2013 Ratemaking and Product Management Severe Weather Workshop

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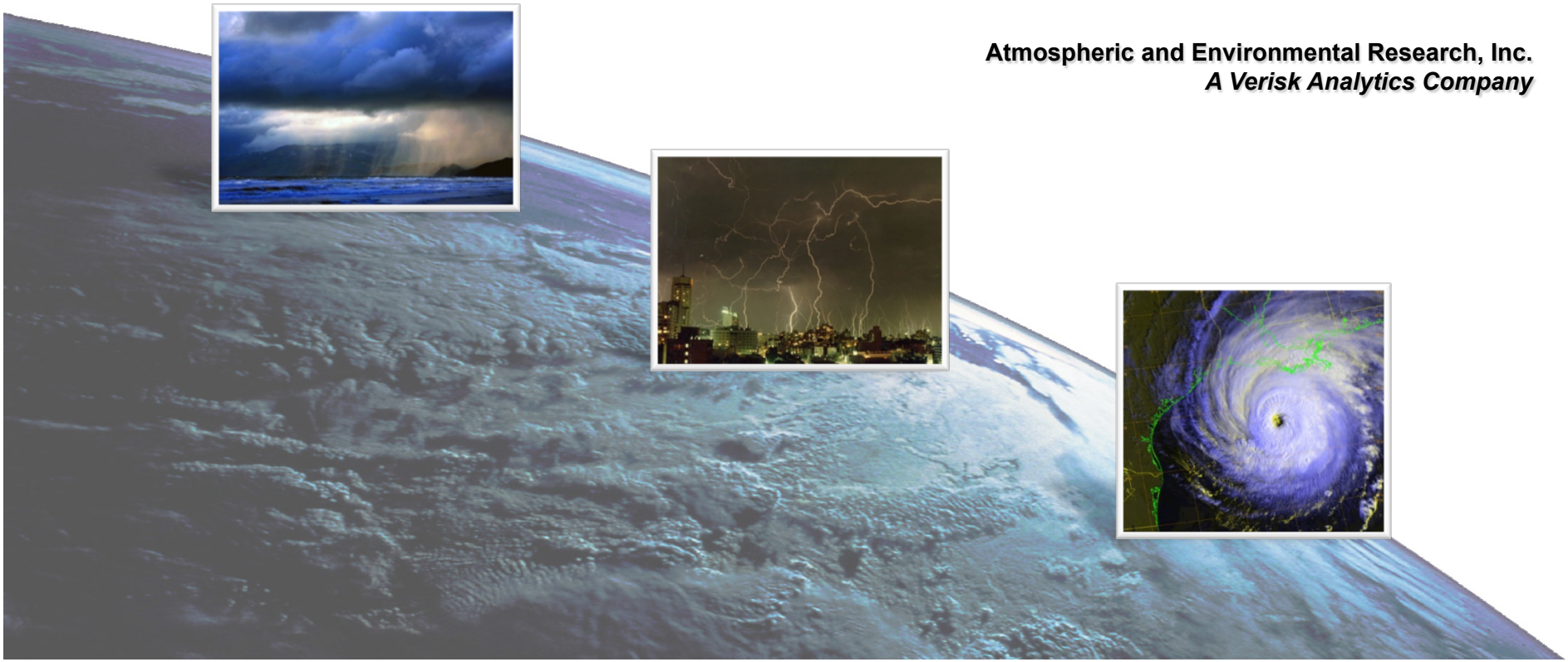
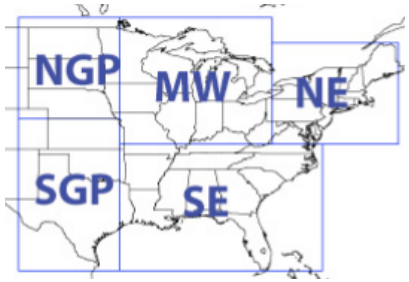
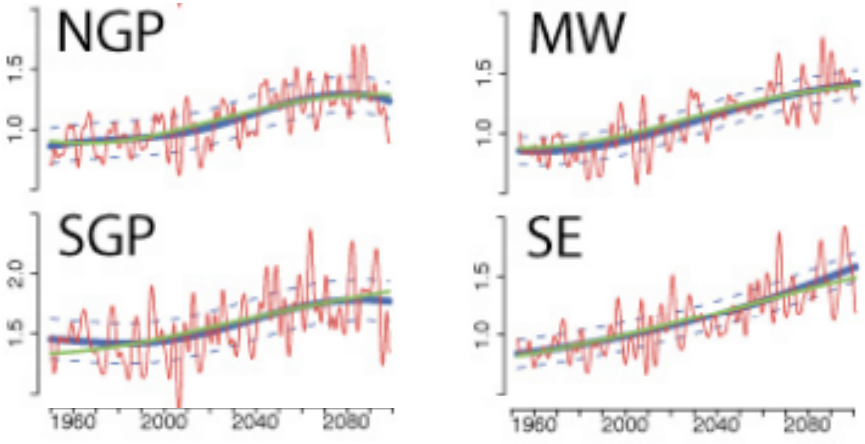
A Verisk Analytics Company



