P8160 - Project 3
Baysian modeling of hurrican trajectories

Group 6

Amy Pitts, Jiacheng Wu, Jimmy Kelliher, Ruiqi Yan & Tianchuan Gao

2022-05-09

Abstract

abstract

1. Introduction

1.1. Background

1.2. Objectives

2. Methods

2.1. Data Cleaning and Exploratory Analysis

There are 702 unique hurricanes in this dataset all the occurred in the north american region between the years 1950 to 2013. Data on the storm's location (longitude & latitude) and maximum wind speed were recorded every 6 hours. The number of observations we have for each storm range from 1 to 118 with a mean value of 31 observations per hurricane. Data is also collected on the storms month, and the nature of the hurricane; (Extra Tropical (ET), Disturbance (DS), Not Rated (NR), Sub Tropical (SS), and Tropical Storm (TS)).

To conduct our analysis we require at least 7 observations for each unique hurricane. In addition, we are only concerned about observations that occurred on 6 hour intervals. The dataset includes a couple observations between the 6 hour time periods. For our analysis we are only going to include observations that are recorded on hour 0, 6, 12, and 18. In addition we will exclude all hurricane IDs that have less then 7 observations. Through this process we remove 460 observations so we are left with 21578 observations and 681 unique hurricanes.

Table 1: Data Characteristics shown by the Nature of the Hurricane variable

Characteristic	**Overall**, N = 21,578	**DS**, N = 963	**ET**, N = 2,149	**NR**, N = 96	**SS**, N = 750	**TS**, N = 17,620
Wind.kt	45 (30, 65)	25 (20, 30)	40 (30, 50)	25 (20, 25)	40 (30, 50)	50 (35, 70)
Latitude	26 (19, 34)	24 (17, 31)	44 (38, 50)	18 (14, 22)	32 (30, 36)	25 (18, 31)
Longitude	-64 (-78, -48)	-65 (-81, -45)	-46 (-62, -28)	-64 (-69, -55)	-65 (-74, -51)	-65 (-80, -51)
Month						
January	69 (0.3%)	5 (0.5%)	0 (0%)	0 (0%)	19 (2.5%)	45 (0.3%)
February	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
March	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
April	53 (0.2%)	0 (0%)	23 (1.1%)	0 (0%)	17 (2.3%)	13 (<0.1%)
May	274 (1.3%)	38 (3.9%)	18 (0.8%)	0 (0%)	57 (7.6%)	161 (0.9%)
June	795 (3.7%)	34 (3.5%)	113 (5.3%)	0 (0%)	58 (7.7%)	590 (3.3%)
July	1,478 (6.8%)	95 (9.9%)	103 (4.8%)	19 (20%)	41 (5.5%)	1,220 (6.9%)
August	5,101 (24%)	290 (30%)	319 (15%)	14 (15%)	108 (14%)	4,370 (25%)
September	8,810 (41%)	249 (26%)	854 (40%)	39 (41%)	160 (21%)	7,508 (43%)
October	3,717 (17%)	163 (17%)	547 (25%)	11 (11%)	146 (19%)	2,850 (16%)
November	1,047 (4.9%)	58 (6.0%)	158 (7.4%)	13 (14%)	86 (11%)	732 (4.2%)
December	234 (1.1%)	31 (3.2%)	14 (0.7%)	0 (0%)	58 (7.7%)	131 (0.7%)

Standardization

3. Results

4. Discussion

4.1. Summary of Findings

4.2. Limitations

4.3 Future Work

4.4. Group Contributions

References

[1] one

[2] two

Appendices