

SOC 4650/5650: Lab-06

Christopher Prener, Ph.D.

February 21st, 2017

Directions

Please complete all steps below. Your final map layout should be uploaded to your GitHub assignment repository by 4:20pm on Tuesday, February 28th, 2017. This lab uses data from the M0Boundary and MetroWx directories in CourseData.

Map Tornadoes Before 2000

1. In a new map document, set the projected coordinate system to NAD 1983 UTM Zone 15N for the Layers data frame.
2. Add the following layers in this order on your Table of Contents:
 - (a) Tornado tracks from the MetroWx directory - leave symbol alone for now
 - (b) Missouri state boundary from the M0Boundary directory - symbolize with no fill, just an outline for now
 - (c) Metro county boundaries from the MetroWx directory - fill should be white
 - (d) Illinois state boundary from the M0Boundary directory - symbolize as a ground layer
 - (e) Missouri state boundary from the M0Boundary directory - symbolize as a ground layer
3. On the Missouri state boundary layer that is directly below the tornado tracks, go to Layer Properties > Symbolology tab. Click on the Symbol button and choose Edit Symbol > Outline. Choose "Boundary, National" from the Symbol Selector and use a warm hue for the color.
4. In the Definition Query tab under Layer Properties for the tornado tracks layer, execute the following query to restrict the data view to tornadoes with an Enhanced Fujita scale (EF scale)¹ of 3 or greater and that occurred between 1950 and 2000 - "mag" >= 3 And "yr" < 2000 .

¹ The enhanced Fujita scale is the standard method of measuring the severity of a tornado. It is on a scale of 0 to 5 with 5 being the most damaging and destructive. An EF-0 tornado has a peak 3 second gust (in miles per hour) of between 65 and 80. An EF-1 has a peak gust between 86 and 110, an EF-2 has a peak gust between 111 and 135, an EF-3 has a peak guest between 136 and 165, and an EF-4 has a peak gust between 166 and 200. The most severe category, EF-5, has a peak 3 second gust greater than 200 miles per hour.

5. Symbolize the tornado paths using their magnitude categories - the EF-3 and EF-4 paths should have different hues with the hue for EF 4 being warmer and lower value (i.e. darker) than the hue for EF 3. Both lines should be thick with a width of 2.0. When you create the categories under the Layer Properties > Symbology > Categories window, make sure to un-check "all other values".
6. Rename this layer Severe Tornadoes.
7. Add another copy of the tornado tracks layer *under* the current tornado tracks layer but above all the other layers on your map. Symbolize it as a ground layer. Restrict this layer to tornadoes that occurred between 1950 and 2000 as well with the following definition query - "yr" < 2000 .
8. Rename this layer Less Severe Tornadoes.
9. Zoom to the metro area counties layer.
10. Rename this data frame as Tornadoes Before 2000.

Map Tornadoes 2000 and after

11. Copy all of your layers from the Tornadoes Before 2000 data frame to a new data frame named Tornadoes 2000 and After. Ensure that the layers in the Table of Contents are ordered identically to the original data frame.
12. Alter the definition queries for both tornado layers so that they show tornado paths between 2000 and 2015. The query should use this logical operator - >= .
13. Zoom to the metro area counties layer.

Construct the Inset Map

14. Copy the Illinois and Missouri state boundary layers (the bottom two layers in each data frame) along with the metro area counties layer to a new data frame named Inset Map.
15. Change the data frame's coordinate system to USA Contiguous Albers Equal Area Conic.
16. Re-symbolize the metro area counties so that they use the "Rose" pre-set symbol.
17. Zoom to the full extent of the map.

Construct the Map Layout

18. At this point you should have three data frames - one with tornado tracks before 2000, one with tornado tracks between 2000 and 2015, and one highlighting the location of the metro area.
19. Switch to the Layout View and create a well formatted map layout for an 8.5" by 11" printout in portrait orientation.
20. Add guides that create .5" margins around the page to help you construct your layout.
21. Re-size your two main data frames so that both of the tornado track data frames are 7.5" wide and 4" tall. The pre-2000 data frame should be on the upper part of the layout and the post-2000 data frame should be below it.
22. Add text that serves as a subtitle for each of the two main data frames.
23. The inset map should be re-sized as well and should be positioned on the layout to give reference to where these data are located in a broader spatial context.
24. Include a legend that identifies what the different tornado tracks mean, a scale bar, a title, and detailed text about authorship, the projection, and what EF-3 and EF-4 mean. These need to be added once and should be used in reference to both main maps. You should use the Severe Tornadoes and Less Severe Tornadoes layers to generate the legend. Also add detailed data about the primary source of these data. Check the `readme.pdf` file in the `SOC5650/Data` folder for details on data sources.
25. Manually add state names to both maps so that you have complete control over where the labels are positioned. Use the halo effect as you normally would for map labels.
26. Export the map layout as a pdf file at 300 dpi.