

Introduction to the Spreadsheet Editor (G04)

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When you are processing geophysical data you may want to view, edit and manipulate the numbers that make up your data. The INTREPID Spreadsheet Editor is a powerful tool which allows you to do all of this.

This Guided Tour shows you how the INTREPID Spreadsheet Editor interprets and manipulates the data contained in INTREPID datasets.

- You will examine the structure of a line dataset and learn to navigate around it.
- You will manipulate the data in an airborne magnetic Line dataset and create a new data field. In this exercise you subtract base station data from raw magnetic data to create a diurnally corrected magnetic channel.

Context of this guided tour

In the context of your data processing cycle, the Spreadsheet Editor may be used at any stage to view and manipulate your data. It is both a window into your data and a versatile tool to make changes to that data. When you want access to the “numbers”, the Spreadsheet is for you. We have extended this tool to support vectors and tensors, using simple mimic graphs in each cell, to give you a quick visual that with practise, gives you a simple way to see how the signal is varying from sample to sample.

	line	Xgda94mga55	Ygda94mga55	rawmag	linetype
1	140201	485347.24	5999360.040074	59291.13	2
2		485342.95	5999359.927777	59291.15	
3		485338.23	5999359.976059	59291.18	
4		485334.21	5999360.111033	59291.21	
5		485331.03	5999359.924847	59291.23	
6		485328.11	5999359.985933	59291.25	
7		485325.20	5999360.047018	59291.28	
8		485322.02	5999359.860832	59291.30	
9		485320.00	5999359.928319	59291.31	
10		485317.09	5999359.989405	59291.32	
11		485314.18	5999360.050490	59291.33	
12		485311.00	5999359.864304	59291.34	
13		485308.08	5999359.925389	59291.35	
14		485305.23	5999361.121186	59291.38	
15		485300.94	5999361.008888	59291.38	
16		485298.03	5999361.069974	59291.38	
17		485294.21	5999361.124658	59291.40	
18		485291.30	5999361.185743	59291.42	
19		485287.00	5999361.073446	59291.44	
20		485283.19	5999361.128129	59291.48	

C:/Intrepid/V4.5/sample_data/guided_tours/intrepid_datasets/albury..DIR

Overview



The INTREPID Spreadsheet Editor is a tool for viewing and editing your data numerically. It enables you to:

- View and edit ALL types of INTREPID datasets in a spreadsheet layout
- Navigate, examine and manipulate the dataset structure
- Search and replace data, using conditional logic
- View gradient and tensor data using special icons that help you to visualise the complex values in each reading
- Perform grid-level arithmetic on gridded datasets. For example, add a pair of grids.
- Create new fields and grids using functions.

This Guided Tour demonstrates the Spreadsheet Editor firstly as a tool for viewing dataset structure, and secondly as a tool for manipulating your data.

Location of sample data for Guided Tours

We provide two complete sets of sample datasets, one in INTREPID format and one in *Geosoft* format. INTREPID works equally well with both formats. When you want to open a dataset, navigate to the directory containing the required data format.

Where *install_path* is the path of your INTREPID installation, the project directories for the *Guided Tours* sample data are

install_path\sample_data\guided_tours\intrepid_datasets and
install_path\sample_data\guided_tours\geosoft_datasets.

For example, if INTREPID is installed in

C:\Program Files\Intrepid\Intrepid4.5.nnn,

then you can find the INTREPID format sample data at

**C:\Program Files\Intrepid\Intrepid4.5.nnn\sample_data\
guided_tours\intrepid_datasets**

This is the default location for the sample data. If you have installed INTREPID normally, the data resides there. If you have installed INTREPID elsewhere, the exercises will work just as well. Just use the appropriate pathnames.

For more information about installing the sample data, see "[Sample datasets—installing, locating, naming](#)" in [INTREPID Guided Tours Introduction \(G01\)](#)

For a more detailed description of INTREPID datasets, see [Introduction to the INTREPID database \(G20\)](#). For even more detail, see [INTREPID database, file and data structures \(R05\)](#).

Location of sample data for CookBooks

Right next to the Guided tours data, is a rich set of more exotic geophysics datasets and grids, already prepared for the cookbook training sessions. A casual user might also gain some trial and error insights into the capabilities of the software, just by testing the Project Manger's ability to preview and describe the attributes of each of the cookbook datasets.

