Predicting Potential Hurricane for year 2016 using the Rainfall Trends in Galveston, Texas

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Abstract: Relationship between monthly average rain fall and hurricanes for Galveston, Texas was investigated from year 2005 to 2016. Based on the analyses it was found that the trend of monthly average rain fall and total rain fall for year 2016 (July 2015 to June 2016) did not correlate with the year 2008 (July 2007 to June 2008) when the third worst hurricane IKE hit Galveston.

1. Introduction: Since hurricanes cause widespread devastation to daily operations and properties, prediction is very important to reduce the losses and evacuate people to safer places. While hurricanes remain difficult to predict, especially because they can suddenly intensify in ways that are poorly understood, hurricane forecasting has become important nowadays. Track forecasts have improved due in part to the increased numbers of satellites, outfitted with more sophisticated weather-monitoring devices. NOAA also has more aircraft available with better monitoring instruments. At the same time, supercomputing power has increased exponentially, and computer models used to forecast a hurricane direction keep improving. By looking at annual variations in various climate parameters, forecasters can make predictions about the overall number and intensity of hurricanes that will occur in a given season.

2. Objectives: To investigate the monthly average rain fall pattern in 2016 with the rain fall pattern before the last hurricane IKE.

3. Temperature Analyses: The City of Galveston is located on the Galveston coast off the southeast coast of Texas. It is bounded on the southeast by the Gulf of Mexico and on the northwest by the Galveston Bay. The island has been subjected to infrequent intervals of major tropical storms and hurricanes. The rain fall data of the Galveston area was collected from the National Climatic and Data Center (www.ncdc.noaa.gov) and analyzed to determine the correlation between hurricanes and average rain fall.
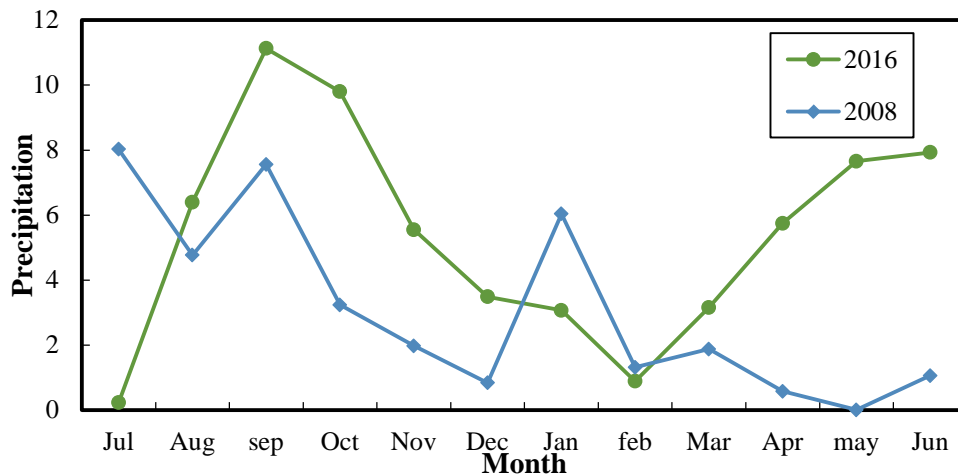

Figure 1: Variation of mean rain fall with months

Fig. 1 shows the variation of mean rain fall for one-year period from previous year July to the following year June. It was noted from the graph that nine months of year 2015/2016 have more rain fall than year 2007/2008. The total annual rain fall was 37.3 inches the year when IKE hit Galveston compared to total rainfall of 65 inches during current year of interest (July 2015 to June 2016).
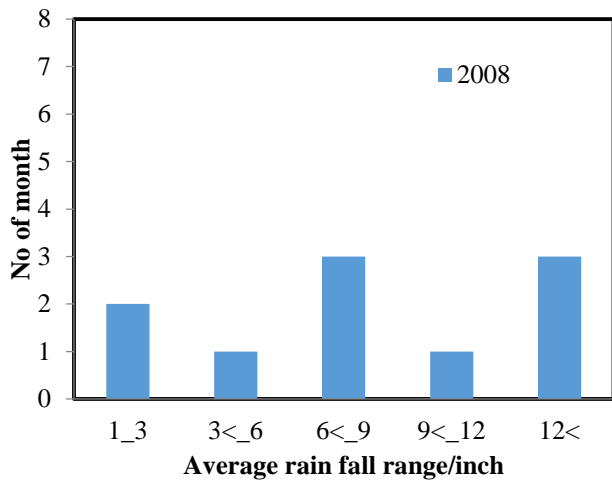

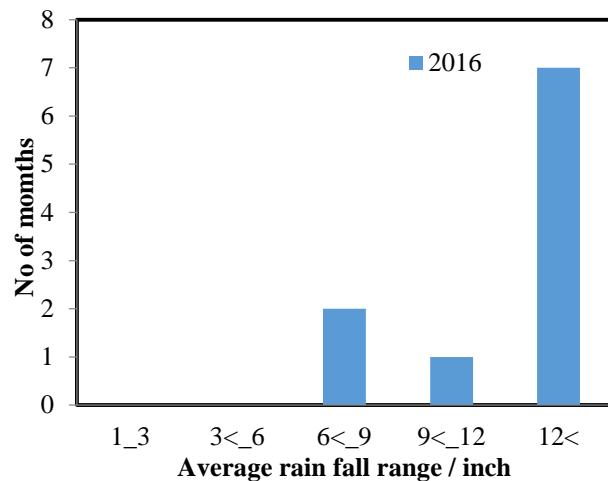Figure 2: Rain fall trend for 2007/2008

Figure 3: Rain fall trend for 2015/2016

In this study monthly rain fall data from July of the previous year to June of the current year was used. Monthly rain fall was grouped in to classes of 0 to 3 inch, 3 to 6 inch, 6 to 9 inch, 9 to 12 inch and greater than 12 inches. In the year of 2008 (Figure 2) when the third worst hurricane hit Galveston the monthly rainfalls can be considered as uniformly distributed. In contrast year 2015/2016 showed 7 months of average rain fall more than 12 inches, between 9-12 inches for one month and 6-9 inches for two months respectively. The trend of rain falls for year 2015/2016 shows median beta (β) distribution where α is 5 and β is 1. From the analyses of rain fall data year 2015/2016 does not correlate with year 2008 hurricane season.

4. Conclusion

Based on the analysis it has been found that 7 months have mean rain fall above 12 inches for year 2015/2016 and only 3 months have mean rain fall more than 12 inches of the hurricane year 2008. Annual mean rain fall was less in year 2008 and annual mean rain fall was highest in year 2016. From this different rain fall trends it can be predicted that year 2016 there will not be a hurricane in Texas.

5. Acknowledgment

6. Reference

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