Two 100 mph Thunderstorm Wind Events in Three Weeks:

The meteorology between two back-to-back extreme wind events in the NWS Chicago service area

Brett Borchardt, Senior Meteorologist, NWS Chicago

1. Overview:

During the summer of 2026, two separate fatal extreme thunderstorm wind events occurred just sixteen days apart in the NWS Chicago County Warning Area (CWA). On July 27, a powerful supercell transitioned into a compact bow echo and produced extreme wind gusts ranging from 80 to 105 mph while moving across portions of DuPage, Cook and Will counties in Illinois and Lake and Newton counties in northwestern Indiana. Then, on August 11, a derecho produced wind gusts of 85 to 110 mph while moving across portions of Kane, DuPage, Will, and Cook counties in northern Illinois and Lake and Porter counties in northwestern Indiana. The back-to-back rounds of extreme winds across southeastern Cook, eastern Will, and northwestern Lake counties led to considerable and widespread tree damage as well as extensive damage to the power infrastructure. In Lake County Indiana, nearly 95% of the county was out of power in the immediate aftermath of the August 11 derecho with outages lasting over 2 weeks in some locations.

Historically, extreme wind events with estimated or measured wind gusts in excess of 100 mph are relatively rare across the NWS Chicago CWA with a frequency of once every 1 to 2 years. While two extreme wind events in the relatively short span of just over two weeks during the summer of 2026 is noteworthy by itself, the mechanisms for extreme wind production varied across both storms. While not exhaustive, both events (July 27 and August 11) are examined in this technical paper from the basis of the forecast leading up to each event and the suspected mechanisms for extreme wind production. Then, brief comparisons will be made with other 100 mph wind events in the NWS Chicago forecast area as well as the states of Illinois and Indiana.

2. July 27, 2026:

a. Forecast leading up to the event

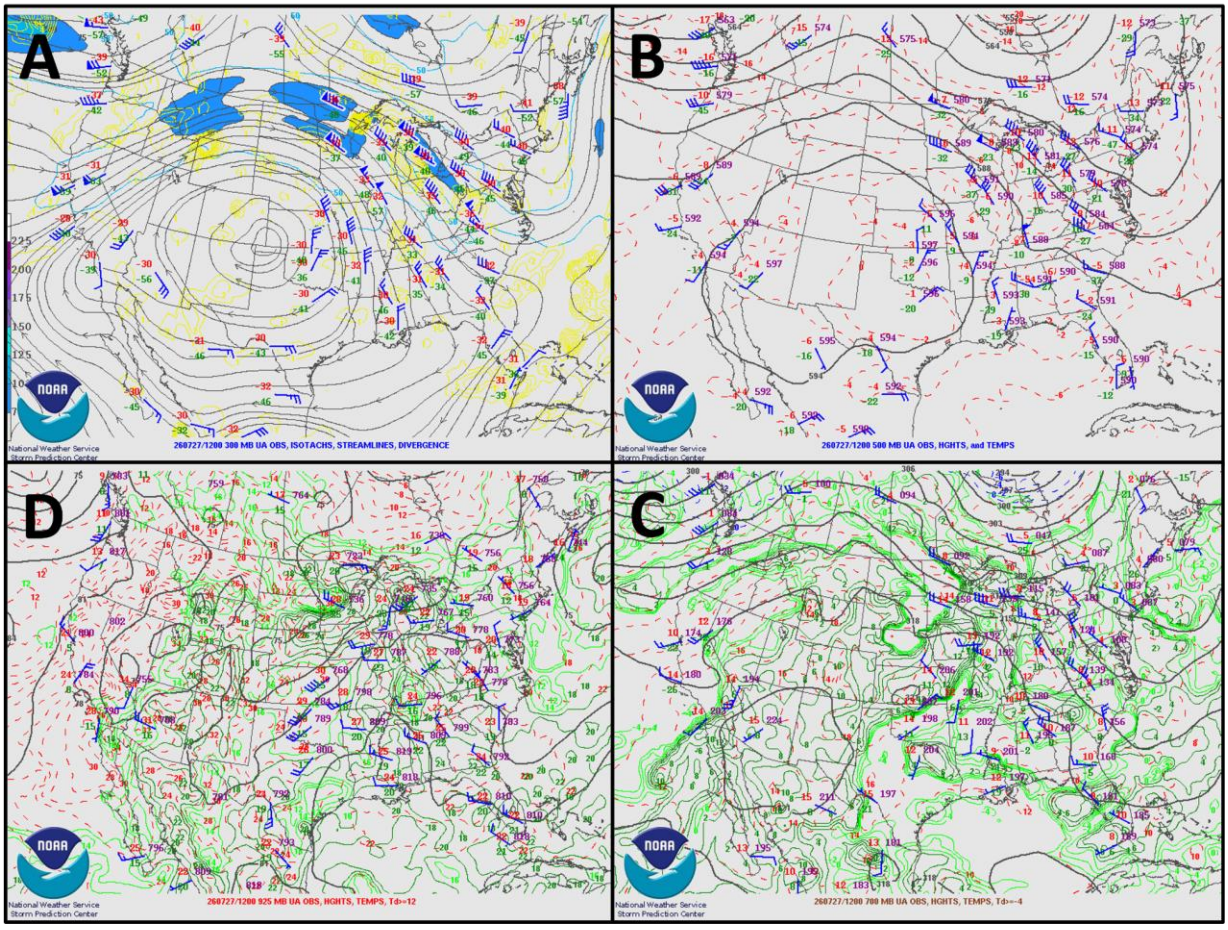

Figure 1. Clockwise from top left, analyzed 300, 500, 700, and 925 mb charts valid at 12:00 UTC / 7:00 AM CDT 27 July 2026. Blue wind barbs indicate observed winds at each level as sampled by 12:00 UTC / 7:00 AM CDT RAOBs. In (a), black contours are streamlines and yellow contours indicate divergence. In (b), (c), and (d), black contours represent isoheights (dm) and red dashed lines indicate temperature (°C). In (c) and (d), green contours indicate dew points (plotted where values are greater than 8°C).

On July 27, 2026, an expansive upper-level ridge characterized by 500 mb heights peaking near 5970m was present across the southwestern United States. On the northeastern periphery of the upper-level ridge, broad northwesterly flow was present across the Great Lakes. A subtle short-wavelength trough was evident propagating southeastward into the Great Lakes anchored by a 500 mb speed max of 50 to 55 kt and 250 mb speed max in excess of 90 kt over Minnesota and northern Wisconsin. Ahead of the wave, low-level flow was veered with 925- to 700 mb winds out of the west to southwest at 15 to 20 kt. The low- to upper-level flow pattern is provided in Figure 1.

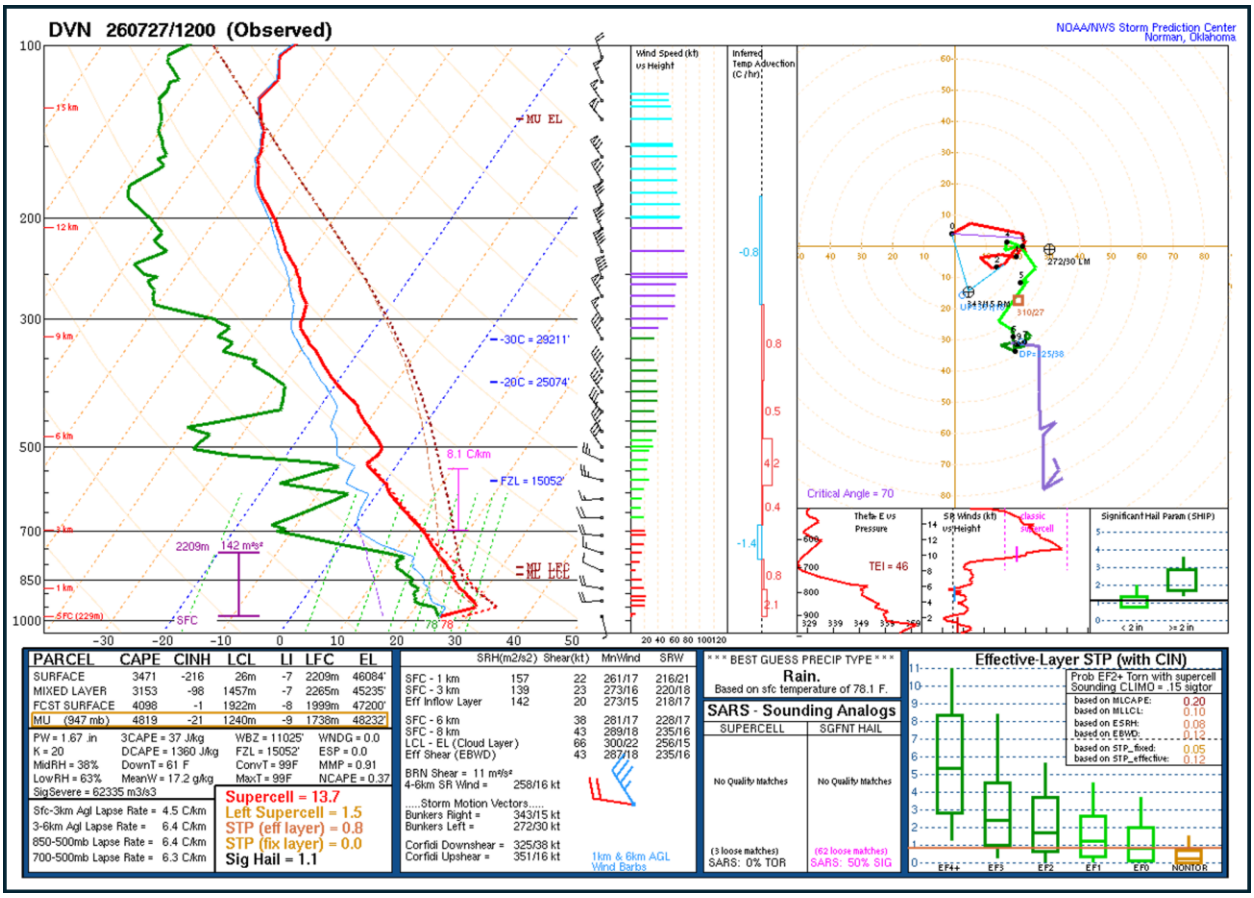

Figure 2. The 12:00 UTC / 7:00 AM CDT RAOB launched at KDVN the morning of 27 July 2026.

Just after daybreak, the air mass across the lower Great Lakes was already extremely moist and unstable[1]. Steady west-southwesterly low- to mid-level winds continuously advected an elevated mixed layer (EML) plume eastward into the Great Lakes atop an evapotranspirationally-enhanced low-level moisture field. The 12:00 UTC / 7:00 AM CDT RAOBS from KDVN, KILX, and KGRB sampled 700 to 500 mb lapse rates in excess of 8 K/km, which with surface dew points in the mid to upper 70s and mean 1 km mixing ratios greater than 17 g/kg, contributed to MUCAPE of 4700 to nearly 5800 J/kg. A representative RAOB from KDVN is provided in Figure 2.

With mid-level lapse rates becoming less steep with eastward extent (e.g., 700 mb temperature of -14°C at KMPX and -8°C at KAPX, Figure 1c), the presence of a diffuse north- to south-oriented mid-level front was implied in the vicinity of Lake Michigan. A hand surface analysis valid at 12:00 UTC / 7:00 AM CDT the morning of July 27 depicted a surface warm front (really the leading edge of a pronounced moisture

[1]In fact, there were areas of dense fog across northern Illinois by daybreak. Dense fog with dew points in the mid 70s is rare in the Great Lakes region.

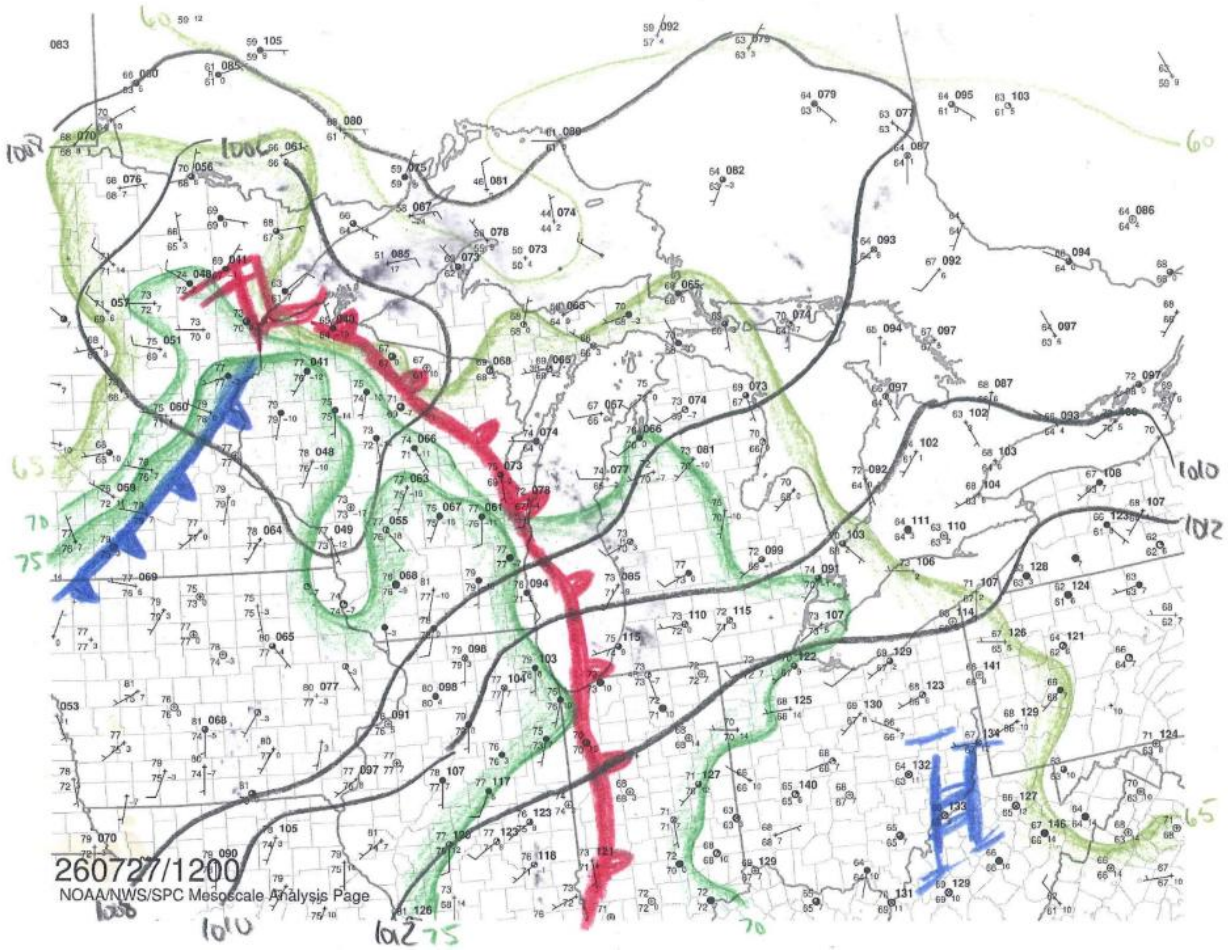

Figure 3. A hand-analyzed surface map valid at 12:00 UTC / 7:00 AM CDT the morning of 27 July 2026. The map was completed by the author the morning of the event. Black contours represent surface isobars, green contours represent surface isodrosotherms, and surface fronts and pressure systems are represented by traditional symbols.

gradient) extending southeastward along the Lake Michigan shoreline as well, away from a weak surface low pressure system centered near Duluth, Minnesota (Figure 3). When paired with the increasingly sheared kinematic profile by virtue of the approaching upper-level speed max (cloud-layer shear of 65 to 75 kt), the environment across the Lower Great Lakes was primed for explosive severe thunderstorm development. As a result, the Storm Prediction Center highlighted the region in a Level 3 out of 5 for severe weather driven by heightened probabilities for damaging winds (Figure 4).

