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Unique Severe Storms Struck Illinois in March 2006

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ABSTRACT

During the night of March 12-13, 2006, a series of severe thunderstorms crossed central and northern Illinois, producing nine tornadoes, damaging hail, heavy rains, and very high winds. These conditions caused great property damage, totaling $37 million, and 38 persons were injured. Seven days later the weather made a dramatic shift, and a massive winter storm moved across central Illinois accompanied by high winds causing blizzard conditions, snowfall totaling 10 inches, sleet, and freezing rains. Thousands of vehicle accidents resulted with 89 persons injured. These two storms were unique in that collectively they produced every type of severe storm that occurs in Illinois. Other weather oddities of note included the winter storm occurring after the summer type storm, and the fact they were separated by only seven days. Furthermore, the most extensive damage occurred in the same area, west-central Illinois and in and near Springfield. Fortunately, no one was killed in Illinois, an outcome likely related to the timely and accurate storm forecasts .

INTRODUCTION

The continental climate of Illinois produces a very wide variety of weather conditions with major changes occurring hourly, daily, monthly, and yearly (Changnon et al., 2004). As a result of the wide differences in air masses that cross the state, Illinois experiences almost every known form of severe storm (except for damaging hurricanes), and storms occur in every month of the year. Tornadoes are most frequent in the spring but occur in all 12 months (Angel, 2002). Hail occurs often in spring and early summer (Huff and Changnon, 1959) , and thunderstorms, which maximize in summer, also occur in every month of the year (Changnon, 2001). Lightning and thunder sometimes occur during a heavy Illinois snowstorm (Changnon, 1964). High damaging winds occur in all months (Changnon, 1980), and intense, heavy rains occur in all seasons but are most frequent in the warm season (Huff and Angel, 1989). The cold season sees major snowstorms, blizzards, sleet, and ice storms (Changnon, 1969).

An 8-day period in March 2006 experienced all forms of warm season and cold season severe storms across central Illinois, often Illinois' home to such diverse extremes. The night of March 12-13 had nine tornadoes, numerous severe thunderstorms, damaging hailstorms, dangerous lightning, heavy rains, and record-setting, non-tornadic high winds. Afterwards, weather conditions took a dramatic turn. Seven days later, instead of more

hail, tornadoes, and high winds, nature provided a rare March winter storm that blanketed parts of Illinois with heavy snow on the official first day of spring, March 21. Such greatly different forms of severe weather have occurred infrequently in past spring seasons, and the vastly different March 2006 storms occurring within a few days was very unusual, particularly with the winter season storm following the warm season event. This shift was observed by many as a highly unusual event (Farm Week, 2006).

March has more volatile weather than any other month. One day can be summer-like and then winter-like conditions develop in a matter of hours, last several days, and are then replaced with warm, spring-like conditions. These shifts often are accompanied by some form of severe weather.

March 2006 exhibited these highly volatile extremes that can occur in this month with highly changeable conditions.

CONVECTIVE STORMS ON MARCH 12-13

By early afternoon on March 12, National Weather Service (NWS) forecasters had recognized the potential for severe storms across central Illinois, and they issued warnings for severe thunderstorms in 27 counties and tornado warnings for 24 other counties, all in central Illinois. A major storm complex originated in northeast Oklahoma at noon and tracked across Kansas and Missouri, reaching Illinois in late evening. This massive storm system ultimately produced 110 tornadoes in this 4-state area (NWS, 2006). Across the nation's mid-section, the weekend of March 11-12, 2006, featured the wildest weather in recent years (Rippy, 2006). Nationally, there were 150 tornadoes, a new 2-day record for March.

A large supercell thunderstorm developed near Tulsa, and traveled across Missouri and into Illinois, creating an unusually long 400-mile track (NWS, 2006), a record exceeding the previous high of 366 miles set in April 2001 by a long-track, Kansas-to-Illinois, supercell hailstorm (Changnon and Burroughs, 2003). A supercell thunderstorm is a long-lasting and quite large storm because it has an internal organization that creates a single, quasi-steady rotating updraft with constantly available warm moist air to fuel the updraft, and the right atmospheric setting including the changes in wind speed and direction with height. Strong winds aloft greatly influence the structure of these storms. The March 2006 supercell produced considerable hail along its track. Hailstones measuring 2 inches in diameter fell west of Springfield and in southeastern Logan County, and hailstones with diameters of 2 to 3 inches fell at Fisher in northwestern Champaign County.

