



OH! BUOY!



NAME:

DATE:

Hurricane Katrina was a Category 4 tropical cyclone when it struck land in 2005. The hurricane's intensity reached a maximum wind speed of 175mph making it the second strongest hurricane ever recorded in the Gulf of Mexico. National Data Buoy Center information was gathered throughout the Atlantic Ocean and Gulf of Mexico as the storm traveled its path.

Using the figure and graphs, answer the questions about Hurricane Katrina and NDBC ocean science data. Don't forget to include the correct unit of measurement in your answers!

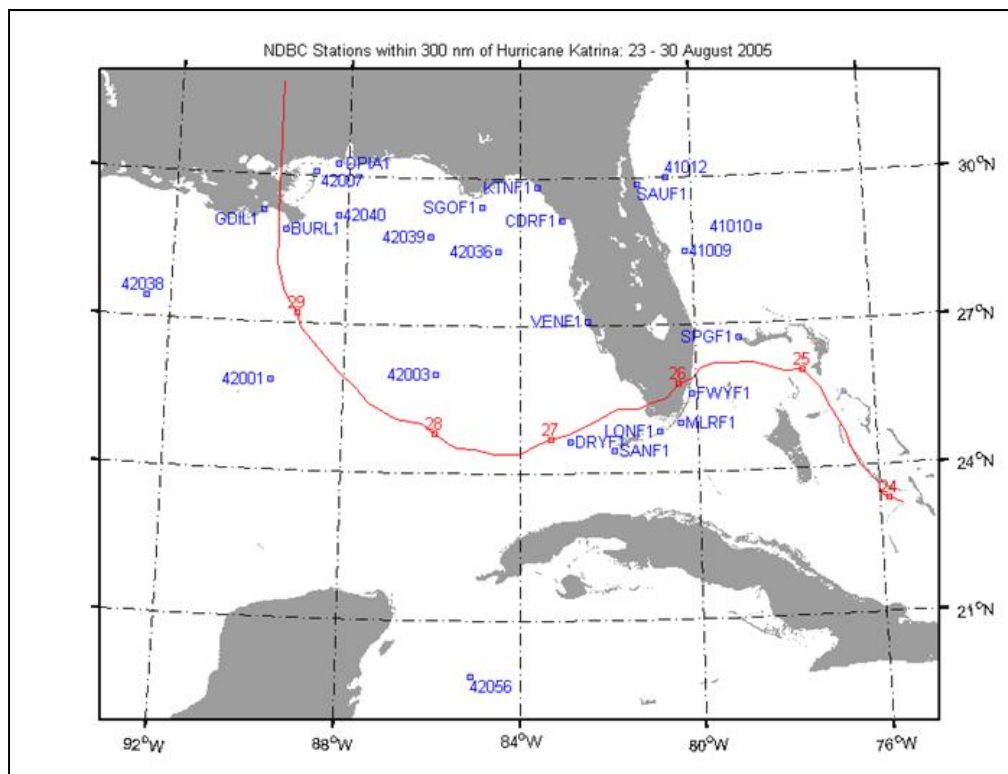


FIGURE 1: The track of Hurricane Katrina's eye from August 24- August 29, 2005.

The start of each day is numbered. National Data Buoy locations are designated by squares and labeled with the station numbers.

Locate NDBC station 42040.