How the Spreadsheet represents INTREPID vector datasets

See "INTREPID dataset types" in [Locating datasets, viewing, statistics, launching tools \(G02\)](#) for a brief introduction to the INTREPID database.

A spatial vector dataset consists of a set of data points. Each data point may have several measurements or quantities associated with it, e.g., X, Y, elevation, temperature, magnetometer reading. We can refer to these quantities as **fields** or **channels** in the dataset.

Note: The word '**field**' has many different meanings in physical sciences and mathematics. A data '**field**' as used here, simply refers to an attribute or quantity associated with a data point. It has no significance in the wider sense of a magnetic or gravity 'field'. This can be confusing, as we might talk about a gravity gradient tensor field also being part of the Spreadsheet visuals.

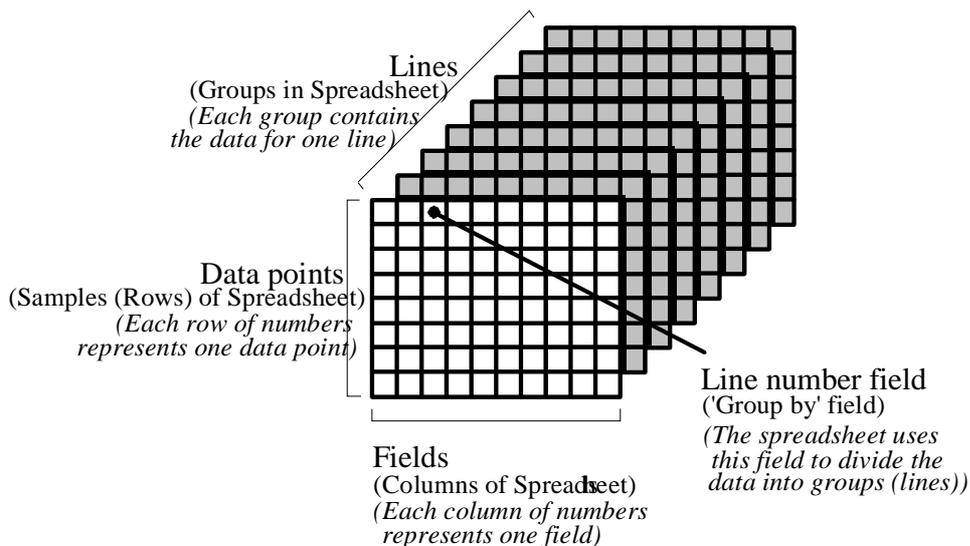
If data is collected at a series of random locations, we refer to it as random or **point** data. This is generally true of gravity and geochemistry surveys. If data is collected along a series of lines we refer to it as **line** data. This is true of airborne surveys, where each line is assigned a unique line number.

The Spreadsheet Editor displays vector data in rows and columns. Each vertical column of the spreadsheet represents a field in the dataset. Each horizontal row of the spreadsheet represents a single data measurement.

An INTREPID **Point** dataset consists of a single group of data. An INTREPID **Line** dataset consists of several groups, where each group represents one survey line of data.

For a Line dataset, the Spreadsheet Editor uses the line number field to group the data into lines. It displays only one line at a time. The line number field is a '**group by**' field, and is the primary identifier for the dataset.

How the Spreadsheet Editor displays a line dataset



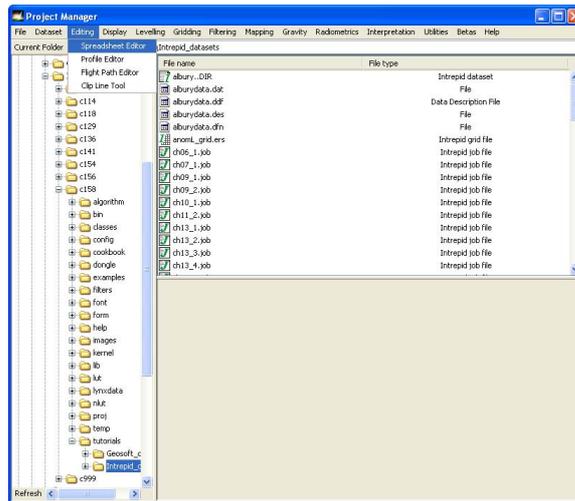
You can also display and edit **grid** datasets using the Spreadsheet Editor. Each group of the spreadsheet represents a horizontal line of grid points. The number of rows in each group is equal to the number of grid cells per line.

