

Exploratory Data Visualization CMSC 471

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Webapp Link: [Storms Webapp \(markojungo.github.io\)](https://markojungo.github.io/StormsWebapp)

Youtube demo link: <https://youtu.be/D9pKra3hTp0>

Task: Are there any trends between storms of different intensities over time?

Sub Tasks:

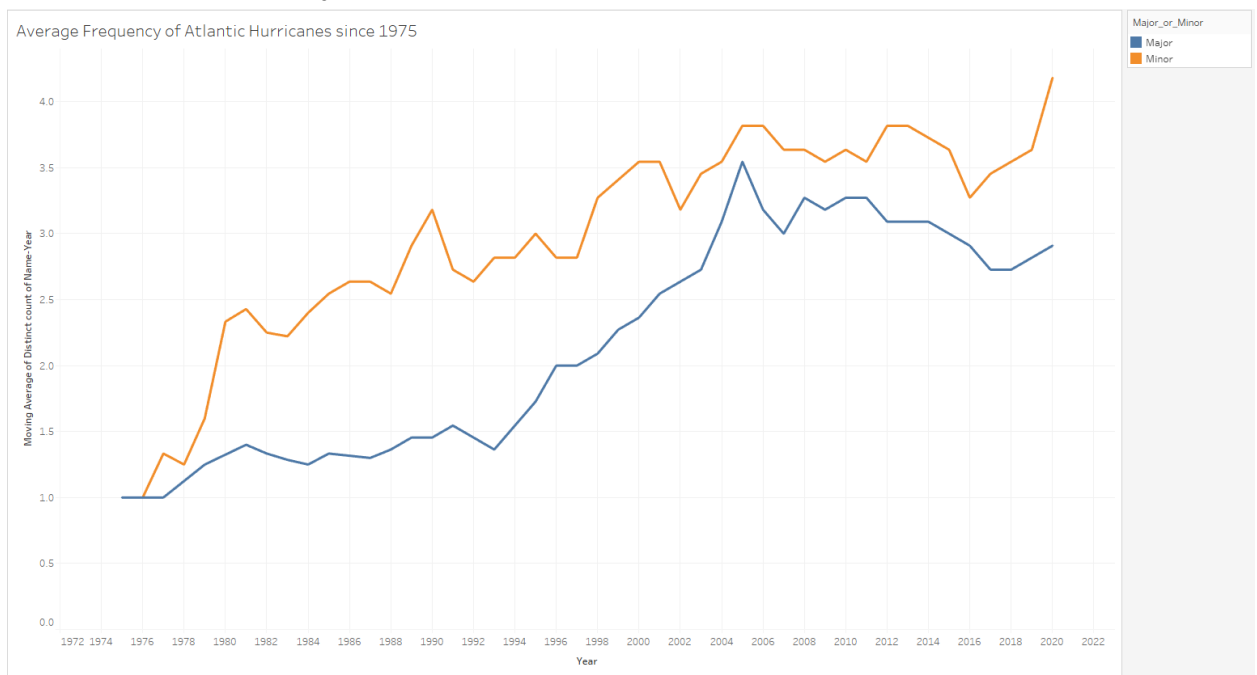
1. Has the frequency of storms with different severities changed between 1975 and 2020?

Actions:

1. Uniquely identify each storm using its name and year
2. Find the maximum category each storm reaches
3. Classify storms into major (reaches at least category 4), minor (reaches at most category 3), or none (never a hurricane)
4. Create a line plot of hurricane count over time
5. Color by major or minor

Findings:

- Storms became more frequent from 1975-2022
- This holds for major and minor hurricanes



