College of Arts and Sciences, Atmospheric Sciences Program

Atmospheric Rivers and Severe Weather

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NOTICE: This poster is an early draft due to research being ongoing; a refined version will be presented in-person at AMS

INTRODUCTION

- Atmospheric Rivers (ARs) are well-known for resulting in heavy rainfall events in the US west coast
- ARs can occur elsewhere around the world's subtropics, including the US east of the Rockies
- ARs are most reliably measured by Integrated Vapor Transport (IVT) and are typically defined by having an IVT of at least 250 $kg \cdot m^{-1} \cdot s^{-1}$

STUDY AREA

Figure 1: Map of the contiguous United States east of the Rockies

METHODS

- Severe storm reports were collected day-by-day from the Storm Prediction Center (SPC) finalized severe storm archive in 2021
  - Only regions with ≥ 10 tornado reports, ≥ 30 hail reports, ≥ 30 wind reports, and/or ≥ 50 total reports were selected; reports had to be clustered enough, determined by eye
- The most significant severe weather events were processed with GIS to determine areal extent
- ERA5 data was downloaded corresponding to each outbreak and analyzed with GIS to find IVT

RESULTS (*PRELIMINARY*)

- Regions of high IVT, often exceeding the AR minimum threshold by a substantial margin, were often associated with major severe weather outbreaks
- There (preliminary) seems to be a preference for ARs to accompany organized severe weather rather than disorganized severe weather (as seen in figure 2 left)

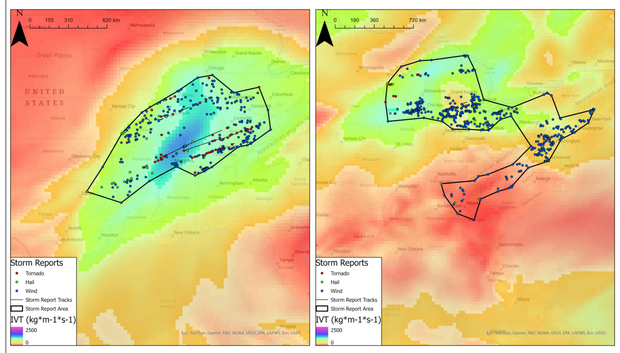

Figure 2: Left - IVT in comparison to the December 10-11 Tornado Outbreak, IVT is shown around the time of the genesis of the Western Kentucky EF4 tornado; Right – IVT in comparison to August 11-12 Severe Outbreak, IVT is shown when an MCS is hitting Northeast Ohio and ordinary cells are becoming severe in the US Mid-Atlantic

MORE RESULTS & ANALYSES TO GO HERE

CONCLUSIONS (*WILL BE COMPLETED ONCE MORE RESEARCH IS FINISHED*)

- Results confirm a relationship between ARs and severe weather events
- Study is limited to several case studies due to limitation of time and resources; more thorough research is invited in the future to strengthen the relationship between severe weather and ARs

REFERENCES

Research ongoing; references will be here in finalized version

ACKNOWLEDGEMENTS

Thanks go out to the Copernicus Program and the European Center for Medium-Range Weather Forecasts (ECMWF) for supplying the ERA5 data, and the Storm Prediction Center (SPC) for supplying the storm report data.