Climate Model Simulations[1] Indicate Possible Future Trend in Mean Occurrence Rate of Storms

- The number of days upon which significant severe winds, hail or tornadoes could occur smoothly trend upward[2]
- Impact in model primarily due to low-level "humidification"





Time series of regionally averaged, number of days with the joint occurrence of severe convective storm forcing and convective precipitation at a grid point in the model.

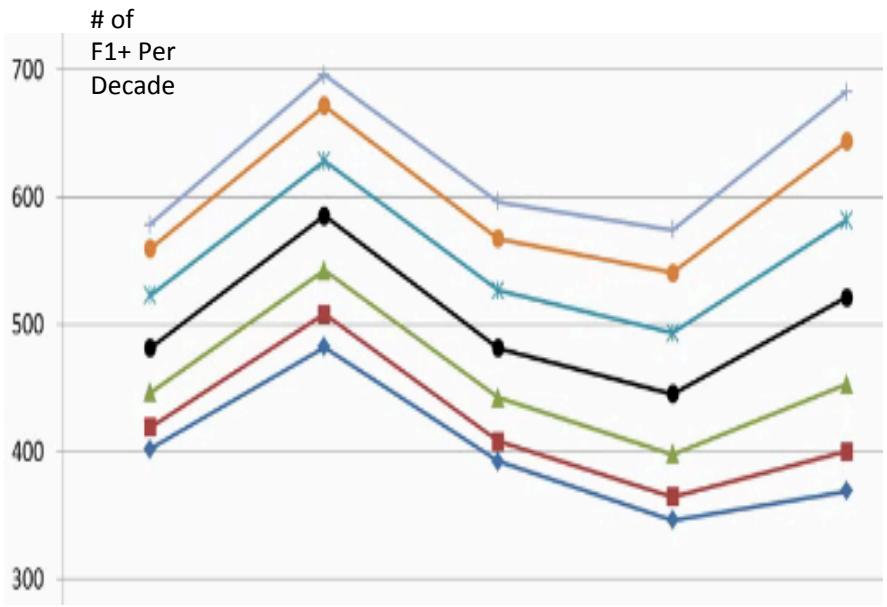
Footnotes:

