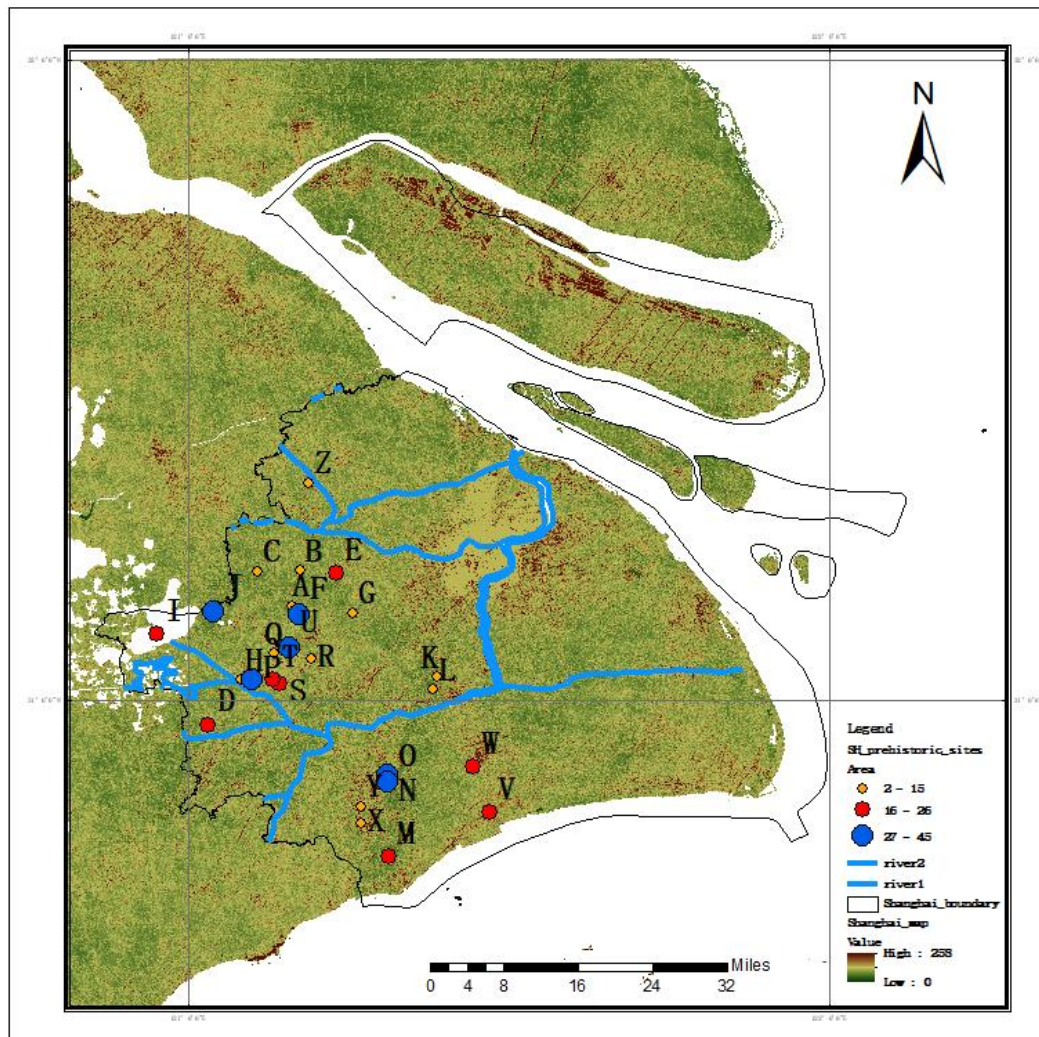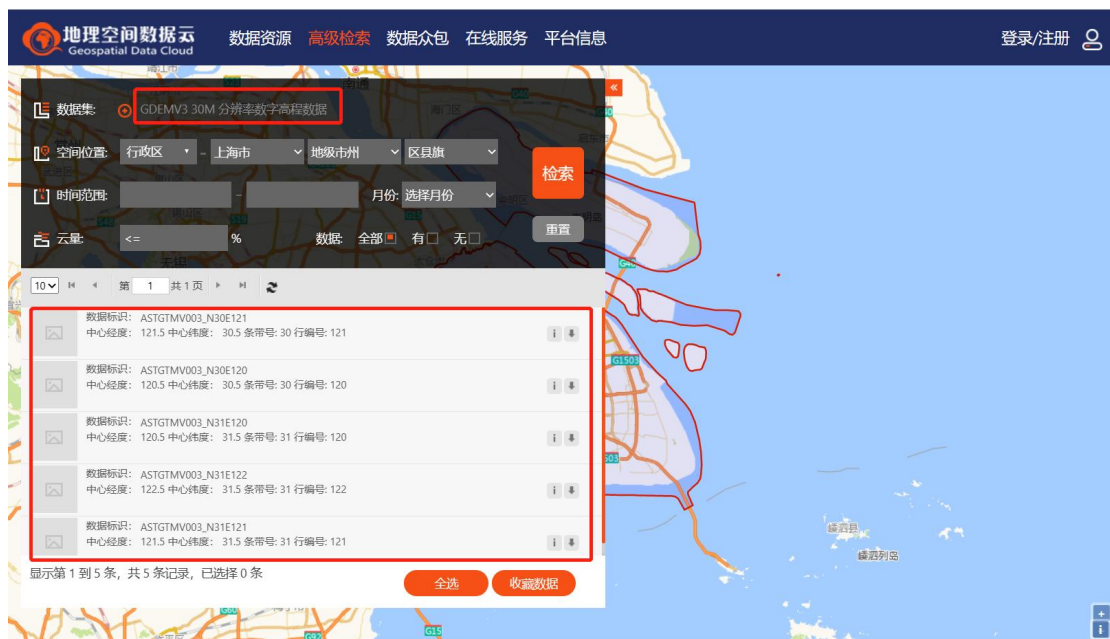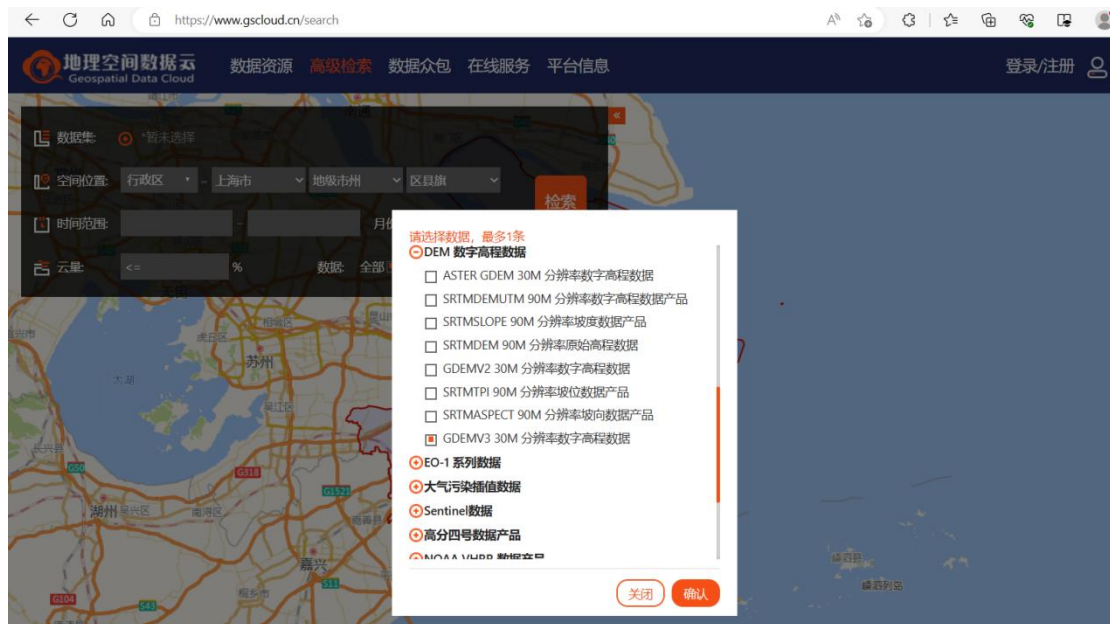# How to draw archaeological map using ArcGIS 10.5

