FEMA Data Analysis Write Up

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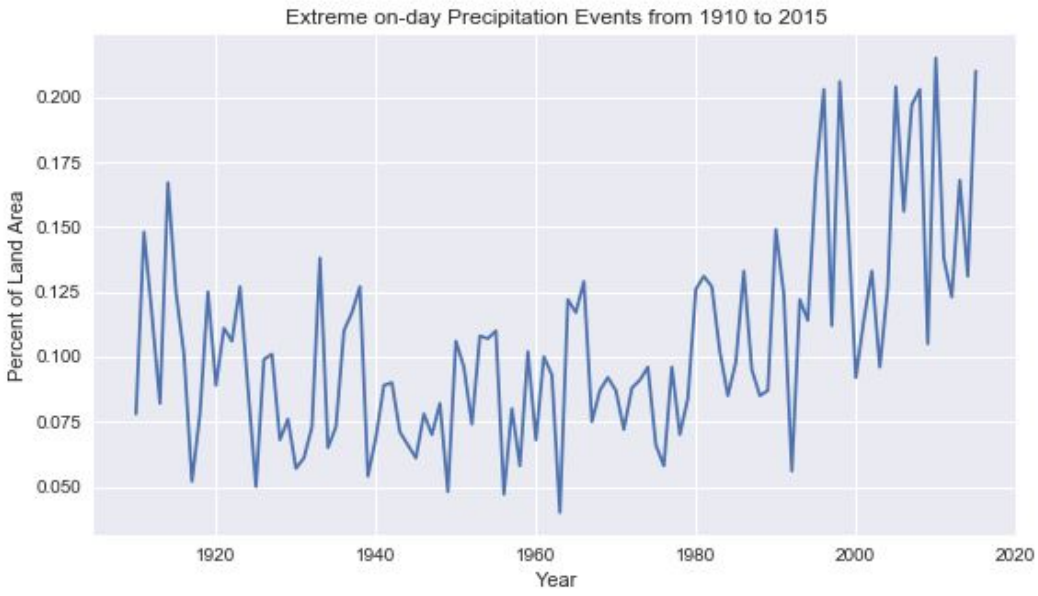
This past summer, the Atlantic had 16 tropical storms, and 6 major hurricanes, which includes the infamous Hurricane Harvey, Irma, and Maria that had huge impacts in Houston, Florida, and Puerto Rico. Every year, the US government allocates federal money to the Federal Emergency Management Agency (FEMA). And within FEMA, we have something called National Flood Insurance Program (NFIP). If you live in a flood zone, NFIP provides affordable insurance to property owners, encourages communities to adopt and enforce floodplain management regulations, and more.

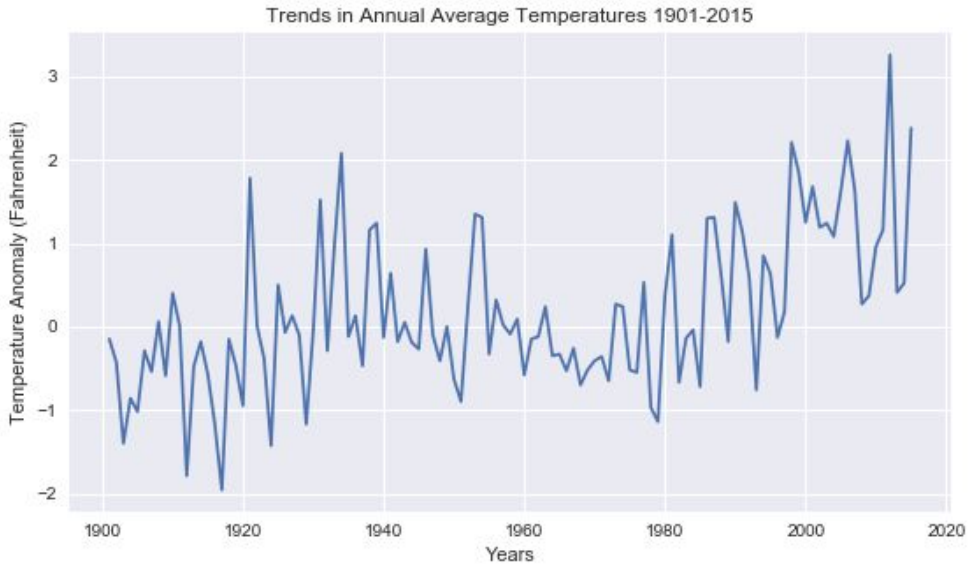
However, NFIP is in $25 billions of dollars in debt. As the frequency and intensity of natural disasters like storms, fires, and hurricanes increase over the years, more assistance will be needed to provide relief for Americans who are affected by current and future natural disasters. Therefore, in this analysis, we will be analyzing, what has been the weather and natural disaster trend over the past decades? What has our government, Federal Emergency Management Agency (FEMA) specifically, have done to combat natural disasters?

