

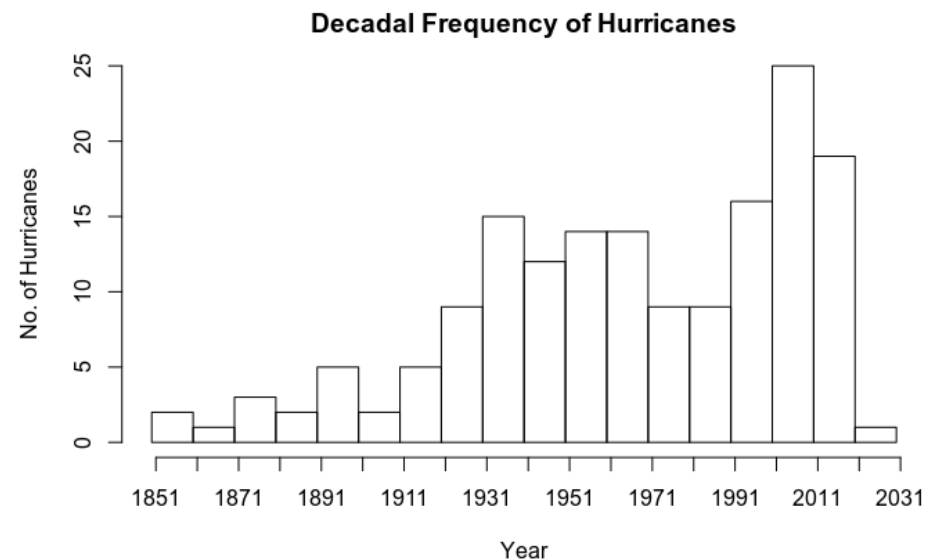
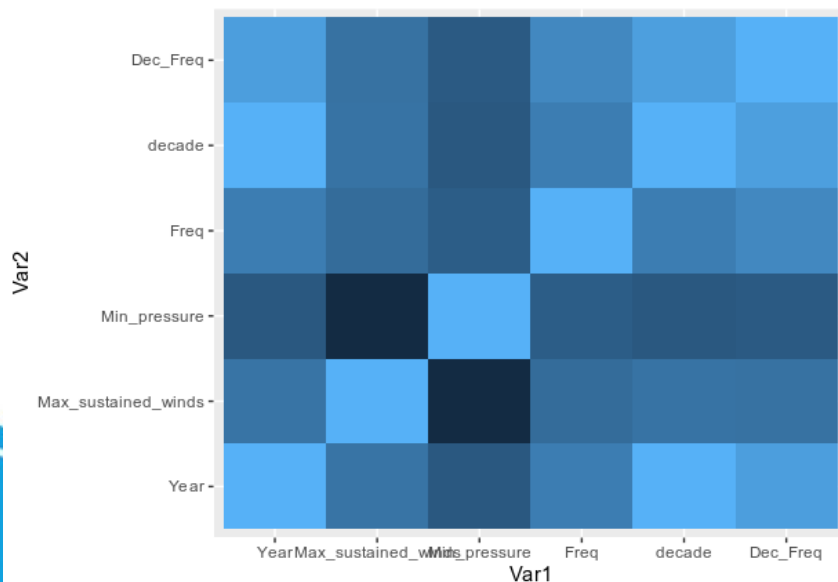
Exploratory Data Analysis (EDA) of Class 4 and 5 Atlantic Hurricanes from 1853 to 2021

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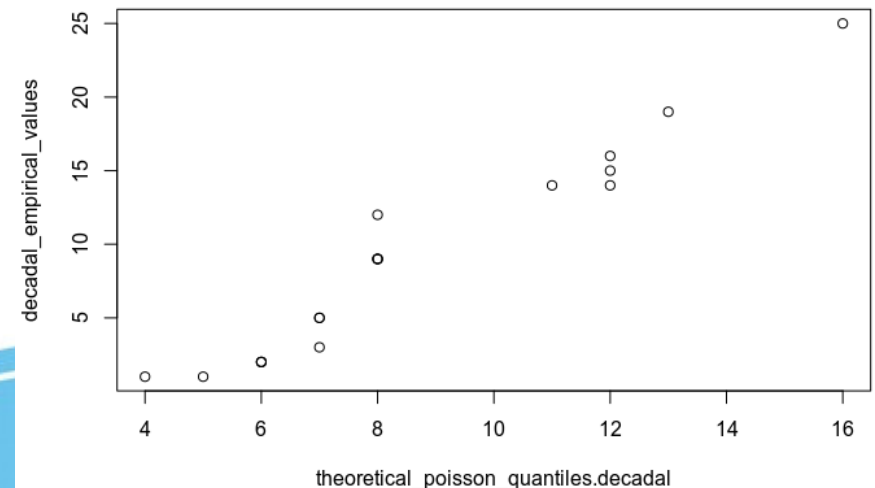
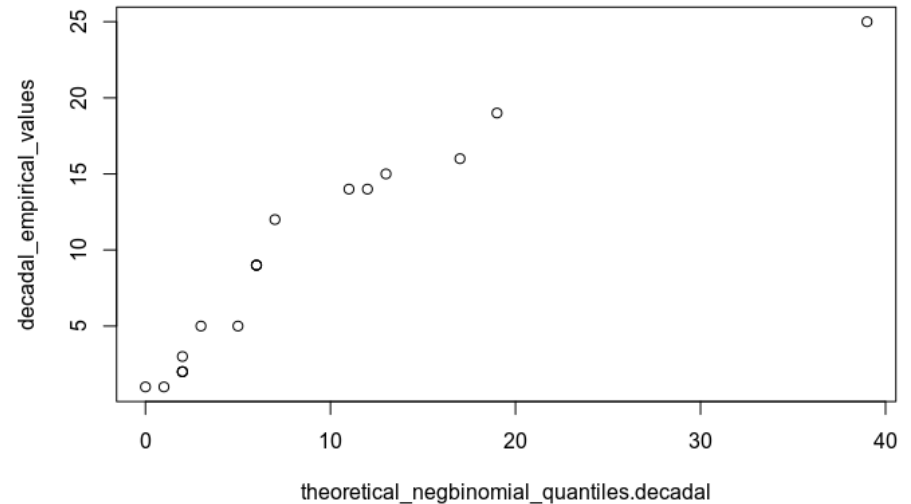
Initial Observations