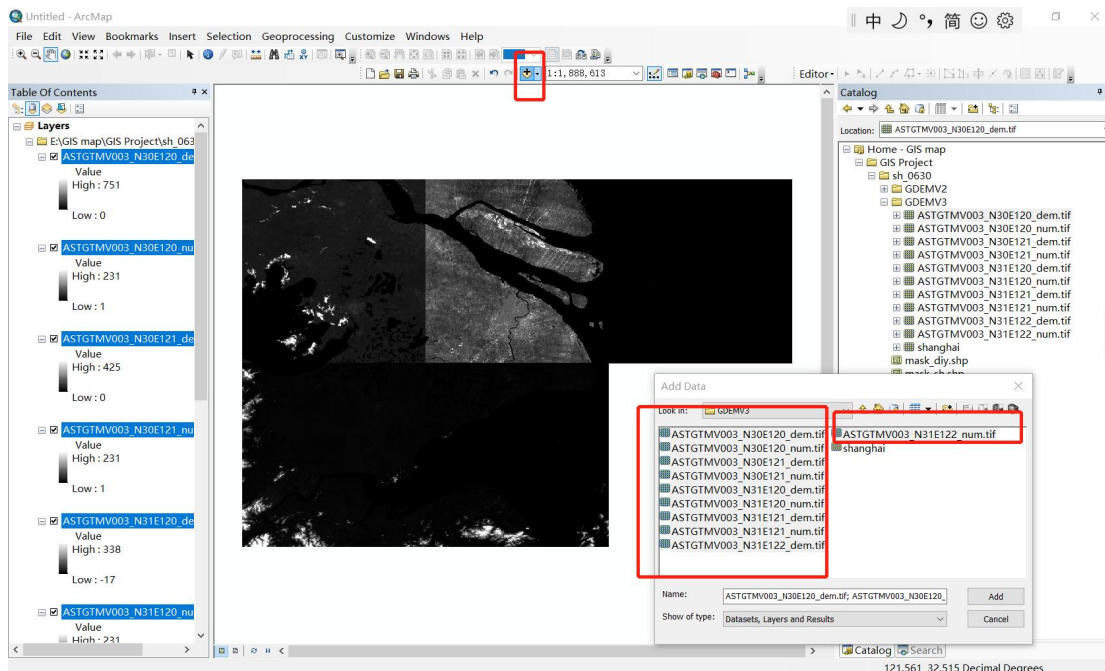Task: Draw a map of prehistorical sites in Shanghai

Step 1: Download DEM files from Geospatial Data Cloud website (www.gscloud.cn)

In our case, we need to download 5 datasets.

Step2 : Import all files into ArcMap (click "Add data" - select files needed)

Step 3: Merge files into one complete map (click "ArcToolbox" - "Data Management Tools" - "Raster"- "Raster Dataset" - "Mosaic")

"Input rasters" is all files to be merged (you can select all the layers and then drag it into the bar) while target raster is the base file that other files will be merged with. Here I choose ASTGTMV003_N30E120_dem.tif as the target.

Mosaic operator is the most important option. This operator will determine the method to mosaic overlapping areas .

Below is the description of official document (Mosaic To New Raster (Data Management)—ArcMap | Documentation (arcgis.com))

The method used to mosaic overlapping areas.

- FIRST —The output cell value of the overlapping areas will be the value from the first raster dataset mosaicked into that location.

- LAST —The output cell value of the overlapping areas will be the value from the last raster dataset mosaicked into that location. This is the default.

- BLEND —The output cell value of the overlapping areas will be a horizontally weighted calculation of the values of the cells in the overlapping area.

- MEAN —The output cell value of the overlapping areas will be the average value of the overlapping cells.

- MINIMUM —The output cell value of the overlapping areas will be the minimum value of the overlapping cells.

- MAXIMUM —The output cell value of the overlapping areas will be the maximum value of the overlapping cells.
- SUM —The output cell value of the overlapping areas will be the total sum of the overlapping cells.

I choose the Blend method because it gives me the best image for my files.
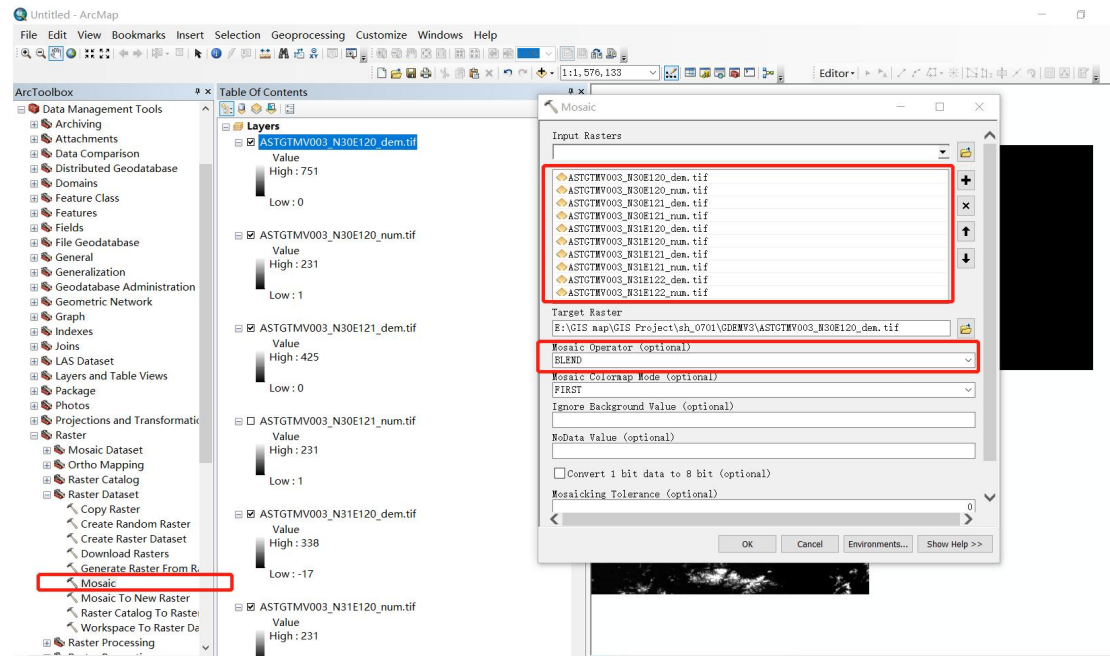
Tip: you can also create a new layer to save the complete map (click "ArcToolbox" - "Data Management Tools" - "Raster"- "Raster Dataset" - "Mosaic to New Raster"). This method will not disturb the original file and is more convenient in most cases. But in my case, there are annoying white lines on the margin of the images, so I simple use the "Mosaic" instead of "Mosaic to New Raster".