While forecast confidence in an episode of severe thunderstorms occurring across the Lower Great Lakes on July 27 was higher than average, exactly when and where were items of comparatively lower confidence. As is often the case in northwesterly flow regimes during the middle of summertime when instability is at a climatological maximum, the threat for one or more rounds of thunderstorms to occur

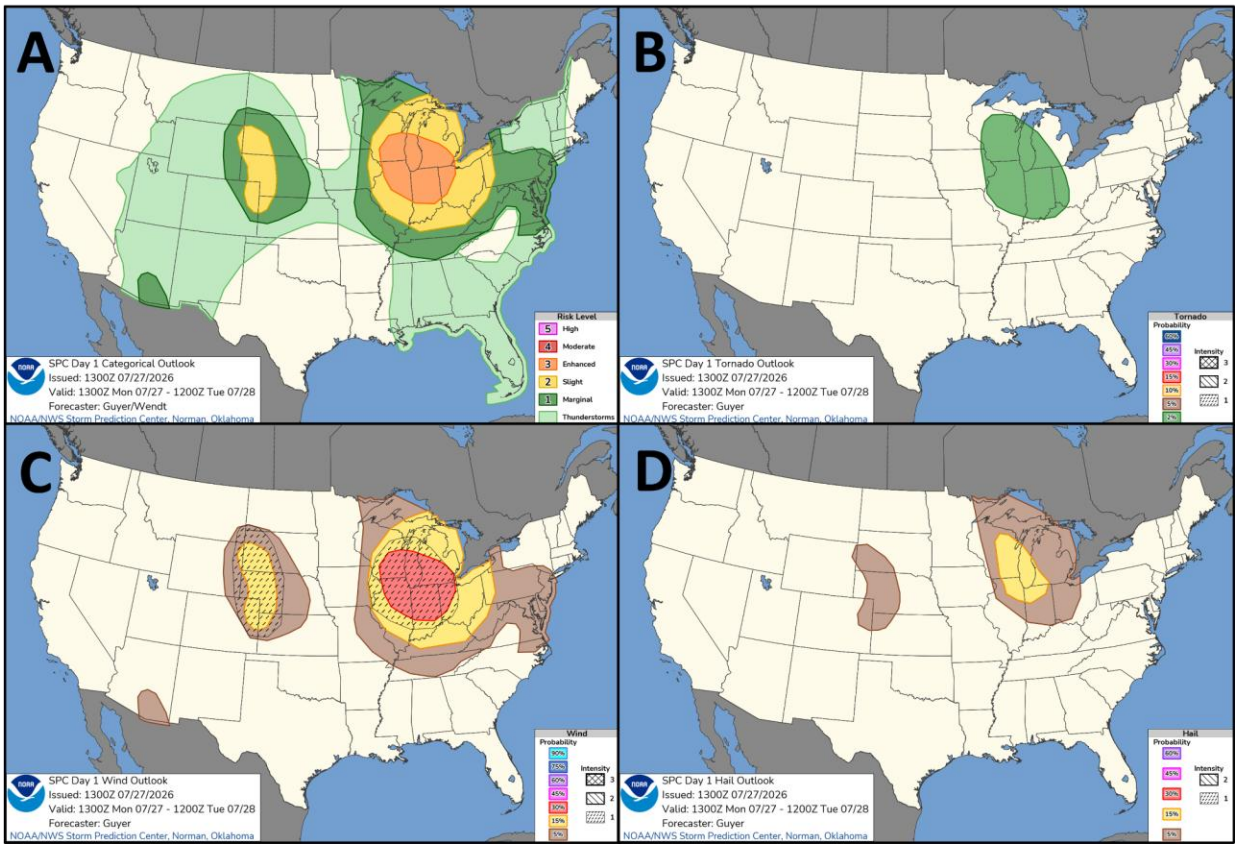

Figure 4. The Day 1 Severe Weather Outlook prepared by the Storm Prediction Center issued at 13:00 UTC / 8:00 AM CDT 27 July 2026. (a) The composite severe weather outlook, (b) the probability of a tornado report within 25 miles of any point, (c) the probability of a damaging wind report within 25 miles of a point, and (d) the probability of a damaging hail report within 25 miles of a point. The single hatching in panel (c) corresponds to a “CIG1” area in which the reasonable max intensity wind may exceed 75 mph.

upstream of the area complicated exactly when and where renewed thunderstorm development or intensification of preexisting thunderstorms would occur. In particular, high resolution model guidance favored a scenario in which thunderstorms would initially develop in the vicinity of western Lake Superior during the evening hours of July 26, grow upscale over northern Wisconsin overnight, and then race southward along the instability gradient into northern Illinois just after daybreak on July 27. While initially discrete thunderstorms (including a few supercells) did develop in far northern Minnesota overnight, they failed to coalesce into a coherent complex and instead dissipated in far northern Wisconsin. Other areas of discrete thunderstorms developed along the elevated frontal boundary across eastern Wisconsin and over Lake Michigan as well, but they too failed to coalesce into thunderstorm complexes. As a result, a relatively pristine convective environment was present across the Lower Great Lakes by daybreak on July 27 (Figure 5).

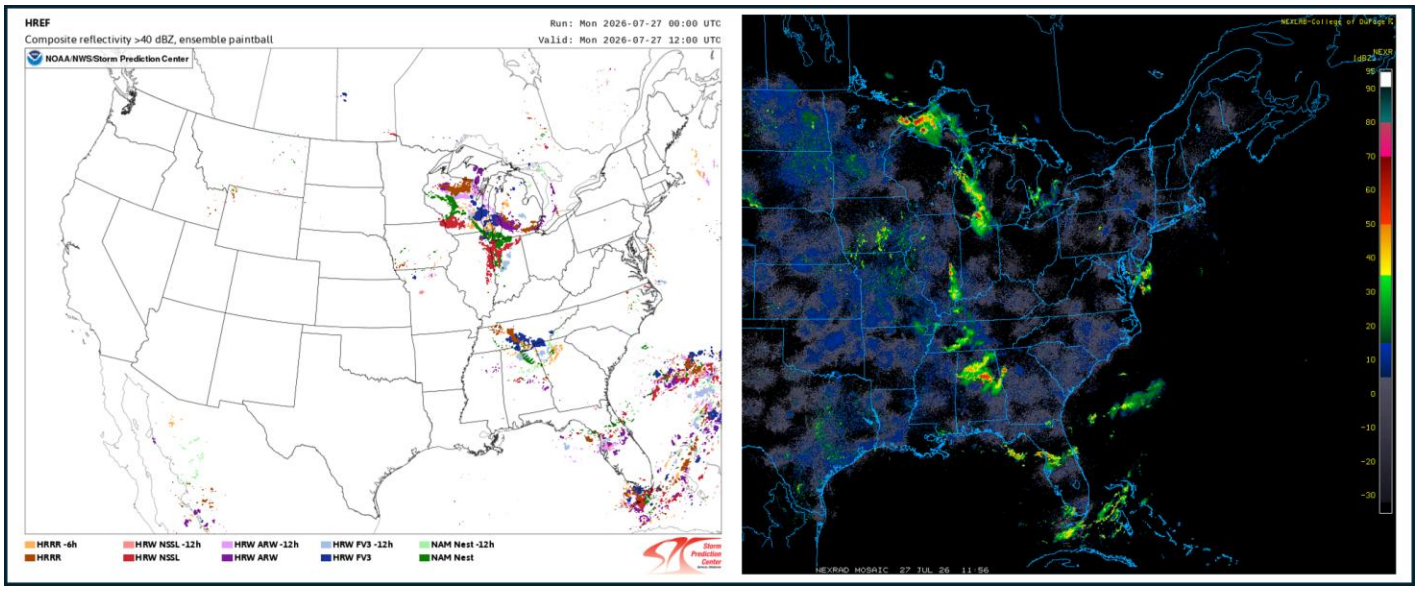

Figure 5: A comparison between model reflectivity and observed reflectivity the morning of July 27, 2026. (Left) Ensemble paintball simulated composite reflectivity >40 dBZ from the 00Z HREF valid at 12:00 UTC / 7:00 AM 27 July 2026. (Right) Regional radar imagery valid at 12:00 UTC / 7:00 AM 27 July 2026, courtesy of the UCAR MMM archive.

Whether or not initially discrete thunderstorms will grow upscale into a forward-propagating cold-pool driven mesoscale convective system (MCS) is a common forecast conundrum during the middle of summertime in the Midwest, especially in environments characterized by strong deep-layer shear in which supercellular processes can dominate large-scale convective evolution. It is common for initial supercell thunderstorms to remain discrete for far longer than expected leading to a delayed upscale growth or no upscale growth entirely. Moreover, in the absence of a robust low-level jet to provide focused low-level isentropic ascent in the vicinity of preexisting convection (to promote a higher coverage of thunderstorms that inevitably interact to develop a composite cold pool), the chance that discrete convection grows into a forward-propagating MCS lowers with each hour after sunset owing to the deleterious impact of collapsing mixed layers and associated increasing surface-based inhibition. Often, isolated to scattered surface-based supercells will shrivel up and dissipate entirely during the overnight hours (often in the 03:00 to 06:00 UTC / 10:00 PM to 1:00 AM time window) as surface-based inhibition simply becomes too strong to be overcome by dynamic lift within supercell updrafts. Such an evolution appeared to take place in northern Wisconsin during the early morning hours of July 27 with several discrete supercells dissipating after 06:00 UTC / 1:00 AM CDT, roughly at the time when most high resolution model guidance depicted upscale growth into a forward-propagating MCS.

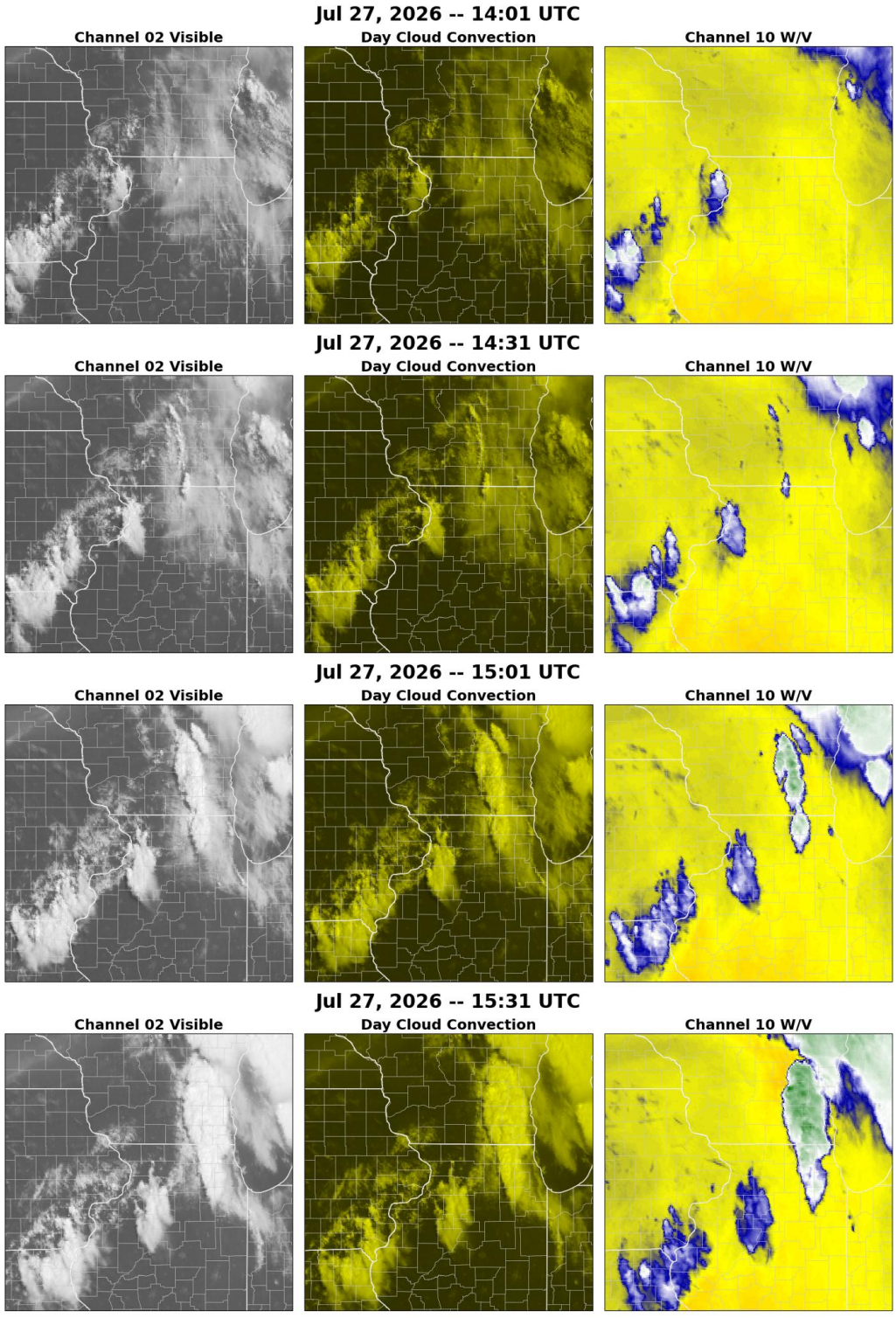

Figure 6. GOES-19 imagery in 30-minute increments between 14:01 UTC and 15:31 UTC / 9:01 AM and 10:31 AM CDT 27 July 2026 centered on northern Illinois. Left panels are visible satellite, middle panels are the day cloud convection RGB composite, and right panels are low-level water vapor imagery.