Steps to follow

Examine a line dataset

- 1 Load a dataset into the spreadsheet editor

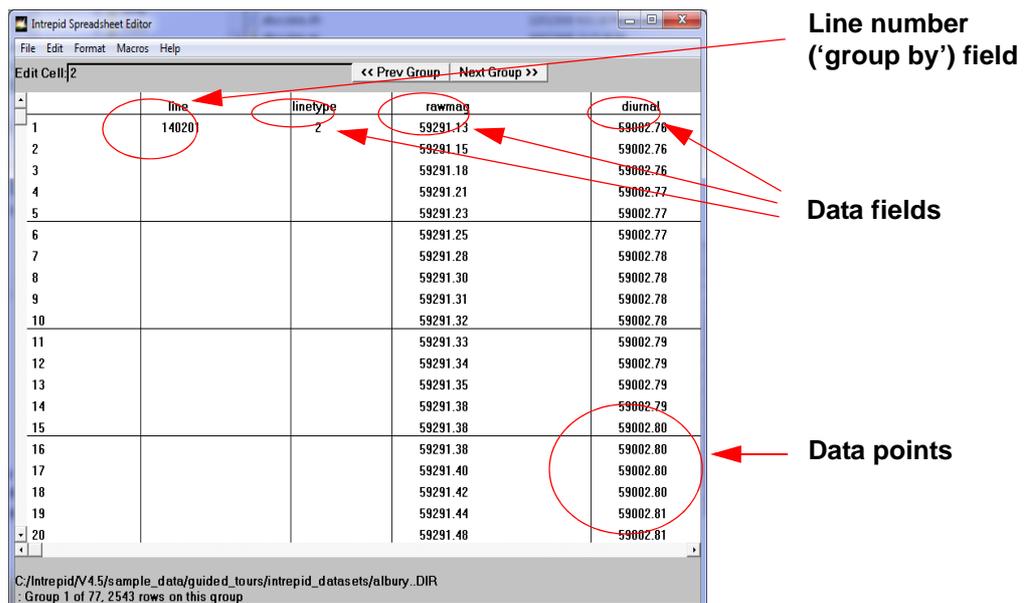
Start the Project Manager. Navigate to the directory **install_path\sample_data\guided_tours\intrepid_datasets**. From the **Editing** menu, launch the Spreadsheet Editor.



See [Locating datasets, viewing, statistics, launching tools \(G02\)](#) for instructions about navigating to different directories and selecting datasets.

Choose **File > Open Dataset**. The INTREPID **Load Dataset** dialog box appears. Select the line dataset **albury..DIR**, and choose **Open**.

INTREPID launches the Spreadsheet Editor and displays the **albury** dataset in the **Spreadsheet** window.



Tip: Each row in the **Spreadsheet** window represents a data point. Each column in the **Spreadsheet** window represents a field. The Editor displays line data from

one group at a time. Each group represents one survey line of data. The line number field is the 'group by' field that identifies each line.

2 Use the scroll bars to view different rows and columns in the current group.

Use the vertical scroll bar to view different data points. You can choose the down or up arrow to advance one or two data points through the group. You can also drag and release the scroll box to advance many data points, or all the way to the end of the current group.

Use the horizontal scroll bar to view different data points. You can choose the right or left arrow to advance one or two columns through the group. You can also drag and release the scroll box to advance many columns.

Now use the << **Prev Group** and **Next Group** >> buttons to view different groups (lines) in the dataset.

