Predicting the Hurricane Probability of 2010 In the Gulf Coast of the United States

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Abstract: Prediction of probability hurricane probability in 2010 along the Gulf Coast of the United States was represented by using the Bayesian analysis and Poisson distribution based on the data collected over the past 159 years. The annual average hurricane per year in the Gulf Coast of the United States was 1.2.

1. Introduction

The Gulf Coast of the United States, sometimes referred to as the Gulf South, South Coast, or 3rd Coast, comprises the coasts of American states includes Texas, Louisiana, Mississippi, Alabama, and west coast of Florida. This includes 1,631 miles of coast line and a population over 20 million(U.S. Census Bureau and W&PE, Inc.) From 1851 to 2009, there have been 191 hurricanes passed through the Gulf States, and 28.3% of them reached Texas (Table 1).

Table 1. Number of Hurricane in each state along the Gulf Coast of the United States (1851-2009)

Gulf States	Number of Hurricane	Percentage	Coast Line	Percentage
Texas	54	28.27%	367	22.5%
Florida (West coast)	81	42.41%	770	47.2%
Louisiana	42	21.99%	397	24.3%
Mississippi	8	4.19%	44	2.7%
Alabama	6	3.14%	53	3.2%
Total	191	100.00%	1631	100.0%

2. Objectives

The Objective of this study was to predict the probability of hurricane in 2010 in Gulf Coast of the United States.

3. Analyses

For Frequency of Hurricane per year, $f(h)=\exp(-\lambda)x\lambda^h/h!$; (h=0,1,2,…), where h is the number of hurricane per year, λ is the expected number of hurricanes during a year. By analyzing 159 data (1851-2009) from NOAA, the parameter λ for the Gulf Coast of the United States was 1.2. It means the probability for hurricane in the Gulf Coast of the United States is 1.2 each year.

The probability of h hurricanes occurring in T years is, $f(h|\ \lambda, T)=\exp(-\lambda T)x(\lambda T)^h/h!$; (h=0,1,2,…), prediction of hurricane probability in 2010 is based on different year cycle (T = 1,2,... ,10) simulation and calculation.

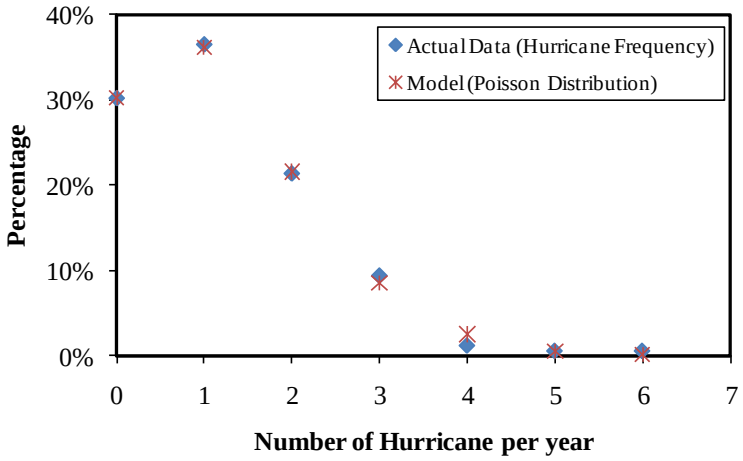

Figure 1. Hurricane Frequency along the Gulf Coast of the United States

Table 2. Hurricane Prediction for 2010 along the Gulf Coast of the United States

	Number of Hurricane											
Cycle	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
1 yr	30.26%	36.17%	21.62%	8.61%	2.57%	0.62%	0.12%					**100%**
2 yr	8.91%	21.54%	26.05%	20.99%	12.69%	6.14%	2.47%	0.85%	0.26%	0.07%	0.02%	**100%**
3 yr	53.71%	18.88%	13.21%	7.70%	3.85%	1.68%	0.65%	0.23%	0.07%	0.02%		**100%**
4 yr	50.41%	17.32%	13.42%	8.92%	5.18%	2.68%	1.24%	0.53%	0.20%	0.07%	0.02%	**100%**
5 yr	31.18%	16.53%	16.02%	13.30%	9.67%	6.24%	3.63%	1.92%	0.93%	0.42%	0.17%	**100%**
6 yr	81.90%	7.52%	4.88%	2.90%	1.59%	0.81%	0.39%					**100%**
7 yr	92.66%	3.78%	2.28%	1.28%								**100%**
8 yr	90.32%	4.33%	2.77%	1.65%	0.93%							**100%**
9 yr	88.79%	4.79%	3.20%	2.02%	1.20%							**100%**
10 yr	75.61%	7.83%	6.03%	4.38%	3.00%	1.95%	1.20%					**100%**

4. Conclusions

The frequency of hurricanes in Gulf Coast of the United States is 1.2 per year. There is higher probability of 0 to 2 hurricanes in Gulf Coast of the United States in 2010. The probability of one hurricane along the Gulf of Mexico varies from 36.2% to 3.8%. The probability of a second hurricane varies from 26.1% to 2.3%.

5. Acknowledge

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6. References

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[2] Elsner, B. J. and Bossak, H. B. (2001) "Bayesian Analysis of U.S. Hurricane Climate", Journal of Climate, 14, 4341-4350.