Between 12:00 and 14:00 UTC / 7:00 and 9:00 AM CDT, an area of muted ACCAS (altocumulus castellanus; mid-level cumulus clouds indicative of instability) tied to a modest 20 to 25 kt 850 to 700 mb low-level jet in eastern Iowa started to expand in coverage and deepen while approaching and ultimately crossing the Mississippi River. In spite of ample amounts of instability (with apparent minimal convective inhibition with a few degrees of heating, per the 12:00 UTC / 7:00 AM CDT DVN RAOB; Figure 2), early attempts for sustained thunderstorm development struggled with overall small convective footprints and only gradual intensification rates. However, as the terminus of the low-level jet approached the vicinity of the low- to mid-level frontal zone near Lake Michigan after 14:00 UTC / 9:00 AM CDT (flow sampled by the KMKX VWP veered modestly between 14:00 and 15:00 UTC / 9:00 and 10:00 AM CDT suggesting modestly better convergence and isentropic ascent, not shown), the ACCAS field rapidly expanded and transitioned into explosive convection that would ultimately organize into an intense southeastward-moving supercell (Figure 6).

In scenarios where predictability is inherently lower than average owing to dependencies on upstream thunderstorms, what is the best way to effectively communicate a high impact but low confidence forecast scenario? Ultimately, communication of the source of uncertainty – namely a dependence on upstream thunderstorms – is effective. Moreover, a simple observational- and ingredients-based approach that largely ignores high resolution model guidance can prove effective as well. In the case of July 27, the presence of an explosive thermodynamic and kinematic environment across the Lower Great Lakes and an approaching upper-level short-wavelength trough to serve as a mechanism for ascent by itself supported a forecast for high-impact severe weather somewhere in the region. Then again, sometimes, a forecast simply hinges on intricacies of convection that are seemingly stochastic or impossible to determine until dependencies are resolved (e.g., where exactly and at what coverage initial thunderstorms develop to promote or limit upscale growth). Taken altogether, the forecast for severe thunderstorms on July 27 was hardly straightforward.

b. Mechanism for extreme wind production

Within an hour of initiation, disorganized convection across southeastern Wisconsin and northeastern Illinois quickly intensified to severe caliber. With unimpeded access to the reservoir of extreme instability, the southernmost cell developed into a supercell conglomerate (several mesocyclones in very close proximity) over DuPage and western Cook Counties between 16:15 and 16:30 UTC / 11:15 and 11:30 AM CDT, with a nearly continuous feed of merging updrafts from eastern Kane County. During this time, the supercell conglomerate grew unusually large (nearly 30 miles across) and

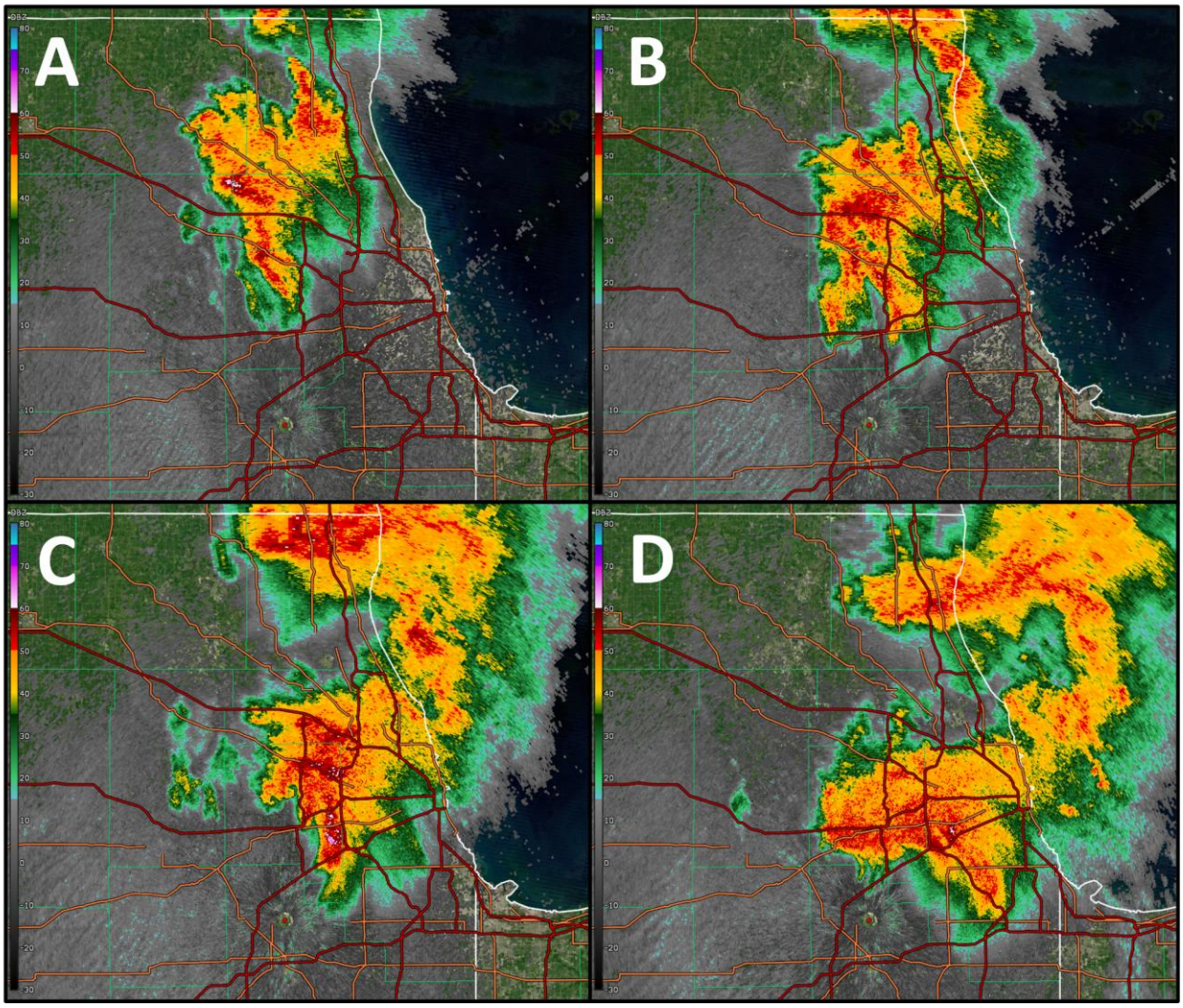

Figure 7. 0.5° base reflectivity from KLOT in roughly 20 minute increments showing the evolution of initially messy convection into a supercell conglomerate and eventually a single dominant supercell from (a) 16:14 UTC / 11:14 AM CDT, (b) 16:33 UTC / 11:33 AM CDT, (c) 16:55 UTC / 11:55 AM CDT, and (d) 17:14 UTC / 12:14 PM CDT 27 July 2026. Note the second storm that approaches from the north in panels (c) and (d) is not of interest in this paper.

intense (echo heights reaching nearly 65,000 feet AGL)[2], with a large (around 6 miles across) low-level mesocyclone in proximity of several merging updrafts. Two short-lived EF-0 tornadoes occurred nearly simultaneously in central DuPage County in Glen Ellyn

[2]Using the KMKX WSR-88D radar, the 60 dBZ echo height peaked at 48 kft AGL, 50 dBZ echo height reached 56 kft AGL, 40 dBZ echo reached 60 kft AGL, echo tops broached 64 kft AGL, and peak echo top divergence was nearly 200 kts between 17:20 and 17:40 UTC / 12:20 and 12:40 PM CDT. Such values depict incredible intensity for any thunderstorm anywhere across the United States. For reference, the freezing level on the 12:00 UTC / 7:00 AM CDT DVN RAOB was around 17,400 feet, -20°C level was around 27,521 feet, and the -30°C level was around 31,100 feet.

and Wheaton within the broad mesocyclone surrounded by a broader region of rear-flank downdraft (RFD) and forward-flank downdraft winds in excess of 70 mph. Ahead of the mesocyclone (tied to one embedded supercell core within the entire conglomeration), hail ranging in size between golf ball and baseballs fell over Downers Grove, Clarendon Hills, Westmont, and Oak Brook. Unfortunately, torrential downpours contributed to a flash flood that led to one fatality and one injury in Downers Grove. Figure 7 depicts the evolution of initially disorganized convection into the supercell conglomerate.

By 17:15 UTC / 12:15 PM CDT, a single dominant supercell emerged across southern DuPage and Cook counties (e.g., Figure 7d). An intense and large RFD surge quickly developed between 17:20 and 17:30 UTC / 12:20 and 12:30 PM CDT across southern DuPage, northern Will, and southwestern Cook Counties as evident by 60 to 70 kt flow between 400 and 600 ft AGL sampled by the KLOT radar (Figure 8), and an expansive region around 10 miles across of greater than 50 kt of flow below 500 feet AGL sampled by the TORD TDWR (not shown). Within the broad RFD surge, a 78 mph wind gust was measured at Argonne National Laboratory in far southern DuPage County. In addition, two EF-0 tornadoes developed at the leading edge of the RFD surge in Romeoville (passing within one quarter mile of the NWS Chicago forecast office) and in Orland Park.

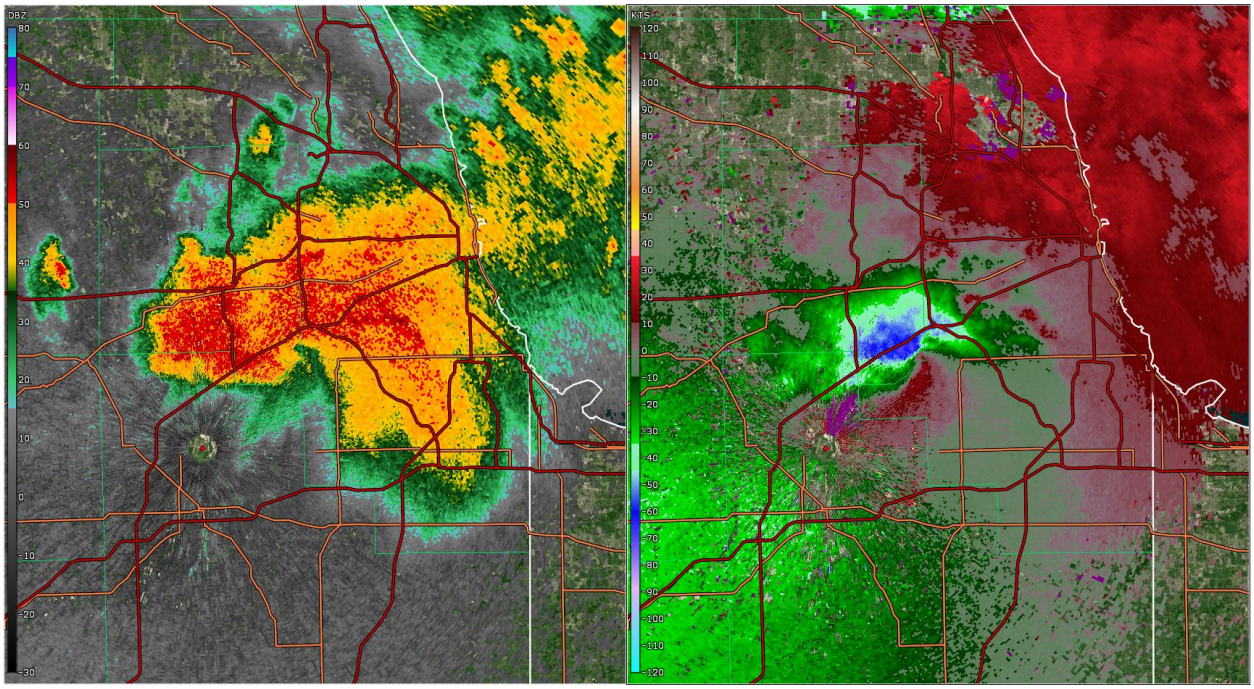

Figure 8: 0.5° base reflectivity (left) and velocity (right) from KLOT at 17:22 UTC / 12:22 PM CDT 27 July, 2026 depicting the initial development of a large and intense RFD surge near the DuPage, Will, and Cook County borders.

