

Assessing Spatial Data Variability in ArcMap

This tutorial is intended to introduce you to some of the basic tools that can be utilized in analyzing the spatial variability within a gridded dataset.

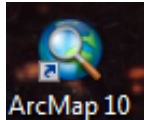
Download and save the “*FOR_373_Project_Files*” to your university server directory, the file can be found on the schedule page of the course website:


http://www.webpages.uidaho.edu/for373new/FOR373_schedule.htm

After you have saved this .zip file, right-click on it and select ‘Extract here’.

Loading Data into ArcMap:

Start by opening the ArcMap program, which should be accessible from your desktop by double clicking the shortcut icon:



Once you are inside the program we can load in both vector (shapefiles including points, lines, and polygons) and rasters (including grids, ASCIIs, and multi-band imagery). We will load in data by clicking on the *Add Data* button ‘’, and then navigating to the location we saved the project files to. We want to add the following files by holding the Ctrl key and selecting each of the files and then clicking the *Add* button:

- hatternai
- lidar_chm
- stands_2000.shp
- WestHatter_5m_contours.shp


Once you have the data loaded into the ArcMap interface it is time to explore the difference data sets you are working with. You can turn datasets on and off by clicking the check-box next to the layers name.

Shortcuts to Navigating:

Zooming - You can zoom-in and out on different part of the map by holding the ‘z’ key to zoom-in or the ‘x’ key to zoom-out and then clicking and dragging a box with your mouse around the areas you want to zoom to.

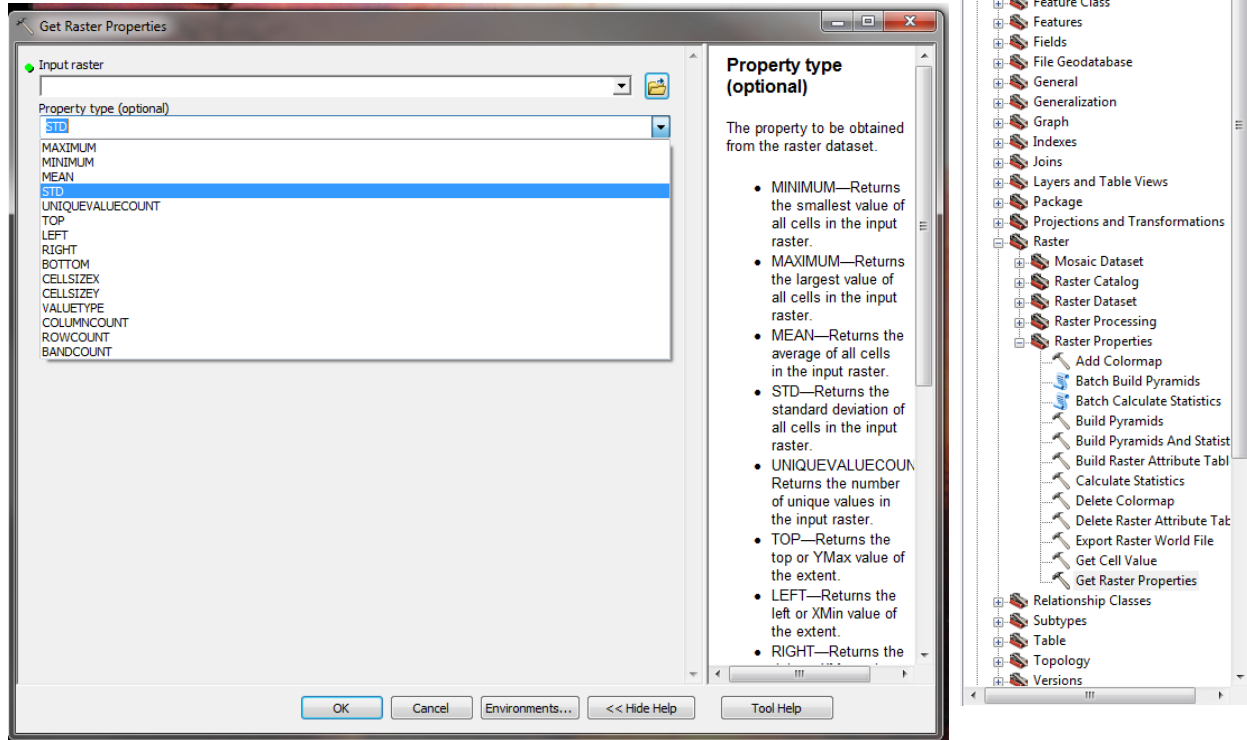
Panning – You can pan around through the map by holding the ‘c’ key and clicking and dragging the map in the direction you want to navigate.

Assessing Raster Variability in ArcMap:

To start altering or analyzing data within ArcMap we need the ArcToolbox to be displayed, if it is not displayed by default simply click the 'ArcToolbox Window' button .

Within ArcMap there is generally several ways of doing any one step of data manipulation or analysis.

