Experimental Severe Weather Index

- **Purpose**: To Provide insight and associated risk to any locations that may experience severe thunderstorms around the globe.
- **Methodology**: A complex algorithm that incorporates severe weather parameters using the GFS operational model forecasts.
  -See Appendix for the entire equation
- **Possible Applications**
  1. Insurance
  2. Agriculture
  3. Aviation Planning

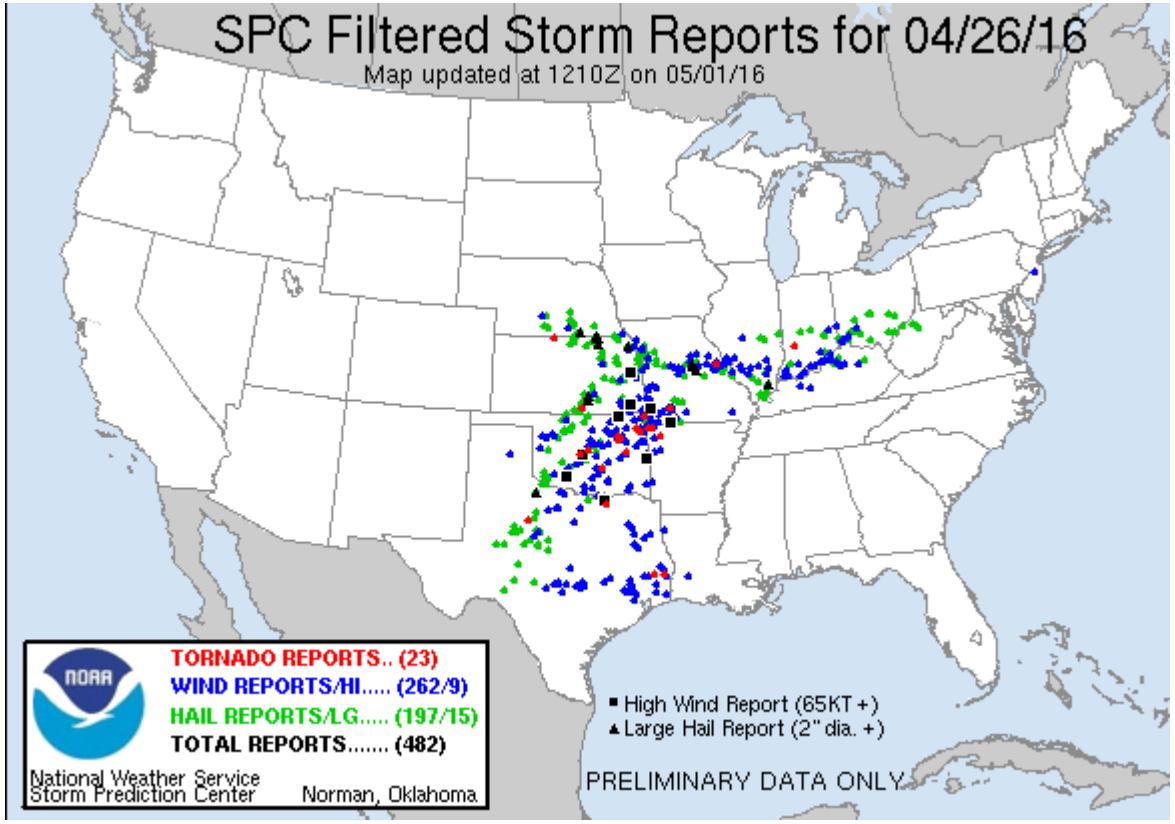
Added Value of the Severe Weather Index

- 3-hour resolution between forecast hours 0-240
  - SPC is a daily aggregate
- 12-hour resolution between forecast hours 240-384
  - SPC Forecast ends on Day 8
- On a gridded platform (global utilization is possible)
  - SPC just focuses on the U.S.

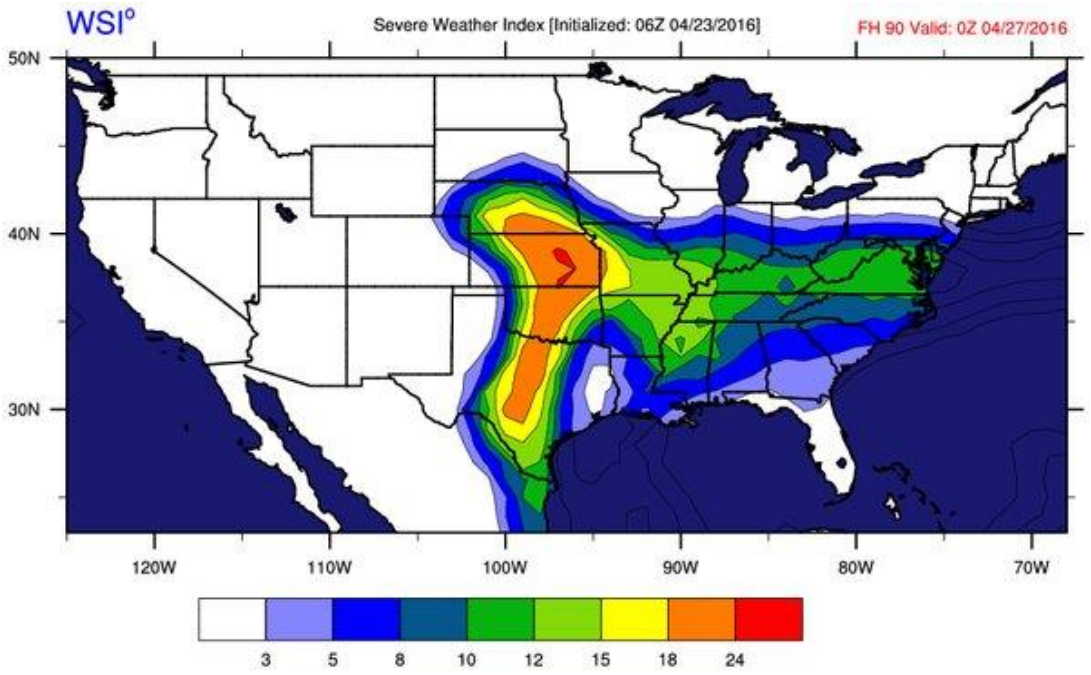
Case Study #1 – Major Severe Wx Outbreak April 26,2016

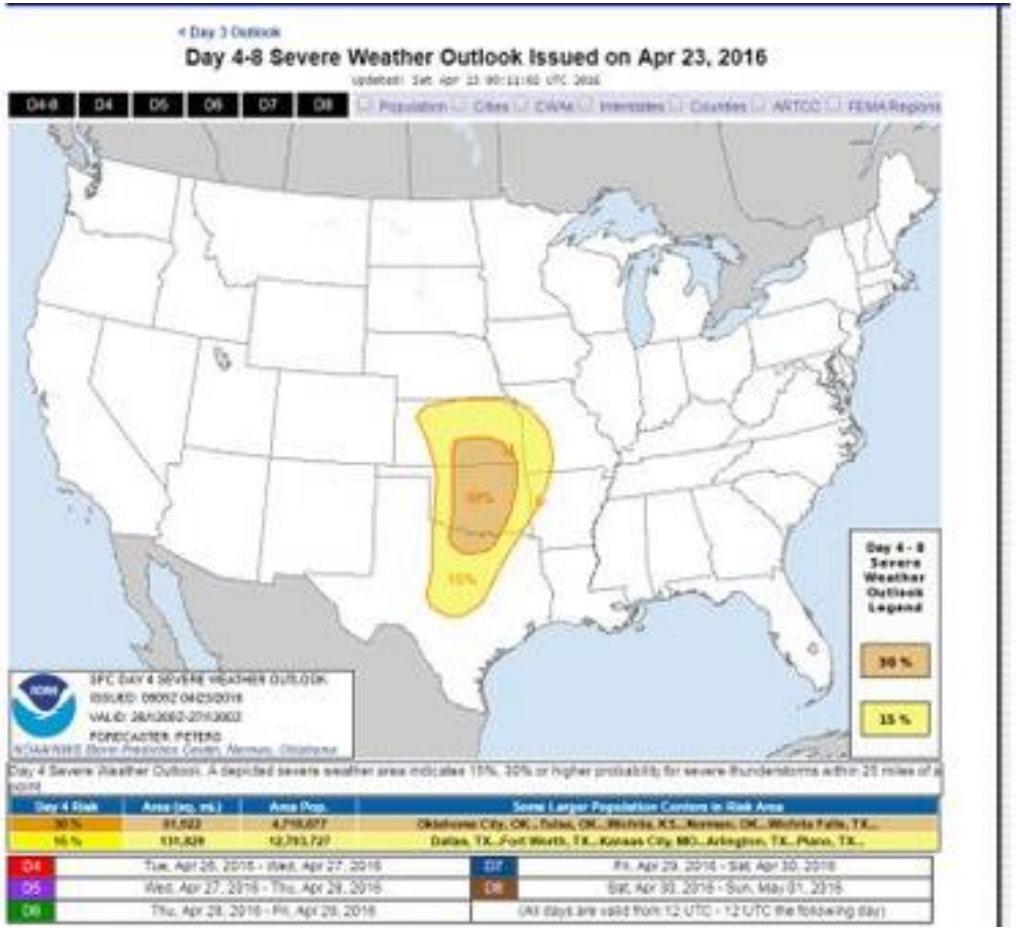
- 482 Total Storm Reports
- 23 Tornados
- 262 Wind Reports
- 197 Hail Reports

-First Case Study available after the creation of the index (Saturday, 4/23/2016)