(1) There is no base files to be selected anymore as this method will treat each files equally.

(2) You need to type in output location and file name with extension(eg: shanghai.tif).

(3) Reference to be GCS_WGS_1984.

(4) You can find the Pixal type and Number of bands of your files by right click one of the file layers and select "properties". Generally speaking, number of bands is 1.

Mosaic To New Raster

Input Rasters

Output Location

Raster Dataset Name with Extension

Spatial Reference for Raster (optional)

GCS_WGS_1984

Pixel Type (optional)

16_BIT_SIGNED

Cellsize (optional)

Number of Bands

1

Mosaic Operator (optional)

OK   Cancel   Environments...   Show Help >>

Layer Properties

General | Source | Key Metadata | Extent | Display | Symbology | Fields | Joins & Relates | Time

| Property	Value
Raster Information	
Columns and Rows	5972, 5430
Number of Bands	1
Cell Size (X, Y)	0.00027777778, 0.00027777778
Uncompressed Size	61.85 MB
Format	FGDBR
Source Type	Generic
Pixel Type	signed integer
Pixel Depth	16 Bit
NoData Value	

Data Source

Data Type: File Geodatabase Raster Dataset
Database: E:\GIS map\Default.gdb
Raster: Extract_tif3
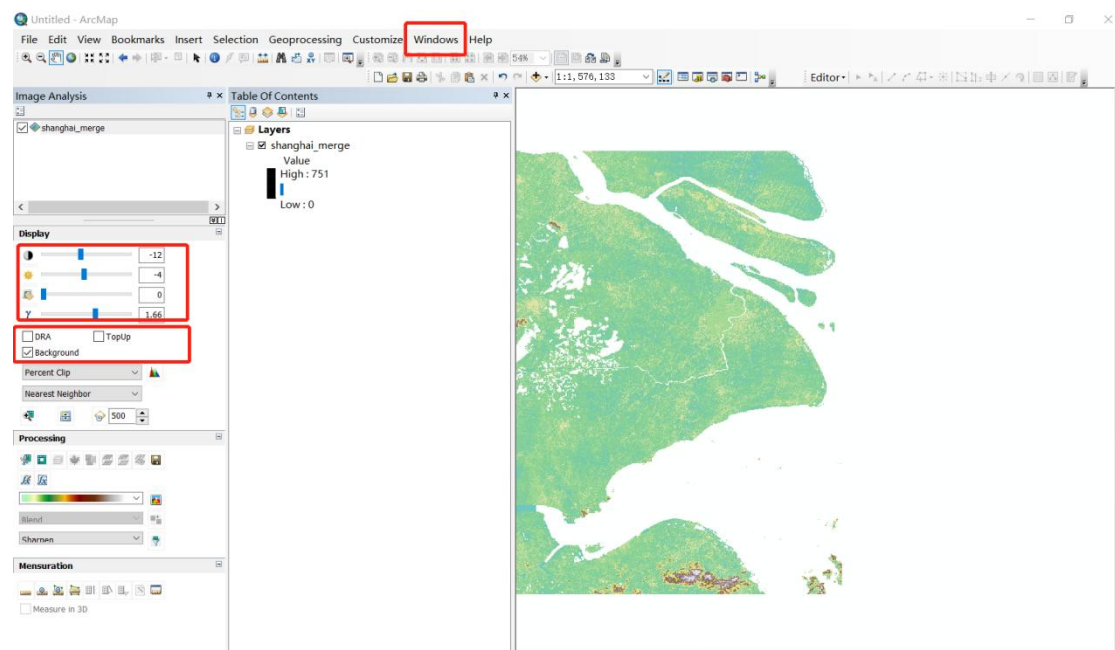
Set Data Source...

确定   取消   应用(A)

This is what complete map looks like after mosaic. Rename the layer as "shanghai_merge"
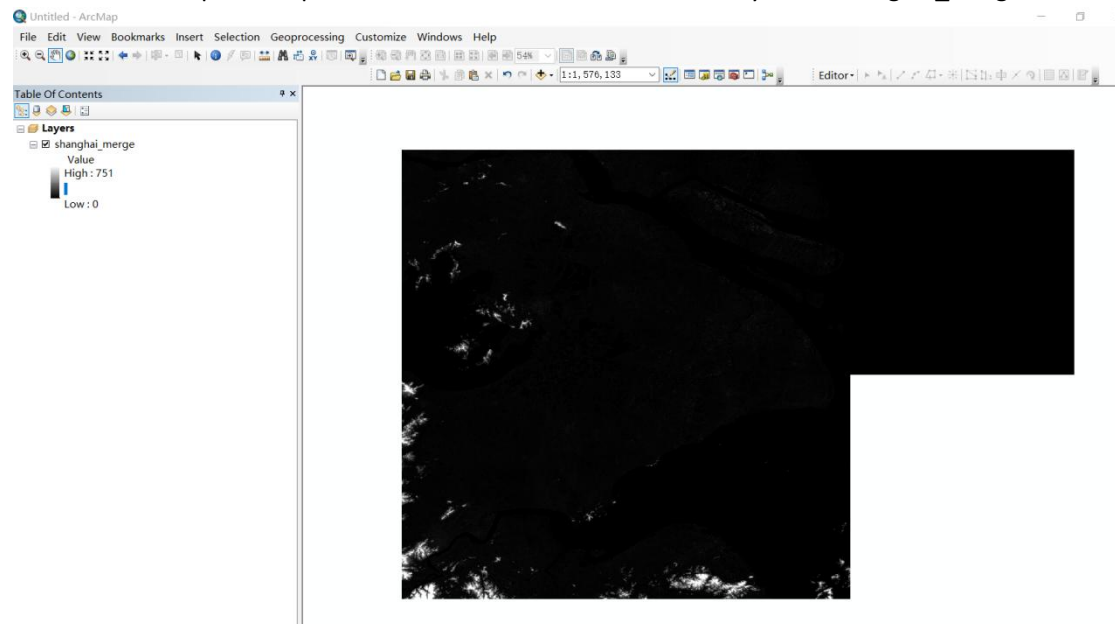
Step 4: Adjust the color of image

