Tornadoes spawned in West Virginia vs Ohio and Predictions

November 28, 2025

Abstract

This experiment is about seeing if West Virginia will spawn more tornadoes than Ohio this year in the months in April through July by looking at and using data to predict how many tornadoes will spawn this year in the months between April through July. I only used two variables of data that I collected and used which was average temperature of months and tornadoes in those months over years to predict. With the data I have temperatures ranging from low cold 50F to warm upper 70F and with 71 tornadoes over five years. I expected that West Virginia would spawn more tornadoes than Ohio but in the end I was wrong with Ohio being able to have almost half of the tornadoes West Virginia could have .

Keywords: Temperature, Tornadoes, and predict

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Introduction

In my experiment I was curious if tornadoes spawned more in Ohio or West Virginia. So I set out and collected data to find my answer. This is because “More tornadoes occur in the US than any other place in the world” according to (Leonard and Law, 2019). With that information and my curiosity needing to be answered and that tornadoes spawn at random with “An average of approximately 1200 tornadoes per year occur in the United States” According to (Moore and McGuire, 2020) which is a lot of tornadoes in one year. If you don’t know what a tornado is, let me explain. “Tornadoes are a tall, narrow, violently rotating funnel of air that extends toward the ground” according to (“Tornadoes,” 2008). Tornadoes are a destructive force that can destroy houses or throw train carts. My purpose for wanting to do this experiment is to see if I can predict how many tornadoes will spawn this year April through July. I will make my hypothesis based on the data I collected and what I know about them.

Methods

I hypothesize that tornadoes will spawn more often in West Virginia than in Ohio in the months between April through July. My null hypothesis is that West Virginia and Ohio will spawn the same amount of tornadoes in the months between April through July. The independent variables are the location (land and climate) because they are both critical to forming a tornado. The land has to be flat for them to form and no big objects can get in the way of it forming. It will disrupt the air flow. The climate has to be perfect, meaning cold air to be on the ground and hot air to be within the clouds for the two climates to collide to form a tornado. The dependent variables are the amount of tornadoes that can and will spawn in Ohio and West Virginia.

Lastly, the controlled variables are the time frames for when the experiment starts this year, the last five years of data and see if I was right, and data based on where I got the information from in past years within the same time frame.

Materials

The materials I used to conduct my experiment was a website that showed me where tornadoes spawned at and what time they spawned. The website also showed us the temperature at the time of the spawning. The following website names are National Centers for Environmental Information and Tornadoes Visualization Data.

Procedures

Figure 1. This picture was taken by wboy.com in West Virginia Figure 2. This picture was taken by NWS in Ohio

For my procedures, I collected data from Tornado Tracks, 1950-2024 and Climate at a Glance Statewide Mapping on how many tornadoes spawned in each region from the last five years and the temperature at the time. The website also provided the average temperature per month April through July. I rounded all numbers to the closest whole number in my data.

I also received information for October and November average temperatures from the last five years including this year. First, I compared October and November temperatures from the last five years to see if any past years are similar to this year. I did this so I can predict the temperature of the next April through July in order to predict how many tornadoes will spawn. Afterwards, I calculated the number of tornadoes and the temperature in each month into five groups for each year and graphed it in two graphs. Then, six groups for October and November and I graphed the temperatures. Afterwards, I reviewed the closest year in temperature for October and November to this year and the last five years in order to base my predictions for this year's tornado forecast for the months April through July. Finally, I calculated the difference from the closest year to this year in temperature and put it in a percentage and subtracted that from the total number of tornadoes from that past year for each month from April through July. Then, I rounded it to the closest whole number and I got the total amount of tornadoes to predict this year.

Results

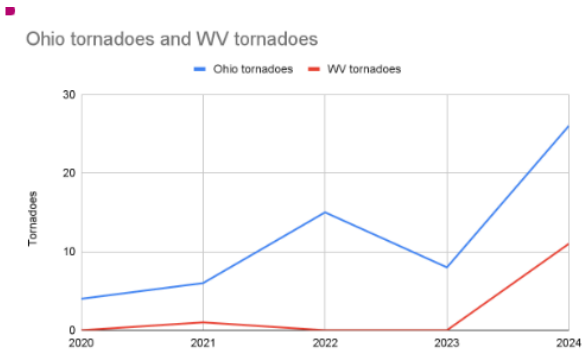

Figure 3: A graph that shows the tornadoes from the last five years in Ohio and West Virginia.