2. When in the year are storms of each category most common?

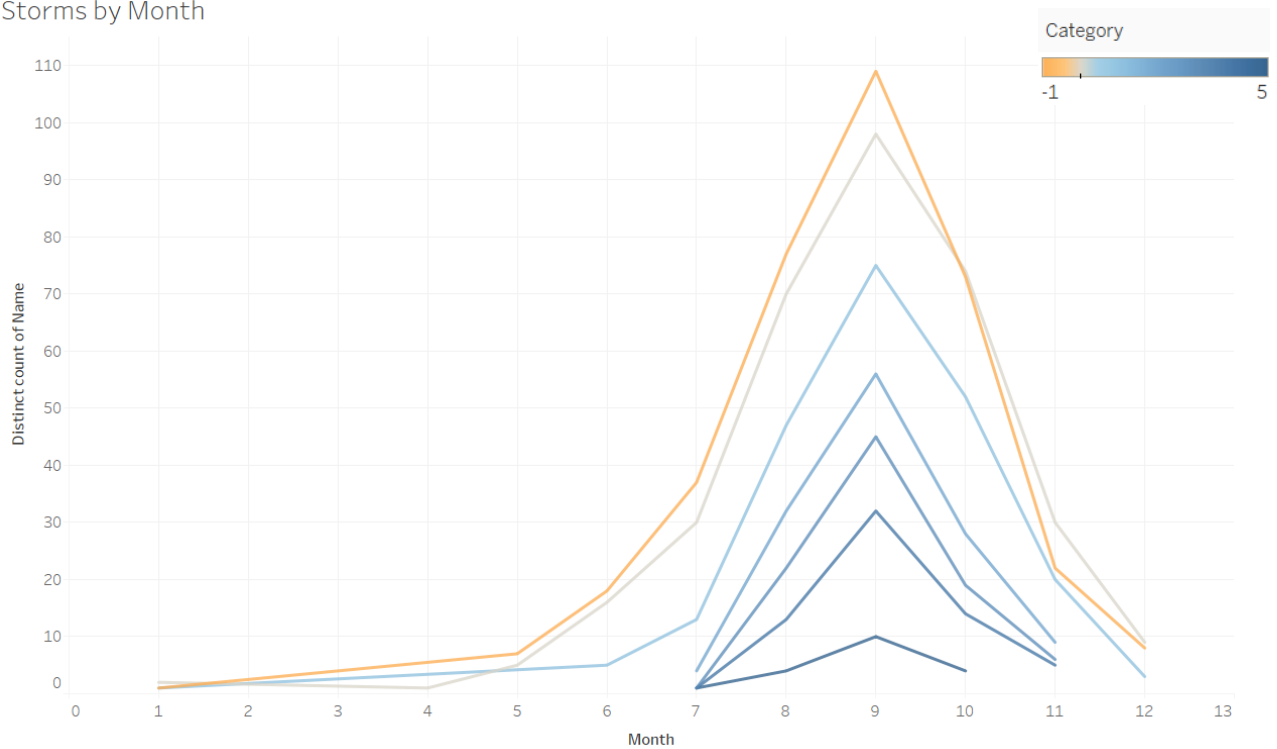
Actions:

1. Plot Month vs count of distinct storms
2. Color by category

Findings:

- Storms are most common in September
- This is true for all categories
- Lower category storms are more common in every month
- There is no noticeable difference in time of year between categories