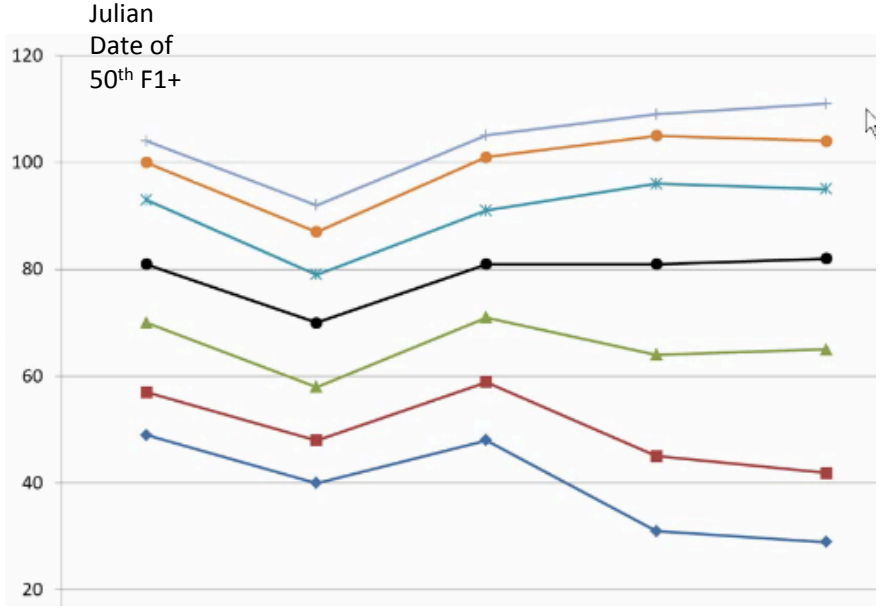
[1]Trapp et al. (2009), Geophysical Research Letters (GRL)

[2]A1B IPCC climate scenario

Analysis[3] of Historical Tornado Reports Indicates Changes in the Variance are Now Detectable

- Number of tornadoes per decade[4] (left) and the day of the year when tornado season "begins" (right) has become more varied





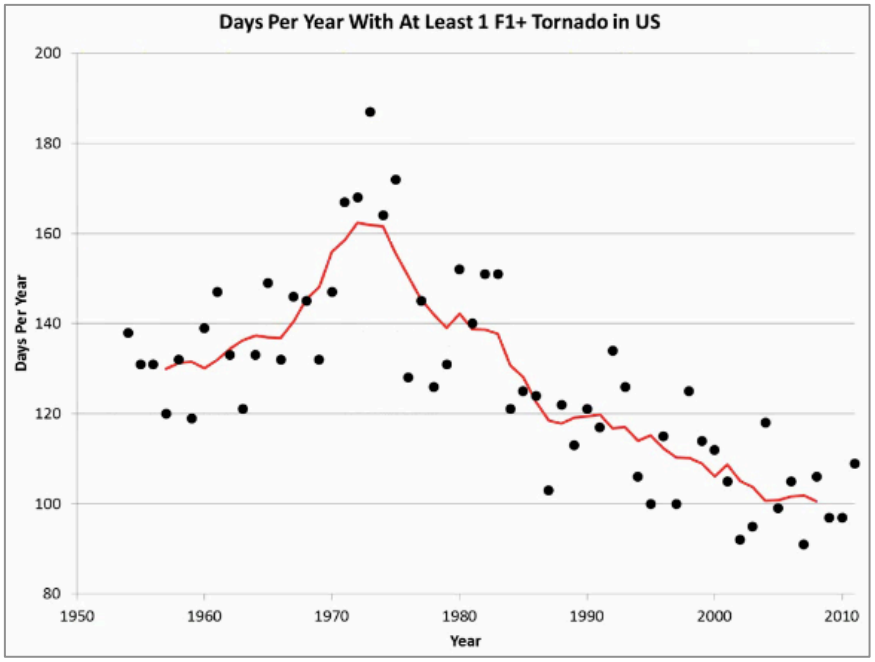
Footnotes:

