30
1.10	Adding Color-scaled Mag Grids to the Project	35
1.11	MAG Real-time and Post-Process - PLAYBACK Options	36
1.11.1	MAG / SS correlated Viewing - Real-Time or Post-Processing	36
1.11.2	Post-processing correlated SS Map View and Mag Editor Data View	41
1.12	Gradiometer Post-Processing in SonarWiz	42
1.12.1	Gradiometer Sample Data Set - optional images	42
1.13	SIT Recommendations	44
2	Magnetometer File Format Templates - Overview	44
2.1	Choosing a File Template and Pre-viewing your Magnetometer Data	45
2.2	Managing your Mag Project - project movement limitations	46
3	Magnetometer File Templates - Format Summary	47

4	Magnetometer File Format Templates – Details	49
4.1	AquaScan AXL	49
4.2	Arts Gavia MAG	49
4.3	Balaswamy-MAG	50
4.4	C&C Magnetometer	50
4.5	CSF Magnetometer	51
4.6	FSL-MAG	52
4.7	G882_Type3	53
4.8	GEMS_Meren13_INT	53
4.9	GEMS_Meren13_INT_SHIFT	54
4.10	GEMS-gradimeter	55
4.11	GEMS-INT-mag1	56
4.12	GEMS-INT-mag2	56
4.13	GEMS-MagLog	57
4.14	GEMS-MagLog-CSV	58
4.15	GEO_G882_Mag	59
4.16	HWTMA-2011-1-MAG	59
4.17	HYPACK RAW File Magnetometer	60
4.18	JSF_MAG_IMPORT	60
4.19	Lat Lon MAG (tab delimited)	60
4.20	Lon Lat MAG (space delimited)	61
4.21	Maglog Type 4	61
4.22	Maglog Type 5	62
4.23	Maglog Type 6	62
4.24	Maglog Type 7	63
4.25	Maglog Type 8 (no longer supported)	64
4.26	Maglog GPS-Pos w/Altitude	65
4.27	Maglog GPS-Pos-Alt-MAG2-MAG3	65
4.28	Maglog Magnetometer	66
4.29	Maglog w/Altitude	67
4.30	MagLog-Spencer	67

4.31	MMT Maglog GPS-Pos w/Altitude.....	69
4.32	OFG-Mag-2.....	69
4.33	PLR Magnetometer.....	70
4.34	PLR Magnetometer (m)	70
4.35	SeaLink MAG.....	71
4.36	SeaLink-Wilhelm	71
4.37	SeaSpy Type 3	72
4.38	SonarWiz-Default-MAG	73
4.39	SWM-E,T,D,L,L,X,M,A,D,S	73
4.40	SWM-MAG882.....	74
4.41	SonarWiz-MAG-file-default	75
4.42	SWM-SEASPY.....	75
4.43	SWM-SEASPY_XY	76
4.44	TBSmith Hypack MAG	76
4.45	TeslaOffshore-MAG-1.....	77
4.46	UDEL_G882_1.....	78
4.47	UDEL_G882_2.....	79
4.48	XYZ MAG.....	80
4.49	XYZA MAG	81
5	Document History.....	82

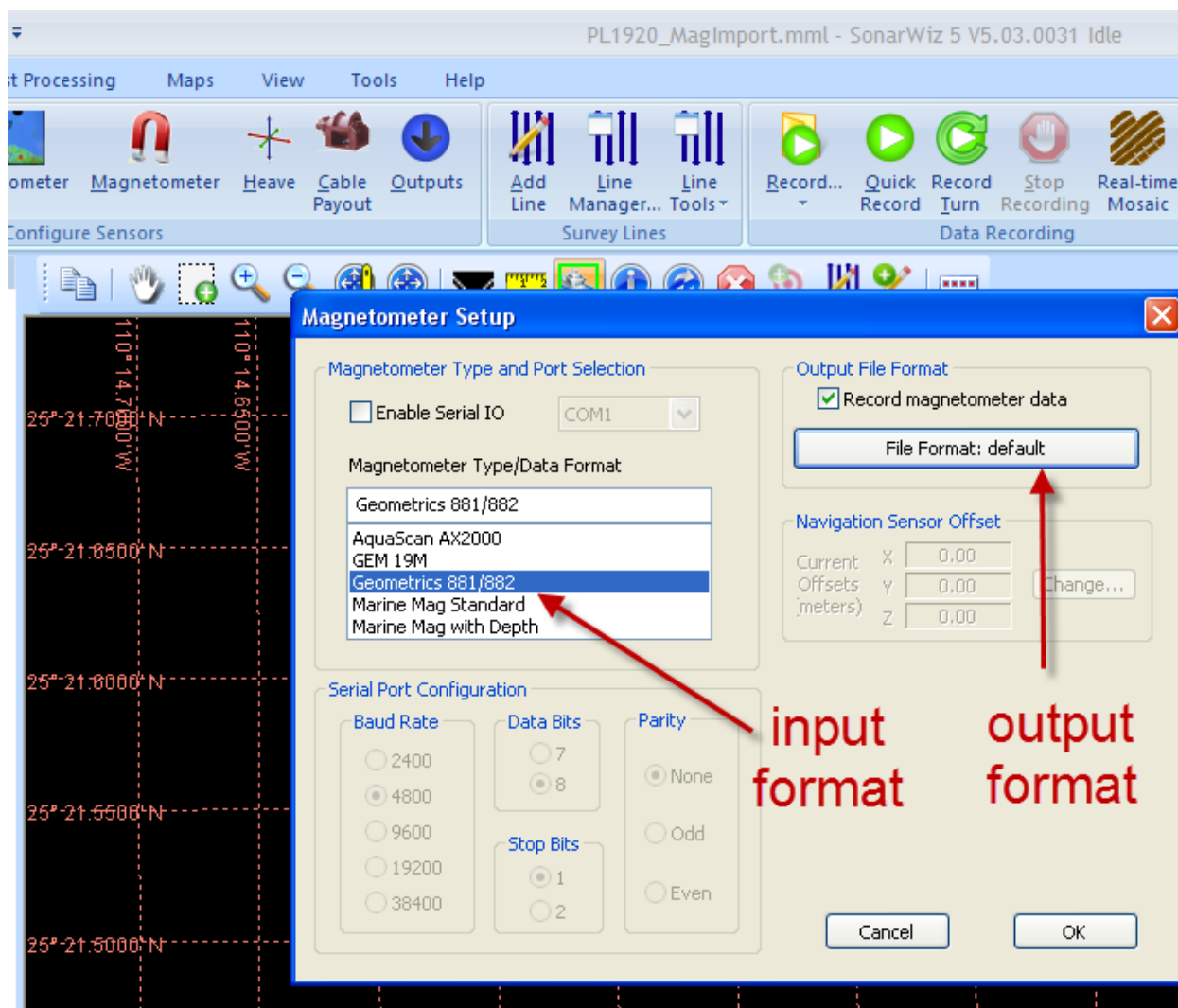
1 Magnetometry Post-Processing Feature - Tutorial

Magnetometry post-processing is available in SonarWiz with purchase of the magnetometry post-processing license option. The templates described below for mag file import, are current as of version **6.05.0025 and 7.04.05**.

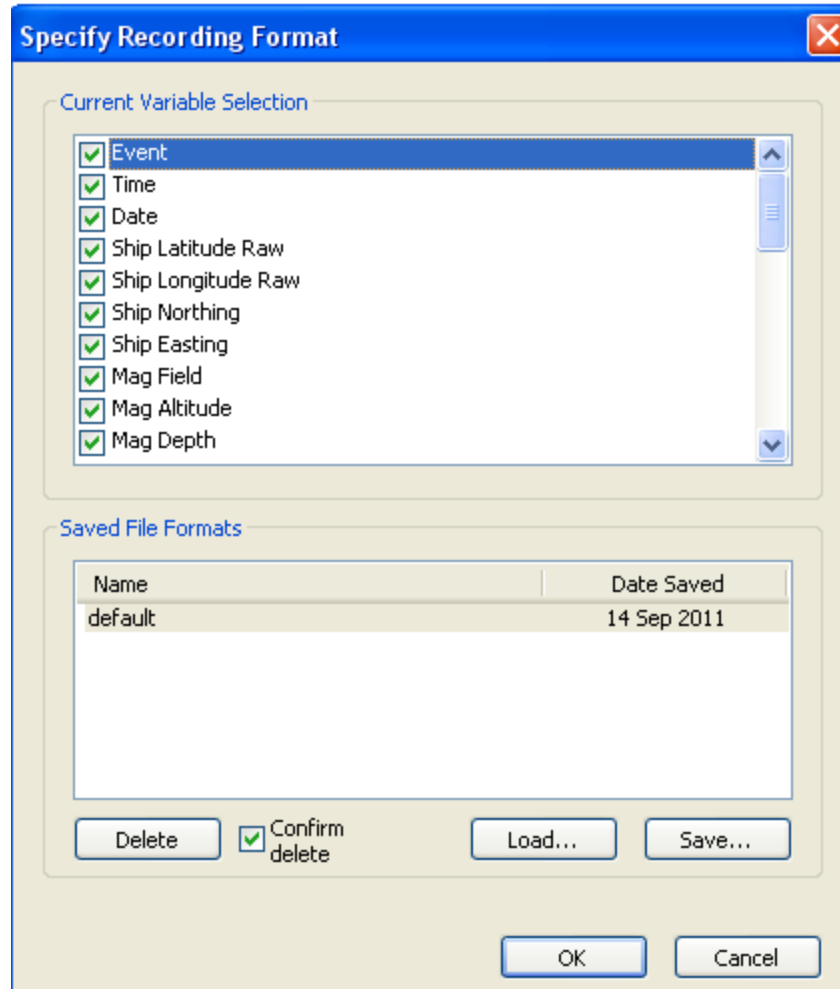
Mag data is typically a text-format file, though it can be saved internal to some sonar files. **With any real-time acquisition interface, mag real-time acquisition comes along as a feature for free.**

What you pay for in the mag post-processing license, is the ability to add magnetometry file post-processing (import and post-processing) for files such as those you have saved during a previous survey, or captured with SonarWiz to disk.

When you record to disk, the mag data can be formatted per your choice, with a set-up dialog under Data Acquisition->Magnetometry. You specify the input format and output file format, if you want to vary it from the default format:



Here's an example of output file format fields formatting choice:

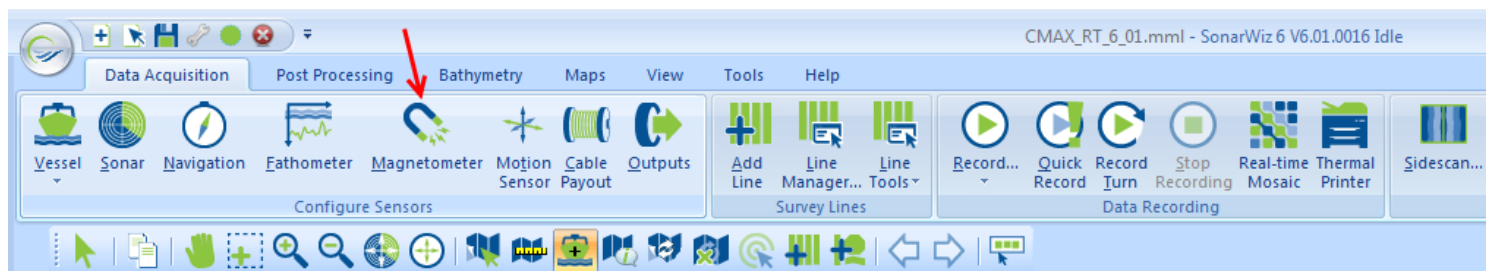


So then the saved file exists after the survey, on your hard drive, typically in the MAG folder of your project.

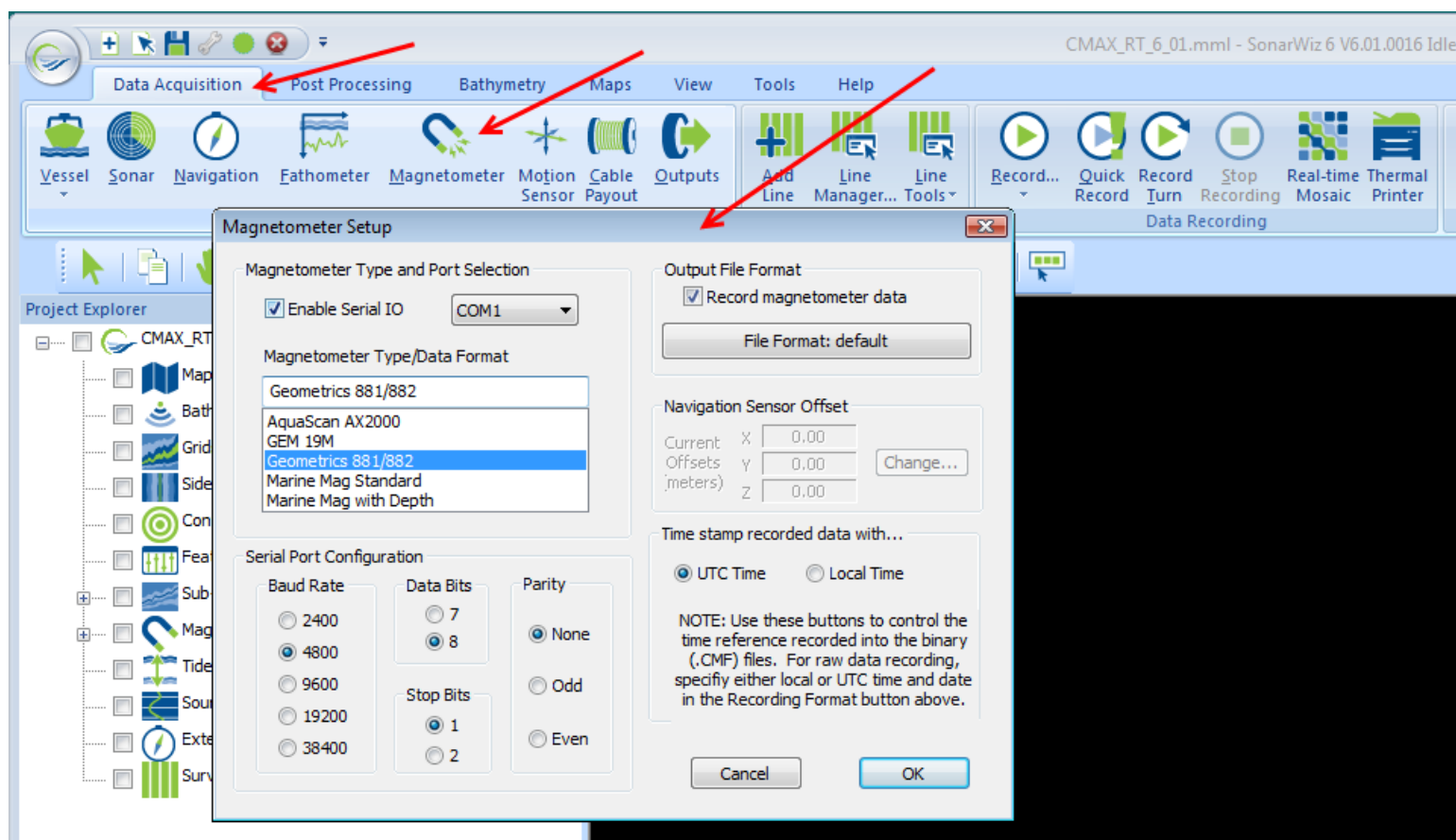
1.1 Generating a MAG File

There are a few ways to generate a MAG data file. Here are some options:

- (1) **With ANY real-time feature set purchase with SonarWiz, you get access to the entire set of DATA ACQUISITION tabs in SonarWiz.** This means that a purchase of Edgetech 4200 sidescan R-T, for example, licenses access to ALL these tabs in the SonarWiz GUI:



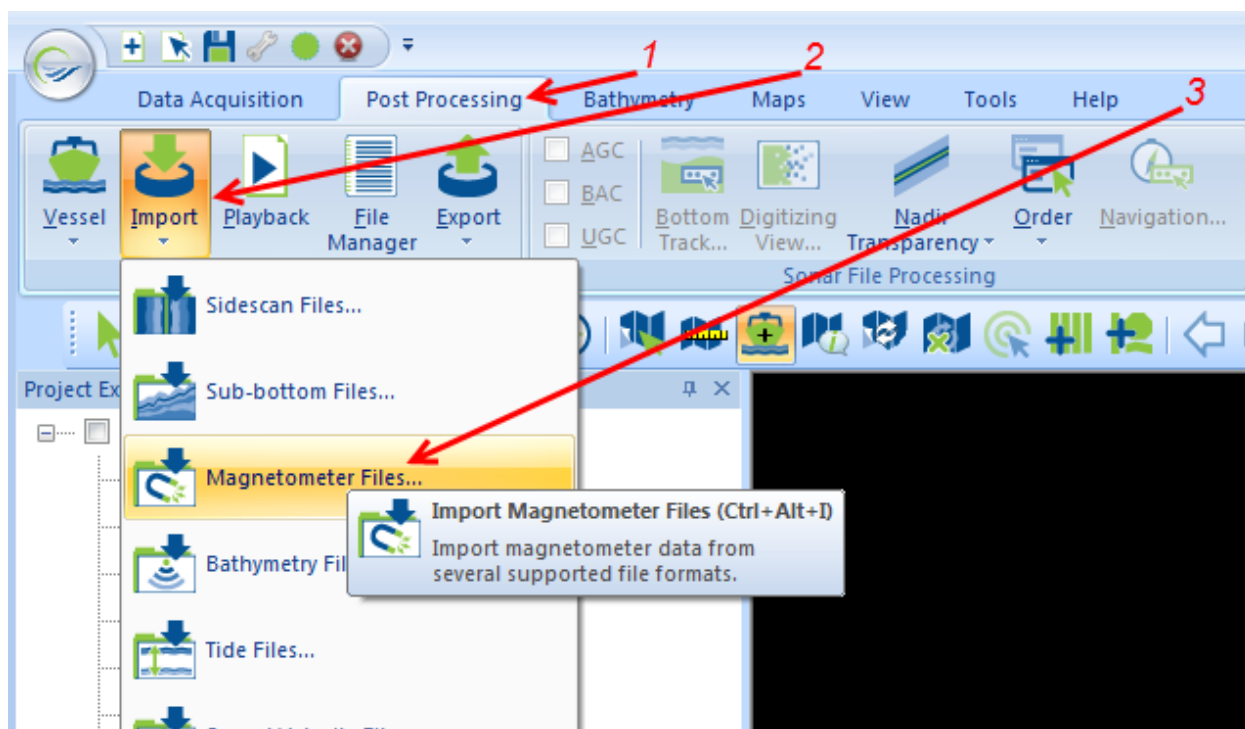
If you can see that in your SonarWiz GUI, you get access to the sub-dialog for setting up MAG real-time data acquisition like this, and you can record MAG data:



Then you just select the settings you need, and record MAG data. No matter what sonar device you have licensed for R-T, it always includes MAG R-T free.

(2) Without any real-time data acquisition features purchased with SonarWiz, you can use your MAG equipment, record a data file, and then import it into SonarWiz, as long as you have the MAG post-processing option license feature in SonarWiz.

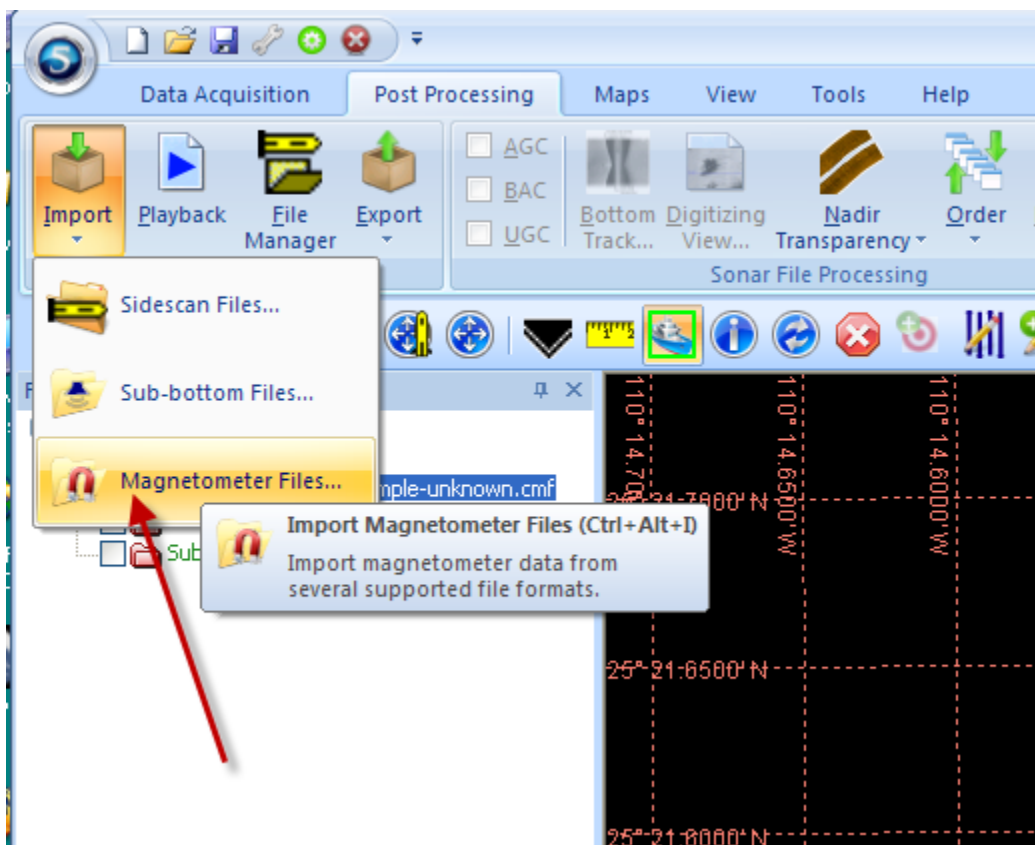
If you have purchased MAG post-processing license, the MAG file IMPORT option will not be greyed out in the IMPORT drop-menu here, and you will be able to import and post-process files according to the information presented below in this PDF:



To post-process the recorded MAG file, you use post-processing-> Import -> Import magnetometer files, and the steps involved in this are described below.

