



Minnesota Severe Weather Trends

Paul Huttner
Chief Meteorologist
Minnesota Public Radio



Minnesota



**Welcome to
the Superbowl
of Weather!**

Minnesota

Tower
- 60 F



175 Degree Range!

Beardsley
115 F

Minnesota
Weather
Extremes





Extreme Cold

Minnesota



Extreme Heat



Tornadoes!



Snow & Hail

**Weather
Types**



Floods

Minnesota Tornadoes

2010 Tornado Records:

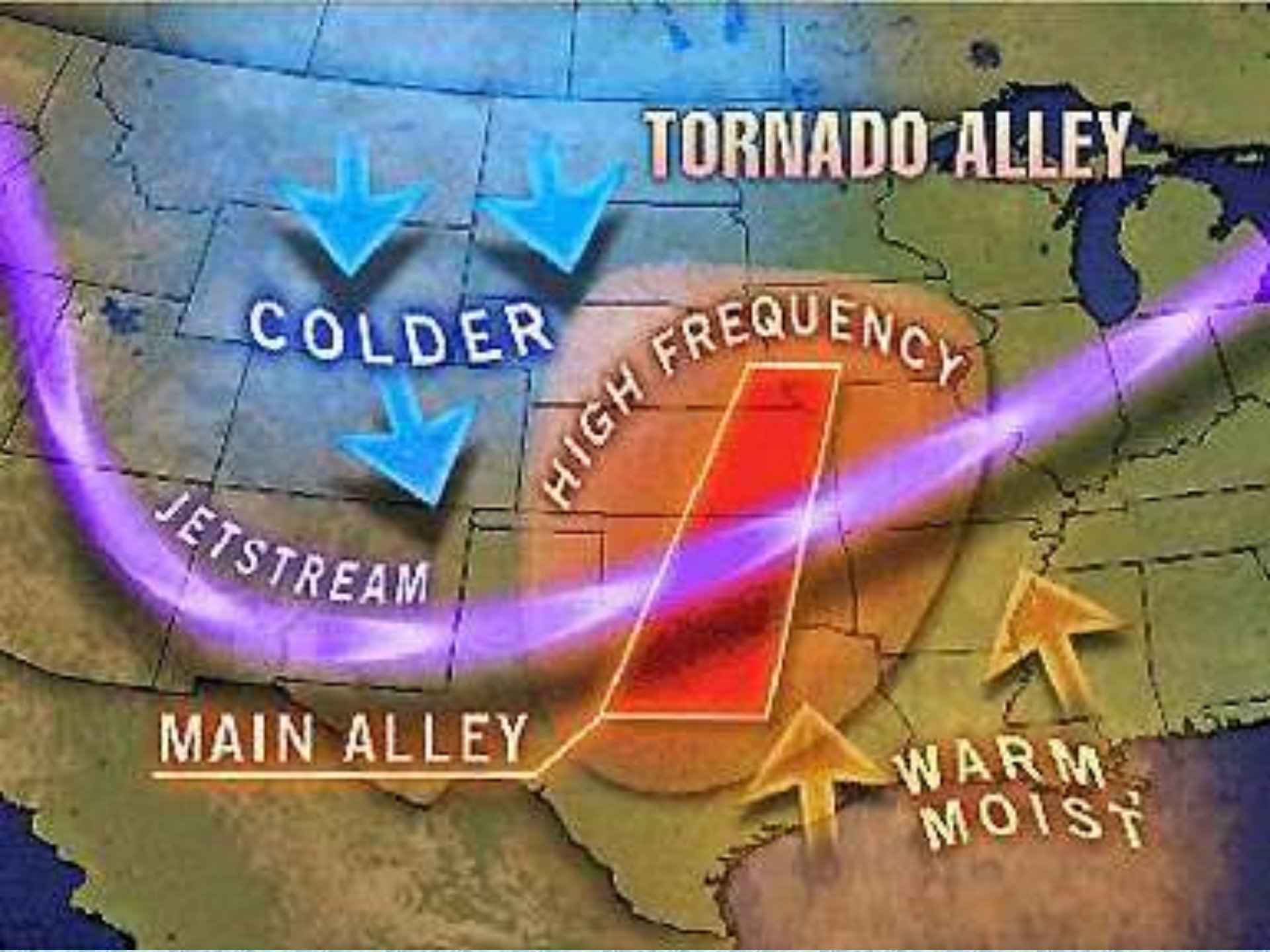
-Single Day: 48 June 17, 2010
(Previous 27 June 16, 1992)