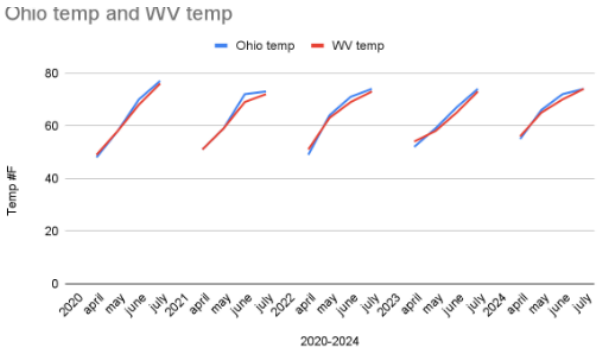

Figure 4: A graph showing the temperature from the last five years in the months April through July from Ohio and West Virginia

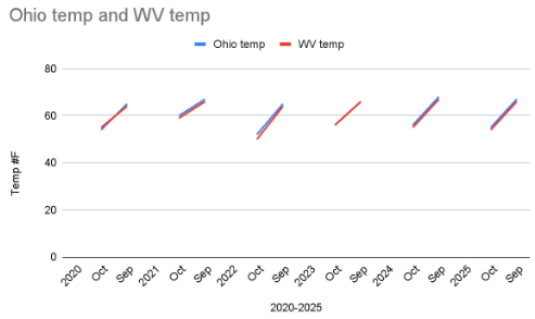

Figure 5: A graph showing the temperature this year and the" last five from october and november in Ohio and West Virginia

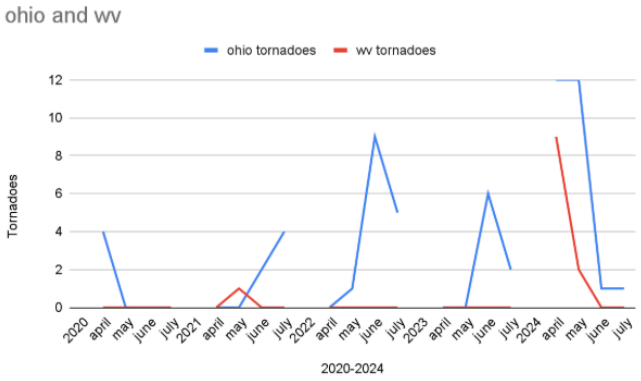

Figure 6: A graph showing tornadoes from from the last five years in April through July in Ohio and West Virginia

My results of these graphs show that most tornadoes spawn in June in Ohio while most tornadoes spawn in April in West Virginia in those five years. The data shows me the temperature to tornado ratio from different years in the months between April through July. They also show how similar the temperatures are in Ohio and West Virginia throughout the years by comparing them side to side. It shows that they have relatively the same temperature not changing and if so only by 1-2%. Tornadoes can spawn the most in high 60F to low 70F in Ohio and from the data I collected the most tornadoes spawn in the upper 50F in West Virginia. Based on the results, it is clear that more tornadoes spawned in Ohio than in West Virginia by 79.7% from the data in the past five years because of how many tornadoes spawned in Ohio compared to West Virginia. With this data it shows that this year's temperature in October and November is more than 90% similar to last year. With the data I have right now I can predict that West

Virginia will have approximately 0-8 spawn in April, 0-2 spawn in May, 0 spawn in June, 0 spawn in July that I predict to spawn this year in the months April through July while Ohio will have approximately 0-11 spawn in April, 0-11 spawn in May, 0 or 1 spawn in June, and again 0 or 1 spawn in July by looking back on the data I have right now from the past, means Ohio will spawn more tornadoes than West Virginia.

Conclusion

The goal of this experiment was to see if with enough data if I can predict how many tornadoes will spawn in West Virginia compared to Ohio in the months between April through July. The results did not support the hypothesis because there is more than a 90% that tornadoes will be the same as last year. That is a 42% chance that more tornadoes will spawn in Ohio than West Virginia. A limitation to this experiment would be more time to graph and get information to be more accurate with my predictions, to use other tools like humanity and looking at weather graphs, the area could be smaller to get more precise information, put the areas I have and split it in groups, and wind speed.

Discussion

These findings may be used to warn people about what they might expect for tornadoes this year and could save a few lives. Because in 2011 “over 1700 tornadoes took the lives of more than 550 people” that year alone according to (Elsner. B., Elsner C., and Jagger, 2015) that is why my data could be useful to people in West Virginia and Ohio. Some good information to have is “Environmental Research Letters suggests that regional tornado outbreaks could be predicted as much as 1-3 months ahead of time by studying patterns” According to (Looking at

ENSO to help predict tornadoes, 2016) so if I had data from the months right before April my chances of predicting tornadoes would go up.

References

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