1.2 Importing a MAG File - Example

To post-process the recorded MAG file, you use post-processing-> Import -> Import magnetometer files:



The input file will look something like this (SWM_882 template example file), when opened with a text editor like NOTEPAD:

```
08/29/2011 07:45:08.998 25.360134 -110.239577 S5 125709.9 S7 5.0 S9 S10
08/29/2011 07:45:09.098 25.360113 -110.239573 S5 125711.89 S7 5.0 S9 S10
08/29/2011 07:45:09.198 25.360086 -110.239554 S5 125714.89 S7 5.0 S9 S10
08/29/2011 07:45:09.298 25.360069 -110.239564 S5 125715.9 S7 5.0 S9 S10
08/29/2011 07:45:09.398 25.360045 -110.239561 S5 125717.89 S7 5.0 S9 S10
```

Here's the template format we have pre-defined for import for this type of MAG file (see attached PDF):

4.31 SWM-MAG882

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 14 (said 14 but there were only 9 fields defined)

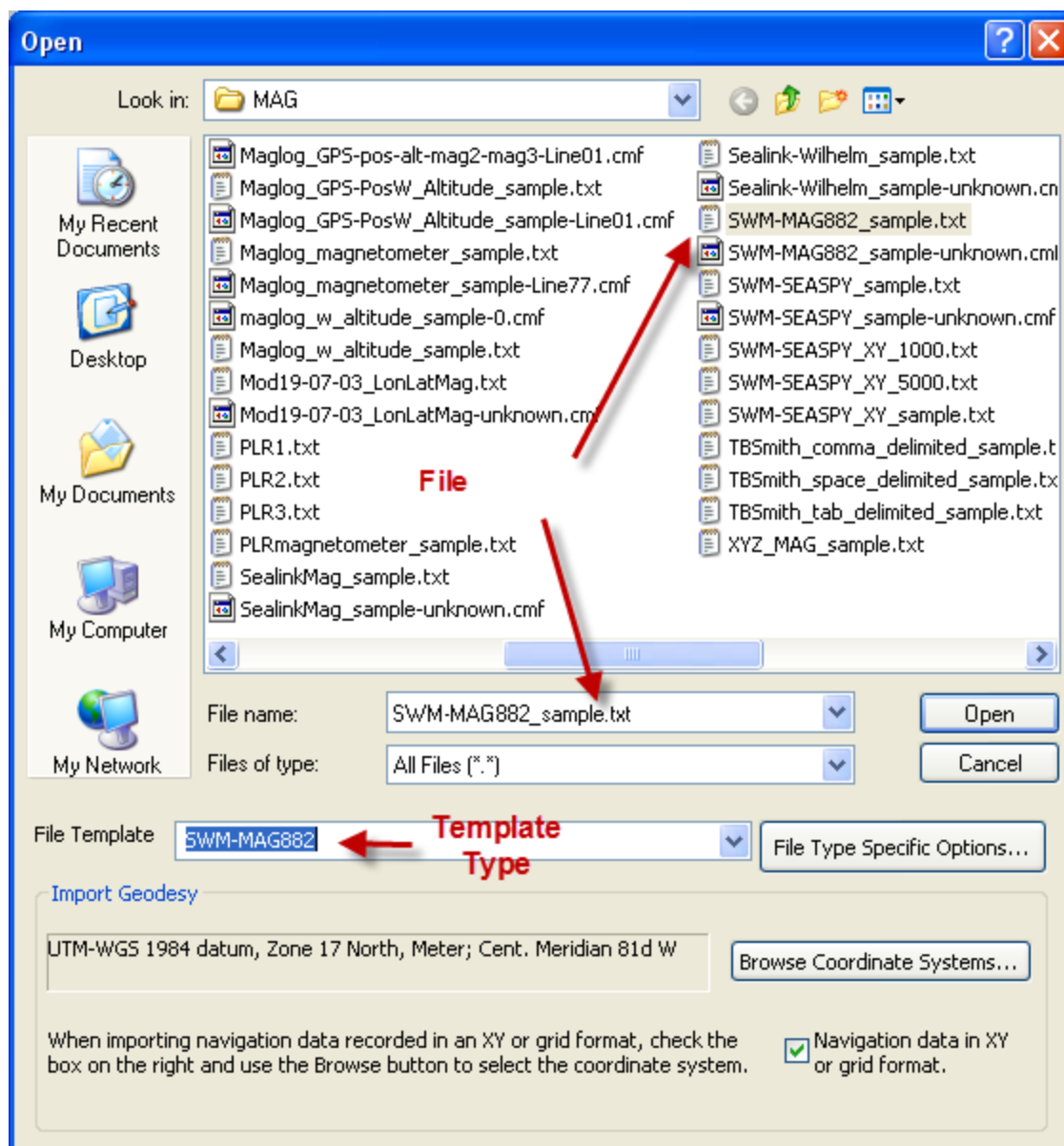
Fields delimited by: Variable delimiter characters (comma or space)

Template format details

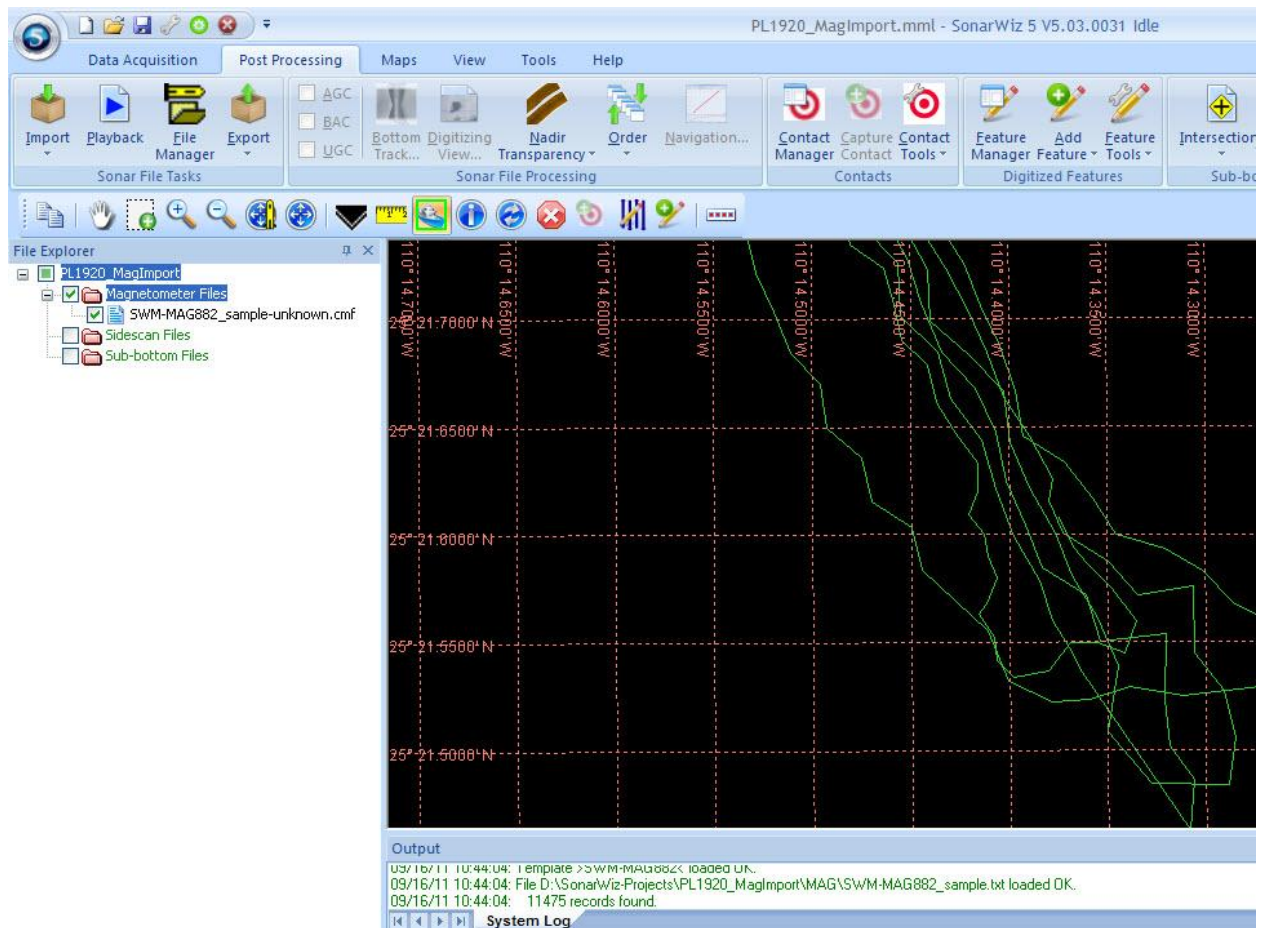
Field	Name	Type	Format
0	date	date	MM/DD/YYYY
1	time	time	HH:MM:SS sss
2	latitude	geocoord	DDD ddd
3	longitude	geocoord	DDD ddd
4	skip1	char	
5	mag_amplitude	float	
6	skip_field_strength	float	
7	mag_depth	float	
8	skip_to_end	char	

Here's the import dialog to bring in the file, accessed by:

Post-processing -> Import -> Import Magnetometry file



Then the SWM-MAG882 format file imports (in this case 11475 records) and shows first in the mosaic view:



1.2.1 Imported MAG Lines - Representation in MML file

When you import mag lines, the line COUNT and name of the imported CMF files is maintained in a visible list inside the project MML file, and you can see this by editing the MML file in NOTEBOOK, for example.

```
<NumOverlays_In_Project>0</NumOverlays_In_Project>
</Vector_Map_Overlays>
<MagFiles>
  <NumMagFilesInProject>10</NumMagFilesInProject>
  <MagFile0000>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-102.cmf&quot;;
</MagFile0000>
  <MagFile0001>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-104.cmf&quot;;
</MagFile0001>
  <MagFile0002>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-105.cmf&quot;;
</MagFile0002>
  <MagFile0003>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-103.cmf&quot;;
</MagFile0003>
  <MagFile0004>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-106.cmf&quot;;
</MagFile0004>
  <MagFile0005>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-201.cmf&quot;;
</MagFile0005>
  <MagFile0006>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-200.cmf&quot;;
</MagFile0006>
  <MagFile0007>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-107.cmf&quot;;
</MagFile0007>
  <MagFile0008>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-101.cmf&quot;;
</MagFile0008>
  <MagFile0009>&quot;D:\SonarWiz-Projects\SampleMagProject_PLRDataSet\Mag\24071311PLR-100.cmf&quot;;
</MagFile0009>
</MagFiles>
<m_magAutoDetectThreshold>10.0000000000</m_magAutoDetectThreshold>
```

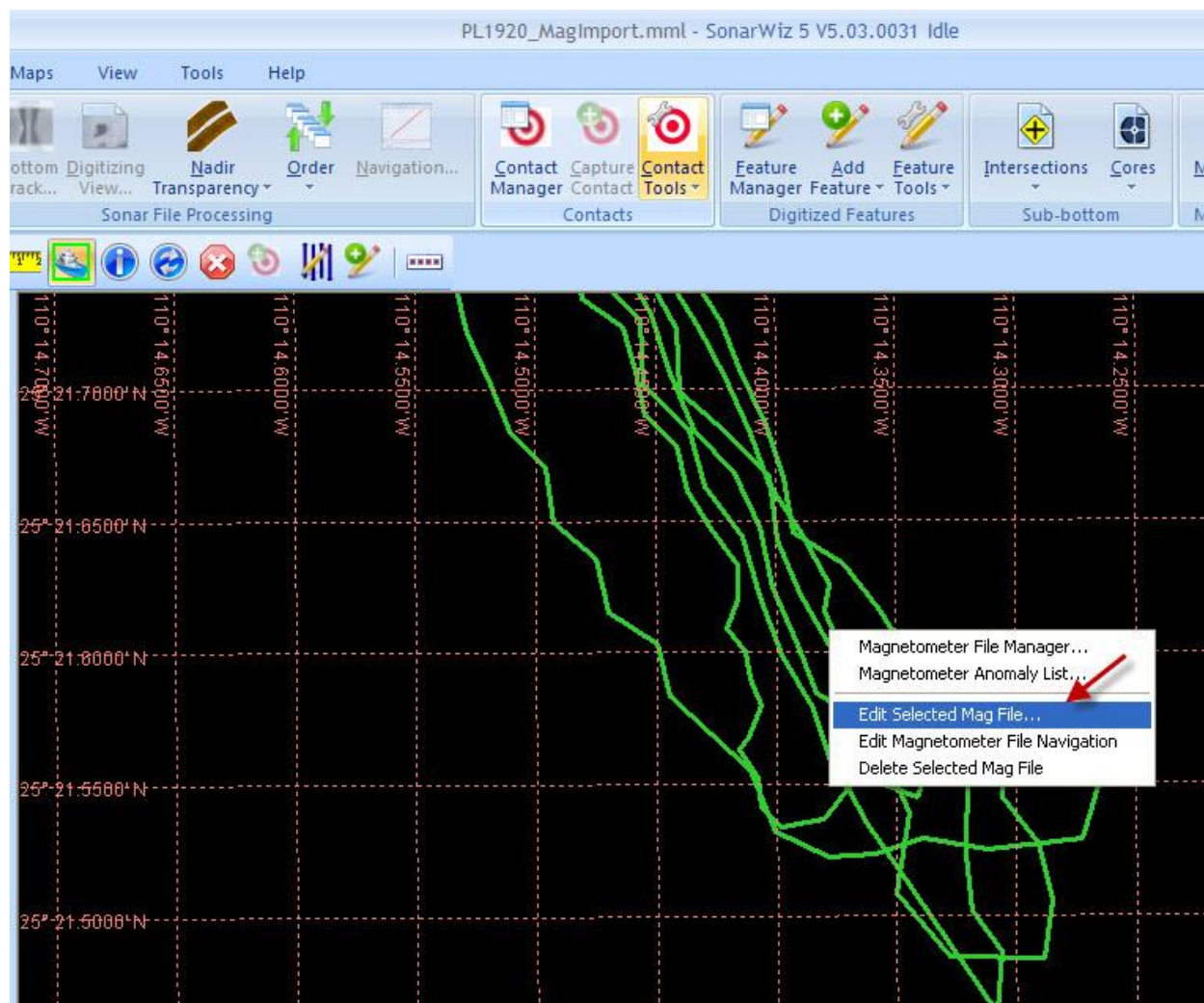
Why do this? It could be an extremely rare event, but suppose your project opened up and there were no MAG lines showing, though you still had the MAG folder with a hundred CMF files there?

CTI support handled such a case just once, but what we did was to use the MAG folder directory of existing CMF files to re-create the CMF file section of the XML project file - the MML file. We mention this here because it is a support option, and because ADD FILES in the sonar file manager works to re-populate a project with CSF (sonar) lines, to repair an MML file, and SonarWiz also support an equivalent function for mag lines and CMF files - ADD FILES in the Mag Manager.

Re-creating the MML file effectively renewed the CMF files and mag anomalies to the project, so keep this in mind in case you have a similar issue.

1.3 Editing Your MAG file - Example

Then you select the file and edit it in the magnetometry file editor:

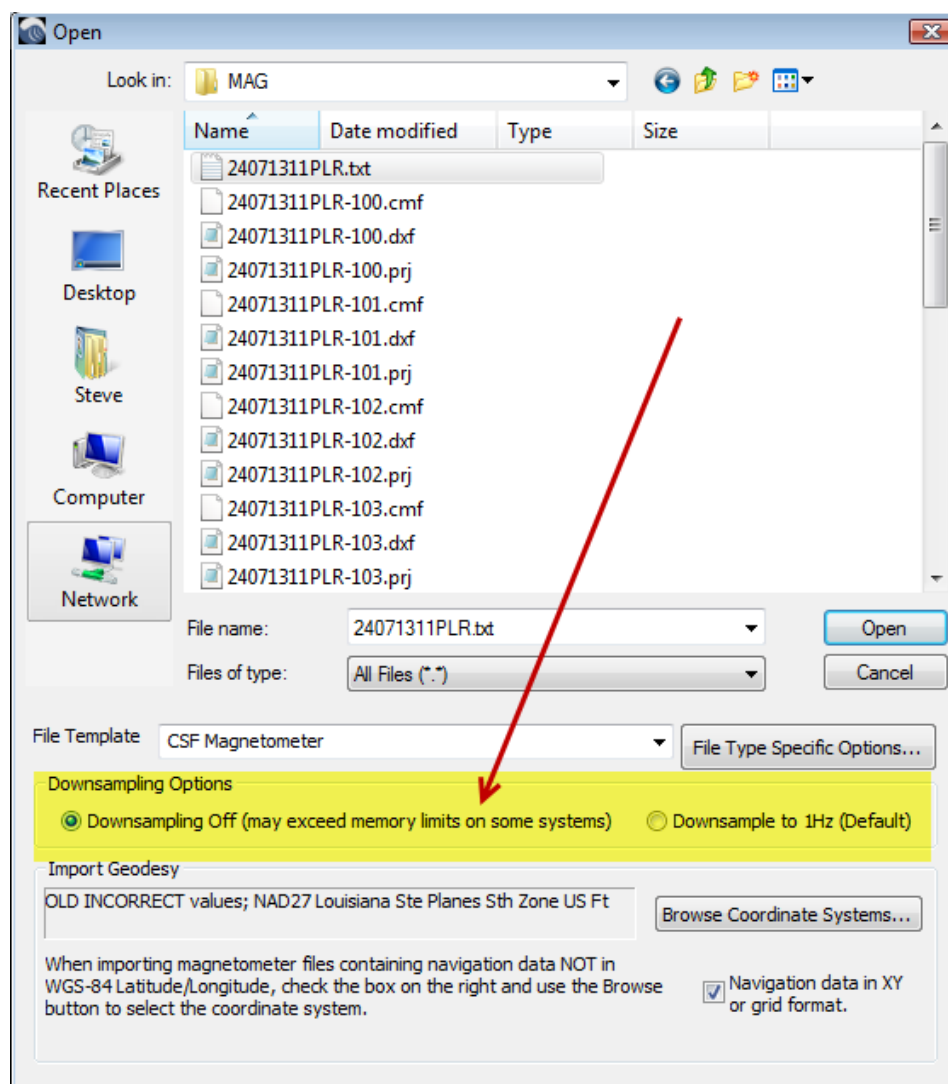


1.3.1 Mag-data decimation (down-sampling) to 1hz rate - 5.07.0012 and earlier

Note that decimation (down-sampling) may occur in your import process, to reduce the mag data to an approx. 1 hz rate. So if you had 10000 raw mag records in the original file, and it had been recorded at a 10hz rate, you would result in 1000 imported records, in the MAG CMF (common mag format) file in your project. The record count is visible beside the line name, in the mag editor view. This is the way mag down-sampling worked in SonarWiz versions 5.07.0012 and all earlier versions.

1.3.2 Mag-data Down-sampling - 5.07.0013 and beyond

A new feature as added in the mag import dialog in version 5.07.0013, providing the option to import full-resolution mag data. The algorithm still avoids repeat-duplicate records, but if your mag data is changing, you get the benefit of higher resolution. Here's where to make the choice, during import:

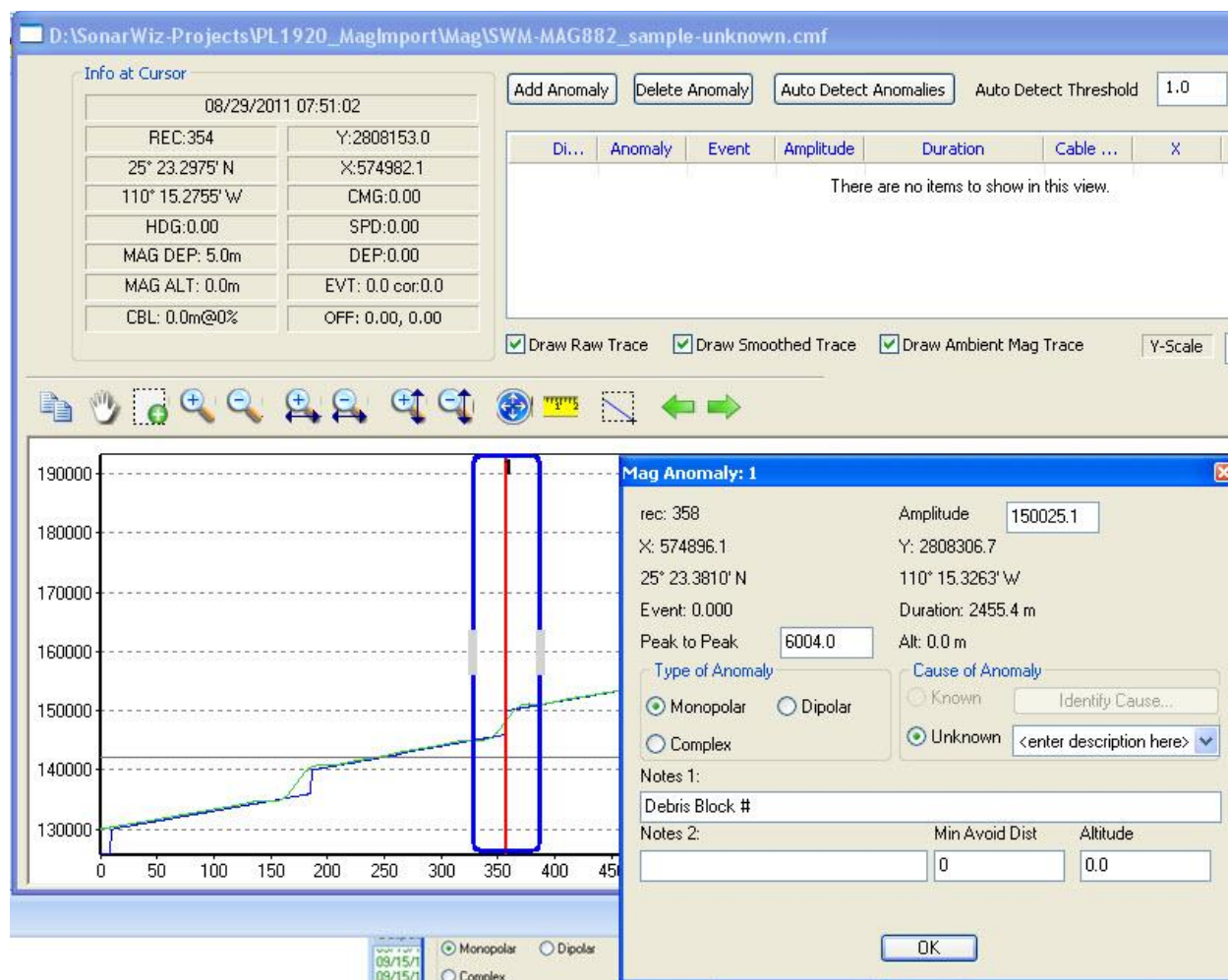


To see the effect, make a copy of your mag line, save it so you have the same file under two different filenames, then import it twice - once as file1, with Down-sampling OFF, and once as file2, with Down-sampling to 1 Hz. This way, you can see the effect on imported record count, and decide which you prefer.

A second format of implicit automatic down-sampling occurs when duplicate positions occur within the import records. With duplicated positions, only the FINAL record at the same position is saved into the import data set.

