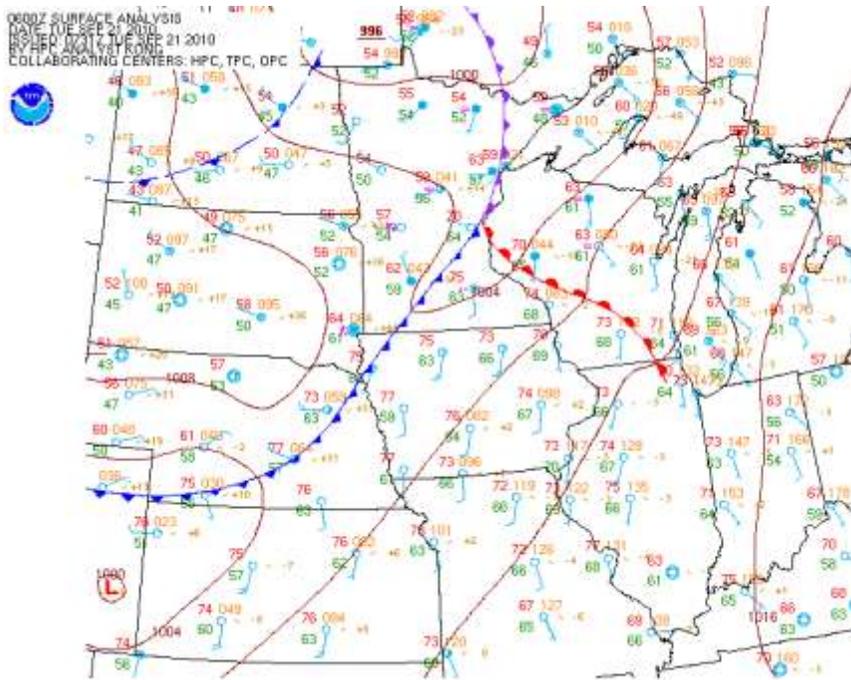


# September 21, 2010: Late-Season Overnight Hail in the Twin Cities

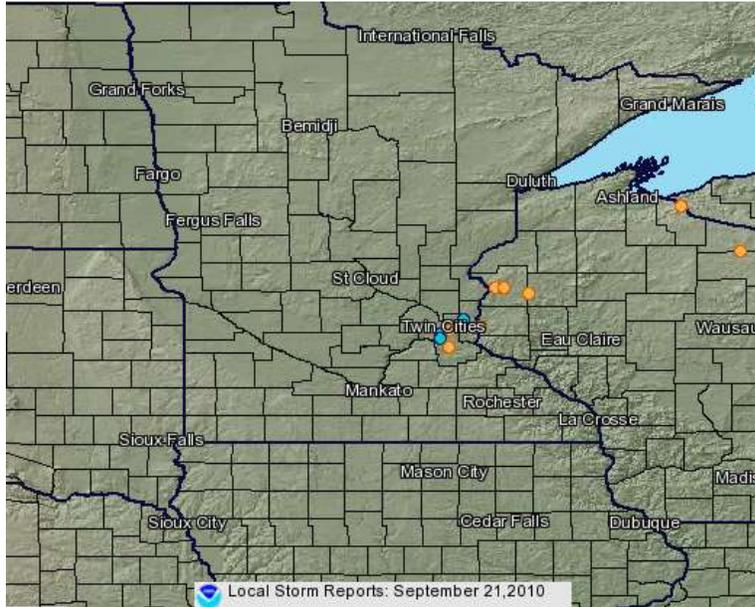
## Synopsis

An area of low pressure lifted northeast across southeast South Dakota and then across Minnesota during the early morning hours of the 21st. This lifted a strong warm front northward, actually causing temperatures on the evening of the 20th to continue to rise. For example, the temperature at the Minneapolis St. Paul International Airport peaked at 80° just prior to midnight, after being in the upper 50s through mid-afternoon. This was a sign of the dynamic system at work. As the low approach and moistened an unstable upper level atmosphere, thunderstorm developed late in the evening into the overnight and spread northeast. These were mainly capable of hail, but the more organized ones did bring down strong winds. The winds were already blowing at nearly 50 mph at 1,000 ft before the storms, so the environment was favorable for isolated pockets of these wind speeds or even stronger.



September 21st: 1 am Surface Weather Map

## Storm Reports



## Text Reports

PRELIMINARY LOCAL STORM REPORT...SUMMARY  
 NATIONAL WEATHER SERVICE TWIN CITIES/CHANHASSEN MN  
 814 PM CDT TUE SEP 21 2010

..TIME...	...EVENT...	...CITY LOCATION...	...LAT.LON...
..DATE...	...MAG....	..COUNTY LOCATION..ST..	...SOURCE....
..REMARKS..			

0119 AM	TSTM WND DMG	3 NNE FARMINGTON	44.70N 93.15W
09/21/2010		DAKOTA	MN NWS EMPLOYEE

A FEW TREES AND BRANCHES DOWN. A SMALL CALF BARN DAMAGED.

0130 AM	HAIL	4 NNE BURNSVILLE	44.82N 93.26W
09/21/2010	M1.00 INCH	HENNEPIN	MN TRAINED SPOTTER

0137 AM	HAIL	1 E RICHFIELD	44.88N 93.26W
09/21/2010	M1.00 INCH	HENNEPIN	MN ASOS

OBSERVED AT MSP INTERNATIONAL AIRPORT.

