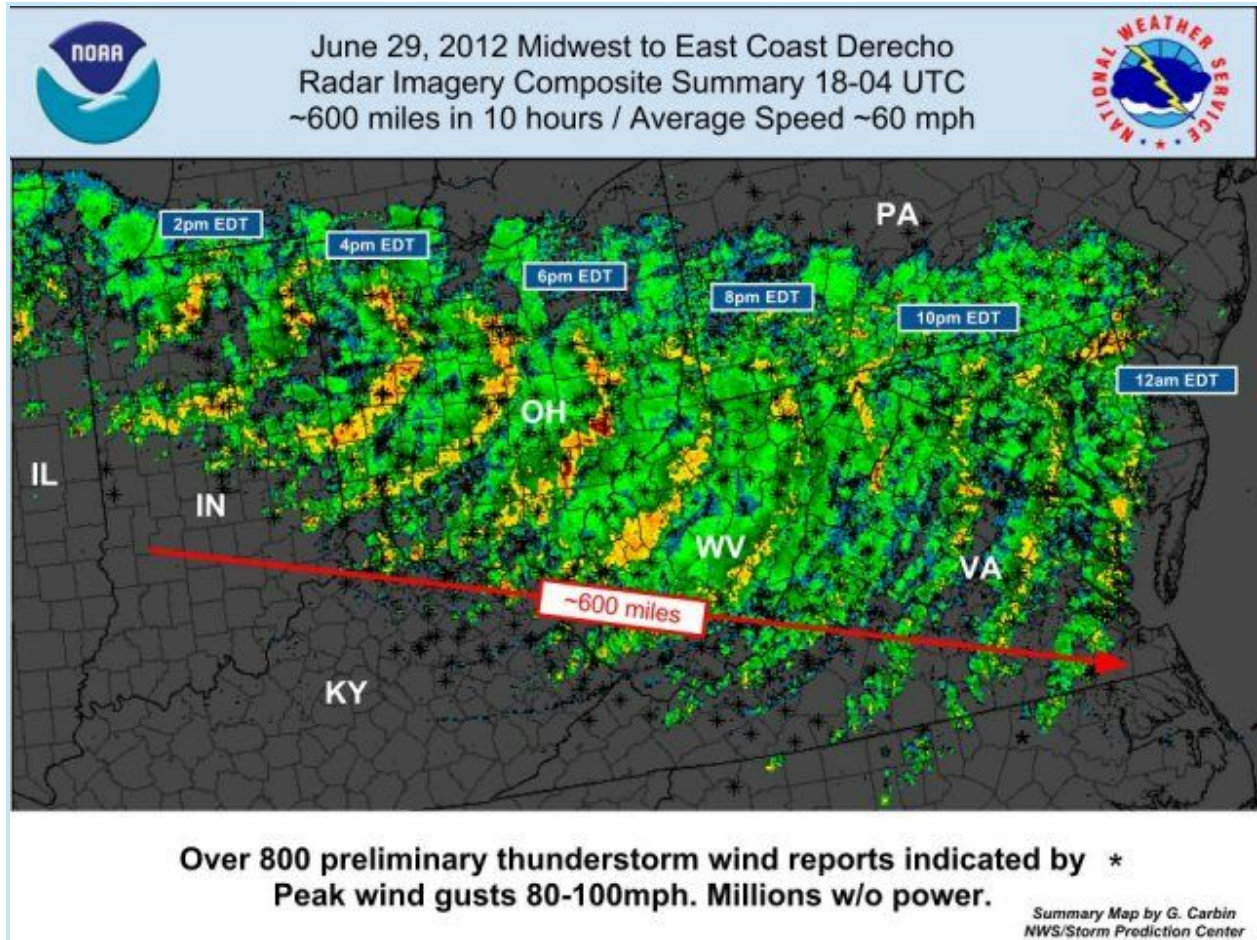


June 29th - 30th, 2012 Derecho



Introduction

During the afternoon and evening of Friday June 29, 2012, an intense, long-lived line of thunderstorms raced eastward at nearly 60 mph from the Midwest to the Mid Atlantic coast. In its wake, these storms left behind a swath of destruction that killed at least 20 people, caused millions in property damage, and caused massive power outages in major urban areas along the storm's path. Meteorologists use the term "derecho" to describe this special type of violent and long-lived windstorm. Essentially, a "derecho" is a long-lived, rapidly moving line of intense thunderstorms that produces widespread damaging winds in a nearly continuous swath.

How far can derechos travel?