1.3.3 Identifying Anomalies

The mag editor view of the data auto-scales nicely, and then you can identify anomalies (kind of like picking targets or contacts in sonar data). Here I have opened the mag editor and am adding my first anomaly:



1.4 Adding Layback to a Mag Line

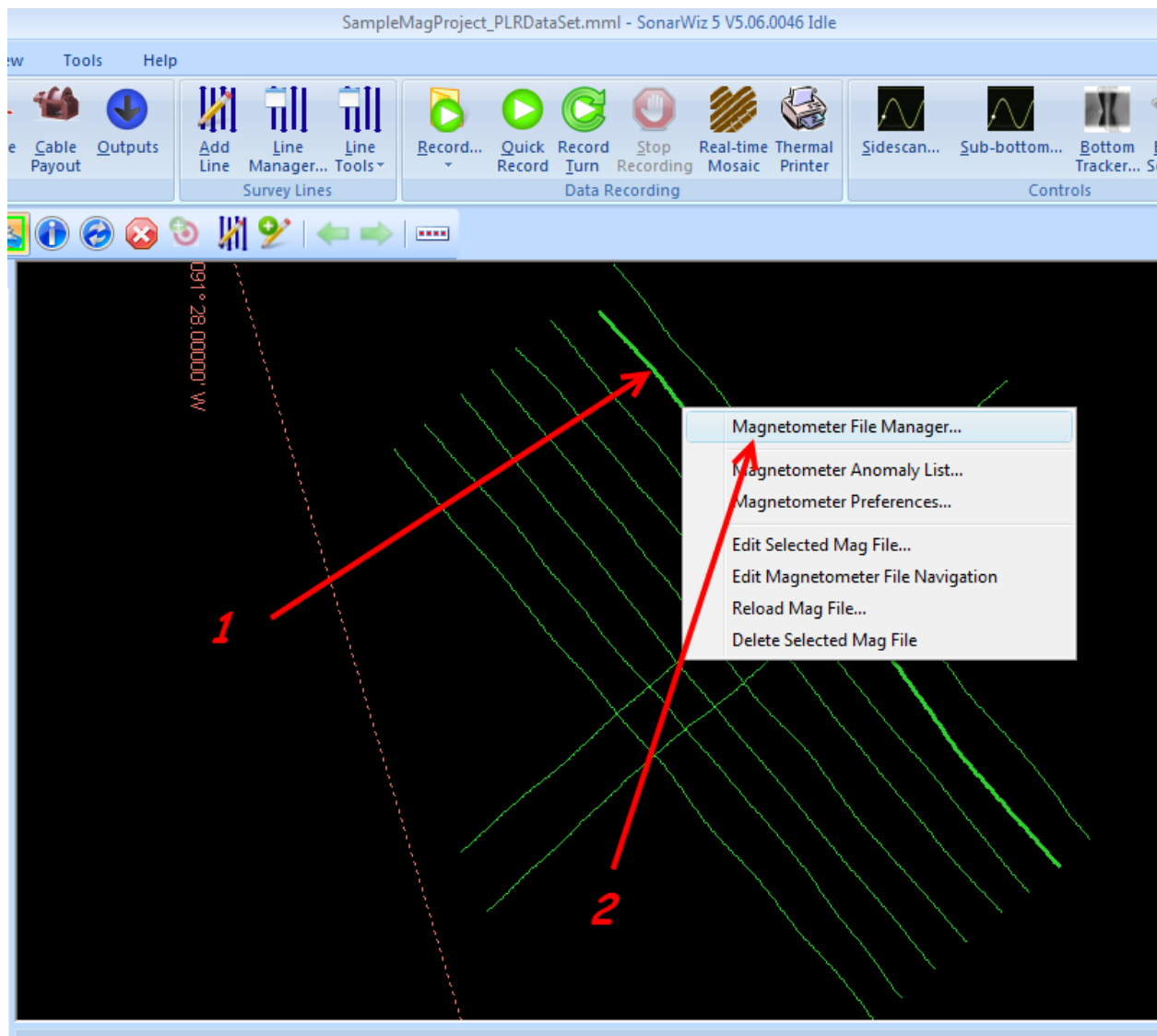
Application of Cable-Out to a mag line can be done, and is done in much the same way as we add layback to sidescan data, as described in the layback tutorial PDF here:

[SonarWiz - Layback CableOut Tutorial.pdf](#)

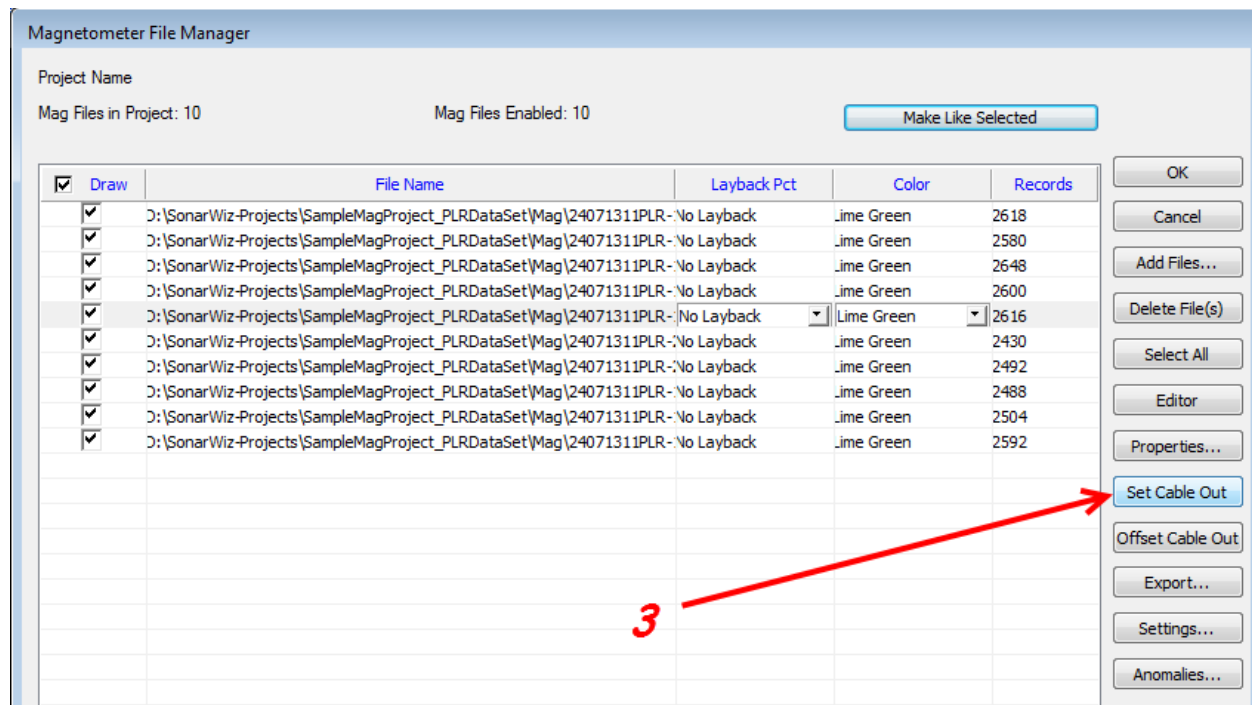
The basic plan is to select your mag line in the mosaic view or in the mag file manager, then select the Set Cable Out button, and identify the cable out (in meters), and lines to which it will be applied.

1.4.1 Setting Mag Layback - Example

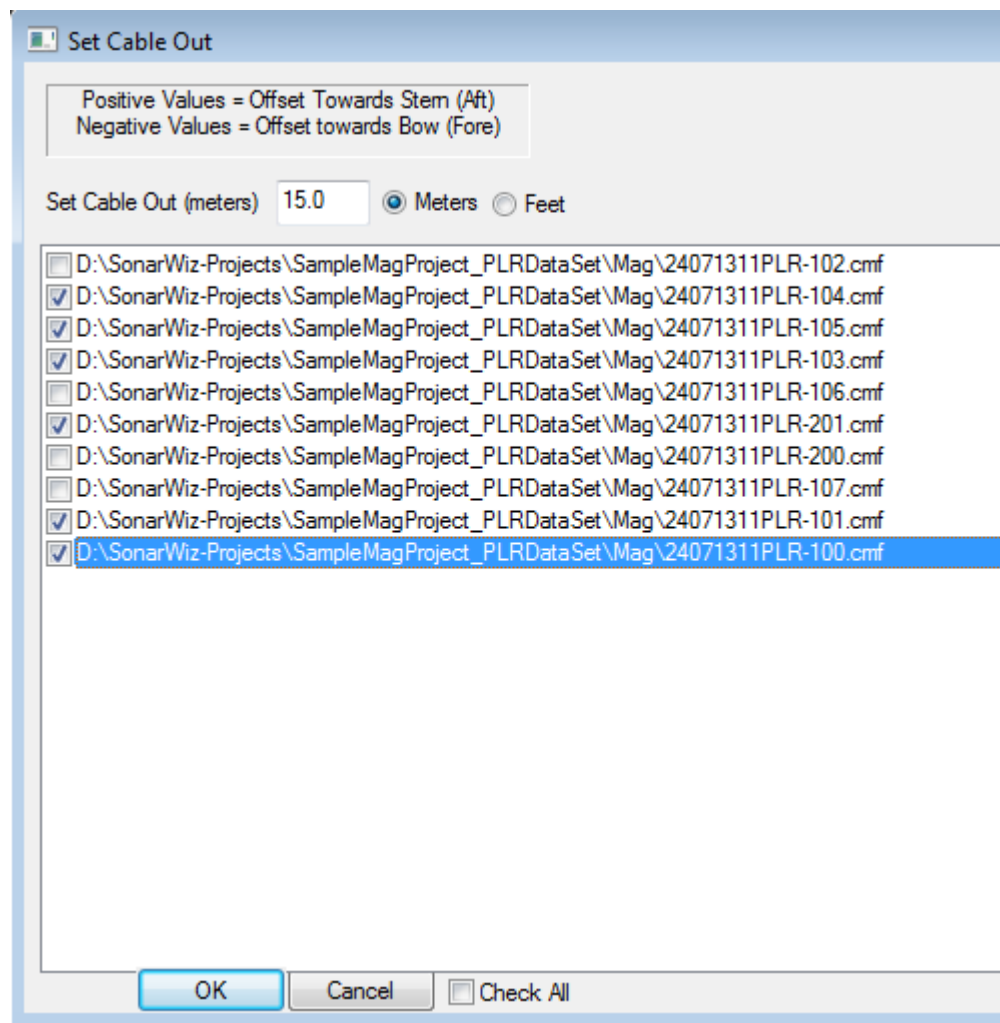
This example uses the Sample Mag Data set PLR-type TXT file input from the SAMPLE DATA area of www.chestech-support.com using SonarWiz 5.06.0046:



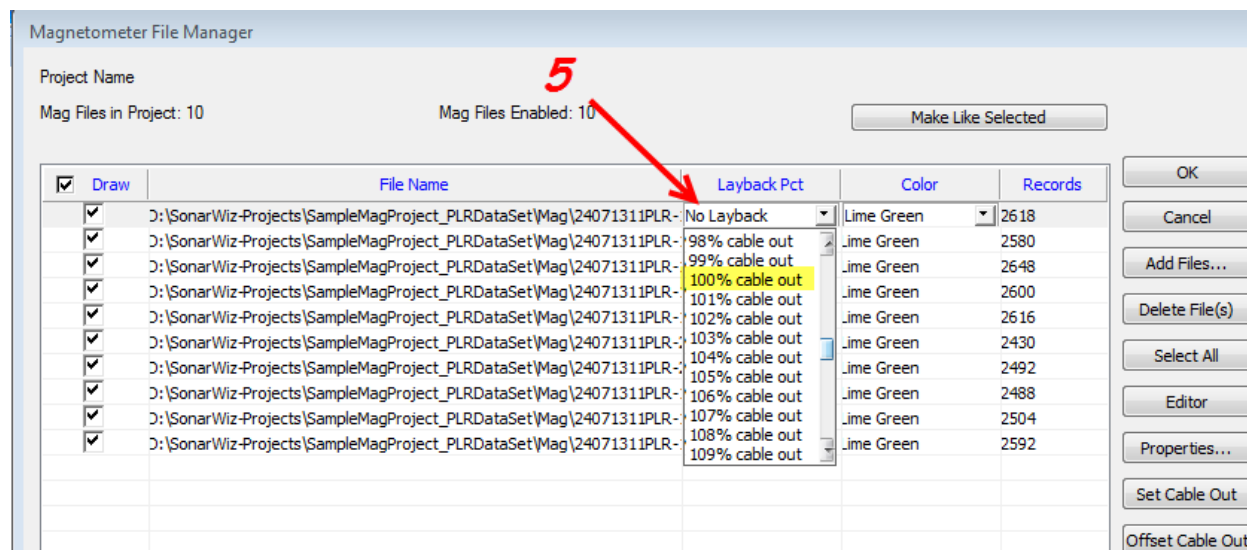
- (1) select a mag line after import, in the mosaic view
- (2) select Magnetometer File Manager
- (3) In the File Manager, select the button to set Cable Out:



(4) Specify the Cable Out in meters, choose the affected lines, and then click OK



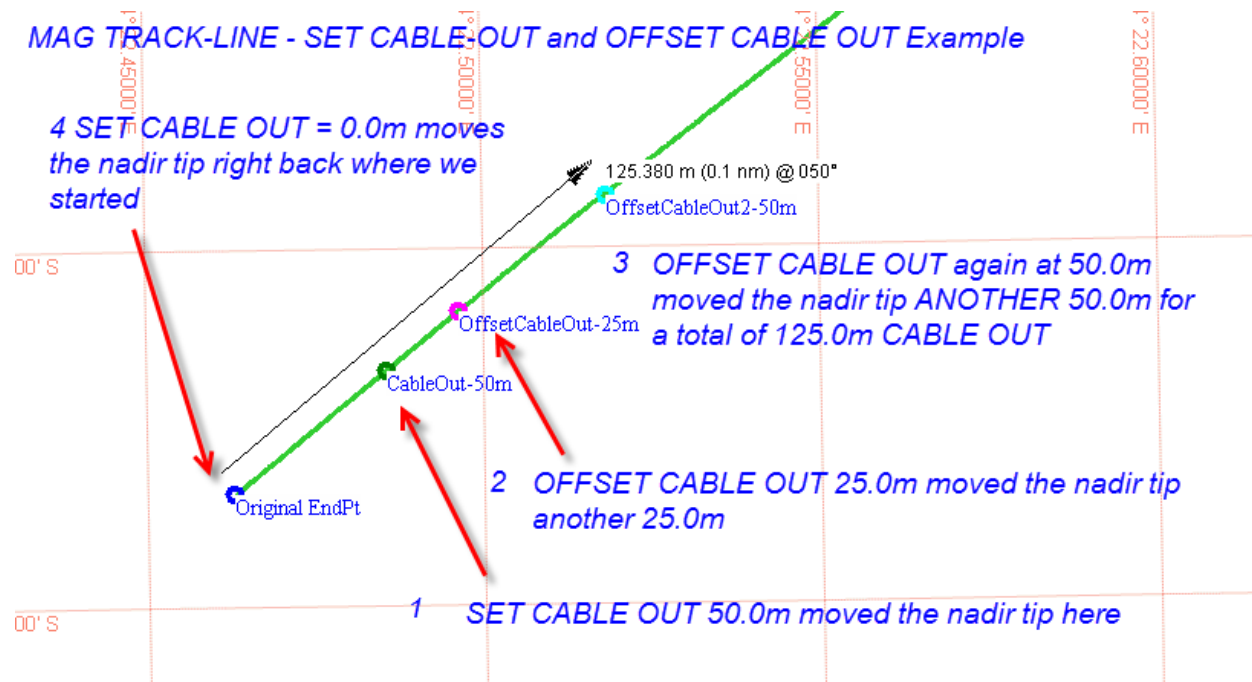
(5) Finally, select the percentage of CableOut to apply for Layback for each line, or set it in one line and use MAKE LIKE SELECTED to apply the same setting to other lines:



1.4.2 Set Cable Out and Offset Cable Out

SET CABLE OUT is an absolute setting option. To set the CableOut to 50m or 100m, just use SET CABLE OUT.

OFFSET CABLE OUT is an additive adjustment. Use it once and set OFFSET CABLE OUT = 25.0 and 25m gets added to the previous CABLE OUT value. Use it again and set OFFSET CABLE OUT = 50.0 and ANOTHER 50.0m gets added to the previous CABLE OUT value. for a total 75.0 m additive adjustment.



See your current values of CABLE OUT by reading the CBL value in the MAG EDITOR.

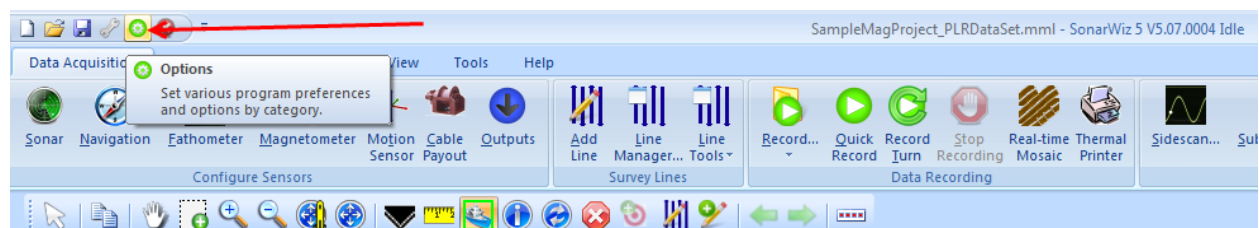


After all the adjustments, to reset the CABLE OUT to ZERO and start over for clarity, just use SET CABLE OUT = 0.0m.

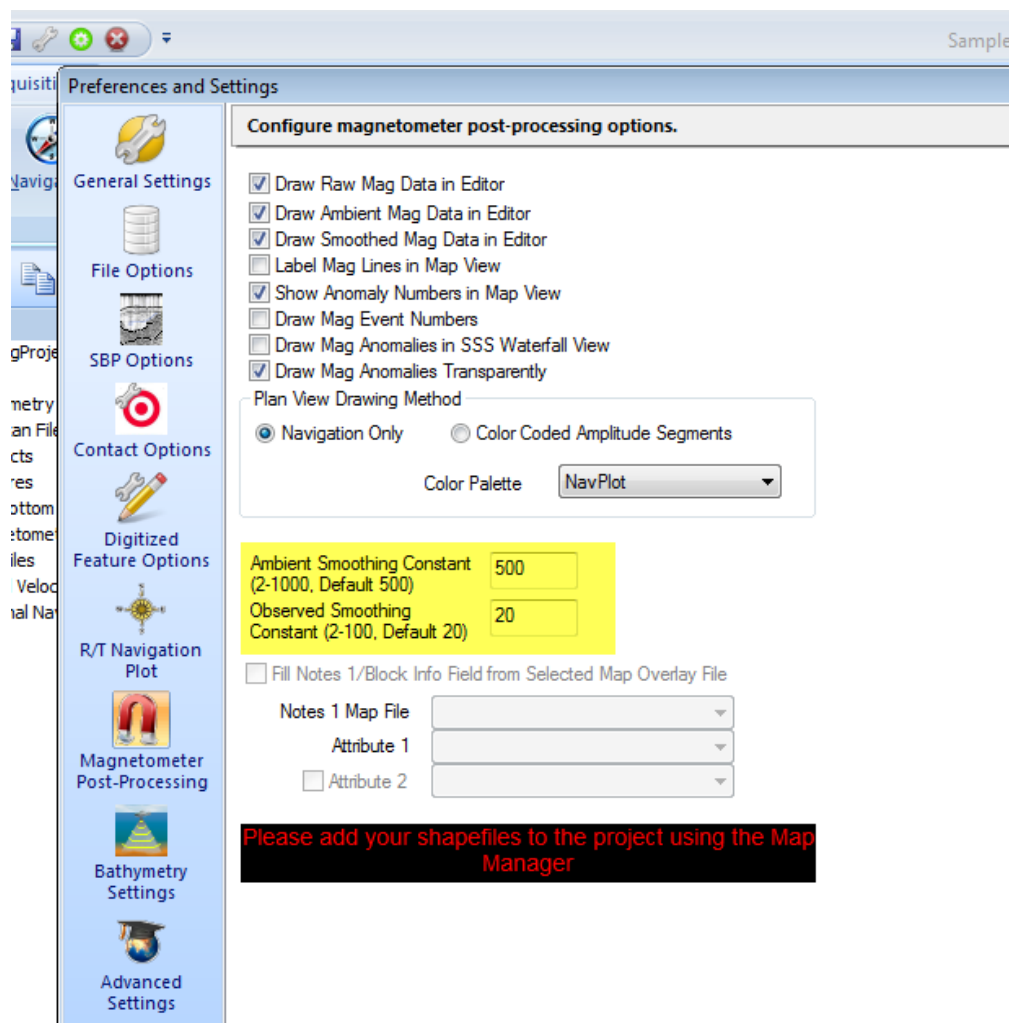
Using OFFSET CABLE OUT = 0.0m will have NO EFFECT on the current CABLE OUT value.

1.5 Controlling Mag Editor Presentation - Raw, Smoothed, Ambient

The ambient data trace in the mag editor is created by over-smoothing the mag data. The settings are controlled in Settings and Preferences, selecting the top green OPTIONS icon in SonarWiz:



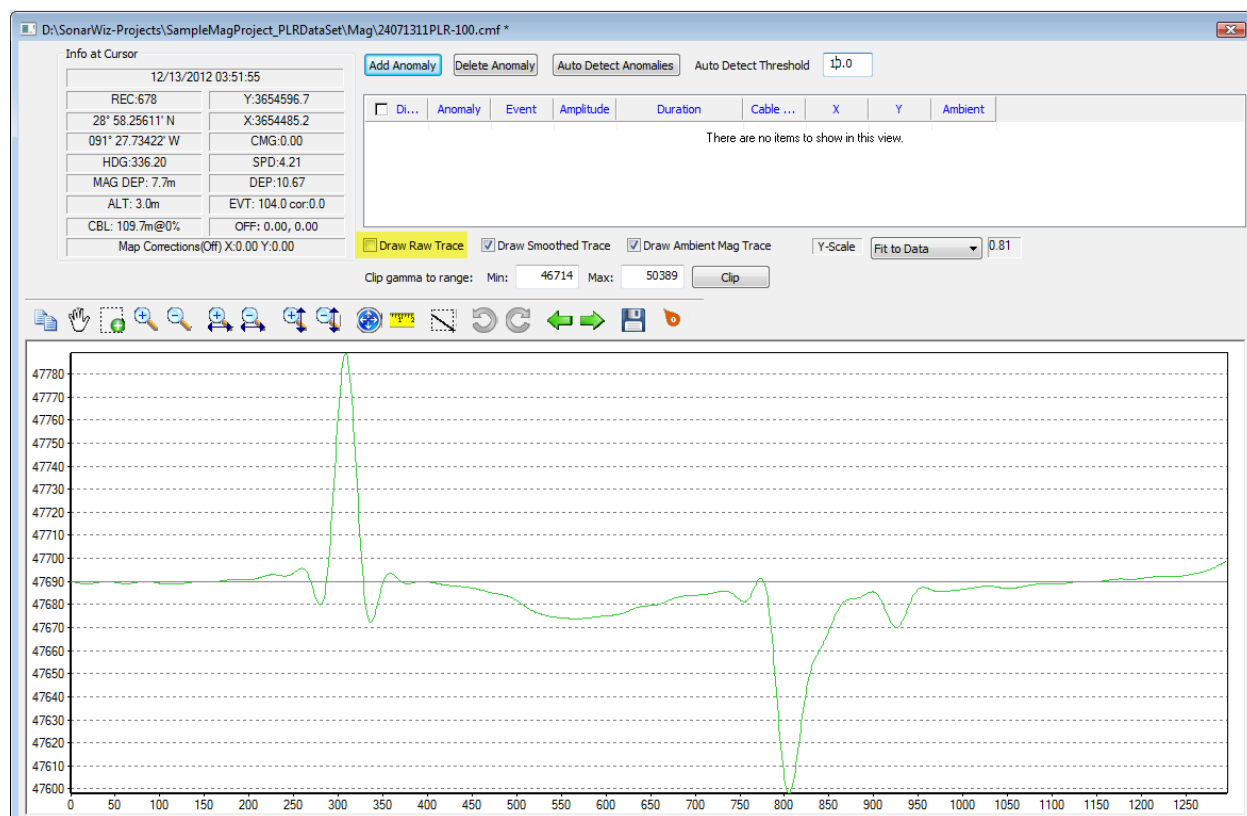
then selecting Magnetometer Post-processing:



By default, SonarWiz creates the ambient trace (black line, in the editor) by using 500-point smoothing. If you want to change the value used in the project, change it in the OPTIONS, then close SonarWiz, re-open, and re-import the mag data. The ambient trace will be updated.

By default, SonarWiz creates the smoothed trace (green line, in the editor) by using 20-point smoothing.

The blue line in the editor is your un-smoothed (observed) raw data. So the "Observed data" smoothing is for presentation of the green line in the mag editor. Typically you would select to view the green and black lines for comparison: RAW TRACE is not checked here:



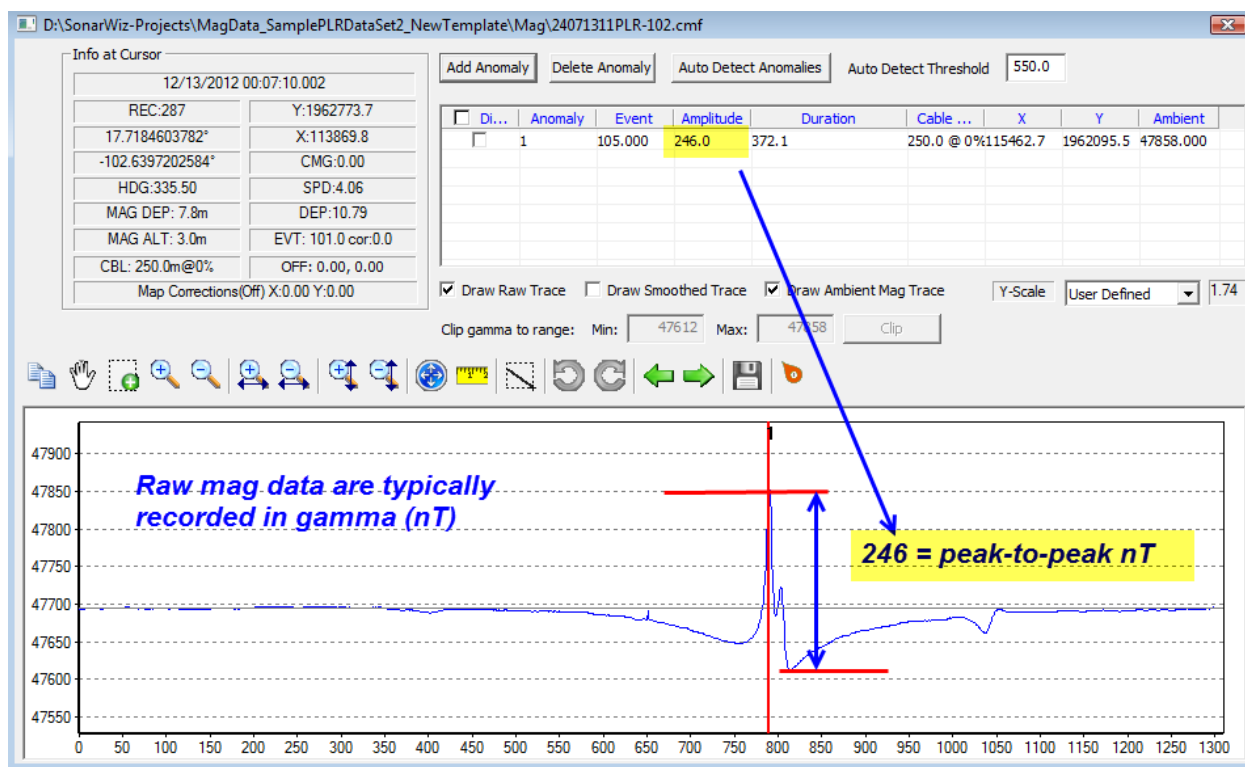
1.6 Computation of Anomaly Amplitude, and Z export in XYZ export

The "Ambient" column (9th column displayed in mag editor) displays the RAW value peak actually, at the anomaly location. The AMPLITUDE value for the anomaly is RAW - AMBIENT at that X,Y location. When you export an ASCII XYZ format CSV, the Z value you are exporting is also the RAW value at that X,Y location. So you can display SMOOTHED data, but it is not part of anomaly height, or Z-value export, computations.