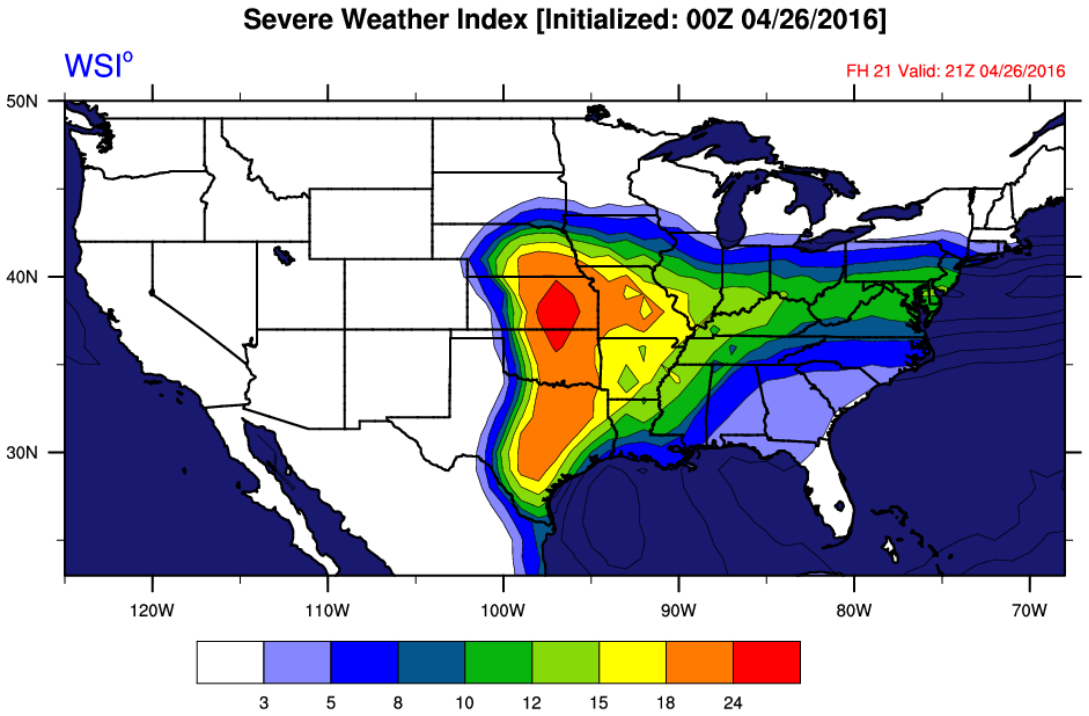


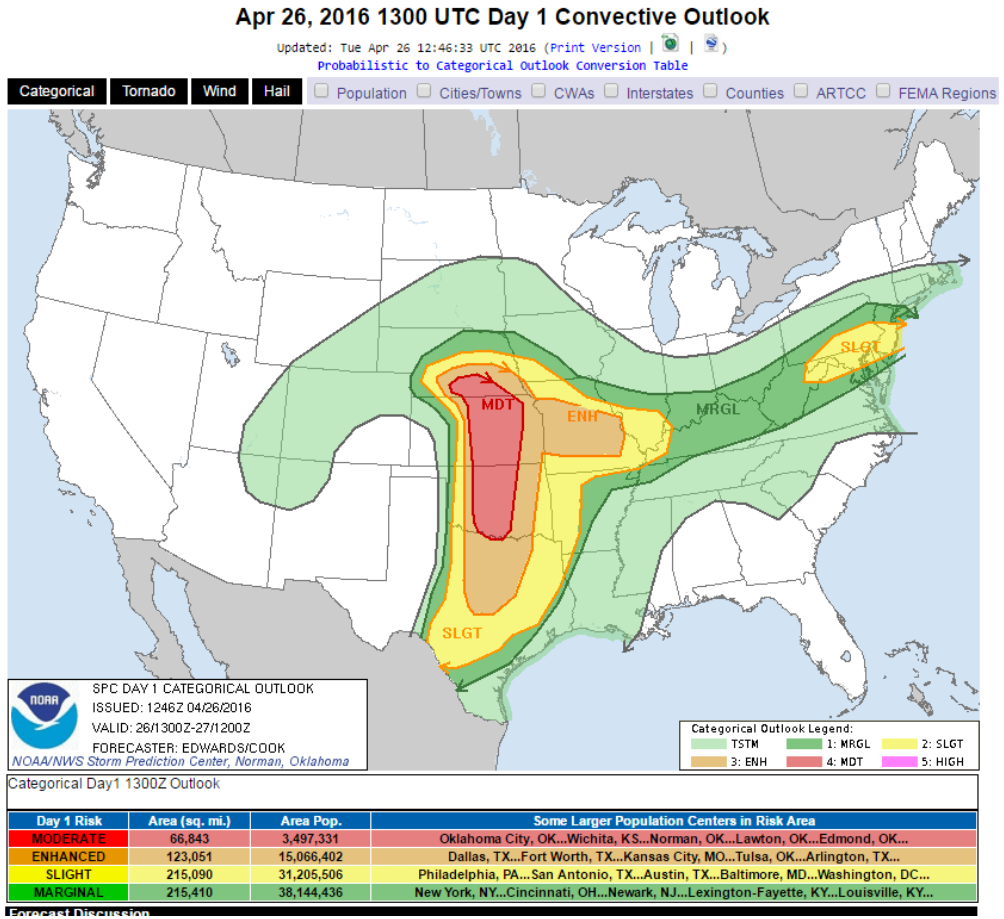
Case Study #1 – **Day 4** Forecast for April 26th





Case Study #1 – **Day 0** Forecast April 26th



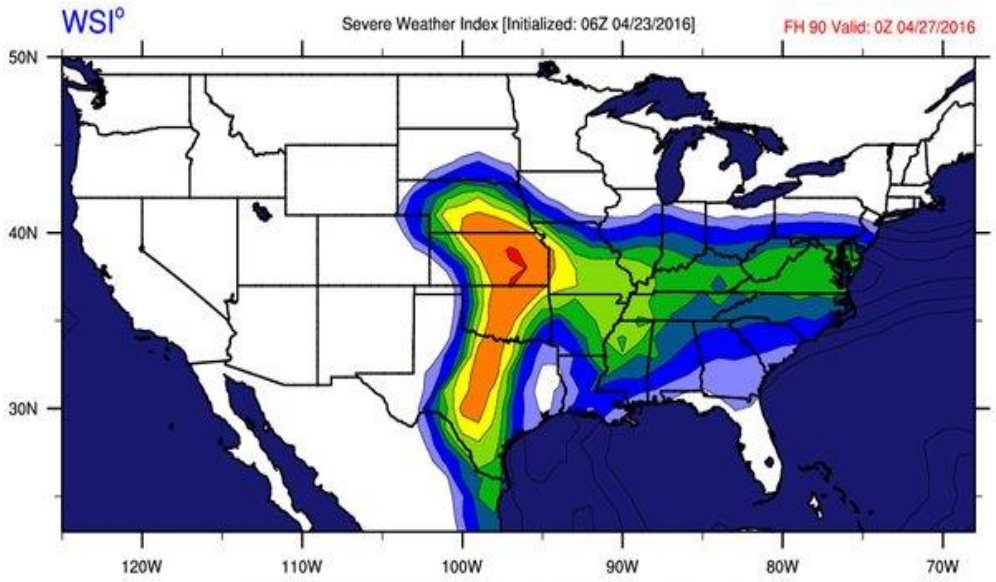


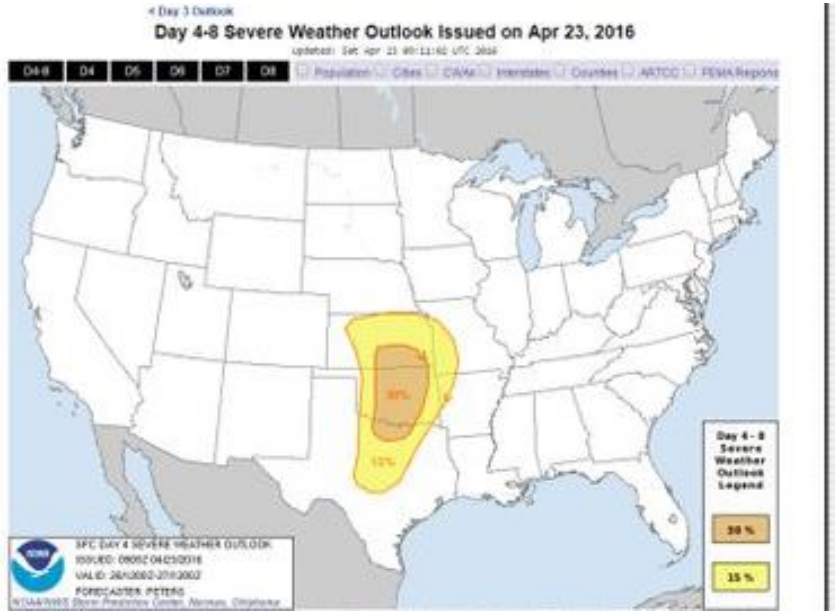
Categorical Day1 1300Z Outlook

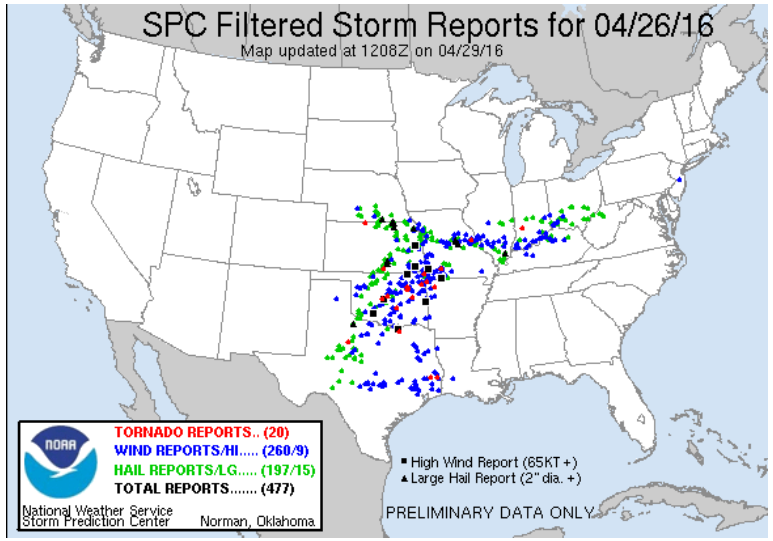
Day 1 Risk	Area (sq. mi.)	Area Pop.	Some Larger Population Centers in Risk Area
MODERATE	66,843	3,497,331	Oklahoma City, OK...Wichita, KS...Norman, OK...Lawton, OK...Edmond, OK...
ENHANCED	123,051	15,066,402	Dallas, TX...Fort Worth, TX...Kansas City, MO...Tulsa, OK...Arlington, TX...
SLIGHT	215,090	31,205,506	Philadelphia, PA...San Antonio, TX...Austin, TX...Baltimore, MD...Washington, DC...
MARGINAL	215,410	38,144,436	New York, NY...Cincinnati, OH...Newark, NJ...Lexington-Fayette, KY...Louisville, KY...

