

Assignments 4/5

This is a double assignment and will be worth 100 points.

Instructions:

Complete the assignment below, and attach a .pdf of all your answers and graphs to an email to geog345@gmail.com. Please include all the questions this time in addition to your answers. In the subject line, type "Assignment 4&5" (without the quotes).

This assignment must be submitted by **Tuesday, October 7, 11:59** pm EST (i.e. before midnight). Late assignments will be deleted. Please only submit your completed assignment once.

1. Type your last, first name

2. Copy and paste the honor pledge:

I pledge on my honor that I have not given or received any unauthorized assistance on this assignment. (Add your initials).

Download the data file Assignment4&5.csv

3. In two sentences or less, explain what the ONI is and where the measurement(s) is/are taken.

4. Graph the ONI measurement using a line graph, with time on the x-axis and the ONI value on the y-axis. Be sure to label your axes, and do your best to make the graph clear and easy to read. (It might be best to have the x-axis cross at the bottom of the graph rather than at zero). Paste the graph into your submission file. If you use Word, you might have more control over the figure if you paste it special as an enhanced metafile.

5. What were the three strongest El Niño years since 1950?

6. What were the three strongest La Niña years since 1950?

7. Compute the mean number of hurricanes per year that made landfall in the U.S. since 1950. Round to the nearest tenth.

8. Compute the mean number of hurricanes that made landfall in the U.S. on years where the ONI was greater than 1.5 since 1950.

9. Compute the mean number of hurricanes that made landfall in the U.S. on years where the ONI was less than -1.5 since 1950.

10. Are increased hurricanes associated with El Niño years or La Niña years?

11. In two sentences or less, explain what the SOI is and where the measurement(s) is/are taken.

12. Compute a 3-month moving average of the SOI (i.e., Jan 1950 = Average(Dec 1949, Jan 1950, Feb 1950)). This will smooth the data so it will be easier to identify trends. This is probably easiest to do in

Excel by creating a new column, and using the `=AVERAGE(D2:D4)` and dragging it down. There are many possible ways to do this in R, including a "for" loop, or by creating a matrix of 3 columns with an offset of one month in each column, then using the "apply" function to take the mean of each row. Graph your smoothed data for the years 1950 to present, using a line graph, like above, time on the x-axis, smoothed SOI on the y-axis. Be sure to label your axes, and do your best to make the graph clear and easy to read. (Again, it might be best to have the x-axis cross at the bottom of the graph rather than at zero). Paste the graph into your submission file.

13. Plot the ONI against the SOI, (i.e., create a scatterplot/ regression). Put ONI on the y-axis and SOI on the x-axis. Make it pretty and paste your plot in your submission file.

14. Is the relationship between ONI and SOI positive or negative or non-existent?

15. On El Niño years, does the SOI tend to be negative or positive?

16. On La Niña years, does the SOI tend to be negative or positive?

17. If the SOI is negative, are hurricanes in the Gulf of Mexico more or less likely?