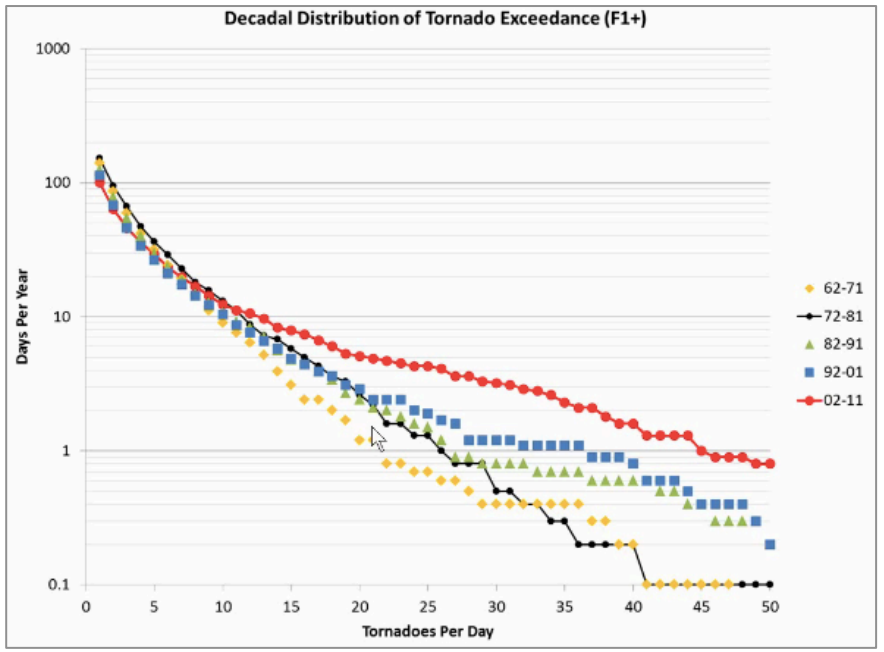
[3]Brooks et al. (2012), 26th SLS Conference

[4]Results of a 1,000 year statistical simulation of tornado days

Analysis[5] of Number of Tornadoes Per Day Indicates Large Tornado Outbreaks are Becoming the Norm