Forecast Discussion

Case Study #1 – **Day 4** Forecast for April 26th - Verification

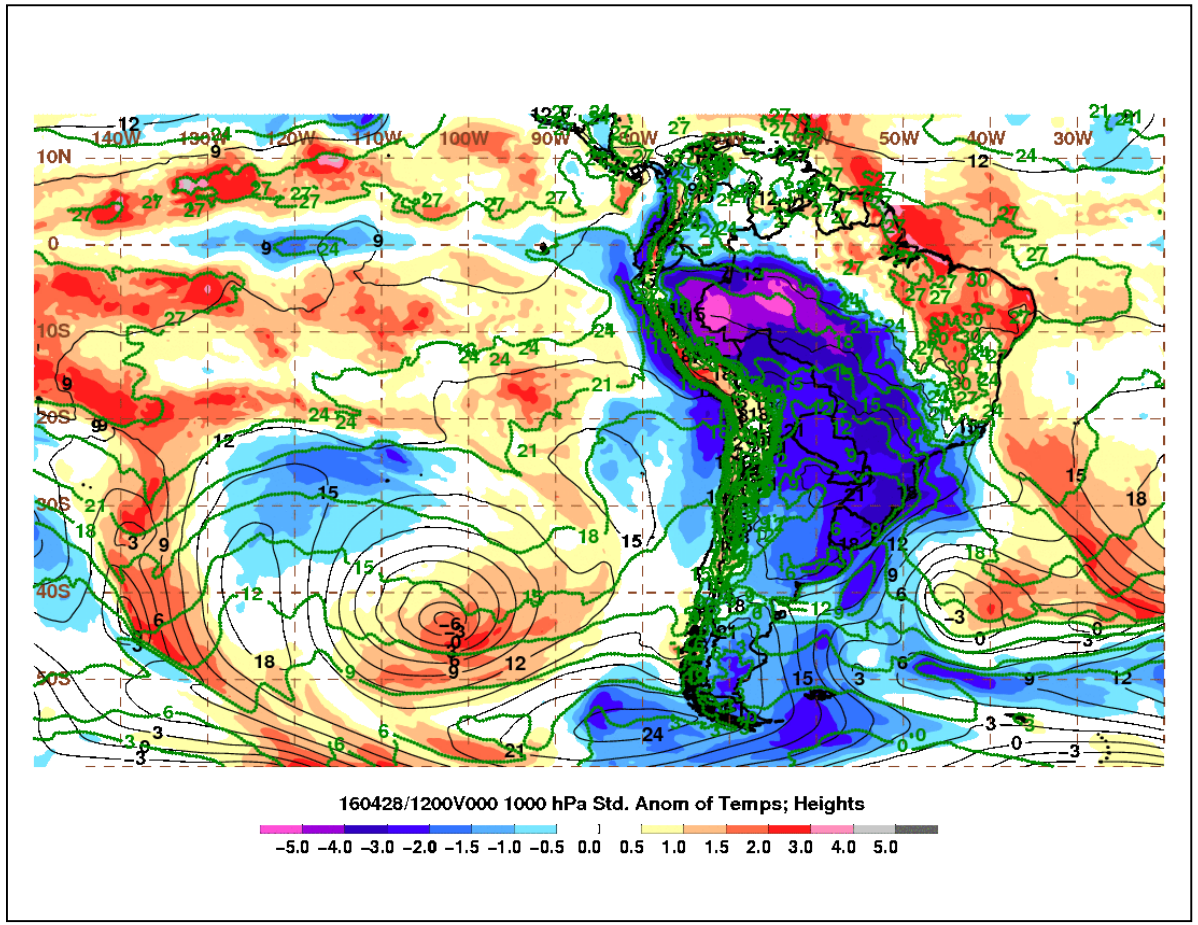




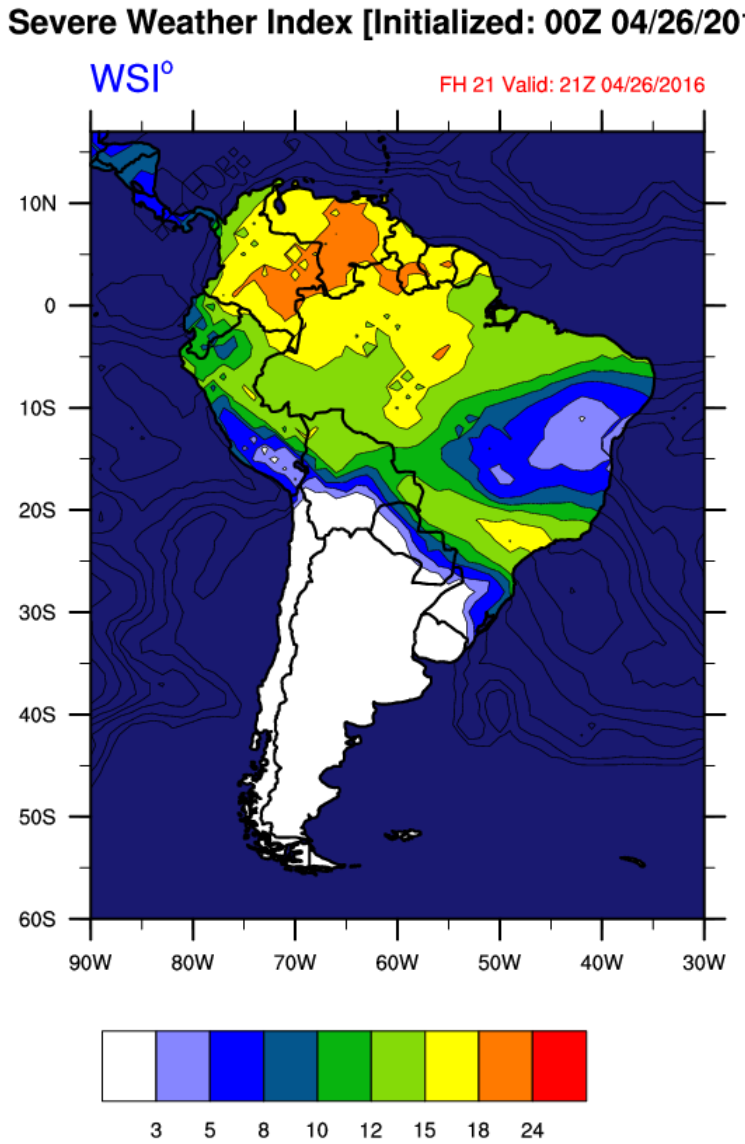


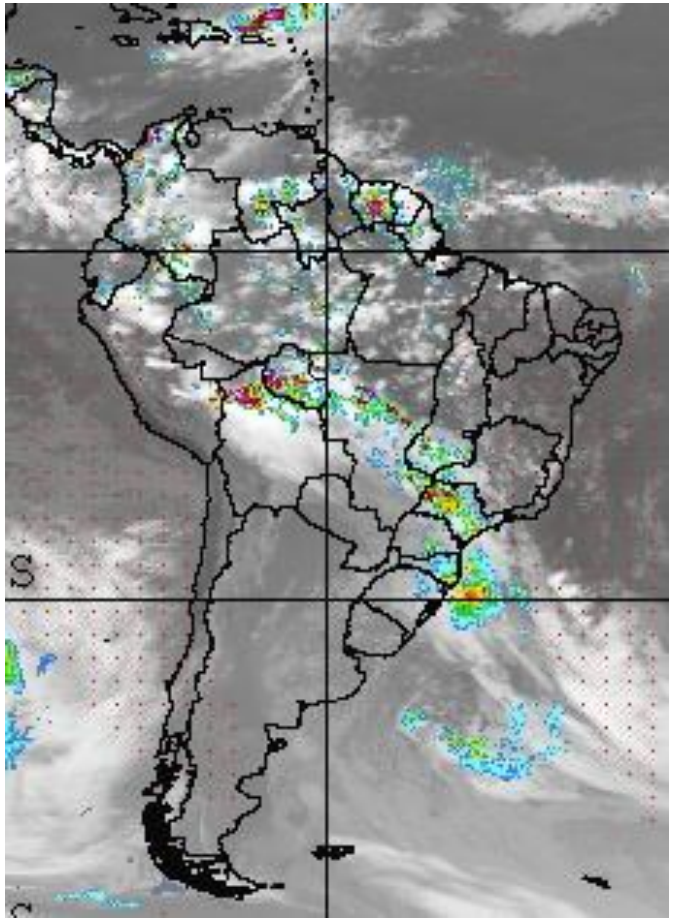
Case Study #2 – South America Cold Surge

- Active Severe Weather Pattern from April 26-28th
- Major Cold Air intrusion down the lee of the Andes
  - ✓ Severe Weather Potential
- Demonstrates Global Application
  - ✓ Impacted Flight Planning in Aviation