- The frequency of hurricanes has shown an upward trend over the decades (refer histogram below)
- The largest number of hurricanes (25) were observed in the decade 2001-2010
- The highest maximum wind speed (305 km/h) sustained was by Hurricane Allen
- The minimum pressure in a hurricane was 882 mbar
- The highest number of hurricanes observed in a year was 5
- Minimum pressure and maximum wind speed have a highly negative correlation index (-0.83) (refer heatmap below)




Distribution Analysis

- Based upon qq-plots of our empirical values of decadal hurricane frequency distribution, we surmise that the probability distributions that best fit the probability distribution of the occurrence of hurricanes (on a per decade basis) are:
 - Negative Binomial Distribution
 - Poisson Distribution
- Other distribution we tried to fit were:
 - Normal
 - Logistic
 - Geometric
 - Exponential
 - Cauchy

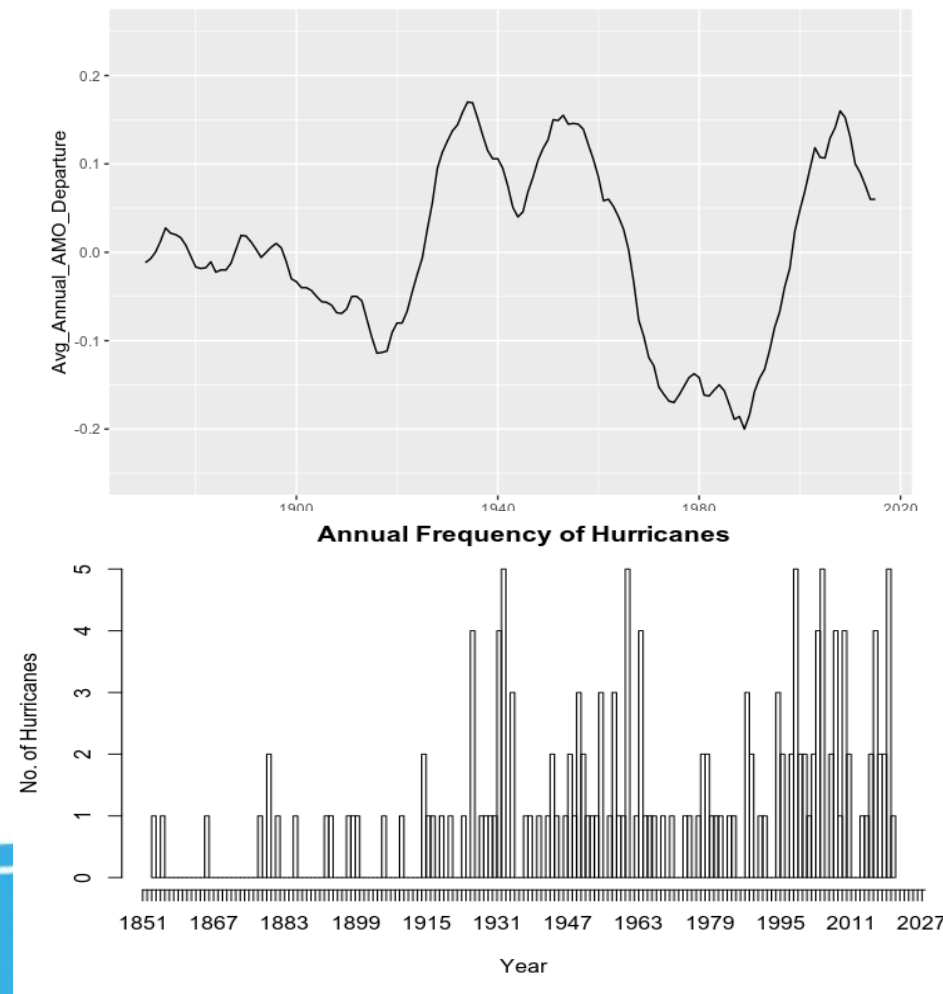


Atlantic Multidecadal Oscillation (AMO)

- Definition: The theorized variability of the sea surface temperature (SST) of the North Atlantic Ocean on the timescale of several decades
 - As per scientific study, the oscillation has an estimated period of 60-80 years
 - There is an attribution of variation of SST to hurricane development in tropical Atlantic areas
 - AMO is also purportedly connected with shifts in hurricane activity and intensity
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Comparison with Atlantic Multidecadal Oscillation (AMO) Index

- It appears that periods of negative AMO departures are correlated with lesser occurrences of hurricanes while periods of positive AMO departures are correlated with larger numbers of hurricanes



References

- Dataset from
 - https://en.wikipedia.org/wiki/List_of_Category_4_Atlantic_hurricanes
 - https://en.wikipedia.org/wiki/List_of_Category_5_Atlantic_hurricanes
- AMO Data from
 - https://climatedataguide.ucar.edu/sites/default/files/amo_monthly.10yrLP.txt
- <https://climatedataguide.ucar.edu/climate-data/atlantic-multi-decadal-oscillation-amo>
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