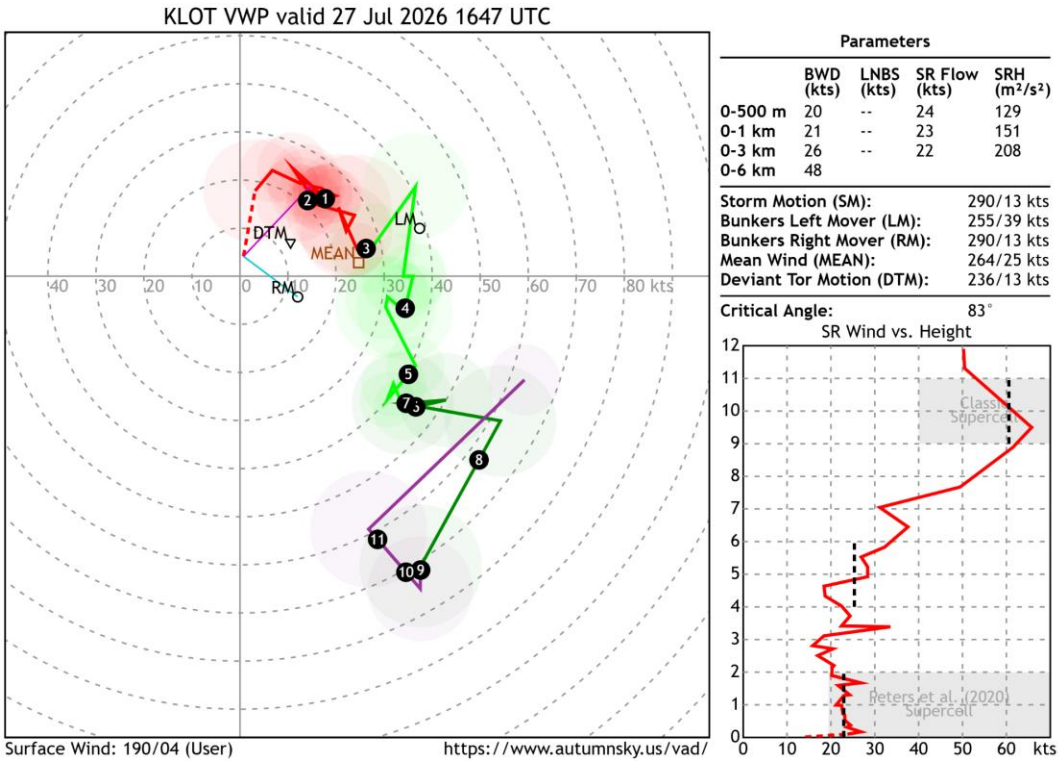

Figure 9: Hodograph derived by the vertical wind profile (VWP) sampled by the KLOT WSR-88D valid at 16:47 UTC / 11:47 AM CDT 27 July 2026. The surface wind was corrected using the observed wind at the KLOT AWOS at 16:45 UTC / 11:45 AM CDT. The plot was generated using the Autumn Sky hodograph viewer.

Between 17:30 and 18:30 UTC / 12:30 and 1:30 PM CDT, the supercell reached peak intensity with peak mid-level rotational velocity of around 70 kt at around 7,000 feet AGL. During this time, the RFD surge expanded in coverage and intensified across southern Cook and northern Will Counties with the width of 60 kt base velocity returns on the 0.5° slice eclipsing 15 miles. The rapid expansion of the RFD was likely influenced by relatively weak low-level shear of 20 to 25 kt from the surface to 3 km (the KLOT VWP was optimally positioned to sample the near-storm environment as the supercell approached and ultimately moved directly overhead; see Figure 9). Meanwhile, the intensity of the RFD was likely influenced by both extreme instability (to promote strong water-loaded downdraft production) and a feed of dry mid-level air along the backside of the broad mesocyclone, in effect leading to the development of a compact rear-inflow jet (RIJ). Through this process, the thunderstorm evolved from a large high precipitation supercell into a compact bow echo (Figure 10).

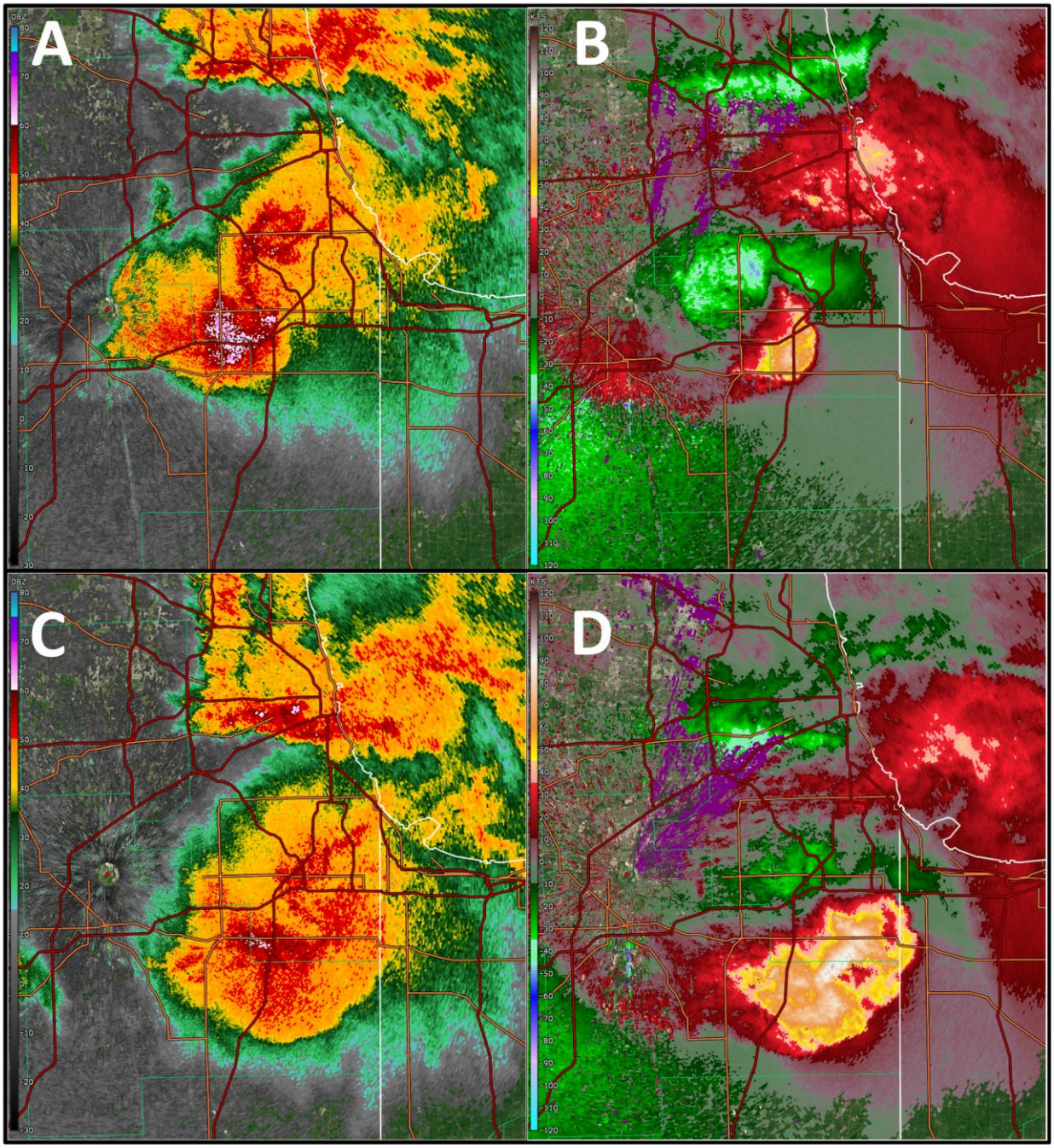

Figure 10: 0.5° base reflectivity (a), (c) and velocity (b), (d) at 17:22 UTC / 12:22 PM CDT (a), (b) and 18:03 UTC / 1:03 PM CDT (c), (d) from KLOT on 27 July 2026 showing the transition form a supercell into a compact bow echo across southern Cook and eastern Will Counties.

At the overlap of the compact rear-inflow jet and RFD surge, a corridor of extreme winds developed in southern Cook and eastern Will Counties. The peak intensity of the hybrid RFD surge was between 18:00 UTC and 18:10 UTC / 1:00 and

1:10 PM CDT in eastern Will County during which velocity returns on the 0.5° degree slice from KLOT ranged from 90 to locally 100 kt at heights of 1300 to 1600 feet AGL (see Figure 10d). Damage was extensive and extreme in this region with widespread snapped and uprooted trees, flipped semi truck containers, metal warehouse structure collapses, and snapped power poles. A 104 mph wind gust was measured at Monee Airport in Monee, Illinois, and two injuries were reported in Beecher, Illinois. Along the northern flank of the expanding RFD surge, two EF-1 tornadoes developed within broader destructive winds near Markham and Lynwood in southern Cook County, too.

In anticipation of the evolution of the thunderstorm from a supercell to a compact bow echo, the National Weather Service in Chicago issued a WEA Destructive-tag Severe Thunderstorm warning for southern Cook and eastern Will counties with an expected wind speed in excess of 90 mph at 17:48 UTC / 12:48 PM CDT (Figure 11). The warning was later upgraded for a threat of wind gusts in excess of 100 mph and expanded to portions of northern Kankakee county in Illinois and southern Lake county in northwestern Indiana. The 104 mph wind gust occurred at 18:04 UTC / 1:04 PM, 16 minutes after the initial issuance of the WEA Destructive-tag Severe Thunderstorm Warning.

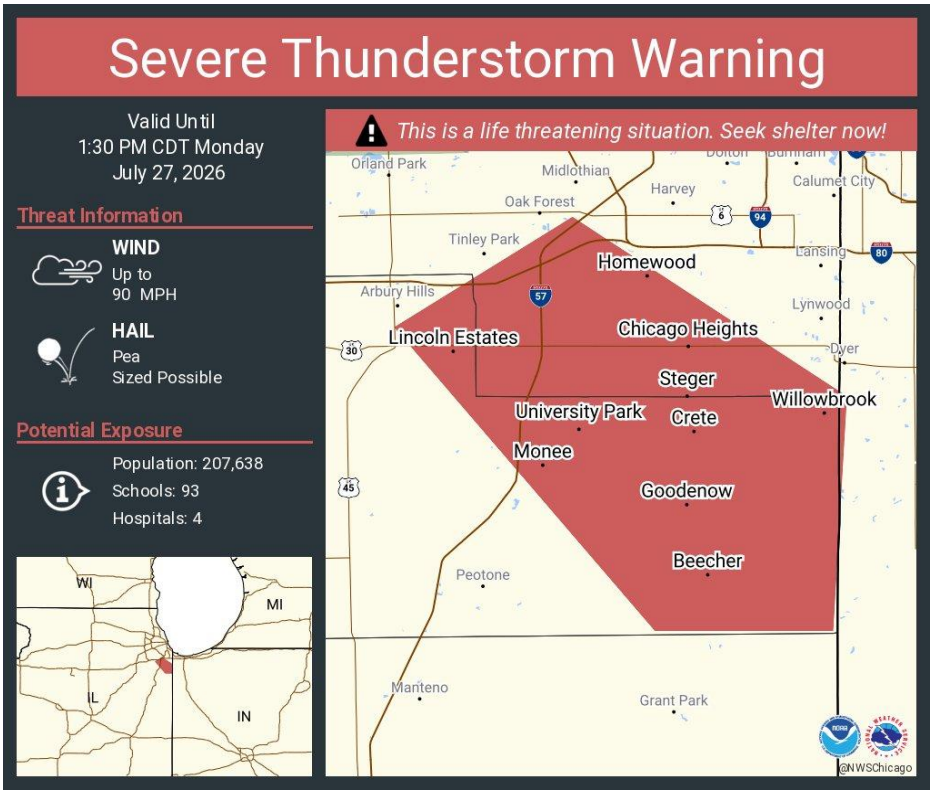

Figure 11: The initial WEA Destructive Severe Thunderstorm Warning issued for portions of southern Cook and eastern Will counties. The initial wind speed of wind gusts up to 90 mph was later upgraded to 100 mph as a downstream warning was issued into Kankakee and southwestern Lake counties.

After 18:30 UTC, the compact bow echo started to weaken while moving across portions of Lake, Porter, Newton, and Jasper counties in northwestern Indiana. Interestingly, damage reports became increasingly sparse as the storm traversed across northwestern Indiana in spite of lowest-angle base velocity data from KLOT still depicting returns greater than 70 kts at 2000 to 3000 feet AGL. The weakening trend was likely encouraged by the unbalanced cold pool (e.g, weak low-level shear) and displacement of the convective system east of the primary instability axis lagging further to the west in Illinois.

Curiously, the initial evolution of the disorganized convection to a supercell conglomerate and then into a single, large, dominant supercell over DuPage and Cook Counties was very similar to the evolution of a destructive supercell that impacted the Chicago metropolitan area on June 13, 2022. Like the July 27, 2026 supercell, the June 13, 2022 supercell developed in an environment characterized by extreme instability within northwesterly flow aloft and was responsible for a swath of destructive winds greater than 80 mph primarily across Cook County, Illinois. However, the June 13 supercell remained discrete rather than evolving into a compact bow echo. The difference in convective evolution was likely tied to the magnitude of the low-level wind shear with comparatively stronger values sampled during the June 13, 2022 event (nearby RAOBs and AMDAR soundings sampled >40 kt of 0-3km shear, not shown).

3. August 11, 2026:

a. Forecast leading up to the event

During the overnight period from August 10 to August 11, 2026, a broad low-level baroclinic zone was present across the Upper Mississippi River Valley and Lower Great Lakes region. Broad quasi-zonal flow with embedded speed maxima tied to subtle short wave-length disturbances was in place atop the baroclinic zone. Ensemble model guidance exhibited strong agreement that one such short wave-length trough anchored by a 50 kt 500 mb speed max originating over the northern Plains would propagate into the central Great Lakes overnight followed by a trailing short wave-length trough into the Lower Great Lakes toward daybreak on August 11. Owing to increasing upper-level diffluence near the overlap of the right entrance region of the lead wave and left exit region of the trailing speed max and increasing low-level convergence along the nose of an intensifying 850mb low-level jet oriented toward the Mississippi River Valley, a complex of thunderstorms was expected to develop within the baroclinic zone across Iowa overnight and then roll into northern Illinois after daybreak. Figure 12 depicts analyzed low- to upper-level charts valid at 00:00 UTC / 7:00 PM CDT August 10.