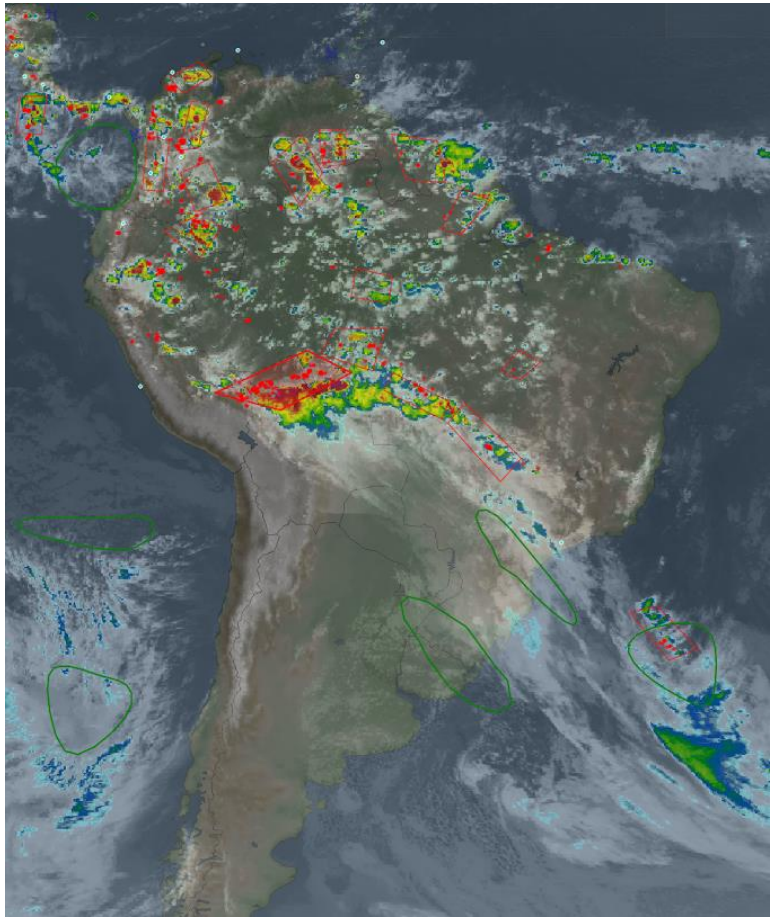


Case Study #2 – **Day 0** Forecast April 26-27





22Z



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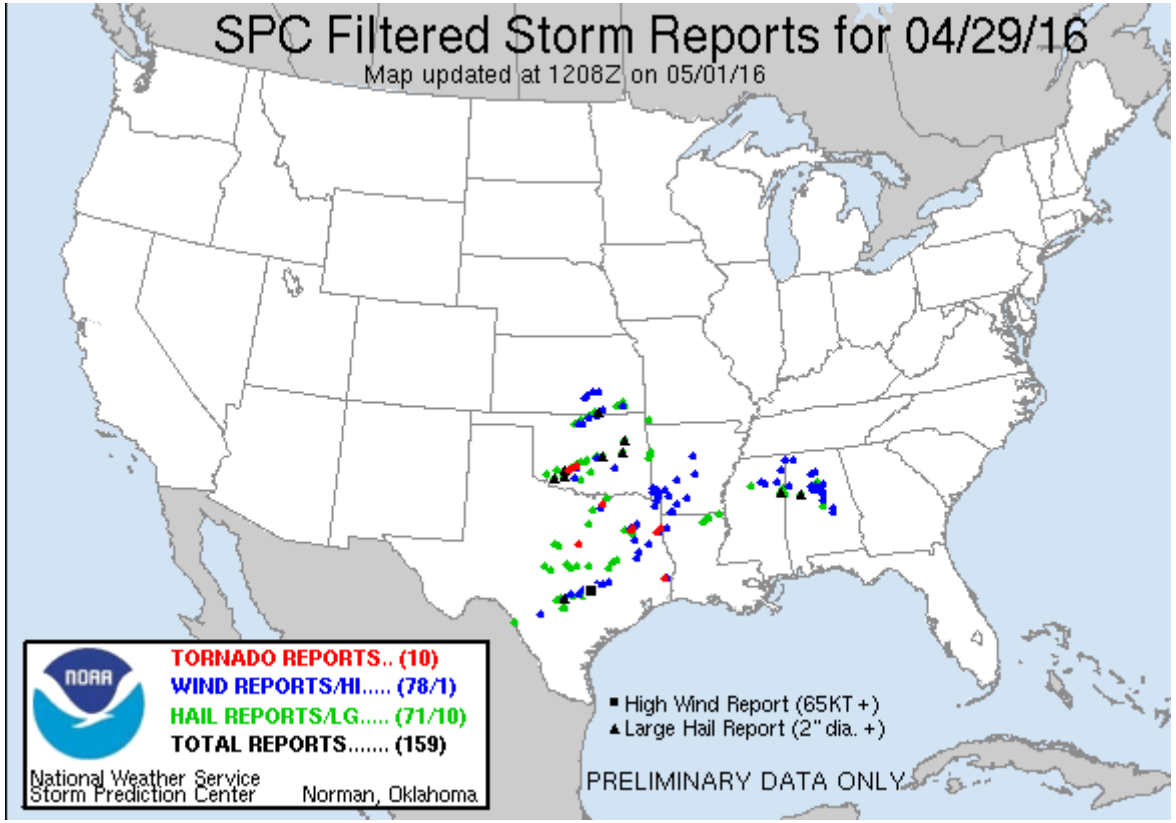
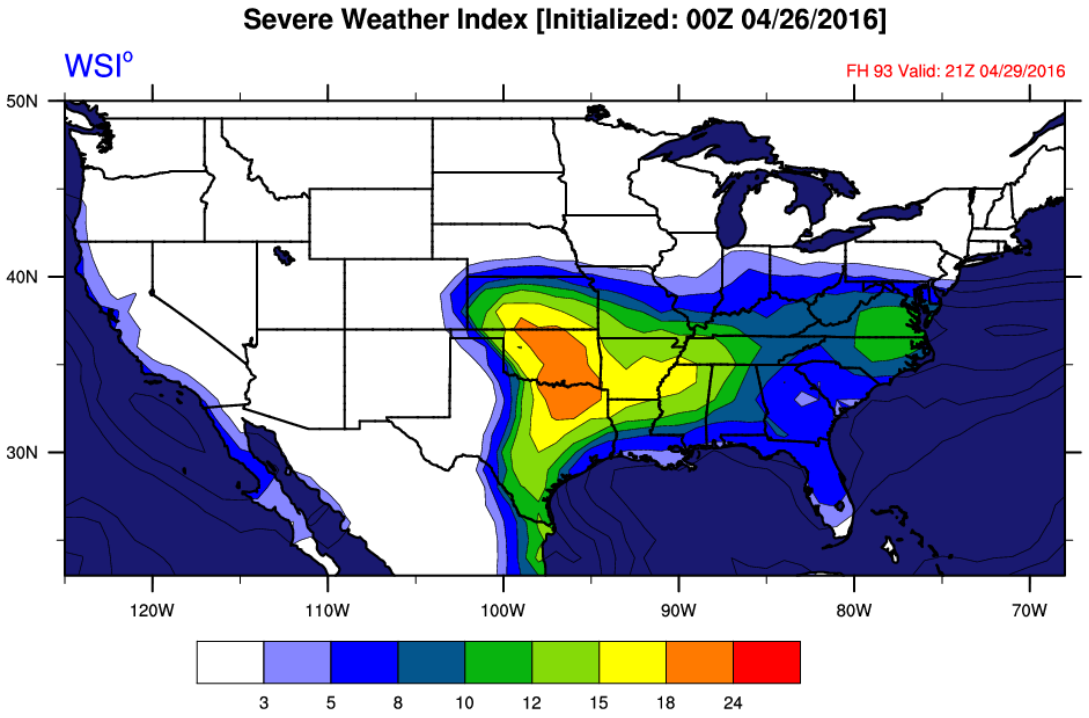
Case Study #3 – Plains Severe Wx Outbreak April 29,2016

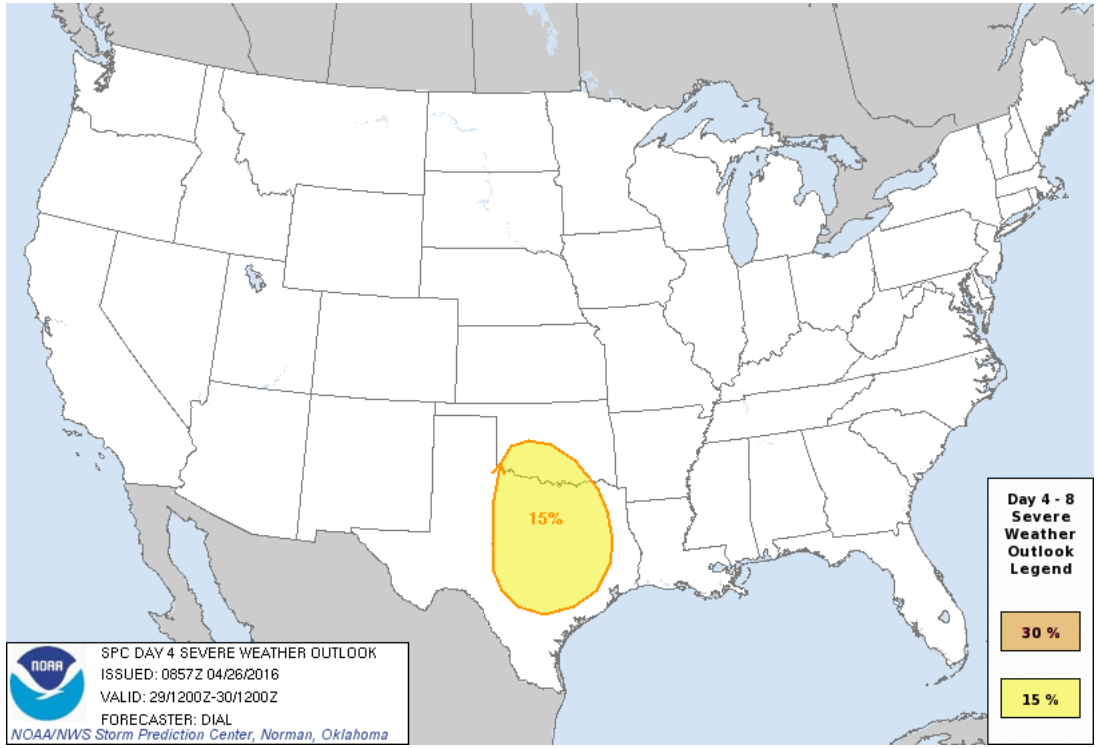
- 159 Total Storm Reports
- 10 Tornados
- 78 Wind Reports
- 71 Hail Reports