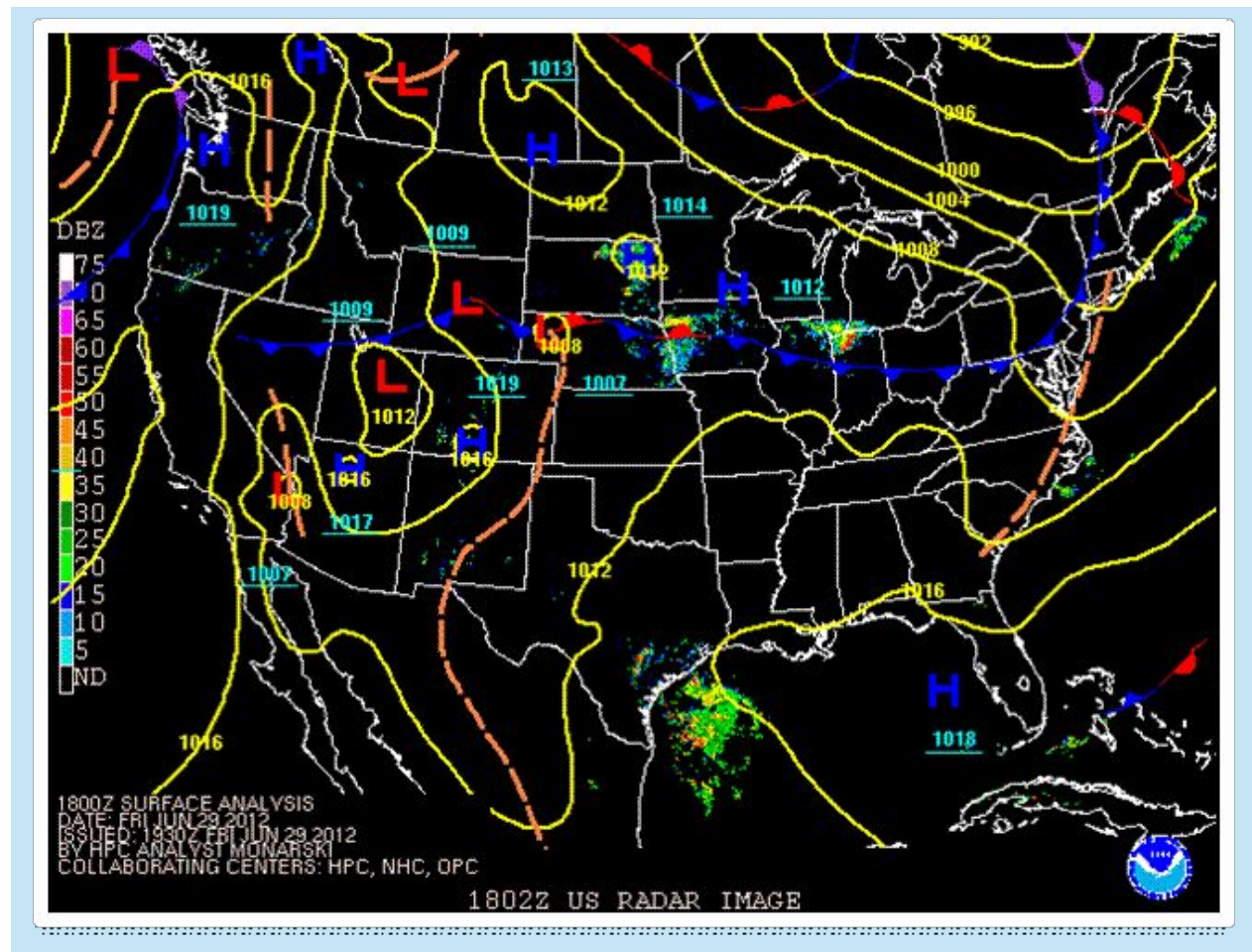
Derechos can travel distances well over 250 miles. The derecho on June 29th travelled over 700 miles from its start in Iowa to the East Coast. A derecho on July 4-5, 1999, travelled a distance of 1300 miles stretching from northern Minnesota across southern Canada before weakening as it exited off the coast of Maine. Derechos are best

recognized for their propensity to produce damaging winds over a fairly widespread region. They are also commonly prolific lightning producers.

What about those damaging winds from derechos?

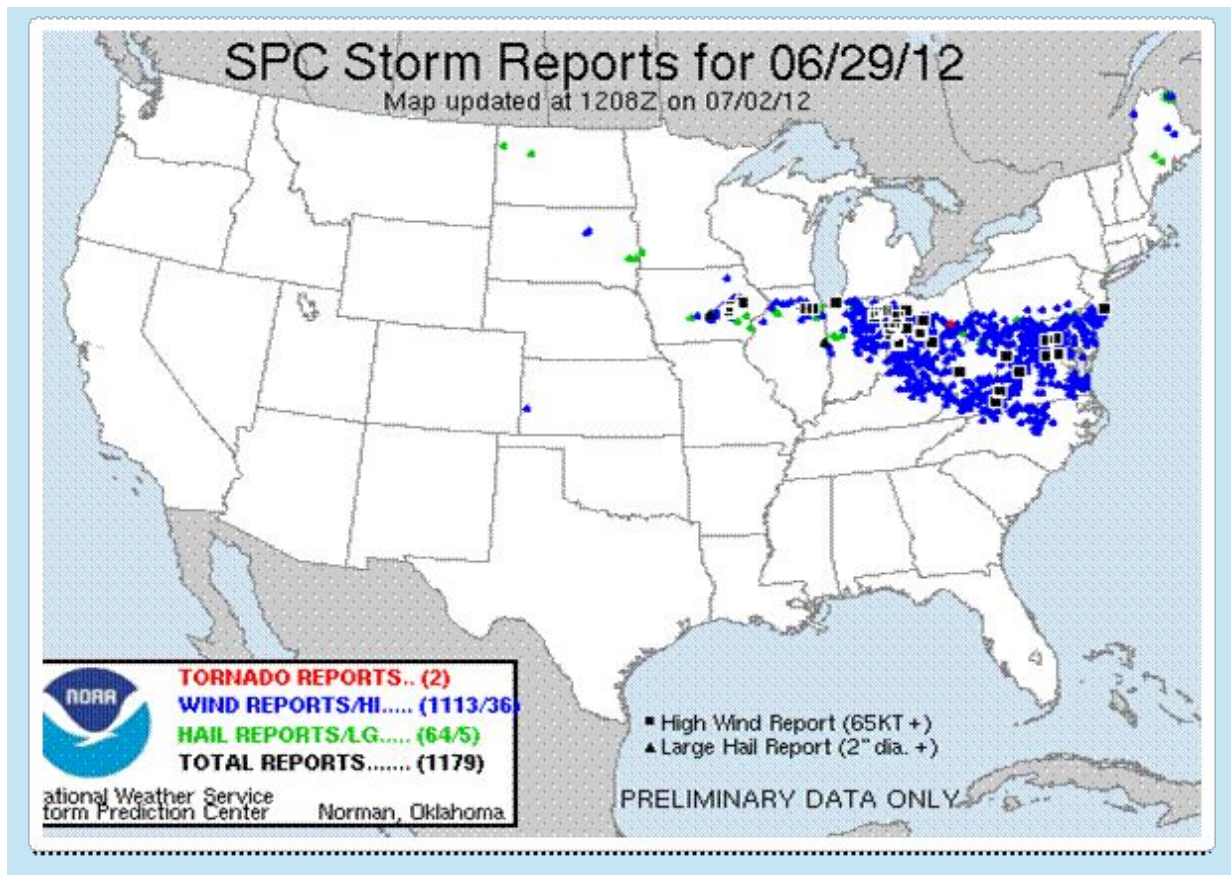
Surface wind gusts of 50 to 75 mph are common with many derechos; some even produce surface wind gusts of over 100 mph. While derechos characteristically produce widespread wind damage in a nearly continuous swath, actual surface winds vary along the track of a derecho. Not all locations within the path of a derecho will experience damage. The highest wind gusts occur with clusters of downbursts from the many thunderstorms that comprise the derecho. Often, narrow corridors, or channels, of higher wind gusts are observed within a derecho. Somewhat analogous to the discontinuous damage observed with tornadoes, where, for example, structures on one side of a residential street might experience damage.

