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NICS

CAPS 4 km Ensemble and 1 km Deterministic Forecast for NOAA HWT

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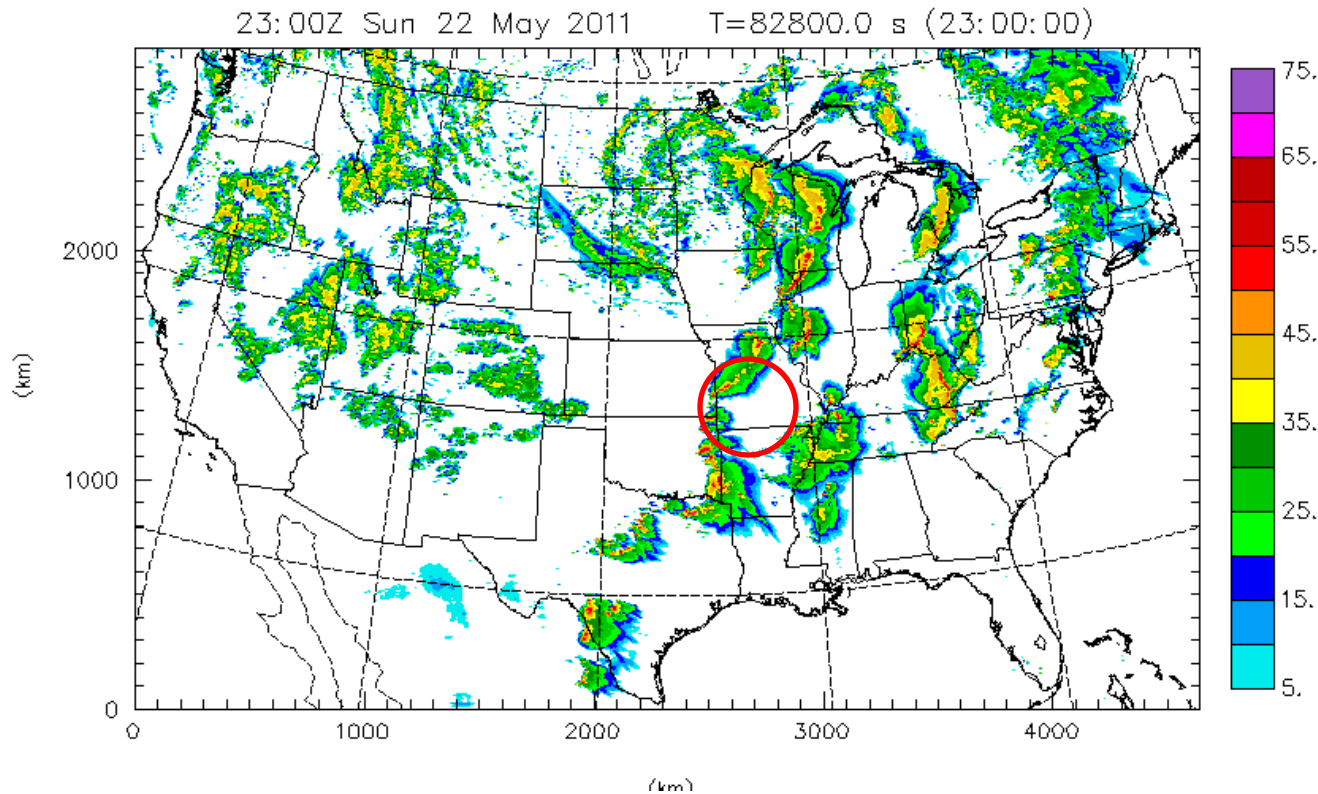
System highlight

- Full continental US domain (4640 km x 2880 km)
- Daily 30 h forecasts: 26-member storm-scale ensemble forecasts at **4 km** grid spacing and one deterministic forecast at **1 km** grid spacing
- Radar data from 140 WSR-88D radars across the US are analyzed into the forecasts
- Ensemble forecast (4 km): from three NWP models—19 WRF-ARW, 5 WRF-NMM, 2 ARPS members
- Deterministic forecast (1 km): WRF-ARW model
- Experiment ran from April 26 to June 18 (on weekdays)
- Athena, a Cray XT4 supercomputer at NICS/U. of Tennessee (over 18000 cores), was dedicated 6 h each day to run the forecasts



