



National Weather Service Grand Rapids Event Summary

Wintry mix of precipitation

01/17/11 – 01/18/11

Overview

Southwest Lower Michigan saw its first significant mix of rain, snow, sleet, and freezing on Monday night. At the Grand Rapids airport, light snow changed over to freezing rain, which lasted approximately four hours between 8 PM on the 17th to Midnight. Areas farther to the northwest, such as Muskegon, saw predominantly snow. Farther south at Kalamazoo, a mix of freezing rain and snow occurred between 8 and 11 PM.

Radar

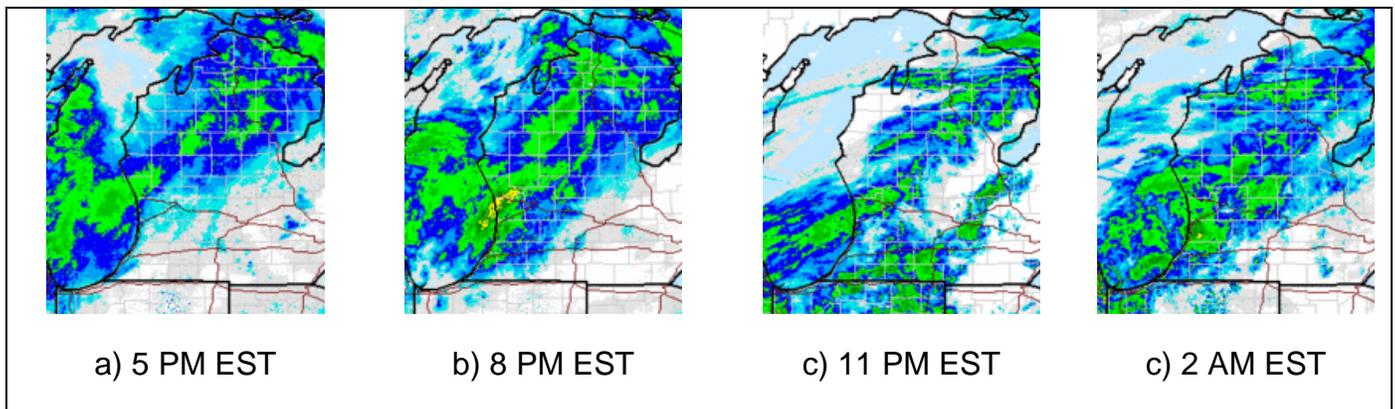


Fig. 1. Radar images at selected times on January 17th – 18th, 2011.

Storm Total Precipitation

A swath of 4 to 8 inches of snow fell from west-central to northern Lower Michigan (Figs. 2 and 3). For comparison, radar estimated storm total snowfall is shown in Figure 4. It is typical for the radar to under-estimate snowfall at greater distances (e.g., from Big Rapids northward) due to the radar beam being too high to detect snowfall.