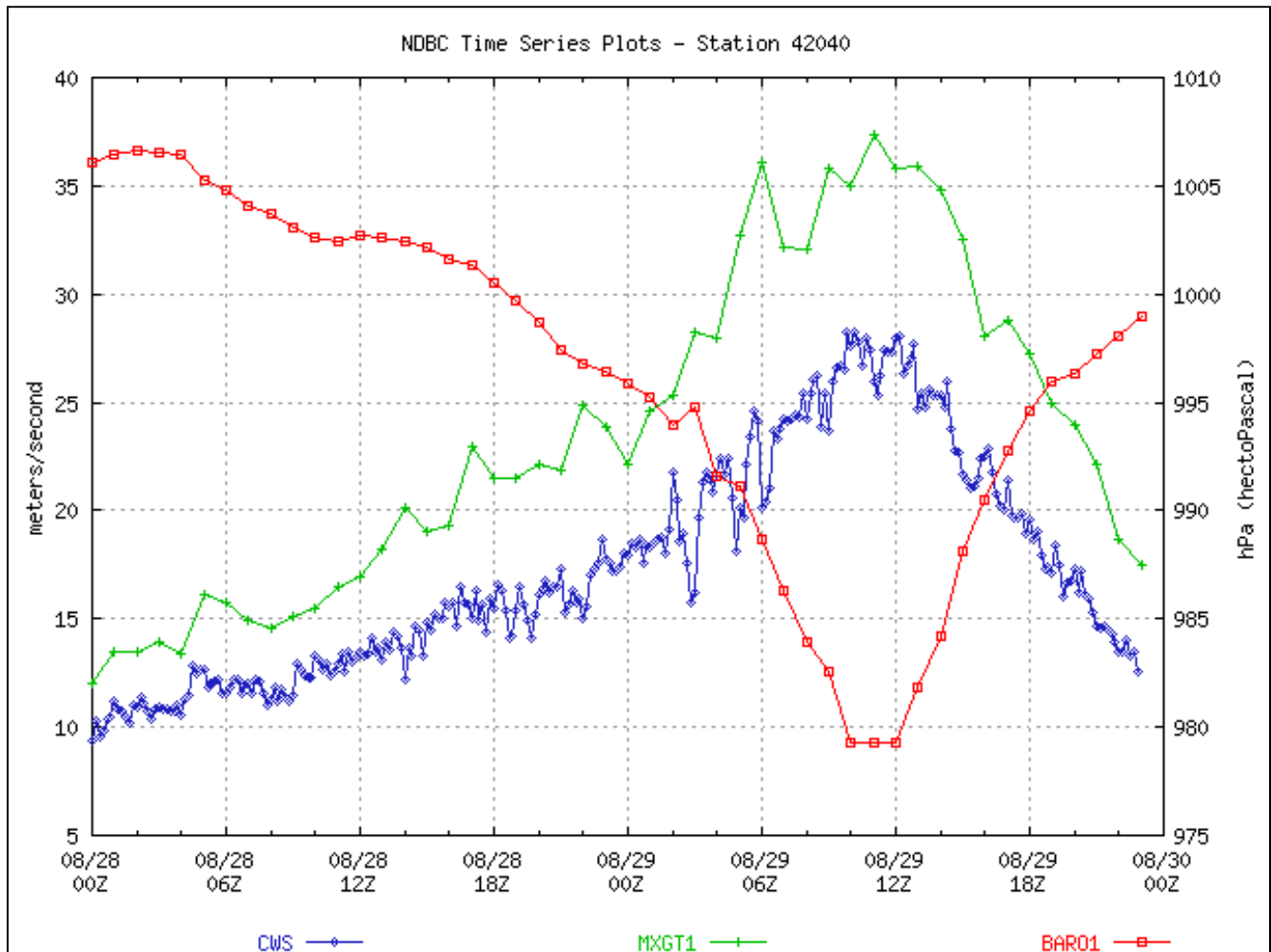
1. What is the approximate latitude and longitude of NDBC station 42040?
2. What day did the eye of Hurricane Katrina pass NDBC station 42040?
3. Where is buoy 42040 located in respect to Katrina's path?

If 1° longitude at 30°N equals approximately 59.95 miles, how far away was station 42040 from the eye's center?

4. How did the path of Hurricane Katrina change between August 28 and August 29?



GRAPH 1



Graph 1: Wind and pressure data collected from Station 42040 during Hurricane Katrina August 2005.

CWS: The average wind speed over 10 minute periods at a height of 5m. Measured in meters/second on the left-hand y-axis.

MXGT1: Peak 5-second gust during the previous hour at a height of 5m. Measured in meters/second on the left hand y-axis.

BAR01: Sea-level pressure averaged over 8 minutes. Measured in hectopascals (hPa) on the right-hand y-axis.