You can choose a color ramp and then go to ("Windows"- "Image Analysis) to adjust r and other parameter.
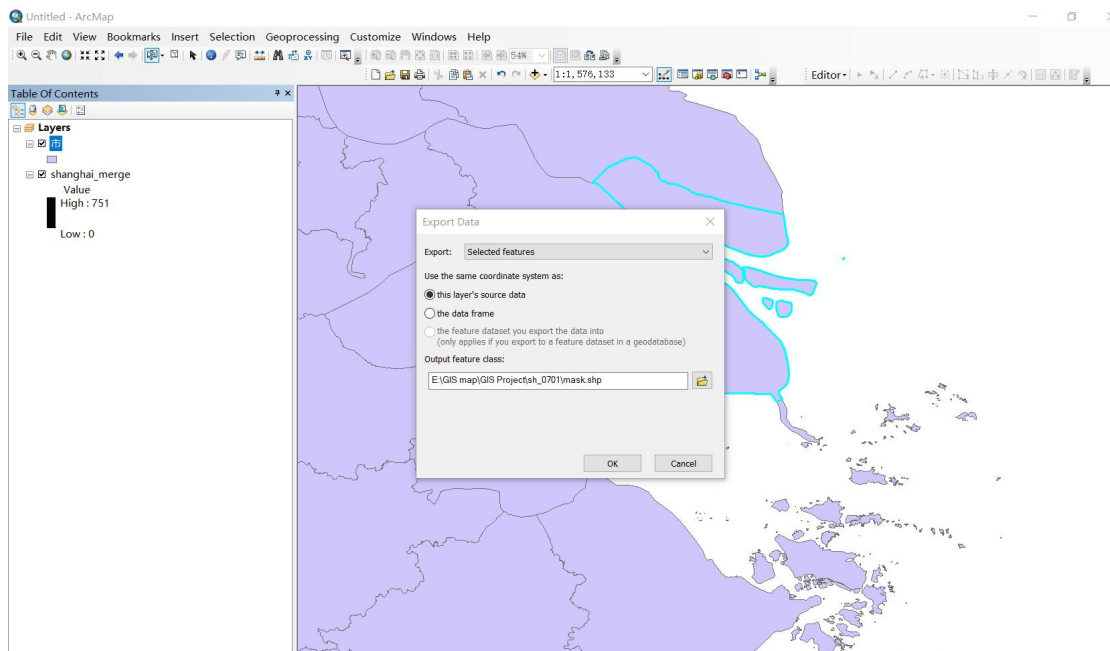

**Step 5: Draw the boundary of Shanghai City**

Import shp file "市" which is file of all cities of China. Select Shanghai area after clicking "select features" on the bar.
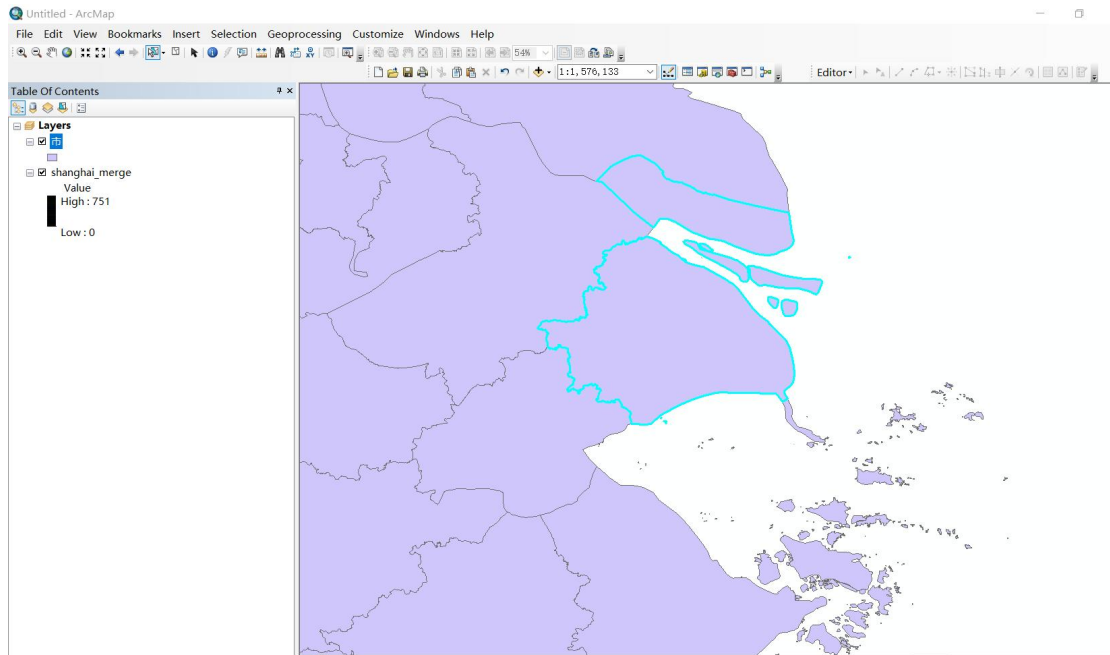
Export the feature by right clicking layer "市" - Data- Export Data. I name this new shp file as "mask" as I could later use this as mask if I want to show map of Shanghai only.
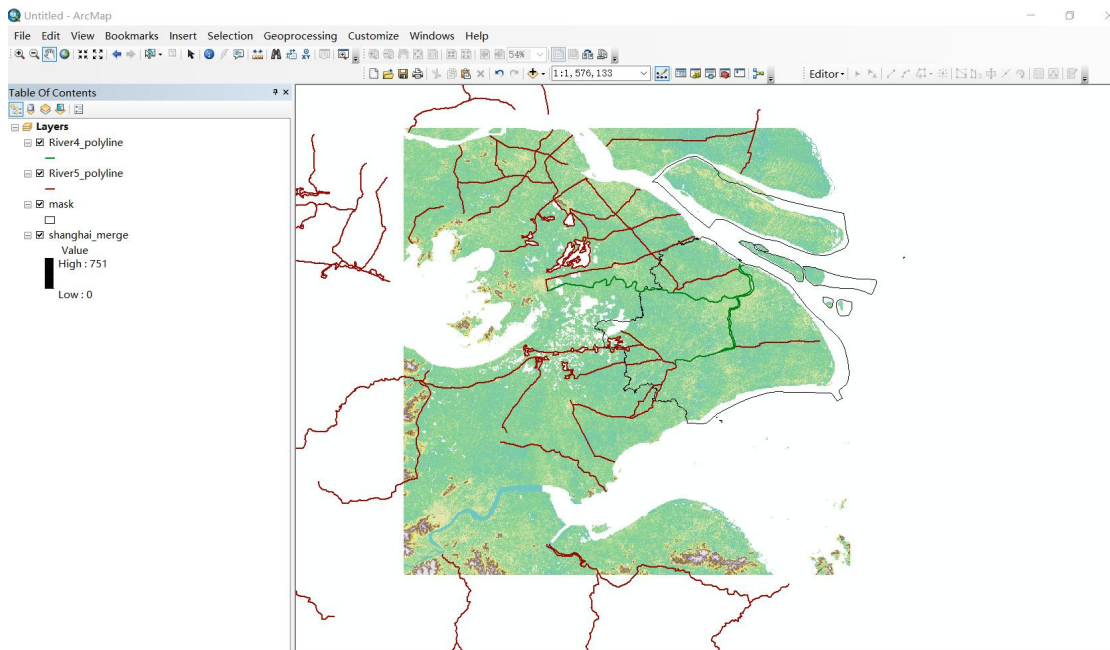