Overview

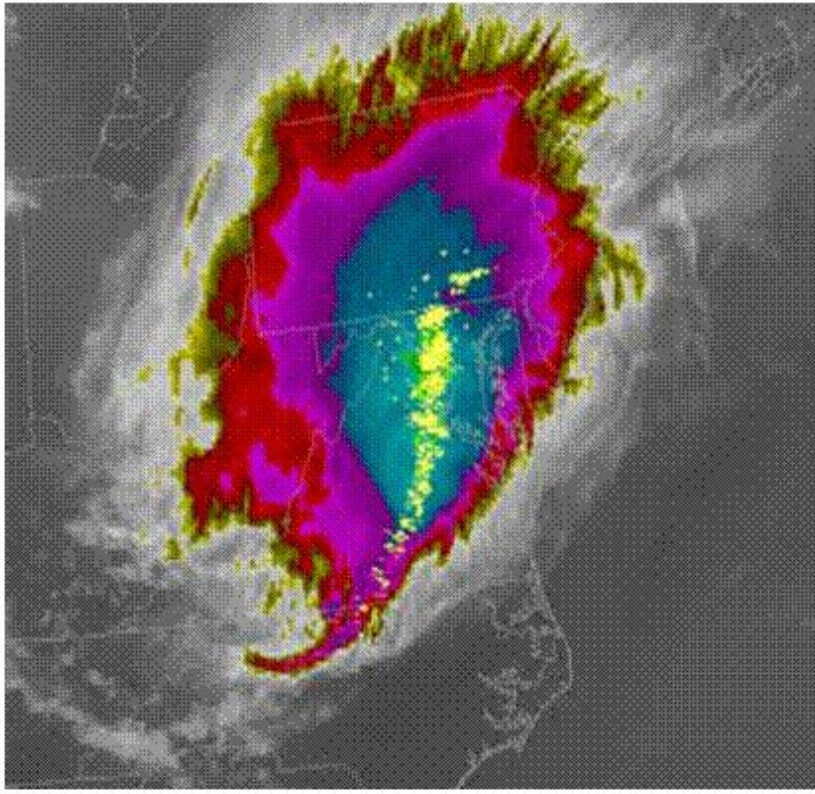


This map shows the position of the surface cool front across the Midwest, Ohio Valley and the Northeast. The initial developing thunderstorm complex near Chicago was the