1.7 Auto-Detection of Anomalies

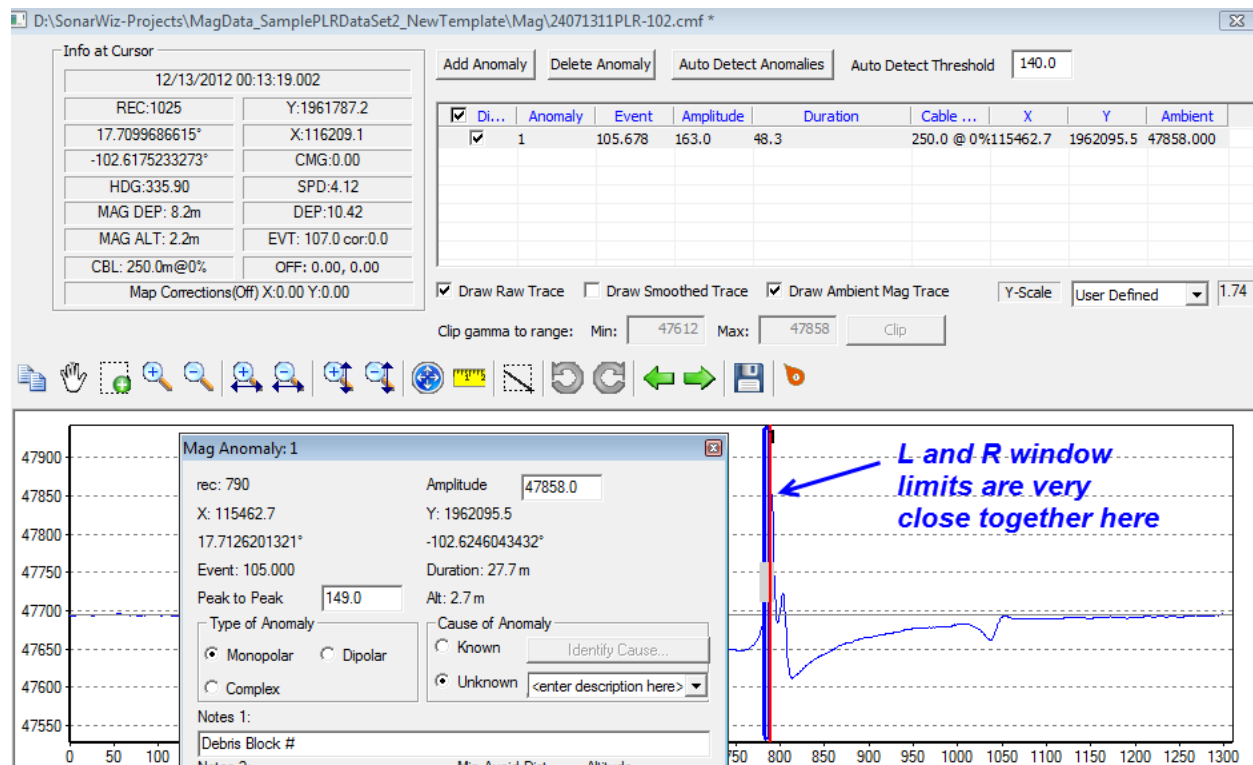
The Auto-detect is just a numerical threshold setting that you need to decide empirically, to help it work for you. It works much like a software-version of an electronic Schmitt level-detection trigger. In the example data above, let's say we want to auto-identify the trace ping positions 300 and 800 as anomalies. They are huge, so we can set the auto-detect threshold at say, 100, and those will be the only two spikes identified at auto-detected anomalies.

NOTE: the RAW (observed) data amplitude is used for auto-detect and anomaly size report - even if it is not displayed. The same goes for Z values in XYZ export - it is the RAW (observed) value. Smoothed traces are just for visual comparison.

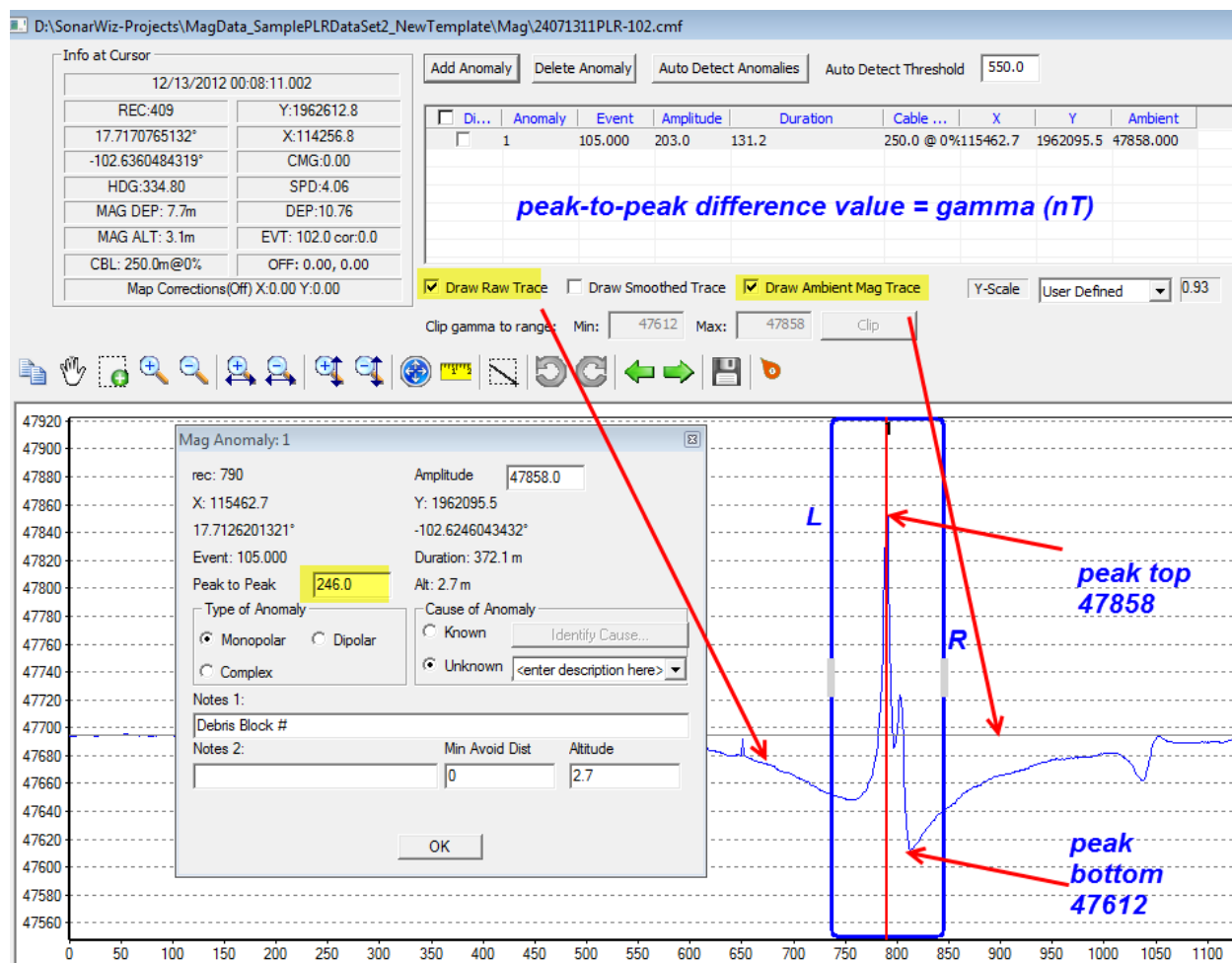


1.7.1 Anomaly amplitude (peak-to-peak RAW difference) measurement

AMPLITUDE = Peak-to-peak (displayed when editing an anomaly) and is the difference between the MAX and MIN values of the RAW trace data, within the anomaly left-right limit bars of the window you see when you click on an anomaly to edit it. These bars are very close together by default,

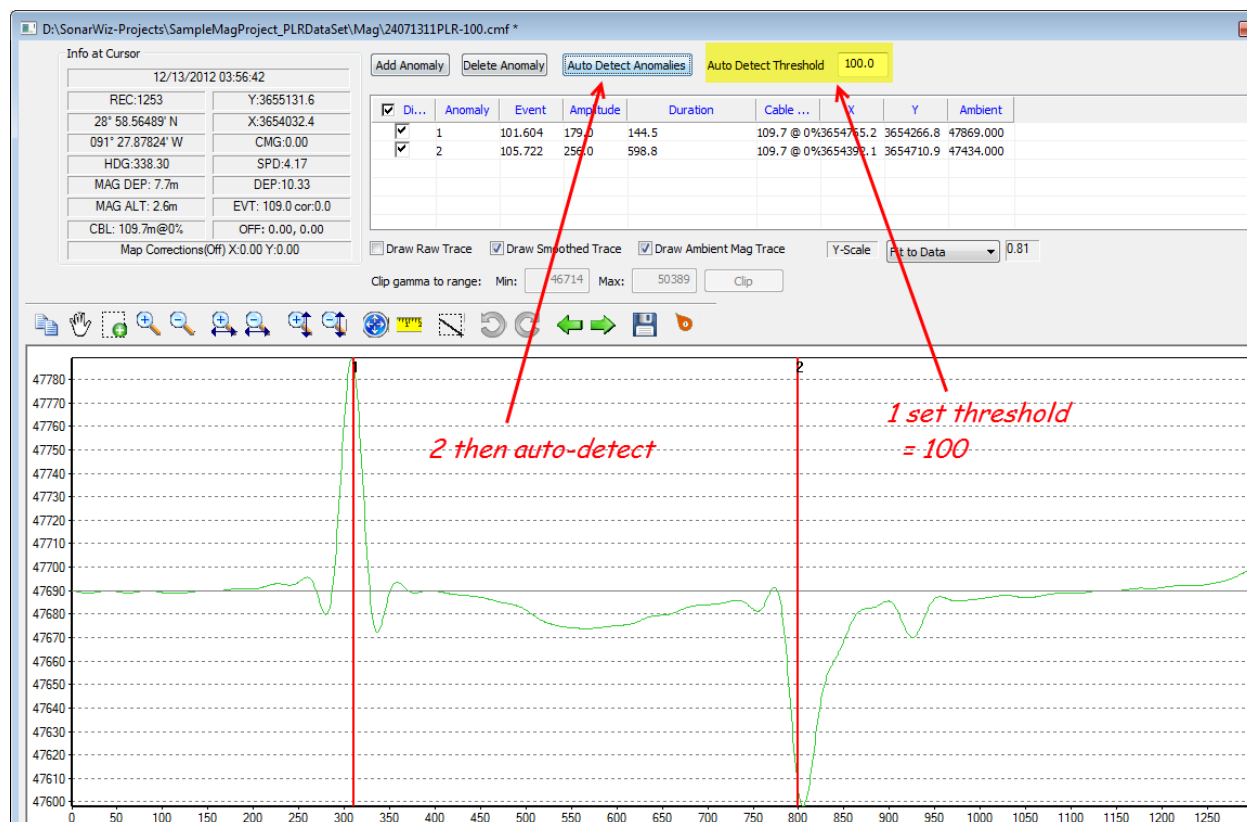


but you can drag-move them wider to include whatever you want to define as a single "anomaly":



Shift L and R bars to include / exclude peaks and troughs and you can see the Peak to Peak value change within the Mag Anomaly display, then when you close it, the same Peak to Peak value will show as AMPLITUDE in the anomaly list of the mag editor (e.g. in this example, 203 will be replaced by 246, when we exit the anomaly-edit window):

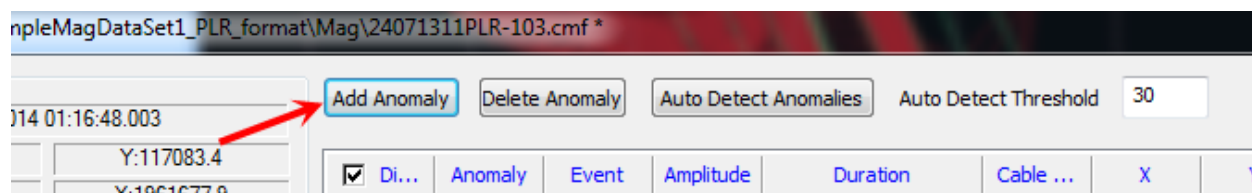




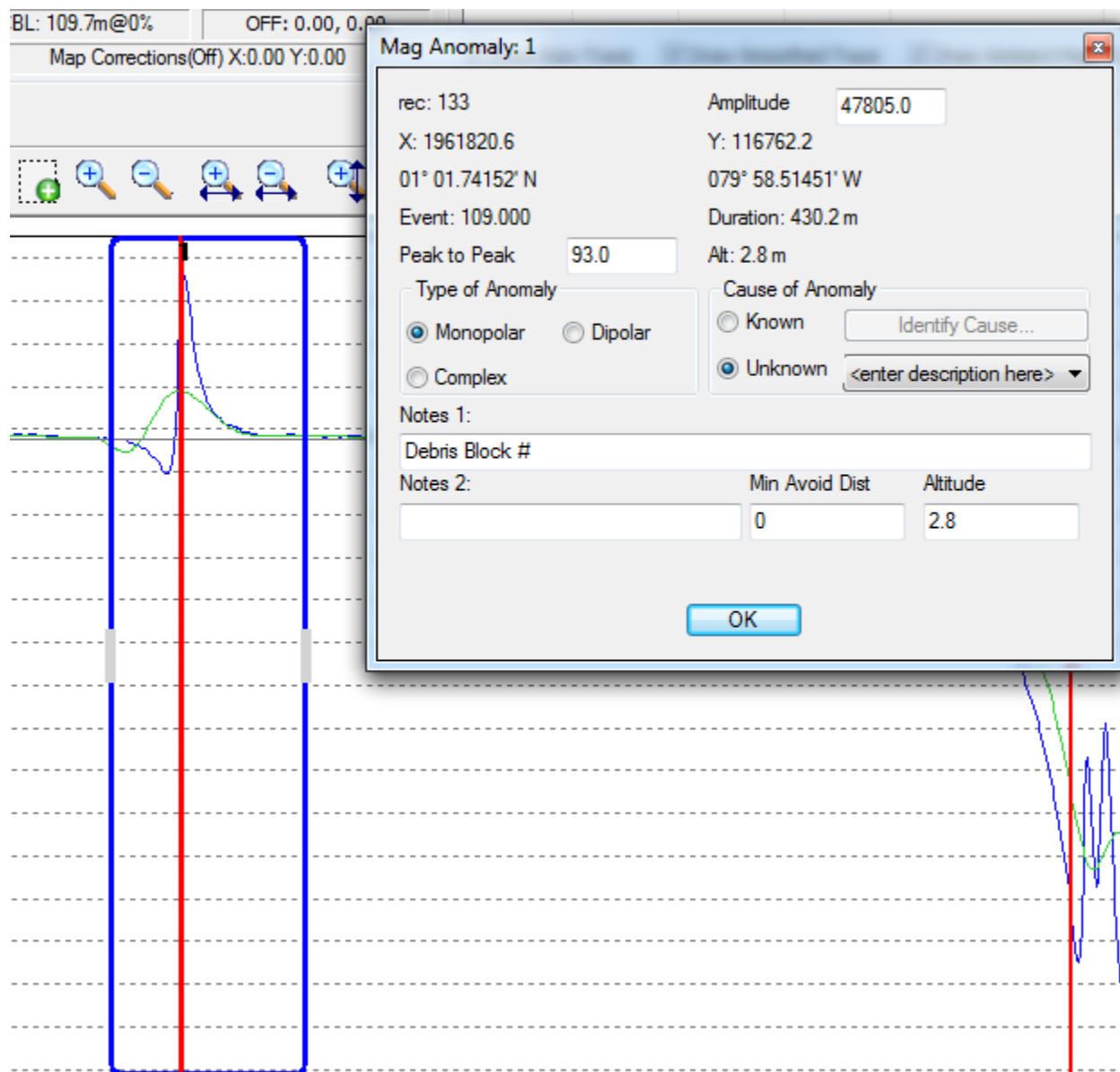
If you do not like the results, just delete the anomalies and try again with a different threshold value.

1.8 Manually Picking, or Editing Anomalies

You can manually pick anomalies just as easily. When you select ADD ANOMALY button:



You get a PEN cursor and can pick an anomaly. The exact position is entirely up to you. Once you pick it, a vertical red cursor will be drawn on your pick location, and a “surround” box will be drawn around your choice, in blue, with sides left and right of your choice, where apparently the signal returns to “flat” near ambient. I.e. the software tries to define this “area” as your “adjacent to the picked” anomaly area. It’s rather arbitrary, and you can adjust it.



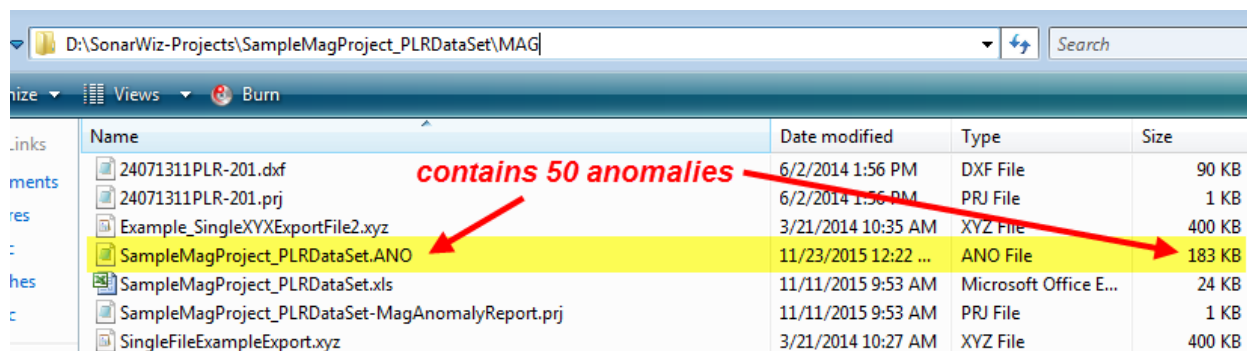
Once your ADD ANOMALY box is open, too, you can identify your anomaly as monopole (singular deflection away from ambient), dipole (peak and trough both part of the same anomaly), or complex (trace goes up-down-up, for example, more than a simple monopole or dipole). These are annotation tags for your own purpose, and have no effect on the location or surround-box-width of your chosen anomaly.

Once you pick the anomaly, too, it's easy to left-click and adjust either the left or right-side positions of the blue surround-box, or grab (left-click) the anomaly cursor itself, and reposition both the anomaly position choice as well as the surround-box, all together as a unit. The exact positioning of all 3 are entirely up to you. If you need to develop local practice guidelines for a team to all make similar decisions about anomaly pick position

or surround-box-width around an anomaly, go ahead and do that. We suggest leaving this responsibility entirely up to you as the user.

1.8.1 Anomalies - Storage in the ANO file

When you add anomalies to the MAG project, they are stored in a binary type (not TXT format) file in the MAG folder of your project, with the file-name = project-name, and the file extension is ANO:



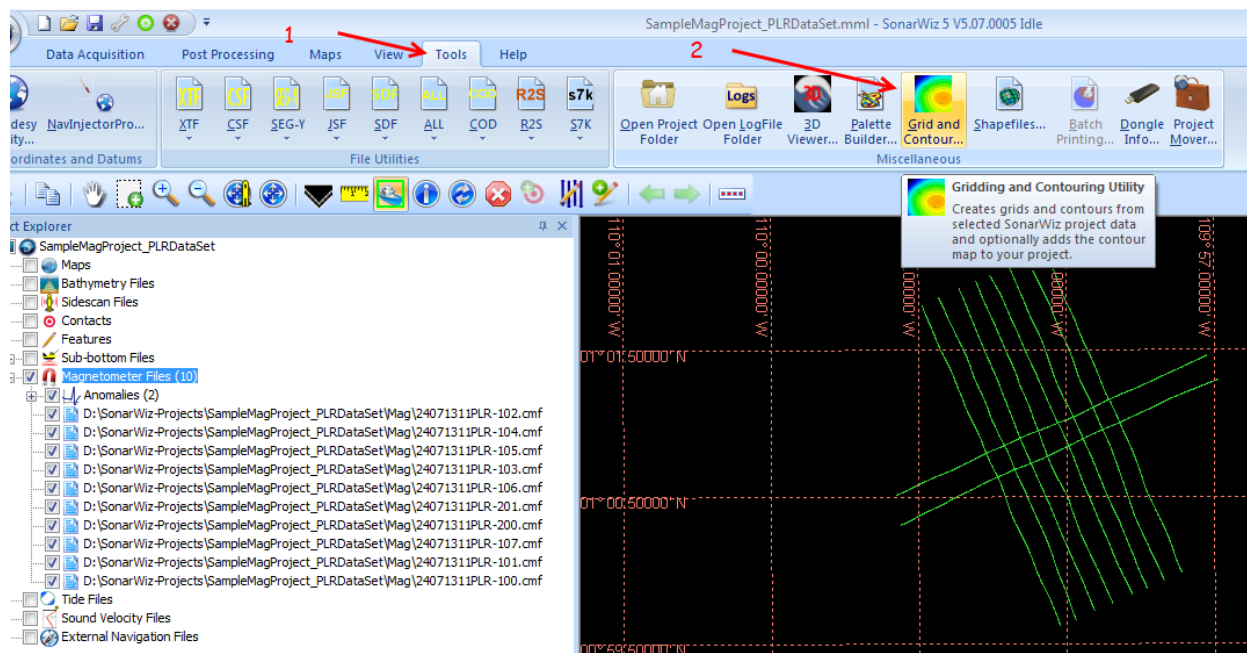
Name	Date modified	Type	Size
24071311PLR-201.dxf	6/2/2014 1:56 PM	DXF File	90 KB
24071311PLR-201.prj	6/2/2014 1:56 PM	PRJ File	1 KB
Example_SingleXYXExportFile2.xyz	3/21/2014 10:35 AM	XYZ File	400 KB
SampleMagProject_PLRDataSet.ANO	11/23/2015 12:22 ...	ANO File	183 KB
SampleMagProject_PLRDataSet.xls	11/11/2015 9:53 AM	Microsoft Office E...	24 KB
SampleMagProject_PLRDataSet-MagAnomalyReport.prj	11/11/2015 9:53 AM	PRJ File	1 KB
SingleFileExampleExport.xyz	3/21/2014 10:27 AM	XYZ File	400 KB

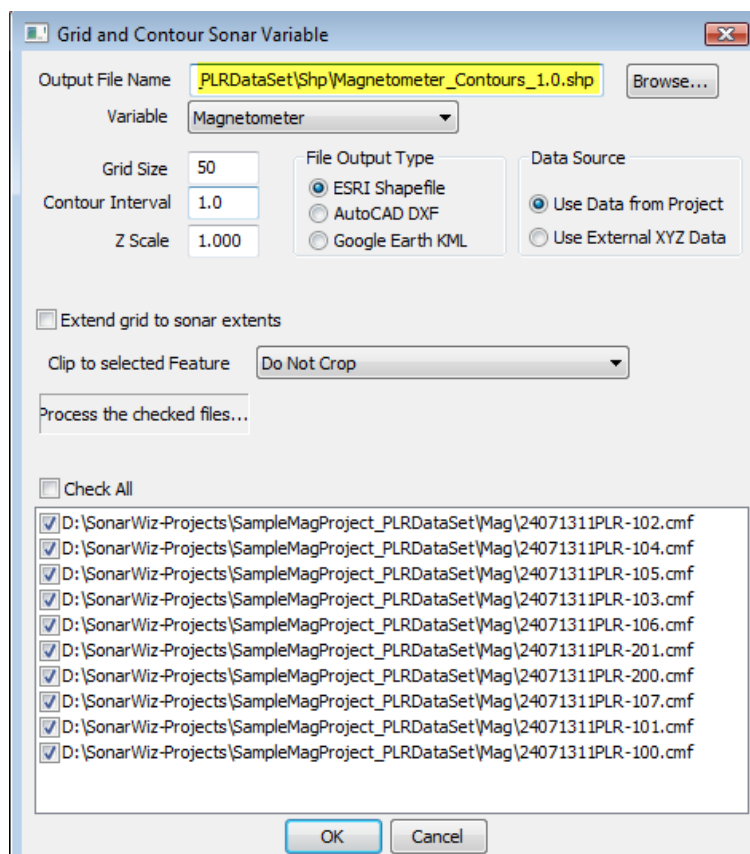
You can see that it is a rather small file, 183KB containing 50 anomalies in this case.