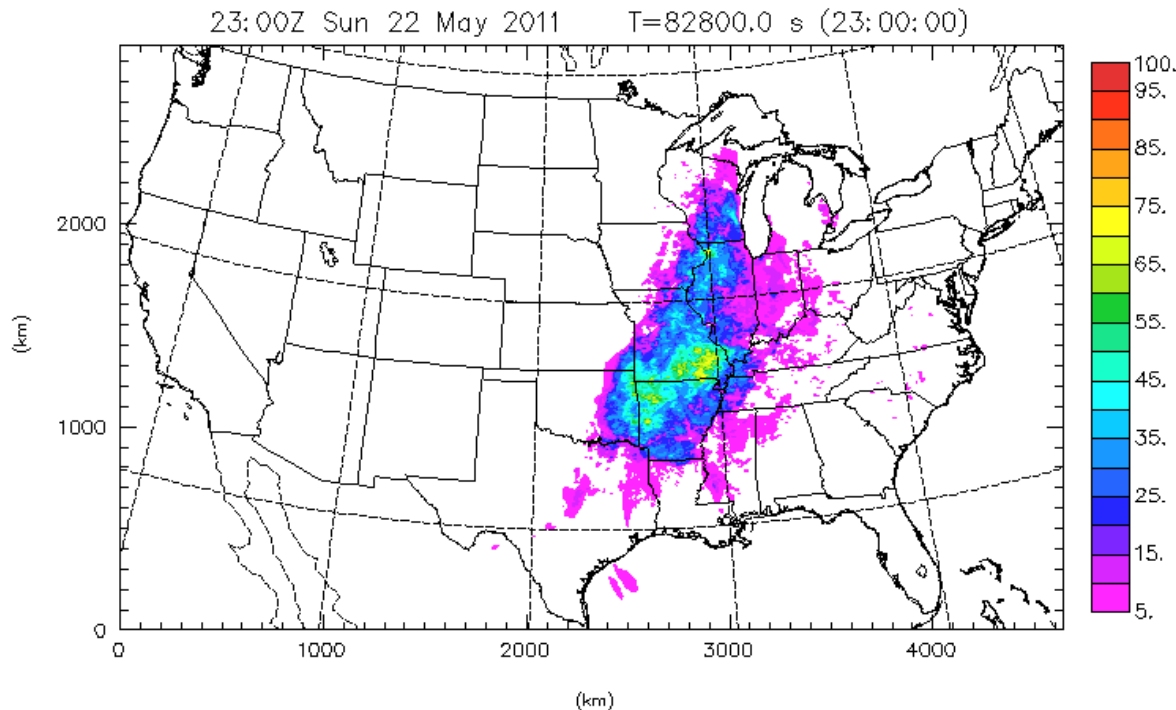
May 22, 2011 Joplin, MO, tornado

- An EF-5 tornado occurred May 22 in Joplin, Missouri, with surface wind greater than 200 mph, causing 138 fatalities and 1150 injured in the Joplin area. It occurred around 2240 to 2300 UTC. This image is the 23 hour forecasted composite radar reflectivity from CAPS WRF forecast at 1-km grid spacing, running on Kraken using 12,800 cores.



May 22, 2011 Joplin, MO, tornado

- This is the 23 hour forecasted neighborhood probability for the Significant Tornado Parameter (STP) ≥ 3 derived from the CAPS storm-scale ensemble forecast (SSEF), running on NICS Athena using 9,800 cores. Statistical study shows majority of tornados EF-2 and above occurred in the regions with STP ≥ 1 .



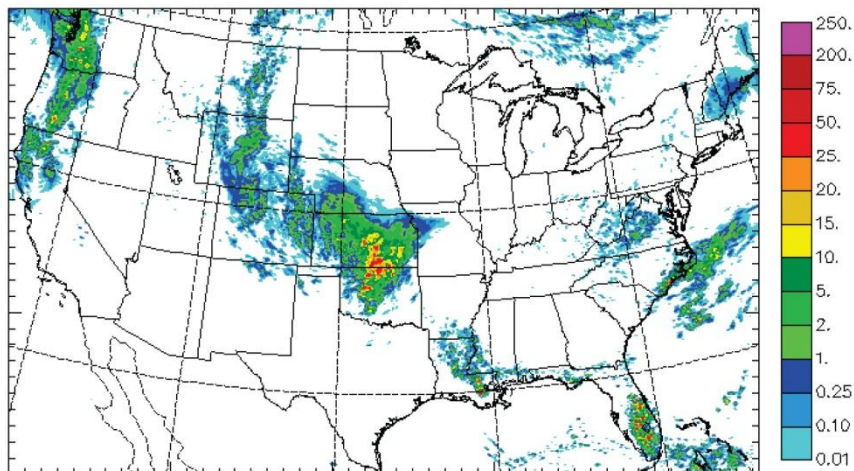
stp3_p(% , Shaded)