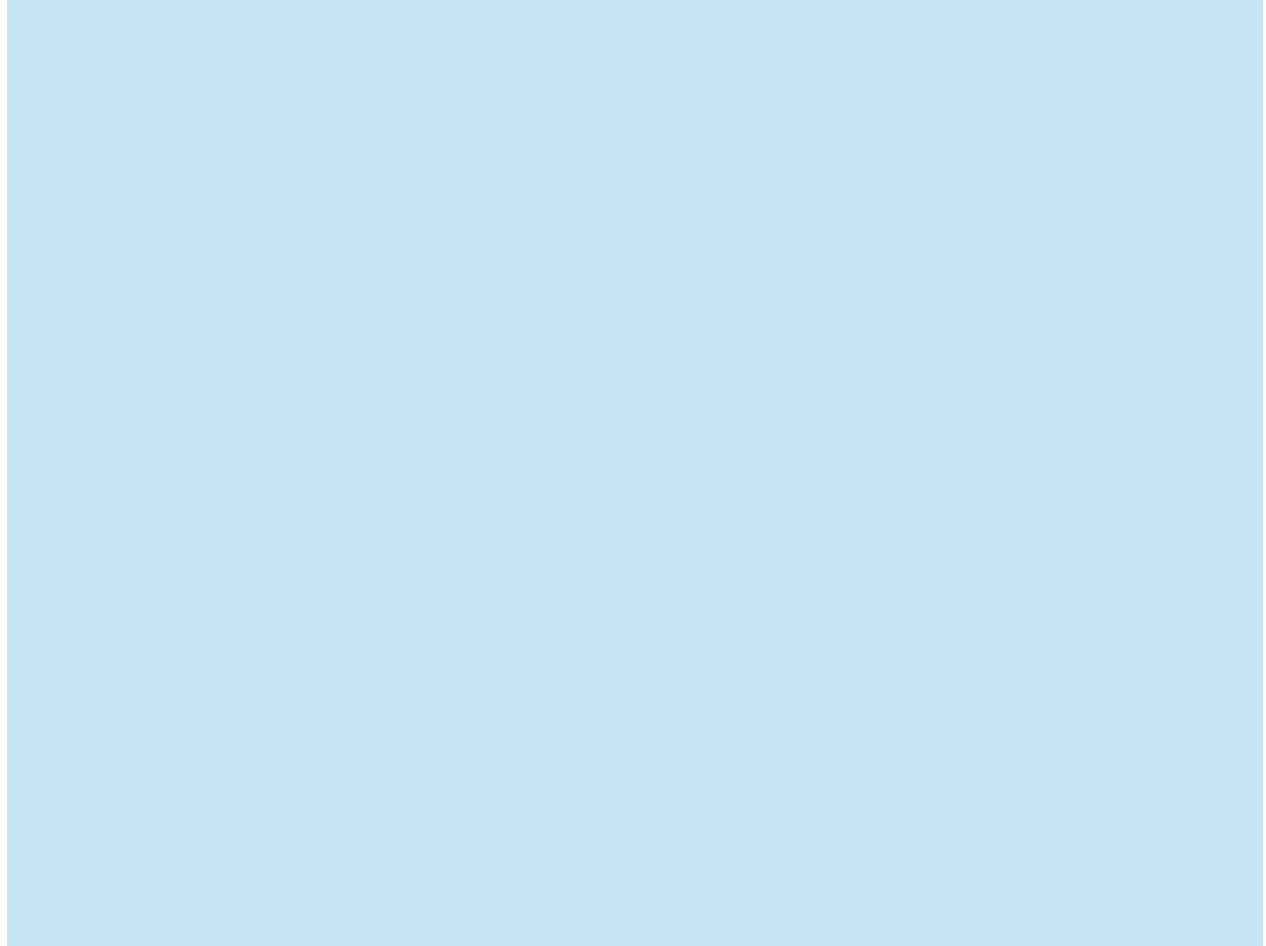
start of what would quickly grow into the derecho. The derecho then basically tracked along the cool front all the way to the Mid Atlantic coast.



Preliminary severe weather reports from June 29th into early June 30th. Wind reports are in blue. Measured wind speeds of 65 knots (75 mph) or more are denoted by black squares.

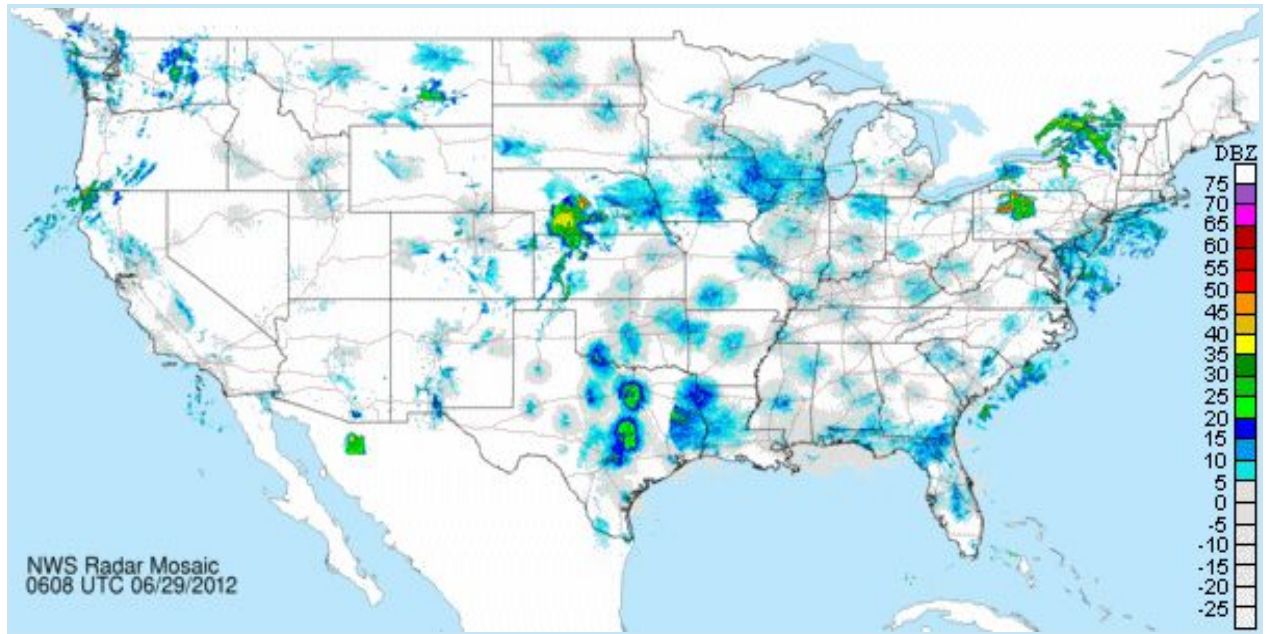


This image was taken at 9:40 PM EDT Friday evening (0140Z June 30, 2012). Overlaid on this image is the 15-minute sum of lightning cloud to ground strikes between 9:30 PM and 9:45 PM EDT. Nearly 1,400 strikes are depicted on this image as the derecho rips through the Mid Atlantic.