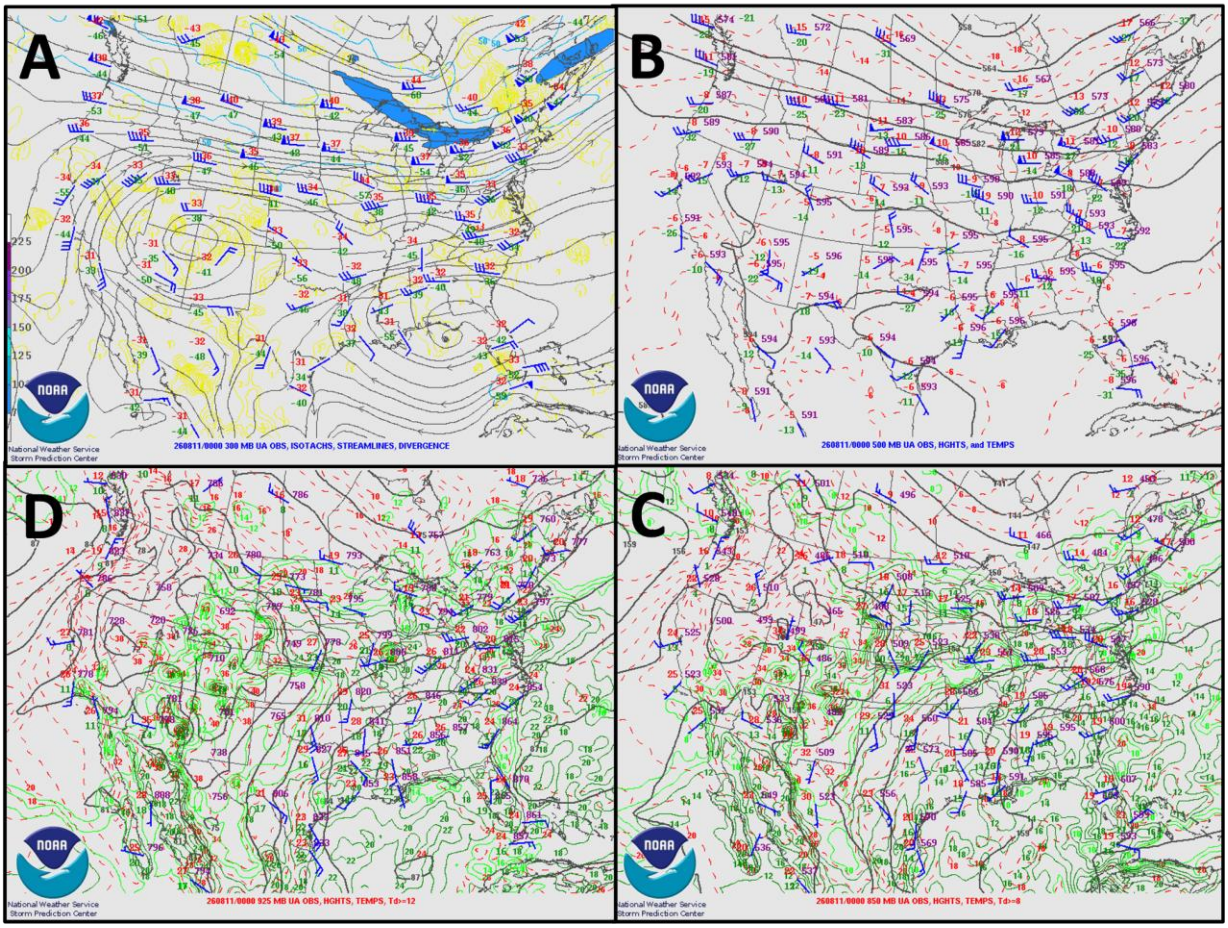

Figure 12. Clockwise from top left, analyzed 300, 500, 700, and 925 mb charts valid at 00:00 UTC / 7:00 PM CDT 10 August 2026. Blue wind barbs indicate observed winds at each level as sampled by 00:00 UTC / 7:00 PM CDT RAOBs. In (a), black contours are streamlines and yellow contours indicate divergence. In (b), (c), and (d), black contours represent isoheights (dm), red dashed lines indicate temperature (°C). In (c) and (d), green contours indicate dew points (plotted where values are greater than 8°C).

Between 05:00 and 07:00 UTC / 12:00 and 2:00 AM CDT, scattered thunderstorms developed near the border region of South Dakota, Nebraska, Iowa, and Minnesota. While the storms remained largely disorganized through the night, they did eventually merge into a broader cluster by 11:00 UTC / 6:00 AM CDT as the centroid of activity approached the Mississippi River[3]. Per the 12:00 UTC / 7:00 AM CDT

[3]While no two environments are the same, a notable difference between that of the overnight periods prior to July 27, 2026 and August 11, 2026 was the magnitude of respective low-level jets and associated low-level isentropic ascent. The strength of the low-level jet during the early morning hours of July 27 was only 20 to 25 kt compared to 40 to 45 kt the morning of August 11. In addition, upper-level forcing appeared to be stronger during the early morning hours of August 11 compared to July 27 owing to a couplet jet structure. Unlike with the initial scattered thunderstorm development the morning of July 27,

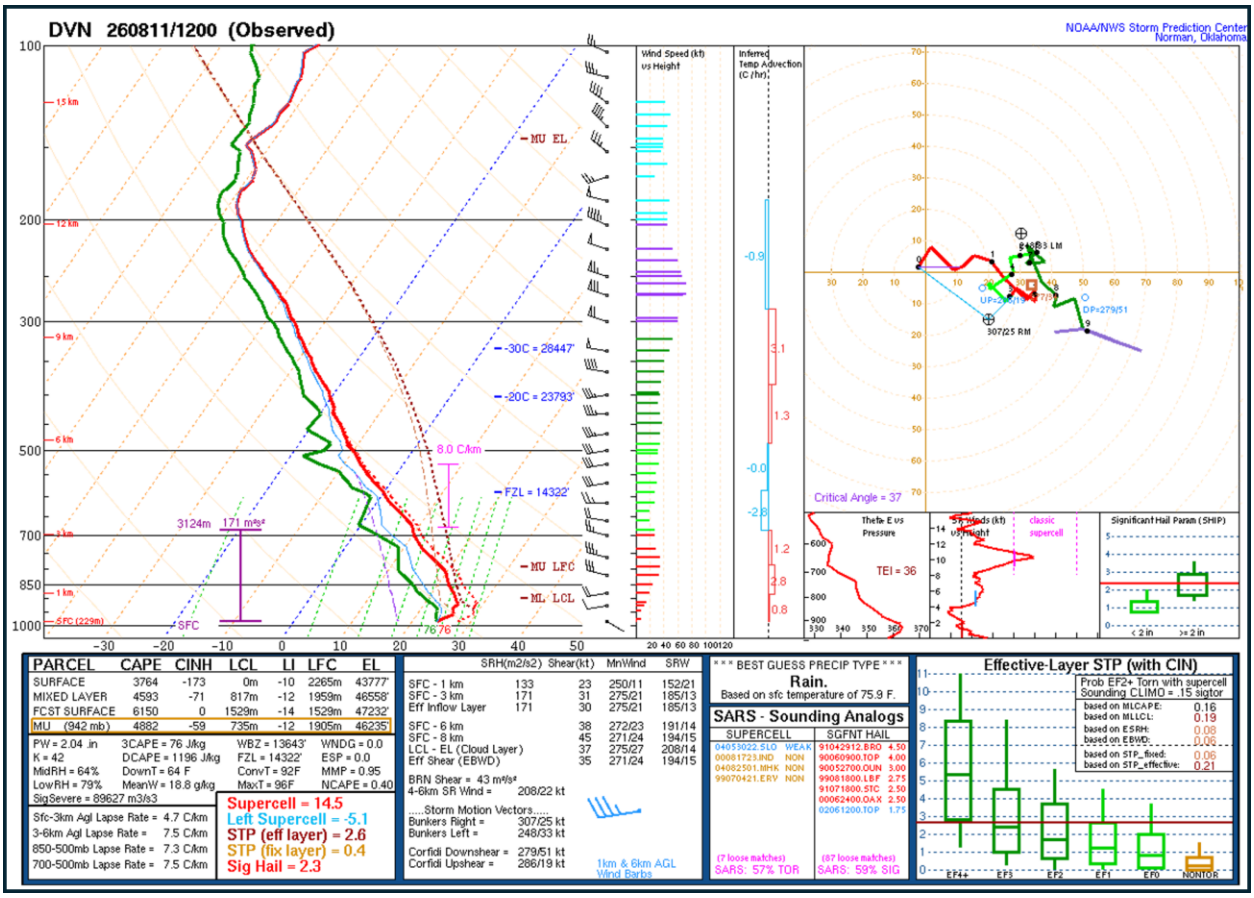

Figure 13. The 12:00 UTC / 7:00 AM CDT RAOB launched at KDVN the morning of 11 August 2026.

DVN RAOB (Figure 13), the downstream air mass was characterized by unusually high moisture content with surface dew points in the mid 70s[4] and 1 km mean mixing ratios of nearly 19 g/kg. When paired with steep mid level lapse rates near 8 K/km, MUCAPE was already approaching 5,000 J/kg ahead of the organizing thunderstorm complex.

While the primary upper-level speed maxima was displaced north of the developing thunderstorm complex, a secondary speed maxima developed across central Iowa in tandem with the developing thunderstorms as confirmed by nearly 65 kt of flow at 500 mb sampled by the 12Z DVN RAOB. As a result, the developing thunderstorm complex had access to appreciable low- to deep-layer shear with

the overall stronger forcing for ascent during the early morning hours of August 11 likely aided in both a higher coverage of initial thunderstorms and the eventual upscale growth into a complex.

[4]Similar to the morning of July 27, 2026, areas of fog and mist were prevalent within the baroclinic zone across northern Illinois at daybreak.

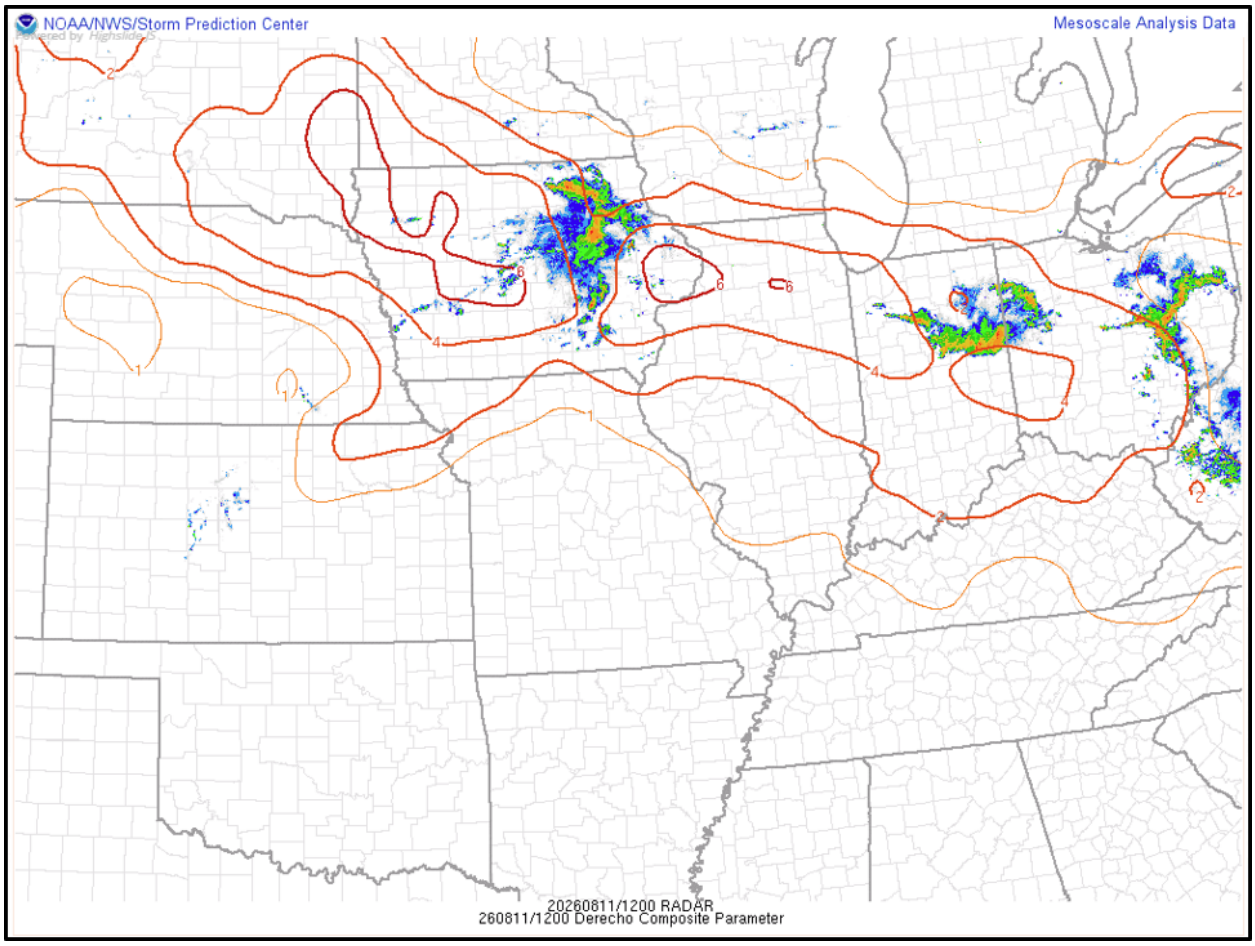

Figure 14. SPC RAP-analyzed derecho composite parameter (contoured) valid at 12:00 UTC / 7:00 AM CDT 11 August 2026. Composite reflectivity is overlaid. Note the developing complex of thunderstorms across northeastern Iowa.

0-3 km and 0-8 km shear of around 30 and 45 kt, respectively. When taken altogether, the environment across northern Illinois and northwestern Indiana was favorable for the continued maintenance and subsequent intensification of the approaching complex of thunderstorms. Indeed, a corridor of heightened values of the Derecho Parameter extended downstream across northern Illinois and into northwestern Indiana (Figure 14).

The Storm Prediction Center outlook valid at 13:00 UTC / 8:00 AM CDT 11 August highlighted the Lower Great Lakes in a Level 3 out of 5 threat level for severe weather driven by heightened probabilities for damaging winds extending from the organizing thunderstorm complex in eastern Iowa (e.g., Figure 15), more or less in line with the corridor of heightened values of the Derecho Parameter.

