**PITCH – TORNADO ALLEY IS SHIFTING SOUTH**

**By: Joslyn Richardson**

**LEDE**

Changing weather patterns and rising temperatures have enhanced the ferocity of tornadoes in the south, shifting the traditional ‘tornado alley’.

**IDEA**

Warmer temperatures brought on by climate change are causing the usual path of tornadoes, known as "tornado alley," to perhaps move farther south, according to data from the Storm Prediction Center, FEMA, and a research conducted by Purdue University. Over the last 20 years, the frequency of tornadoes, the intensity of their funnels, and the number of deaths they cause have all reduced in the area known as "tornado alley," while they have risen in the southern states.

Tornado Alley: Texas, Oklahoma, Kansas, and Nebraska

Southern States: Alabama, Mississippi, Arkansas, Louisiana, Tennessee, and Florida

**NUT GRAPH**

Both the frequency and severity of tornadoes have been on the rise in the southern United States, a region where tornadoes are more likely to be unexpected and people are less likely to be prepared for them.

\*\*The data also demonstrates how storms are becoming more violent as a direct result of rising temperatures and how climate change is producing more ferocious storms.

**THE STEPS USED TO ANALYZE THE DATA**

In my search for information on weather patterns, I visited a number of websites, including weather.gov, the National Oceanic and Atmospheric Administration (NOAA), and others. I was interested in data spanning the years 2000 to 2020 to demonstrate whether or not patterns have changed, whether or not tornadoes have grown more common, where they have been more frequent, and the intensity of these storms as they have progressed through time. I wanted to narrow my focus to just ‘Tornado Alley’ and the ‘Southern Alley’ (what was formerly known as Dixie Alley, but the weather channel stopped using that term last year) in order to demonstrate the shift in the location of tornadoes, if one occurred, which it appeared to have done based on the information I gathered. I would collect the data from the website, construct my own Excel tables with the data, and then use a pivot table to make the best of my attempts to include numerous aspects. After organizing and cleaning my data, and once I had the information that I wanted to present in a chart, I would upload it to a website such as data wrapper so that it could assist me in creating my graphs. I then applied what we had learned in class to the process of creating my graphs so that they could accurately explain my data.

**PLANS FOR HOW YOU WOULD REPORT AND STRUCTURE THIS STORY IF GIVEN MORE TIME**

I need additional climatic knowledge. Since the storm prediction center meticulously documents everything and makes it easy to access, there is a wealth of information available on the frequency and intensity of tornadoes. The climate is the more complicated factor. It requires a more in-depth examination of weather patterns, shifting temperatures, and the factors that contribute to the production of more powerful tornadoes in the south. I would want to continue my research in this manner so that I may forward my story to the next level and have all of the facts that complements the plot.

In addition to this, I would conduct interviews (a list of which can be seen below) and talk to industry professionals about their perspective on the current trend that is evolving. Is it true that there are more tornadoes occurring all over the place? From what I observed, it does not. From what I analyzed, tornadoes seem to be popping up more mainly in the south; nevertheless, I need to back up the relationship with additional evidence, and I believe Ernst Agee, a professor of research at Purdue University, would have some of the answers. In addition, I would like to conduct an interview with a residents of both regions to discuss the frequency with which they observe tornadoes, as well as whether or not they observe any changes in the climate or the level of destruction, and what their thoughts are regarding the process.

I would want a report that is at least 1,500 words long and includes visualizations every 300-500 words to substantiate the facts and provide readers with visualizations that speak to what is actually happening.

**WHO I WOULD INTERVIEW**

* Ernest Agee –Purdue University, PhD in Atmospheric Science, Agee’s team studied data from the past 60 years to look for a shift in annual tornado activity. The team divided the 60 years into two groups: 1954-1983, which was a time of cooler temperatures compared to an increasingly warmer second period, from 1983-2013.
* Jennifer Larson – Agee’s research assistant at Purdue
* Undergraduate students Alexandra Marmo and Samuel Childs in Purdue’s Department of Earth, Atmospheric and Planetary Science who also worked on the project
* James B. Elsner, a professor at Florida State University in Tallahassee with a focus on tornadoes, hurricanes, and climate change
* Adam Sobel, founding director of Columbia University’s Initiative on Extreme Weather and Climate, based at Lamont-Doherty Earth Observatory.
* Residents in Tornado Alley
* Residents in Southern Alley

**DATA**

Purdue University…

* A Purdue University research team has found that the center of tornado activity in the United States has shifted in recent decades, and this shift is possibly influenced by climate change.
* Agee’s team studied data from the past 60 years to look for a shift in annual tornado activity. The team divided the 60 years into two groups: 1954-1983, which was a time of cooler temperatures compared to an increasingly warmer second period, from 1983-2013.
* Data showed a notable decrease in both annual counts and tornado days in the traditional “tornado alley” of the central plains, aided by declines in summer and autumn. However, annual values were sustained in the southeast with some increase in “Dixie alley” due in part to substantial autumn seasons increases from Mississippi to Indiana, Agee says.

Storm Prediction Center…

* <https://www.spc.noaa.gov/climo/torn/1999deadlytorn.html>
* <https://www.spc.noaa.gov/climo/torn/2007deadlytorn.html>
* [https://www.spc.noaa.gov/climo/online/monthly/2017\_annual\_summary.html#](https://www.spc.noaa.gov/climo/online/monthly/2017_annual_summary.html)
* <https://www.spc.noaa.gov/climo/online/monthly/2000_annual_summary.html>

FEMA…

* <https://www.fema.gov/sites/default/files/2020-07/tornado-risk-hazards-southeast_recovery-advisory.pdf>

Spatial trends in United States tornado frequency...

* A research conducted in 2018 indicated that the number of tornadoes has usually dropped over the last four decades within Tornado Alley, but the number of tornadoes has increased just to the east, over the Lower Great Lakes, and into the Deep South.
* <https://www.nature.com/articles/s41612-018-0048-2>

**GRAPHS**

Comparing fatalities…. When you compare these two graphs (1999 and 2007), you can plainly see that there was a significant increase in the number of deaths that occurred in the south in 2007 in comparison to the number that occurred in 1999. Now, I am aware that you may be thinking that this may simply be an aberration due to the fact that there was a powerful tornado in the south or something else that occurred in 2007. Because of this, I created a single graph of correlation to demonstrate the rise in fatalities in the south from the period from 1999 to 2007.

Chart

Description automatically generatedChart, bar chart

Description automatically generated

Chart, line chart

Description automatically generated

Number of killer tornadoes per year…

Chart, line chart

Description automatically generated

Chart, bar chart

Description automatically generated

<https://public.flourish.studio/visualisation/11898713/>