University of California Davis
Department of Statistics

Practice in Statistical Data Science (STA-160)

Analysis on the Effect of Atlantic Hurricanes on the US Airport Network

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1 Introduction

Atlantic hurricanes are tropical cyclones that form in the Atlantic Ocean between the months of June to November every year. These natural weather formations come in varying intensities and can lead to billion of dollars worth of damage to buildings and properties. The main goals of our project involve examining the effect of hurricanes falling into (3,4,5) categories of the Saffir-Simpson Hurricane Wind Scale on the US airport network through changes in flight cancellations and delays corresponding to changes in the weather and geographical distance away from the center of the hurricane. The hurricanes we examined study in depth were Sandy (2012, Class: 3), Ike (2008, Class 4), and Katrina (2005, Class: 5).

2 Description of Data

2.1 Data Preprocessing

For our project, we used data from three sources.

1. Bureau of Transportation Statistics (BTS) (Airline On-Time Performance Data)
2. National Oceanic and Atmospheric Administration (NOAA) (IBTrACS-WMO Data)
3. OpenFlights (airports.dat)

BTS data was used to get on-time performance of each flight. OpenFlights was used to get the longitude and latitude of each airport as well as the UTC offset. NOAA was used to get hurricane information. The NOAA storm information is given at every 6 hour intervals.

The primary cleaning task we performed was standardizing the departure time in BTS, which was presented as local time to the region, to UTC time with the help of OpenFlights. Then we computed the distance of the origin and destination coordinate to the center of the storm. Afterwards, we merged BTS and OpenFlights on origin and destination coordinates. Then we cut the departure time into the same 6 hour intervals as the NOAA storm data to do the final merge.

3 Method

4 Conclusion