Group (line) navigation buttons

Vertical scroll bar for navigating rows (data points)

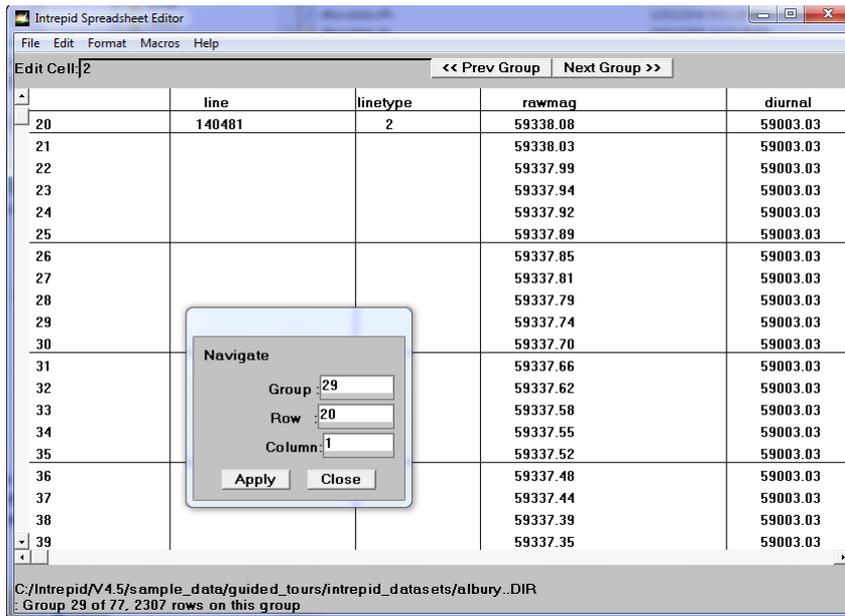
Horizontal scroll bar for navigating columns (fields)

	line	linetype	rawmag	diurnal
1	140201	2	59291.13	59002.76
2			59291.15	59002.76
3			59291.18	59002.76
4			59291.21	59002.77
5			59291.23	59002.77
6			59291.25	59002.77
7			59291.28	59002.78
8			59291.30	59002.78
9			59291.31	59002.78
10			59291.32	59002.78
11			59291.33	59002.79
12			59291.34	59002.79
13			59291.35	59002.79
14			59291.38	59002.79
15			59291.38	59002.80
16			59291.38	59002.80
17			59291.40	59002.80
18			59291.42	59002.80
19			59291.44	59002.81
20			59291.48	59002.81

3 Use the *Navigate* function to navigate to a different group.

Use the scroll bars and group navigation buttons to return to the top left of group 1 as shown when you first launched the tool. From the **Edit** menu, choose **Navigate**. INTREPID displays the **Navigate** dialog box. Enter **29** into the **Group** text box, and **20** into the **Row** text box.

Choose **Apply**. INTREPID displays the 29th group, beginning at row 20.

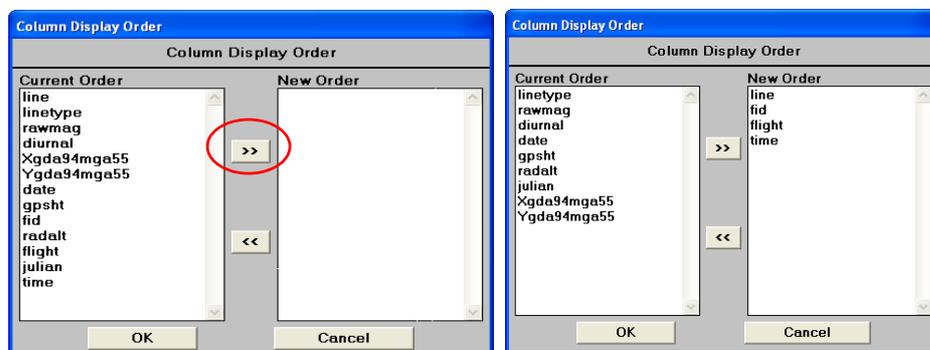
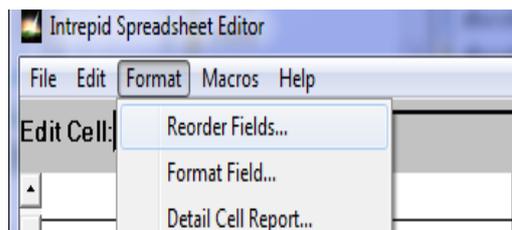


Note the line number. You are viewing the data from line **140481**. Close the **Navigate** dialog box. Observe how the **Spreadsheet Editor** reports the dataset name, the current group and the number of rows in the current group at the bottom of the tool.

Note: You can leave the **Navigate** dialog box open on the screen and use it as required.