Figure 1 shows the tracks of the nine tornadoes that occurred in Illinois on March 12, all the result of the supercell storm. The longest track tornado (labeled #1) began at the Illinois River at 7:07 p.m. and moved 66 miles to the ENE, terminating in south-central Springfield at 8:26 p.m. This large storm with a F2 intensity rating and a path width varying from ¼ to ¾ mile, destroyed all 30 houses in Barrow and did major damage in Springfield's southwestern and southern sections. Another strong F2 tornado (#4 on Fig. 1) formed over central Springfield at 8:25 p.m. just as the first tornado was dissipating. This new tornado did great damage to the central and eastern parts of the city on its 4-mile track. City power lines were downed and power outages lasting 12 to 36 hours

affected 25,000 Springfield homes. It took five days before all the power service was restored. Downed trees and power poles blocked most roads into Springfield on March 13, and debris blocked and closed a railroad line. The two Springfield tornadoes badly damaged 1,000 homes, two shopping centers, and two hotels, while 24 city residents were injured.

As shown on figure 1, the other seven tornadoes had tracks that were essentially parallel to the major storm. The three tornadoes in Logan County destroyed many power lines (Fig. 2), and toppled a 350-foot communication tower. The nine tornadoes were closely aligned in space and time and formed a "family of tornadoes," a condition often generated by a supercell (Fujita, 1974). The parallel tracks and temporal closeness of tornadoes 6-7 and 8-9 also suggest the presence of twin vortices.

Lightning started several fires along the huge thunderstorm's path, including a building near Watseka. High winds generated by the massive storm tore down power lines in Ford County, and did major damage in Elliott and to many farms in McLean, Dewitt and Ford counties. Another severe thunderstorm passed across central Illinois from 3 to 4 a.m., and produced large hail near Farmer City and wind damage at Saybrook in McLean County.

Other thunderstorms during the night created strong downbursts leading to damaging winds in the Quad City area and in certain suburbs of Chicago. Moline recorded a wind speed of 107 mph, a new station record and fastest speed to occur nationally during March 2006 (Rippy, 2006). Early morning (March 13) high winds near Bridgeview, a southwest suburb of Chicago, were estimated at 85 to 100 mph by NWS meteorologists, and caused considerable property damage in Bridgeview. Many parts of northwestern Illinois, from Moline to Freeport, received hail of ¾ to one inch in diameter. Large amounts of hail also fell from Knox County eastward along the Illinois River Valley from La Salle to Kankakee. Ottawa and Joliet had hailstones ranging from 1½ to 2 inches in diameter, a rare event (Huff and Changnon, 1959).

Heavy rains also occurred throughout most parts of central and northeastern Illinois, producing totals of 1 to 2.5 inches in a few hours. Rains were heaviest in Sangamon, Logan, and Dewitt counties where 2 to 2.5 inches fell. The area from Moline to Freeport and eastward to Waukegan also received 2 to 2.5 inches of rain. Flash flooding occurred in parts of central Illinois, including in Dewitt and Ford Counties, and in parts of Chicago and its northern suburbs.

The strong storm system also created high winds that continued through the morning hours of March 13 and caused structural damage in central and northeastern Illinois. Damaged buildings in Antioch led to three injuries, and the winds caused major damage to a shopping mall in Prospect Heights and to homes in parts of Evanston.

Illinois fortunately experienced no deaths due to this sizable storm system, although 37 persons were injured. More than 1,685 Illinois homes were badly damaged including many farm homes, those in Springfield, and in several other communities. The total storm damage estimate is $37 million. The Governor of Illinois declared seven counties (Ford, Greene, Logan, Morgan, Randolph, Sangamon, and Scott) as disaster areas. This provided state reimbursements for a portion of the local recovery costs. The federal govern-

ment also provided disaster assistance to Sangamon, Greene, Logan, Morgan, and Scott counties.

WINTER STORM ON MARCH 21

On March 20, a deep low pressure system with attendant cold front was moving east from the High Plains and developed a track along the Ohio River Valley, a perfect scenario for creating a major winter storm across the Midwest. Cold Arctic air behind the cold front prevailed over Kansas, Missouri, and Illinois, and the low's passage brought Gulf moisture that flowed up and over the cold air, creating heavy snow and sleet. The resulting significant snowstorm that developed in Kansas was moving eastward across Missouri on March 19-20 (Rippy, 2006).