Min=0.00 Max=73.3



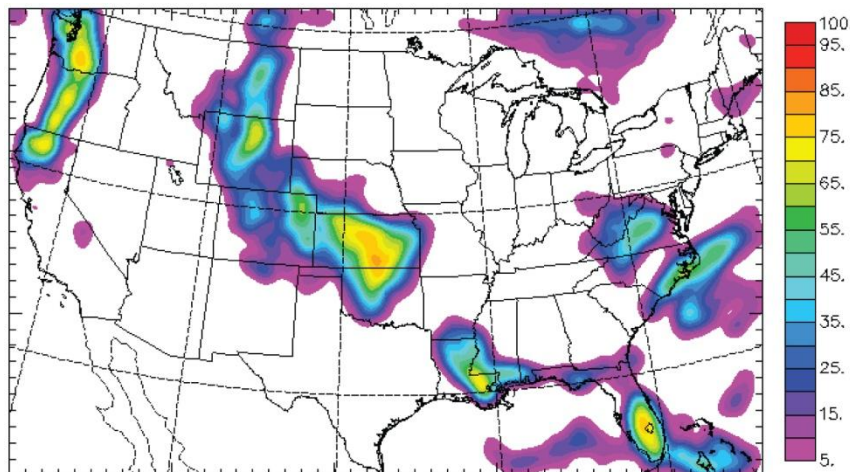
CAPS ensemble product

- <http://forecast.caps.ou.edu>
- http://www.caps.ou.edu/~fkong/sub_atm/spring10.html
- **4 TB** data per day archived (A total of **36 days** complete dataset)