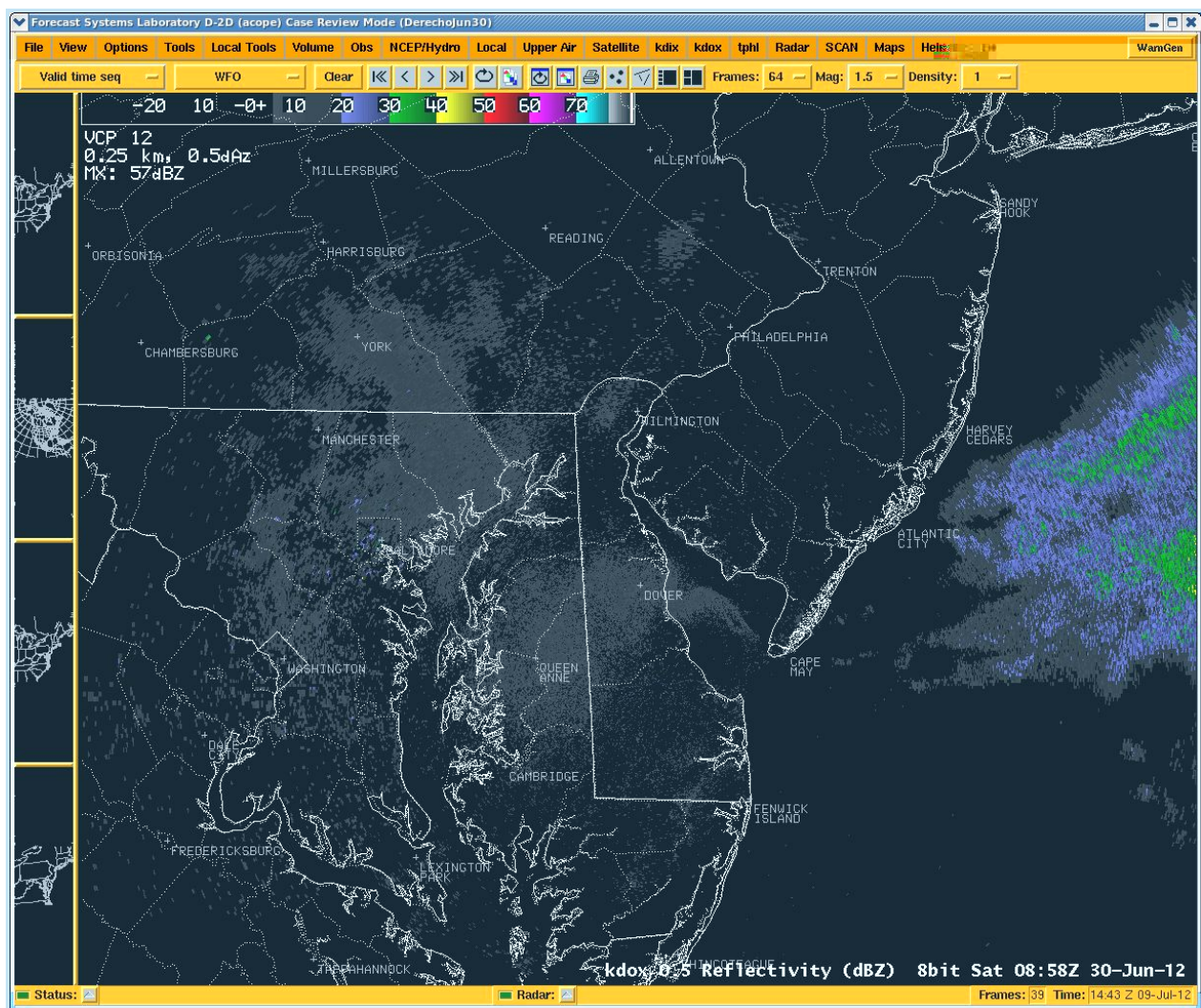


This is a full length IR satellite animation of the derechos progression from the Mid-West through the Mid-Atlantic states. The orange colors represent cloud top temperatures near -60C while the dark brown and grey colors represent temperatures below -80C. The colder the temperatures the taller the storms are and the more powerful they become.

