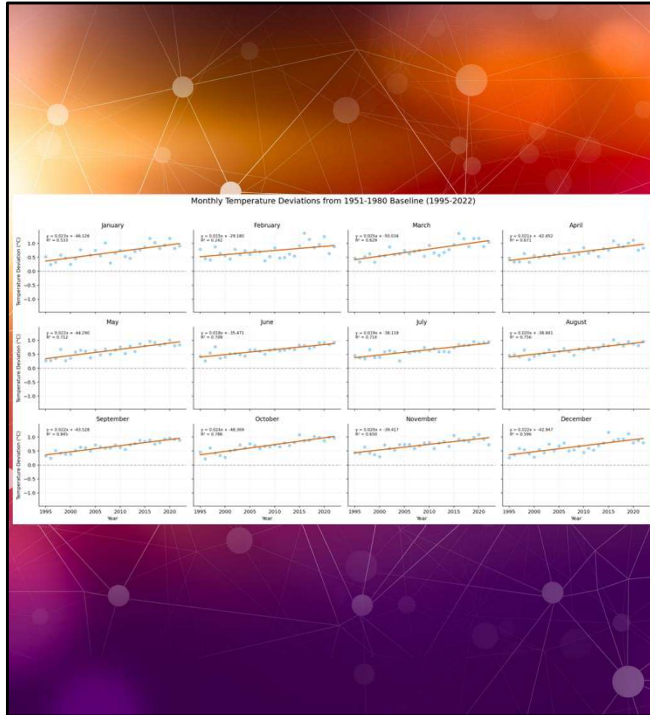


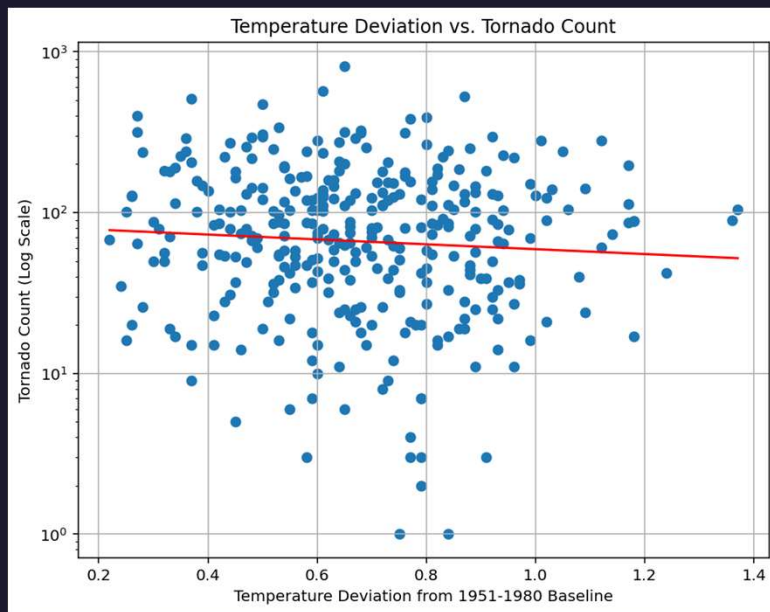
Exploring the Relationship Between Earth Temperature and Cyclonic Storms

Global Temperature Deviations and Tornado Activity in the continental United States (1995-2022)

Does global temperature increases result in more frequent or more powerful tornados?



This presentation explores the relationship between rising global temperatures and tornado activity. Data on global temperature anomalies from 1995-2022 was sourced from NASA, while tornado data for the same period came from NOAA. As shown in the first visualization, monthly temperature deviations from the 1951-1980 baseline exhibit a clear upward trend across all months.

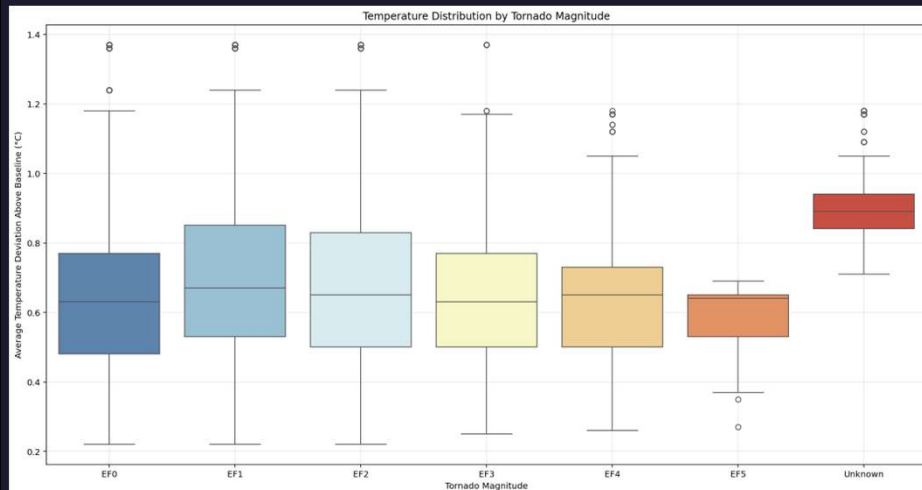


Summary Statistics of Monthly Tornado Counts:

count	335 (1995-2022)
mean	105.3
std	101.7
min	1
25%	37
50%	79 (median)
75%	137
max	817

Correlation between
temperature and tornado count:
Pearson's (r) = -0.078

The scatter plot reveals no strong correlation between monthly temperature deviations and tornado counts, as evidenced by a correlation coefficient of -0.078. While average monthly tornado counts range from 1 to a maximum of 817, this variability doesn't appear to be directly linked to temperature deviations in this dataset. Further investigation beyond this simplified monthly analysis may be needed to uncover more subtle or complex relationships.



Summary Statistics by Magnitude:

magnitude	count	mean
EF0	20005	0.634
EF1	10552	0.693
EF2	2935	0.675
EF3	824	0.645
EF4	192	0.631
EF5	17	0.569
Unknown	762	0.900

While the average temperature deviation for all magnitudes is around 0.6-0.7°C above baseline, there isn't a clear, consistent trend of increasing temperature deviation with increasing tornado magnitude. Notably, unknown magnitudes have a higher average temperature deviation (~0.9°C), while EF5 tornadoes, despite their severity, have a slightly lower average deviation (~0.6°C). This suggests other factors beyond simple temperature deviation likely play significant roles in tornado magnitude.

Conclusion and Key Takeaways

- No clear indication/relationship that increasing global temperatures are resulting in more frequent and intense storms.
- Consider other contributing factors that may interact with temperature including humidity, large scale weather patterns, and wind shear. All of which influence tornado development.
- Use smaller time scales, such as daily or weekly observations, in advance of tornadic activity to better evaluate the temperature activity that may be masked by monthly averaging.
- Since we are utilizing global average temperatures, either expand the tornado dataset to include global tornado data or utilize continental United States average temperature data.
- Additional research is clearly indicated.

Our analysis of NASA global temperature data and NOAA tornado data from 1995-2022 shows a clear warming trend, but no strong correlation between monthly temperature deviations and tornado frequency or a consistent relationship with tornado intensity. Based on this simplified analysis, we cannot conclude that global temperature increases directly result in more frequent or more powerful tornadoes. It's important to acknowledge limitations such as using monthly averages which may obscure short-term temperature influences, and focusing solely on U.S. tornado data might not represent global trends.