

# Palm Sunday Tornado Outbreak

April 11, 1965

Palm Sunday on April 11, 1965 started off as a sunny warm spring day with temperatures reaching the lower 80s in some Midwestern states. Many people in these areas were either at church or outside enjoying the nice warm weather after that year's unusually cool spring, but conditions would not remain nice for very long.

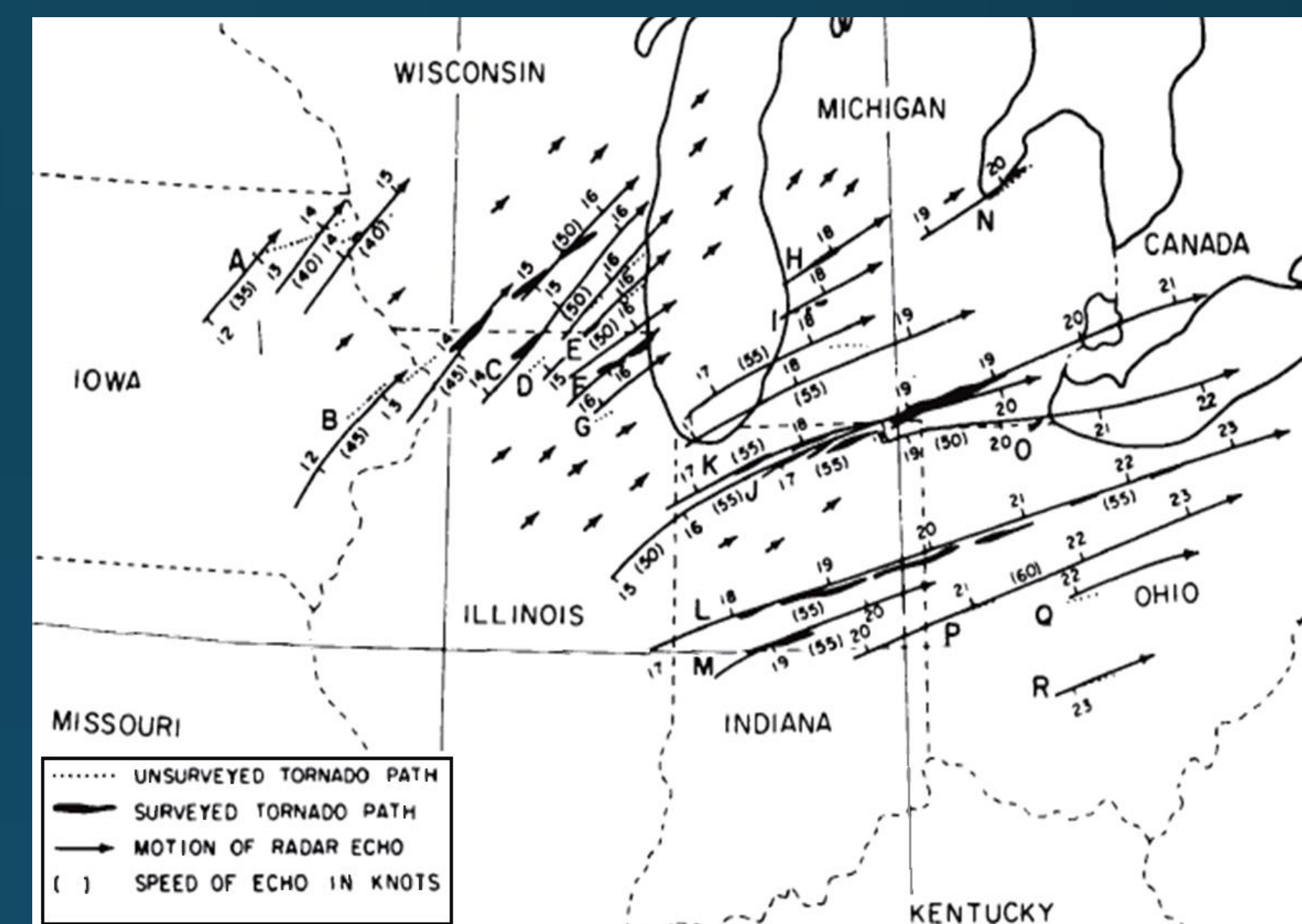
The day became the second largest tornado outbreak at the time and fourth of all time. While the outbreak covered six states, including Illinois, Indiana, Iowa, Michigan, Ohio, and Wisconsin, it was Indiana that was hit hardest. In all, there were 47 confirmed tornadoes in an 11-hour period. The storms killed at least 258 people and injured 3,148 others (according to the American Red Cross). Property damage in Indiana topped \$145 million, Michigan sustained \$51 million, and Ohio reached \$42.5 million. The total damage from all these storms reached \$300 - \$400 million.