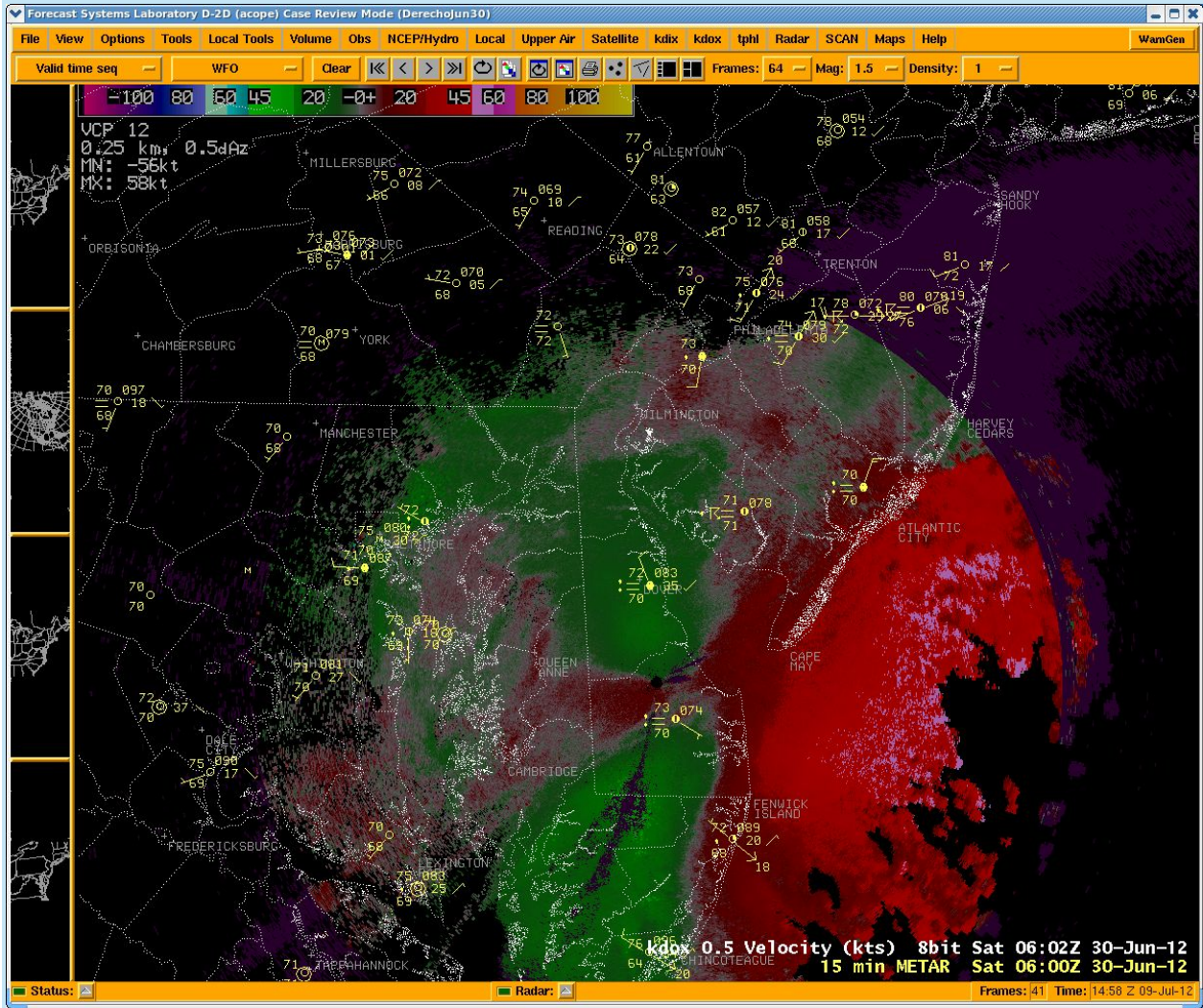
Radar Imagery and Lightning



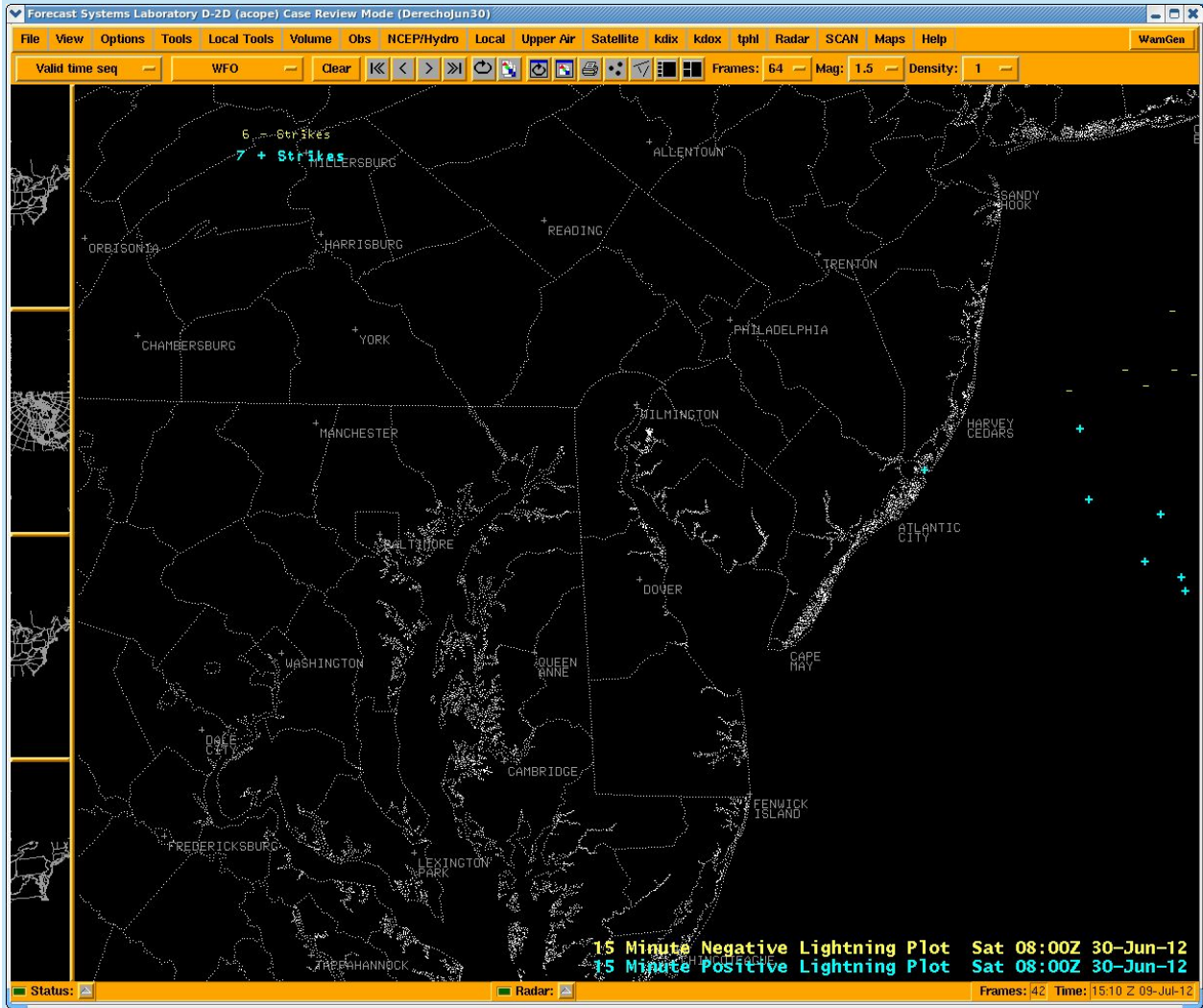
An animated radar mosaic of National Weather Service and Department of Defense radars for the continental United States. The loop runs from 2:08 AM EDT (0608Z) June 29, 2012 to 2:48 AM EDT (0648Z) on June 30th with a 10 minute interval.



