GEOG473/673 – Advanced R Final Project

Due: 4/18/2021 at midnight

We've spent the better part of 7 weeks learning how to utilize advanced R for geospatial data management and mapping. The final project involves you coding in R to demonstrate proficiency with the language. You will have 4 in class time periods to accomplish this task. I will be present to help for all 4 classes.

Specifics

- This represents 20% of your final grade.

Goal: Demonstrate proficiency in R.

Option 1: Choose your own.

So far, either myself or the R packages we've been using have supplied the datasets. It's now time for you to select your own dataset. Some of you are graduate students or aspiring upperclassmen who have plenty of your own data to dive into for an advisor, lab, or project. Some of you have final projects in other classes where R could be used to enhance your workflow you otherwise might've done in Excel or ArcGIS. Here's your chance to knock 2 things off your to-do list with 1 go.

For example:
With a dataset(s) of your choosing:

1) Describe the dataset and goal of the R script
2) Load the dataset(s) in R
3) Quality Control / Quality Assure the data – explain your methods
4) Perform basic statistical analysis
5) Create a function for your analysis/plotting
6) Use advanced customization with base R plotting with your dataset
7) Use ggplot2 to plot your dataset
8) Add shapefiles/mapping tools to plot (if it's a spatial dataset)
9) Show trends (if it's a time series dataset)

These are the main areas we covered with R. I'm not going to be picky about how you accomplish the above required tasks because this could vary tremendously from goal to goal or dataset to dataset. Do not mistake leniency for carelessness though – you do have to show proficiency in R. So long as you demonstrate proficiency in R, I don't care what do.

Submit resulting images and R Script to Canvas before 4/18/2021 at midnight.

Option 2: Compare DEOS Agricultural Weather vs. Climatology

Now, I realize that not everyone will have a dataset that they want to play with above. Further, I realize that some of you may prefer specific tasks to complete this project. Here is your option for a final project.

DEOS Daily Agricultural Weather Dataset

- Daily averaged data from 2010-Present as a spatial dataset over Delaware
- Over 4000 days of data (each day since 2010)
- THREDDS Link - http://basin.ceoe.udel.edu/thredds/dodsC/DEOSAG.nc.html
- *Note that if the thredds link doesn't work (may happen if you are on Windows), the dataset can also be found in the Github Datasets folder as deosAG.nc*

DEOS Agricultural Climatology Dataset

- Daily averaged data that has been averaged again for each day of
- 366 days of data
- THREDDS Link - http://basin.ceoe.udel.edu/thredds/dodsC/deos_doy_climatology.nc.html
- *Note that if the thredds link doesn't work (may happen if you are on Windows), the dataset can also be found in the Github Datasets folder as clim.nc*

1) Use ncdf4 to open the Links above – (nc_open("http://basin.ceoe.udel.edu/thredds/dodsC/DEOSAG.nc"))
2) Select a single lat/lon point within the Daily Agricultural Weather Dataset, gather the data, plot the time series of temperature (variable is meanTemp)
3) Select same lat/lon point within the climatology dataset. Average all of the meanTemp values so you are left with one Mean Temperature for the year. Use the abline function to add this to the plot above.
4) Select recent day from the Daily Agricultural Weather Dataset, plot a raster image of meanTemp
5) Find the same day within the Climatology Dataset. For example, if you selected April 16th above, the 107th day of year in leap years, select the 107th day for the meanTemp variable in the climatology dataset. Plot this days average temperature.
6) Subtract the climatology meanTemp raster from the Daily Agricultural Weather Dataset's meanTemp. Plot the difference.

Submit resulting images and R Script to UD Canvas before 4/18/2021 at midnight.