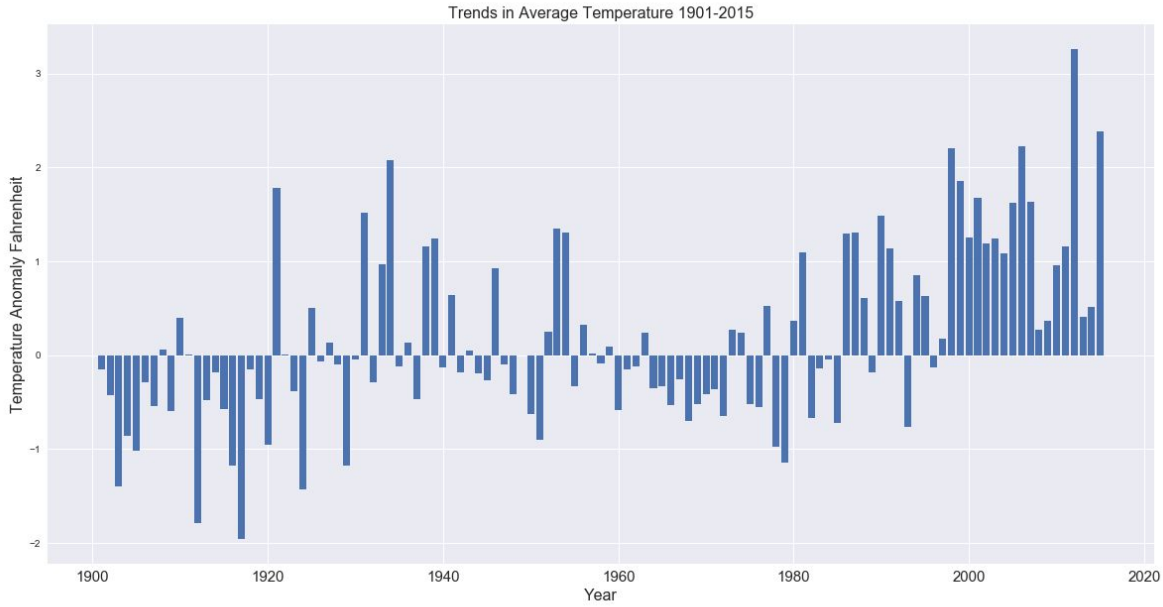
Has there been an increase in extreme weather events?



According to our chart above, extreme precipitation events have filled an increased surface area of land. Especially from 1960 to present, the percentage of the land area where a much greater than normal portion of total annual precipitation has come from extreme single-day precipitation events has increased over the years. This could possibly mean that increased precipitation has led to more natural disasters.

