

Easy Contours in Global Mapper

While many GIS Tips & Tricks columns focus on the Esri-based ArcGIS and ArcGIS Pro software packages, there are many other software packages that offer similar GIS-based analytical tools. In this column we will explore using Global Mapper™ to quickly produce contour lines from a Digital Elevation Model. This workflow is relatively straightforward; it uses a basic Global Mapper license, no extensions required, and only requires a bare earth Digital Elevation Model (DEM) which can easily be downloaded from the USGS National Map (<https://apps.nationalmap.gov/downloader/>) or the NOAA Digital Coast (<https://coast.noaa.gov/dataviewer/#/>), both of which have been discussed in other GIS Tips & Tricks columns. Global Mapper™ provides the end-user with multiple options for constructing contours, including custom intervals, major and minor contours, and smoothing algorithms accessed directly from a simple dialog box system.

THE BASIC WORKFLOW

- Step 1** — Load a bare earth DEM into Global Mapper,
- Step 2** — Select the “Analysis” Tab on the Ribbon,
- Step 3** — Select the “Generate Contours (from Terrain Grid) tool on the dropdown,
- Step 4** — Update/Fill-in a few parameters on a dialog box,
- Step 5** — [optional] Export the generated contours to a permanent file of your choice.

EXAMPLE WORKFLOW

Note: For this example, we downloaded a 1-meter DEM for the Pisgah National Forest area in North Carolina from the U.S. National Map. The DEM was referenced to UTM Zone 17N/NAD83 in meters (EPSG:26917). The file format is a 32-bit Floating Point GeoTIFF.

- Step 1** — Load the bare earth DEM.
- Step 2** — From the menu bar, click the Analysis Tab and select the “Generate Contours (from Terrain Grid) tool as in Figure 1).

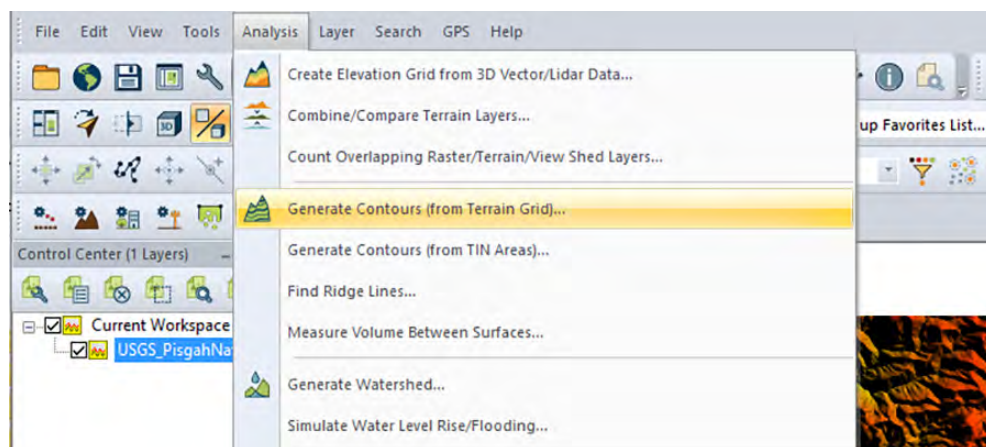


Figure 1. Starting the Generate Contours Dialog Box from the Analysis Tab in Global Mapper™.

- Step 3** — Fill in the Contour Generation Options Dialog. Notice that there are four Tabs across the top of this Dialog.

The Contour Generation Options Tab (Figure 2) is used to specify the contour interval and other optional characteristics of the lines. In this case, we will generate 10-meter contours with Minor Contours every 10-meters and Major Contours every 100 meters in this very rugged terrain. Notice that Global Mapper™ reports the elevation ranges in the DEM (345.9 to 861 meters in this example) and there are options for resampling the DEM, smoothing the contour lines, and removing closed (small circular looping) contour lines on this Tab.

TIP #1

The “Discard Closed Contour Lines Shorter than” will omit closed (looping) contour lines of a length less than the specified measure. This is important if you want to remove small circular contours that can be prevalent in lidar-derived DEMs. Depending on your use-case, this value can range to hundreds of meters and may require empirical testing.

