**Lab 10: Temperature**

**Question 1:**

Think about what a diagram of this would look like. What is the angle between the zenith and the sun? [Look at slide 2 of the PowerPoint].

**Question 2:**

<http://www.esrl.noaa.gov/gmd/grad/solcalc/azel.html>

If you were born in a foreign country, pick your favorite U.S. city for part (a)

Step 1: Chose city nearest to you and the default Lat, Long, and UTC offset will populate. NO-daylight savings time. [write down for part a]

Step 2: Enter birthdate at NOON or 12:00:00 24 hr [write down for part b]

Step 3: Find zenith angle by calculating 90- solar elevation= solar zenith [write down for part c]

**Question 3:**

Determine solar intensity using the solar constant (So =1000 W/m^2) multiplied by the solar zenith angle, Θ, from question 2c.

**I saved you time on the remainder of the questions and I provided the data for you on my website.**

**Question 4:**

For this question you are plotting Temperature variation in **Brownwood, Texas**. You can find the data on my website link titled “Brownwood, Texas”. On the bottom of page 66, include the Lat, Long, and Elevation for Brownwood, Texas found at the left corner of the pdf link I provided.

On the top of page 67, you will be plotting the average maximum temperature of the month. This is labeled TMAX (monthly mean, max). DO NOT use the TAVG column. Be sure to include labels for the access and units (ex. Mean Max Temp (F); months). Connect all dots with a line. The sites should be colored a different line and include a key above the plot indicating which site corresponds with which line/color. If a month is missing data, skip that month.

**Question 5:**

For this question you are plotting Temperature variation in**Jamestown State Hospital, North Dakota.** You can find the data on my website link titled “Jamestown State Hospital ND”. Plot on the same graph you used for number 4. On the bottom of page 66, include the Lat, Long, and Elevation for Jamestown State Hospital ND. Not any differences between the Texas and the North Dakota site and explain why the difference in Temperature may be related to the difference in BOTH Latitude and altitude. Now answer number 5.

**Question 6:**

Use **Aberdeen, Washington** (Labeled on the Website as Washington)and **Chula Vista, CA** (Labeled on the Website as “Imperial Beach (ChulaVista)”)**.** On the bottom of page 67, write down the Lat, Long, and Elevation for the two sites.Plot both on same graph on page 68. Again, plotting the average maximum temperature of the month. This is labeled TMAX (monthly mean, max). DO NOT use the TAVG column. Be sure to include labels for the access and units (ex. Mean Max Temp (F); months). Connect all dots with a line. The sites should be colored a different line and include a key above the plot indicating which site corresponds with which line/color. If a month is missing data, skip that month.

**Question 7:**

Step 1: Compare the Washington and California site to each other. Think about their geographic locations and explain why they are different and how this difference effects temperature variation.

Step 2: How do the sites in Washington and California compare to North Dakota and Texas. [Hint! Look at the section heading above #6 and think about how this type of location plays a role. Revisit Slide 5]

**Question 8:**

Use **Parker Reservoir, California** (Labeled on the Website as Parker Reservoir CA)and **Eastman, Georgia** (Labeled on the Website as “Eastman GA”). On the bottom of page 68, write down the Lat, Long, and Elevation for the two sites.Plot both on same graph on page 69. You may need to go above the plot to plot a point, that is fine. Again, plotting the average maximum temperature of the month. This is labeled TMAX (monthly mean, max). DO NOT use the TAVG column. Be sure to include labels for the access and units (ex. Mean Max Temp (F); months). Connect all dots with a line. The sites should be colored a different line and include a key above the plot indicating which site corresponds with which line/color. If a month is missing data, skip that month.

**Question 9:**

Look at google maps (satellite image) to see the difference in surface types. The surface type does make a difference. Why do you think that is the case?

**Question 10:**

Use **Tahoe City, California** (Labeled on the Website as Tahoe City CA)and **Marysville Yuba Co Airport, California** (Labeled on the Website as “Marysville CA”). On the bottom of page 69, write down the Lat, Long, and Elevation for the two sites.Plot both on same graph on page 70. You may need to go above the plot to plot a point, that is fine. Again, plotting the average maximum temperature of the month. This is labeled TMAX (monthly mean, max). DO NOT use the TAVG column. Be sure to include labels for the access and units (ex. Mean Max Temp (F); months). Connect all dots with a line. The sites should be colored a different line and include a key above the plot indicating which site corresponds with which line/color. If a month is missing data, skip that month.

**Question 11:**

The altitude does explain the difference in temperatures. How does temperature change with altitude? Do we see that in the plot above?

**Question 12:**

You are using the city you chose in number 2 or something close to it (do your best).

**Use this website for the rest of the lab:**

<https://gis.ncdc.noaa.gov/maps/ncei/summaries/monthly>

 To access the data on the website above:

1. Change the year to **2014**
2. Click Temperature Maximum (**NOT** Mean Temperature)
3. Click the wrench to the right of monthly summary, click identify in the new window
4. Search for your location in the search box
5. Use the identify tool to click on the station
6. Click the results tab on the left box on the screen
7. Click view/download data
8. Record the Latitude, Longitude, and Elevation

**Remember to include axis labels and a figure legend!**

**Question 13:**

This will depend on what location you used, so use your knowledge from the previous questions to find an answer

**Question 14-15:**

I told Tim that this lab was pretty long, so we agreed to eliminate the last two questions. You do not need to complete 14 or 15.