To assess the variability within the lidar_CHM layer the most simplistic tool we can use is the 'Get Raster Properties' tool:



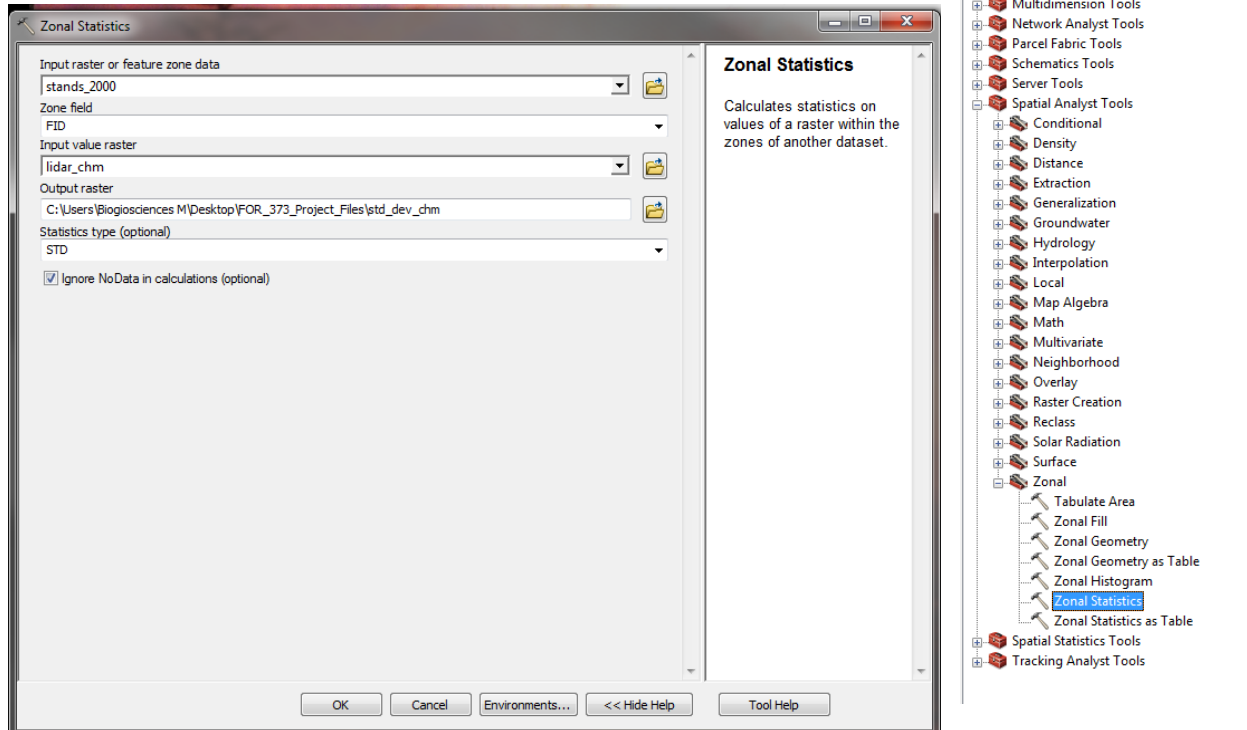
For our purposes we want to select the 'lidar_chm' layer from the *Input raster* dropdown menu and then since we want to assess the variability within the dataset we will use the STD or standard deviation operation from the *Property type* dropdown menu and then press Ok.

Now we can right-click on the lidar_chm layer and select the Properties option, and then under the Source tab scroll down to the Statistics section where we can see the Std dev. of all values within the dataset.

While this analysis can be useful for certain operations, what if we wanted to know the variability within different subsections of a raster?

For this we will have to add a couple of steps to our processing chain and use a slightly more sophisticated analysis approach.

To assess the variability of the lidar_CHM layer within each of the polygons of the stands_2000 layer we can use is the ‘Zonal Statistics’ tool:




For our purposes we want to select the ‘stands_2000’ layer from the *Input raster or feature zone data* dropdown menu and then since we want to assess the variability within all of the individual stands we will select ‘FID’ under the *Zone field* dropdown menu, this will allow us to assess statistics within each of the unique polygons.

Then we want to select the ‘lidar_chm’ layer under the *Input value* raster dropdown and select ‘STD’ or standard deviation under the *Statistics type* dropdown.

Once all of the parameters are selected, click the folder icon next to the *Output raster* field and navigate to where we saved the zip data from the website. Once at the appropriate location name the raster you are about to create ‘ST_dev_chm’ and click save and then click Ok on the Zonal Statistics window.

This will add the new layer ST_dev_chm to your map, turn it on and explore the range of variability that

it identified by using the Identify tool ‘’. Once you have the tool open select the ‘ST_dev_chm’ layer from the *Identify from:* dropdown menu and you will be able to click on different areas of the map and see what the standard deviation of LiDAR-derived canopy heights within the different stands.