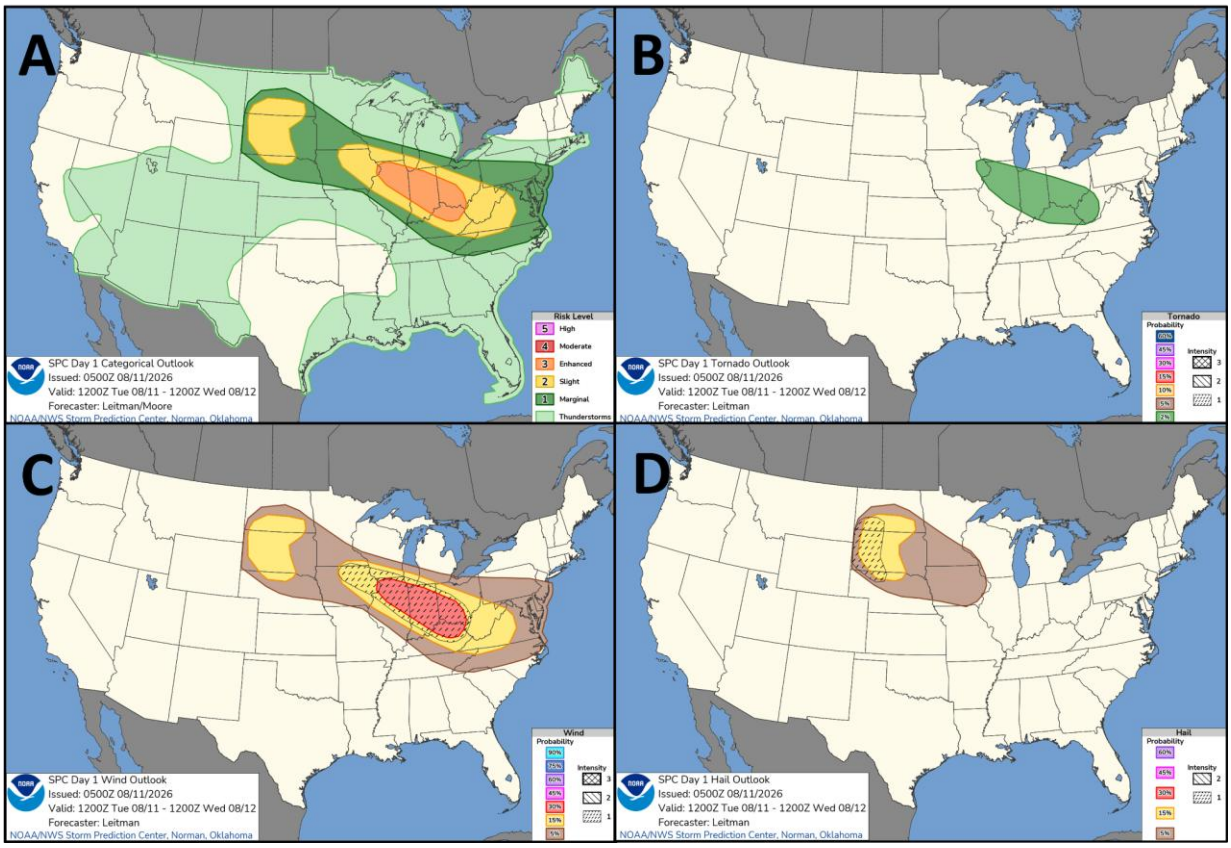

Figure 15. The Day 1 Severe Weather Outlook prepared by the Storm Prediction Center issued at 13:00 UTC / 8:00 AM CDT 11 August 2026. (a) The composite severe weather outlook, (b) the probability of a tornado report within 25 miles of any point, (c) the probability of a damaging wind report within 25 miles of a point, and (d) the probability of a damaging hail report within 25 miles of a point. The single hatching in panel (c) corresponds to a “CIG1” area in which the reasonable max intensity wind may exceed 75 mph.

b. Mechanism for extreme wind production

Per radar data from KDVN, the overall structure of the developing MCS as severe weather production started west of the Mississippi River was complex. Between 12:00 and 13:00 UTC / 7:00 and 8:00 AM CDT, an eastward-pointing RIJ developed near Independence, Iowa and influenced the development of a compact bow echo that tracked due eastward toward Dubuque, Iowa. The compact bow echo became responsible for a corridor of measured wind gusts of 60 to 85 mph and several embedded EF-1 tornadoes primarily west of the Mississippi River. Between 13:00 and 13:30 UTC / 8:00 and 8:30 AM CDT, a notable area of damaging winds surged southeastward toward the Quad Cities, effectively elongating the footprint of the

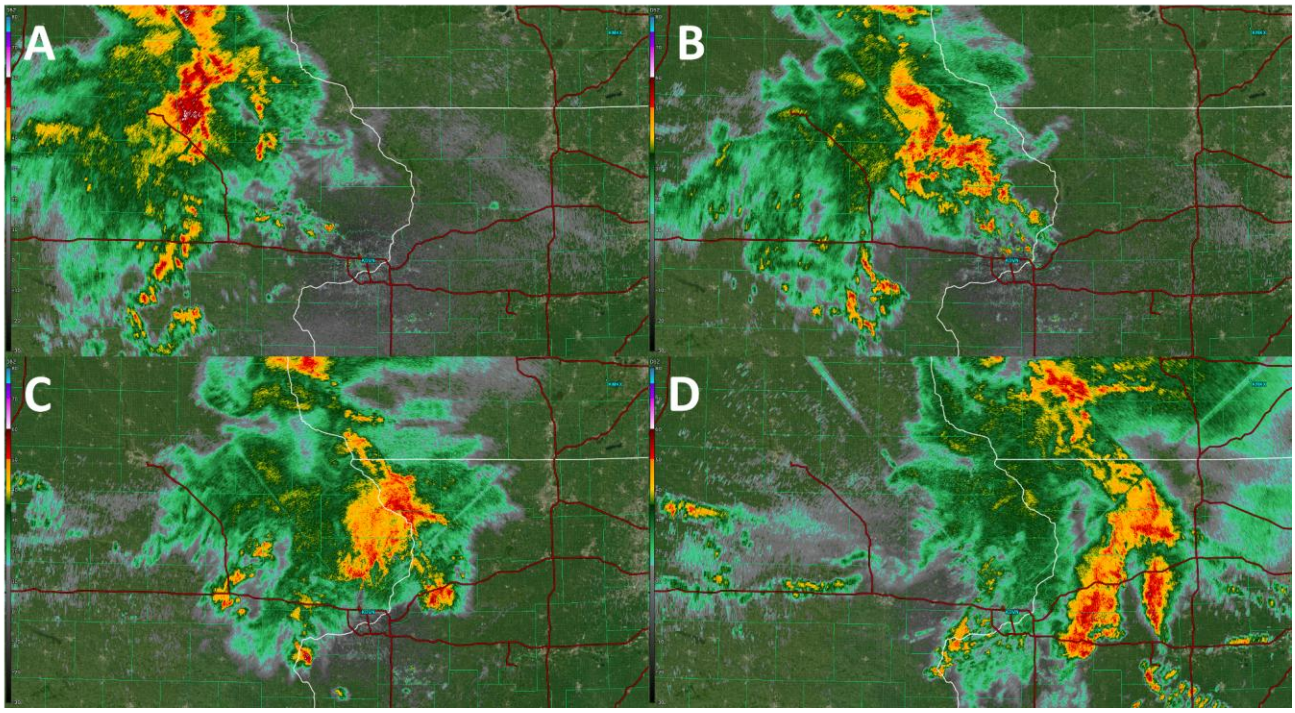

Figure 16. 0.5° base reflectivity from KDVN in roughly 45 minute increments showing the evolution of the thunderstorm combles from (a) 12:06 UTC / 7:06 AM CDT, (b) 12:45 UTC UTC / 7:45 AM CDT, (c) 13:30 UTC / 8:30 AM CDT, and (d) 14:15 UTC / 9:15 AM CDT 11 August 2026.

complex of storms to encompass areas from the Wisconsin state line to the Interstate 88 corridor. Radar data from both KDVN and KLOT indicated several separate surges of wind internal to the complex rather than a single consolidated RIJ structure, effectively rendering damaging winds to localized corridors rather than across a widespread area as the complex of storms crossed the Mississippi River. Moreover, the leading edge of reflectivity remained somewhat ill-defined with regions of stratiform precipitation and newly developing thunderstorms preceding the complex of storms. The evolution of the complex of storms between roughly 12:00 and 14:00 UTC / 7:00 and 9:00 AM CDT is shown in Figure 16.

Between 14:00 and 15:00 UTC / 9:00 and 10:00 AM CDT, the complex of storms began to merge with new thunderstorms that were developing near the Interstate 39 corridor. At the same time, elevated scans of base velocity from KLOT depicted the rapid development, consolidation, eastward acceleration, and descent of a large and intense RIJ centered between the Interstate 88 and 80 corridors. As the intensifying RIJ reached the leading edge of the complex of storms, the reflectivity gradient tightened substantially and increased in forward motion from around 40 kt at 14:00 UTC / 8:00 AM to nearly 55 kt by 15:00 UTC / 10:00 AM CDT. The net result was the rapid organization of an eastward-racing bow echo structure by 15:00 UTC / 10:00 AM CDT (Figure 17).

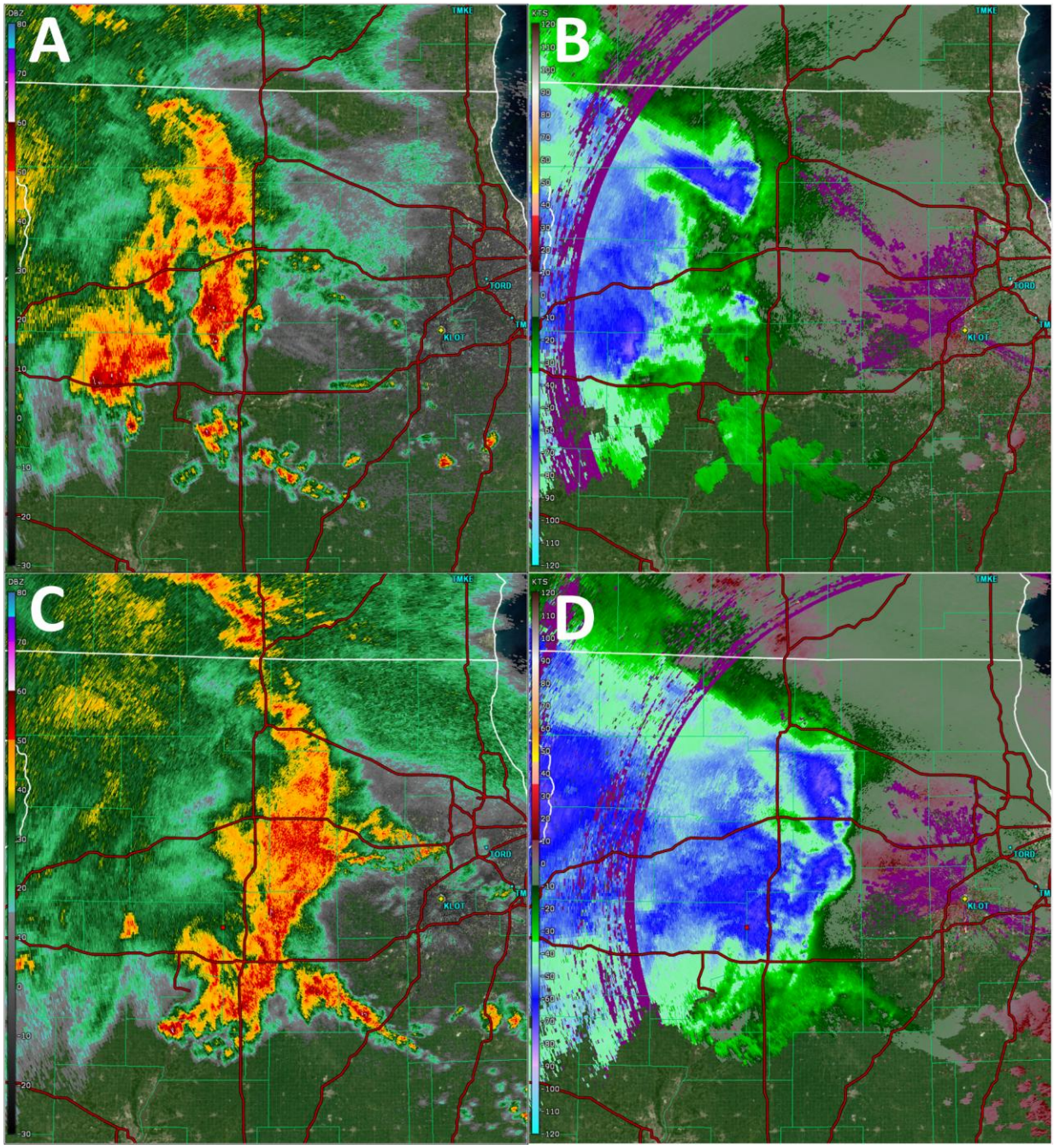

Figure 17: 0.5° base reflectivity (a), (c) and velocity (b), (d) at 14:28 UTC / 9:28 AM CDT (a), (b) and 14:49 UTC / 9:59 AM CDT (c), (d) from KLOT on 11 August 2011 depicting the rapid organization and consolidation of a rear-inflow jet and bow echo structure. Dark blue shading corresponds to radar-indicated wind speeds greater than 60 kts.

Per radar data from KLOT, TORD, and TMDW, the newly developed and consolidated rear-inflow jet reached the ground near the DeKalb, LaSalle, Kane, and Grundy County lines at 15:00 UTC / 10:00 AM CDT. Between 15:00 UTC and 15:45 UTC / 10:00 and 10:45 AM CDT, the bow echo raced across the central and southern Chicago metropolitan area producing widespread destructive winds. An unusually large number of measured significant wind gusts were reported ranging between 80 and 100 mph across Sugar Grove, Aurora, Batavia, Plainfield, Kankakee and Peotone. Tornadoes ranging in intensity from EF-0 to EF-1 were confirmed in Oswego, Seneca, Morris, Wilmington, New Lenox, and Homer Glen, as well.