-Month: (48+) June 2010
(Previous 38 June 2001)

-Year: 145 (preliminary total)
(Previous 74 in 2001)

2010 SPC Preliminary Tornado Reports

- **Minnesota 145**
- Texas 96 (#1...7 of past 10 years)
- Kansas 92
- Oklahoma 73
- North Dakota 68
- Colorado 66
- Wisconsin 61



TORNADO ALLEY

COLDER

HIGH FREQUENCY

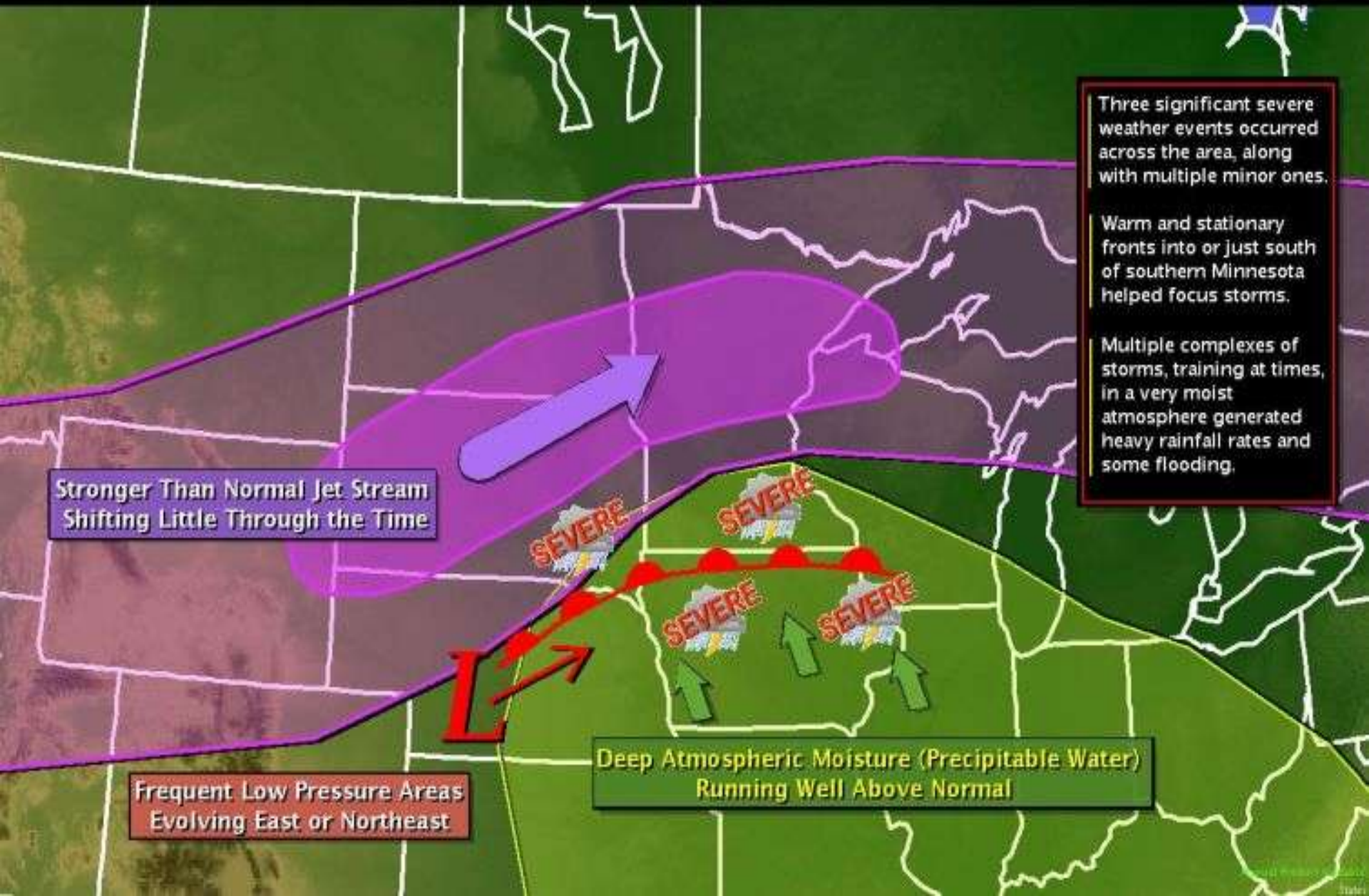
JETSTREAM

MAIN ALLEY

WARM
MOIST

Ingredients Leading to Widespread Severe Weather and Heavy Rain

June 17th-June 26th



Three significant severe weather events occurred across the area, along with multiple minor ones.