Click the square under mask layer, and set it as hollow then it will be the boundary of SH.
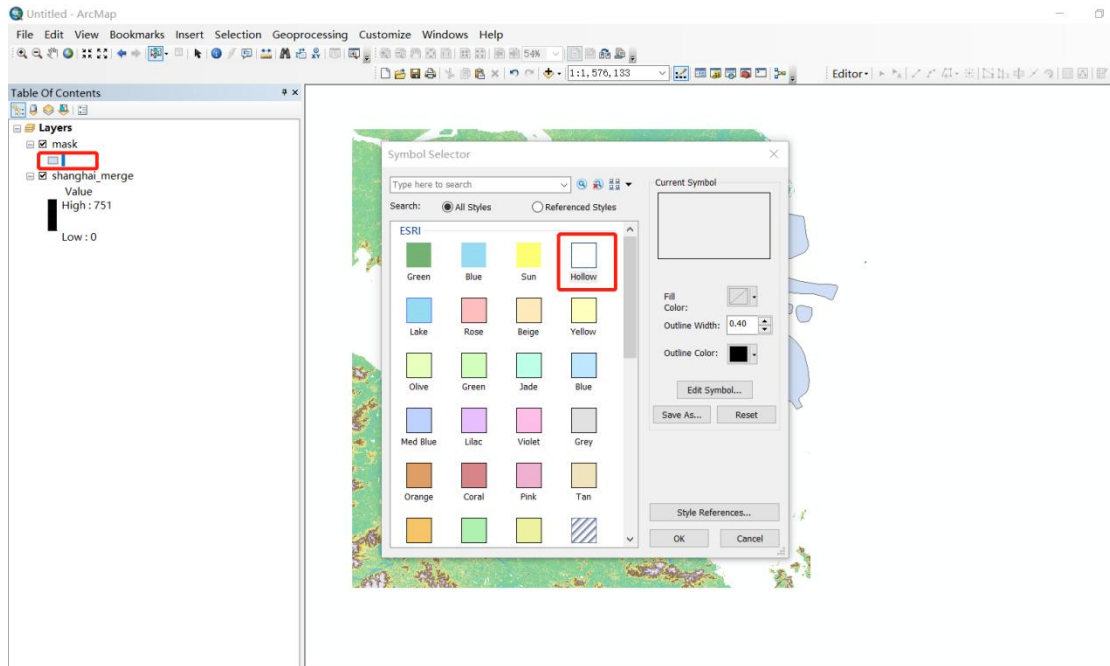
Step 6: Draw rivers in SH

(1) Import river shp file "River4_polyline" and "River5_polyline". These two files contains river in China.

(2) Clip river by mask (click "ArcToolbox" -   "Analysis Tools" - "Extract"- "Clip") . Here we use Analysis tools instead of "Data Mgt Tools" because rivers are features instead of datasets.

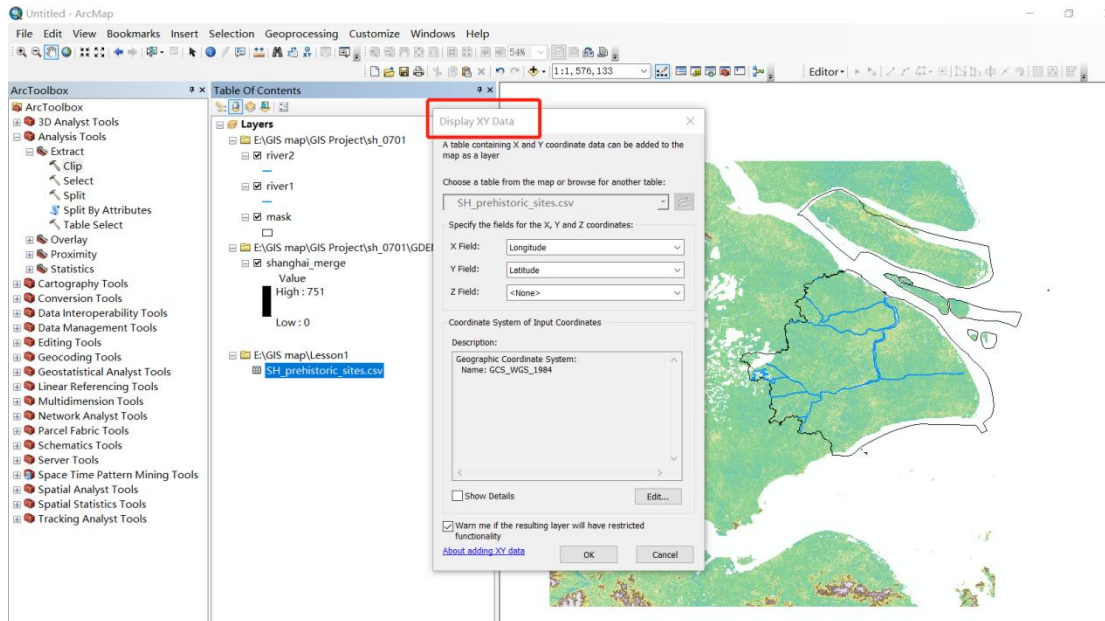"Import features" is the feature you want to clip while the clip features is the mask you create.
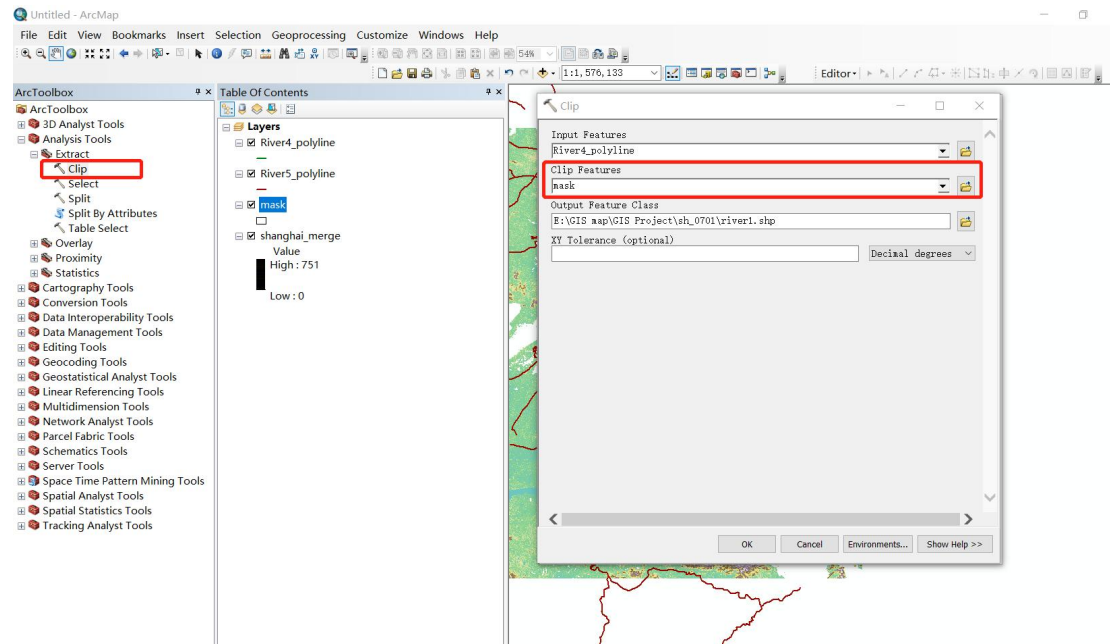
Rename the output as "river1" and "river2" and set the line type as "river" by click the line below the layer.
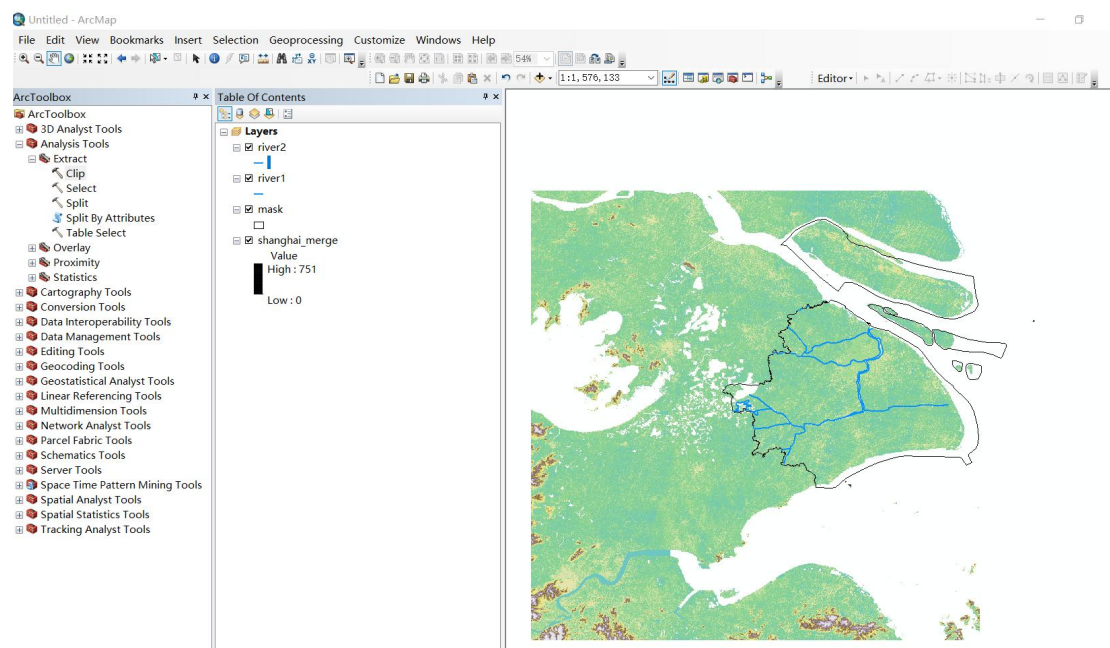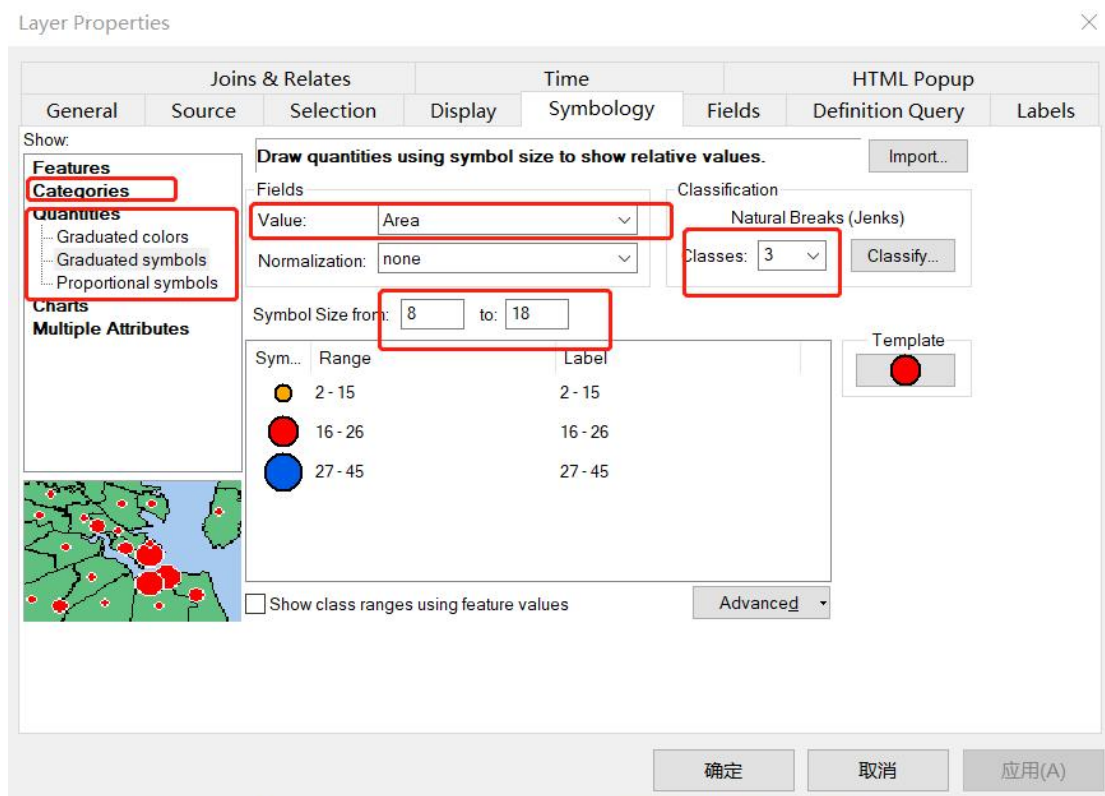