Photogrammetric Engineering & Remote Sensing
Vol. 89, No. 6, June 2023, pp. 343-346.
0099-1112/22/343-346

© 2023 American Society for Photogrammetry
and Remote Sensing
doi: 10.14358/PERS.89.6.343

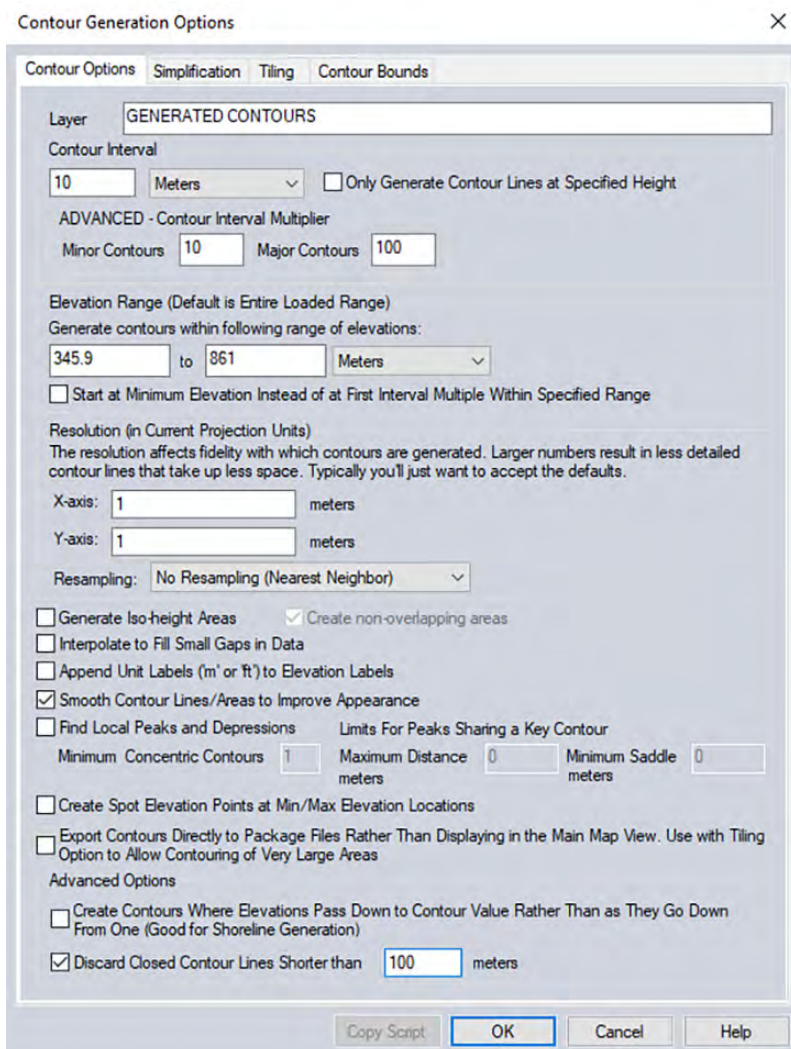


Figure 2. The Global Mapper Contour Options Tab used when generating contours.

TIP #2

The Simplification Tab (Figure 3) provides a slider to adjust the number of non-essential points along a contour line. The more points maintained to define the contour's shape, the larger the size of the resulting file, but the better the shape of the lines. The default value is 0.10, and of course, "never accept the defaults", we recommend a 0.20 as a starting setting and increasing the value if the file size is too large or decreasing this value if the contour lines are too jagged for your use-case.

Zooming in to a smaller area in this DEM shows the 100-meter Major and 10-meter Minor contours symbolized in different line weights (Figure 4.)

TIP #3

The Pisgah National Forest DEM used in this example was 356 MB in size (10,000 x 10,000 cells) and processed the 10-meter contours in a little over one minute and four seconds. When processing very large DEM mosaics, try resampling the DEM with one of the optional methods (See Figure 2) to decrease processing time.

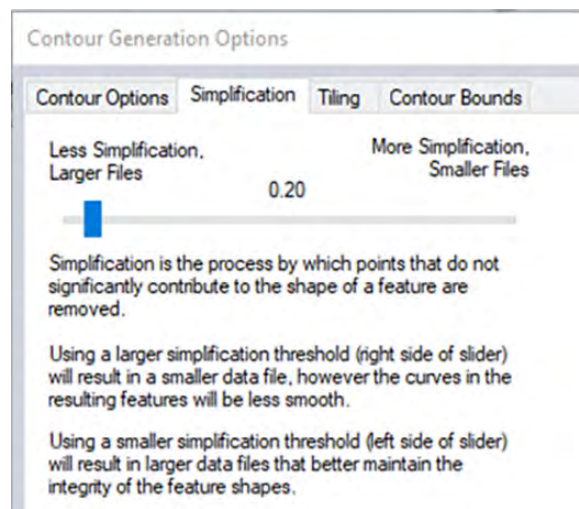


Figure 3. The Simplification Tab slider is used to control the number of nodes per contour line; this also influences the file.

