Our project features an interactive dashboard of 3 connected visualizations: a map of hurricane tracks across the Atlantic ocean, a histogram of storm counts over a selected time period, and a second histogram featuring the distribution of storm categories.

The aim of this visualization was to allow users to explore patterns in these Atlantic storms over the time period of 1950 to 2015.

This interface and the dataset behind it could be used by climate researchers who will be able to better understand trends in frequency and storm category over time and location, which will inform policy makers in preparing community infrastructure.

Additionally, giving the general public more knowledge about the variety of Atlantic hurricanes can inform them about their risks while being entertaining.

The visualizations in this project were accomplished using a combination of Javascript and d3, python, and HTML. The Atlantic ocean hurricane data used was sourced from NOAA (the National Oceanic and Atmospheric Administration)

Our data visualization interface features 3 main elements, along with an interactive dashboard: a spatial map of hurricane tracks, a histogram of storm occurrence over time, and a histogram of storm category occurrence.

The main element in our interface is the map of hurricane tracks in the Atlantic ocean. By positioning the larger map in the front of the screen, the user’s attention will be drawn to it first.

This is important because the lower charts serve to further contextualize the larger map, therefore using visual hierarchy to provide a flow to the interface.

The map was chosen because geographic patterns are an essential part of atmospheric science. The ability to hover over a given track and get information about the name of the storm and its parameters adds a microscopic view to the macroscopic visualization.

Being able to zoom in on an individual storm will also make the visual interface seem less cluttered, by forcing the user to focus.

Additionally, the intensity of categorized hurricanes was color coded from yellow, orange, red TO purples. By transitioning from warmer/pastel to cooler/darker tones as intensity increases, the user is able to separate and make note of the different categories visually, both on the larger map and the smaller supporting charts.

Using color to distinguish between categories is important when the dataset is this large, because the lines in the graphic have the potential to look cluttered.

When looking at geographic patterns on the large map, it is clear that most storms originate off the African and Caribbean coast.

Those emerging from the African coast will commonly follow a straight path westward, then begin to curve northward as they approach the coast or after making landfall.

Notably, a significant amount never make landfall on the North American coast and instead veer further northward.

However, this does not hold true nearly as much when filtering for only Category 5 storms, suggesting that more powerful storms are more likely to make landfall.

The two supporting histograms were created to fill holes in understanding left by the spatial data. On the bottom left, we displayed a histogram of storm occurrences per year indicated by the interactive interval.

Trends such as occurrence over time cannot easily be visualized on the larger map, but provide important information about outlier years and the average behavior of hurricanes over a climate norm.

As apparent when looking at the lower left histogram, 2005 was the most active year for hurricanes. Also visible on the lower right histogram is the lack of a consistent temporal trend for hurricane activity, reflecting the complexity of global climate systems.

On the bottom right, occurrences of storms per storm category were plotted, considering the total number of storms over the user entered time interval.

This displays important trends in storm intensity, which are less emphasized on the map due to the number of tracks displayed.

When looking at the distribution of categories, some trends remain apparent.

Most storms are weak and uncategorized, and C5 storms are relatively common compared to the other categories.

The ability of the user to customize the interface is important because it gives time to explore the big picture before attempting to find trends over a smaller interval.

The use of progressive disclosure is important here when considering complex atmospheric datasets, because of how many parameters affect any given trend in weather. Additionally, using live sliders makes the experience cleaner for the user.

In conclusion, the main strengths of this visualization are the ease of access in exploring temporal trends and a multi-faceted view of any given time interval from 1950 to 2013.

The interactive panel is designed to be easy to operate, and the overall structure and look of the design is clean and simple. This simplicity is important to help the user focus on the dense information presented in the spatial trends and histogram.

Drawbacks to this design include the potentially cluttered look of the tracks, and the sparse and potentially inaccurate data for time periods around the 1950s.

User interface implementations such as focusing on a single track and color coding storm categories provide solutions to the first issue, and additional datasets could be found for future work.

Future work on this dataset could also focus on displaying more information about the trends in storms.

Possible features to accomplish this goal include animation over time, comparison between Atlantic and Pacific cyclone storm trends, and overlaying a sea surface temperature marker on hurricane tracks

Accessibility features such as screen reader support, text description for images, and keyboard navigation should also be implemented in future work