Step 7: Draw prehistoric sites in SH

(1) Import sites csv file
(2) Right click - display XY data

(3) Set symbology in "Layer properties". eg: there is area (m2) in the csv file and I use this value to differentiate sites and thus use different symbol size. You can also change color of circle according to categories.


Step 8: Cut the map

Because the whole map seems to be too large for me, I think it would be better to focus on SH

area. Then I need to cut the map by my DIY mask.

(1) Create a new shapefile named "clip". Feature type to be polygon.
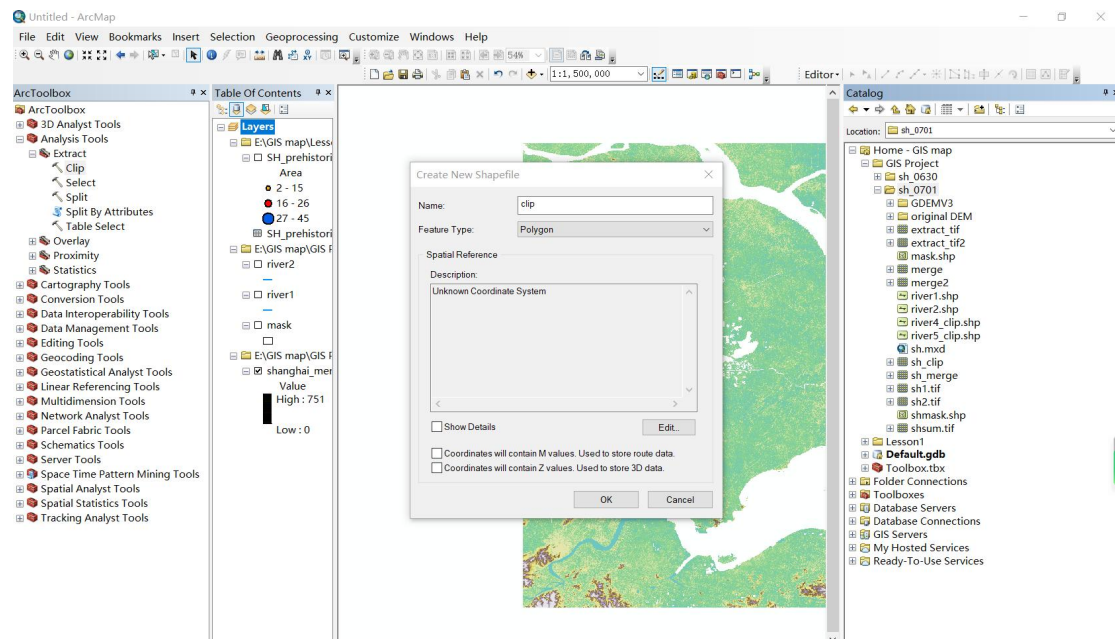