This is a 6-hour loop from the KDOX Doppler Radar (located in northern Sussex County, DE). This shows the intense derecho approaching from the west, then quickly moving across Maryland, Delaware and southern New Jersey. Note the brighter colors especially across southern New Jersey, where the intense storms caused the widespread damage.



This is a 5-hour loop from the KDOX Doppler Radar (located in northern Sussex County, DE). The red (brighter) color is wind moving away from the radar and greens/blues is wind moving toward the radar. The velocities are in knots.

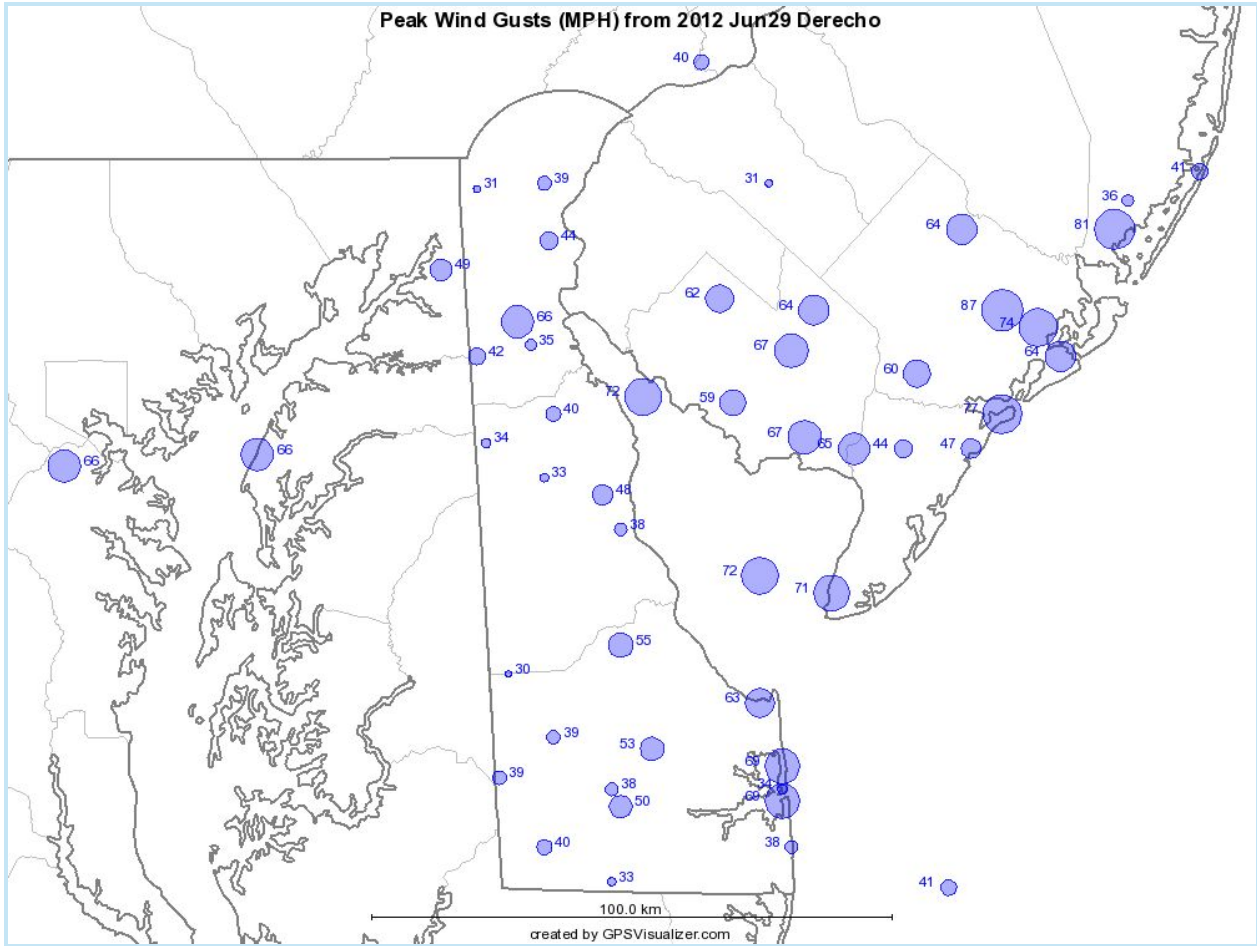


This is a 7-hour loop of cloud to ground lightning strikes. One thing to note is the rapid increase in lightning as the storms moved into and across southern New Jersey.

