

EENS 3050/6050	Natural Disasters
Tulane University	Prof. Stephen A. Nelson
Homework Assignment IV. Weather Exercises	

This document last updated on 16-Nov-2016

1. Go to the following link to download and print a hurricane tracking map to be used for this exercise - <http://www.tulane.edu/~sanelson/geol204/trackingmap.pdf> In order to print this file you will first need to obtain the Adobe Acrobat reader (see EENS3050 homepage). Be sure to set your printer to print this file in Landscape mode.
 - a. Once you have the tracking map, plot the following hurricane coordinates for Hurricane Mala on the map. Note that the **coordinates refer to the position of the center of the eye of the hurricane**. At each latitude and longitude also write the wind velocity in red and the storm center velocity in blue. Make sure you write them as small as you can and still read them. **(2 points)**

Track of Hurricane Mala					
Date	Time	Latitude (N)	Longitude (W)	Max Wind Velocity (miles/hr)	Storm Center Velocity (miles/hr)
Aug. 3	12:00 PM	10.3	26.9	41	8
Aug. 4	12:00 PM	11.0	33.1	43	8
Aug. 5	12:00 PM	12.2	39.4	52	8
Aug. 6	12:00 PM	13.6	45.8	66	8
Aug. 7	12:00 PM	15.2	52.9	74	6
Aug. 8	12:00 PM	16.8	59.5	76	10
Aug. 9	12:00 PM	19.1	64.7	77	12
Aug. 10	12:00 PM	21.2	68.1	88	10
Aug. 11	06:00 AM	21.2	70.0	110	15
Aug. 11	06:00 PM	21.2	74.0	128	15
Aug. 12	06:00 AM	22.0	78.0	135	18
Aug. 12	06:00 PM	23.0	80.0	144	18
Aug. 13	06:00 AM	24.0	84.0	155	18
Aug. 13	06:00 PM	25.0	86.0	160	15
Aug. 13	09:00 PM	26.0	87.0	166	20
Aug. 14	03:00AM	28.0	89.0	166	20
Aug. 14	06:00 AM	28.5	88.0	167	18
Aug. 14	12:00 PM	28.5	84.0	160	15
Aug. 14	06:00 PM	28.5	83.0	160	15
Aug. 15	01:00 AM	28.5	81.5	135	15
Aug. 15	06:00 AM	30.0	80.0	135	20
Aug. 15	12:00 PM	33.0	79.0	140	20
Aug. 15	06:00 PM	34.0	78.0	140	20
Aug. 16	00:00 AM	35.0	77.0	135	25
Aug. 16	06:00 AM	37.0	76.0	110	35
Aug. 16	12:00 PM	38.0	75.0	105	38
Aug. 16	6:00 PM	39.0	73.0	65	35

- b. After you have plotted all of the points on the map, connect the points with lines using the following color codes: **(1 point)**

Wind Velocity (miles/hr)	Safir-Simpson Scale Category	Minimum Storm Surge Height near Landfall (feet)	Line Color
39-73	Tropical Storm		Black
74-110	1 - 2	4 - 8	Green
111-130	3	9 - 12	Blue
131-155	4	13 - 18	Orange
>155	5	>18	Red

Make sure you turn the map in with your homework.

Note that information to help answer the questions that follow is contained in your lecture notes.

- c. What was the likely minimum height of the storm surge at Tampa Florida on the afternoon of Aug. 14? **(1 point)**
- d. What were the maximum sustained winds at Tampa Florida during the evening of Aug. 14? (Be sure to take into account both wind velocity and storm center velocity) **1 point)**
- e. What were the maximum sustained winds on the Florida Gulf Coast at 29.0 North latitude during the evening of Aug. 14? **(1 point)**
- f. As the Hurricane crossed Florida between Tampa and Orlando it lost intensity. Explain why this is occurred. **(1 point)**
- g. Describe what the weather would have been like in Disney World (Orlando, Florida, 28.5°N, 81.5°W) at **exactly** 1:00 AM on Aug. 15. **(1 point)**
- h. What would have been the maximum sustained wind speed at Charleston, South Carolina as the Hurricane passed by there on Aug. 15? **(1 point)**
- i. Hurricane tracks can be described as coast-normal and coast-parallel. What kind of track did the storm take with respect to the west coast of Florida during most of the day on Aug. 14? What kind of track did the storm during the afternoon of Aug. 15? **(1 point)**
- j. What would have been the minimum storm surge at Wilmington, North Carolina just before the storm hit there? **(1 point)**
- k. New Orleans is located at 30° North Latitude, 90° West Longitude. What would the National Hurricane Center have been saying about New Orleans after the report of the hurricane's location and storm center velocity on Aug. 14 at 03:00 hours? **(0.5 point)** What would have been the wisest thing you could have possibly done if

you were living in New Orleans at this time? Why? **(0.5 point)**

1. In the year Hurricane Mala occurred (which year is irrelevant), how many named tropical storms/hurricanes had occurred in the Atlantic prior to this storm? **(2 points)**

