SRTM30 Global Topography Data in ArcGIS 10

Shuttle Radar Topography Mission 30 Plus (SRTM30 PLUS) is a global topography data set that provides measured and estimated topography at 30 arcsecond resolution (approximately one km). Information and data access is found at http://topex.ucsd.edu/WWW_html/srtm30_plus.html.

The steps below will guide you through the process of downloading SRTM30 PLUS bathymetry data in ASCII XYZ format and working with the data in ArcGIS 10 to create both raster files and contour lines.

Step 1   Download SRTM30 Data in ASCII Format

Visit the link for the data (above) and click the *Get ASCII XYZ-file, region* link. This will take you to a page with a data window where you will enter the coordinates of your study site. If your area of interest covers a relatively large geographic area then it may be necessary to divide the area up into overlapping sections for download.

Enter the latitude and longitude coordinates into the data window and click *get data*. Processing may take a few moments. When complete, click *File > Save Page As* from the main menu and ensure that the *Save As Type* box is set to *Text Files*. Change the file extension from .CGI to .TXT and click *Save*.

Step 2   Add Column Headings

Browse to the location of the saved file and open it in a text editor application (i.e.Notepad++). The data is in tab-delimited format, meaning that a tab separates each entry. It is important that this format is kept intact. ArcGIS will automatically search for column headings on the first line of the document when it is added to ArcMap.