Step 4A — Save your Global Mapper™ Workspace to make the GENERATED CONTOURS permanent for Global Mapper™, and/or

Step 4B — Export the contours to another GIS Format for use in ArcGIS, GRASS, and/or other mapping packages.

Here are the steps to Export the GENERATED CONTOURS to an Esri shapefile.

Step 5 — Right-click on the GENERATED CONTOUR layer in the Control Center, scroll to the Layer bar and slide to the right to open the options, and select EXPORT – Export Layer(s) to New File (Figure 5)

Step 6 — Select the Layers to Export from the Dialog Box (Figure 6)

Step 7 — Use the Dropdown selections (Figure 7) and scroll down the list to find the file format to export. In this case "Shapefile" is far down the alphabetical listing.

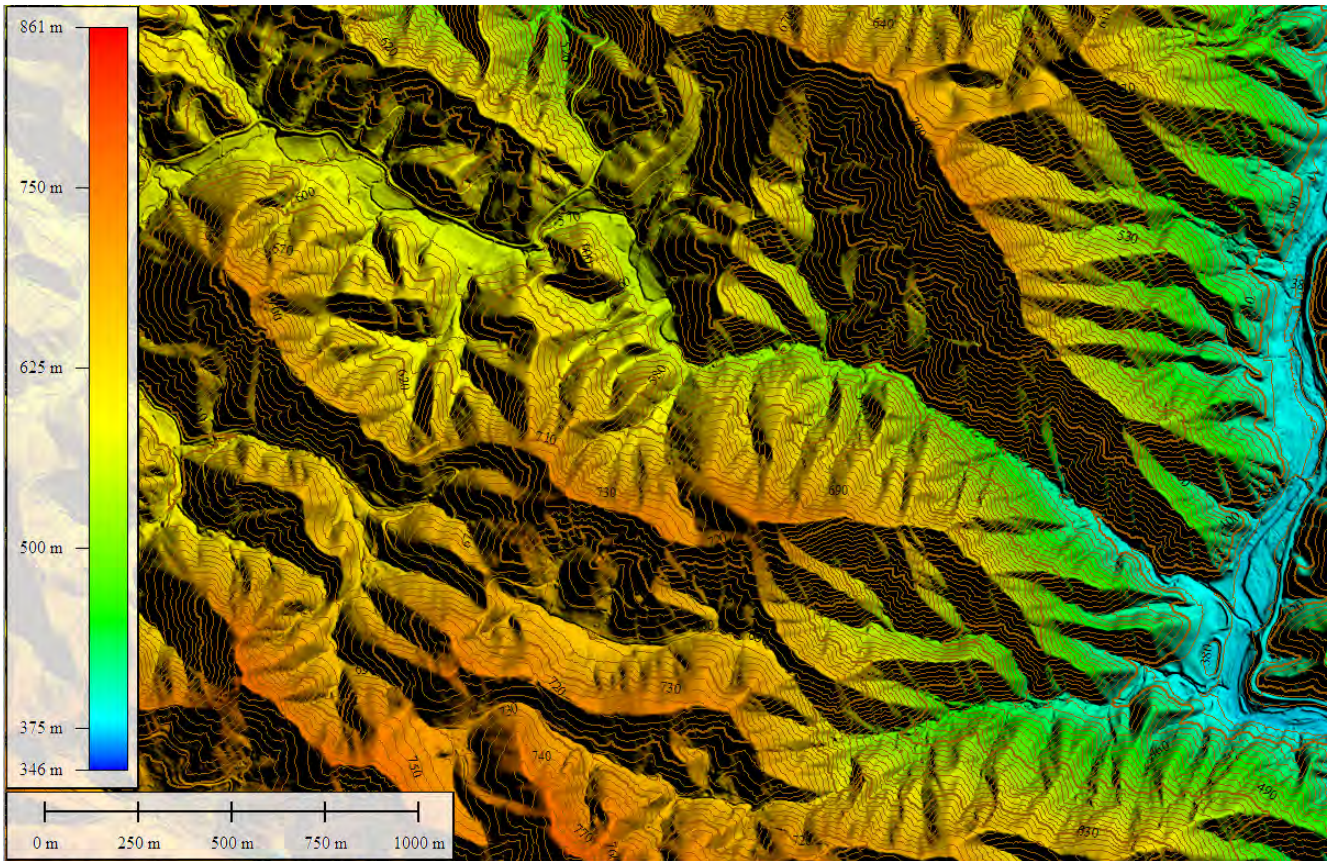


Figure 4. 10-meter Minor and 100-meter Major contours Global Mapper™ generated from the DEM.

