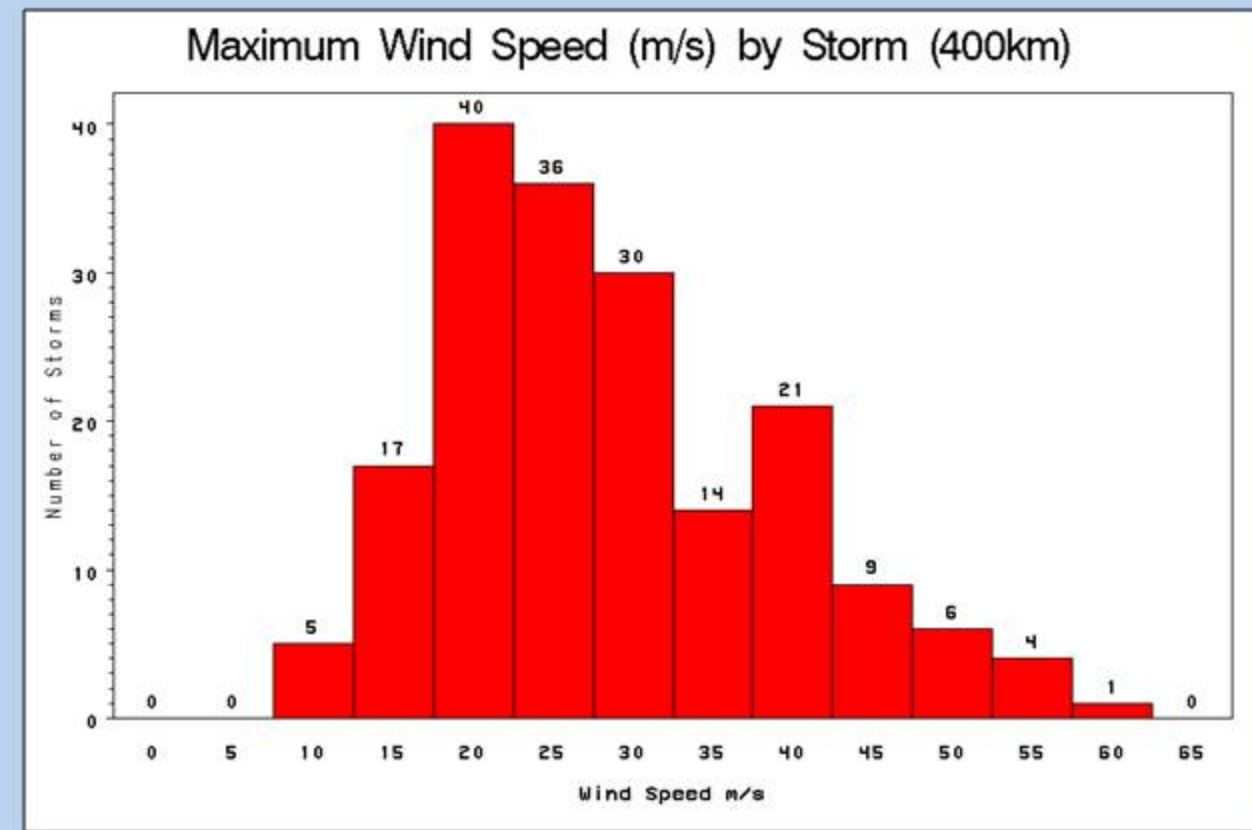
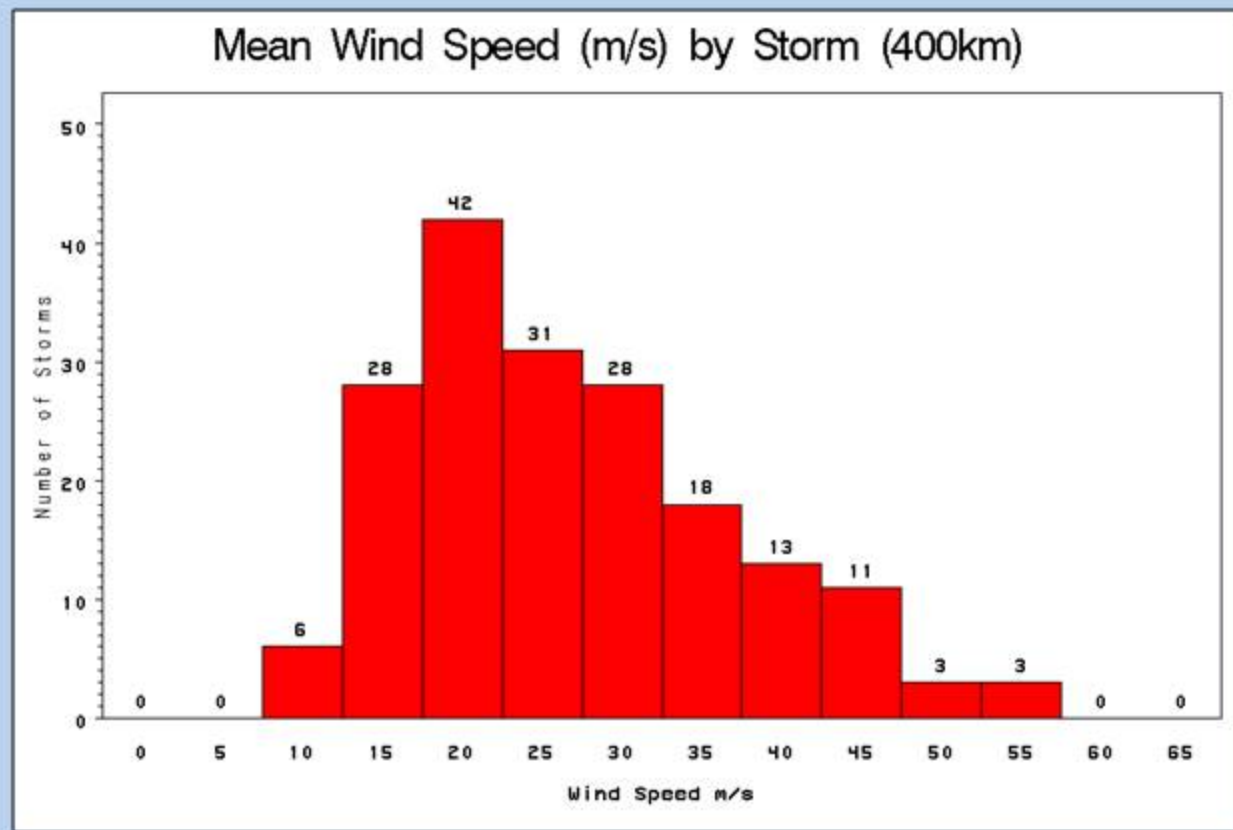


Determining the Likelihood of an Intense Hurricane in New York City

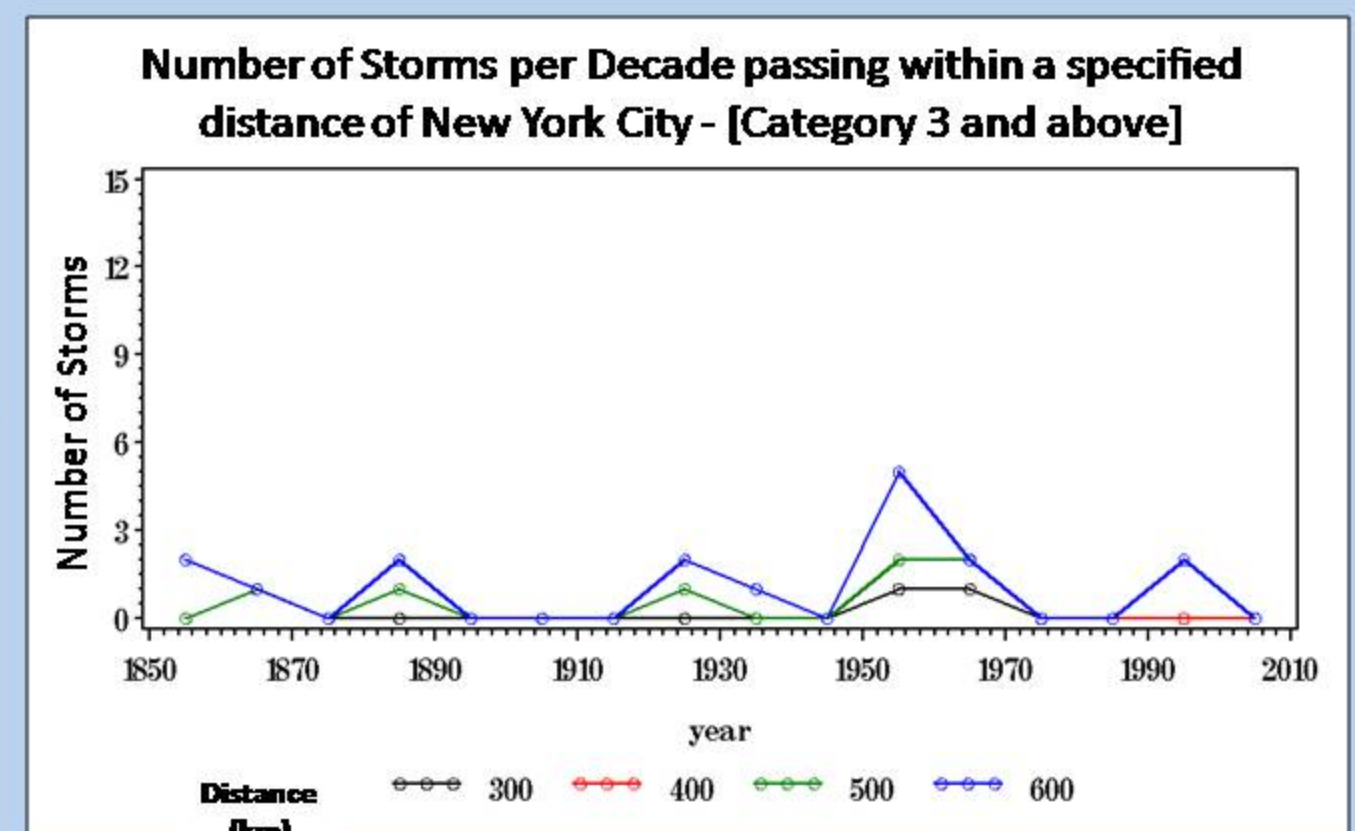
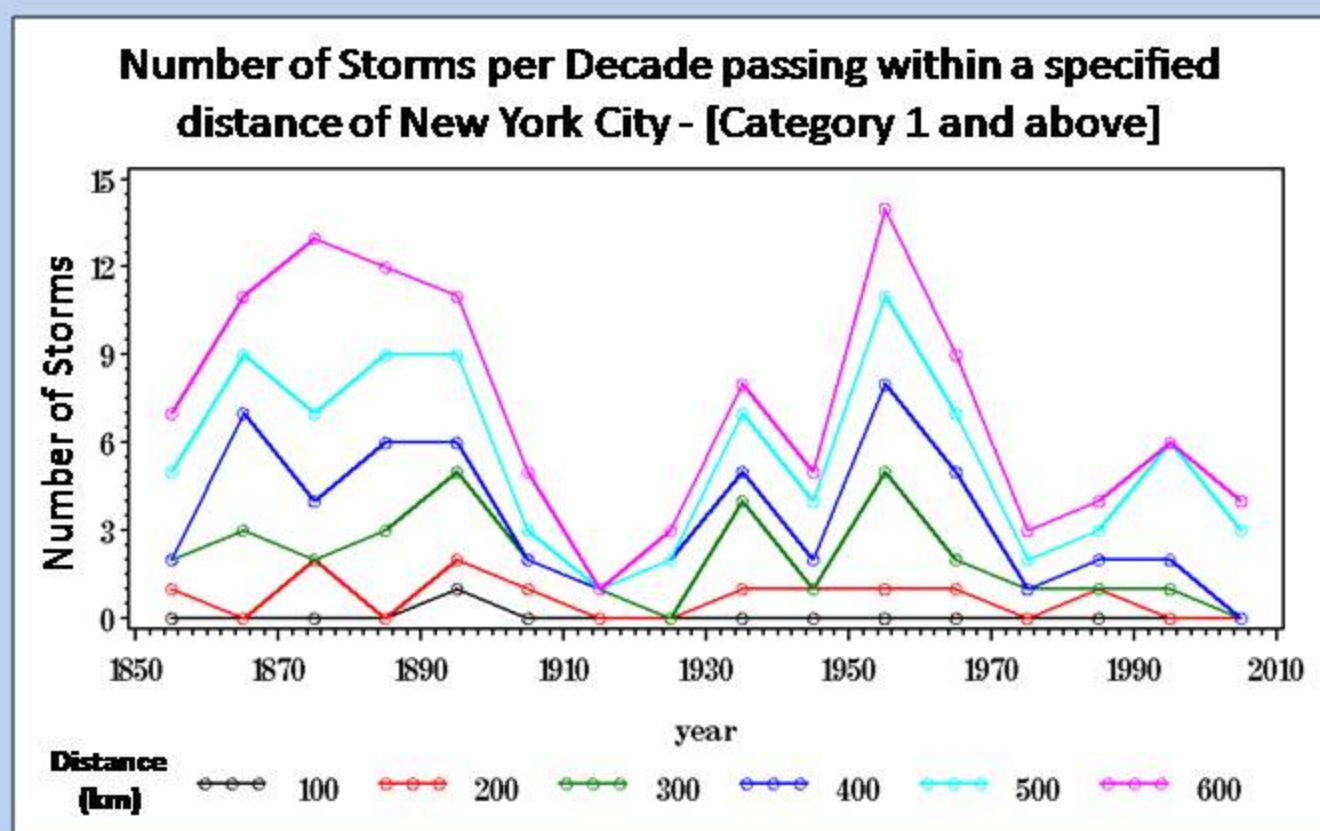
Presented by:
Alexander J Sonneborn

Faculty Advisors:
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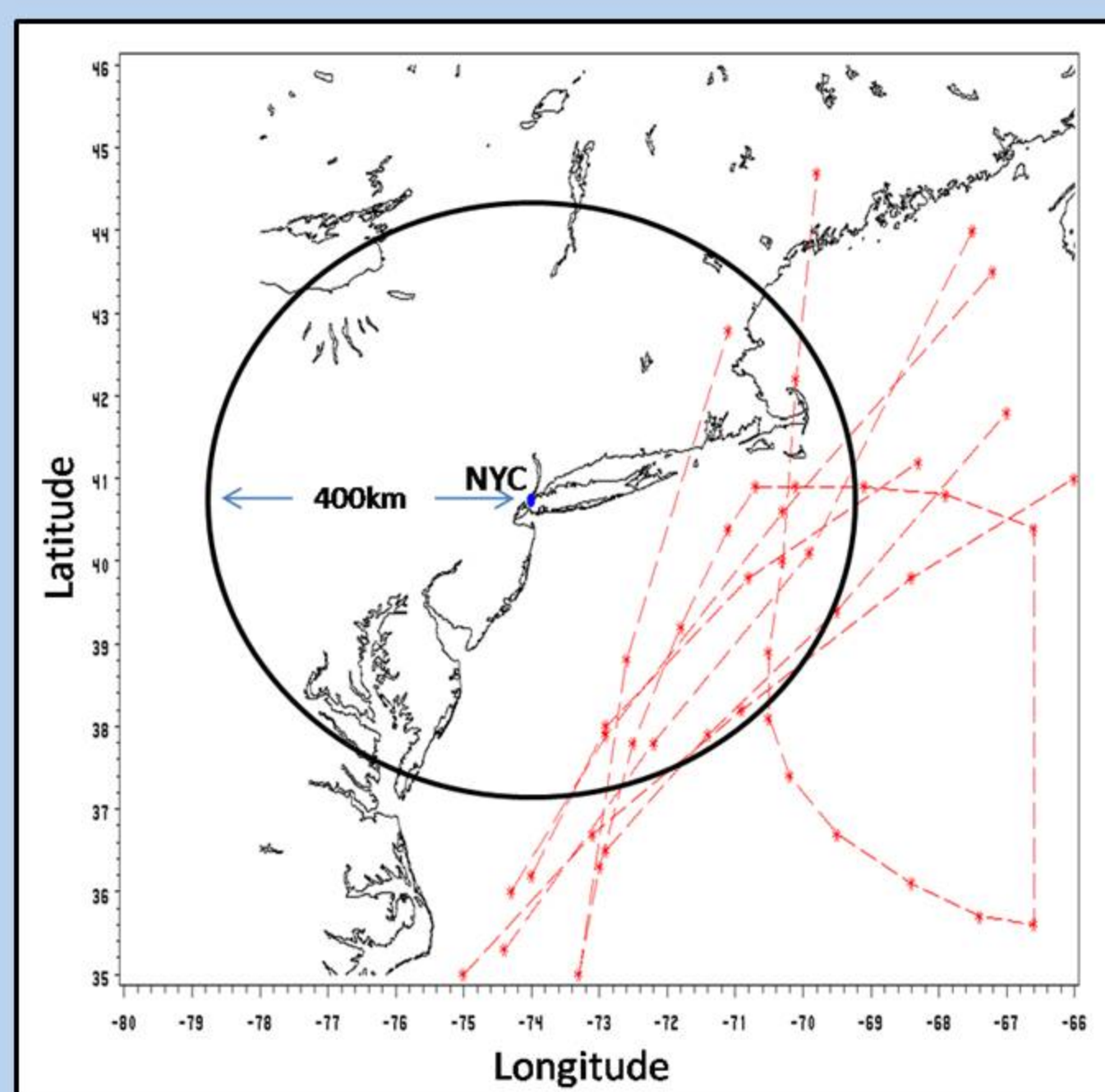
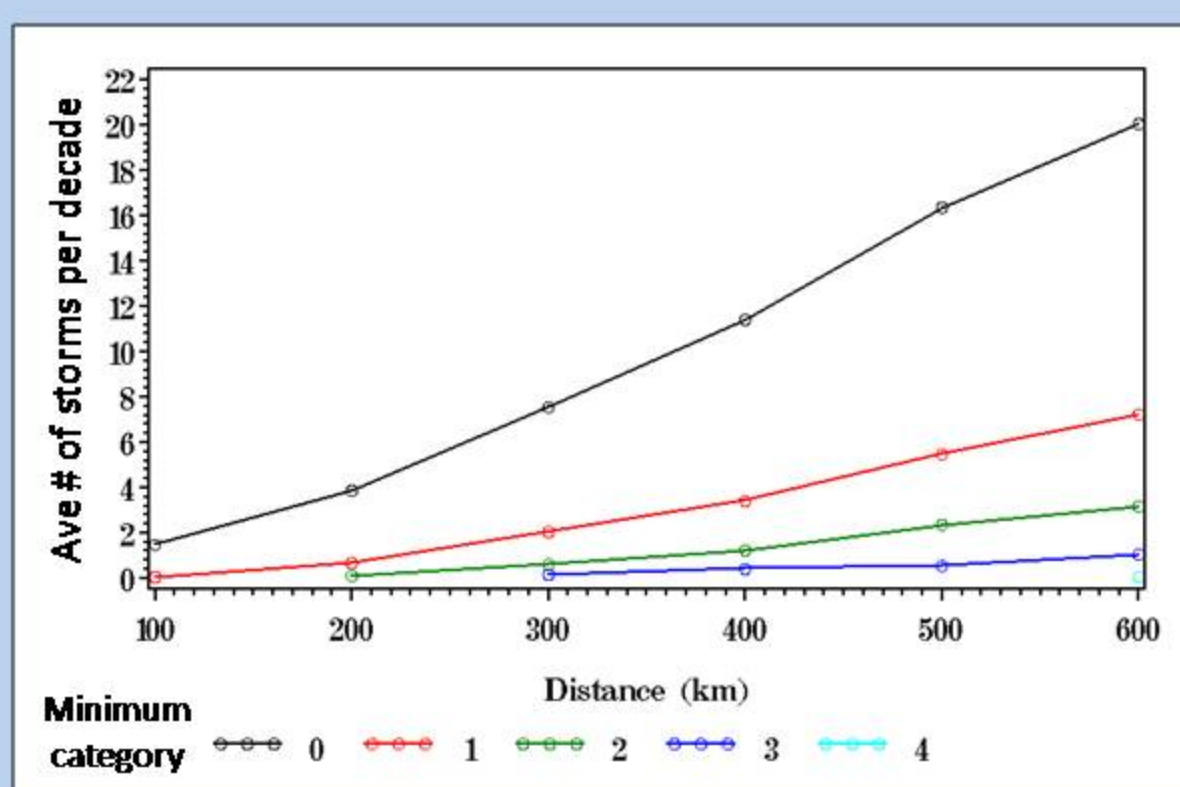
Objective: to model rare events, specifically category 3, 4, and 5 hurricanes, in the New York City area using 157 years of data



Summary data histograms for all recorded storms coming within 400km of Manhattan, New York. Similar histograms were created for radius lengths of 200km and 600km.



The above graphs illustrate the problems inherent in making likelihood predictions based on available data. Within each graph we see that the number of data points increases as the cutoff distance increases. However, this may lead to decreased representativeness, as points far away may have different risks of intense hurricanes. The differences between the graphs reveal that increasing the intensity cutoff also decreases the number of data points.



Average number of storms per decade exceeding a given intensity threshold passing within a specified radius of New York City, as a function of radius. If the density of storm tracks were uniform, we would expect a quadratic relationship.

Next Steps:

- analyze the data using *out-of-sample likelihood maximization* (also known as 'jackknifing') and *Poisson regression*
- use identical statistical analysis techniques on large data sets created using Monte Carlo simulations