- 4 Use the **Reorder Fields** function to change the display order of the fields (columns)

From the **Format** menu, choose **Reorder Fields**. INTREPID displays the **Column Display Order** dialog box. From the **Current Order** list, select **line** and move it (>>) to the **New Order** list. Then select and move the **fid**, then **flight** and **time** fields.



Choose **OK**. INTREPID displays the new column order in the Spreadsheet Editor.

- 5 Exit from the tool

To exit from the Spreadsheet Editor, choose **Quit** from the **File** menu.

Manipulate a line dataset

You will now use the Spreadsheet Editor to create a new data field using a combination of the existing fields. The new data field appears as a new column in the Editor.

In this exercise you use the Editor to perform a routine diurnal correction on magnetic survey data. Using the **albury** dataset, you subtract the base station data from the raw magnetic data to create a diurnally corrected magnetic channel. You also add the mean diurnal value to the new field.

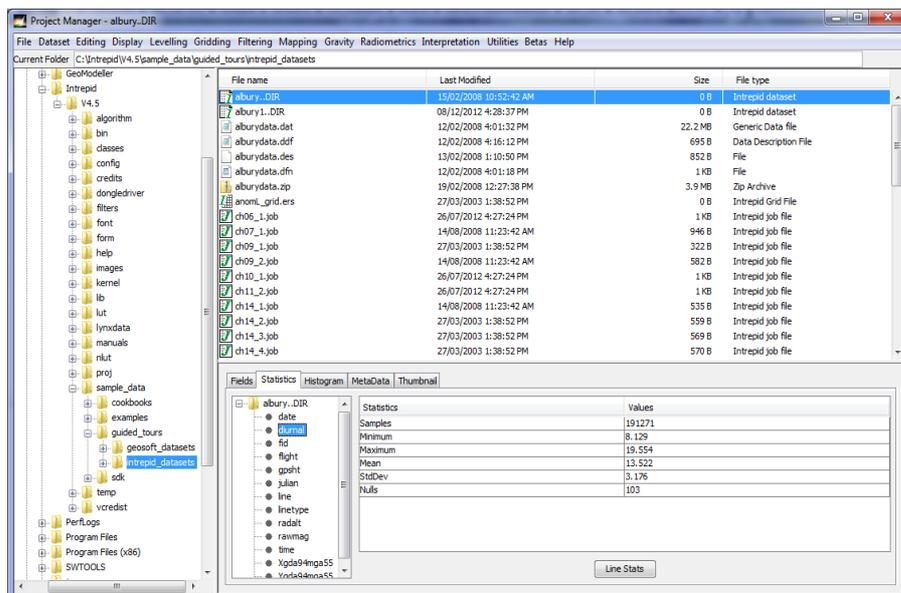
Quick Review: The Earth’s magnetic field varies with time. One of these time variations which affects airborne magnetic surveys is called the Diurnal. During the airborne magnetic survey, the diurnal variation is monitored by a base station at some fixed ground location. By subtracting the diurnal from the aircraft data, we get a residual magnetic signal which has no time dependence. It is also common practice to add the mean magnetic field value to the diurnally-corrected survey data, to compensate for the arbitrary level shift introduced by the diurnal subtraction.

1 Calculate a Mean value for the diurnal field.

Start the Project Manager. Navigate to the directory **install_path\sample_data\guided_tours\intrepid_datasets**. In the **File name** panel of the Project Manager, select the dataset **albury..DIR**. The dataset details appear in the lower panel.

After the thumbnail colour image has finished drawing, select the **Statistics** tab. The list of all data fields appear under the **albury** dataset. Select the **diurnal** field. If a histogram is displayed, select the **Statistics** tab. Make a note of the **Mean value** for the diurnal field.

59003 nT.



2 Auto-load a dataset into the spreadsheet editor

With the **albury..DIR** dataset still highlighted in the Project Manager, launch the Spreadsheet Editor. INTREPID launches the Spreadsheet Editor and displays the **albury** dataset in the **Spreadsheet** window. This feature of

INTREPID is called **auto-loading** a dataset.

Note: Auto-loading is not enabled for all INTREPID tools.