2. Visit the National Hurricane Center web site at: <http://www.nhc.noaa.gov/>, Find the answers to the following questions (hint - many, but not all, answers can be found in the NOAA: Hurricane Facts link near the bottom of the page):
 - a. List the 10 Hurricanes that have caused the most deaths in the **United States** since 1900. Give the estimated death toll for each. **Make sure you only include hurricanes since 1900 (1 point)**
 - b. List the top ten hurricanes that have been the most costly in the U.S. since 2000. Give the name of the storm, states affected, year of the storm, and dollar amounts **in 2013 dollars** for each. **(1 point)**
 - c. During a hurricane are you supposed to have the windows and doors on the storm side closed and the windows and doors on the lee side open? Explain your answer. **(1 point)**
 - d. In the southern Atlantic Ocean, hurricanes are almost non-existent. What reasons can you find for this? **(1 point)**
 - e. Why do hurricanes hit the East coast of the U.S., but not the West coast? **(1 point)**
 - f. Has a hurricane ever hit the west coast of the United States? If so, where, and when what are the implications of this considering the earth appears to be undergoing a warming cycle? **(1 point)**
 - g. What are the chances (probability) that New Orleans will receive a direct hit from a hurricane or tropical storm in any given year? **(1 point).**
 - h. Which part of the United States has the highest probability of direct hit from a hurricane or tropical storm in any given year? **(1 point)**

3. On October 29, 2012 Hurricane Sandy made landfall in New Jersey. Using an internet search, answer the following questions.
 - a. How much damage and how many direct deaths did Hurricane Sandy inflict on the United States?**(1 point)**
 - b. What was the wind speed and storm Category of Sandy when it made landfall ? **(1 point)**
 - c. Which states were affected by Sandy, and which state suffered the most damage and the highest number of deaths.? **(1 point)**

- d. Was there anything unusual about the path of Hurricane Sandy? Were forecasters able to predict this path **(2 points)**
 - e. What could be done to mitigate the damage to the region in the event of another storm like Sandy? **(1 point)**.
 - f. Is there any hard scientific evidence that Sandy was caused by climate change **(1 point)**.
4. Because you are now living in New Orleans which suffered a devastating disaster in 2005 due to Hurricane Katrina, it is important to have a better understanding of this disaster because it is still affecting the city and will do so for a long time into the future. Still, there is much misinformation that is still being circulated about the disaster. Your instructor has published a paper about some of this misinformation (he refers to this as myths) and you can read the paper at the following link: http://www.tulane.edu/~sanelson/Katrina/Myths_of_Katrina.pdf . After reading the paper answer the following questions:
- a. What are the 5 myths discussed by Nelson in the article? **(2 points)**
 - b. Which of these myths (if any) did you personally believe before reading this article? **(1 point)**
 - c. Why should anyone believe Nelson over what they have heard or read elsewhere? **(1 point)**
5. The president of Denyallclaims Insurance Company, I. Won Pei, is considering moving into the state of Oklahoma hoping to make some excessive profits by selling a lot of tornado insurance. He is in the process of writing a prospectus for the board of directors, but has some questions about tornadoes. He asks you for answers to these questions, knowing that you have taken a course on natural disasters. Because you see this as an opportunity to get a promotion to a coveted position as regional manager in Fargo, North Dakota, you willing agree to provide the answers to his questions. You know that the answers probably can be found on internet at sites like the WhyFiles twister site - <http://whyfiles.org/013tornado/> and the NOAA tornado FAQ page- <http://www.spc.noaa.gov/faq/tornado/index.html> so you go to these sites to find the answers to the following questions:
- a. How long can a tornado last? **(1 point)**
 - b. What is the most important energy source in a tornado? **(1 point)**
 - c. Why are tornadoes most frequent in the afternoon and evening? **(1 point)**
 - d. What is the maximum death toll from a single tornado in the U.S.? **(1 point)**
 - e. Where and when did this occur, and what was the estimated cost of the damages (in current dollars)? **(1 point)**

- f. What is difference between a "Tornado watch" and a "Tornado Warning"? **(1 point)**
- g. Is it true that one of the safest places to go if you are on the highway during a tornado is under a bridge or highway overpass? Explain your answer. **(1 point)**

[Return to EENS 3050 Homepage](#)