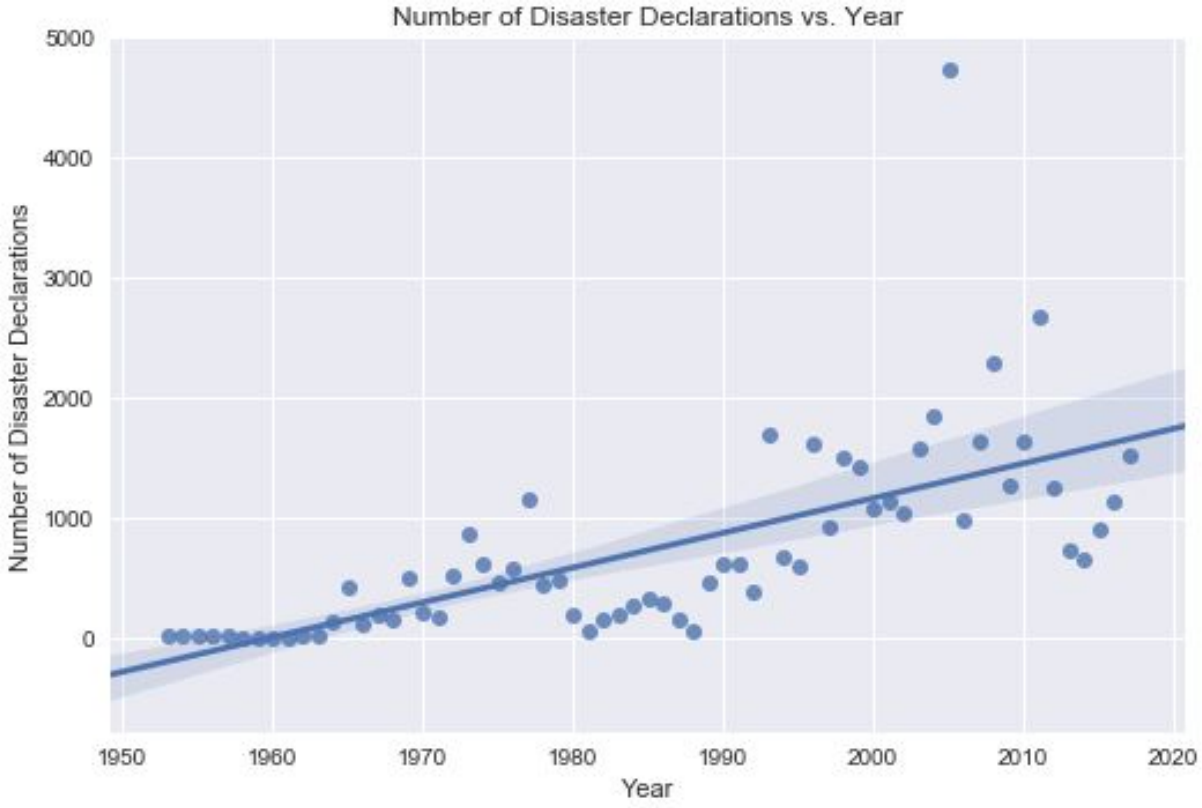
Has the temperature overtime been increasing?





In our graphs showing temperature anomalies we have notice a trend of temperatures being consistently above average. In the 1996 to 2015 timeframe, each year the temperature has been above the 1901-2015 period average. This is even more stark when you look at our bar graph “Tends in Annual Average Temperatures 1901-2015”. Overall, the average temperature has been increasing over time.

What is the trend of natural disaster occurrences over the past years?