Warm and stationary fronts into or just south of southern Minnesota helped focus storms.

Multiple complexes of storms, training at times, in a very moist atmosphere generated heavy rainfall rates and some flooding.

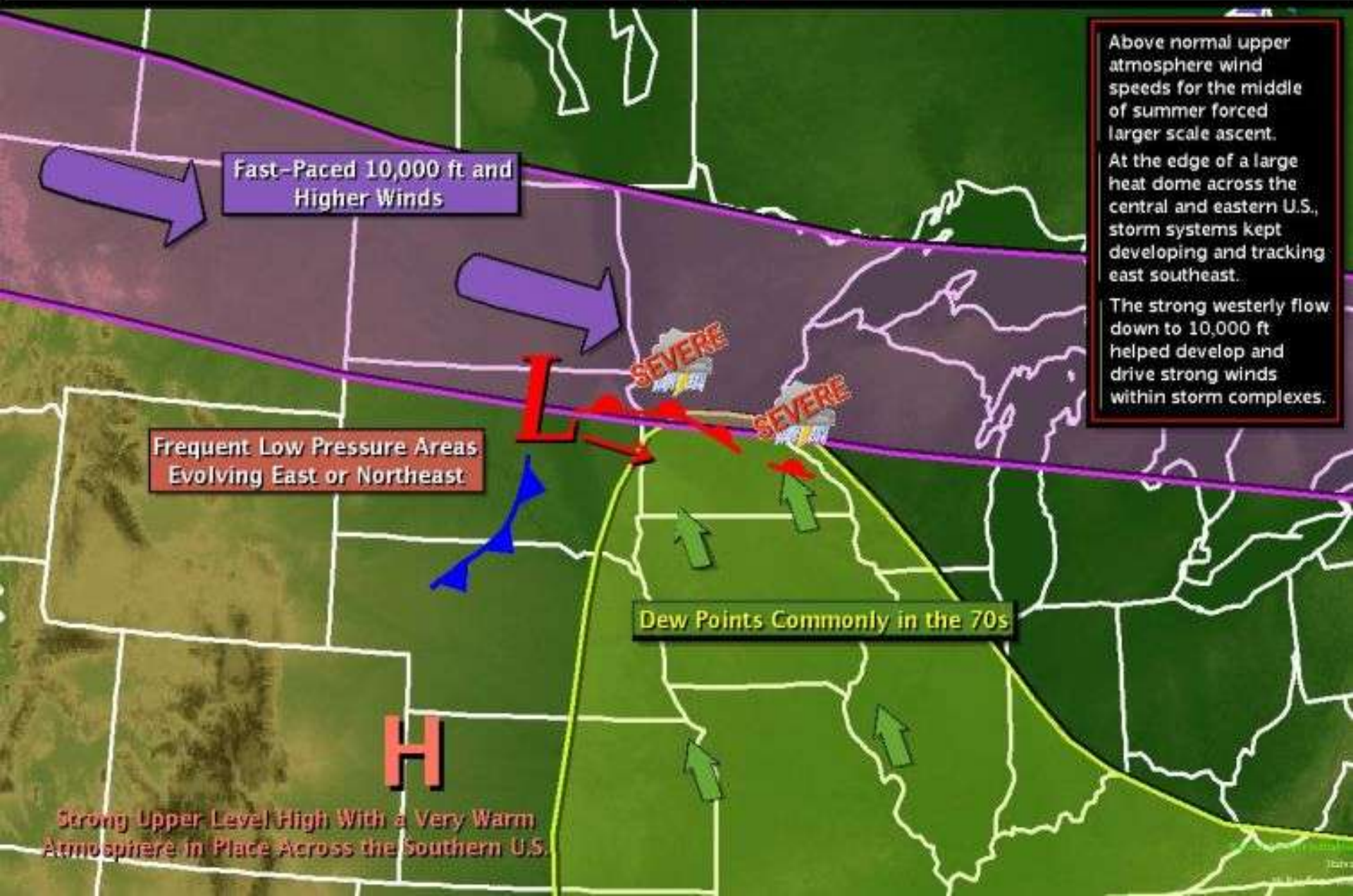
Stronger Than Normal Jet Stream Shifting Little Through the Time