Independent Variable-Date and time: Month/day above time of day in military time



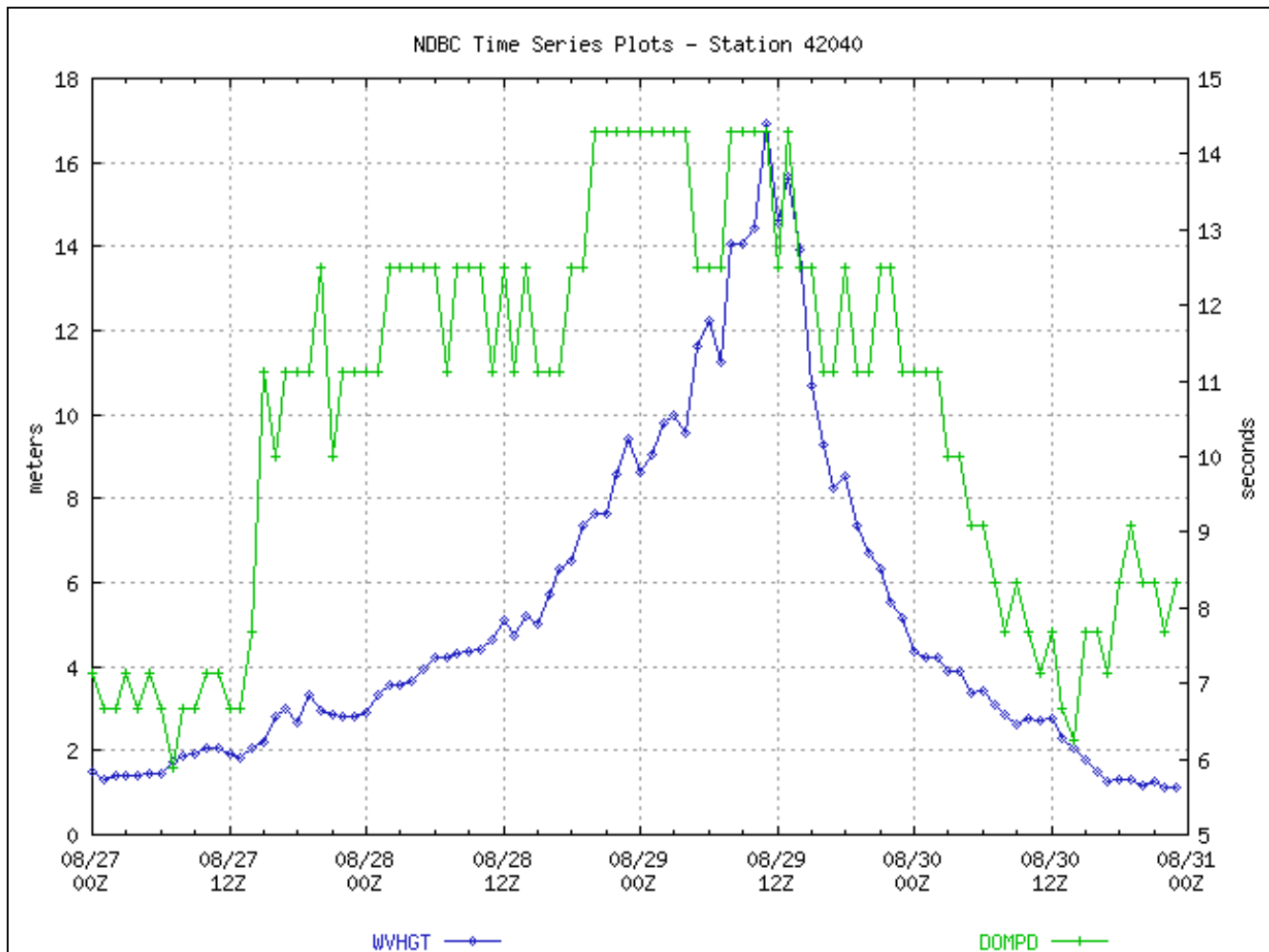
Graph 1 Questions:

5. According to graph 1, what day and time did the atmospheric pressure begin to drop as Hurricane Katrina approached Station 42040?
6. What was the highest atmospheric pressure before it began to fall?
7. What was the lowest pressure recorded at station 42040?
8. What day and times was the lowest pressure recorded at station 42040?
9. What was the highest recorded average wind speed during Katrina at Station 42040?
10. Convert the highest recorded average wind speed to miles per hour. (1 m/sec = 2.2369 miles per hour)
11. What was the highest recorded wind gust during Katrina at Station 42040?
12. Convert the highest recorded wind gust to miles per hour. (1 m/sec = 2.2369 miles per hour)
13. Based on what you know about hurricanes, when did hurricane Katrina start to move away from station 42040?
14. A. Look at Graph 1 on August 29 at 6am. What do you notice about the wind speed and wind gusts during this time?

B. Does this happen anywhere else on Graph 1 as Katrina moved past Station 42040?
15. Are the trends for this graph for wind speeds and pressure what you would expect for a typical hurricane approaching a stationary point? Explain your answer.



GRAPH 2



Graph 2: Wave data collected from Station 42040 during Hurricane Katrina August 2005

WVHGT: Average of the highest 1/3 of waves during the sampling period. Measured in meters on the left-hand y-axis

DOMPD: The wave period (time between consecutive passes of the wave crests) of the waves with the most energy. Measured in seconds on the right hand y-axis

Independent Variable-Date and time: Month/day above time of day in military time



Graph 2 Questions:

16. What was the maximum significant wave height recorded by station 42040 during Hurricane Katrina?
17. Convert the maximum significant wave height from meters to feet. (1 meter = 3.28 feet)
18. When (day and time) was the maximum significant wave height recorded?
19. What was the length (time) of the greatest wave period recorded by station 42040 during Hurricane Katrina?
20. Did the dominant wave period and significant wave height follow similar trends as Hurricane Katrina approached station 42040? Explain your answer.

WAVE DIMENSIONS:

Wave steepness is the slope determined by the ratio between wave height and wave length. Wave steepness can be inferred from buoy measurements of wave height and period. When wave heights and periods are close to the same value (e.g., six foot seas every six seconds) wave steepness is severe.

21. Given the information about wave dimensions above and using Graph 2, look at the waves on August 28. Give the corresponding wave height and dominant period for August 28 at midnight, noon, and 9:00PM. During these time periods, was the wave steepness severe? Explain your answer.

Graphics used in this exercise from: <http://www.ndbc.noaa.gov/hurricanes/2005/katrina/>