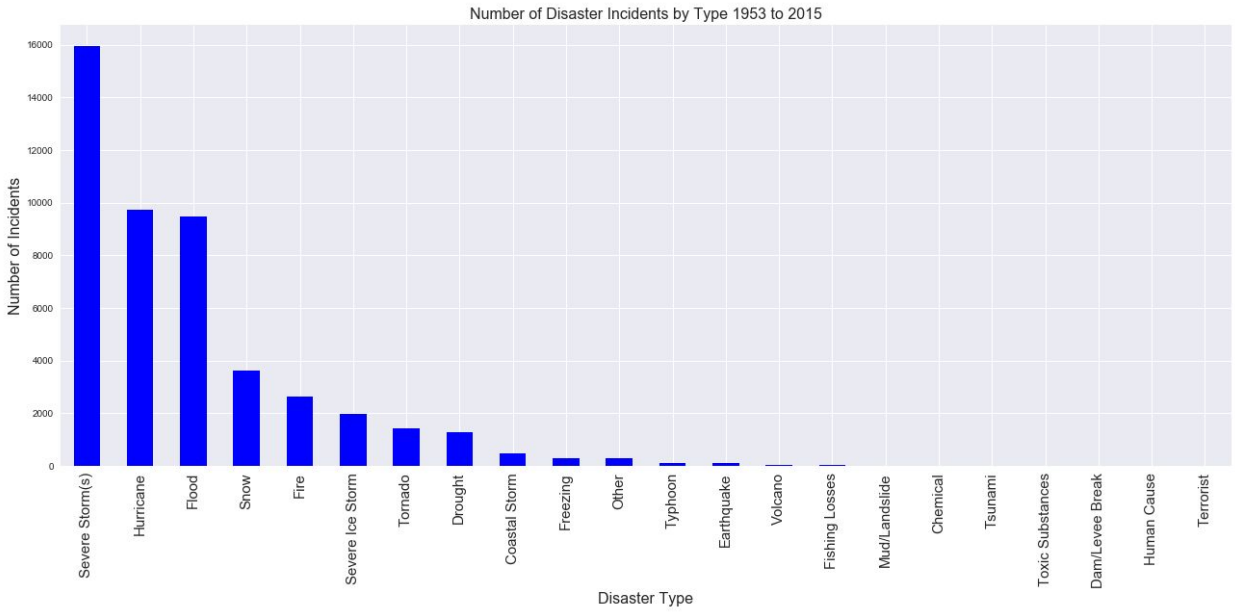
Disaster declarations are federally declared disasters that have occurred, which includes common natural disasters like hurricanes and earthquakes, but also includes human caused disasters such as terrorism and chemical spills.

As seen in this graph, the number of disaster declarations has increased over the past decades. The beginning few years between 1950s to 1970s may not accurately represent the number of natural disasters that have occurred due to lack of data collected. Regardless, we can see that the number of disasters have increased over the years. The line is the regression line relative to the x and y variables and the shaded area shows the 95% confidence interval for that regression.

Is there a correlation between temperature, precipitation, and natural disasters? What is the weather and natural disaster trend over the past five years?

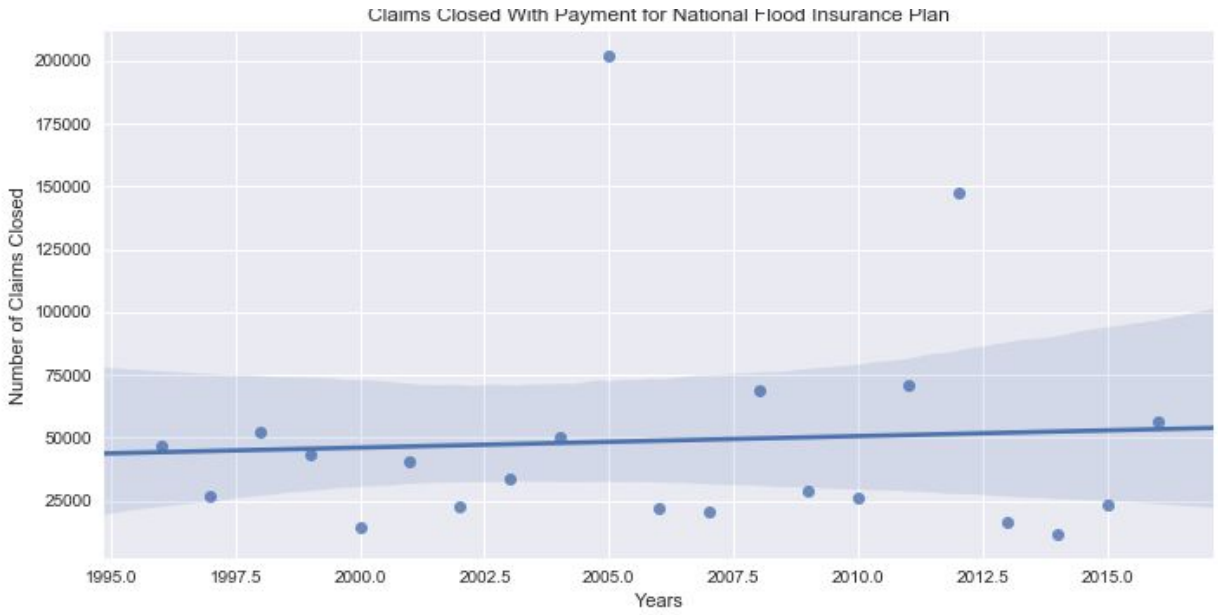
By comparing our precipitation and temperature data with our disaster declaration data, we can see that there is a positive trend for all three graphs from around 1960 to present. The number of disaster declarations have been steadily increasing over time as temperature and precipitation.