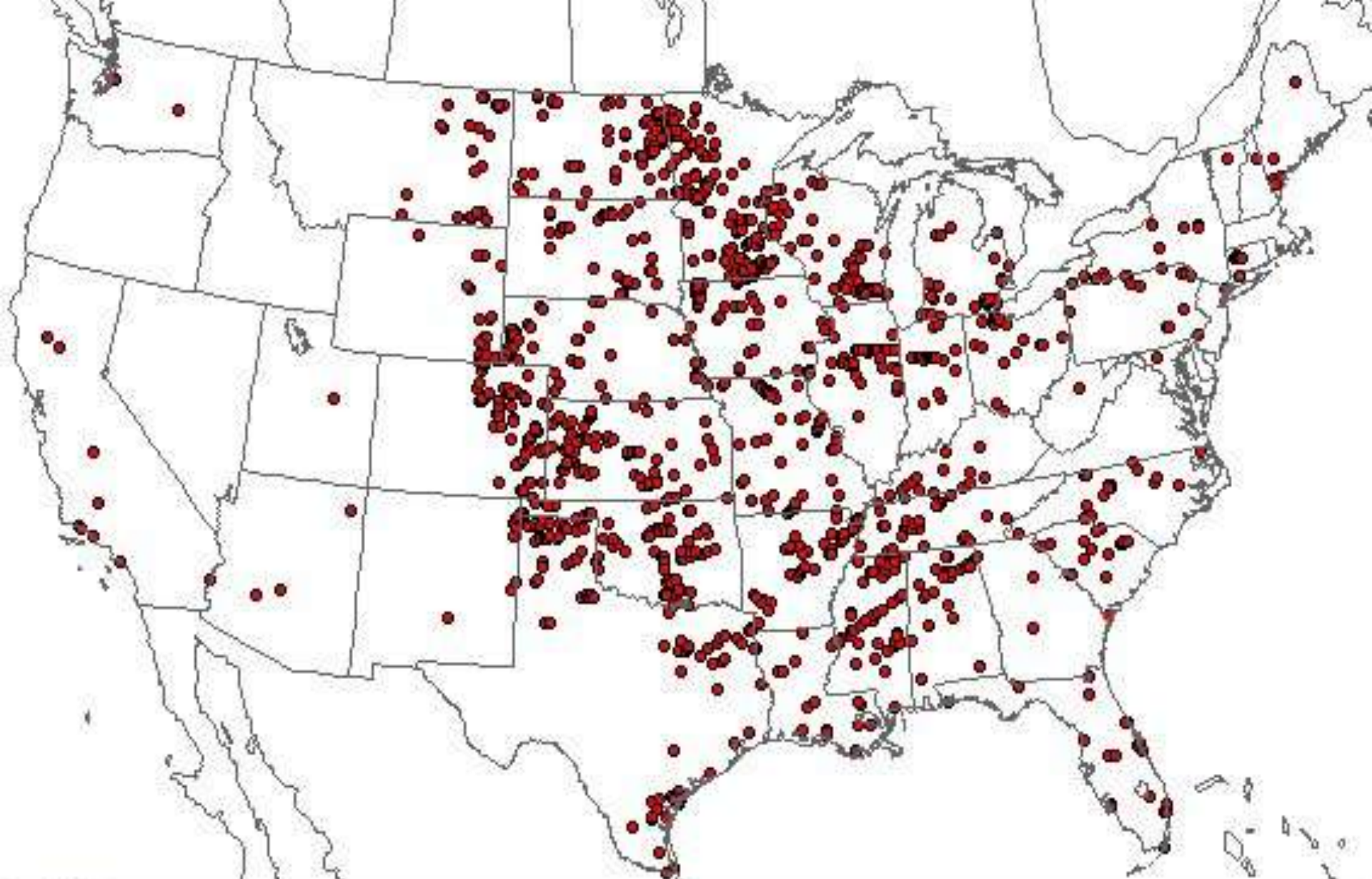
Frequent Low Pressure Areas Evolving East or Northeast

Deep Atmospheric Moisture (Precipitable Water) Running Well Above Normal

Ingredients Leading to Multiple Severe Weather Events

July 10th-July 17th





**So is
Tornado Alley
moving
north?**



Minnesota Tornadoes

Annual Average:

1950-2009 = 25.8/year

2000-2009 = 43.2/year

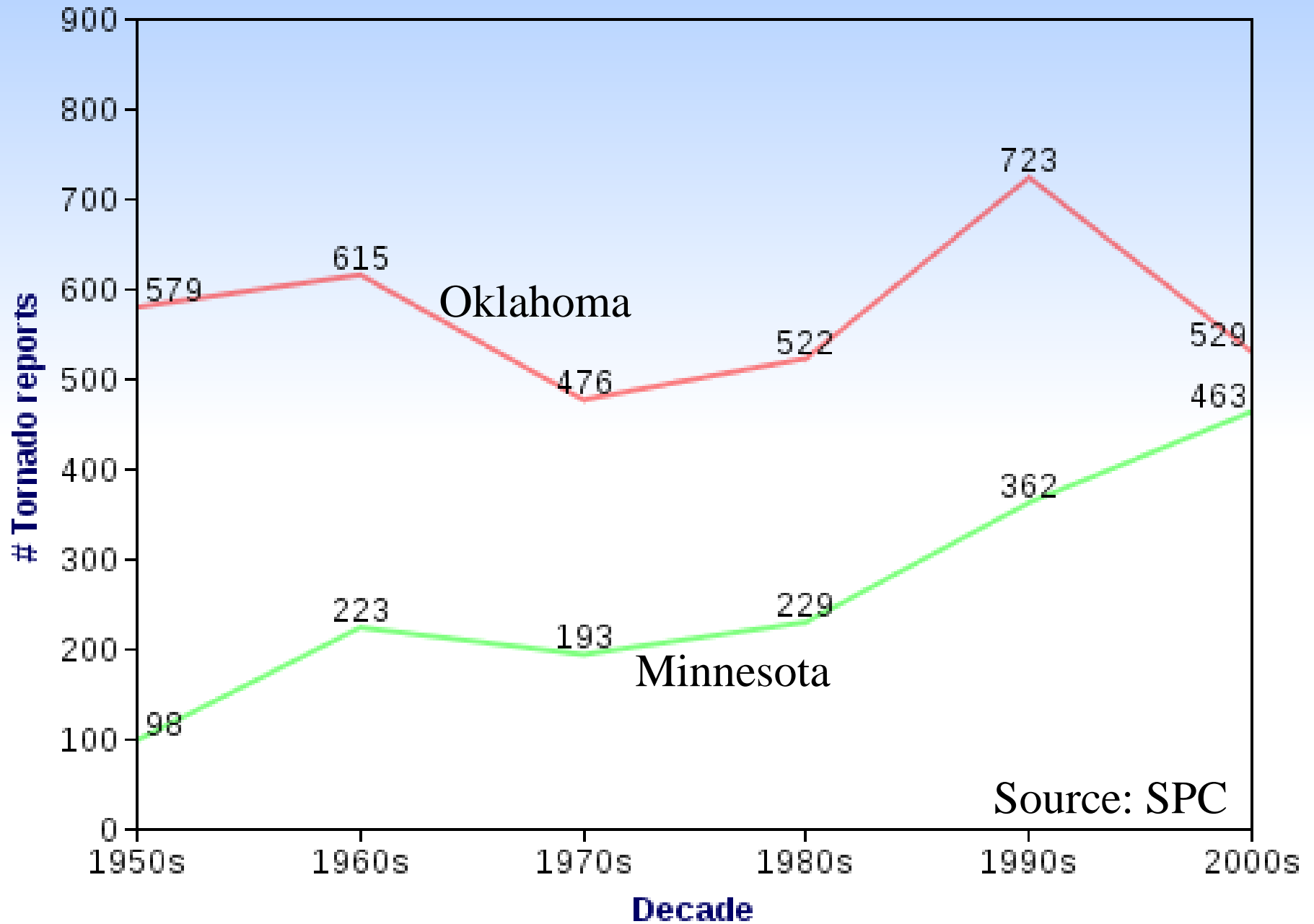
Add 2010 = 48.4/year!