In a second project, we saw that over 500 anomalies were stored in an ANO file that was 1.9MB in size. So even though you can't see inside the file except for with SonarWiz, you can tell from its size if it has anomalies in it.

1.9 Creating Grid and Contour Exports of your Mag data

Using the Tools -> Grid / Contour option, you can create gridded mag exports to profile your data. Here's the grid/contour export dialog:

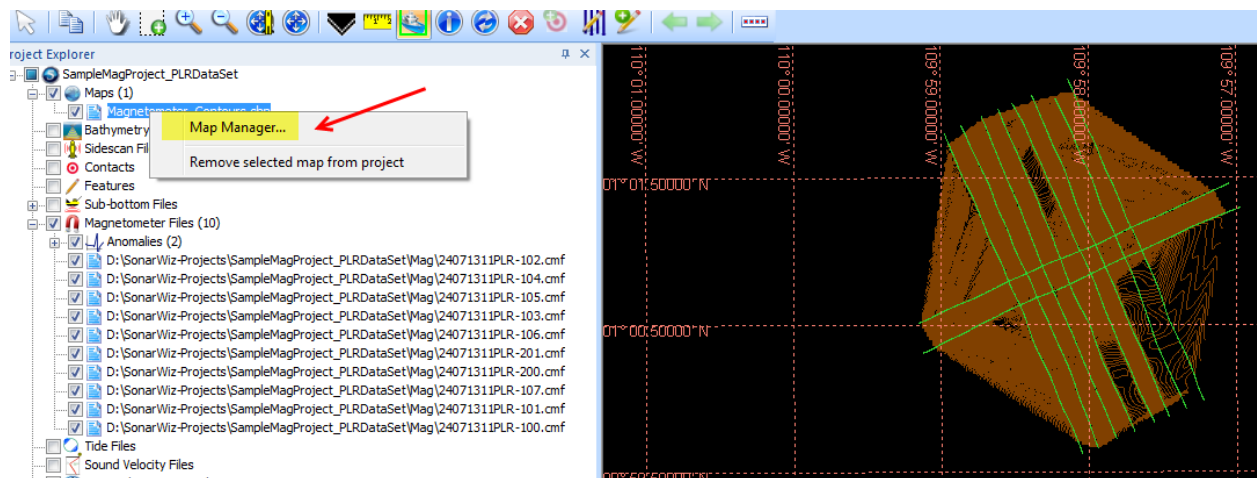




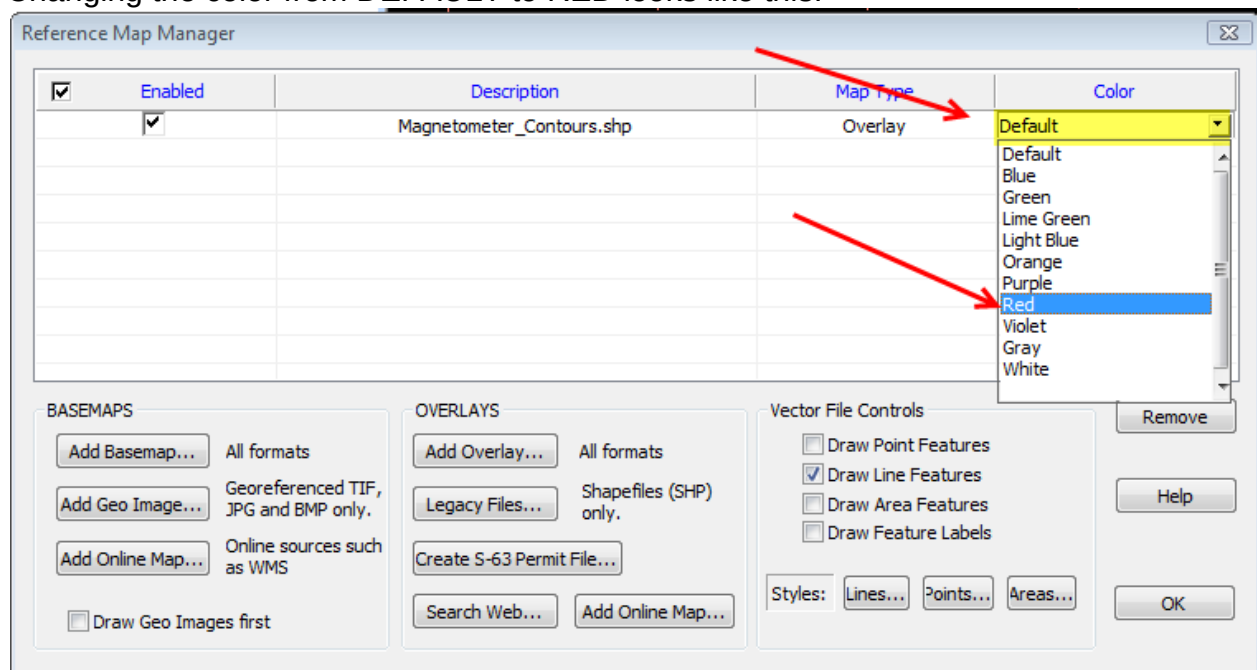
The Z scale is the easiest to understand. Z-Scale is simply a multiplier on the value being gridded. It's useful for example to convert meters to feet or change the sign of a depth value from negative to positive. 1.0 is the default, but this example will show both 1.0m and 5.0m grid resolution.

Procedurally, the first step in SonarWiz, to generating contours is to take all of the input data and place it into rows and columns that are the same size. That's called 'gridding'. The size of these cells is the 'grid size'. If you make the grid size very large then effectively you are creating a low pass filter because data values from a spatially larger area are all combined into a single cell. If you make the cell size smaller then each cell will hold fewer values and therefore reflect dynamic changes in the variability of the data being gridded. The contouring process then operates over the gridded data to find the boundaries between areas in the grid with different values.

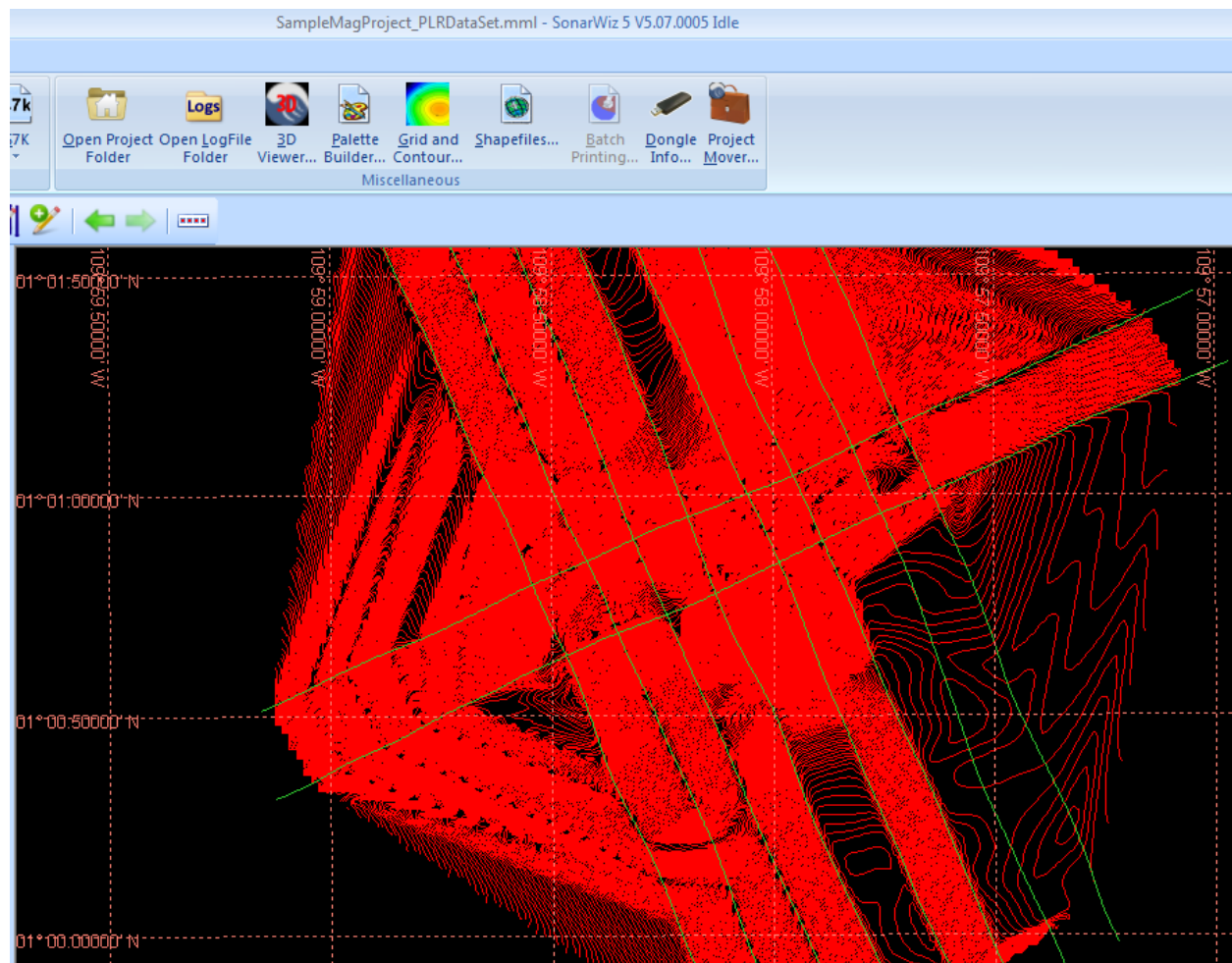
So the most important value to control is contour resolution (in meters), and 5.0 m resolution was usually a good choice for this particular data set. To make the grid lines a little farther apart, use a larger value for grid resolution, in meters. When the SHP file is generated, it may not be optimally visible in your project as an overlay, until you select MapManager, right-click in the COLOR column, and change DEFAULT color to something like RED:



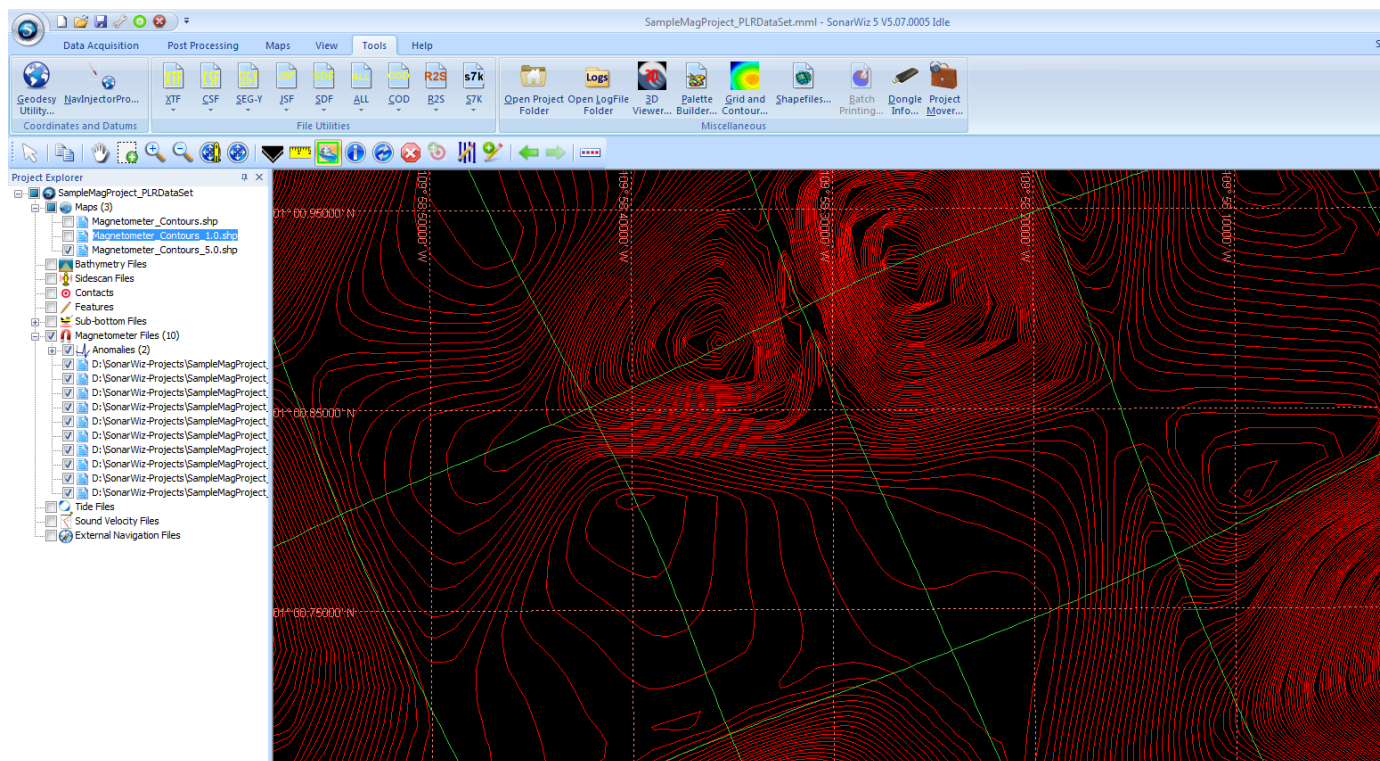
Changing the color from DEFAULT to RED looks like this:



The result:

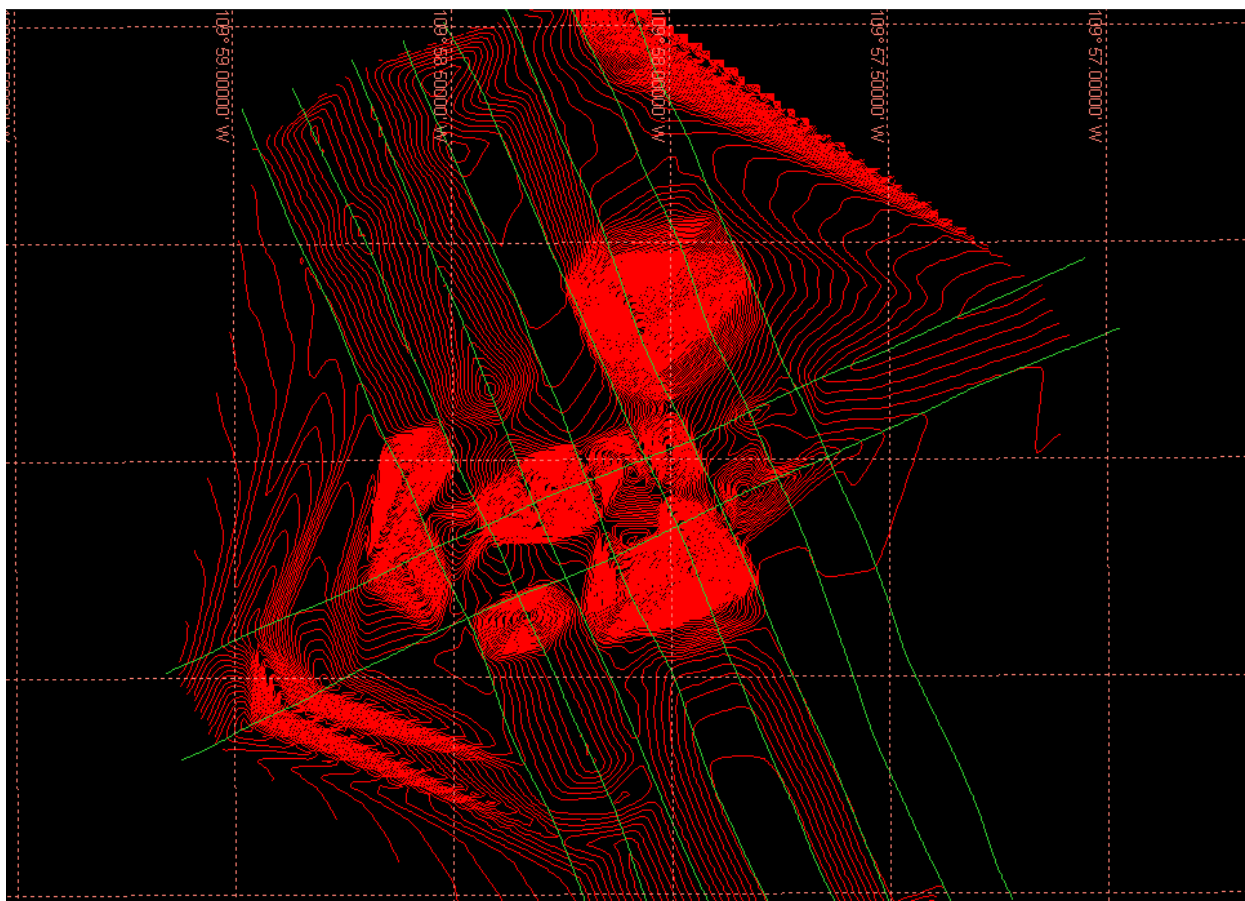


This is actually a little too dense (1.0m grid resolution shown above), so we will scale it back to a second export of 5.0m resolution. So as not to over-write my first exported grid, I change the name to identify this as a 5.0m export resolution:



This is a fantastic 2D view of the mag data, but in terms of directing divers on a second view of the seafloor, the anomaly report may be better. This makes for a good publication view of the overall survey though. 5.0m resolution looked better in this survey. The resolution looking best in your own survey will depend upon how closely, and in what direction, your survey lines move with respect to one another. This PLR sample data survey was a well-designed set of parallel survey lines with a few intersecting lines.

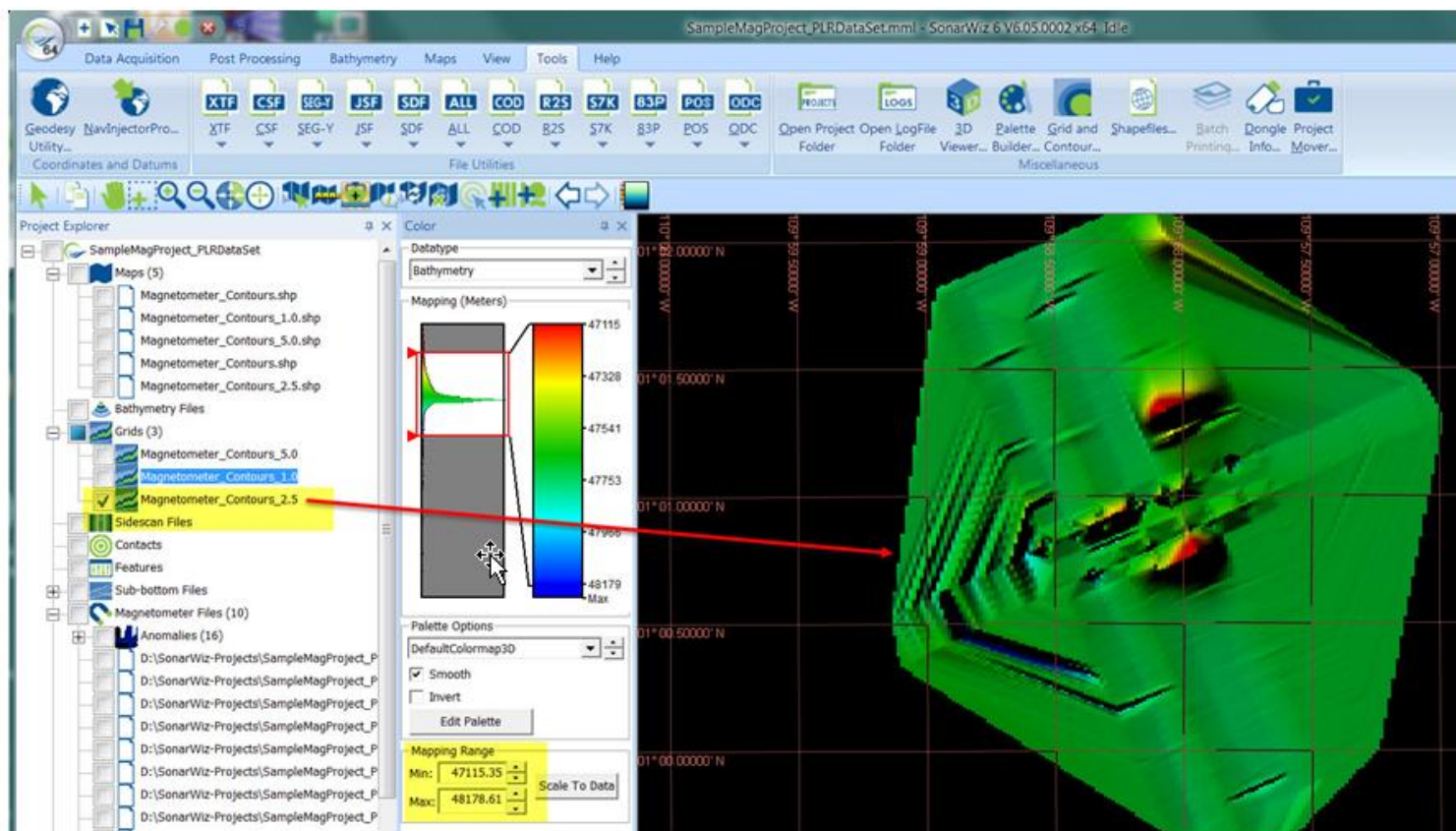
Overall grid view, at 5.0 meter grid resolution, Z=1.0, GridSize = 50, stepped back a few notches on the ZOOM:



1.10 Adding Color-scaled Mag Grids to the Project

The "SonarWiz Gridding" PDF, Rev 9.0 or later, in your SonarWiz 7 DOCS folder (use HELP -> Browse HELPDOCS folder) explains another option for mag data presentation. The grid / Contour dialog allows you to select ESRI SHP file export format, but it actually exports 2 formats of your data:

- (1) the ESRI SHP file show in the examples above, and
- (2) a GRD file of the same name, a Surfer6 GRID file. These are added to the project using the Project Explorer GRIDS category -> ADD GRID function, and are color-mapped to the mag amplitude data using COLOR WINDOW technique, not the map manager "color" selection. (See section 1.1 of the SONarWiz Gridding PDF to see how to select group color (SonarWiz 6, or SonarWiz 7.01.003 or earlier), or solo-item color (SonarWiz 7.01.004 or later) and create a color-mapped grid scaled according to the way you want to see color mapped to mag amplitude. Example:



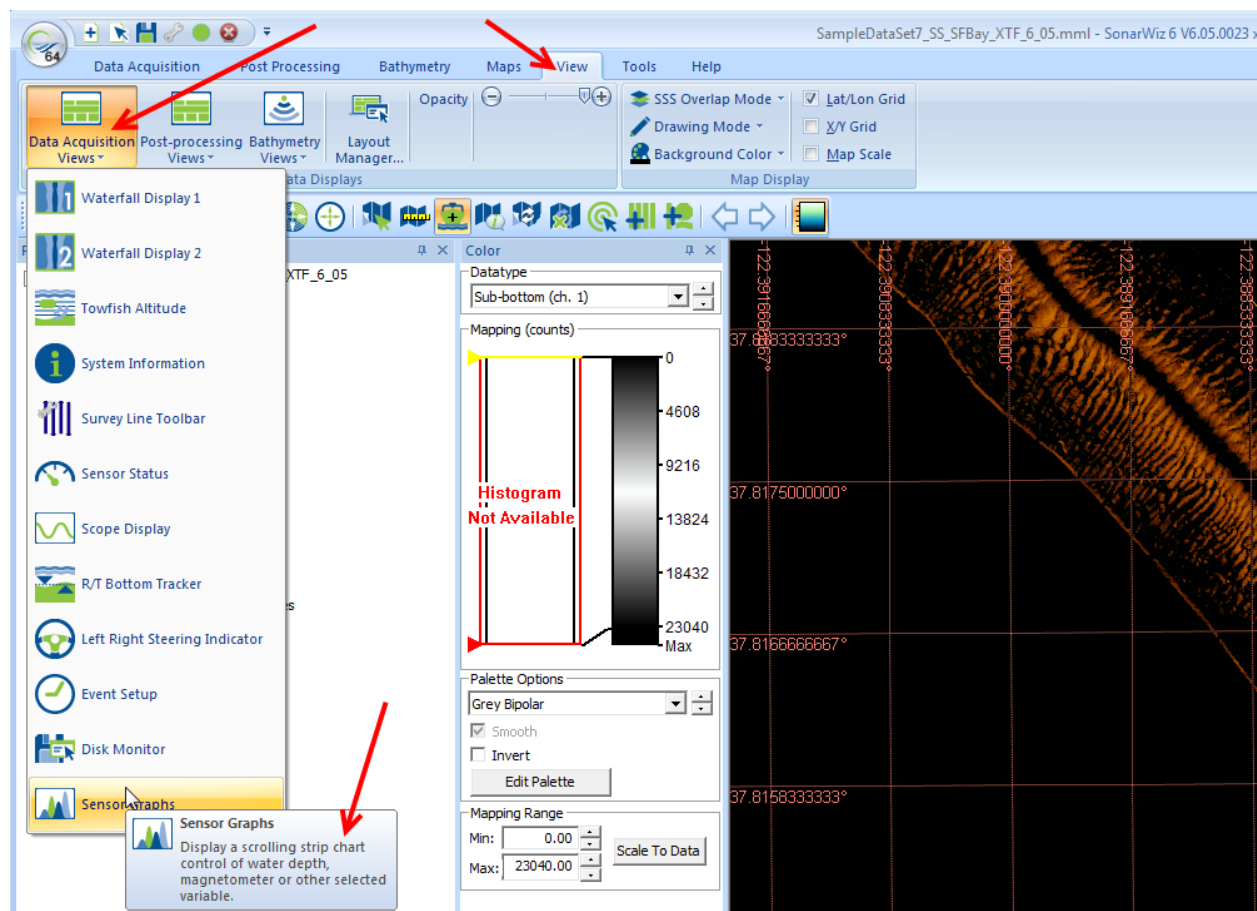
1.11 MAG Real-time and Post-Process - PLAYBACK Options

We've described the mag editor view of the mag data, which shows the ambient filtered data versus your raw data and the anomalies you have picked. There are 3 more interesting ways to view the mag data which we will describe here.