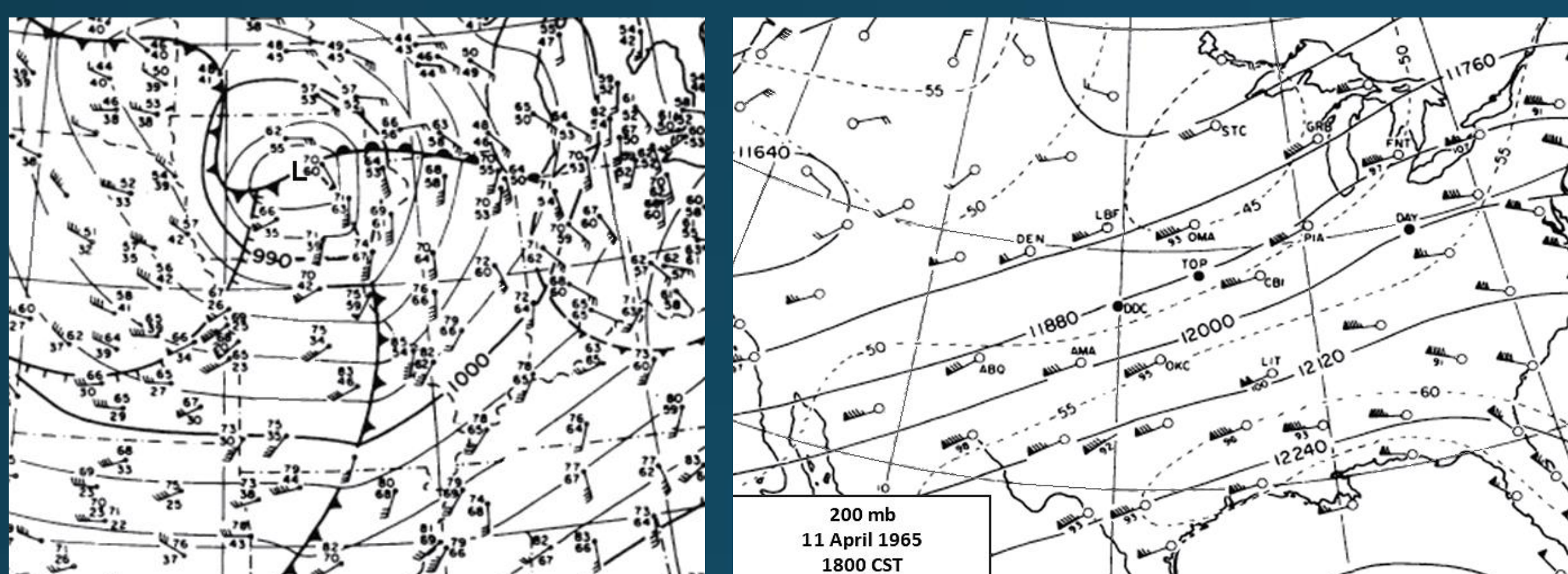
Series of photos showing a double funnel tornado at about 5:32 pm CST. Courtesy of Monthly Weather Review. Taken by Paul Huffman of The Elkhart Truth.

## Meteorological Setup

- On the morning of April 11, surface low pressure was centered over western Iowa with a warm front extending to the east. A cold front stretched to the south that was producing thunderstorms over northern Missouri and central Illinois.
- Aloft at 200 mb, a stronger than normal jet stream was located from the southwest U.S. through the Midwest.
- The low pressure system intensified later in the day as it moved east, and drew warm, moist air north ahead of the cold front, setting the stage for tornado development.
- Just before the first tornado, locations in Kansas, Illinois, and Missouri reported strong winds from 10,000 to 14,000 feet with strong wind shear between 12,000 and 14,000 feet, which increased convergence at low-levels and enhanced storm severity.



Tornado paths. Courtesy of Monthly Weather Review.



Surface (far left) and 200 mb maps (left) associated with the tornado outbreak. Courtesy of Monthly Weather Review.

## Tornado Impacts

- 258 Killed
- 3,148 Injured
- Nearly \$400 Million (1965) in Damage
- 6 States Affected
- Several Communities Majorly Damaged

## Lessons Learned

- Due to the large number of fatalities, the U.S. Weather Bureau implemented the "Tornado Watch" and "Tornado Warning" program that is in use today.
- The Weather Bureau did a good job predicting the severe weather, but many communities failed to receive the message due to communication services being damaged by the storm and a failure of the public to understand the difference between a forecast and an alert.
- Eyewitness reports, pictures, and videos of tornado clouds and funnels, and aerial photographs of scratch marks, suction marks, drift marks, and patterns of uprooted trees were very helpful to researchers in understanding the dynamics of tornadoes.

*"The extent of the damage was unbelievable. At least 100 house trailers were destroyed. They were ripped from their frames, twirled about in the air, then sent crashing to the ground."*

-Paul Huffman, The Elkhart Truth



(Left) Circular pattern of downed trees. (Right) Suction marks from a tornado in a field. Courtesy of Monthly Weather Review.

(Left) Widespread tornado damage. (Right) Damage in Midway Trailer Court near Goshen, IN. Courtesy of Monthly Weather Review.