(2) Click "Editor" on the bar - "start editing" -select "clip" layer - "Create Features"- select "clip" layer and Rectangle - draw a rectangle on the area I want to focus on - stop editing -save.
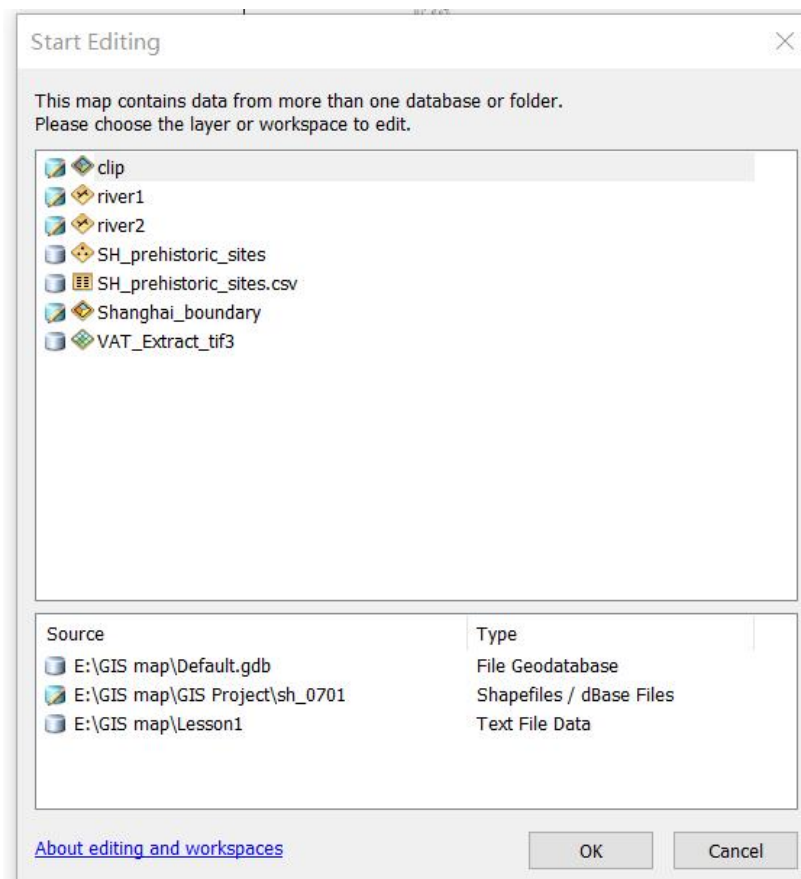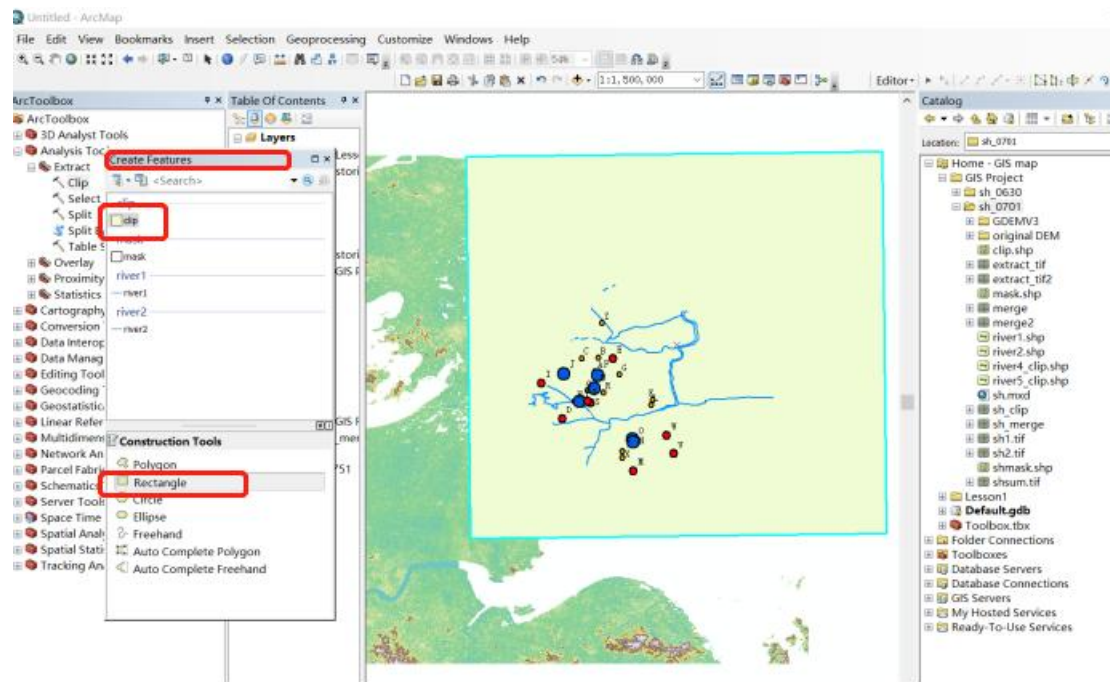
Here you may not able to save the file in the location you want (The software will five a "fail" notice). If this happened, just save with default name.
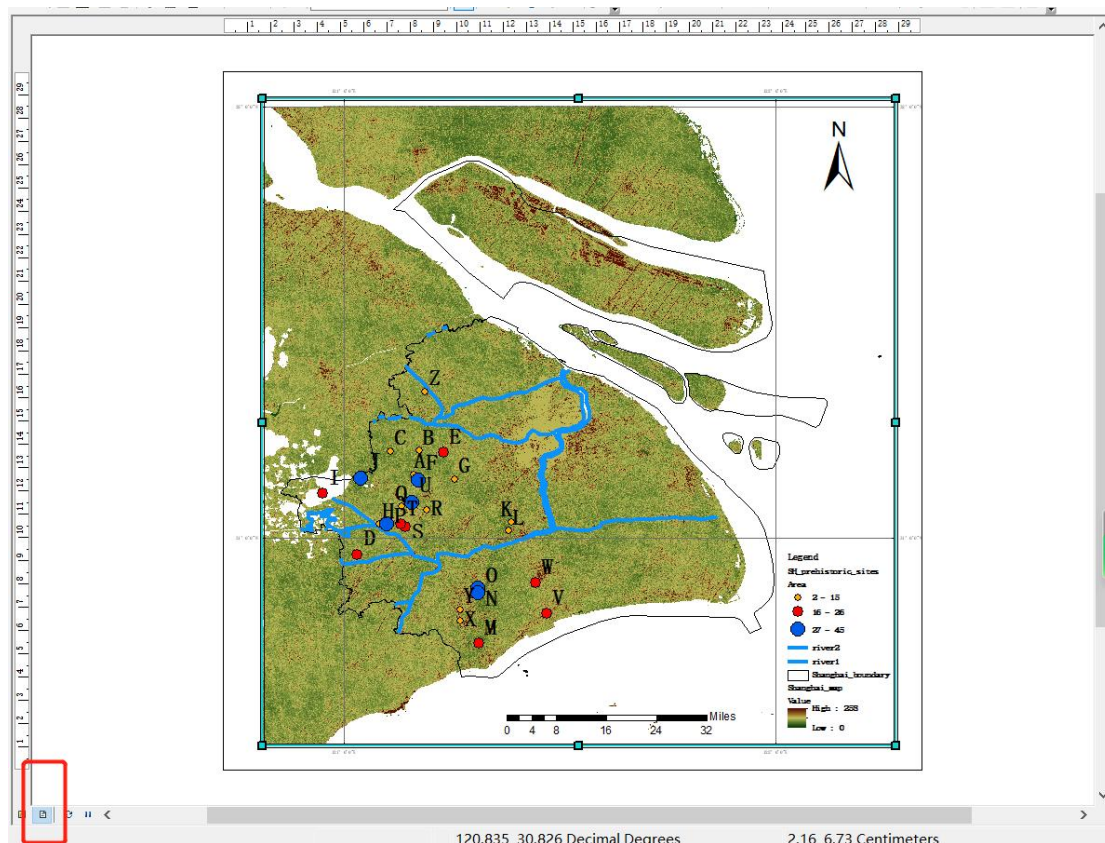
(3) Extract the area I want ((click "ArcToolbox" - "Spatial Analyst Tools" - "Extract by Mask")
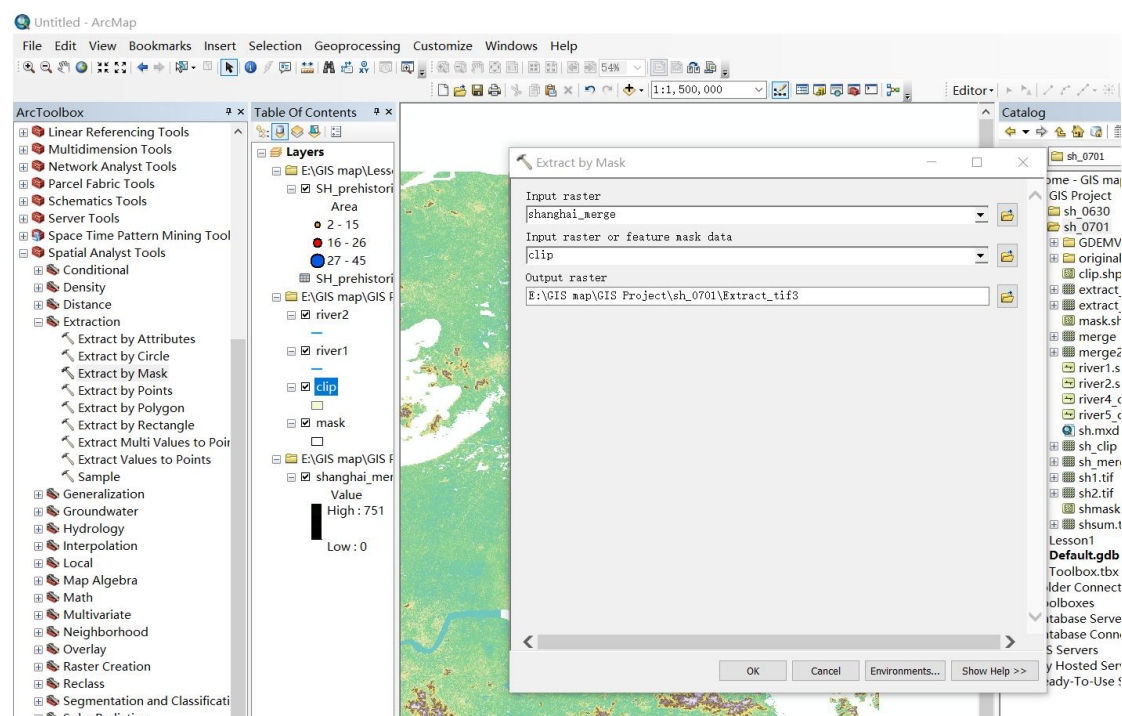
(4) After extraction, you may need to adjust the color again (repeat step 4)