Storms by Month



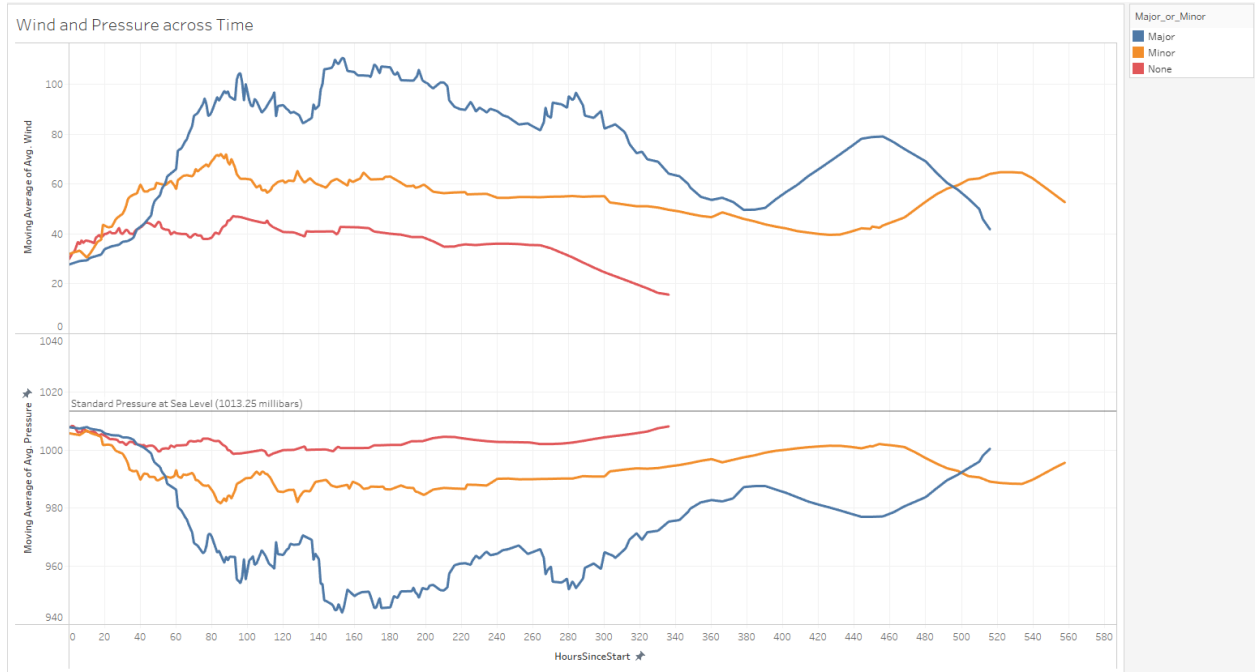
3. How do wind and pressure change over the lifetime of a storm?

Actions:

1. Calculate hours elapsed since start of storm at each timestamp
2. Plot elapsed hours vs average wind speed
3. Plot elapsed hours vs average pressure
4. Switch to moving averages to smooth noise
5. Color by category (major, minor, or none as calculated earlier)

Findings:

- Major storms reach the highest wind speed and lowest pressure
- Storms tend to pick up intensity rapidly for a few days and then slow down over a long time period



4. How do storms move over time, and how does land affect this?
Is there a relationship between Pressure, Wind Speed, or Size

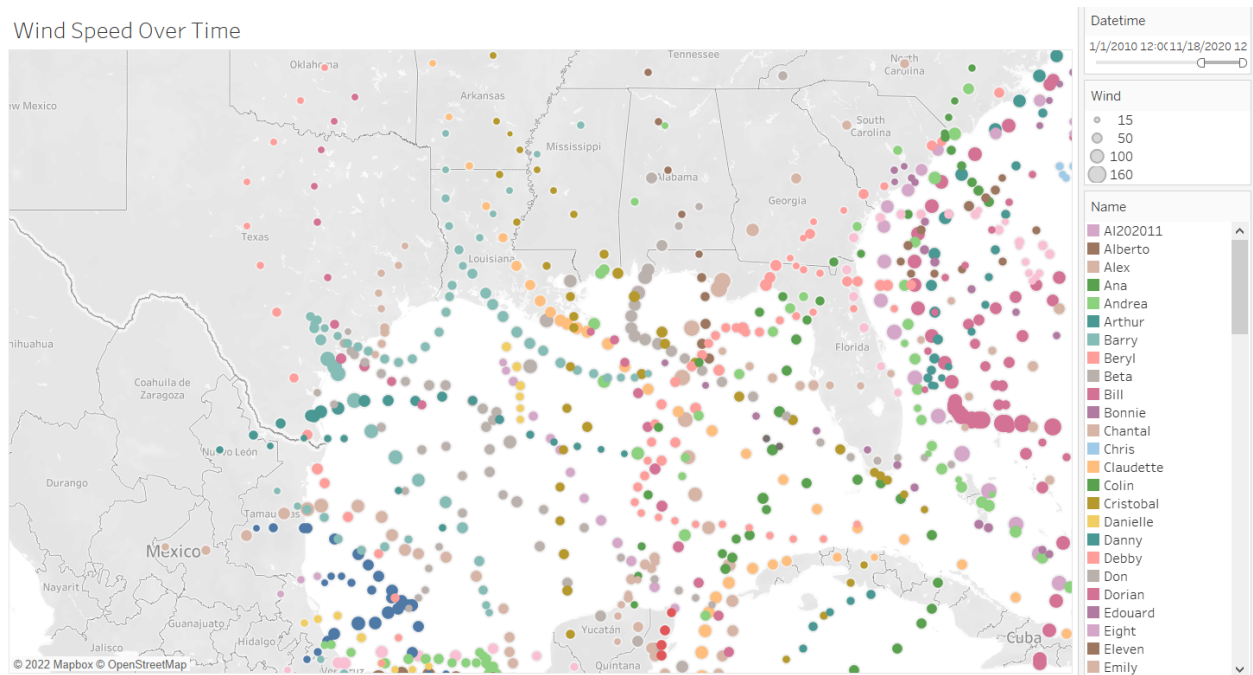
Actions:

1. Create a map of all storms
2. Color dots by storm name
3. Map dot size to wind speed
4. Filter to only storms since 2010 to reduce clutter

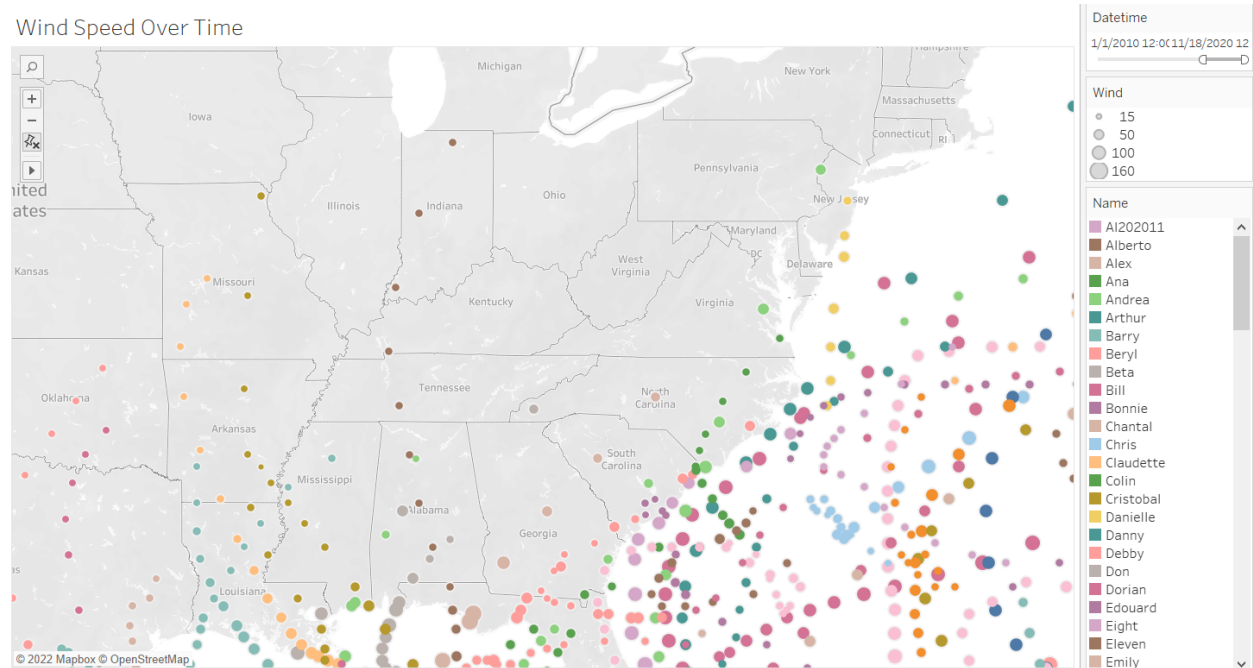
Findings:

- Storms tend to move north (the screenshots don't show direction, but hovering over the dots reveals that the storms move north over time)
- Storms tend to calm down and then disappear when they make landfall
- Storms that stay in the sea for longer maintain their wind speed for longer

Wind Speed Over Time



Wind Speed Over Time



Insights:

1. Storms have gotten more common since 1975
2. Storms are most common in September
3. Storms rapidly grow in intensity before slowly losing intensity
4. Storms tend to fall in intensity or die after making landfall

Story: We will track Atlantic Storms across various levels of time

Video:

Github: <https://markojungo.github.io/storms-webapp/>