Annual Average Number of Tornadoes, 1953-2004



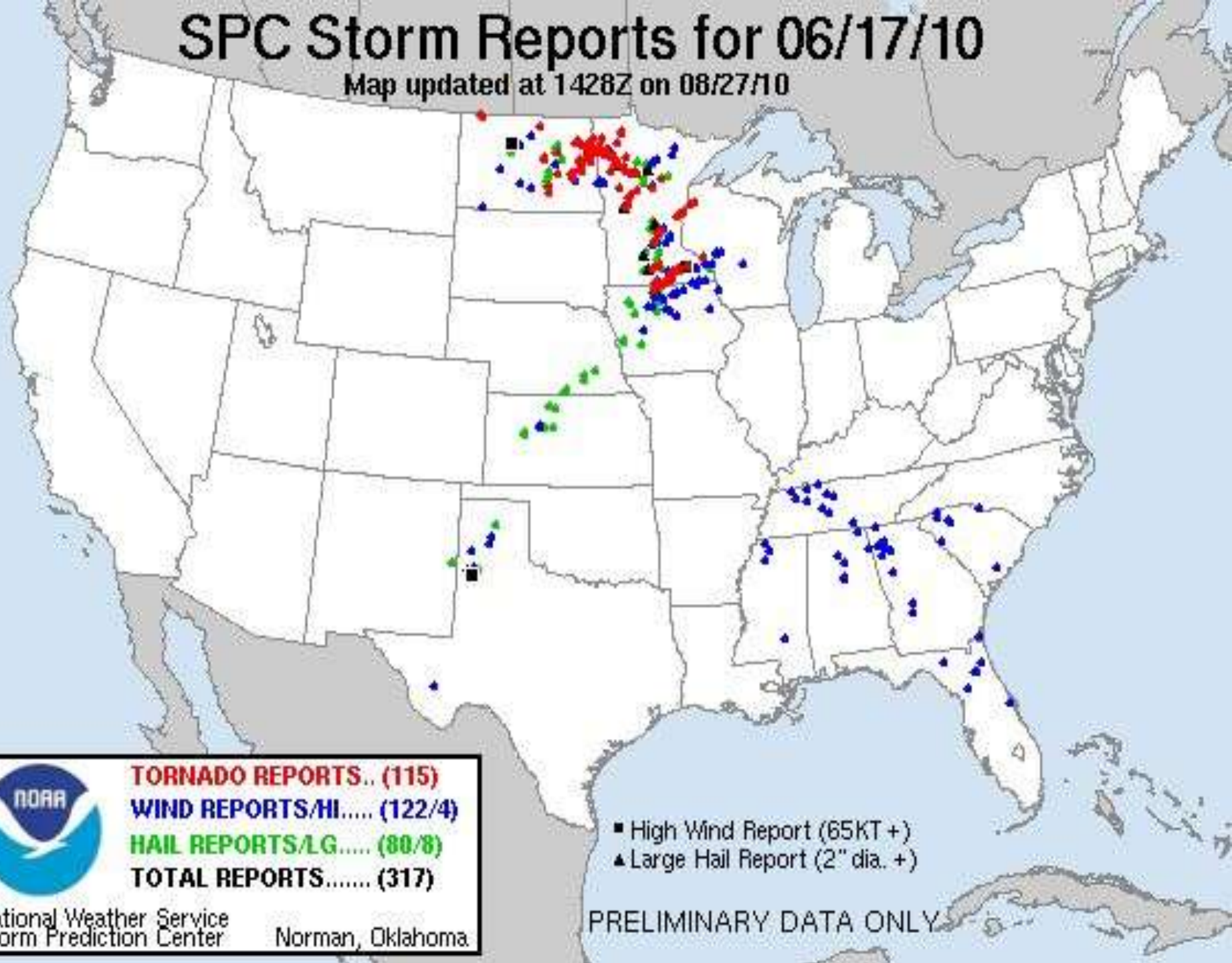
Source: NCDC

Tornado Reports by Decade



SPC Storm Reports for 06/17/10

Map updated at 1428Z on 08/27/10



TORNADO REPORTS.. (115)

WIND REPORTS/HI..... (122/4)

HAIL REPORTS/LG..... (80/8)

TOTAL REPORTS..... (317)

- High Wind Report (65KT +)
- ▲ Large Hail Report (2" dia. +)



