

Hurricanes and Annual Temperature Trends in Galveston, Texas

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Abstract: Relationship between daily, monthly and annual atmospheric temperatures and hurricanes for Galveston, Texas was investigated from year 2001. Based on the analyses it has been found that the maximum mean highest temperatures better correlated to the hurricanes seasons in 2005 (Katrina and Rita) and 2008 (Ike).

1 Introduction

Analyses of global surface air temperature and sea surface temperature has been studied by many researchers (Hansen et al., 1999 and Smith and Reynolds, 2004). Wang et al., (2008) studied the effects of Global warming and hurricanes in the United States. Atlantic hurricane activity has been largely increased in frequency and intensity since 1995. The 2005 hurricane season was the most active year on record, with 28 named tropical storms in the Atlantic basin and 15 of them reaching hurricane intensity. For the year 2008 there were 16 named storms with 8 of them reaching hurricane intensity including the Hurricane IKE which had a landfall in Galveston, Texas. The recent increase in the Atlantic hurricane activity has fueled a debate on the role of global warming in the increase (Goldenberg et al., 2001). In this paper the surface temperature analysis of Galveston has been carried out from 2001.

2 Objectives

The objective of this study was to investigate the relationship between air temperature and hurricanes data for the Galveston, Texas which had the largest number of hurricanes in the last 100 years along the Texas Gulf Coast.

3 Temperature Analyses

The City of Galveston is located on Galveston coast off the southeast coast of Texas. It is bounded on the southeast by the Gulf of Mexico and on the northwest by Galveston Bay. The island has been subject to infrequent intervals of major tropical storms and hurricanes. The temperature 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 temperatures.

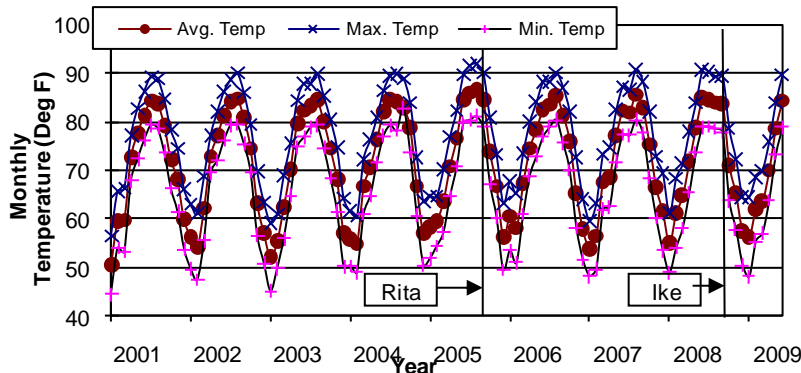


Fig. 1 Absolute Mean Temperature

Figure 1 shows the average, maximum and minimum temperature for every month from year 2001 to 2009. Maximum temperature has been observed for the years 2005, 2007 and 2008 with 92 °F, 90.9 °F and 90.8 °F respectively. Figure 2 shows the monthly average temperature. It has been found that the highest temperature was observed for the year 2005 hurricane season, most active hurricane season. Figure 3 shows the change in temperature for each year $\Delta T = T_i - T_0$. Where ΔT is the change, T_i is the average temperature for the year, and T_0 is the average normal temperature from 1971 to 2000. It showed that years 2005, 2006 and 2008 had recorded maximum temperature changes.

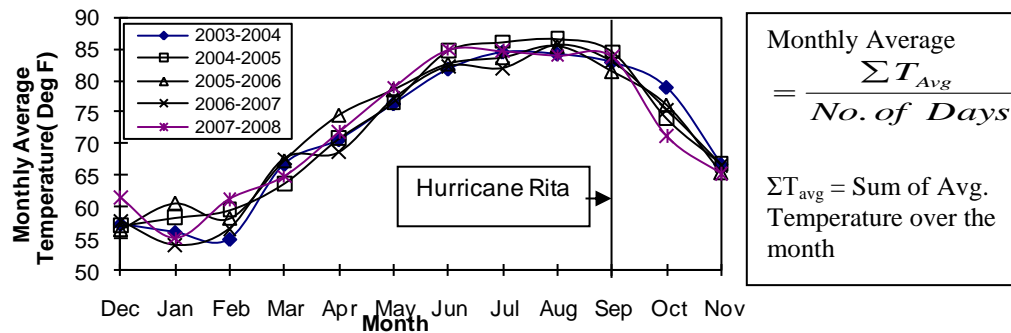


Fig. 2 Monthly Average Temperature

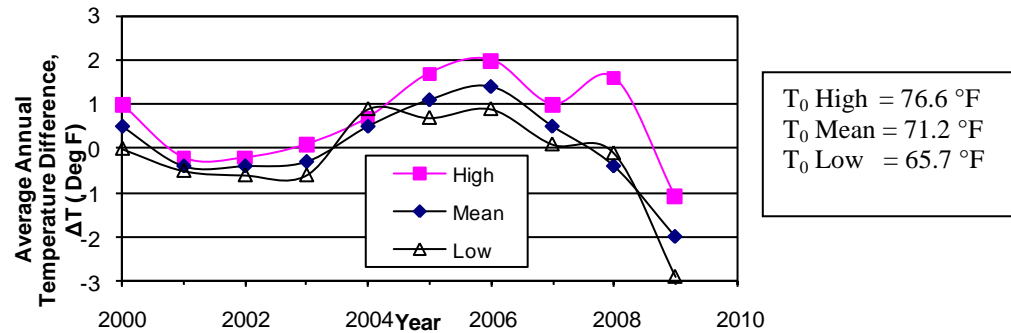


Fig. 3 Difference in Annual Temperature from Baseline Temperature (T_0)

4 Conclusion

Monthly maximum temperature was the highest in year 2005 and had the most active hurricane season in history. Monthly average temperature (average temperatures over the month) were highest in years 2005, 2007 and 2008 and correlated better with the hurricanes in years 2005 and 2008. Maximum annual temperature correlated with the active hurricane season.

5 Acknowledgement

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6 References

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