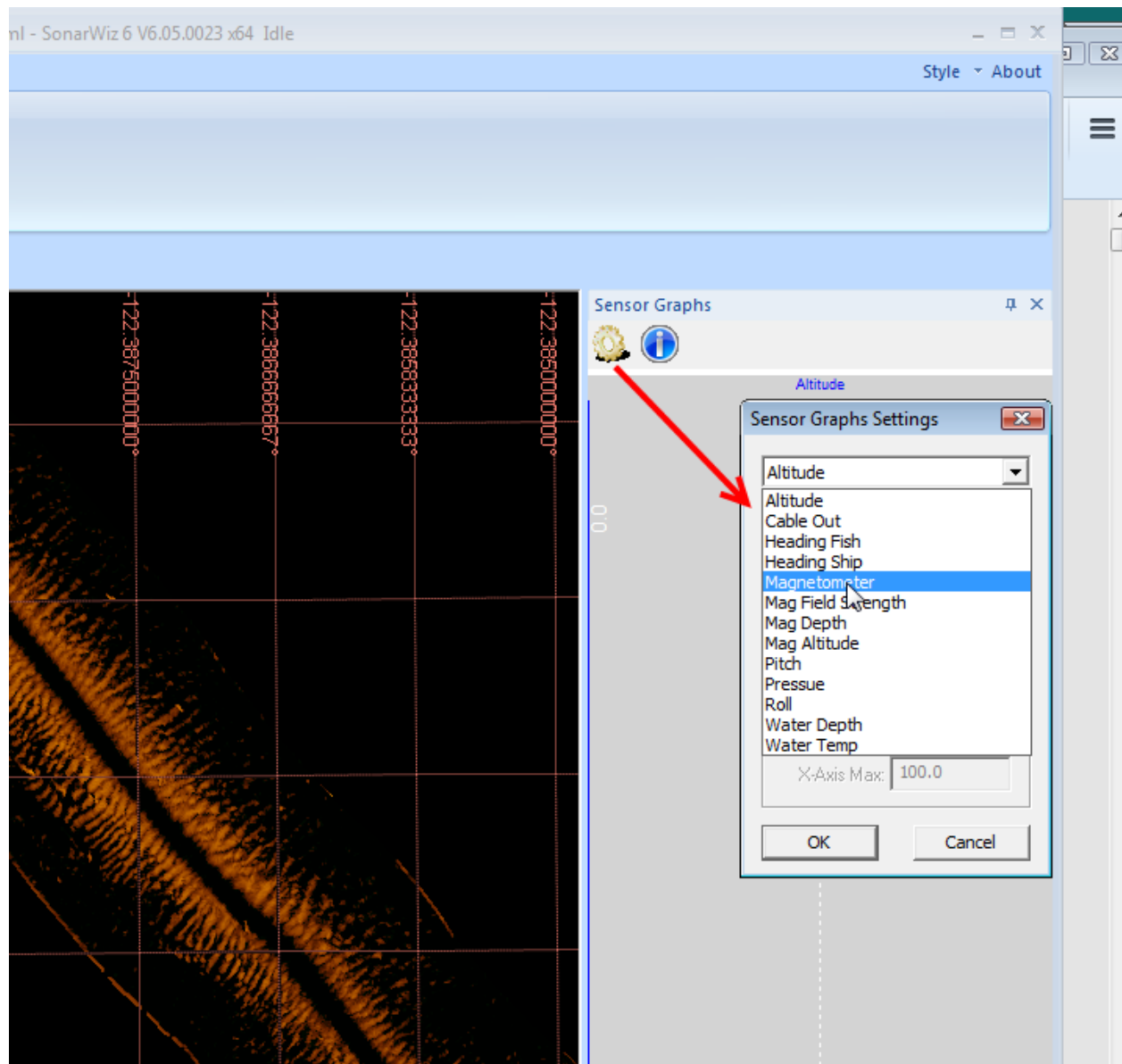
1.11.1 MAG / SS correlated Viewing - Real-Time or Post-Processing

You can set up a View -> Data Acquisition -> SENSOR GRAPH display graphic on your GUI and dock it, for viewing MAG data, and this works in 2 situations:

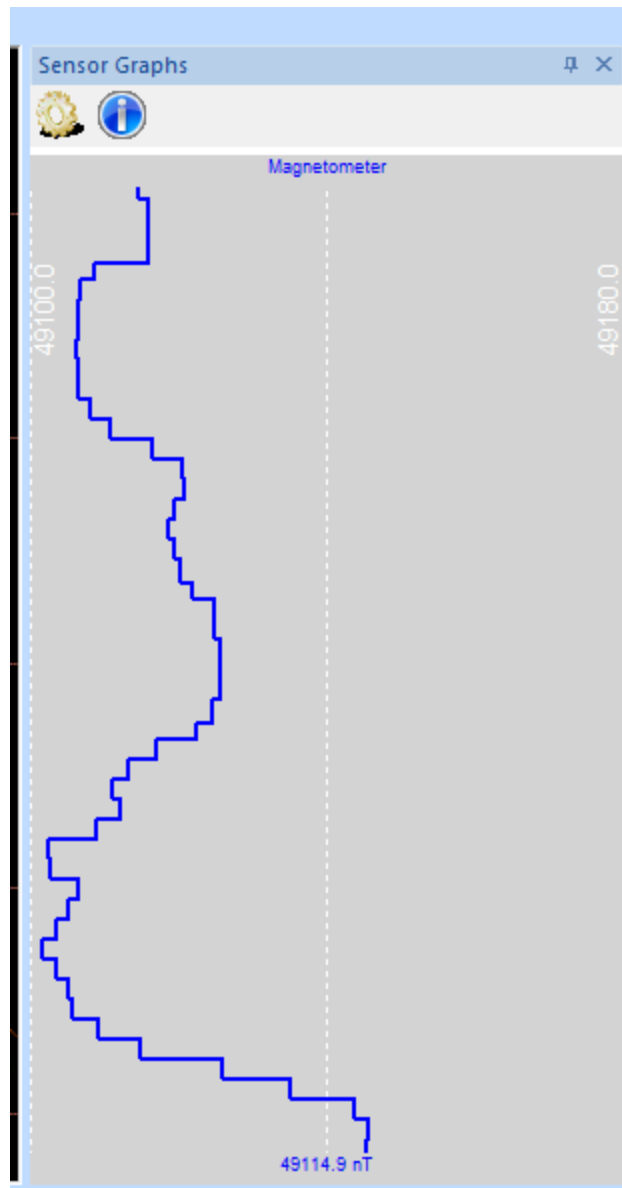
- (1) Real-time viewing of the mag sensor graph works DURING the real-time data acquisition of mag data.



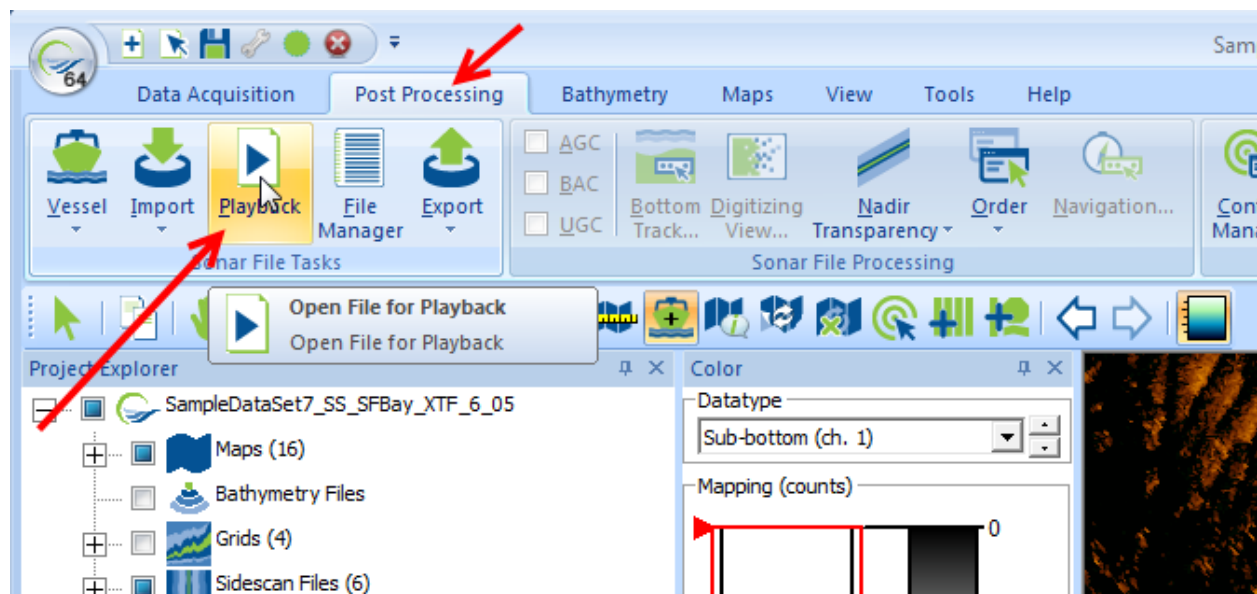
Then dock the sensor graph display graphic - say to the right of the map view, and you will see live MAG data as it records. Use the SETTINGS gear icon to choose MAGNETOMETER as the data type to display:



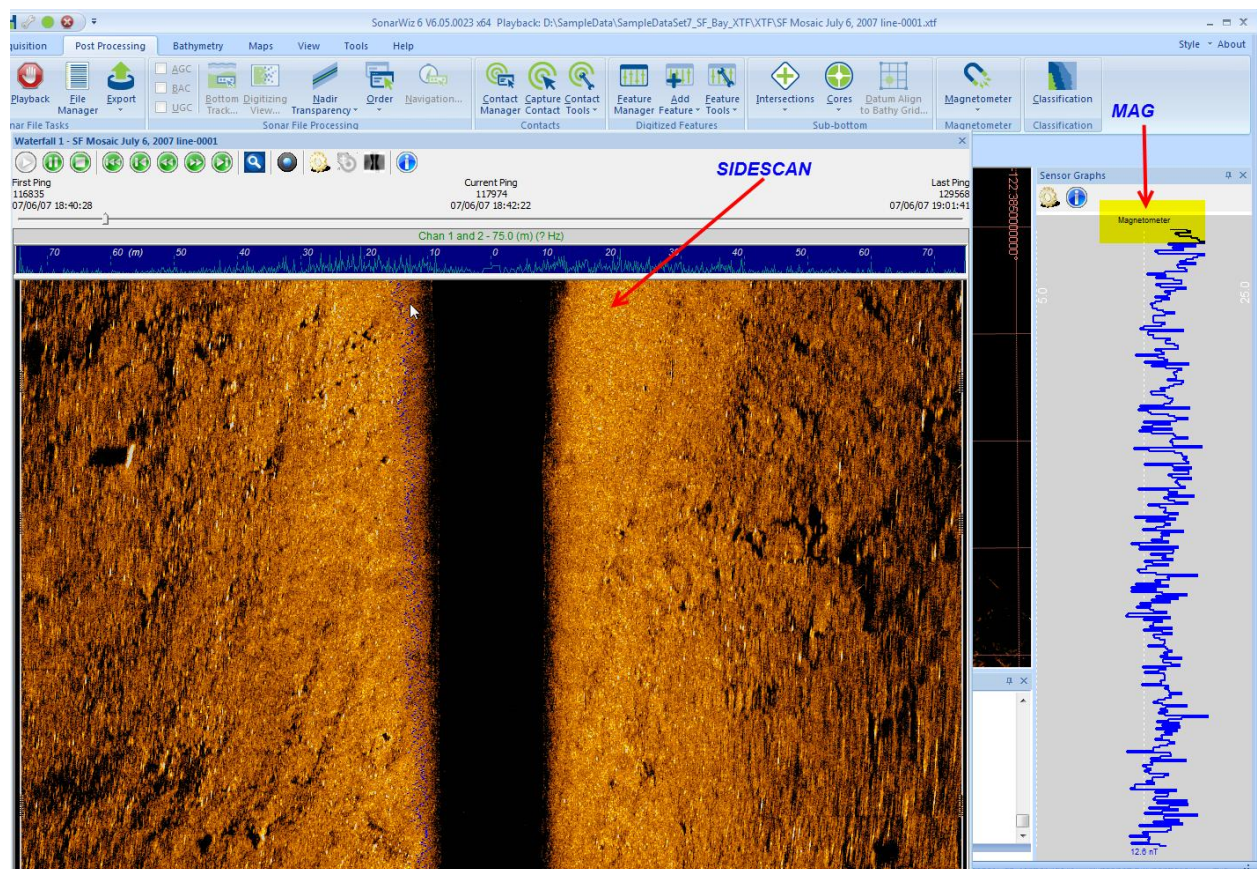
The incoming mag data will display like so:



- (2) If you have previously recorded a sidescan file, and the mag data is inside (e.g. XTF data recorded in www.chestech-support.com SAMPLE DATA area Sample Data Set 7, San Francisco Bay, 2007 Klein3000 SS/mag data), then during post-processing, you can play back XTF data



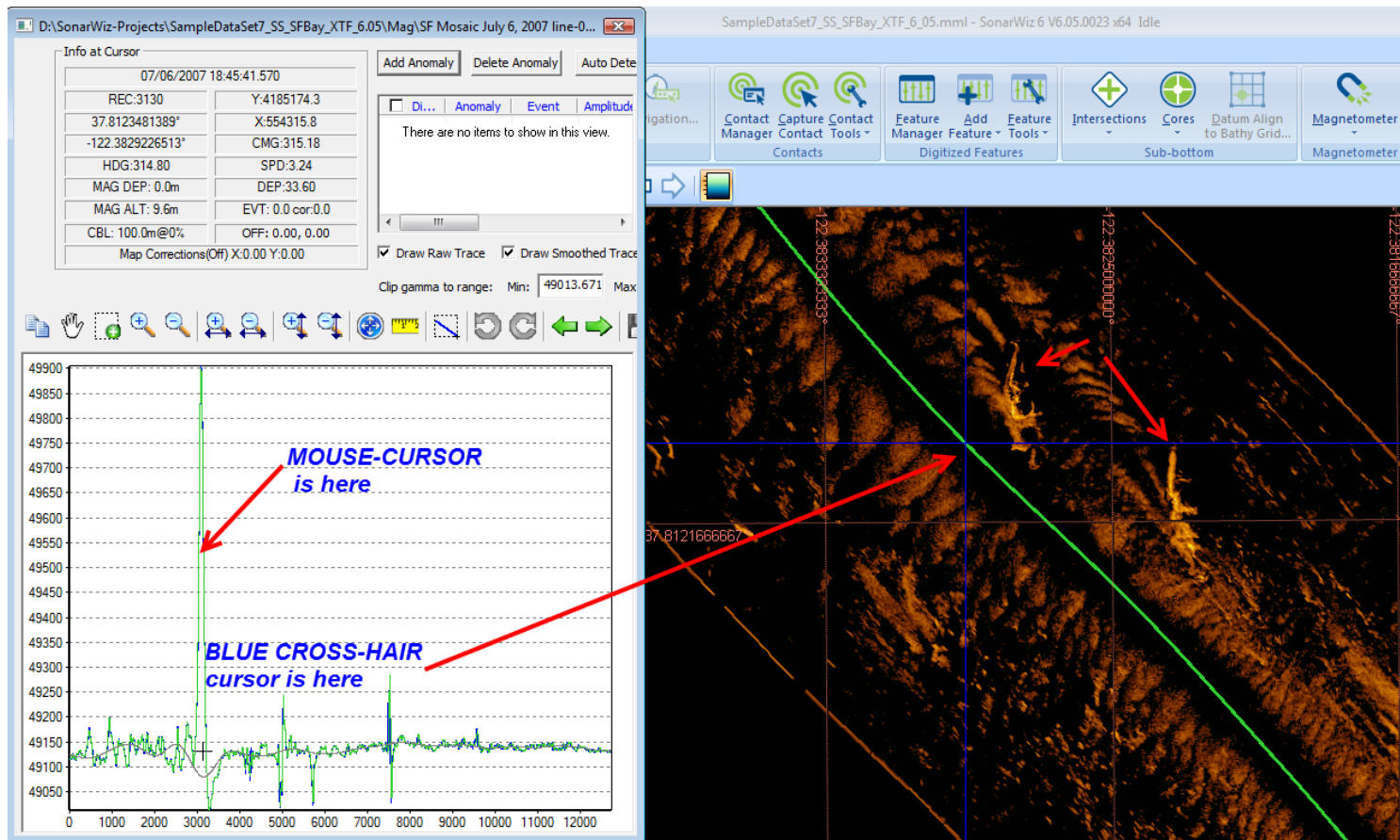
and have both a sidescan waterfall and a sensor graph waterfall:



This does need you to have recorded the mag data INSIDE the sidescan file, which is supported for a variety of the SonarWiz real-time servers.

1.11.2 Post-processing correlated SS Map View and Mag Editor Data View

A third way to see the correlation between mag data in the mag editor, and same-position sidescan data in the map view, is to have the MAG EDITOR open, and the MAP VIEW sidescan visible beside it, then move the mouse cursor to the mag anomaly:



It may be hard to see in a PDF, but on-screen it's easy to see the moving blue cross-hair cursor, which shows the co-located sidescan position (right side of GUI) of where you are pointing the mouse in the mag editor data (left side dialog). In this case it's easy to see the 2 ships causing the mag anomaly.

1.12 Gradiometer Post-Processing in SonarWiz

Gradiometer post-processing is now supported directly in SonarWiz 7, since version 7.00.0019:

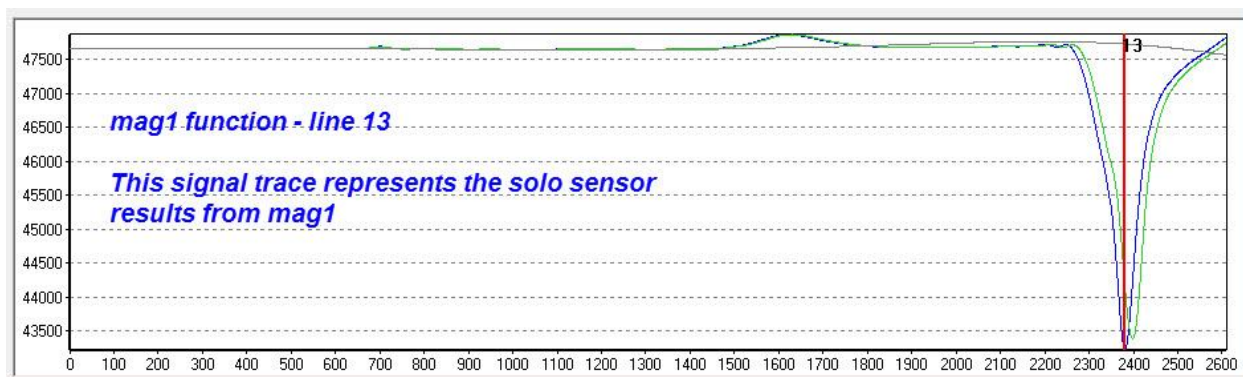
7.00.0019 64-bit	1/26/2018 12:34:26 PM	3. ENHANCMENT:MAG:SI-568 -- We have added a new field to the magnetometer file import template types which allows us to create mag_file templates with two mag amplitude values in the same template. The idea is that when the template parser sees two mag amplitudes it will subtract mag1-mag2 and store that difference in the CMF file. The first new template that uses the new "mag_amplitude2" field is called GEMS_Gradiometer and appears in FFtemplates_system.db3 version 7.65
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See sections 4.8, 4.9, and 4.19 above, describing our first set of sample gradiometer data, and how it can be imported. Your gradiometer data file will need position and mag1 and mag2 columns, as a minimum, to import and compute gradiometer results. Previous versions of SonarWiz supported the separate mag1 or mag2 post-processing, serially, from a single file. The results could be compared by SonarWiz in grid format, using the volumn calculator, which supports grid subtraction. The new feature in 7.00.0019 supported in SonarWiz, is that the subtraction of mag1 - mag2 columns can be done during the import stage, so that direct viewing, editing, anomaly-identification, and all other magnetometry post-processing functions, can be applied to the gradiometer results. All it takes is to have at least position and mag1 and mag2 columns within the same data file, to be able to import it and compute the mag1 - mag2 gradiometer results during import.

