



Rocky Mountain Mapping Center

Spatial Analysis of North American Hurricanes Using a Geographic Information System (GIS) - Answer Key for ArcView 8.x

Author: [Joseph J. Kerski, Geographer, USGS, jjkerski@usgs.gov, 303-202-4315](mailto:jjkerski@usgs.gov)

- 1) [The world30 layer represents a background grid.]
- 2) [brown]
- 3) [Atlantic Ocean]
- 4) [They are in the North Atlantic Ocean.
They cover the Caribbean Sea.
They cover eastern North America.
They do not affect Africa, Asia, Europe, Australia.
They can travel into the Far North.
They have beginnings and endings off Africa, Europe, South America, North Atlantic Ocean.]
- 5) [Yes, Why are they so predominant in the Northern Atlantic Ocean and nowhere else?
Why are hurricanes so numerous along the Eastern Coast of North America?]
- 6) [Hurricanes move from east to west.
Most hurricanes curve to the north as they get close to North America.
Hurricanes don't move too far across land once land is reached.]
- 7) [Storms normally move in a west to east direction.
Hurricanes move east to west.]
- 8) [Latitude and longitude.]
- 9) [24 countries.]
- 10) [4 continents.]
- 11) [North America, South America, Africa, and Europe.]
- 12) [Sorted by the YEAR column.]
- 13) [From 1851 to 2001.]
- 14) {33,917 rows.]
- 15) [Late summer and autumn.]

- 16) [No.]
- 17) [September.]
- 18) [D = Disturbance; E = Extra tropical; SD = Subtropical Depression; SS = Subtropical Storm; L = Tropical Low; TD = Tropical Depression; TS = Tropical Storm; W = Tropical Wave; H1 = Category 1 <125 km; H2 = Category 2 125-170 km; H3 = Category 3 170-225 km; H4 = Category 4 225-280 km; H5 = Category 5 >280 km.]
- 19) [H4 = Category 4 and H5 = Category 5.]
- 20) [TS = Tropical Storm]
- 21) [H5 = Category 5]
- 22) [It is the least numerous because it is the strongest. (Fortunately!) A hurricane must have the proper balance of weather conditions to grow to that level.]
- 23) [B]
- 24) [Less due to the number of segments of each hurricane]
- 25) [12 days; from Nov. 23, 2001 to Dec. 4, 2001]
- 26) [Hurricane Olga started as an "E-Extra tropical storm" on the first day. On the second day it grew to a "SS-Subtropical storm" and a "TS-Tropical storm". It remained a tropical storm till the end of the 4th day when it became a "H1-Category 1" hurricane. Remained an H1 till the end of the 7th day when it turned back to a tropical storm where it remained for 1 day. On the 9th day it decreased to a tropical depression. On the 10th and 11th days it strengthened back to a tropical storm. On the 12th day it decreased again to a tropical depression where it then dissipated.]
- 27) [Hurricanes strengthen and weaken overtime depending on weather conditions, as water temperature and outside barometric pressure.]
- 28) [92 mph on November 27, 2001]
- 29) [H1-Category 1]
- 30) [Pressure was lowest (973) when it was a H1 hurricane.]
- 31) [As the winds increase, the pressure decreases. Winds spin faster and tighter as the pressure decreases.]
- 32) [The path originated near the center of the Atlantic Ocean and meandered as it strengthened. It had a mostly Southwest direction until it veered sharply north, then a 90-degree turn to the east at the end. The closest countries were Puerto Rico, Haiti, and the Dominican Republic.]
- 33) [Hurricane Olga developed into a tropical storm strengthening almost immediately (47-63 mph). While it meandered, it strengthened to a Category 1 (75 mph). Olga lessened to almost nothing while it moved SW. When it turned sharply to the north, it strengthened again to a Subtropical storm (> 39 mph) before it dissipated.]

- 34) [The barometric pressure started as a higher pressure system (995-1001) and decreased, becoming a tropical storm, and decreased again when it became a hurricane (973-975) during it's meander. It, then, gradually strengthened until it dissipated.]
- 35) ["name" = 'Hugo']
- 36) [approximately 13 degrees N latitude; 20 degrees W longitude]
- 37) [The Gambia and Senegal]
- 38) [approximately 53 degrees N latitude; 58 degrees W longitude]
- 39) [Canada]
- 40) [Puerto Rico and the United States]
- 41) [15 days]
- 42) [September 18, 1989]
- 43) [4 days later on September 22, 1989]
- 44) [intersect]
- 45) [8 states]
- 46) [67,149,349]
- 47) [far northwest corner]
- 48) [south to north]
- 49) [southeast to northwest]
- 50) [Dominican Republic, Haiti, Cuba, United States, Canada]
- 51) [It lasted 20 days and covered an extremely large amount of area, traveling far into the interior of the United States and ended in the far north Atlantic almost to Iceland.]
- 52) [It traveled deep into the mid-western states, into Kansas, Iowa and Wisconsin; and it traveled far into the Northern Atlantic Ocean almost to Iceland.]
- 53) [20 days]
- 54) [estimated 336]
- 55) [The article stated there was a large high pressure system off the east coast of North America which sent the storm far inland to go around the blocking high.]
- 56) [Galveston, Texas]