What are the most frequent natural disasters?



According to our data the vast majority of the disaster declarations made by FEMA have been for severe storms and hurricanes. There also has been a very clear increase in disaster declared by FEMA over the years. Severe storms, hurricanes, and flooding are the top three FEMA disaster declarations, which we assume to be the most frequent natural disasters.

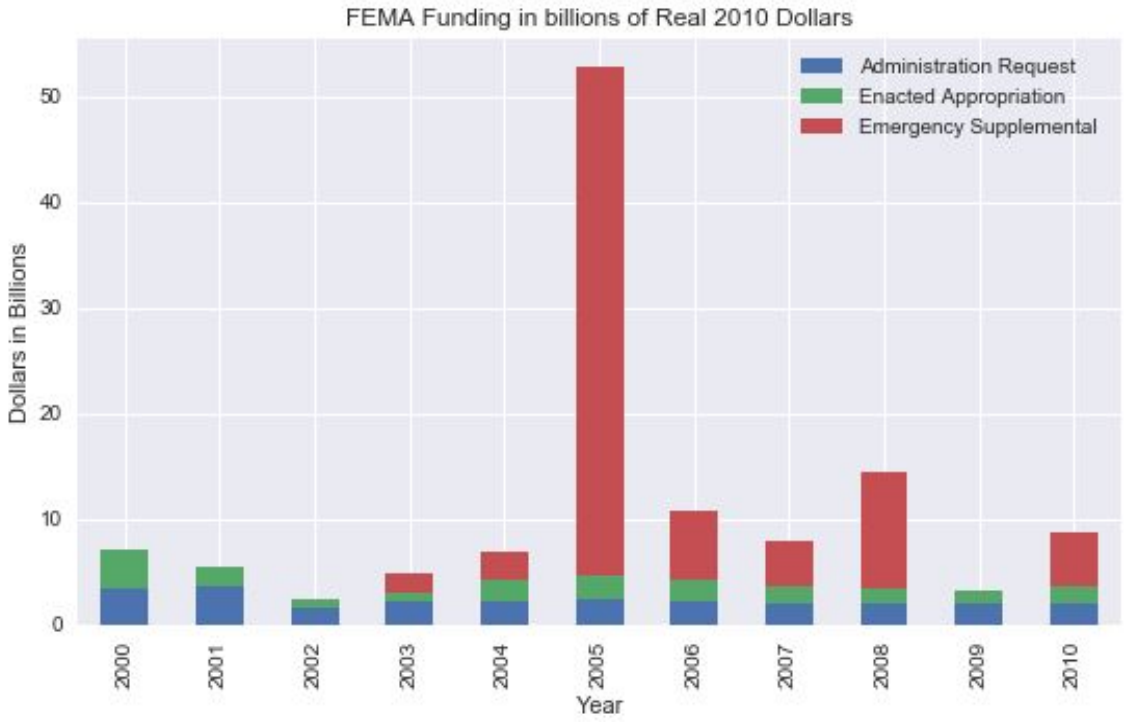
Has there been a trend on the number of claims closed with payment from the National Flood Insurance Program (NFIP)?