National Weather Service
Storm Prediction Center

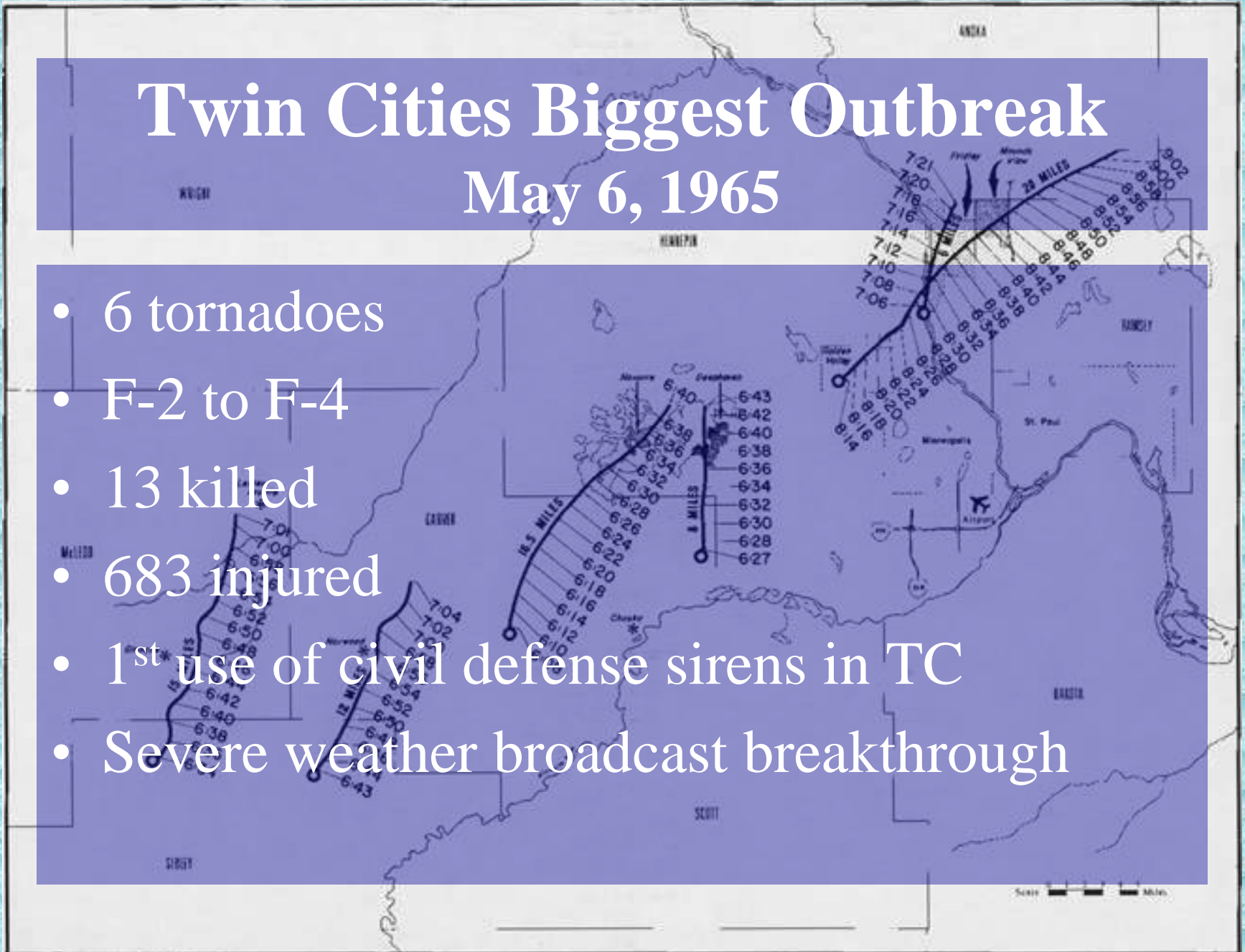
Norman, Oklahoma

PRELIMINARY DATA ONLY

Twin Cities Biggest Outbreak

May 6, 1965

- 6 tornadoes
- F-2 to F-4
- 13 killed
- 683 injured
- 1st use of civil defense sirens in TC
- Severe weather broadcast breakthrough



August 19, 2009

- 11 tornadoes
- 8 in Minnesota; 3 in Wisconsin
- EF-0 to EF-1
- No fatalities or injuries?
- Extremely rapid development

Conclusions

- 2010: Most active severe weather year on record in Minnesota
- Tornado alley moved 500 miles north in 2010!
- MN Tornado frequency has nearly doubled since 1950! (25.8 to 48.4)

Questions

- Is 2010 an atmospheric fluke?
- Will decadal trends continue?
- Is tornado alley shifting north?
- Should we prepare to adapt to increased severe weather outbreaks?