There should be one blank line before the data entries begin; this is where you will type your column headings. Ensure that you enter short, concise headings with no spaces or special characters. Type the first heading, press the TAB key, type the second heading, press the TAB key, etc. Once you have entered a heading for each column, save the file and close the application.

Step 3   Display XY Events in ArcMap

Open ArcMap (*Programs > ArcGIS > ArcMap)* and click the *Add Data* button ( ). Browse to the location of your text document and highlight it, then click *Add*. The file will appear in the ArcMap table of contents under the *Source* tab.

Right-click the file and select *Display XY Data*. The resulting dialog should have the column containing longitude values listed as the X field, the column containing latitude values listed as the Y field, and the column containing topography or bathymetry values listed as the Z field.

Under the *Coordinate System of Input Coordinates* section, click the *Edit* button.

In the *Spatial Reference Properties* dialog, click *Select* and then browse to *Geographic Coordinate Systems > World* and select *WGS 1984.prj*. Click *Add* and *OK* to return to the *Display XY Data*

dialog, and then click *OK* to run the process. If you receive a message about the lack of an *Object-ID* field, take a moment to read its contents and then click *OK* to proceed. We will rectify this issue in the next step.
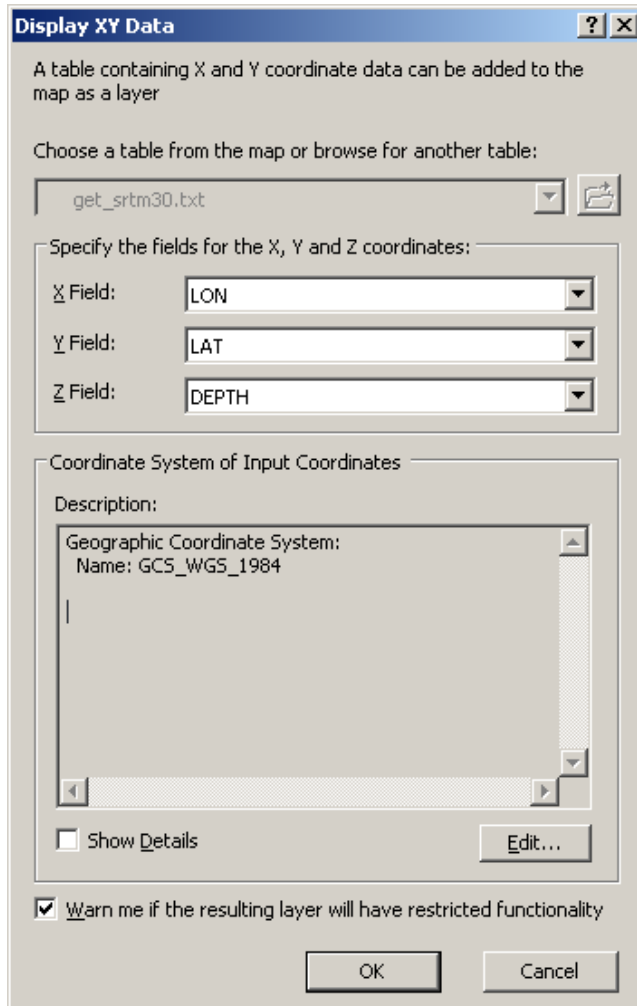
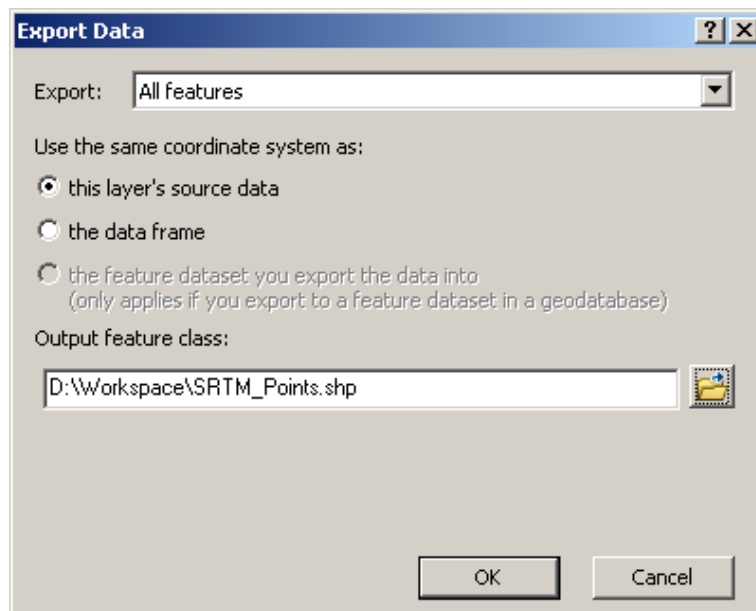The *Display XY Data* dialog with parameters