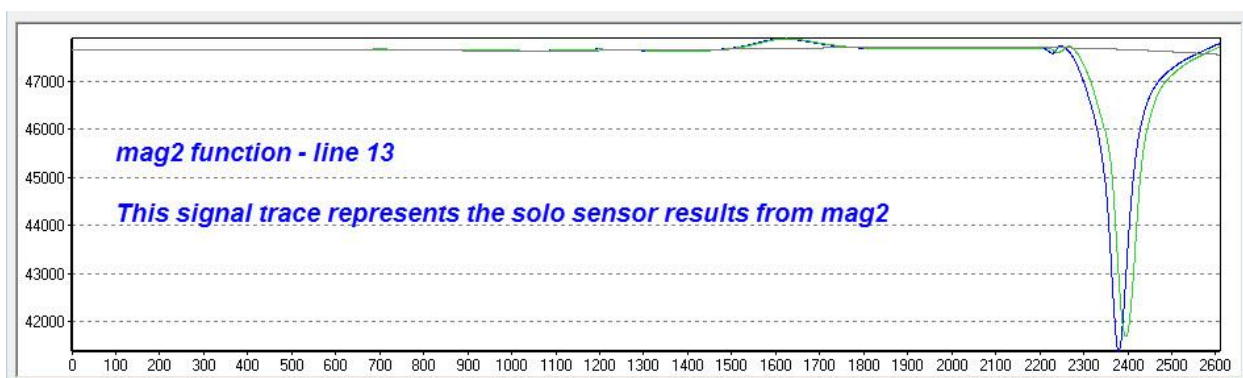
1.12.1 Gradiometer Sample Data Set - optional images

All the basic functions of magnetometry post-processing are available on a gradiometer data set. Specifically though, you may want to consider these 3 optional views:

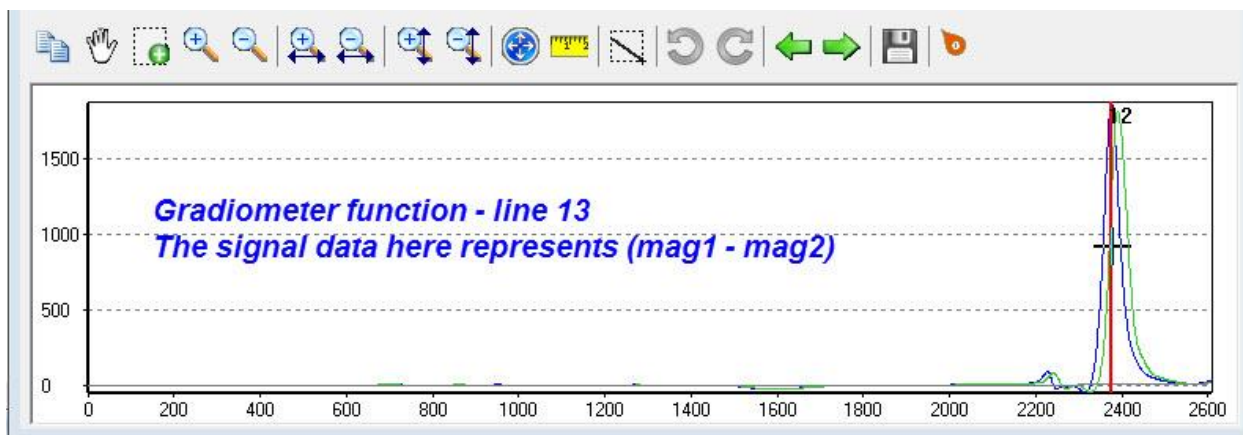
(1) Direct import, editing, gridding and contour line views of the mag1 data alone;



(2) Direct import, editing, gridding and contour line views of the mag1 data alone;



(3) Direct import, editing, gridding and contour line views of the mag1-mag2 gradiometer data.



There is value in viewing all 3 options. The individual mag1 and mag2 views show you background ambient mag influences, in addition to the sensor-specific anomalies. The gradiometer trace being a subtraction of mag1-mag2, gives the benefit of a common-mode rejection factor, since common signals at both sensors will subtract out, leaving only a difference function showing where mag1 and mag2 were independently seeing a magnetic disturbance, more at one sensor than the other.

1.13 SIT Recommendations

Surrogate Item Trial (SIT) is a recommended test practice discussed in many magnetometer vendor web-sites,. The basic idea is to calibrate your sensor and see how much magnetic deflection you get, when surveying at various distances from a ferrous object of known mass. If you've done that, then you have a better sense of what the ferrous mass might be, when you perform a real survey, and see a magnetic deflection of a certain amplitude.

2 Magnetometer File Format Templates - Overview

Inside the SonarWiz Program Files folder is a special file, controlling the ability to import mag files (and other serial-data template-parsed inputs): FFTemplates_system.db3. Note that FFTemplates_system.db3 also contains templates for magnetometer sensors, but for magnetometer file import, only the template choices available of type “magnetometer file” are presented in the SonarWiz import “File template” choice drop-menu, shown below for SonarWiz (newest changes in yellow)::

AquaScan AXL
 Arts Gavia MAG
 Balaswamy-MAG
 C&C Magnetometer
 C&C Magnetometer_No_Date
 CSF Magnetometer
 FSL-MAG
 G882_Type3
 GEMS_Meren13_INT
 GEMS_Meren13_INT_SHIFT
 GEMS-Gradiometer
 GEMS-INT-mag1
 GEMS-INT-mag2
 GEMS-MagLog
 GEMS-MagLog-CSV
 GEO_G882_Mag
 HWTMA-2011-1-MAG
 Hypack Raw File Magnetometer
 JSF_MAG_IMPORT
 Lat Lon MAG (tab delimited)
 Lon Lat MAG (space delimited)
 Mag Log Type 4
 Mag Log Type 5
 Mag Log Type 6
 Mag Log Type 7
 Maglog GPS-Pos w/ Altitude
 Maglog GPS-Pos-Alt-MAG2-MAG3
 Maglog Magnetometer
 Maglog w/ Altitude
 MagLog-Spencer
 MMT Maglog GPS-Pos w/Altitude
 PLR Magnetometer
 PLR Magnetometer (m)
 SeaLinkMAG
 SeaLink-Wilhelm
 SeaSpy Type 3
 SonarWiz-Default-MAG
 SWM-E,T,D,L,L,Y,X,M,A,D,S
 SWM-MAG882
 SWM-MAG-file-default
 SWM-SEASPY
 SWM-SEASPY_XY
 TBSmith Hypack MAG
 TeslaOffshore-MAG-1
 UDEL_G882_1
 UDEL_G882_2
 XYZ MAG

NOTE: The choices above are present in version 7.00.0019 and beyond. These import options can be made available in SonarWiz 6, by downloading and installing the UTILITIES area FFTemplates_system.db3 file from <http://www.chestech-support.com>.

2.1 Choosing a File Template and Pre-viewing your Magnetometer Data

Based upon the magnetometer file import templates shown below, examine your own ASCII text file magnetometer data and see if it matches an existing template. Using an existing template is easiest, but if we don't have one to match your file, we can create one. Magnetometer files are easily imported into EXCEL, and can then be manipulated by column, and can often be set up to match an existing template. In fact, the

magnetometer data can easily be pre-viewed in EXCEL by viewing columns as a line graph.

2.2 Managing your Mag Project - project movement limitations

Anomalies are linked to the specific filename (CMF) and location of those files, in your project, and this has implications. If you create the project at a certain drive letter and path name and project name, you can move the project to another PC, but you must maintain the exact same drive letter, path name (folders sequence), and project name, in the new location, in order to be able to fully re-use (edit, add, delete) anomalies from the first project.

For example, if the first computer project is:

D:\SonarWiz-projects\MagProject1 (on computer #1)

then that entire folder can move intact to computer #2 and be placed at the exact same location, and it will open and be fully useable with the same or a later version of SonarWiz, e.g.

D:\SonarWiz-projects\MagProject1 (on computer #2)

If you need to add to the project after the move, new files and anomalies will be possible too!

3 Magnetometer File Templates - Format Summary

In the Magnetometry file import options, here are the File Template types which may be selected:

```
AquaScan AXL
Arts Gavia MAG
Balaswamy-MAG
C&C Magnetometer
C&C Magnetometer_No_Date
CSF Magnetometer
FSL-MAG
G882_Type3
GEMS_Meren13_INT
GEMS_Meren13_INT_SHIFT
GEMS-Gradiometer
GEMS-INT-mag1
GEMS-INT-mag2
GEMS-MagLog
GEMS-MagLog-CSV
GEO_G882_Mag
HWTMA-2011-1-MAG
Hypack Raw File Magnetometer
JSF_MAG_IMPORT
Lat Lon MAG (tab delimited)
Lon Lat MAG (space delimited)
Mag Log Type 4
Mag Log Type 5
Mag Log Type 6
Mag Log Type 7
Maglog GPS-Pos w/ Altitude
Maglog GPS-Pos-Alt-MAG2-MAG3
Maglog Magnetometer
Maglog w/ Altitude
MagLog-Spencer
MMT Maglog GPS-Pos w/Altitude
PLR Magnetometer
PLR Magnetometer (m)
SeaLinkMAG
SeaLink-Wilhelm
SeaSpy Type 3
SonarWiz-Default-MAG
SWM-E,T,D,L,L,Y,X,M,A,D,S
SWM-MAG882
SWM-MAG-file-default
SWM-SEASPY
SWM-SEASPY_XY
TBSmith Hypack MAG
TeslaOffshore-MAG-1
UDEL_G882_1
UDEL_G882_2
XYZ MAG
```

(These mag file templates are all available in 7.00.0019 and later versions.)

These are the key fields in the following templates:

File Template Name	Fields	Key Fields
AquaScan AXL	8	Preamble, mag, latitude, lat-hem, longitude, lon-hem, skip, skip
Arts Gavia MAG	6	Longitude, latitude, mag_amp, mag_amp, skip
Balaswamy-MAG	6	Time, date, shot#, mag_amplitude, easting, northing
C&C Magnetometer	11	Shot, time, date, latitude, longitude, easting, northing, mag
CSF Magnetometer	N/A	Importing embedded MAG channel from within a CSF file
FSL - MAG	6	Date, time, mag, easting, northing
G882_Type3	15	Date, time, lat, long, skip, skip, mag_amplitude, skip, skip, skip
GEMS_Meren13_INT	15	Mag, skip, depth, date, time, long., lat., skips ...linename, skip
GEMS_Meren13_INT_SHIFT	15	Mag, skip, depth, date, time, skip, skip, long., lat., skips ...linename, sk
GEMS-gradimeter	26	Mag, skip1, depth, altitude, Mag2 ... date, time ... cable-out
GEMS-INT-mag1	26	Mag, skip1, depth, altitude, skip2 ... date, time ... cable-out
GEMS-INT-mag2	26	skip1, skip2, depth, altitude, Mag ... date, time ... cable-out
GEMS-MagLog	15	Mag, sig1, depth, date, time, skip, skip, long., lat., skip, skip, skip, height
GEMS-MagLog-CSV	15	Mag, sig1, depth, date, time, skip, skip, long., lat., skip, skip, skip, height
GEO G882 MAG	9	Skip, skip, easting, northing, skip, skip, mag_amplitude, skip, skip
HWTMA-2011-1-MAG	9	Date, time, line, easting, northing, mag, alt, hdg, layback
Hypack Raw Magnetometer	N/A	Complex text-file format (not template-driven)
JSF_MAG_IMPORT	8	Date, time, latitude, longitude, mag, skip, depth, altitude
Lat Lon Mag (tab delimited)	3	Latitude, longitude, mag
Lon Lat Mag (space delimited)	3	Longitude, latitude, mag
Mag Log Type 4	19	Mag, sig1, depth, altitude, date, time, longitude, latitude ...
Mag Log Type 5	16	Mag, sig1, date, time, long, lat, shift_lon, shift_lat, atargets, nmags ...
Mag Log Type 6	17	Mag, sig1, date, time, long, lat, shift_lon, shift_lat, atargets, nmags ...
Mag Log Type 7	18	Date, time, mag_amp, sigQ, mag_depth ...
Maglog GPS-POS w/Altitude	16	Mag, depth, altitude, date, time, longitude, latitude ...
Maglog GPS-Pos-Alt-MAG2-MAG3	25	Mag, depth, altitude, date, time, longitude, latitude ...
Maglog Magnetometer	17	Mag, depth, altitude, date, time, longitude, latitude ...
Maglog w/Altitude	18	Mag, depth, altitude, date, time, longitude, latitude ...
MagLog-Spencer	18	Mag, sig1, depth, alt, date, time, long, lat, shift_lon, shift_lat ...
MMT Maglog GPS-pos w/altitude	8	Mag, signal, depth, altitude, date, time, longitude, latitude
PLR Magnetometer	18	Time, line, shot, northing, easting, heading, speed, mag...
PLR Magnetometer (m)	18	Time, line, shot, northing, easting, heading, speed, mag...
SeaLink MAG	6	Date, time, mag_amp, easting, northing, mag_amp
SeaLink-Wilhelm	19	Skip0, Mag, Skip2-8, altitude, latitude, longitude, Skip12-19
SeaSpy Type 3	16	Skip, time, date, lat., long., north., east., mag, skip, skip, cable-out ...
SonarWiz-Default-MAG	10	Date, time, lat, long, Easting, Northing, mag_amp, skip, skip, skip
SWM-E,T,D,L,L,Y,X,M,A,D,S	11	Shot, Time, Date, Lat, Long, skip, skip, mag, alt, depth, skip
SWM-MAG882	9	Date, time, latitude, longitude, mag, strength, depth
SonarWiz- MAG-file-default	10	Date, time, lat, long, Easting, Northing, mag_amp, skip, skip, skip
SWM-SEASPY	12	Date, time, latitude, longitude, mag, depth, altitude
SWM-SEASPY_XY	12	Date, time, easting, northing, mag, depth, altitude
TBSmith Hypack MAG	5	Shot, easting, northing, mag, linename
TeslaOffshore-MAG-1	12	Shot, skip, skip, depth, easting, northing, mag, alt, skip, date, time ...
UDEL_G882_1	30	Mag_amplitude is in column 21

UDEL_G882_2	32	Mag_amplitude is in column 32
XYZ MAG	3	Easting, northing, mag

4 Magnetometer File Format Templates – Details

The following named templates are currently supported by SonarWiz 6.05.0009 and subsequent versions, and are selectable under the “File Template” button of the mag file import dialog.

4.1 AquaScan AXL

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 8

Fields delimited by: single delimiter character

Field delimiter: comma

Template format details

Field	Name	Type	Format
0	preamble	char	
1	Mag_amplitude	float	
2	latitude	Geocoord	DDDMM.mmm
3	Lat-hemisphere	char	
4	longitude	Geocoord	DDDMM.mmm
5	Lon-hemisphere	char	
6	Unused_1	float	
7	Unused_2	integer	

4.2 Arts Gavia MAG

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 1

Record delimiters: Newline

Number of fields: 7

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	longitude	geocoord	DDD.ddd
1	latitude	geocoord	DDD.ddd
2	Mag_altitude	float	
3	Mag_amplitude	float	
4	skip	float	
5	time	time	HH:MM:SS.sss
6	date	float	

4.3 Balaswamy-MAG

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 1

Record delimiters: Newline

Number of fields: 7

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	longitude	geocoord	DDD.ddd
1	latitude	geocoord	DDD.ddd
2	Mag_altitude	float	
3	Mag_amplitude	float	
4	skip	float	
5	time	time	HH:MM:SS.sss
6	date	float	

4.4 C&C Magnetometer

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 11

Fields delimited by: single delimiter character

Field delimiter: comma

Template format details

Field	Name	Type	Format
0	shotnumber	char	
1	time	time	HH:MM:SS.sss
2	date	date	MM/DD/YY
2	latitude	geocoord	
4	longitude	geocoord	
5	easting	gridcoord	
6	northing	gridcoord	
7	mag_amplitude	float	
8	mag_altitude	float	
9	mag_depth	float	
10	signal_strength	float	

4.5 CSF Magnetometer

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

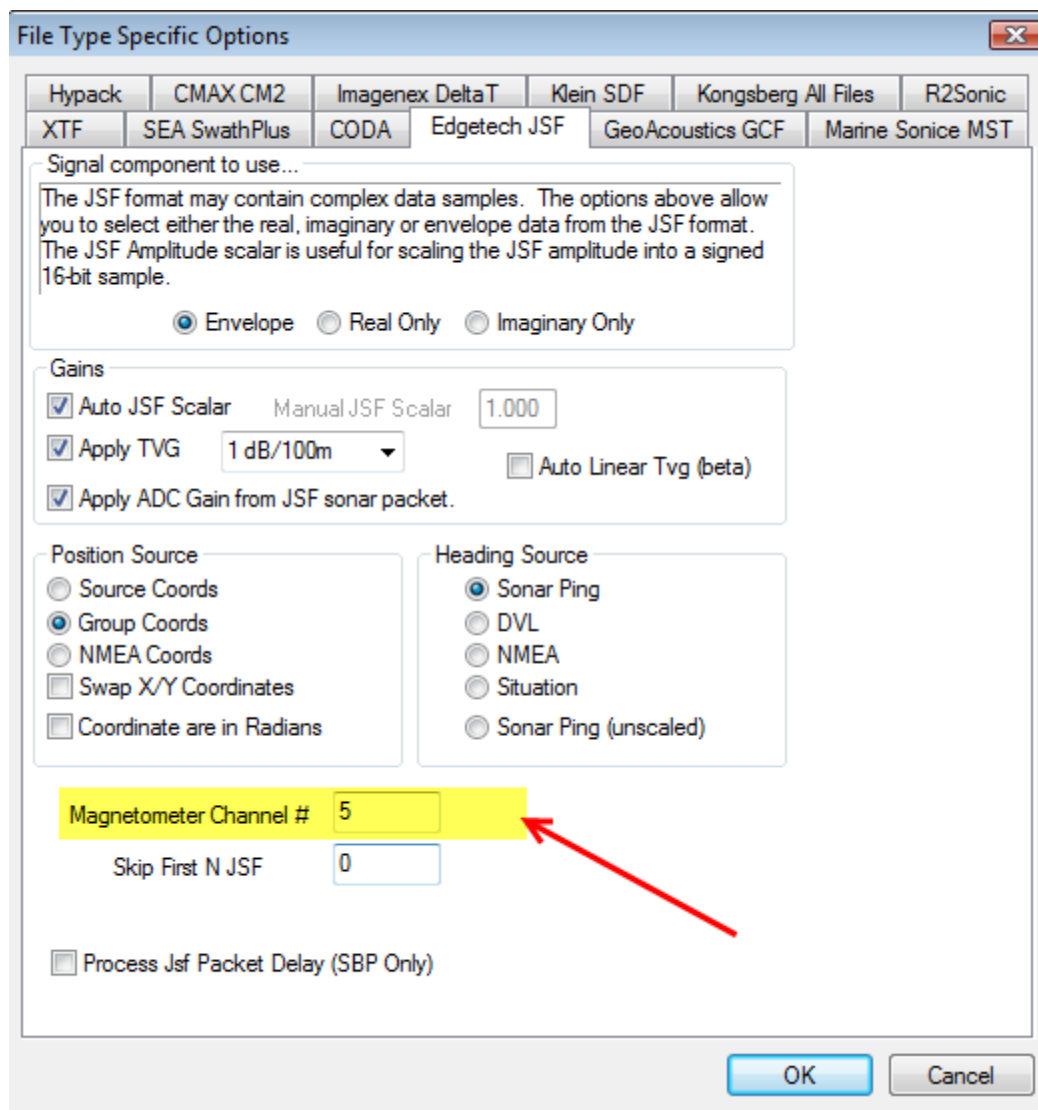
Number of fields: 0

Fields delimited by: single delimiter character

Field delimiter: comma

Template format details: None

The "CSF Magnetometer" template is used to give the user a template format choice when importing MAG data from a CSF file – not used for TXT file import. For example, if you recorded using a Klein 3000 or Edgetech 4200, and the mag data channel was fed in through the towfish, the mag data would be recorded directly into the sonar file as a "channel" in the XTF or JSF file. When you import from a file like this, for XTF there is no extra instruction needed, but for JSF files, you have a choice. You designate the magnetometry data channel, using "File Type Specific Options", in the sonar file import dialog like this:



After importing the sonar file, which creates the internal "Compact Sonar File" CSF file format in the SonarWiz mosaic, you then import the magnetometer data - which basically extracts it from the CSF file, and makes it editable as a separate "CMF" (Compact mag format) file, supported by the mag editing features of the magnetometry post-processing license of SonarWiz.

4.6 FSL-MAG

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 5

Record delimiters: Newline

Number of fields: 6

Fields delimited by: variable delimiter characters

Template format details

Field	Name	Type	Format
0	date	date	DD/MM/YYYY
1	time	time	HH:MM:SS.sss
2	mag_amplitude	float	
3	shotnumber	char	
4	easting	gridcoord	
5	northing	gridcoord	

4.7 G882_Type3

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 10

Fields delimited by: single delimiter character

Field delimiter: comma

Template format details:

Field	Name	Type	Format
0	date	date	DD/MM/YY
1	time	time	HH:MM:SS.sss
2	latitude	geocoord	DDD.ddd
3	longitude	geocoord	DDD.ddd
4	skip1	float	
5	skip2	float	
6	mag_amplitude	float	
7	Skip_3	float	
8	Skip_4	float	
9	Skip_5	integer	

4.8 GEMS_Meren13_INT

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 15

Fields delimited by: single delimiter character

Field delimiter: space

Template format details:

Field	Name	Type	Format
0	mag_amplitude	float	
1	Skip_1	float	
2	mag_depth	float	
3	date	date	MM/DD/YY
4	time	time	HH:MM:SS.sss
5	longitude	geocoord	DDD.ddd
6	latitude	geocoord	DDD.ddd
7	Skip_2	float	
8	Skip_3	float	
9	Skip_4	integer	
10	Skip_5	integer	
11	Skip_6	integer	
12	Skip_7	float	
13	linename	char	
14	Skip_layback	float	

4.9 GEMS_Meren13_INT_SHIFT

Very similar to the previous template, but longitude, latitude shift by 2 positions, from 5,6 to 7,8.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 15

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	Skip_1	float	
2	mag_depth	float	
3	date	date	DD/MM/YY
4	time	time	HH:MM:SS.sss
5	Skip_2	float	
6	Skip_3	float	
7	longitude	geocoord	DDD.ddd
8	latitude	geocoord	DDD.ddd
9	Skip_4	integer	
10	Skip_5	integer	
11	Skip_6	integer	
12	Skip_7	float	
13	linename	char	

14	Skip_layback	float	
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4.10 GEMS-gradiometer

See the next 2 templates. This template reads mag1 (index 0) and mag2 (index 4) and subtracts them, producing a singular gradiometer result, which gets saved as the imported CMF file, as the mag amplitude.

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 26

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	skip1	float	
2	mag_depth	float	
3	mag_altitude	float	
4	mag_amplitude2	float	
5	skip2	float	
6	skip3	float	
7	skip4	float	
8	skip5	float	
9	date	date	DD/MM/YY
10	time	time	HH:MM:SS.sss
11	skip8		
12	skip9		
13	skip10		
14	skip11		
15	skip12	integer	
16	skip13	integer	
17	longitude	geocoord	DDD.ddd
18	latitude	geocoord	DDD.ddd
19	skip14		
20	skip15		
21	skip16	integer	
22	skip17	float	
23	linename	char	
24	skip18	char	
25	cable-out	float	

4.11 GEMS-INT-mag1

This template allows individual viewing/editing of a gradiometer component - the first mag-amplitude appearing in the data (column index 0).

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 26

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	skip1	float	
2	mag_depth	float	
3	mag_altitude	float	
4	skip2	float	
5	skip3	float	
6	skip4	float	
7	skip5	float	
8	skip6	float	
9	skip7	date	DD/MM/YY
10	skip8	time	HH:MM:SS.sss
11	skip9	geocoord	DDD.ddd
12	skip10	geocoord	DDD.ddd
13	skip11	geocoord	DDD.ddd
14	skip12	geocoord	DDD.ddd
15	skip13	integer	
16	skip14	integer	
17	longitude	geocoord	DDD.ddd
18	latitude	geocoord	DDD.ddd
19	skip15	geocoord	DDD.ddd
20	skip16	geocoord	DDD.ddd
21	skip17	integer	
22	skip18	float	
23	linename	char	
24	skip19	char	
25	cable-out	float	

4.12 GEMS-INT-mag2

This template allows individual viewing/editing of a gradiometer component - the second mag-amplitude appearing in the data (column index 4).

