

## The BRIDGE: Using On-Line Oceanographic Data July Data Tip - Seafloor Mapping

**Objective:** To create a 3-D plot of the submerged Axial Volcano off the Oregon coast.

### Procedure:

#### Downloading Data

1. Click on the **NOAA /National Geophysical Data Center (NGDC)** link. This page allows you to choose the area of the seafloor you wish to map.
2. Click on the **Search Gridded 5-minute Global Relief Data** link.
3. Enter the following latitude and longitude information:  
Upper: **47**      Left = **-131**      Lower = **45**      Right = **-129**  
Database Options: **ETOPO5 5 minute grid**  
Data Output Options: **ASCII Format Depth/Elevation Matrix**  
Delimiter: **Comma**  
Then click **Create File** button.
4. Click on the **File saved as** link.
5. In your Internet browser, go to **File, Save As**. Type the name as you wish to save the file, be sure to save it as a text file with the extension **.txt**. Select **Text** as your file type. Also, be sure to note what directory it is saved under. Hit **Save**.

#### Importing Data into Excel


6. Open Microsoft Excel. Open the file you just saved (be sure you have selected Text in the *File Type*). You will get the Text Import Wizard.  
Step 1 - Select **Delimited**, **Start Import at Row: 1**, and **File Origin: Windows (ANSI)**. Hit **Next**.  
Step 2 - Select **Delimiters: Comma** and **Text Qualifier: "**. Hit **Next**.  
Step 3 - Select **Column Data Format: General**. Hit **Finish**. If you see "#####" in a cell(s) instead of numbers, do not panic. This just means your columns are not wide enough to display the whole number so you need to make the columns wider by clicking and dragging the line between the letters at the top of the column.
7. You have just imported all the data which read from the northwest corner of our grid (131EW, 47EN) in the first cell to the southeast corner of our grid (129EW, 45EN) in the very last cell. However, the latitude and longitude values are not listed so we will add these now.

In the empty row above the first row of data (**Column A, Row 20**), enter the longitudes in increments of 5 minutes starting with the western boundary of 131E to the eastern boundary of 129E. Longitudes converted to decimal are: **131.0, 130.92, 130.83, 130.75, 130.67, 130.58, 130.5, 130.42, 130.33, 130.25, 130.17, 130.08, 130.0, 129.92, 129.83, 129.75, 129.67, 129.58, 129.5, 129.42, 129.33, 129.25, 129.17, 129.08, 129.0**.



Add the latitudes in the first empty column to the right of the data (**Column Z, Row 21**) starting with 47EN and ending with 45EN. Latitudes converted to decimal are: **47.0, 46.92, 46.83, 46.75, 46.67, 46.58, 46.5, 46.42, 46.33, 46.25, 46.17, 46.08, 46.0, 45.92, 45.83, 45.75, 45.67, 45.58, 45.5, 45.42, 45.33, 45.25, 45.17, 45.08, 45.0.**

Plotting the data as they are arranged now will create a mirror image of the actual seafloor instead of a true plot (an artifact of Microsoft Excel), so to prevent this we will now sort the data so they are arranged in order of ascending latitude. Highlight the data cells **INCLUDING** the column of latitudes but **EXCLUDING** the row of longitudes (**Column A, Row 21 to Column Z, Row 45**). Go to **Data, Sort, Sort by: Column Z** (the column with the latitude values), **Ascending**. Click **OK**. The data are now sorted.

### Graphing Data

8. Go to an empty cell, G1 for instance, and click on the  (chart wizard) icon.

Step 1 - Under *Standard Types* select **Chart Type: Surface**. Under *Chart Sub-type* select the upper left chart sub-type (colored, 3D). Hit **Next**.

Step 2 - Under *Data Range* tab, click on the  (collapse dialog) icon. Highlight from the first cell of data to the last cell (in the last column) of data. Do not include the latitudes or longitudes. Click on the  (open dialog) icon. Switching the *Series In:* from columns to rows will just change the angle at which it's viewed. Either is correct, but select rows for now.