The point data will appear on your screen and will likely resemble a black rectangle. Zoom in to the data and you will see that it is actually a grid of evenly spaced points.
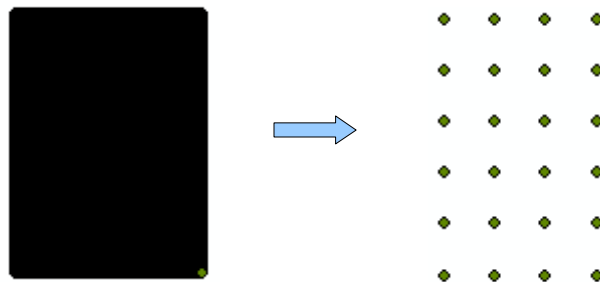
Gridded points at 1:50,000,000 and 1: 125,00 scale

The XY Event layer that you have created is a temporary layer that is only viewable in the ArcMap session where it was created. XY Event layers lack an Object-ID field, which means that they can not be used in geoprocessing operations, table joins, etc. To create a permanent point layer that can be used in further GIS processes and analysis, right-click the event layer name in the table of contents and select *Data > Export Data.*

In the *Export Features* dialog, choose to export *All Features* with the same coordinate system as the layer's source data. Use the *Output Feature Class* browse button to browse to the location where you wish to save the new file, give the file a descriptive name and click *OK.* A new point shapefile will be created in the directory you specified.
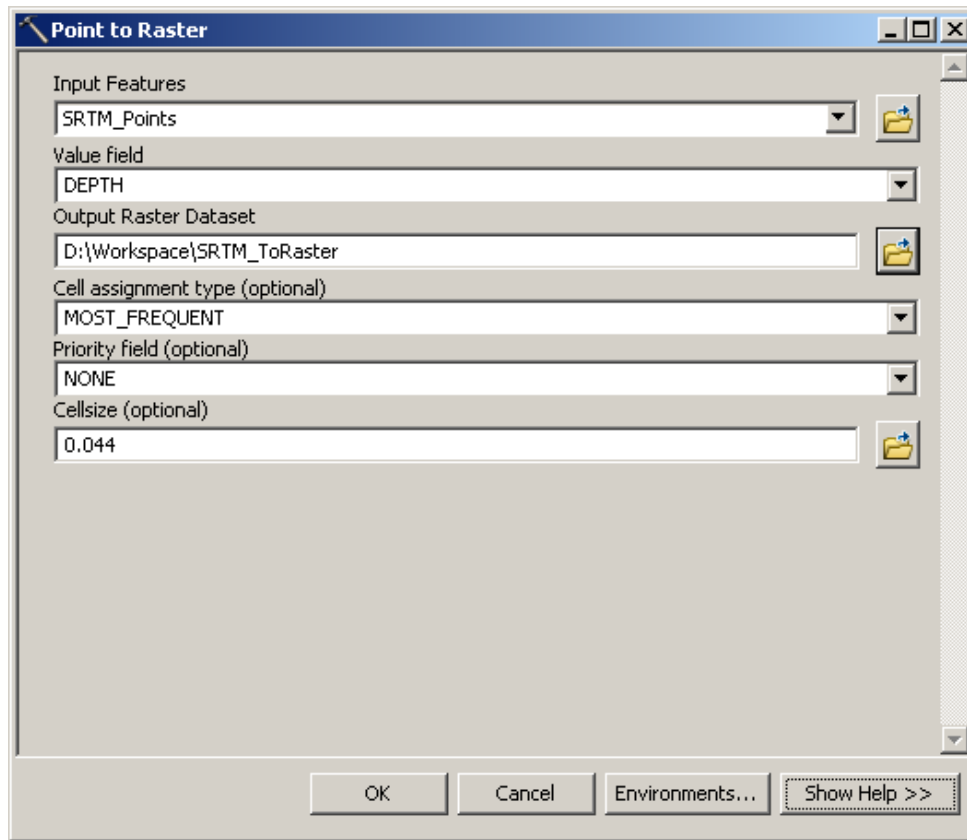

Export Data dialog with parameters

Once you have verified that the new shapefile has been successfully created, it is safe to remove the XY Event Layer from the map.

Step 4   Create a raster grid

The point shapefile contains a grid of evenly spaced points that each represent a location and an elevation or sounding value. This file can be used as input to create a raster grid that will display the difference in values across a surface. To create a raster grid from the point file, open ArcToolbox ( ) and browse to the *Conversion Tools > To Raster* toolbox. Double-click the *Point To Raster* tool to open its dialog.

Set the *Input Features* as your SRTM point file, and set the *Value Field* to the column containing depth or elevation values. Set the *Output Raster Dataset* parameter to the directory where you wish to save the new raster file (note that the name of the raster file must be less than 13 characters). Leave the rest of the parameters as defaults and click *OK* to run the tool.

Point to Raster dialog with parameters

A new raster file will be processed and added to ArcMap. This file will show elevation values as a colour gradient to emphasize the contrast between high and low values.


Raster surface derived from depth values of the point shapefile created in Step 3

Step 5   Create contours

In order to create contours from the raster grid, you must have the Spatial Analyst extension installed and authorized on your machine. If the extension is not enabled in ArcMap, browse to *Customize > Extensions* and ensure that *Spatial Analyst* has a check mark in the corresponding box. If you receive a message stating that you do not have a license for the Spatial Analyst extension, please send a message requesting instructions for enabling the extension to dataimage@trentu.ca.

Browse to *ArcToolbox > Spatial Analyst Tools* and double-click the *Contour* tool to open its dialog.