- 57) [September 9, 1900]
- 58) ["city" = 'Galveston']
- 59) [a circle]
- 60) [A buffer is the area equidistant from the center of the selected item.]
- 61) [769 hurricane tracks]
- 62) [43 actual hurricanes; 32 are not named. Hurricanes were not named prior to August of 1952.]
- 63) [1854]
- 64) [Hurricane Allison in 2001]
- 65) [Milwaukee WI; 2 hurricanes; not many hurricanes reach as far north as Wisconsin. One of the 2 hurricanes was the Great Galveston Hurricane of 1900 (btid352)] **{Answers will vary}**
- 66) [Florida]
- 67) [intersect]
- 68) [Area]
- 69) [10 states were crossed using largehurricanes.shp.] {answer will be different using hurricanetracks.shp}
- 70) [No, using largehurricanes.shp.] {answer will be different using hurricanetracks.shp}
- 71) [Florida, with 134 large hurricanes; Yes. Florida is the most vulnerable because hurricanes can strike Florida from several directions. It is usually the first state for hurricanes to make land-fall, as hurricanes curve up from the southeast.] {number of hurricanes reaching Florida will be larger using hurricanetracks.shp}
- 72) [Hurricanes can strike Florida from several directions. Florida is usually the first state where hurricanes make land-fall.]
- 73) [**Create a map of your work.**]
- 74) [Cuba]
- 75) [Hurricane Fifi; it ended in the Pacific Ocean]
- 76) [Area]
- 77) [11 countries crossed by large hurricanes.] {answer will be different using hurricanetracks.shp}
- 78) [The United States. The United States, as a country, covers more area than do the other countries (except Canada). Canada, though larger in area than the United States, is too far north for most hurricanes to reach.]

- 79) [Cuba. Cuba is similar to Florida because hurricanes can strike it from several different directions.]
- 80) [Yes]
- 81) [The first row, with no country given, means there was incomplete data.]
- 82) [Janet - Mexico and Belize, 1955; Beulah - Mexico/Texas border, 1967; Gilbert - Mexico, 1998; Anita - Mexico, 1977; Edith - Honduras, 1971; not named - Puerto Rico, 1928; and David - Dominican Republic, 1979]
- 83) [32]
- 84) [Yucatan, it is similar to Cuba and Florida where hurricanes can strike from several directions.]
- 85) [Merida in the Yucatan; Tampico on the Gulf Coast; Chetumal in Quintana Roo; and Ciudad Victoria in Tamaulipas]
- 86) [Area]
- 87) [5] {answer will be different using hurricanetracks.shp}
- 88) [Tamaulipas, because of being on the Gulf Coast.] {answer may be different using hurricanetracks.shp}
- 89) [No] {answer may be different using hurricanetracks.shp}
- 90) [Janet in 1955, Beulah in 1967, Gilbert in 1998, and Anita in 1977]
- 91) [Honduras and Nicaragua]
- 92) [Both in Mitch's path]
- 93) [Mitch developed in the southern Caribbean Sea, meandered and strengthened rapidly in 2 days to a Category 1. In another 2 days, it became a Category 5, the strongest. It traveled through the northern countries in Central America of Honduras and Nicaragua, hooked around and entered the Gulf of Mexico through the Yucatan; traveled across southern Florida and then headed into the Atlantic Ocean. It dissipated in the northern Atlantic between Iceland and Scotland.]
- 94) [19 days]
- 95) [October 22, 1998 - November 9, 1998]
- 96) [606]
- 97) [25]
- 98) [The selected cities seem to be along the southern and western edge of the largehurricane buffer zone.]
- 99) [16]
- 100) [fewer by 9]
- 101) [20,764,164]
- 102) [In the coastal cities, build retaining walls or move buildings away from the water's edge. Build homes stronger to withstand the high winds; eliminate mobile homes.]

Increase hurricane warning times, and evacuation times.]

103) [Hurricanes can occur anytime during the year.

Hurricanes can live long lives and can travel over long distances if the proper weather conditions exist. Hurricanes mostly develop in the central Atlantic Ocean, but can also develop off the west coast of

Africa

and the Caribbean Sea.

Most are in the mild to medium intensity.

Many don't become hurricanes but remain in the tropical storm category.

Medium to strong intensity hurricanes cause much damage and can kill up to tens of thousands of people,

mostly due to high winds and heavy rain causing flooding. Can also cause tornadoes.

Which countries are prone to hurricanes can teach a person in governmental departments how to plan for

hurricanes, how to minimize damage before they strike, and how to deal with the hurricane's aftermath.]

{There may be other answers.}

104) [Using GIS to analyze hurricanes can teach a person how hurricanes behave and travel.

In this lesson, you learn how to read attribute tables and analyze the data in the tables.

You learn how to bring data from different kinds of tables together to analyze a combination of data.

You learn how to create graphs to "see" how data compares within a category.

You learn how to work with point, line, and polygon data, and how to create buffers around points and lines.]

{There may be other answers.}

[Back to USGS Rocky Mountain Mapping Center Education](#)

[U.S. Department of the Interior](#)

[U.S. Geological Survey](#)

[Rocky Mountain Mapping Center](#)

Maintainer: webmaster@rockyweb.cr.usgs.gov

URL: http://rockyweb.cr.usgs.gov/public/outreach/gislessons/hurricaneslesson_8_key.html

Last modified: 7 September 2004