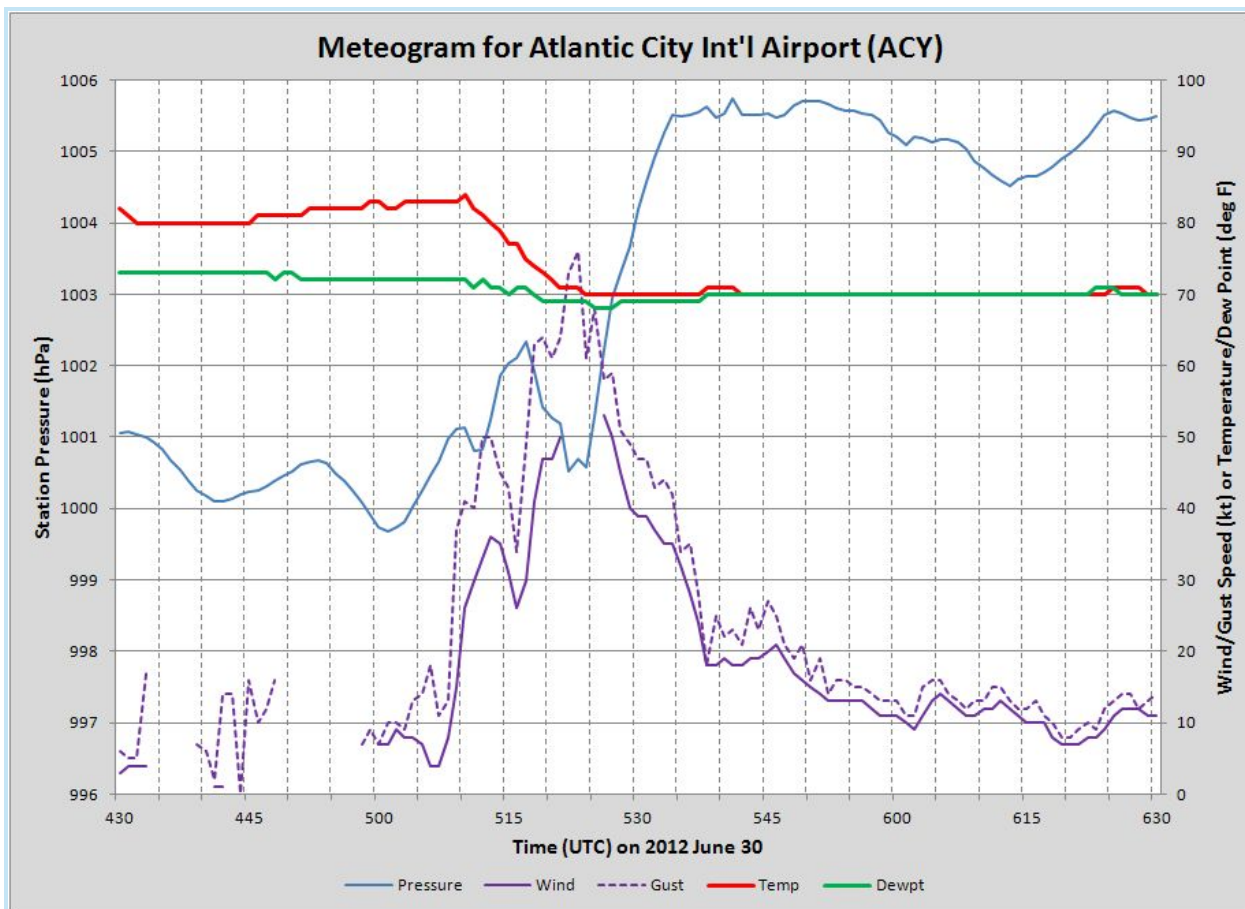
Storm Reports and Other Data

Peak Gust (mph)	Location
87	Atlantic City Airport, NJ
81	Tuckerton, NJ
77	Pt Point, NJ
74	Absecon, NJ
71	Cape May Ferry Terminal, NJ
69	Dewey Beach, DE
69	Indian River Inlet, DE
67	Millville, NJ
67	Bivalve, NJ
66	Atlantic City Marina, NJ
66	Tolchester Beach, MD
65	Eldora, NJ
64	Vineland, NJ
64	Absecon Channel, NJ
64	Mullica Township, NJ
64	Smyrna, DE
63	Lewes, DE
62	Upper Deerfield Township, NJ
60	Estell Manor, NJ
59	Ellendale, DE
59	Newport, NJ
55	Milford, DE

Peak wind gusts across the impacted areas were nearly 90 mph. Several locations had measured gusts to or above 60 mph.



This is a plot of the wind gusts (mph). Each blue circle is scaled to the magnitude of the wind gust at that location (i.e. the larger the circle the higher the wind gust).



This graph shows the measured weather conditions at the Atlantic City International Airport, NJ during the early morning hours of June 30, 2012. Note the wind gusts (dashed dark blue line), which indicates that the winds gusted over 40 knots (46 mph) for about 25 minutes, and over 50 knots (58 mph) for at least 10 minutes.

Local Impacts

The derecho winds across Maryland's Eastern Shore and Delaware were produced mostly from an intense gust front that moved well ahead of the rain. The northern end intensified near Baltimore, MD and then moved across northern Delaware and especially southern New Jersey. Intense lightning moved across southern New Jersey along with widespread wind gusts of 60 mph to nearly 90 mph. The intensity and widespread nature of the winds took down numerous trees and power lines. This resulted in hundreds of thousands of customers without power. Some areas did not get power back until at least a week after the storm.

[Check out a more detailed version of all Storm Reports provided to our office here](#)

Summary

Derechos are relatively uncommon to this region, especially ones of this magnitude. Typically, the Mid Atlantic region might experience a derecho once every two to four years. The last significant derecho that impacted our area or a portion of it occurred on June 4, 2008. Realize that the vast majority of thunderstorms that impact our region will not be associated with a derecho. But, derechos can occur locally and at any time; tomorrow, next week or next month, or not until several years from now. Monitoring your local National Weather Service forecasts and media outlets is the best way to know if any future derecho or other types of severe weather could impact your location.

Acknowledgements

The wind data and storm reports included in this presentation were obtained via the public, trained spotters, emergency managers, DEOS, NJ Weather Network and Weatherflow