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 26

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	skip0	float	
1	skip1	float	
2	mag_depth	float	
3	mag_altitude	float	
4	mag_amplitude	float	
5	skip3	float	
6	skip4	float	
7	skip5	float	
8	skip6	float	
9	skip7	date	DD/MM/YY
10	skip8	time	HH:MM:SS.sss
11	skip9	geocoord	DDD.ddd
12	skip10	geocoord	DDD.ddd
13	skip11	geocoord	DDD.ddd
14	skip12	geocoord	DDD.ddd
15	skip13	integer	
16	skip14	integer	
17	longitude	geocoord	DDD.ddd
18	latitude	geocoord	DDD.ddd
19	skip15	geocoord	DDD.ddd
20	skip16	geocoord	DDD.ddd
21	skip17	integer	
22	skip18	float	
23	linename	char	
24	skip19	char	
25	cable-out	float	

4.13 GEMS-MagLog

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 15

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	Signal_1	float	
2	mag_depth	float	
3	date	date	DD/MM/YY
4	time	time	HH:MM:SS.sss
5	SKIP1	float	
6	SKIP2	float	
7	longitude	geocoord	DDD.ddd
8	latitude	geocoord	DDD.ddd
9	SKIP3	integer	
10	SKIP4	integer	
11	SKIP5	integer	
12	GPS_Height	float	
13	LINE	integer	
14	Mag_Cableout	float	

4.14 GEMS-MagLog-CSV

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 15

Fields delimited by: single delimiter character

Field delimiter: comma

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	Signal_1	float	
2	mag_depth	float	
3	date	date	DD/MM/YY
4	time	time	HH:MM:SS.sss
5	SKIP1	float	
6	SKIP2	float	
7	longitude	geocoord	DDD.ddd
8	latitude	geocoord	DDD.ddd
9	SKIP3	integer	
10	SKIP4	integer	
11	SKIP5	integer	
12	GPS_Height	float	

13	LINE	integer	
14	Mag_Cableout	float	

4.15 GEO_G882_Mag

(Added in release 5.08.0009)

Delimited by: Character

Lines per record: N/A

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 9

Fields delimited by: single delimiter character

Field delimiter: comma

Template format details

Field	Name	Type	Format
0	SKIP1	float	
1	SKIP2	float	
2	Easting	gridcoord	
3	Northing	gridcoord	
4	SKIP3	float	
5	SKIP4	integer	
6	Mag_amplitude	float	
7	SKIP5	float	
8	SKIP6	float	

4.16 HWTMA-2011-1-MAG

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 9

Fields delimited by: single delimiter character

Field delimiter: comma

Template format details

Field	Name	Type	Format
0	date	date	MM/DD/YYYY
1	time	time	HH:MM:SS.sss
2	Linenname	char	

2	easting	gridcoord	
4	northing	gridcoord	
5	mag_amplitude	float	
6	mag_altitude	float	
7	mag_depth	float	
8	mag_cableout	float	

4.17 HYPACK RAW File Magnetometer

A binary file type import from HYPACK RAW files.

4.18 JSF_MAG_IMPORT

Used during Edgetech server recording of mag data, which then gets imported.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 8

Fields delimited by: single delimiter character

Field delimiter: comma

Template format details

Field	Name	Type	Format
0	date	date	MM/DD/YYYY
1	time	time	HH:MM:SS.sss
2	latitude	gridcoord	DDD.ddd
3	longitude	gridcoord	DDD.ddd
4	mag_amplitude	float	
5	skip	float	
6	mag_depth	float	
7	mag_altitude	float	

4.19 Lat Lon MAG (tab delimited)

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 3

Fields delimited by: Single delimiter characters (tab)

Template format details

Field	Name	Type	Format
0	latitude	geocoord	
1	longitude	geocoord	
2	mag_amplitude	float	

4.20 Lon Lat MAG (space delimited)

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 3

Fields delimited by: Single delimiter character (space)

Template format details

Field	Name	Type	Format
0	longitude	geocoord	
1	latitude	geocoord	
2	mag_amplitude	float	

4.21 Maglog Type 4

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 19

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	Unused_signal1	float	
2	mag_depth	float	
3	mag_altitude	float	
4	date	date	MM/DD/YY
5	time	time	HH:MM:SS.sss
6	Gps_longitude	geocoord	DDD.ddd
7	GPS_latitude	geocoord	DDD.ddd
8	Shift_longitude	geocoord	DDD.ddd

9	Shift_latitude	geoord	DDD.ddd
10	ATargets	integer	
11	NMags	integer	
12	longitude	geoord	DDD.ddd
13	latitude	geoord	DDD.ddd
14	Unused_GpsQc	integer	
15	Unused_GPSheight	float	
16	linename	char	
17	Layback (Mag_cableout)	float	
18	event	integer	

4.22 Maglog Type 5

Template added in 5.06.0049.

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 16

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	Unused_signal1	float	
2	date	date	MM/DD/YY
3	time	time	HH:MM:SS.sss
4	longitude	geoord	DDD.ddd
5	latitude	geoord	DDD.ddd
6	shift_longitude	geoord	DDD.ddd
7	shift_latitude	geoord	DDD.ddd
8	ATargets	integer	
9	NMags	integer	
10	Gps_longitude	geoord	DDD.ddd
11	Gps_latitude	geoord	DDD.ddd
12	Unused_GpsQc	integer	
13	Unused_GPSheight	float	
14	linename	char	
15	Layback (Mag_cableout)	float	

4.23 Maglog Type 6

Template added in 5.07.0014.

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 17

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	unused_signal1	float	
2	date	date	MM/DD/YY
3	time	time	HH:MM:SS.sss
4	gps_longitude	geocoord	DDD.ddd
5	gps_latitude	geocoord	DDD.ddd
6	shift_longitude	geocoord	DDD.ddd
7	shift_latitude	geocoord	DDD.ddd
8	ATargets	integer	
9	NMags	integer	
10	longitude	geocoord	DDD.ddd
11	latitude	geocoord	DDD.ddd
12	Unused_GpsQc	integer	
13	Unused_GPSheight	float	
14	linename	char	
15	Route	char	
16	Layback (Mag_cableout)	float	

4.24 Maglog Type 7

Template added in 5.08.0003.

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 18

Fields delimited by: single delimiter character

Field delimiter: comma

Template format details:

Field	Name	Type	Format
0	date	date	MM/DD/YYYY
1	time	time	HH:MM:SS.sss

2	mag_amplitude	float	
3	signalQuality	integer	
4	mag_depth	float	
5	linename	char	Used to split files!
6	longitude	geocoord	DDD.ddd
7	latitude	geocoord	DDD.ddd
8	mag Easting	gridcoord	
9	mag Northing	gridcoord	
10	Utmzone	char	e.g. 34N
11	GPSlatitude	geocoord	DDD.ddd
12	GPSlongitude	geocoord	DDD.ddd
13	GPS Easting	gridcoord	
14	GPS Northing	gridcoord	
15	GPSzone	char	e.g. 34N
16	Marker	char	
17	MarkerTime	char	

4.25 Maglog Type 8 (no longer supported)

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 19

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	Unused_signal1	float	
2	mag_depth	float	
3	mag_altitude	float	
4	date	date	MM/DD/YY
5	time	time	HH:MM:SS.sss
6	Gps_longitude	geocoord	DDD.ddd
7	GPS_latitude	geocoord	DDD.ddd
8	Shift_longitude	geocoord	DDD.ddd
9	Shift_latitude	geocoord	DDD.ddd
10	ATargets	integer	
11	NMags	integer	
12	longitude	geocoord	DDD.ddd
13	latitude	geocoord	DDD.ddd
14	Unused_GpsQc	integer	
15	Unused_GPSheight	float	

16	linename	char	Used to split files!
17	route-name	char	
18	Layback (Mag_cableout)	float	

4.26 Maglog GPS-Pos w/Altitude

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 16

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	Unused_signal1	float	
2	mag_depth	float	
3	mag_altitude	float	
4	date	date	MM/DD/YY
5	time	time	HH:MM:SS.sss
6	longitude	geocoord	DDD.ddd
7	latitude	geocoord	DDD.ddd
8	Unused_Shift_longitude	float	
9	Unused_Shift_latitude	float	
10	Unused_ATargets	integer	
11	Unused_NMags	integer	
12	Unused_GpsQc	integer	
13	Unused_GPSheight	float	
14	linename	char	
15	Layback (Mag_cableout)	float	

4.27 Maglog GPS-Pos-Alt-MAG2-MAG3

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 25

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	skip	float	
2	mag_depth	float	
3	mag_altitude	float	
4	skkip	char	
5	5	float	
6	6	float	
7	7	float	
8	8	float	
9	date	date	MM/DD/YY
10	time	time	HH:MM:SS.sss
11	11	float	
12	12	float	
13	longitude	geoord	DDD.ddd
14	latitude	geoord	DDD.ddd
15	15	float	
16	16	float	
17	17	float	
18	18	float	
19	19	float	
20	20	float	
21	21	float	
22	22	float	
23	linename	char	
24	Layback	float	

4.28 Maglog Magnetometer

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 17

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	Unused-f1	float	
2	mag_depth	float	
3	date	date	MM/DD/YY
4	time	time	HH:MM:SS.sss
5	Unused-f5		
6	Unused-f6		
7	Unused-f7		

8	Unused-f8		
9	Unused-f9		
10	Unused-f10		
11	longitude	geocoord	DDD.ddd
12	latitude	geocoord	DDD.ddd
13	Unused-f13		
14	Unused-f14		
15	linename	char	
16	mag_cableout	float	

4.29 Maglog w/Altitude

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 18

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	Unused-f1	float	
2	mag_depth	float	
3	mag_altitude	float	
4	date	date	MM/DD/YY
5	time	time	HH:MM:SS.sss
6	Unused-f5		
7	Unused-f6		
8	Unused-f7		
9	Unused-f8		
10	Unused-f9		
11	Unused-f10		
12	longitude	geocoord	DDD.ddd
13	latitude	geocoord	DDD.ddd
14	Unused-f13		
15	Unused-f14		
16	linename	char	
17	mag_cableout	float	

4.30 MagLog-Spencer

Template added in 5.06.0059.

Delimited by: Line Count

Lines per record: 1

Column name record: 1st

Initial skip count: 1

Record delimiters: Newline

Number of fields: 18

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	mag_amplitude	float	
1	skip_signal1	float	
2	mag_depth	float	
3	mag_altitude	float	
4	date	date	MM/DD/YY
5	time	time	HH:MM:SS.sss
6	longitude	geocoord	DDD.ddd
7	latitude	geocoord	DDD.ddd
8	skip_shift_lon	float	
9	skip_shift_lat	float	
10	skip_ATARGETS	float	
11	skip_NMAGS	float	
12	skip_LON_MAG1	float	
13	skip_LAT_MAG1	float	
14	skip_GPS_QC	float	
15	skip_GPS_HEIGHT	float	
16	linename	char	
17	mag_cableout	float	

4.31 MMT Maglog GPS-Pos w/Altitude

(Added in 5.07.0011; Mag_signalStrength added in 6.01.0008)

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 1

Record delimiters: Newline

Number of fields: 8

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	Mag_amplitude	float	
1	Mag_signalStrength	float	
2	Mag_depth	float	
3	Mag_altitude	float	
4	date	date	YYYY/MM/DD
5	time	time	HH:MM:SS.sss
6	longitude	geocoord	DDD.ddd
7	latitude	geocoord	DDD.ddd

4.32 OFG-Mag-2

(Added in 7.04.05) Initially Field 0 is a SKIP but we have requested support for the parsing of UNIXTIME (date/time in UNIX format) here.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 1

Record delimiters: Newline

Number of fields: 9

Fields delimited by: single delimiter character

Field delimiter: tab

Template format details

Field	Name	Type	Format
0	skip1	float	UnixTime - skipped for now, support has been requested
1	latitude	geocoord	DDD.ddd
2	longitude	geocoord	DDD.ddd
3	Mag_depth	float	
4	Mag_altitude	float	

5	skip2	float	
6	skip3	float	
7	skip4	float	
8	Mag_amplitude	float	

4.33 PLR Magnetometer

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 18

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	id	char	
1	time	time	JJJHHMMSS.s
2	linename	char	
3	shotnumber	char	
4	northing	gridcoord	
5	easting	gridcoord	
6	depthprimsonder		
7	unused1		
8	unused2		
9	cmg		
10	heading	float	
11	speed	float	
12	distancegone		
13	crosstrack		
14	mag_amplitude	float	
15	mag_depth	float	
16	mag_cableout	float	
17	mag_altitude	float	

4.34 PLR Magnetometer (m)

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 18

Fields delimited by: single delimiter character

Field delimiter: space

Template format details

Field	Name	Type	Format
0	id	char	
1	time	time	JJJHHMMSS.s
2	linename	char	
3	shotnumber	char	
4	northing	gridcoord	
5	easting	gridcoord	
6	depthprimsonder		
7	unused1		
8	unused2		
9	cmg		
10	heading	float	
11	speed	float	
12	distancegone		
13	crosstrack		
14	mag_amplitude	float	
15	mag_depth	float	
16	mag_cableout	float	
17	mag_altitude	float	

4.35 SeaLink MAG

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 6

Fields delimited by: Single delimiter character - SPACE

Template format details

Field	Name	Type	Format
0	date	date	YYYY/MM/DD
1	Time	Time	HH:MM:SS.sss
2	mag_amplitude	float	
3	easting	gridcoord	
4	northing	gridcoord	
5	mag_altitude	float	

4.36 SeaLink-Wilhelm

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 19 (should be 20)

Fields delimited by: Single delimiter character - SPACE

Template format details

Field	Name	Type	Format
0	Skip-0	char	
1	Mag_amplitude	float	
2	Skip-2	char	
3	Skip-3	char	
4	Skip-4	char	
5	Skip-5	char	
6	Skip-6	char	
7	Skip-7	char	
8	Skip-8	char	
9	Mag_altitude	float	
10	longitude	geocoord	DDD.ddd
11	latitude	geocoord	DDD.ddd
12	Skip-12	char	
13	Skip-13	char	
14	Skip-14	char	
15	Skip-15	char	
16	Skip-16	char	
17	Skip-17	char	
18	Skip-18	char	
19	Skip-19	char	

4.37 SeaSpy Type 3

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 16

Fields delimited by: Single delimiter character

Field delimiter: comma

Template format details

Field	Name	Type	Format
0	Skip1	integer	
1	Time	Time	HH:MM:SS.sss
2	Date	char	MM/DD/YY
3	latitude	Geocoord	DDD.ddd
4	Longitude	Geocoord	DDD.ddd

5	Northing	Gridcoord	
6	Easting	Gridcoord	
7	Mag_amplitude	float	
8	Skip2	float	
9	Skip3	integer	
10	Mag_cableout	float	
11	Mag_copy1	float	
12	Skip4	char	
13	Skip5	char	
14	Date2	date	MM/DD/YY
15	Time2	time	HH:MM:SS.sss

4.38 SonarWiz-Default-MAG

This format supports mag file import when the data were recorded by SonarWiz, and has date-format DD/MM/YY e.g. 27/11/16 = November 27, 2016.

Note that this import template also supports 27-11-16 format date import.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 10

Fields delimited by: single delimiter character (comma)

Template format details

Field	Name	Type	Format
0	date	date	DD/MM/YY
1	time	time	HH:MM:SS.sss
2	latitude	geocoord	DDD.ddd
3	longitude	geocoord	DDD.ddd
4	northing	Gridcoord	
5	easting	Gridcoord	
6	mag_amplitude	float	
7	mag_altitude	float	
8	mag_depth	float	
9	mag_signalStrength	float	

4.39 SWM-E,T,D,L,L,X,M,A,D,S

New in FFTemplates_system.db3 versions 7.31 and later (included in SonarWiz5.04.0012 and later), created as a resolution to PL2106.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 11

Fields delimited by: Single delimiter characters (comma)

Template format details

Field	Name	Type	Format
0	shotnumber	char	
1	time	time	HH:MM:SS.sss
2	date	date	MM/DD/YY
3	latitude	geocoord	DDD.ddd
4	longitude	geocoord	DDD.ddd
5	skip1	float	
6	skip2	float	
7	mag_amplitude	float	
8	mag_altitude	float	
9	mag_depth	float	
10	skip3	float	

4.40 SWM-MAG882

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 14 (said 14 but there were only 9 fields defined)

Fields delimited by: Variable delimiter characters (comma or space)

Template format details

Field	Name	Type	Format
0	date	date	MM/DD/YYYY
1	time	time	HH:MM:SS.sss
2	latitude	geocoord	DDD.ddd
3	longitude	geocoord	DDD.ddd
4	skip1	char	
5	mag_amplitude	float	
6	skip_field_strength	float	
7	mag_depth	float	
8	skip_to_end	char	

4.41 SonarWiz-MAG-file-default

This format supports mag file import when the data were recorded by SonarWiz, and has date-format MM/DD/YY e.g. 11/27/16 = November 27, 2016.

Note that this import template also supports 11-27-16 format date import.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 10

Fields delimited by: single delimiter character (comma)

Template format details

Field	Name	Type	Format
0	date	date	MM/DD/YY
1	time	time	HH:MM:SS.sss
2	latitude	geocoord	DDD.ddd
3	longitude	geocoord	DDD.ddd
4	northing	Gridcoord	
5	easting	Gridcoord	
6	mag_amplitude	float	
7	mag_altitude	float	
8	mag_depth	float	
9	mag_signalStrength	float	

4.42 SWM-SEASPY

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 12

Fields delimited by: Variable delimiter characters (space)

Template format details

Field	Name	Type	Format
0	date	date	MM/DD/YYYY
1	time	time	HH:MM:SS.sss
2	latitude	geocoord	DDD.ddd
3	longitude	geocoord	DDD.ddd
4	skip-1	char	
5	skip-2	char	

6	mag_amplitude	float	
7	skip-3	char	
8	skip-4	char	
9	mag_depth	float	
10	Skip-5	char	
11	mag_altitude	float	

4.43 SWM-SEASPY_XY

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 12

Fields delimited by: Variable delimiter characters (space)

Template format details

Field	Name	Type	Format
0	date	date	MM/DD/YYYY
1	time	time	HH:MM:SS.sss
2	easting	gridcoord	
3	northing	gridcoord	
4	skip-1	char	
5	skip-2	char	
6	mag_amplitude	float	
7	skip-3	char	
8	skip-4	char	
9	mag_depth	float	
10	Skip-5	char	
11	mag_altitude	float	

4.44 TBSmith Hypack MAG

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 5

Fields delimited by: Variable delimiter characters (comma, tab, space)

Template format details

Field	Name	Type	Format
0	shotnumber	char	
1	easting	gridcoord	
2	northing	gridcoord	

3	mag_amplitude	float	
4	linename	char	

4.45 TeslaOffshore-MAG-1

Mag from EVNAV software.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 12

Fields delimited by: single delimiter character (comma)

Template format details

Field	Name	Type	Format
0	shotnumber	char	
1	skip-1	float	
2	Skip-2	float	
3	mag_depth	float	
4	easting	gridcoord	
5	northing	gridcoord	
6	mag_amplitude	float	
7	mag_altitude	float	
8	skip-8	float	
9	date	date	DD/MM/YYYY
10	time	time	HH:MM:SS
11	skip-11	float	

4.46 UDEL_G882_1

Special 30-field format for U. Delaware team, format 1. This format allows U.Del team to choose column 21 as MAG_AMPLITUDE

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 1

Record delimiters: Newline

Number of fields: 30

Fields delimited by: single delimiter character (comma)

Template format details

Field	Name	Type	Format
0	skip1	char	
1	mag_altitude	float	
2	mag_depth	float	
3	skip4-hdg	float	
4	skip5-pitch	float	
5	skip6-revo	float	
6	skip7-roll	float	
7	skip8-curr	float	
8	skip9-dep	float	
9	skip10-dep	float	
10	skip11-flux	float	
11	skip12-flux	float	
12	skip13-flux	float	
13	skip14-hdg	float	
14	skip15-hdg	float	
15	latitude	geocoord	DDD.ddd
16	skip17-lat	geocoord	DDD.ddd
17	skip18-line	integer	
18	longitude	geocoord	DDD.ddd
19	skip20-lon	geocoord	DDD.ddd
20	mag_amplitude	float	
21	skip22-mag_dul	float	
22	skip23-pitch	float	
23	skip24-pitch	float	
24	skip25-roll	float	
25	skip26-roll	float	
26	skip27-sig	float	
27	skip28-base	float	
28	skip29-utc	float	
29	date	date	MM/DD/YY

4.47 UDEL_G882_2

Special format for U. Delaware team, format 2, allows U.Del team to use comp-mag-dul column 32 data for mag_amplitude.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 1

Record delimiters: Newline

Number of fields: 32

Fields delimited by: single delimiter character (comma)

Template format details

Field	Name	Type	Format
0	skip1	char	
1	mag_altitude	float	
2	mag_depth	float	
3	skip4-hdg	float	
4	skip5-pitch	float	
5	skip6-revo	float	
6	skip7-roll	float	
7	skip8-curr	float	
8	skip9-dep	float	
9	skip10-dep	float	
10	skip11-flux	float	
11	skip12-flux	float	
12	skip13-flux	float	
13	skip14-hdg	float	
14	skip15-hdg	float	
15	latitude	geocoord	DDD.ddd
16	skip17-lat	float	
17	skip18-line	integer	
18	longitude	geocoord	DDD.ddd
19	skip20-lon	float	
20	skip21-mag	float	
21	skip22-mag_dul	float	
22	skip23-pitch	float	
23	skip24-pitch	float	
24	skip25-roll	float	
25	skip26-roll	float	
26	skip27-sig	float	
27	skip28-magbase	float	
28	skip29-utc	float	
29	date	date	MM/DD/YY
30	skip31-time	char	
31	mag_amplitude	float	

4.48 XYZ MAG

Our simplest format - always a great option if you have an obscure new format and simply want to see the data, without necessarily time or date. You can manipulate your data in EXCEL, drop and swap columns and save an X,Y,MAG format (e.g. easting, northing, MAG) in CSV format, set up a project at the right position and import the data in XYZ format.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 3

Fields delimited by: Variable delimiter characters (comma, space)

Template format details

Field	Name	Type	Format
1	easting	gridcoord	
2	northing	gridcoord	
3	mag_amplitude	float	

4.49 XYZA MAG

Our next-to-simplest format - another great option if you have an obscure new format and simply want to see the data, without necessarily time or date. You can manipulate your data in EXCEL, drop and swap columns and save an X,Y,MAG,DEPTH format (e.g. easting, northing, MAG,DEPTH) in CSV format, set up a project at the right position and import the data in XYZ format.

Delimited by: Line Count

Lines per record: 1

Column name record: None

Initial skip count: 0

Record delimiters: Newline

Number of fields: 4

Fields delimited by: Single delimiter character - comma

Template format details

Field	Name	Type	Format
1	easting	gridcoord	
2	northing	gridcoord	
3	mag_amplitude	float	
4	mag_depth	float	

5 Document History

Rev 31, 7/25/2019 - Sections 4.42 describes new OFG-Mag-2 format, and a new description of implicit automatic duplicated-position down-sampling was added.

Rev 30, 2/19/2019 - Sections 1.4.2 added to clarify the set cable out and offset cable out operations

Rev 29, 10/24/2018 - Sections 1.11 revised to explain color-mapped GRID presentation options for mag data

Rev 28, 2/27/2018 - Sections 1.11 and 1.12 on gradiometer post-processing and SIT recommendations added.

Rev 27, 1/29/2018 - Sections 4.8, 9, 10 added describing the new sample data format for gradiometer post-processing, new in SonarWiz 7.00.0019.

Rev 26, 11/10/2017 - Section 1.10 added to explain mag-SS correlated viewing options.

Rev 25, 10/9/2017 - Clarification added about the anomaly amplitude (peak-to-peak RAW value difference) within an anomaly left-right-window limits user-defined area, section 1.7

Rev 24, 2/9/2017 - New format XYZA appears in 7.00.0009 (maybe 6.05.0020) with FFTemplates_system.db3 version 7.63.

Rev 23, 2/9/2017 - New formats SonarWiz-Default-MAG, SWM-MAG_file-default, UDEL_G882_1, and UDEL_G882_2 added.

Rev 22, 8/24/2016 - Clarifications added explaining that RAW (observed) data are used for anomaly amplitude, and XYZ (Z portion) of export data. Section 1.5 is clarified to explain how to change the value of the ambient smoothing count in a project. New section 1.6 also clarifies the computational details of anolamie height and Z-value in XYZ export.

Rev 21, 11/23/2015 - New section 1.2.1 describing the CMF files area of the MML file, and section 1.7.1 added explaining where the ANO file is stored, containing anomalies.

Rev 20, 6/30/2015 - New section 1.1 added to clarify how you generate MAG data files and that the MAG R-T option is FREE with any sonar R-T feature purchase on your license key.

Rev 19, 4/28/2015 - Template 26 MMT Maglog GPS-Pos w/Altitude - Mag_SignalStrength added to replace position 2 Unused_MagSignal parameter.

Enhancement appears in SonarWiz 6.01.0008, and data imported using this template may be edited in ZEDIT to see the graph of Mag_signalStrength.