- SPC trended in favor of the Index

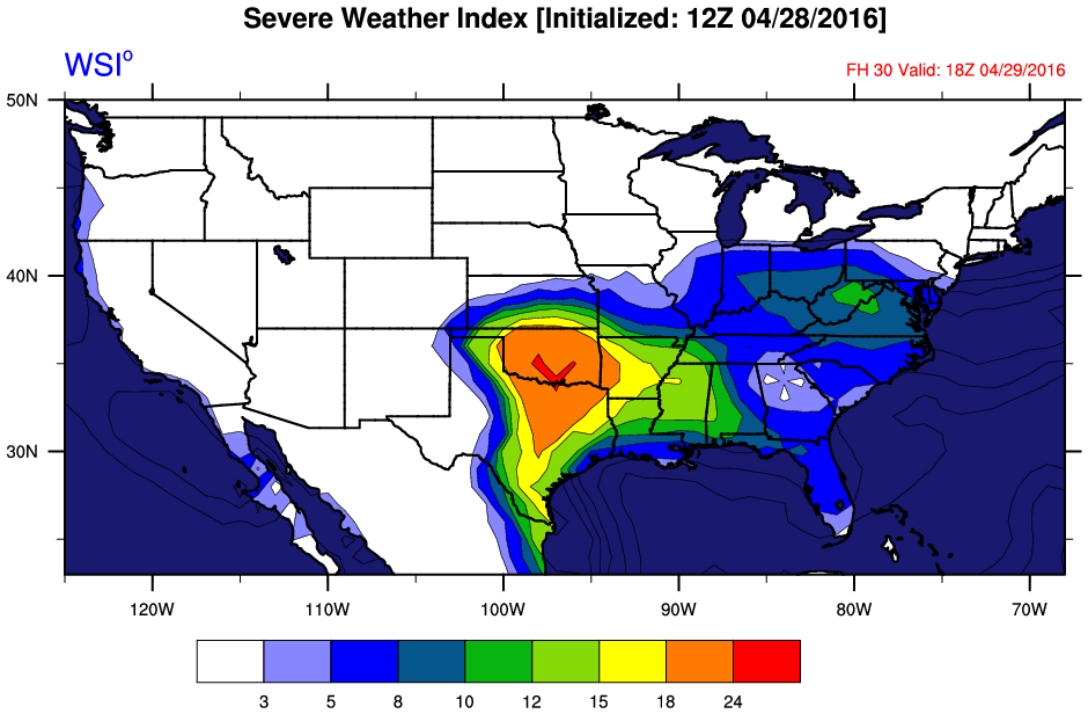


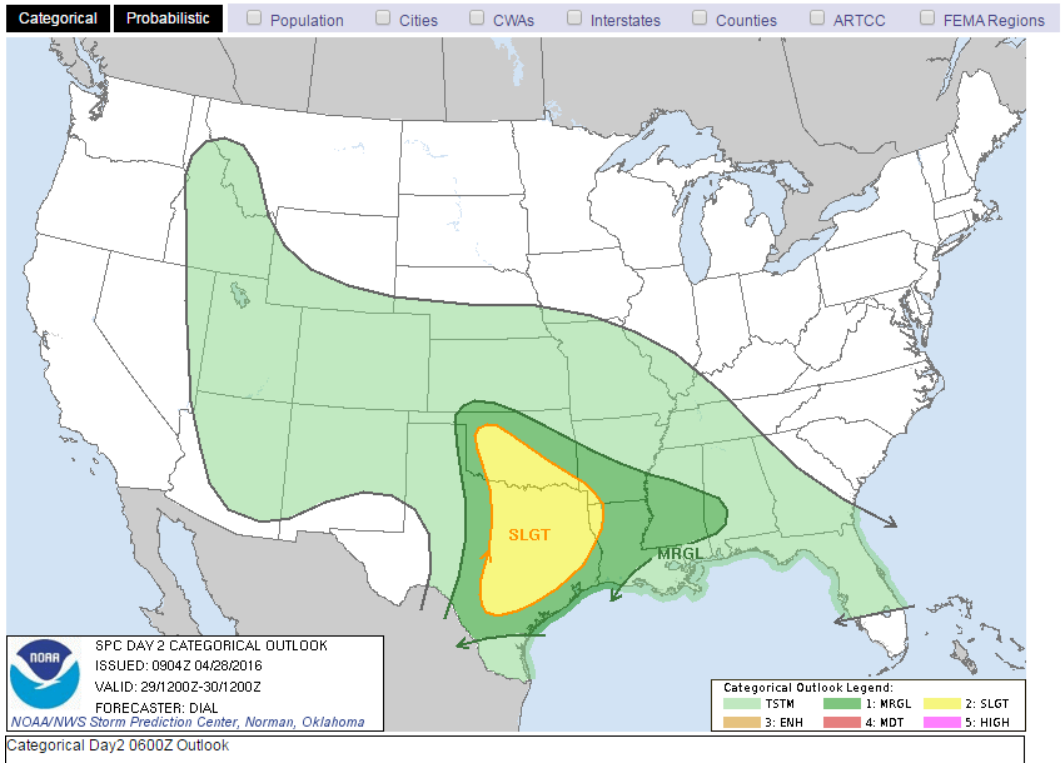
Case Study #3 – Day 4 April 29



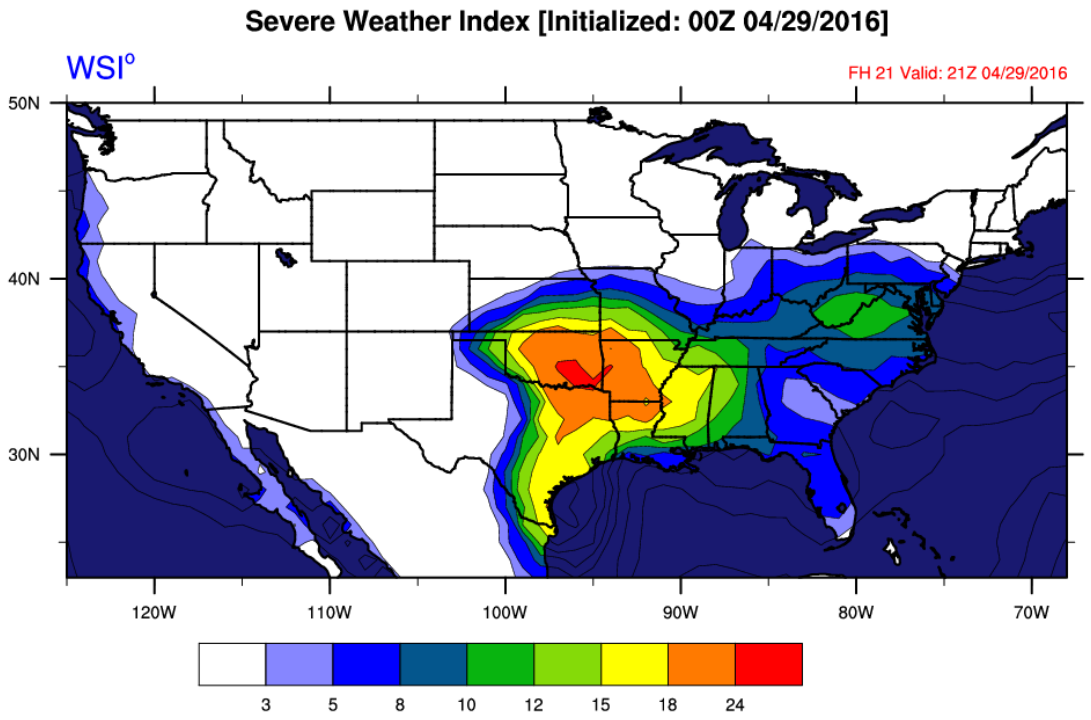


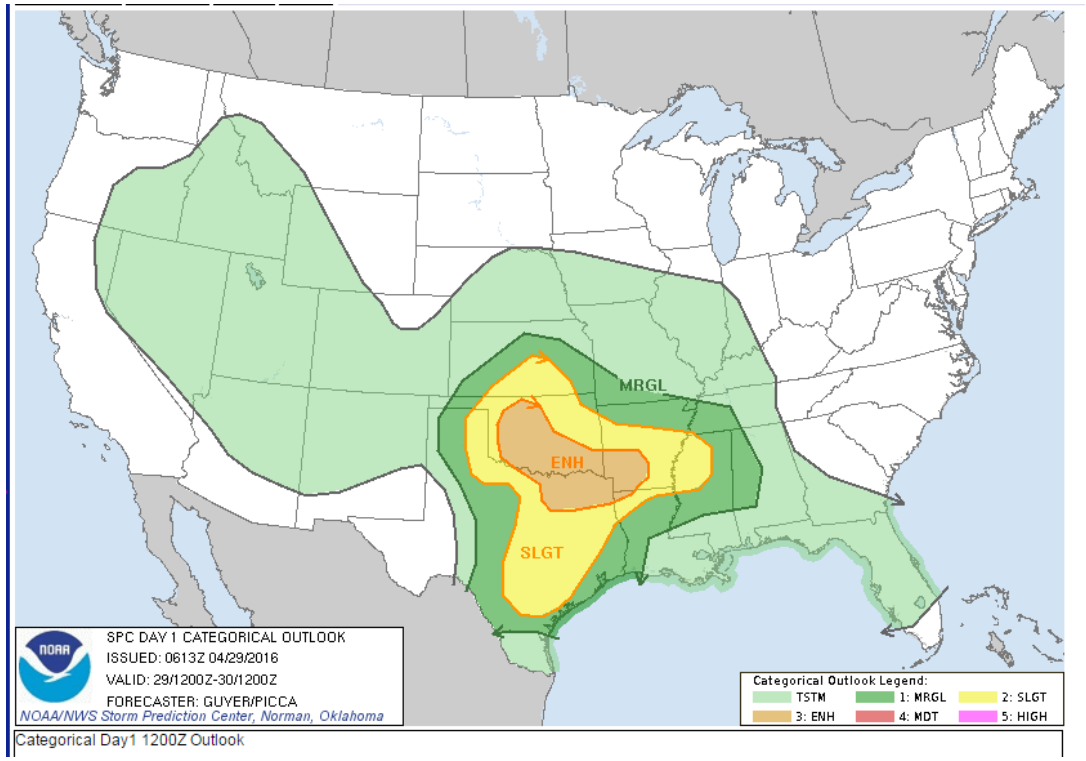
Case Study #3 – Day 2 April 29





Case Study #3 – Day 0 April 29



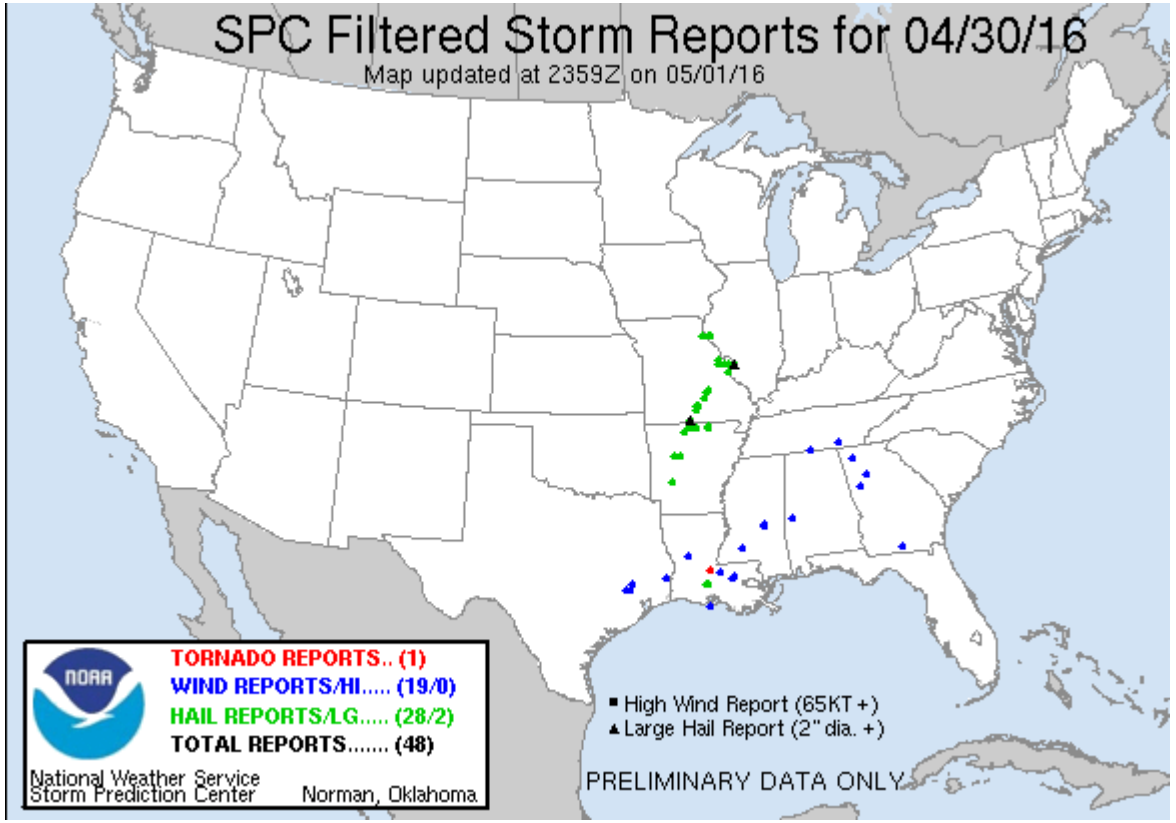


Case Study #4 – MS Valley (~Bust)

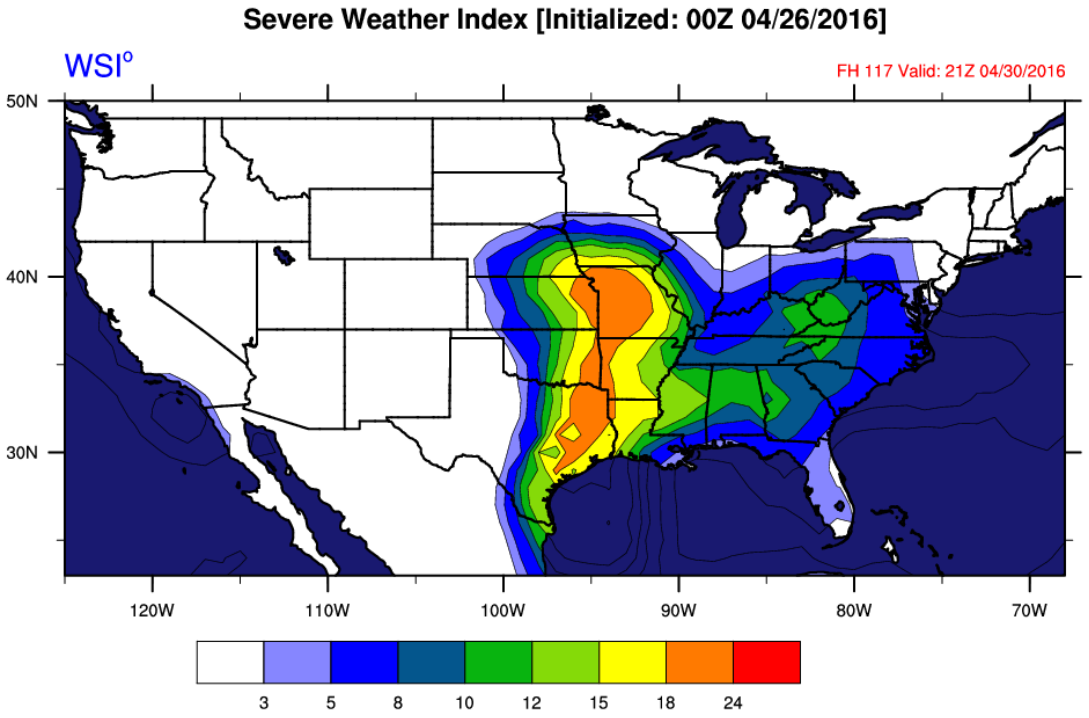
- 48 Total Storm Reports
- 1 Tornado
- 19 Wind Reports
- 28 Hail Reports