- Average decrease in the number of tornado days per year[6] since the 1970s (left)
- Average increase in the number of tornadoes per day since the 1970s (right)





Footnotes:

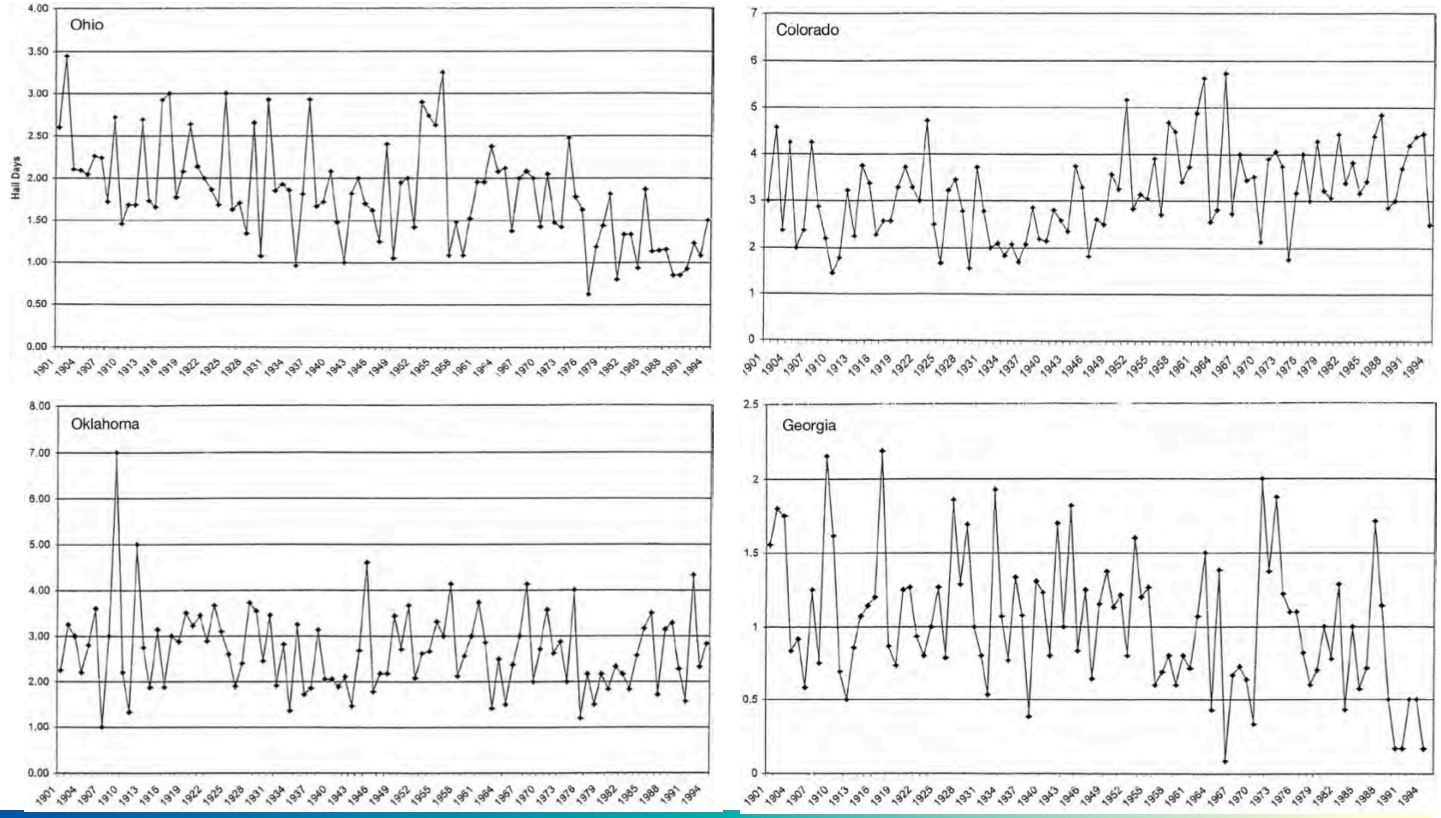
[5]Brooks et al. (2012), 26th SLS Conference