Step 9 : Add Legend, North arrow, Scale bar and Grid.

Change to layout view (left lower corner, second button)

- Legend, North arrow, Scale bar: Click "insert" on the bar
- Grid: Select the border of the image and then right click "properties" -"grid"

Step 10: final adjustment of the layout by zooming out and zooming in the area .
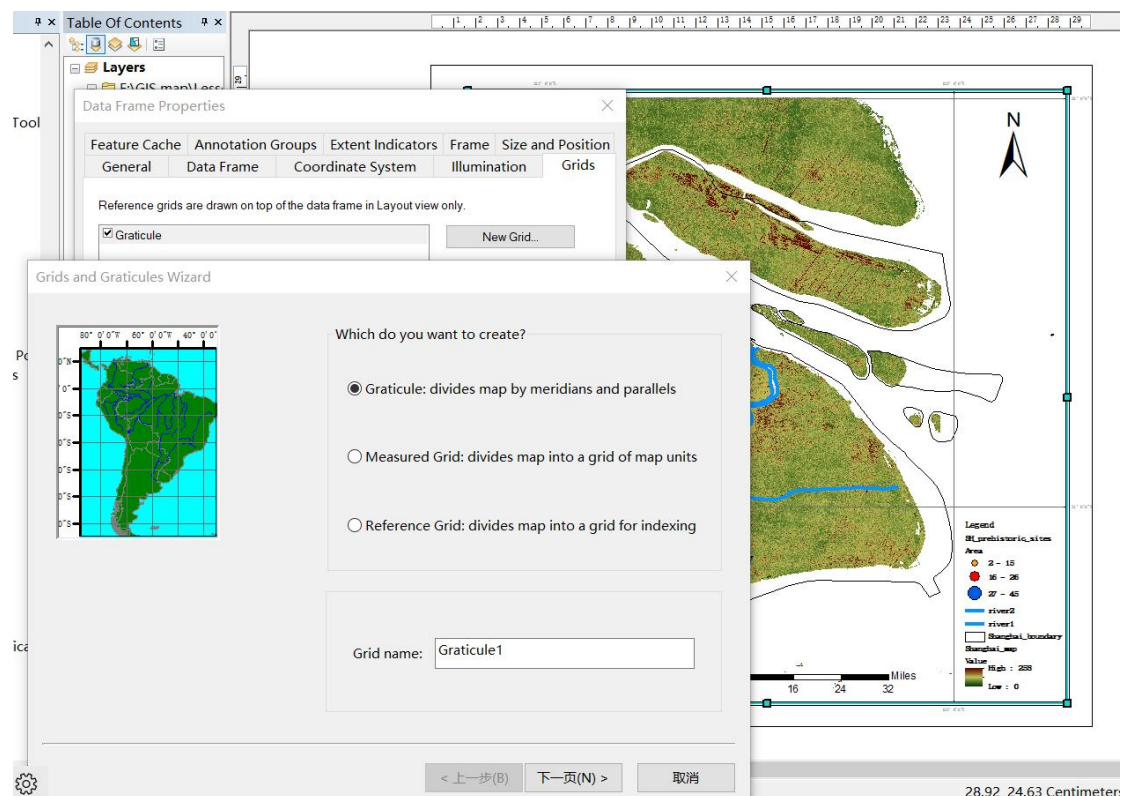
Adjust all other things for better illustration.