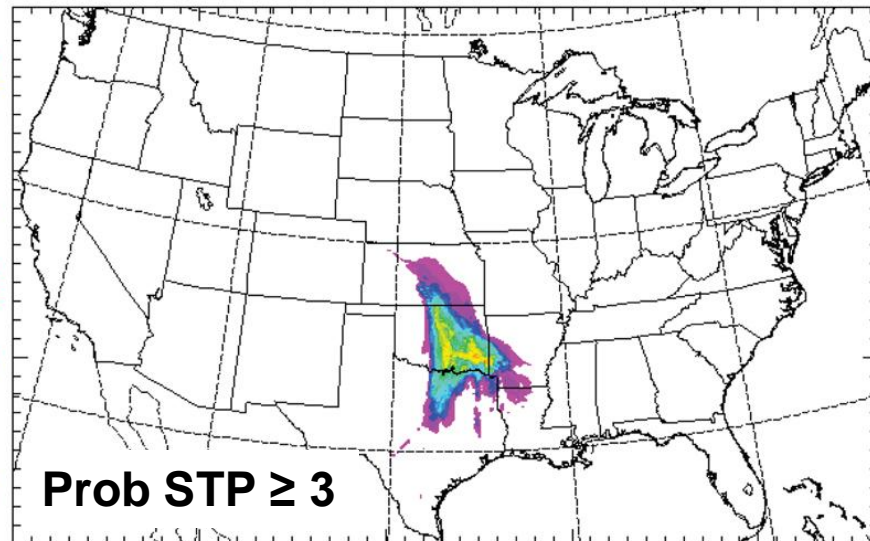
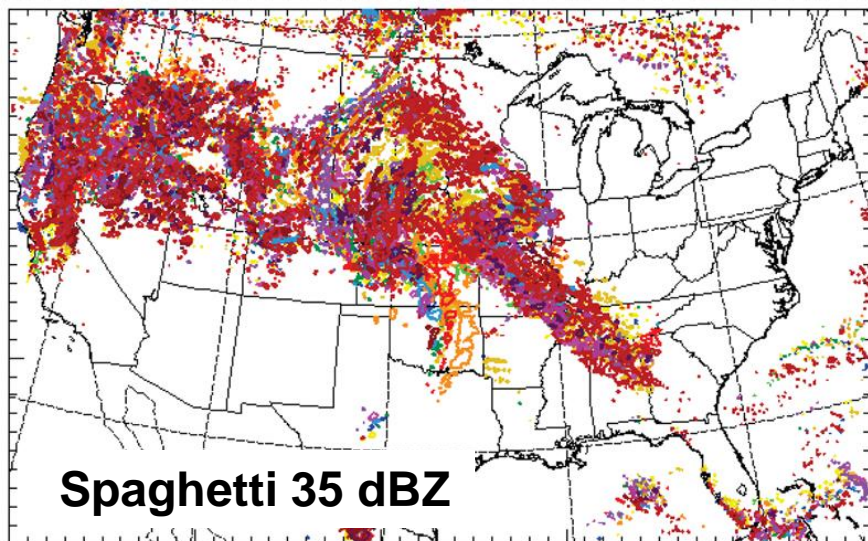
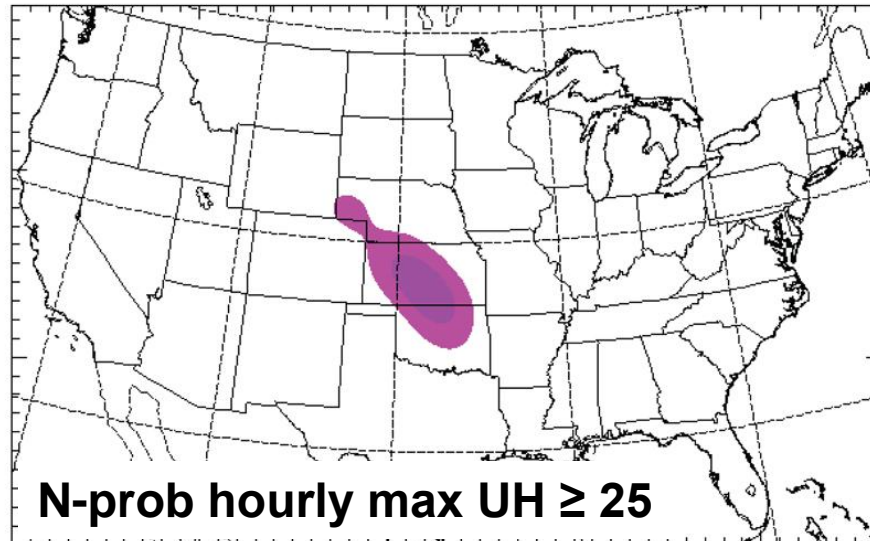
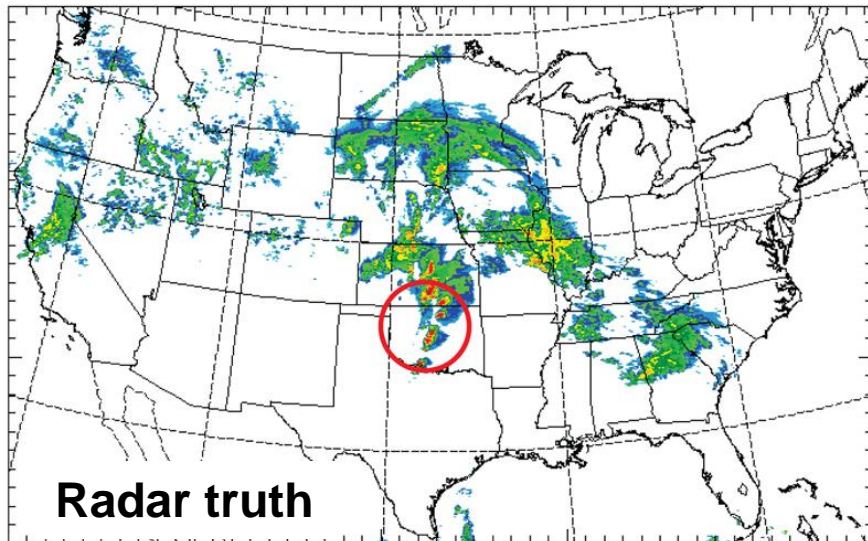


Probability matching mean:
1 h accumulated precipitation
(24 h fcst, valid 00Z May 20)

Neighborhood probability:
1 h accumulated precipitation ≥ 0.25 "