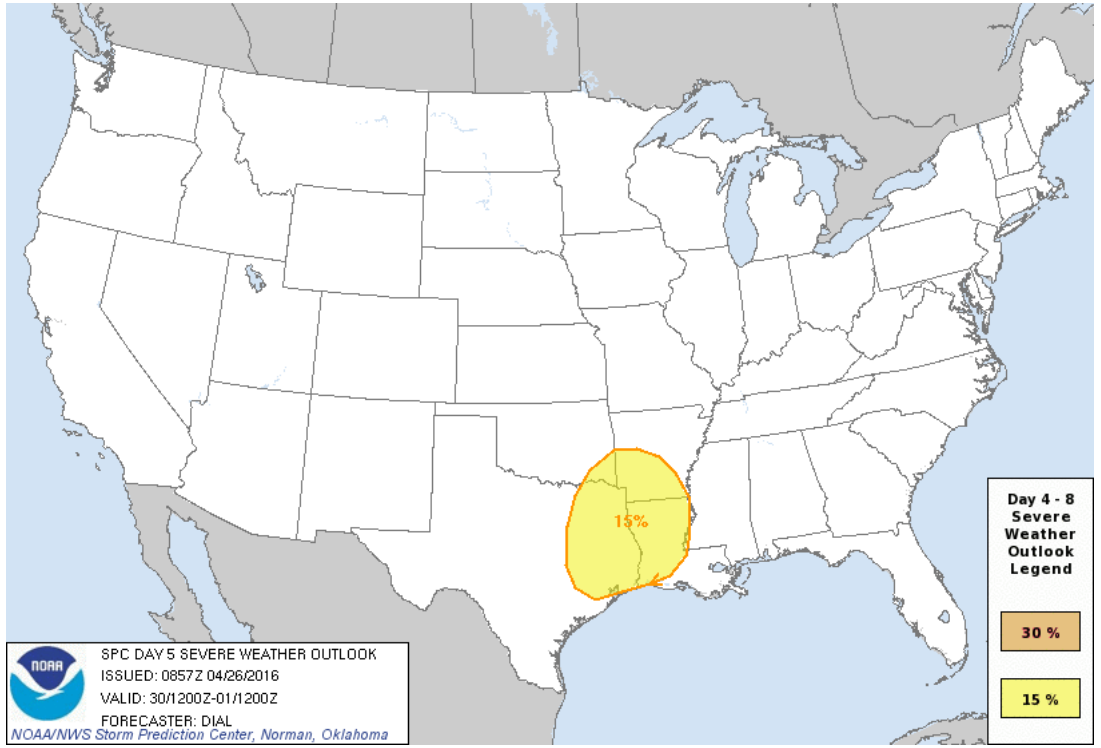
- The Index over-predicted the nature of severe weather, though correctly captured the spatial structure.

