USGS
science for a changing world

Hurricane Map

Data Visualization Analysis Teacher Guide

Background

Hurricanes are classified into five categories based on their intensity, maximum sustained wind speeds and damaging powers. The classification system is called the Saffir-Simpson Hurricane Wind Scale. The categories are as follows:

Category 1: Very dangerous winds that will produce some damage. Sustained 74-95 mph winds.

Category 2: Extremely dangerous winds will cause extensive damage. Sustained 96-100 mph winds.

Category 3: Devastating damage will occur. Sustained 111-129 mph winds.

Category 4: Catastrophic damage will occur. Sustained 130-156 mph winds.

Category 5: Catastrophic damage will occur. Sustained winds over 157 mph.

Hurricane intensity changes due to interactions between the storm and its environment. Environmental factors that can impact hurricane intensity are location and geography, dry air intrusion, wind shear, and ocean temperature. As hurricanes encounter land, they lose intensity because they are losing their primary source of fuel, warm ocean water. An influx of dry air can weaken a hurricane or prevent it from intensifying. High wind shear can disrupt the structure of the hurricane causing it to weaken. Hurricanes are powered by heat from the oceans. Warm sea surface temperatures provide more moisture and energy for a hurricane which leads to stronger winds and more intense rainfall.
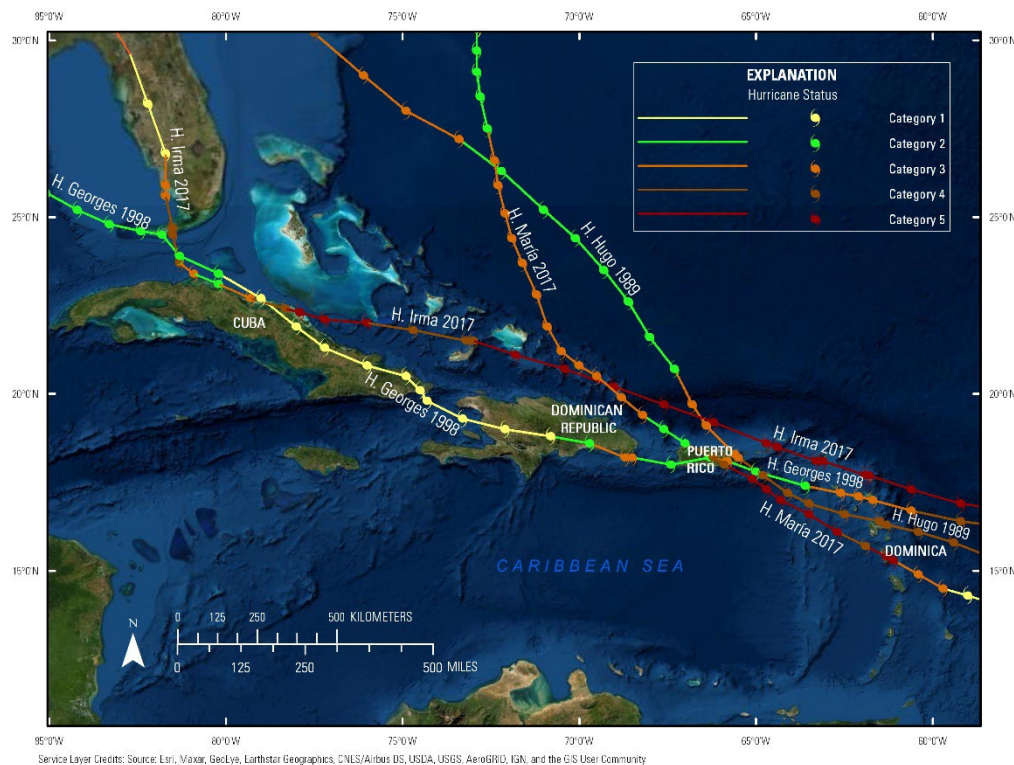
Observe

1. What do you notice about this visualization? Record 3 observations. Consider axes, title, type of visualization (line graph, bar chart, map, bubble chart, or other), time, etc.

- *There isn't a title*
- *The paths of four different hurricanes are shown—Hugo (1989), Georges (1998), Irma (2017), Maria (2017)*
- *The key shows five different categories for hurricanes*
- *Each hurricane category is a different color*
- *Latitude and longitude are shown on the outside edges of the map: 10 to 30 degrees north for latitude and approximately 60 to 85 degrees west for longitude.*
- *There is a distance scale in kilometers and miles*
- *All hurricane paths have multiple colors*
- *The location is the Caribbean Sea*
- *The islands shown and labelled are Puerto Rico, the Dominican Republic, Dominica, and Cuba.*

Analyze

1. List the variables in the visualization.

- *There are no variables in the visualization*

2. A relationship between variables exists when one influences the other. Do you notice a relationship between any of the variables in the visualization? If so, describe the relationship you observe.
- *The hurricanes that occurred in 2017 (Irma and Maria) reached category 5 whereas the 1989 and 1998 hurricanes, Hugo and Georges, did not go above category 4.*

Interpret

1. What trends or patterns do you notice in the data? In 1 -2 sentences, summarize the main takeaway of this visualization.

The hurricanes vary in intensity along their path. The storms shown that occurred in 2017 had a higher intensity than the storms that occurred in 1989 and 1998.

2. If you had to explain this to an adult, what would you tell them in 2 – 3 sentences?

The hurricanes shown were more intense in 2017 than they were in 1989 and 1998.

Connect

1. How does this visualization connect to your world?

Answers will vary. Consider the following:

- *Hurricanes have continued to intensify due to climate change and have been causing more catastrophic damage. Depending on your location, the community may have been impacted by a hurricane.*

2. How does this connect to what we are learning about in class right now?

Answers will vary