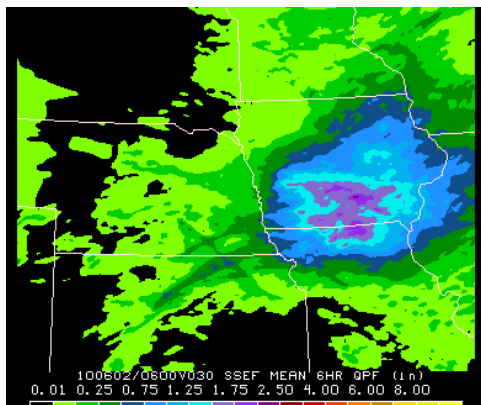


May 10 OKC Tornado—valid 22 UTC

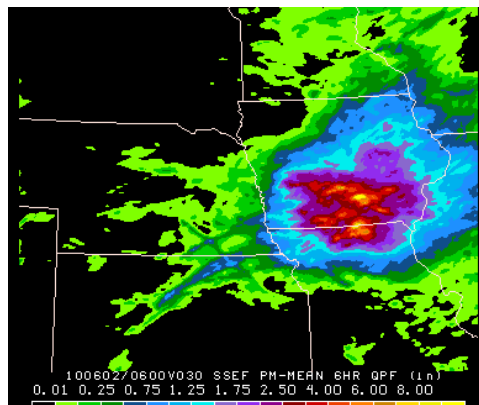


0-6Z accumulated precipitation: 30 h forecast (June 1, 2010)