On the morning of March 20 the NWS issued severe winter storm warnings for most central Illinois counties. The snowfall from the advancing storm began in the early hours of March 21, ironically the date that marks the official start of spring.

The storm system moved west-to-east across central Illinois during the early morning and afternoon of March 21. Snow was heaviest in a narrow belt 90 miles wide from Quincy to Pana in central Illinois with a secondary maximum near Paris in eastern Illinois (Fig. 3). High winds produced blizzard conditions across south-central Illinois, and the resulting poor visibility led to hundreds of auto and truck accidents. High winds also caused much drifting, while freezing rain and large quantities of sleet fell along the storm's southern edge, creating very slippery conditions and numerous vehicular accidents. Most of the snow ended by late afternoon as the large winter storm system moved into Indiana..

The resulting total snowfall pattern in Illinois (Fig. 3) shows three areas with 7 or more inches of snow, and the maximum was 10.5 inches at Winchester, which is located 40 miles west of Springfield. Springfield had 6 inches of snow, a new one-day record high value for March, and Peoria had 5 inches, also a new one-day record for March.

Due to the timely issuance of storm warnings, road crews were out early clearing the roads, but the high winds that accompanied the storm kept blowing snow back over the roads. Many rural roads along the storm track were closed on March 21, and all schools in the large snow region (Fig. 3) were closed. More than 2,450 vehicular accidents occurred, and traffic was blocked by accidents on several highways including Interstates 70, 55, and 57. Injuries occurred to 89 individuals but no one was killed.

SUMMARY AND CONCLUSIONS

Although March experiences wider weather swings than occur in any other month in Illinois, the occurrence of the two massive March 2006 storms ranked as a weather-climate oddity for several reasons. Most importantly, the conditions produced by the two events included all forms of severe storms that occur in Illinois. Another oddity was having the winter storm occur after the spring storm. The temporal closeness of the two storms, just seven days apart, was another unusual outcome. The area with the most damage from both storms was west-central Illinois, in and near the Springfield area, an interesting outcome. An oddity that serves as a blessing is that neither storm resulted in any deaths,

partly a result of the excellent, long-lead storm forecasts issued by the National Weather Service. Last but not least was the irony of having a major winter storm on the official first day of the spring season.

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Figure 1. Tornadoes on March 12, 2006, and locations with damages (times are p.m.).

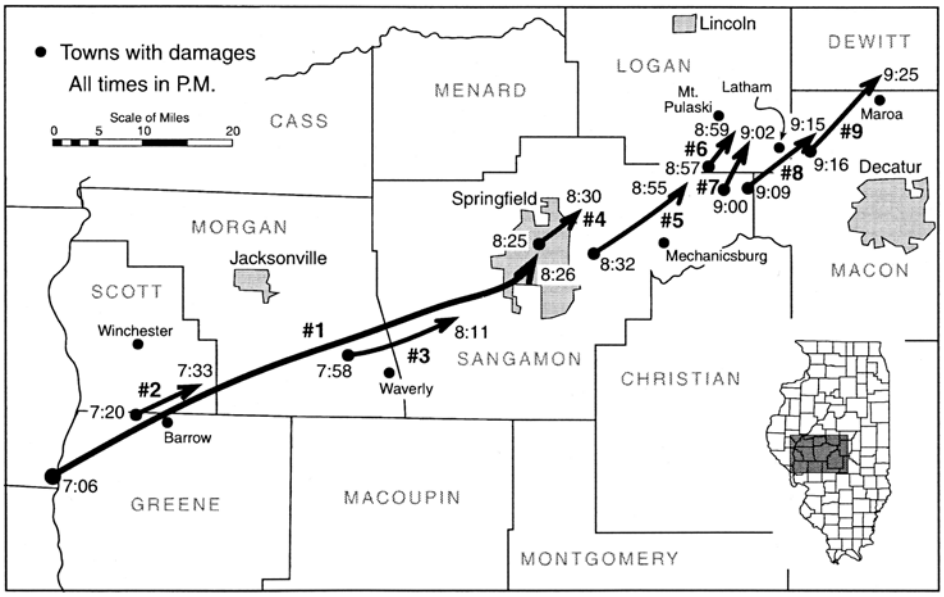

Figure 2. A country road near Mt. Pulaski with many power poles downed by a tornado on March 12. (Photo courtesy of Decatur Herald and Review, and taken by Kelly Huff).

Figure 3. Pattern of snowfall (in inches) on March 21, 2006.