- SPC trended in favor of the Index

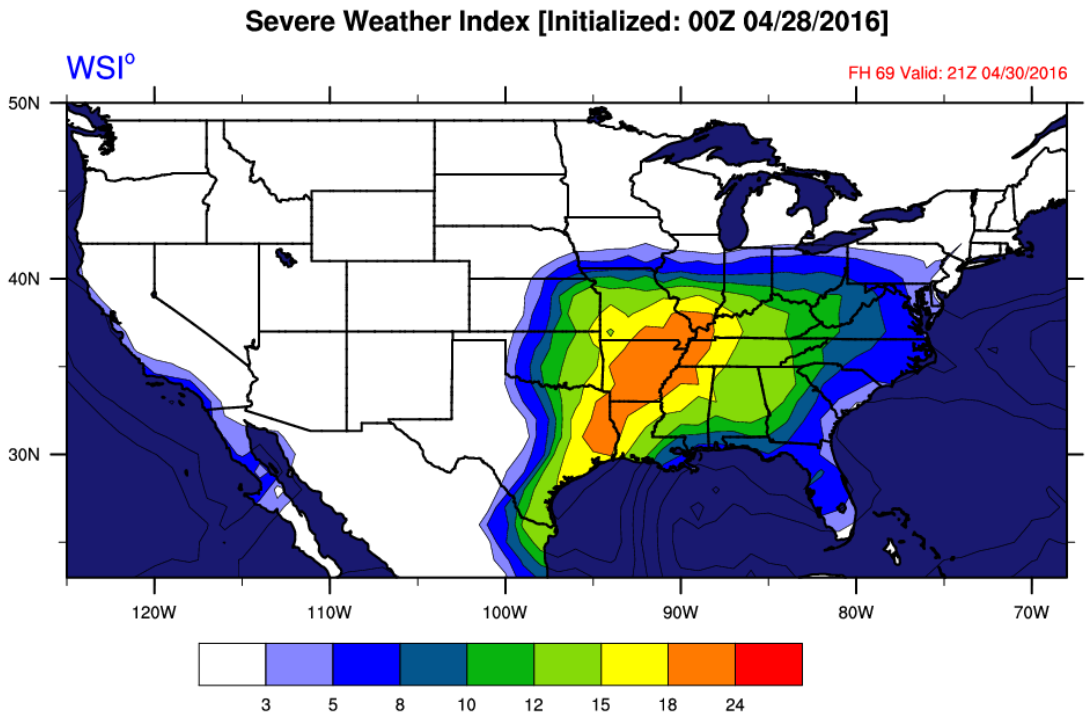


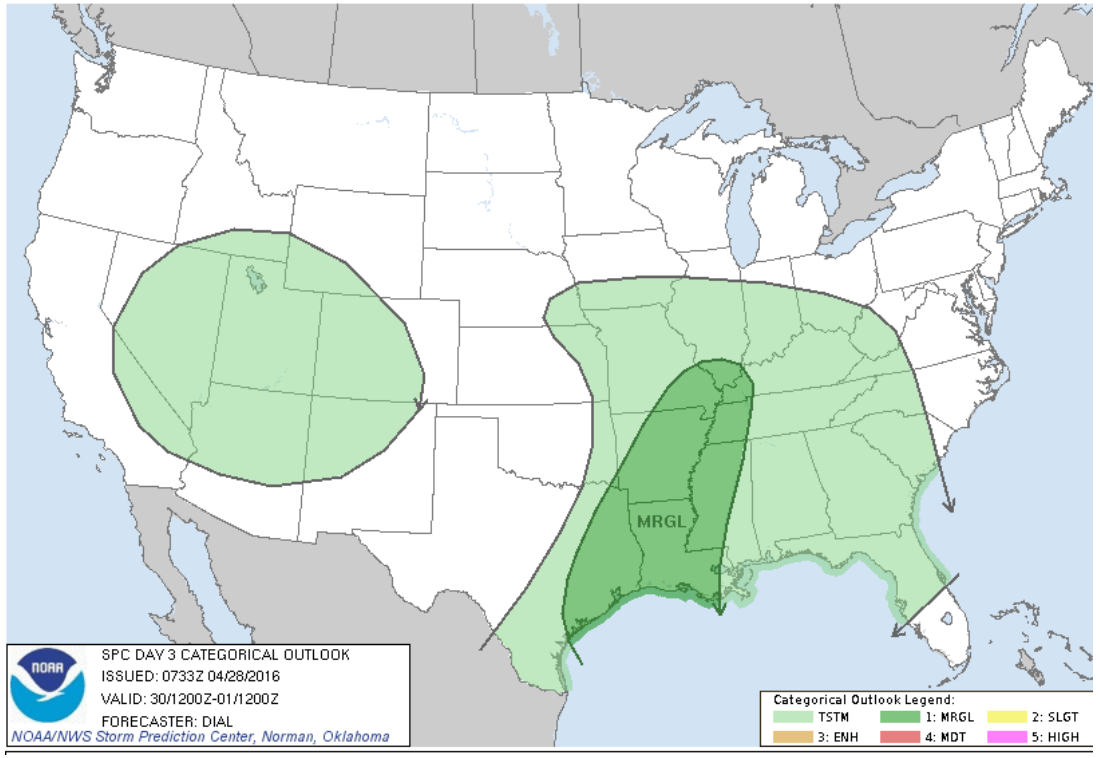
Case Study #4 – Day 5 April 30



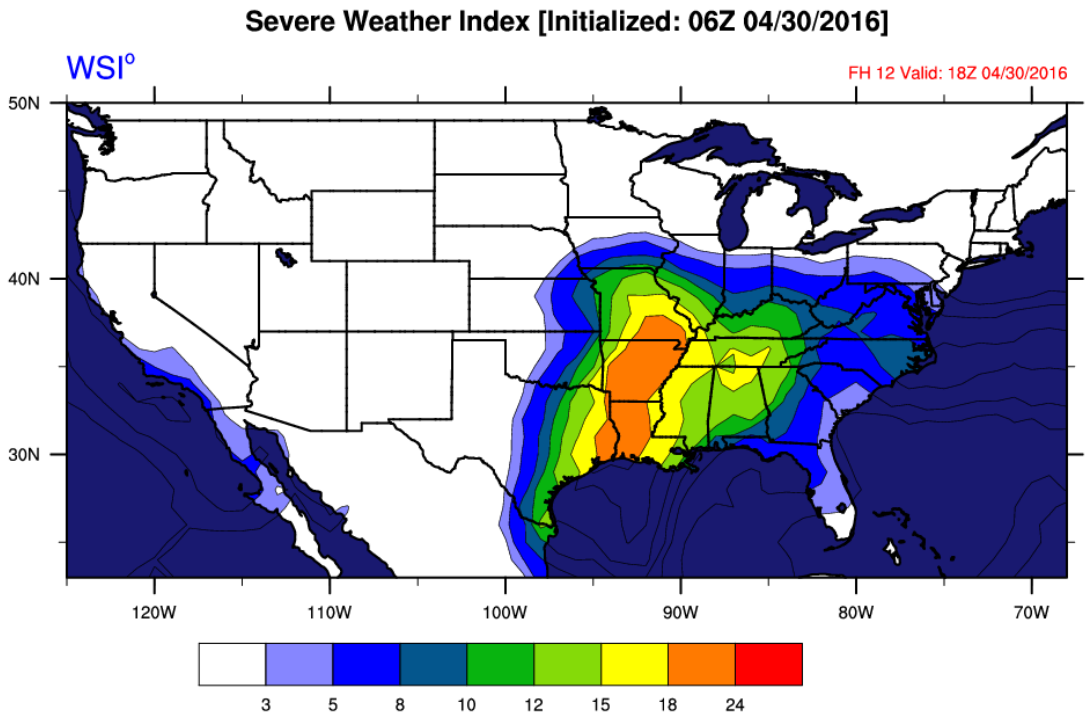


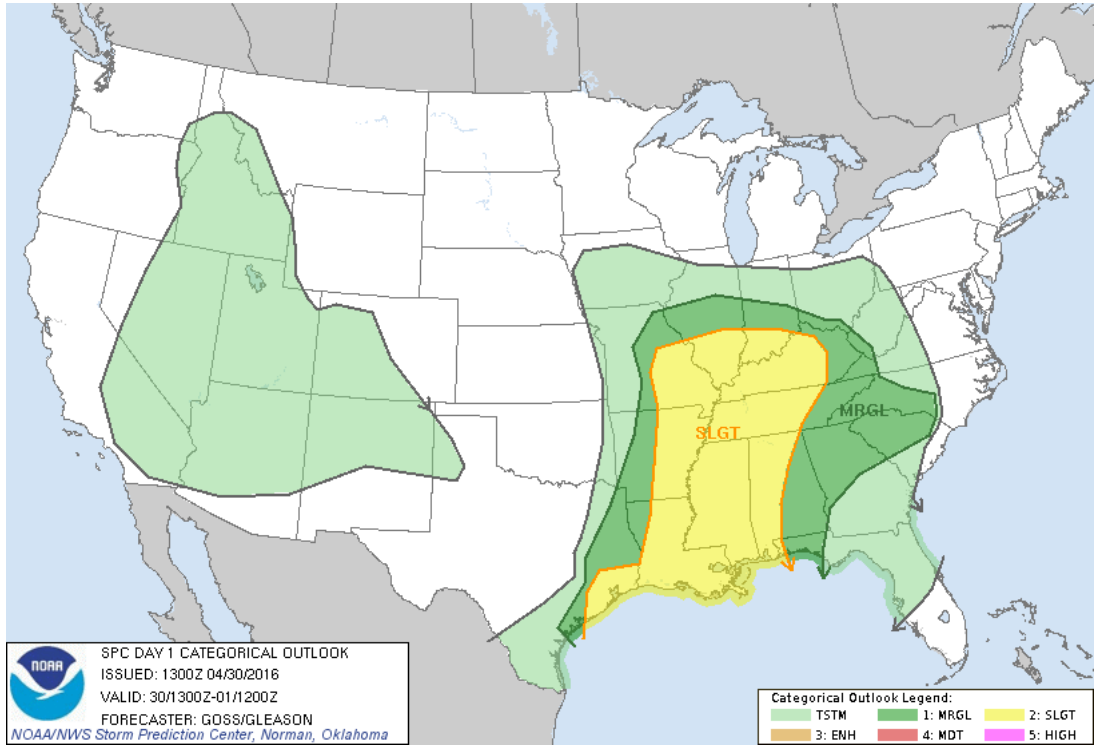
Case Study #4 – Day 3 April 30





Case Study #4 – Day 0 April 30

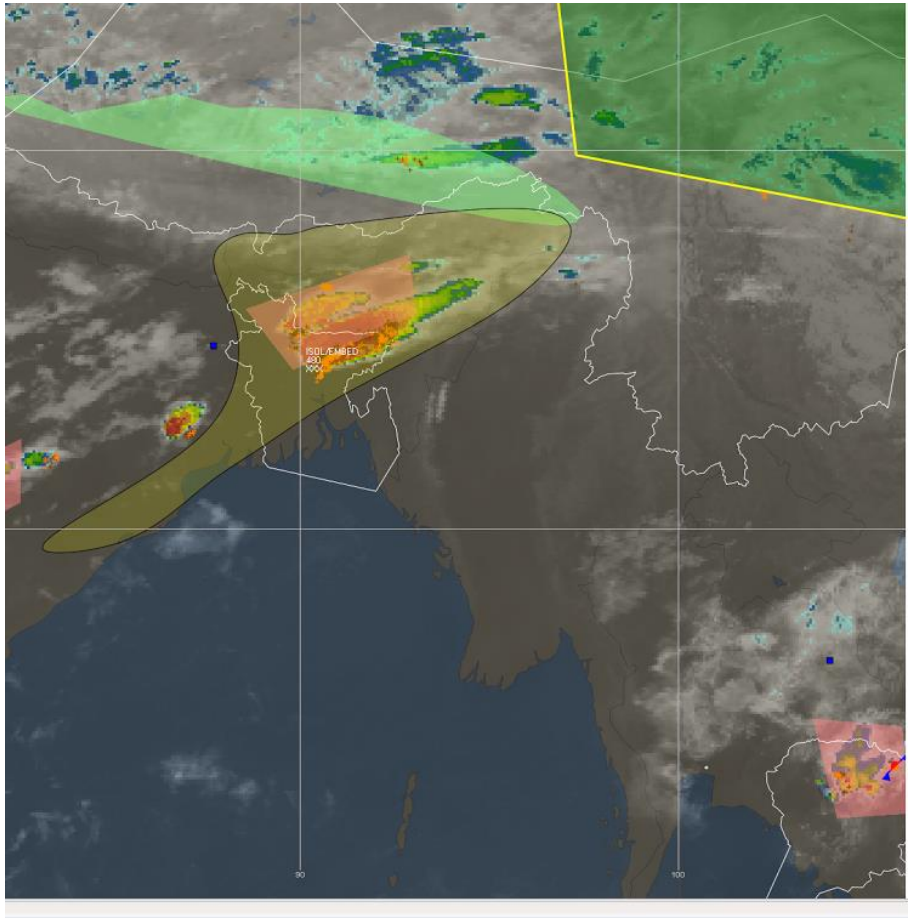




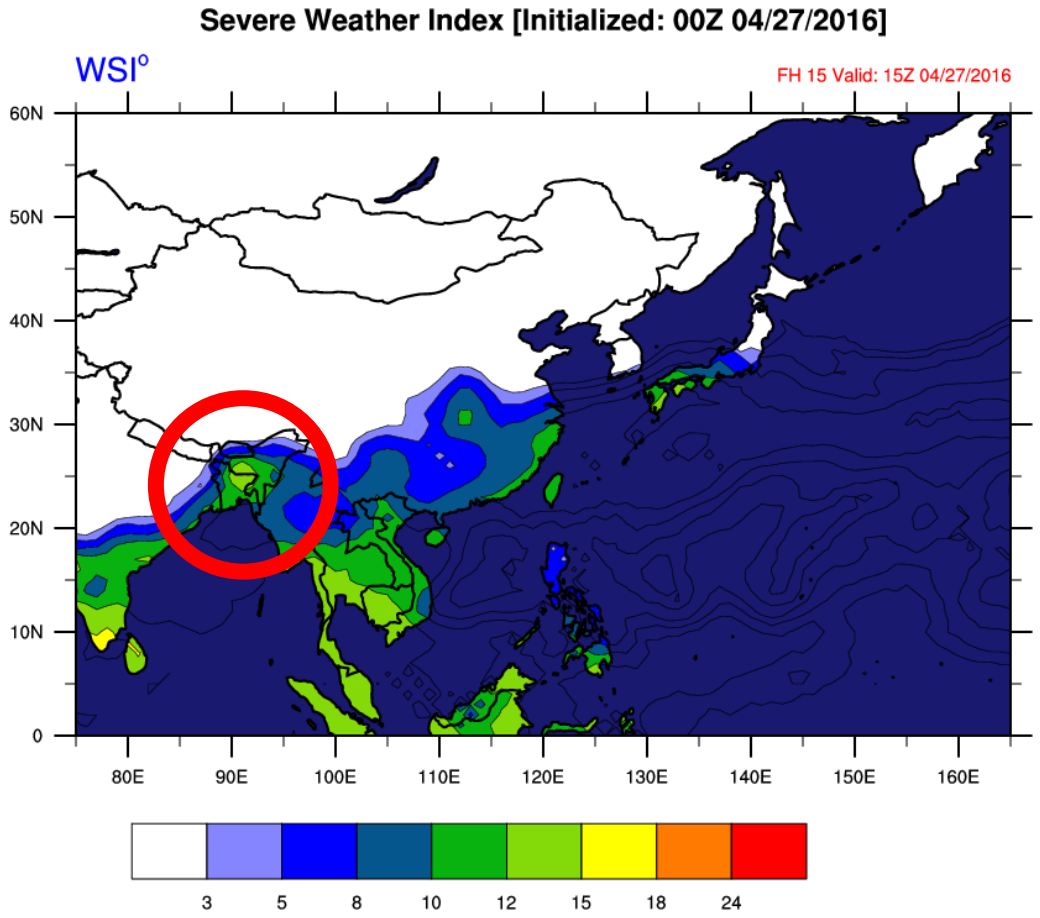
Case Study #5 – Bangladesh MCS April 27,2016

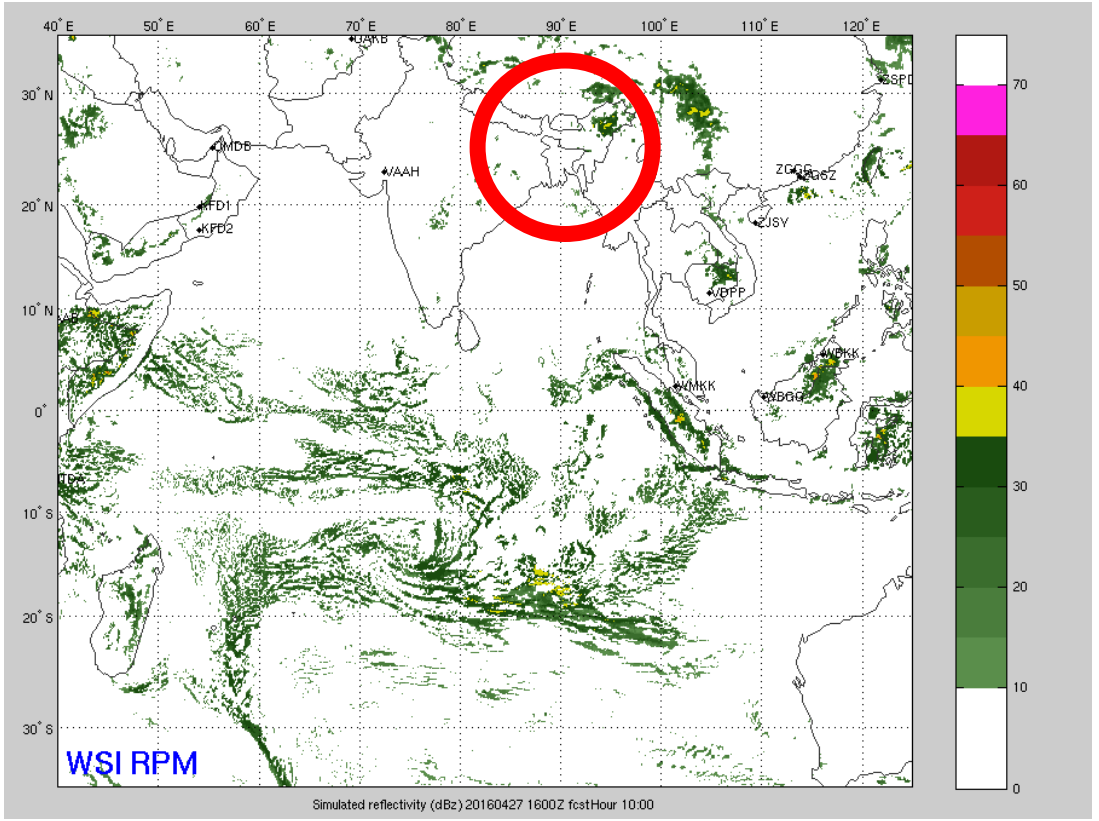
Aviation Operational Forecaster brought this to my attention.