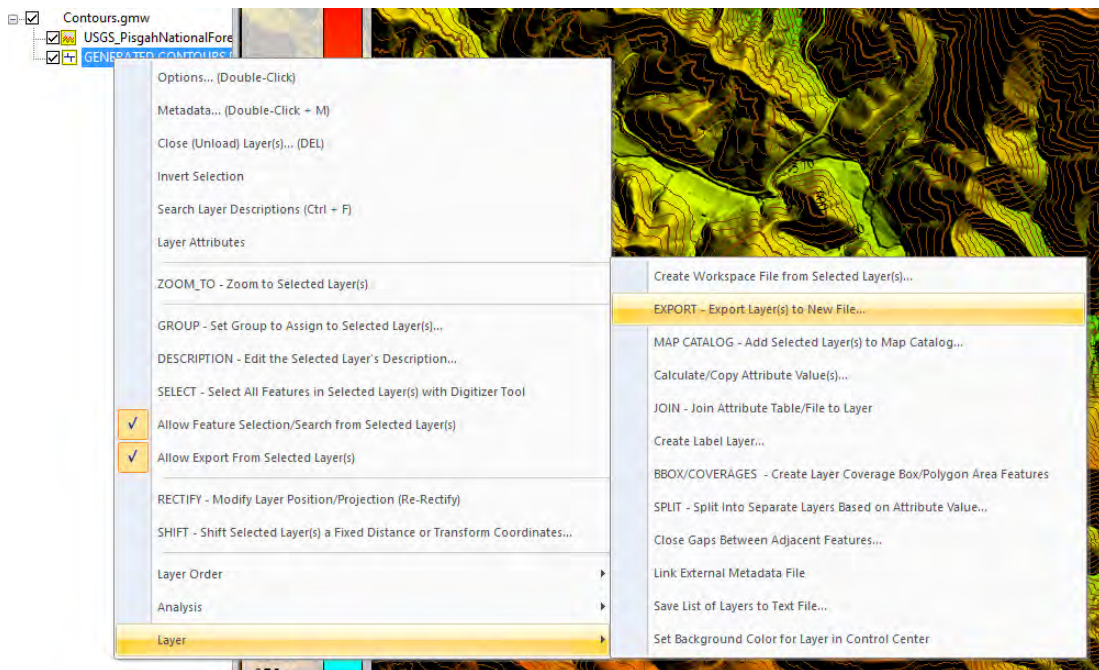


Figure 5. Starting the Global Mapper™ EXPORT dialog to export the GENERATED CONTOURS line file

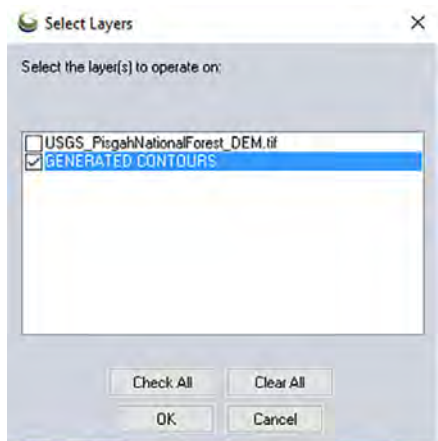


Figure 6. The Global Mapper™ “Select Layers” dialog box used to select the layer to export.

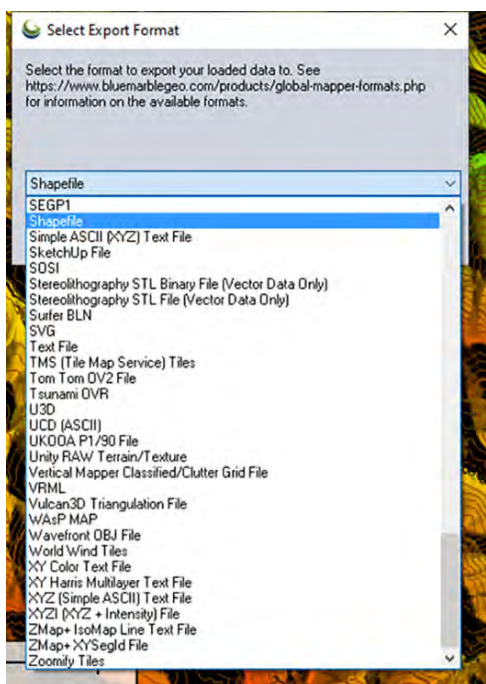


Figure 7. The Global Mapper™ export file format selection menu; the available formats are alphabetical.