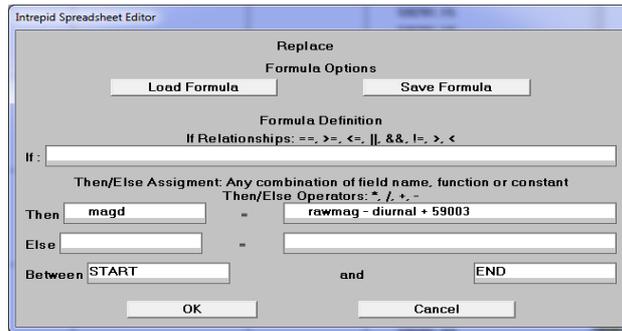
3 Use the Replace function to create a new field in the dataset.

In the Spreadsheet Editor, from the **Edit** menu, choose **Replace**. The INTREPID **Replace** dialog box appears.

The arithmetical expression we use contains no conditional statement. Therefore leave the **If** text box blank.

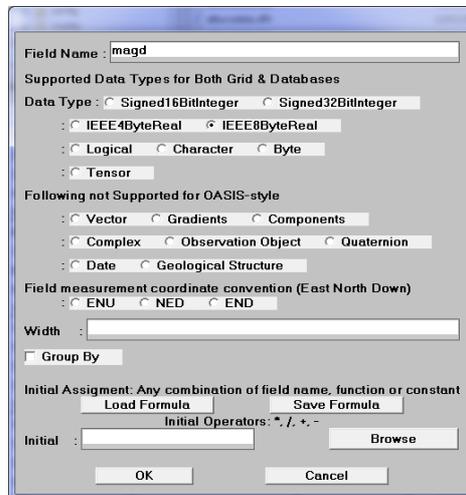
In the text box to the right of **Then**, type **magd**. This becomes the name of our new data field. In the textbox to the right of the = sign, type the following expression:

rawmag – diurnal + 59003



59003 is the mean value for the diurnal data field. Does it agree with your value? When you are done, press **OK** on the **Replace** dialog box.

A **Please Choose** dialog box appears. **Create New Column?** Choose **Yes**. The INTREPID **Create New Field** dialog box appears.



The **Field Name** is **magd**. The **Datatype** is **IEEE8byte real** (default). The data field is **not** Group By, so **Group By** stays unchecked (default).

Choose **OK** in the **Create New Field** dialog box. The dialog box disappears and INTREPID calculates the new data field.

Now you can view the new field as a column in the Editor. From the **Format** menu, choose **Reorder Fields**. Select the **rawmag**, **diurnal** and **magd** fields in turn, and move them to the **New Order** list. Choose **OK**. The Editor re-orders those data fields to the left of the display screen where you can see them.

4 Exit from the tool

To exit from the Spreadsheet Editor, choose **Quit** from the **File** menu.

Further things to consider

Using the Project Manager, examine the histogram and statistics for the **magd** field. Compare the range of the data (Max-Min) with that of the **rawmag** field. Are they similar or different ?

If there was noise or spikes in the diurnal data, what effect would you expect the diurnal subtraction to have on the aircraft data?

If the base station was located in a magnetically noisy area, it may be necessary to do some pre-processing of the diurnal data before applying the correction. This might involve editing spikes out of the data, or filtering it before applying the spreadsheet operation.

For further editing operations, see [Editing with the Spreadsheet Editor \(G11\)](#).

For full details about the Spreadsheet Editor, see [Spreadsheet Editor \(T15\)](#).

Key points for this guided tour

In this guided tour you used the Spreadsheet Editor to:

- Navigate and view INTREPID datasets;
- Understand the structure of an INTREPID dataset.
- Create a new data field in an INTREPID dataset.

Frequently Asked Questions



Q : Does the INTREPID database store all INTREPID data?

A : Yes, the binary database that underpins INTREPID stores vector (line, point, polygon) and grid datasets.

Q : Are there size limits in the database?

A : INTREPID itself imposes no size limits. Size limits are imposed by the Operating System and the computer hardware.

Q : Can I save my arithmetic formula and reload it at a later session?

A : Yes, the Spreadsheet Editor Replace dialog box has Load Formula and Save Formula buttons which allow you to do this.

Q : I created a field I don't want - can I delete it?

A : Yes, the Spreadsheet Editor lets you delete fields, under Edit - Delete Field.

Q : How can I find out more about what arithmetic expressions are supported?

A : The Spreadsheet Editor has its own Help facility. The INTREPID documentation contains a comprehensive summary of the Spreadsheet functions.