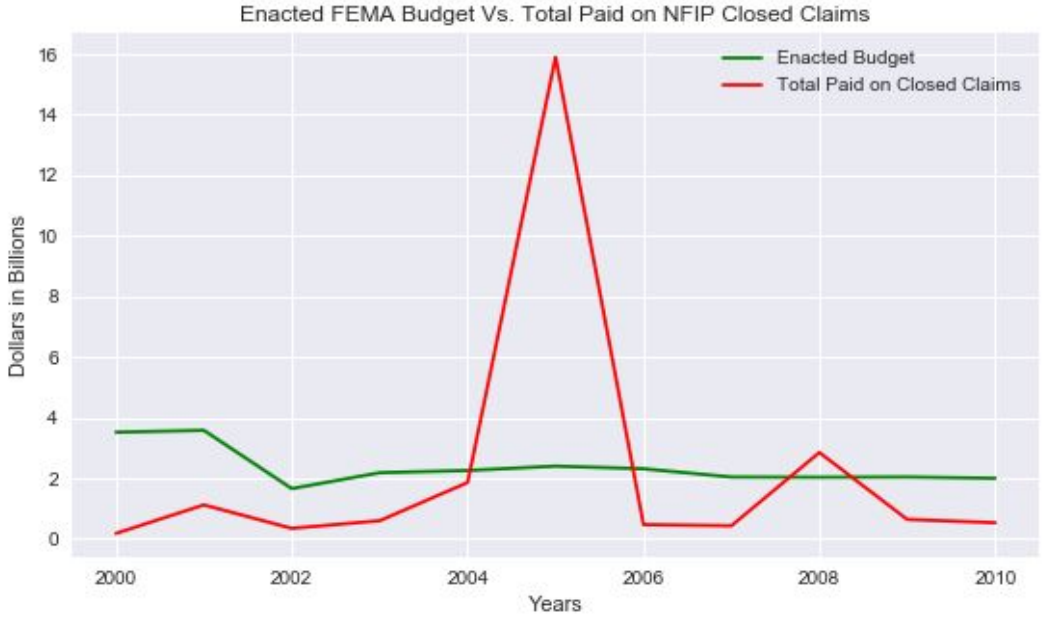


Severe storms, hurricanes, and flooding are the top three FEMA disaster declarations, so we looked at NFIP. NFIP is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. The Mitigation Division within the FEMA manages the NFIP and oversees the floodplain management and mapping components of the Program.

There are outliers in the number of claims closed, but overall, we found that y is not significantly related to x as the slope is closer to zero. The number of claims closed for NFIP has not significantly increased over time.

What are the projections of FEMA budget each year vs how much money they actually spent? Can we find out how they got into debt? Is there a correlation between natural disasters and US government spending on disaster relief?





Each fiscal year, FEMA and the Office of Management and Budget (OMB) submit a request to the President for the amount of funding the two agencies determine DRF should receive, which is show by the blue bar. We see that the administration's requests are underestimations of the actual appropriations enacted and supplemented (green bars). Emergency appropriations bills show by the red provide funding that is in addition to what was previously enacted through the regular appropriations process.

The enacted budget of FEMA exceeds the total paid on NFIP closed claims. However, in 2005 when Hurricane Katrina happened, we see that the NFIP claims exceeded the enacted budget greatly. NFIP is within the FEMA budget, and with just one year of 2005, FEMA has gone into debt. Even when the expected claims exceeds FEMA budget, we can see that the proximate years' budgets have not been impacted. With this past year with Hurricane Harvey and Irma, FEMA will further go into debt due to the NFIP.