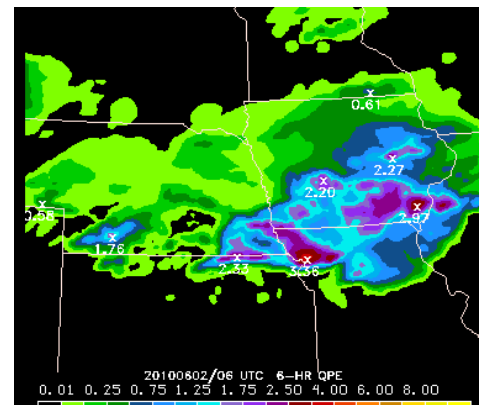
SSEF mean



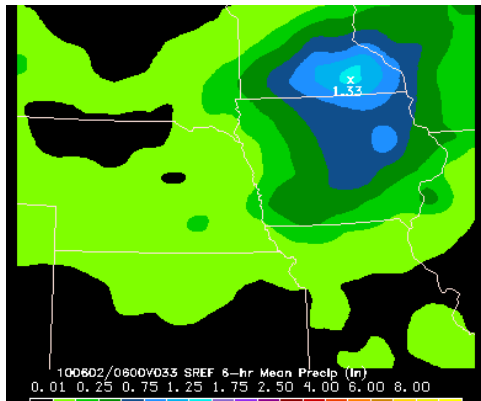
SSEF prob match



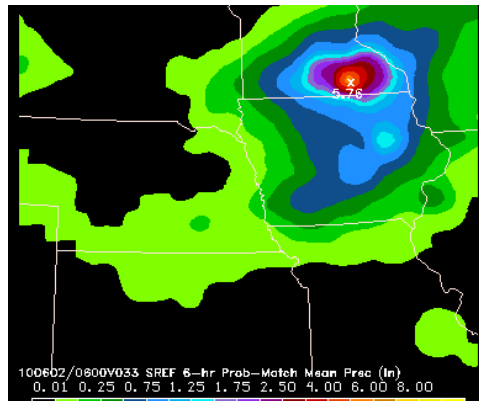
QPE



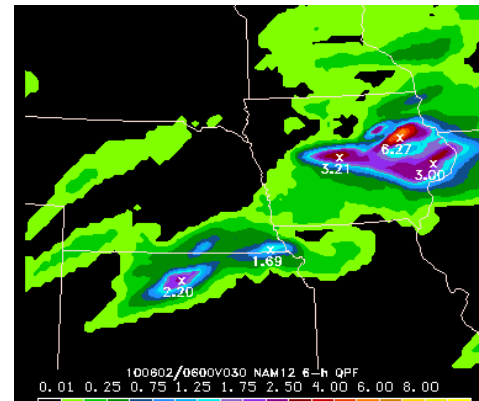
SREF mean



SREF prob match



NAM

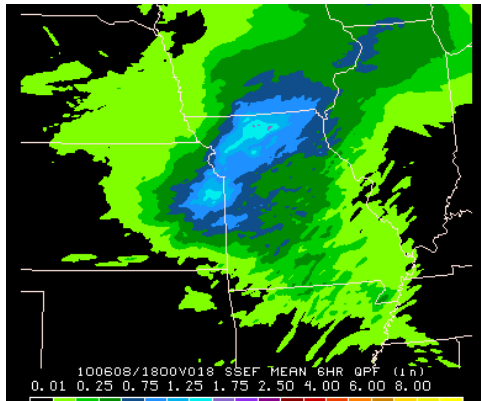


HWT images

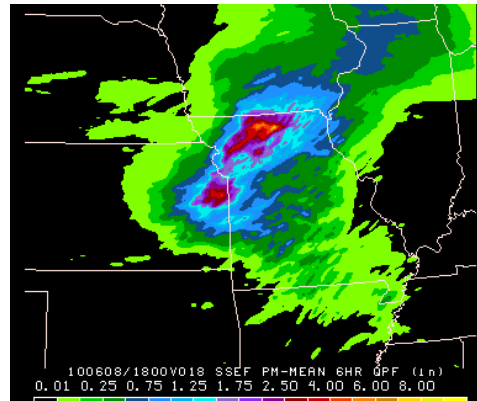


12-18Z accumulated precipitation: 18 h forecast (June 8, 2010)

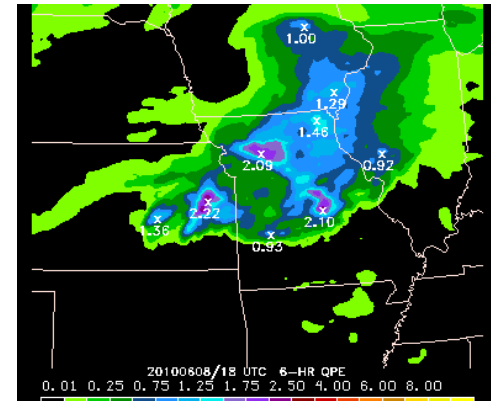
SSEF mean



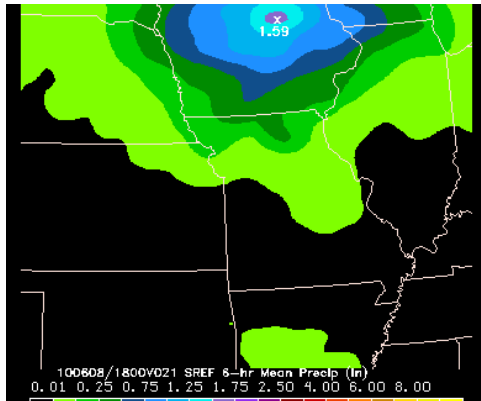
SSEF prob match



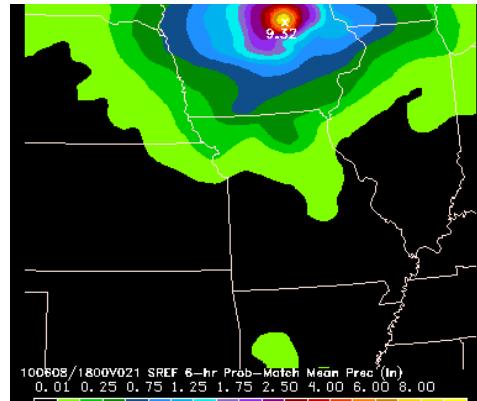
QPE



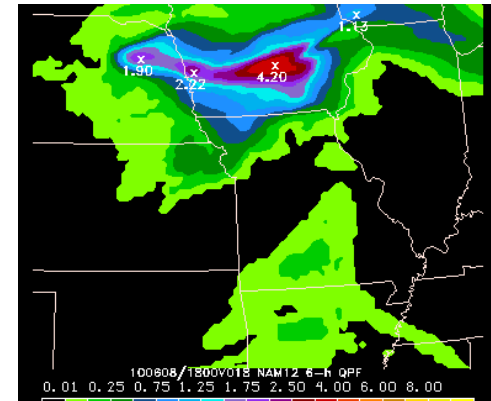
SREF mean



SREF prob match



NAM



HWT images





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