[6]Based on NOAA's Storm Data database from 1955 to 2011

NOAA Observing Station Datasets[7] Provide Longest Record of Ground-Verified Hail Occurrences in U.S.

- NOAA station records[8] provide valuable climate information to complement traditional storm spotter datasets

Annual number of hail days, 1901-1995



Footnotes:

[7]Changnon et al. (2009), Illinois Water Survey

[8]Based on days with hail observations from selected NOAA observing stations

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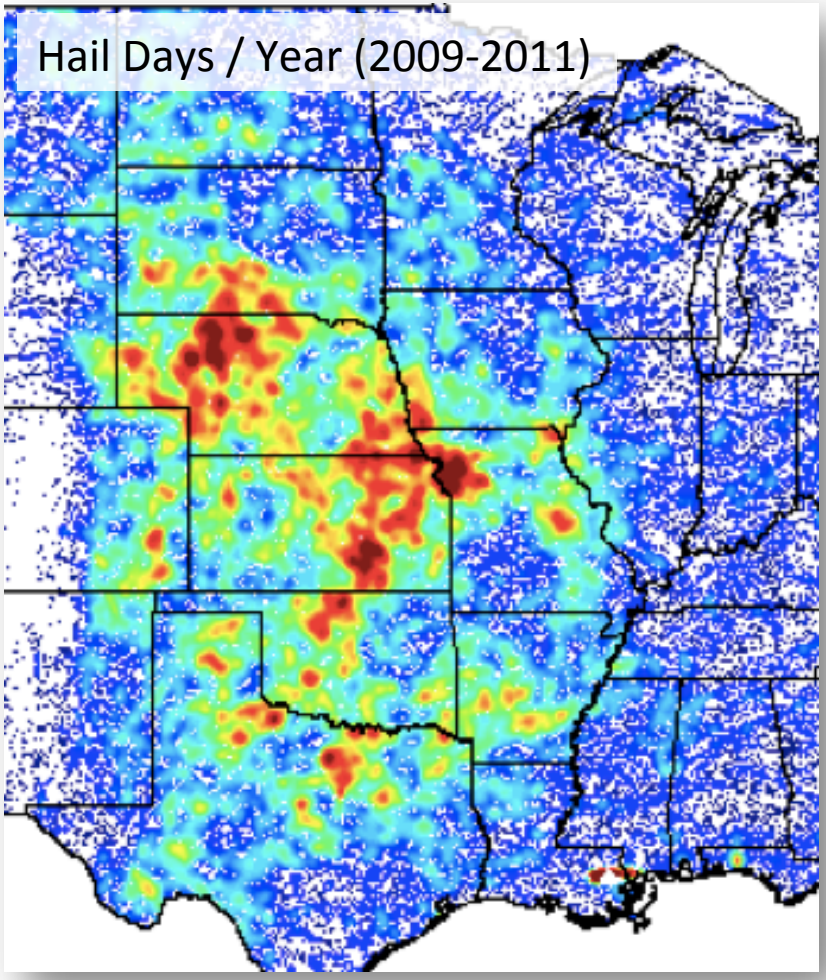
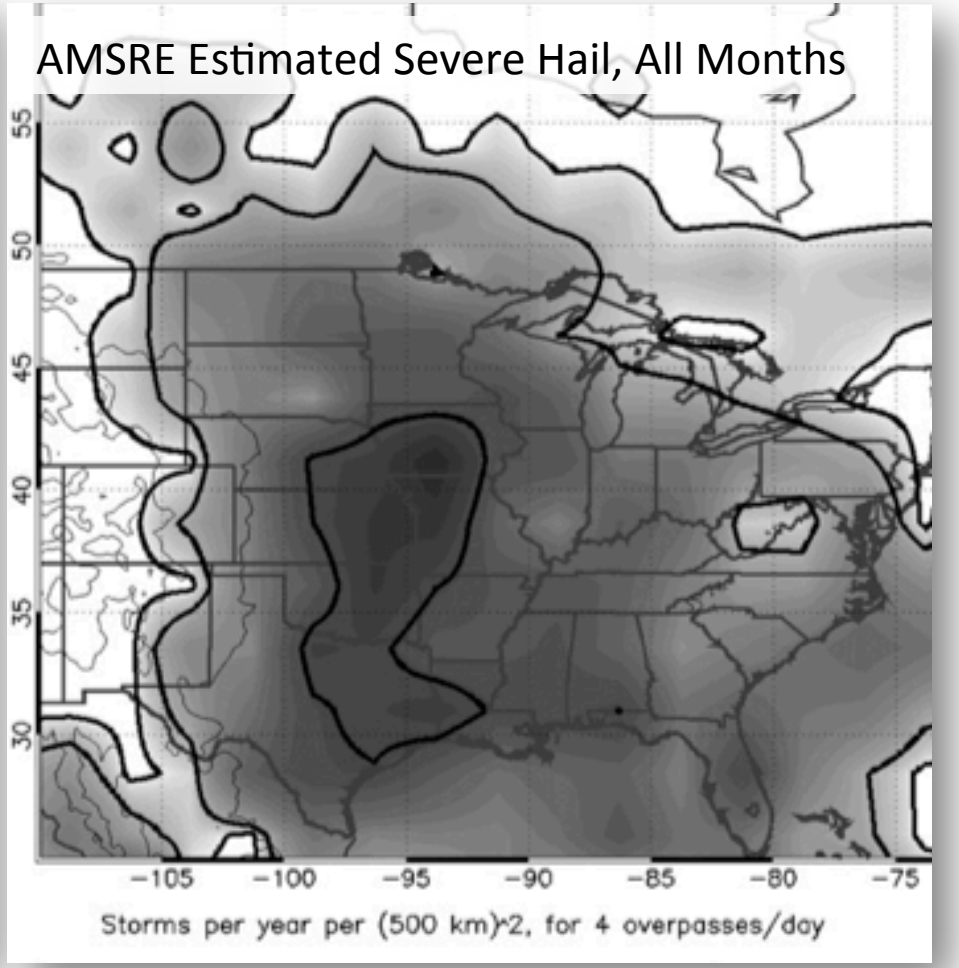
Remote Sensing[9,10] Provides 20 Years of High-Precision Data to Place Long-Run History in a Modern Context