0140 AM	TSTM WND DMG	2 SW ST PAUL	44.93N 93.13W
09/21/2010		RAMSEY	MN TRAINED SPOTTER

A FEW 12 INCH DIAMETER TREES DOWN NEAR RANFDOLF AND  
 HAMLINE IN THE HIGHLAND PARK AREA.

0140 AM	HAIL	2 SW ST PAUL	44.93N 93.13W
09/21/2010	M1.25 INCH	RAMSEY	MN TRAINED SPOTTER

IN HIGHLAND PARK AREA.

0145 AM HAIL 2 SW ST PAUL 44.93N 93.13W  
09/21/2010 M1.50 INCH RAMSEY MN TRAINED SPOTTER

IN HIGHLAND PARK AREA. SPOTTER INDICATES A DEAD TREE IS  
DOWN IN NEIGHBORHOOD.

0145 AM HAIL MAPLEWOOD 44.99N 93.02W  
09/21/2010 M1.50 INCH RAMSEY MN TRAINED SPOTTER

MAINLY NICKEL SIZE BUT A FEW AS LARGE AS PING PONG BALL.

0145 AM TSTM WND DMG ST PAUL 44.95N 93.10W  
09/21/2010 RAMSEY MN TRAINED SPOTTER

12 INCH TREE BRANCH DOWN AT STINSON AND SPRINGFIELD.

0150 AM HAIL MAHTOMEDI 45.06N 92.96W  
09/21/2010 M1.50 INCH WASHINGTON MN TRAINED SPOTTER

0152 AM TSTM WND DMG HUDSON 44.97N 92.74W  
09/21/2010 ST. CROIX WI LAW ENFORCEMENT

BRANCHES DOWN AND POWER OUTAGES REPORTED. 0.50 INCH HAIL  
AS WELL.

0235 AM TSTM WND DMG CENTURIA 45.45N 92.56W  
09/21/2010 POLK WI PUBLIC

STOP SIGN BLOWN DOWN

0238 AM TSTM WND DMG TURTLE LAKE 45.39N 92.14W  
09/21/2010 BARRON WI PUBLIC

TREES DOWN ON 15TH STREET AND HWY 8.

0240 AM TSTM WND DMG BALSAM LAKE 45.46N 92.45W  
09/21/2010 POLK WI PUBLIC

POWER POLE AND TREE DOWN.

0242 AM TSTM WND DMG BALSAM LAKE 45.46N 92.45W  
09/21/2010 POLK WI PUBLIC

TREES AND POWER LINES DOWN.

0255 AM HAIL BLOOMING PRAIRIE 43.87N 93.05W  
09/21/2010 M0.88 INCH STEELE MN COUNTY OFFICIAL

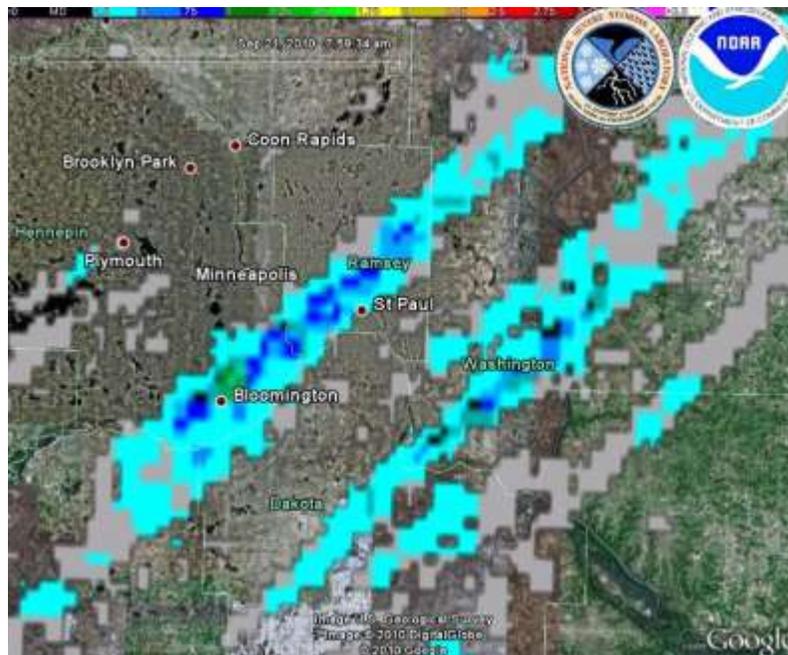
## Radar



Sept 21st NWS Chanhassen Doppler Radar Elevated Image (~16-18 kft) at 1:35 am of Storm Over MSP Airport

## Hail Swaths

NWS Doppler Radar has many algorithms that can calculate various storm-based parameters to assist NWS warning forecasters in storm monitoring and forecasting. One of those is MESH, or Maximum Estimated Size of Hail. This is based on the thunderstorm's reflected power, or reflectivity, and the environmental temperature profile and correlating these through past research to give a hail size forecast. While the magnitude is rarely perfect, it can often give a reasonable idea of hail size. In addition, looking at this parameter over time and space can reveal where the heaviest hail damage may have occurred.



Sept 21st NWS Chanhassen Doppler Radar MESH Algorithm over the Twin Cities Storms: 12 am - 3 am