The forward motion of the bow echo increased further to nearly 65 kt while approaching northwestern Indiana between 15:45 and 16:30 UTC / 10:45 and 11:30 AM[5]. It is in this window–from Interstate 57 through the first two western rows of counties in northwestern Indiana–that the storm reached peak intensity. Per radar data from KLOT, an expansive area of 0.5° base velocity returns greater than 60 kt peaked in footprint across a north-to-south distance of over 40 miles and greater than 80 kt over a

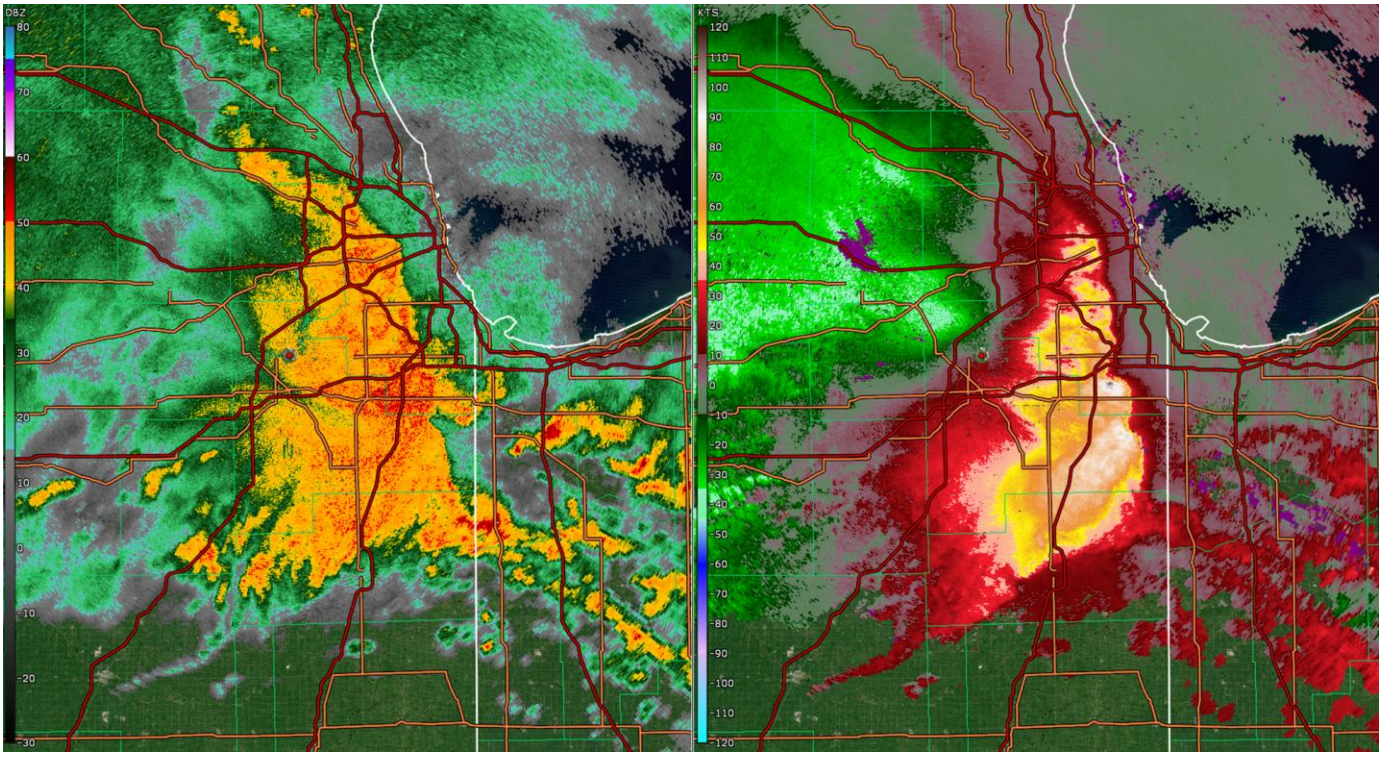

Figure 18: 0.5° base reflectivity (left) and velocity (right) from KLOT at 15:48 UTC / 10:48 AM CDT 11 August 2026 depicting a classic bow echo radar reflectivity structure and intense rear-inflow jet with several embedded mesovortices.

[5]The leading edge of the bow crossed the Indiana state line into central Lake County at 15:55 UTC / 10:55 AM and reached the La Porte County line at 16:27 UTC / 11:27 AM.

north-to-south distance of nearly 20 miles while moving across eastern Cook and eastern Will, in northeastern Illinois and Lake, Porter, and portions of Newton and Jasper counties in northwestern Indiana. Widespread snapped and uprooted trees, snapped power poles, and intermittent structure damage was reported across the aforementioned counties. Figure 18 depicts the bow echo approaching a period of peak intensity while approaching the Indiana state line.

The most destructive damage was confined to two swaths associated with strong mesovortices that developed simultaneously at the leading edge of the destructive winds. The southernmost mesovortex produced a 25-mile long EF-2 tornado that started near Frankfort, Illinois and lifted near St. John, Indiana. Damage within the path of the tornado was at times difficult to discern from widespread damage produced by estimated wind gusts in excess of 80 mph. Meanwhile, the northern mesovortex produced an EF-1 tornado near Homewood before transitioning into a long-lived wind surge that corresponded to extreme damaging winds at the surface from southern Cook County through northern Lake and Porter counties along the Interstate 80 and 94 corridors. Between 15:48 UTC to 16:33 UTC / 10:48 and 11:33 AM CDT, a 45 minute timespan, the lowest-level base velocity from KLOT sampled wind speeds ranging from 95 to 111 kt on the southern side of the mesovortex from eastern Cook County through

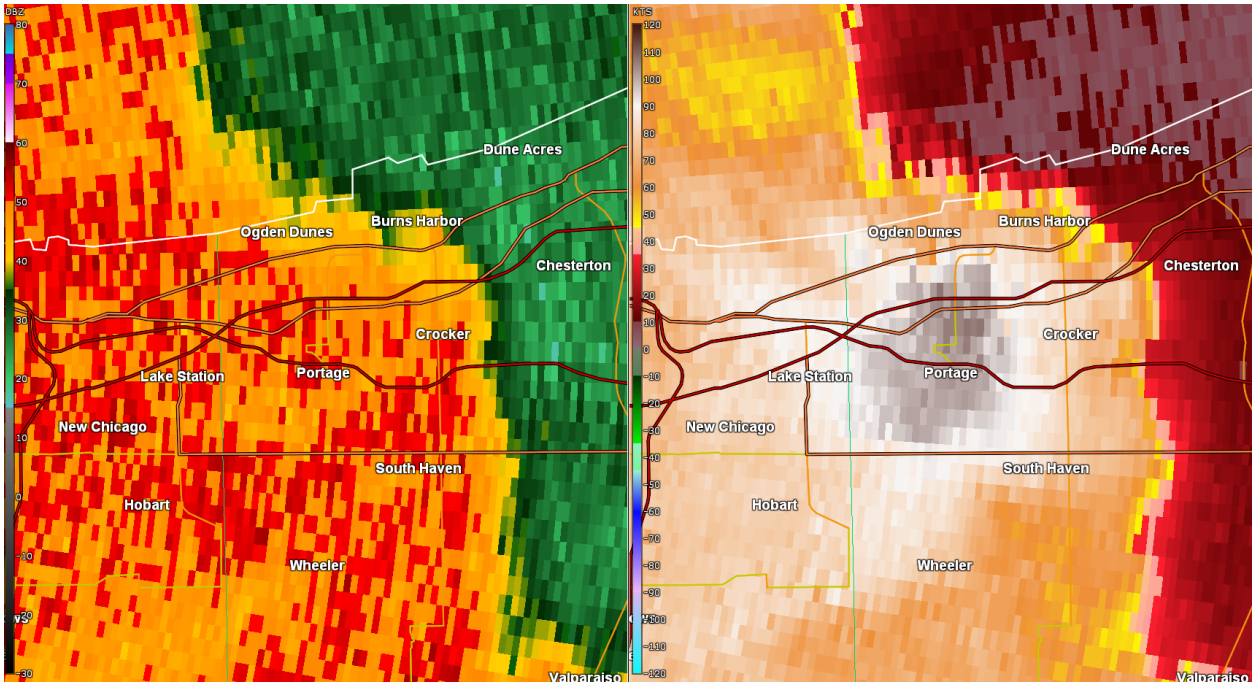

Figure 19: 0.5° base reflectivity (left) and velocity (right) from KLOT at 16:16 UTC / 11:16 AM CDT 11 August 2026 depicting extreme damaging winds in Portage, Indiana. The diameter of radar base velocity returns greater than 100 kt (dark gray) was approximately 3.75 miles at this time.

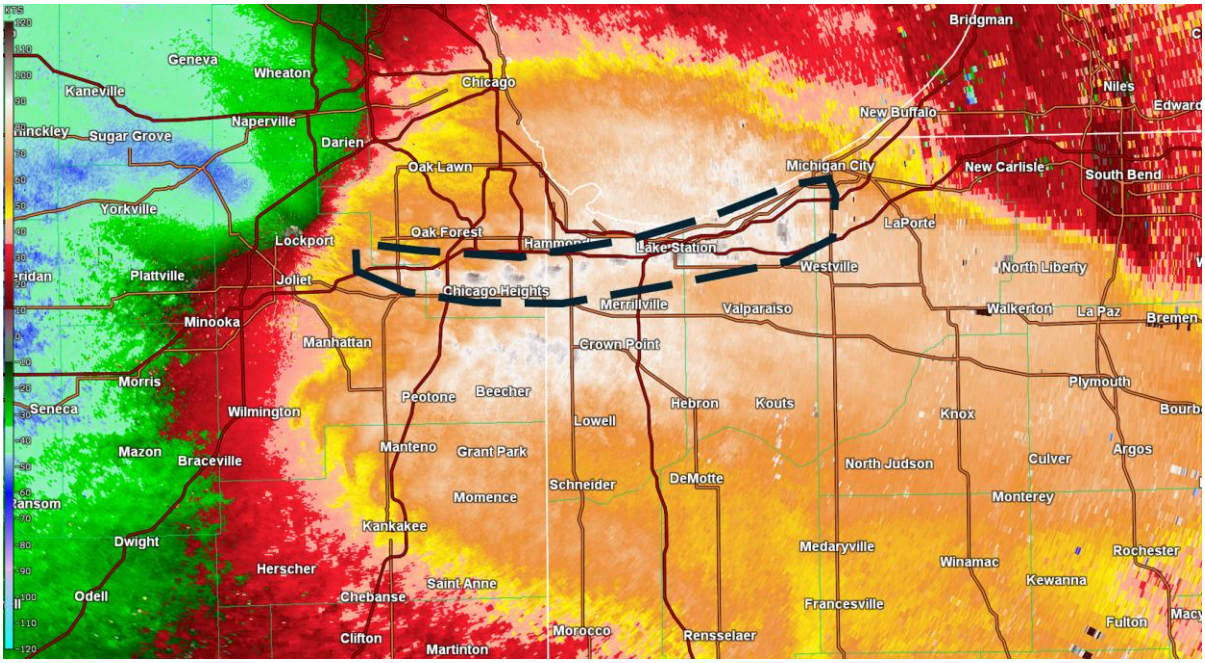

Figure 20: Accumulated 0.9° base velocity from KLOT between 15:00 and 17:00 UTC / 10:00 AM and 12:00 PM CDT. White colors correspond to base velocity returns greater than 80 knots while gray colors correspond to base velocity returns greater than 100 knots. The corridor of extreme winds associated with the northern mesovortex in which there were estimated wind speeds of 100 to 110 mph is highlighted by the dashed black contour.

northern Lake and Porter counties. At 16:16 UTC / 11:16 AM CDT, the diameter of the region of >100 kt returns was approximately 3.75 miles while moving over Portage, Indiana at a height of approximately 3100 feet AGL (Figure 19). The intensity, longevity, and geographic footprint of the enhanced wind surge was impressive (Figure 20).

Damage within the wind surge associated with the northern mesovortex was consistent with EF-1 to EF-2-intensity on a widespread basis. Along the corridor, there were widespread snapped and uprooted trees including intermittent blowdowns of forested areas with a greater than 80% of tree canopy loss. Several high tension power trusses collapsed, and the hood of a rail car was tossed. Homes and businesses sustained damage to roofing structures. A wind gust of 99 mph was measured at the Gary Airport where multiple hangar buildings were damaged. Unfortunately, an unhoused woman lost her life in Gary after being hit by flying debris. After consultation with wind damage experts, wind gusts likely ranged from 100 to 110 mph along the entire path of the northern mesovortex, but may have been locally higher[6].

[6]While the highest confirmed peak measured wind gust during the derecho was 99 mph at Gary Airport, there was an unsubstantiated report of a measured 110 mph wind gust on a personal weather station in Glenwood, IL on the southern side of the northern mesovortex.