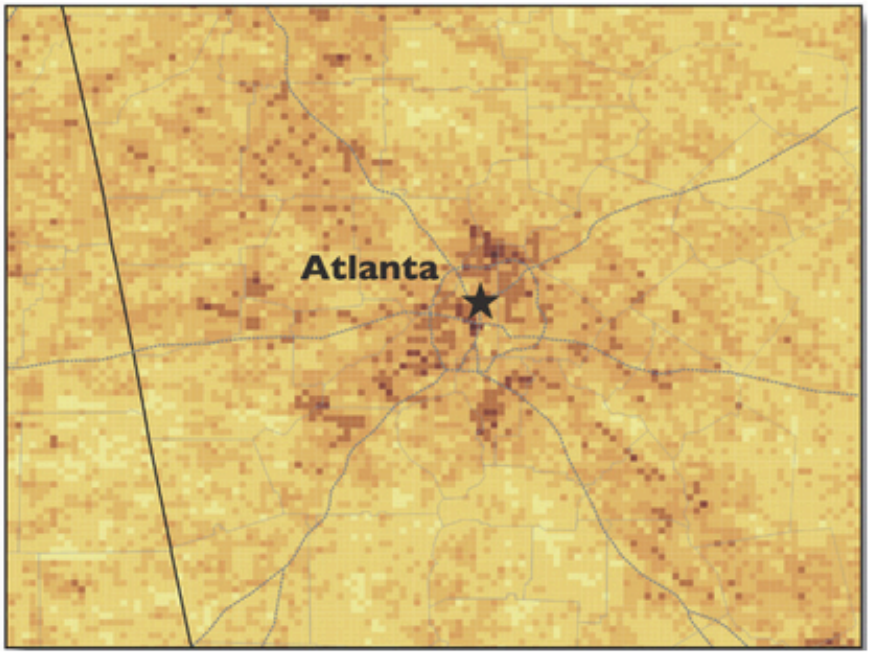


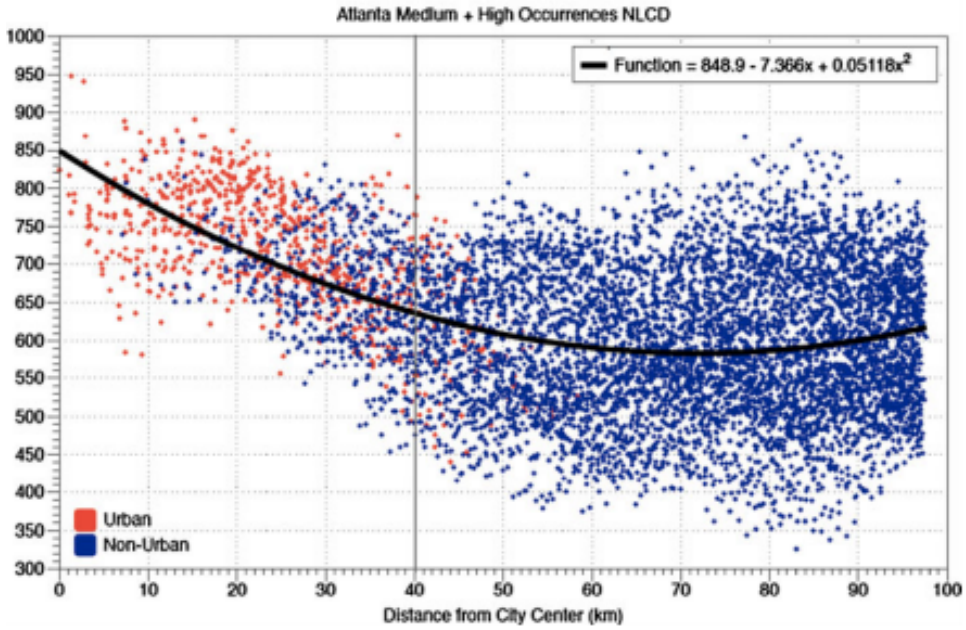
Footnotes:
[9]AER Benchmark™ Database
[10]Cecil & Blankenship (2012)

Urban Environmental Also Result Changes in Strong Storm Frequency[11]

- Increased thunderstorm signatures on radar in urban area shown by dark orange shading

Radar climatology on strong t-storm days during westerly flow





Footnotes:

[11]Ashley et. Al (2011)