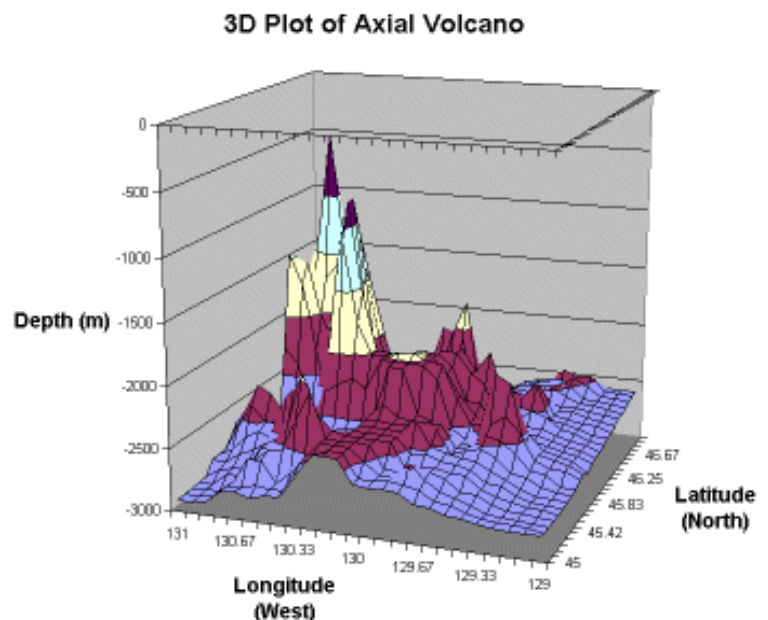
Under the *Series* tab, go to **Category (X) axis labels** and click on the  (collapse dialog) icon. Select the row of longitudes (**Row 20**). Click on the  (open dialog) icon. For the **Series**, in the **Name** box enter each individual latitude from 45E to 47E for Series 1 to Series 25, respectively. Hit **Next**.

Step 3 - These are the chart options. Enter the titles, legend, etc. that you wish. (The X axis is longitude, the Y axis is latitude, and the Z axis is depth.) Hit **Next**.

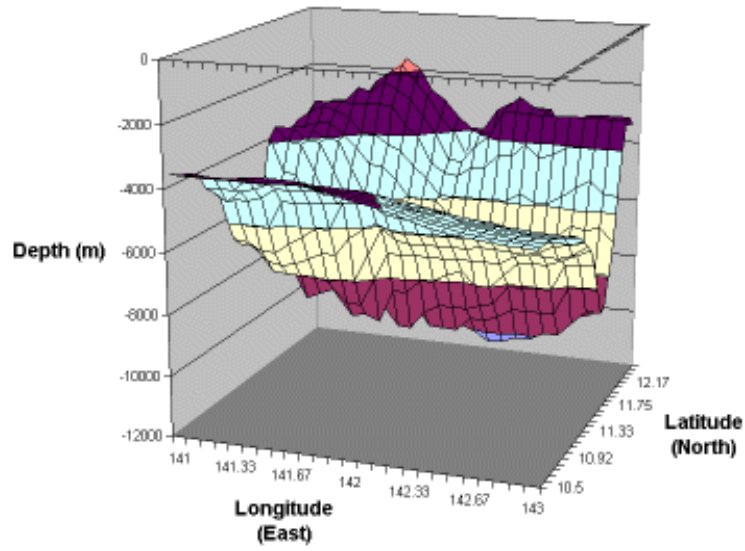
Step 4 - Select *Place Chart As New Sheet: Chart 1*. Hit **Finish**.

9. To save your spreadsheet and plots, go to **File, Save As**. Select *File Type Microsoft Excel Workbook (\*.xls)*.

You have created a 3D plot of the Axial Volcano off the coast of Oregon! For a view from a different angle repeat the graph and change *Series In* (see #9 Step 2) from rows to columns. Now try plotting the Mariana Trench and the Kaikoura Canyon (coordinates are listed on the Bridge data tip).



3D Plot of Mariana Trench



3D Plot of Mariana Trench