TIP #4

Key-in the letter “S” on the keyboard by selecting the Drop-down list for quick navigation.

Step 8 — On the Shapefile Export Options dialog box (Figure 8), when you check the “Export Lines” box, a Windows file browser will appear; navigate to a writable directory and specify a file name (Global Mapper™ will append .shp to your filename. Be careful to check the “Generate Projection (PRJ) for each Exported SHP File”. There are several more options and additional Tabs with other parameters and press “OK” to export/write the file.

Global Mapper™ provides an efficient, extremely flexible option for constructing contours from a DEM. It really is that easy.

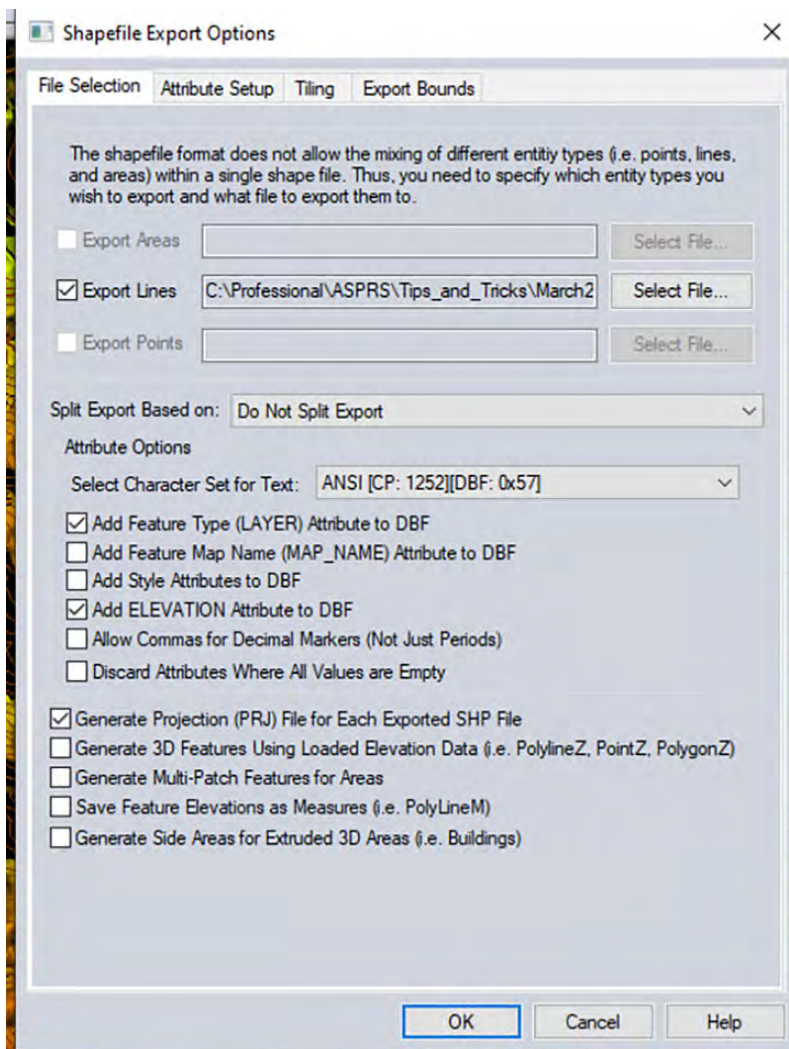


Figure 8. The Global Mapper™ Export Shapefile Options dialog box showing four tabs (across the top) and multiple options screens.

Send your questions, comments, and tips to GISTT@ASPRS.org.

Srinu Ratnala is a project manager with Dewberry’s Geospatial and Technology Services group in Fairfax, VA. Sri’s areas of expertise include analytics and visualization solutions. He has been working with lidar and other 3D-related projects.

Andrew Peters, GISP is a senior associate and assistant department manager with Dewberry’s Geospatial and Technologies Services group in Fairfax, VA. Andrew specializes in assessing the accuracy of lidar information by comparing raw lidar data with ground survey data, generating bare-earth models, and using models for contour line creation.

Al Karlin, Ph.D., CMS-L, GISP is a senior geospatial scientist with Dewberry’s Geospatial and Technology Services group in Tampa, FL. Al works with all aspects of lidar, remote sensing, photogrammetry, and GIS-related projects. Al also teaches Mapmaking for the Social Sciences at the University of Tampa.