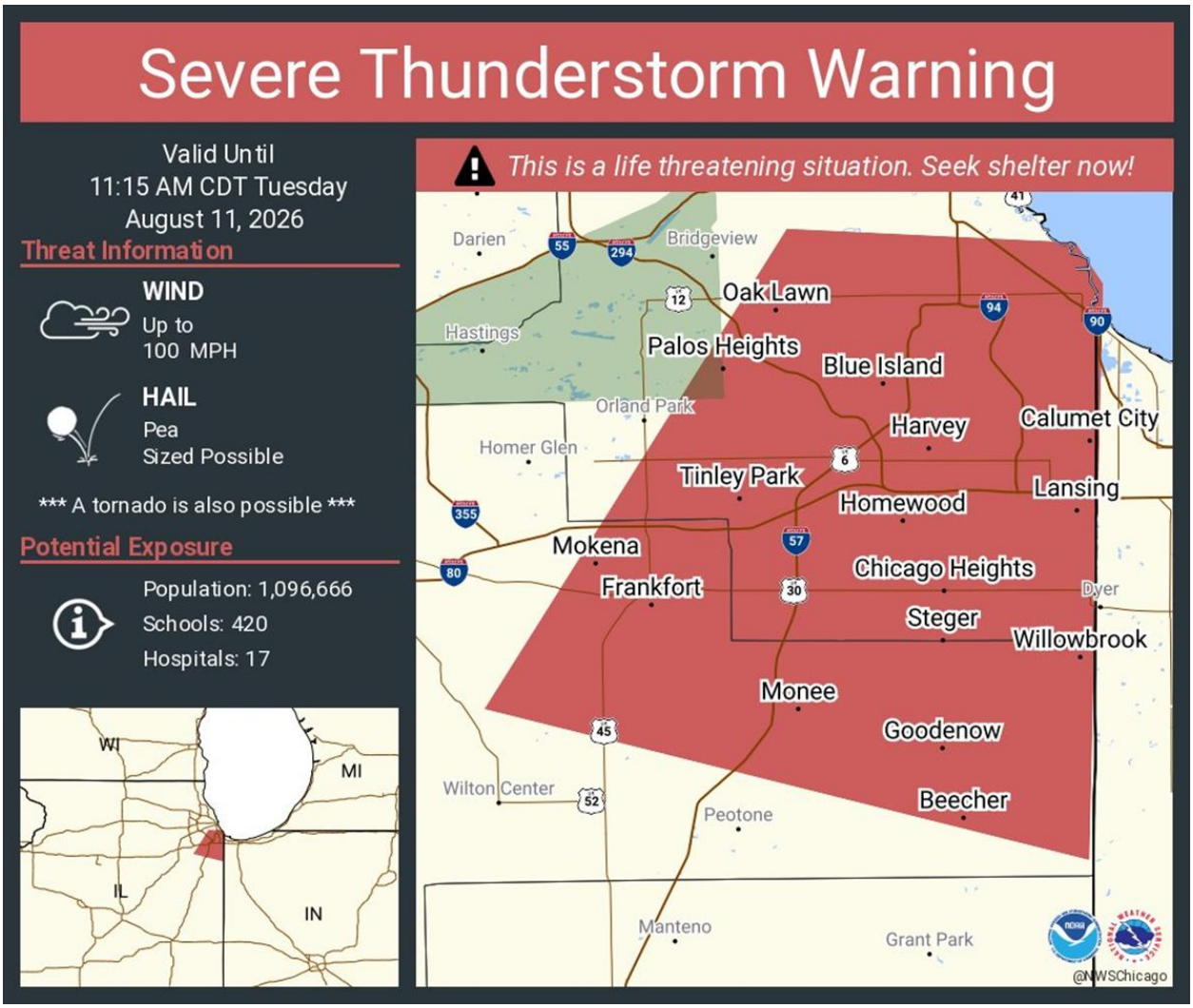

Figure 21: An example of one of the WEA Destructive Severe Thunderstorm Warnings issued for portions of southern Cook and eastern Will counties on August 11, 2026. The initial wind speed of wind gusts up to 80 mph in the initial, larger, warning was later upgraded to 100 MPH in the warning update and covered the start of the path of extreme winds in eastern Cook County.

Forecasters at NWS Chicago recognized the evolution of the bow echo as it quickly organized across north-central Illinois and ultimately raced across northeastern Illinois and northwestern Indiana. In addition to numerous Tornado Warnings, forecasters issued several WEA Destructive Severe Thunderstorm Warnings including three that explicitly warned for wind gusts in excess of 100 mph[7] (reference shown in Figure 21).

[7]Prior to July 27, 2026, NWS Chicago had issued a total of 3 Severe Thunderstorm Warnings for wind gusts in excess of 100 mph. These were for thunderstorms on June 4, 2011, June 21, 2011, and July 1, 2012.

While the bow echo started to weaken in intensity while moving into LaPorte, Starke, and Pulaski counties (likely owing to a less pristine air mass partially used by thunderstorms that developed earlier in the morning), damaging winds continued eastward before ceasing west of the Interstate 69 corridor. However, new development along the southern side of the cold pool in central Indiana led to the development of a new leading edge of thunderstorms that raced southeastward producing widespread wind damage as far south as eastern Tennessee before weakening in Alabama and Georgia. Owing to the long swath of damage that included intermittent measured significant-severe wind gusts, the Storm Prediction Center classified the event as a derecho.

4. Comparisons with past 100 mph wind events in the NWS Chicago CWA:

Destructive wind events with measured or estimated winds in excess of 100 mph are relatively rare across the United States including within the NWS Chicago CWA. Including the destructive thunderstorm evenings on July 27 and August 11, 2026, there have been 12 total severe weather events in which there were estimated or measured winds in excess of 100 mph in the NWS Chicago CWA since 1950. It is likely that there have been more 100 mph severe thunderstorm wind events than in the official database especially prior to the year 2000[8]. Based on the past 15 years, the frequency of 100 mph wind events is around once every 1 to 2 years. Table 1 lists all known[9] measured or estimated severe thunderstorm wind gusts in excess of 100 mph in the NWS Chicago service area.

While 100 mph severe thunderstorm events are rare, *measured* wind gusts in excess of 100 are comparatively even more unusual. Since 1950, there have only been six measured wind gusts in excess of 100 mph in the state of Illinois and two in the state of Indiana[10]. Table 2 (Table 3) lists all known measured severe thunderstorm wind gusts in excess of 100 mph in the state of Illinois (Indiana).

---

[8]Methods to identify, report, and ultimately document severe weather have improved over the past 10 to 20 years.

[9]There are three separate entries in StormData for estimated 90 kt (104 mph) wind gusts in LaSalle County, Illinois on October 3, 2000. In the event narratives, there are references to police estimating 90 mph winds for each entry. As a result, it appears the actual wind speeds should be 78 kt and not 90 kt. In addition, there is a report of a microburst that impacted Streamwood, Illinois on June 29, 1990 with estimated wind speeds of 150 mph. After additional analysis, this event was more likely associated with an extreme gravity wave/wake low on the backside of a squall line.

[10]There are five StormData entries between the years of 1956 and 1965 listing wind gusts in excess of 100 mph. However, it is unclear if the wind gusts were measured or estimated.

Table 1: A list of all known estimated or measured wind gusts in excess of 100 mph in the NWS Chicago CWA. In the “Wind Speed” column, “E” indicates an estimated wind speed while “M” indicates a measured wind speed.

Date	Wind Speed	Location	StormData
4/6/1972	E 100 mph	Ogle County, IL	Link
7/5/2003	M 104 mph	Pecatonica, IL	Link
6/14/2010	E 100 mph	Boswell, IN	Link
6/4/2011	E 110 mph	Dinwiddie, IN	Link
5/6/2012	E 100 mph	Crescent City, IL	Link
6/12/2013	E 100 mph	Winfield/Range Line, IN	Link
6/24/2013	E 100 mph	Harmon, IL	Link
5/20/2014	E 100 mph	Malta, IL	Link
6/30/2014	E 100 mph	Range Line, IN	Link
8/10/2020	E 100 mph	Forreston, IL	Link
7/27/2026	M 104 mph	Monee, IL	*Not yet available*
8/11/2026	E 110 mph	Portage, IN	*Not yet available*

Table 2: A list of all known measured wind gusts in excess of 100 mph in the state of Illinois.

Rank	Wind Speed	Date	Location	StormData
1	107 mph	3/12/2003	Rock Island, IL	Link
2	105 mph	7/15/2024	La Prairie Center, IL	Link
3	104 mph	7/27/2026	Monee, IL	*Not yet available*
-	104 mph	7/5/2003	Pecatonica, IL	Link
-	104 mph	6/10/2003	Scott Air Force Base	Link
6	100 mph	6/22/2010	Beardstown, IL	Link

Table 3: A list of all known measured wind gusts in excess of 100 mph in Indiana.

Rank	Wind Speed	Date	Location	StormData
1	100 mph	6/22/2016	Cairo, IN	Link
-	100 mph	8/23/2006	Michigan City, IN	Link

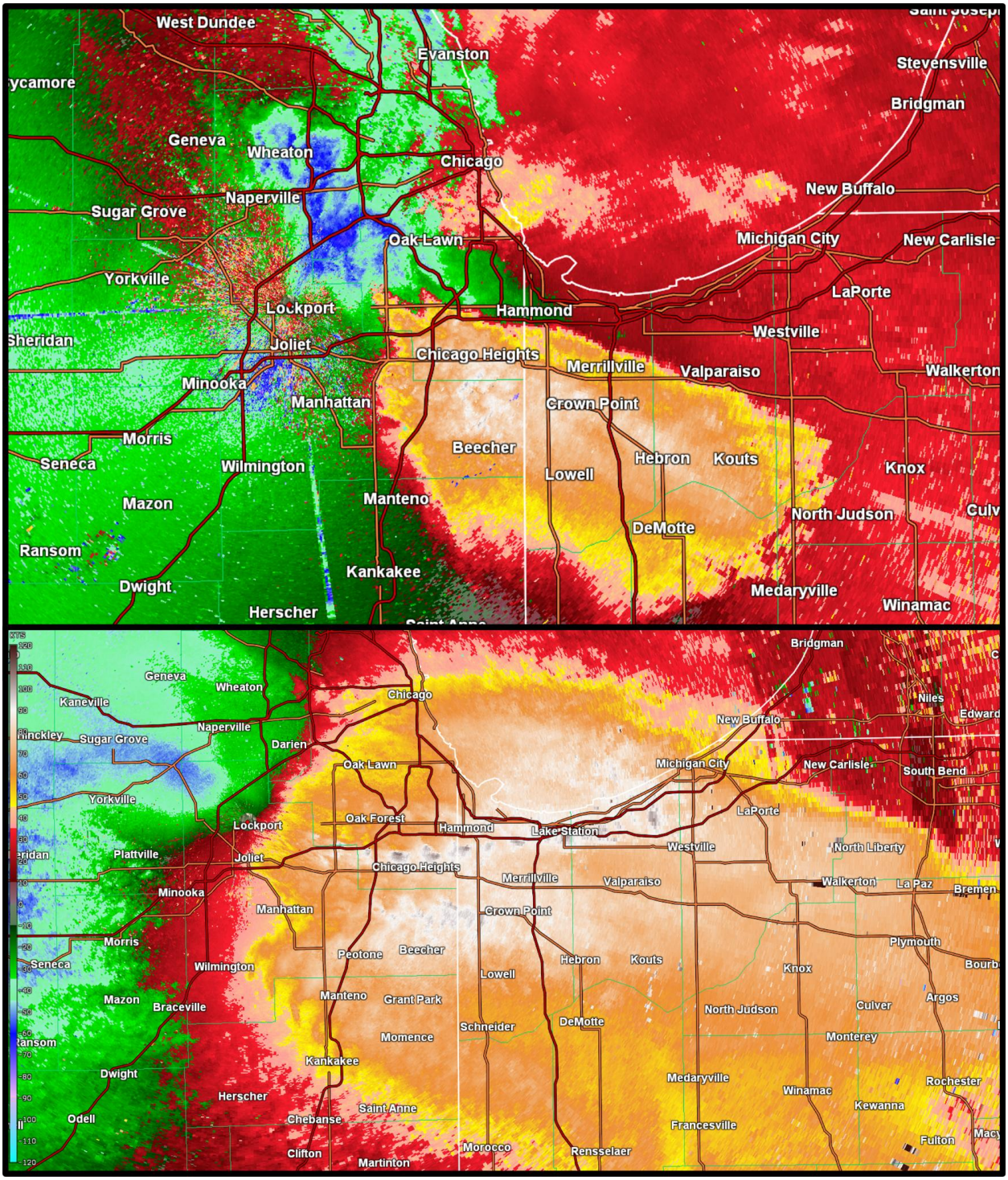

Figure 22: Accumulated 0.5° base velocity from KLOT between (top) 16:30 UTC and 19:00 UTC / 11:30 AM and 2:00 PM CDT July 27, 2026 and (bottom) 0.9° base velocity from KLOT between 15:00 and 17:00 UTC / 10:00 AM and 12:00 PM CDT August 11, 2026. Orange (white) contours correspond to base velocity returns greater than 60 knots (80 knots).

Including 2026, there have only been three years in which there were two 100 mph severe thunderstorms wind events in the same year in the NWS Chicago CWA. In 2013, two separate events occurred 12 days apart and roughly 115 miles from event location to event location. In 2014, two separate events occurred 41 days apart and roughly 93 miles from event location to event location. In 2026, the events took place 16 days apart with a distance between events of roughly 12 miles. For this reason, the two events in 2026 were unusual in that nearly the same area was impacted repeatedly by destructive thunderstorm winds just weeks apart (see Figure 22). Indeed, impacts caused by the August 11, 2026 derecho were likely exacerbated by the destructive wind event on July 27 via weakened tree limbs and damaged power infrastructure[11]. Power outages across portions of northeastern Illinois and northwestern Indiana in the wake of the August 11, 2026 derecho peaked at over 500,000 customers including nearly 95% of Lake County, Indiana alone. In Gary, Indiana, the power outage lasted 14 days which is one of the longest power outages caused by a severe thunderstorm event in U.S. history[12].

In all, the July 27 and August 11, 2026 destructive wind events were unusually intense, impacted nearly the same area, and occurred through different mechanisms. The July 27, 2026 event was driven by a transition from a large supercell into a compact bow echo, while the August 11, 2026 event was facilitated by a strong, long-lived mesovortex at the leading edge of a derecho. The forecasts leading up to both events included conditionalities on the development of thunderstorms during the overnight periods, and occurred during the morning to early afternoon periods. The damage caused by the events were unusually impactful and caused prolonged power outages. The two 100 mph-wind producing thunderstorms were just two events in a record-breaking severe weather season in the NWS Chicago service area.

Additional information about the July 27, 2026 event can be found here.
Additional information about the August 11, 2026 derecho can be found here.

Last updated: September 17, 2026.

[11]It should also be noted that repeated rounds of rain across northern Illinois and northwestern Indiana led to increasingly saturated soils. Between July 27 and August 10, 2026, 3 to 8 inches of rain fell across portions of DuPage, Will, and Cook counties in Illinois and Lake and Porter counties in Indiana. As a result, wet antecedent conditions may have been a contributing factor to the widespread tree destruction (particularly uprooted trees) across the areas most impacted by the August 11 derecho.

[12]According to electricchoice.com, the longest power outages caused by a severe thunderstorm was 16 days in Cedar Rapids, Iowa in the wake of the historic August 10, 2020 derecho followed by longer than 14 days in West Virginia after the historic June 29, 2012 derecho.