Regents Earth Science
Hurricane Dean in Google Earth

Name _____

Teacher:_____ Period:_____

Get this Google Earth file:

http:www.stevekluge.com/geoscience/ges/hurricanedean.kmz

and explore the images and data as you read and work through this lab.

Introduction

Hurricane Dean began as a tropical depression off the coast of Africa on August 13, 2007. The next day, Dean had strengthened to a tropical storm, and on August 16, 2007 Dean became the first hurricane of the Atlantic Tropical Season of 2007.

During the next 8 days, Dean traveled westward across the tropical Atlantic, entering the Caribbean Sea on August 17, passing just south of Jamaica on the 19th, and making landfall as a strong Category 5 hurricane on the Yucatan Peninsula on August 21.

In this lab, you'll explore data collected during the storm by satellites, aircraft, and buoys in order to discover some basic truths about the behavior of these huge storms.

Procedure

Review and examine the information available in the Google Earth file as you answer the following questions. Questions marked with a "☆" require you to use the answers to previous questions to develop your understanding of how hurricanes work and behave, and are key to your understanding of hurricanes.

1. Use the ruler tool to measure the entire length of the path of Dean, from Advisory 1 (at the eastern end of the storm track) to his end in Mexico, and report that distance here:

   _____ miles

   _____ nautical miles

   _____ kilometers

2. Click on every 3rd or 4th storm position, starting at Advisory 1 and working westward to longitude 87W, and describe how the "maximum sustained wind speed" changes over time.

   _____

   _____

3. Describe, using actual temperatures, how the sea surface temperature changes as you travel westward across the Atlantic along the 15th parallel of latitude.

   _____

   _____

   _____

4. What was the approximate sea surface temperature as Dean became a tropical storm?

   _____

5. What was the approximate sea surface temperature as Dean became a hurricane?

   _____

6. What was the approximate sea surface temperature as Dean reached Category 5 strength?

   _____

☆ 7. Describe the relationship between sea surface temperature and the strengthening of tropical storms and hurricanes. Use specific temperatures in your description.

_____

_____

_____

_____

_____

_____

8. What is the range of forward speeds of the storm (referred to as "tracking" in the Google Earth advisories) during it's lifetime?

Slowest: _____ fastest: _____

☆ 9. What is the average tracking speed of the storm? (you don't need to calculate it, just look for the most frequently appearing tracking value)

_____

10. What was the maximum sustained wind speed, and what was the Saffir Simpson Category, as Dean came ashore on the Yucatan Peninsula?

Wind speed:_____ Category:_____

11. What happened to the maximum sustained wind speed and Category as Dean crossed the Yucatan Peninsula? Use specific times, wind speeds, and categories in your description.

_____

_____

_____

_____

_____

☆ 12. What caused the wind speed changes you've noted in question 11. In your answer, list the factors involved, and explain **how** and **why** they affect wind speed.

_____

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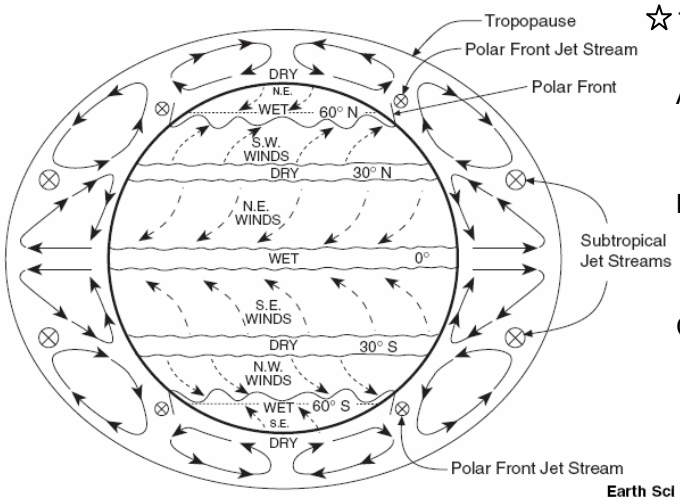

Earth Scl

☆ 13. Refer to the chart of planetary winds to the left, and do/answer the following questions.

A. Place a dot on the diagram at the approximate latitude of Advisory #1, and another at the location of Advisory #37. Connect the dots with a smooth line.

B. Does the forward motion of the hurricane seem to be at least in part driven by the planetary winds?

_____

C. Complete the statements below by filling in the blanks

"Dean's path veered to the _____ of the direction the planetary winds were moving"

"While the planetary winds were blowing to the SW, Dean moved towards the _____"

D. Hurricane Florence ran across the Atlantic Ocean during September of 2006. While she never made landfall, her path is typical of many Atlantic tropical storms. Study Florence's path in the Google Earth file (she started a little north of Dean, and moved more northeasterly into the Atlantic)

D1. At what latitude did Florence turn to the north? _____

☆ D2. Look at the Planetary Winds diagram on the previous page, and explain why Florence moved off to the northeast after crossing that latitude.

_____

_____

☆ 14. Notice the water temperatures along the Louisiana, Mississippi, Alabama, and Florida panhandle coast (around 30N, 88W) and describe **how** and **why** those water temperatures might affect a storm making landfall there.

_____

_____

_____

_____

☆ 15. Describe **how** and **why** the water temperatures along the east coast of Florida (29N, 80W) might affect the intensity of a storm moving up the coast there, or making landfall there?

_____

_____

_____

_____