- Strong MCS over the Bangladesh area
- RPM showed no storm threat
- Experimental Severe Weather Index bulls-eyed this location



Cast Study #5 – Day 0 Bangladesh

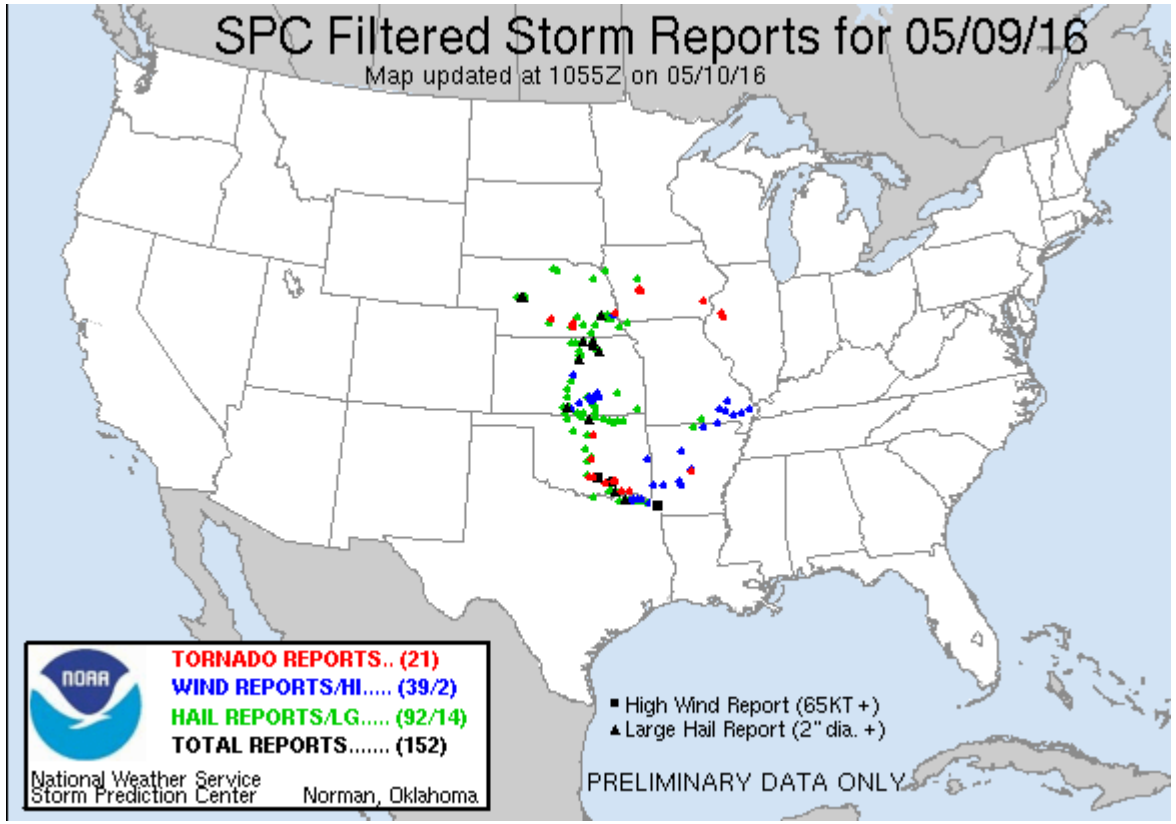




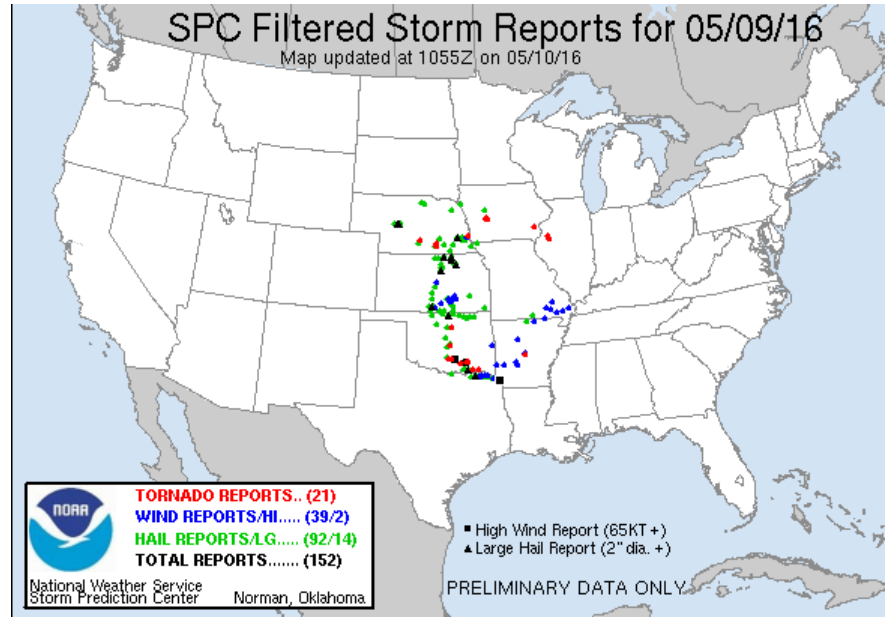
Case Study #6 – Plains/Midwest Tornado Outbreak

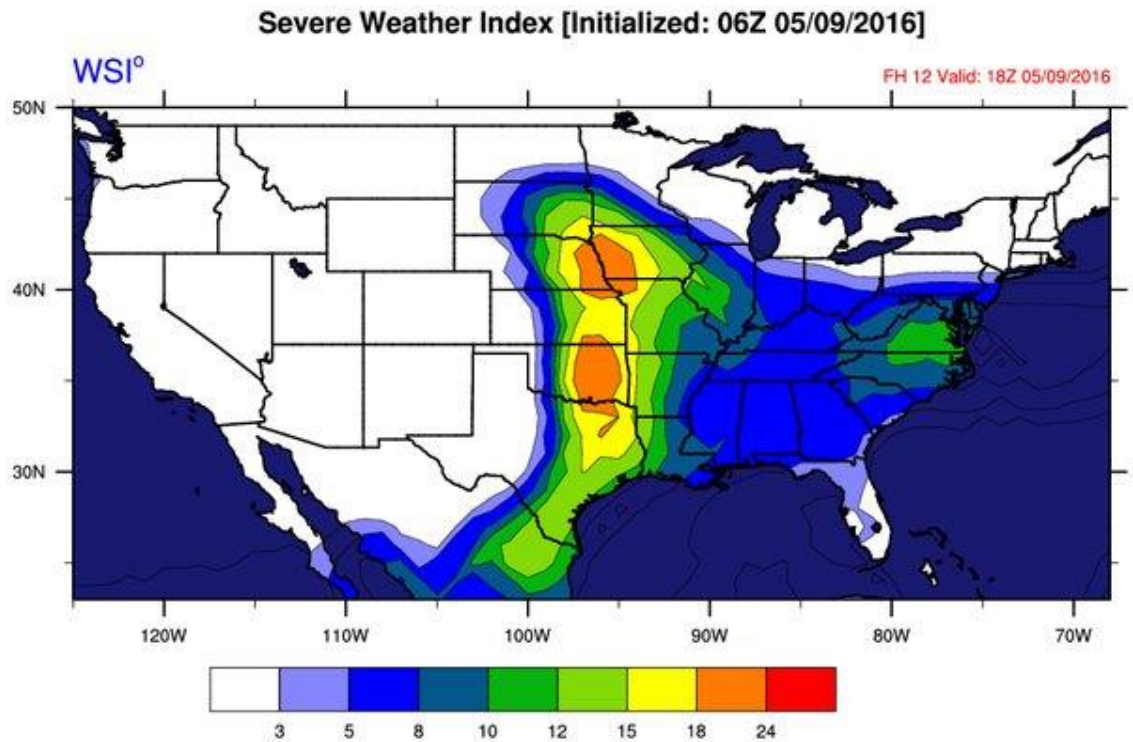
- 152 Total Storm Reports
- 21 Tornado
- 39 Wind Reports
- 92 Hail Reports

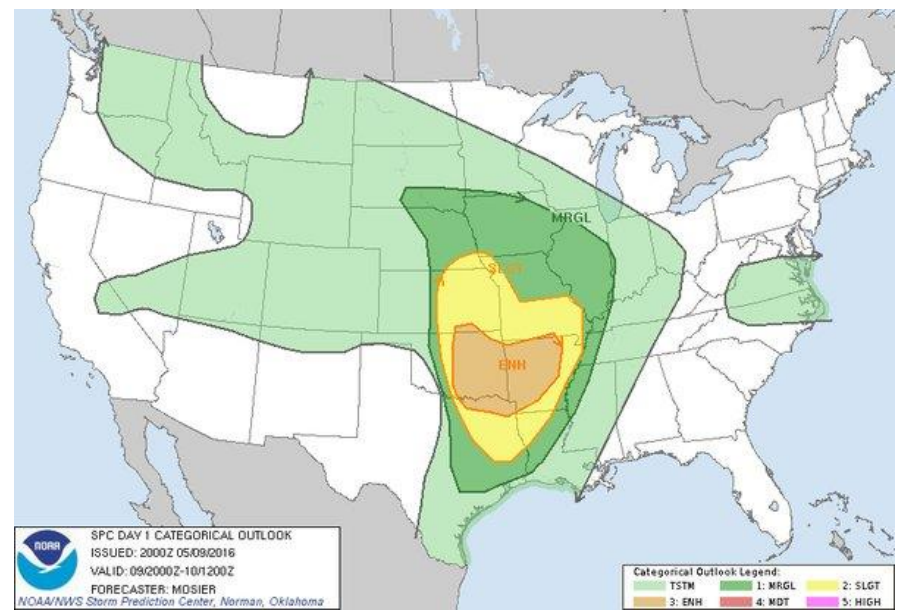
Provided some extra color to the Day 0 SPC outlook over NE-IO-IL



Verification →







Case Study #7 – Day 4 May 26