Set the raster file created in Step 4 above as the *Input raster.* In the *Output polyline features* box, browse to the location where you wish to save the output and give the file a descriptive name. Set the contour interval based on your own preference. Leave the other parameters as defaults and click *OK* to run the tool.
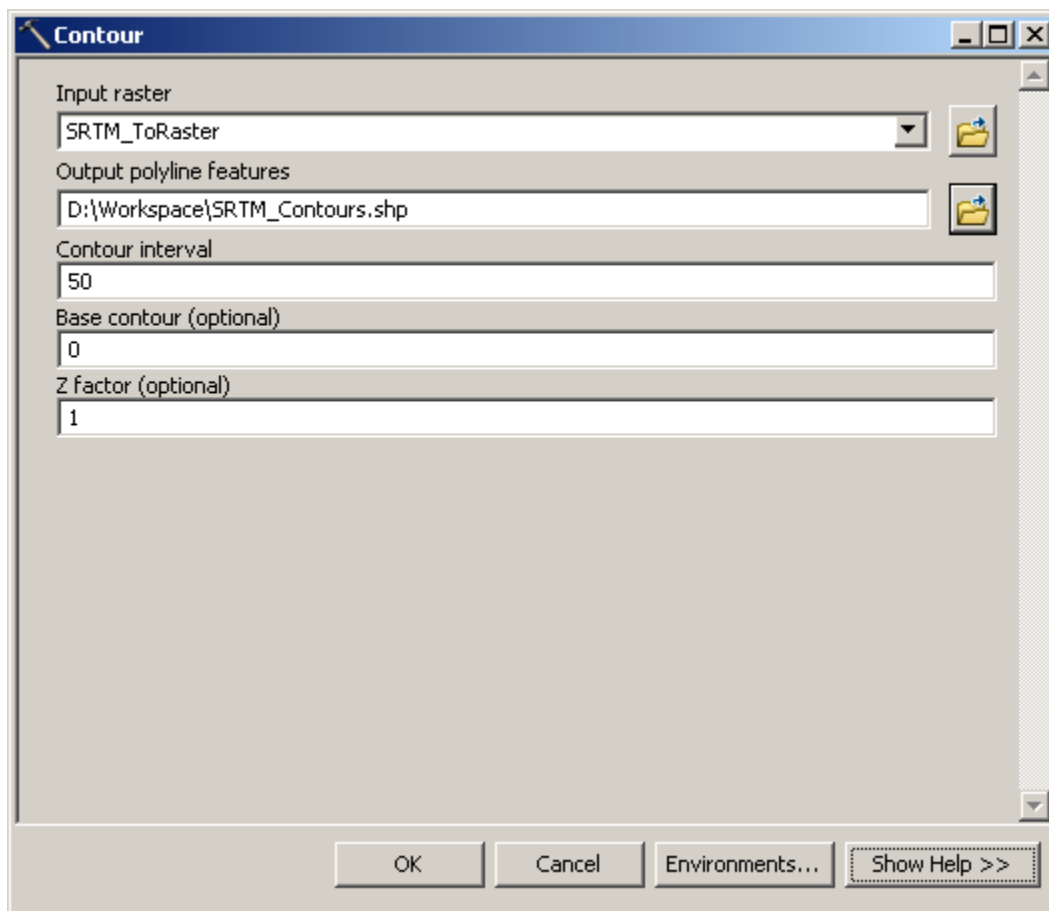
Contour dialog with parameters

The output will be added to ArcMap as a polyline feature.
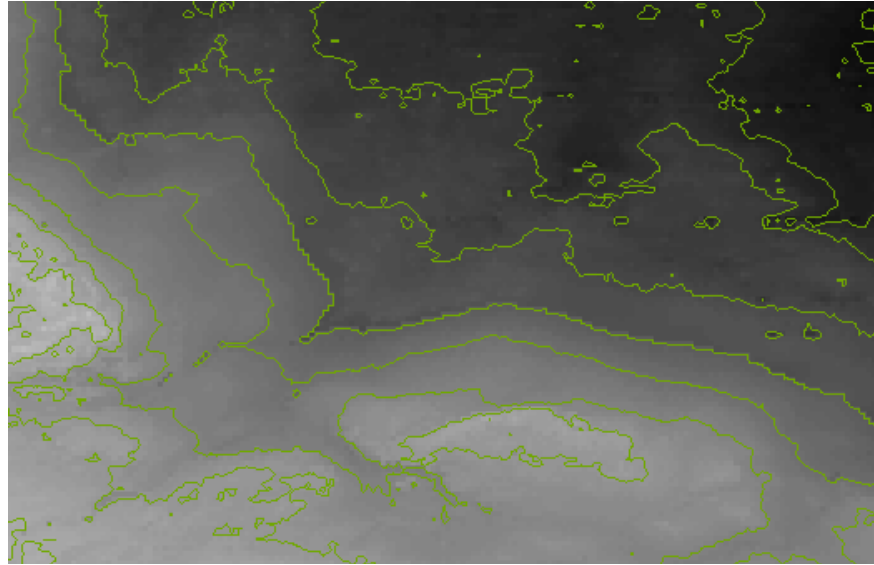
Contour lines corresponding to the underlying digital elevation model created in Step 4

If necessary, repeat Steps 1 through 5 above for each section of your study area. It is then possible to merge each section to create one contour file, project the files to a coordinate system of your choice, or use the files as inputs to subsequent geoprocessing operations.

If you originally divided your study area into sections, repeat Steps 1 through 5 for each section to create contours for the entire area of interest.