Spatial Analyst - Working with Rasters

Overview

Raster datasets (images, grids, surfaces) are used in many geoscience applications. Satellite images, bathymetry, surface tops and bottoms, and gravity/magnetics datasets can be viewed in ArcMap along with the rest of your GIS data. The Spatial Analyst extension of ArcGIS contains tools for creating, managing, and analyzing these raster datasets. By learning how to effectively display them in the map, and understanding the details of the data behind the images, you can tap into these rich data sources and perform advanced locational analysis not available elsewhere.

Audience

Those who are comfortable with ArcGIS and want to learn about raster data and the Spatial Analyst extension; including, but not limited to: Geologists, Geophysicists, Geoscience Technicians, and GIS Analysts.

Topics Covered

Day 1

- Introduction to Raster Data – What raster data looks like in ArcGIS and why you would use raster data (Raster vs. Vector; Spatial Analyst Applications; Raster Storage Structures; Spatial Analyst Extension; Raster Processing Overview)
- Raster File Formats – How is raster data stored? Understanding the different raster formats supported by ArcGIS. (Raster File Formats; Raster Compression; Image Bit Depth; Adding Raster Files; ArcGIS GRID; Native Data Read/Write; Geodatabase Rasters; Raster Associated Files)
- Raster Display Settings – How to improve the display (colors, clipping, brightness, etc.) of rasters in the map. (Scale Dependent Display; Temporarily Clip; Effects Toolbar; Layer Properties; Raster Layer Renderers; Eliminating the Background; Image Analysis Window; Accelerated Rendering)
- Raster Creation - Create a surface from different sources including point data. (Surface Points; Interpolation; Coincident Points; Raster Interpolation Methods; Geostatistical Analyst; TINs/Terrains)

Day 2

- Surface Tools – Create contour lines from an elevation raster. Analyze surface rasters to determine slope, line of sight, etc. (Generation Contour Lines, Slope, and Aspect Rasters; Generating Hillshades; Cut and Fill; Line of Sight)
- Map Algebra – Use the Raster Calculator to perform calculations on rasters for complex mathematical equations. Combining raster datasets for analysis. For example, subtract a formation top from a formation bottom to create an isopach. Incorporate Python to use Spatial Analyst tools and create raster output. (Map Algebra Overview; Conditional, IsNull, and SetNull Statements; Focal Statistics Functions; Raster Calculator; Python Scripting Window; Raster Objects and Non-Raster Output; Spatial Analyst Classes)
- Raster Analysis –Use raster data to infill missing data in a well attribute table by overlaying the well spots with the raster. (Environment Settings; Processing Order; Clip; Rasters with Functions; Merge; Nibble; Region Group; Cell Statistics; Extract Values to Points). Perform Cost Distance Analysis and Suitability Modeling
- Raster Catalogs and Mosaicked Raster Datasets – Compare different types of datasets that consist of many raster images combined into one. (Managed vs. Unmanaged Raster Data; Raster Catalogs; Mosaicked Raster Datasets)
- Georeferencing – Taking scanned images and placing them in the correct spatial location sothey can be displayed in ArcMap. (Georeferencing an Image; Assessing Error; Update Georeferencing vs. Rectify; Resampling)

Format

In-person instruction with hands-on practice, and course materials you can keep.

Prerequisites and Recommendations

Attendees should have knowledge of Microsoft Windows® and be familiar with the basic use of ArcGIS, including the topics covered in either the **Fundamentals of ArcGIS** or **ArcGIS Desktop I** classes.