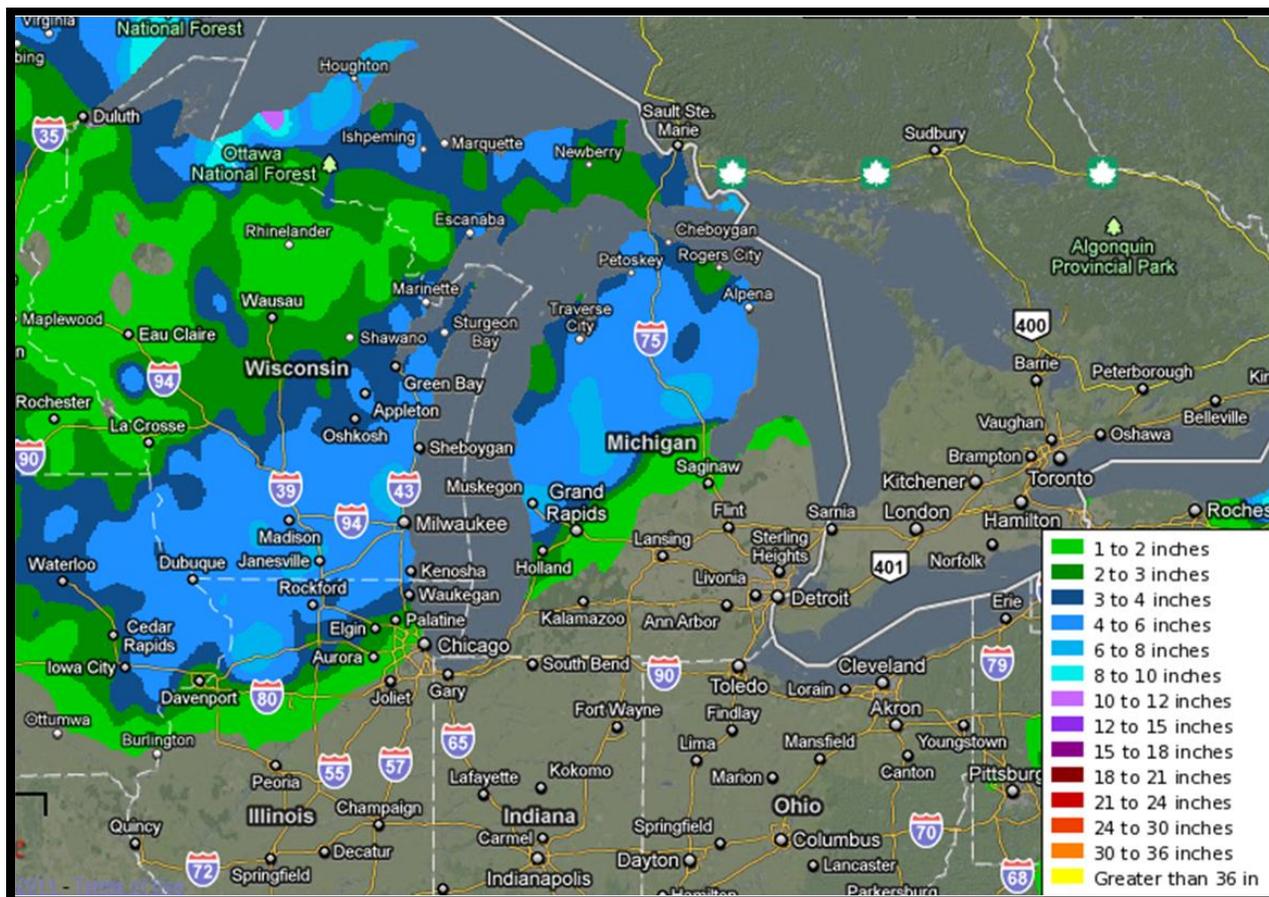


Fig. 2. Regional 48 hour snowfall ending Noon Tuesday.

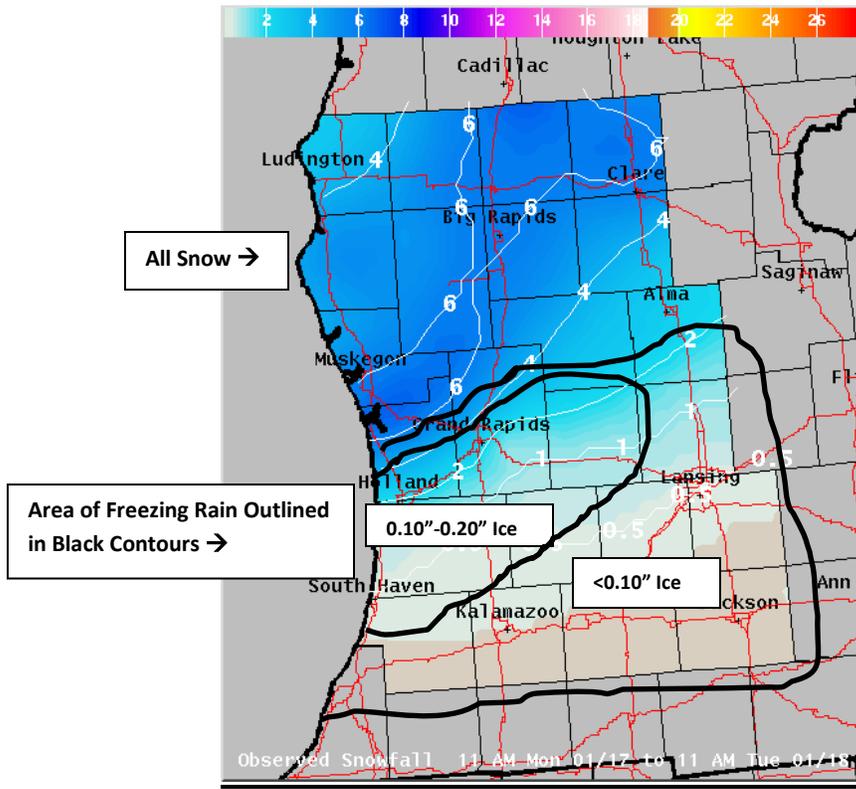


FIG. 3. 24-hour snowfall ending at 11 AM EST January 18th, 2011.

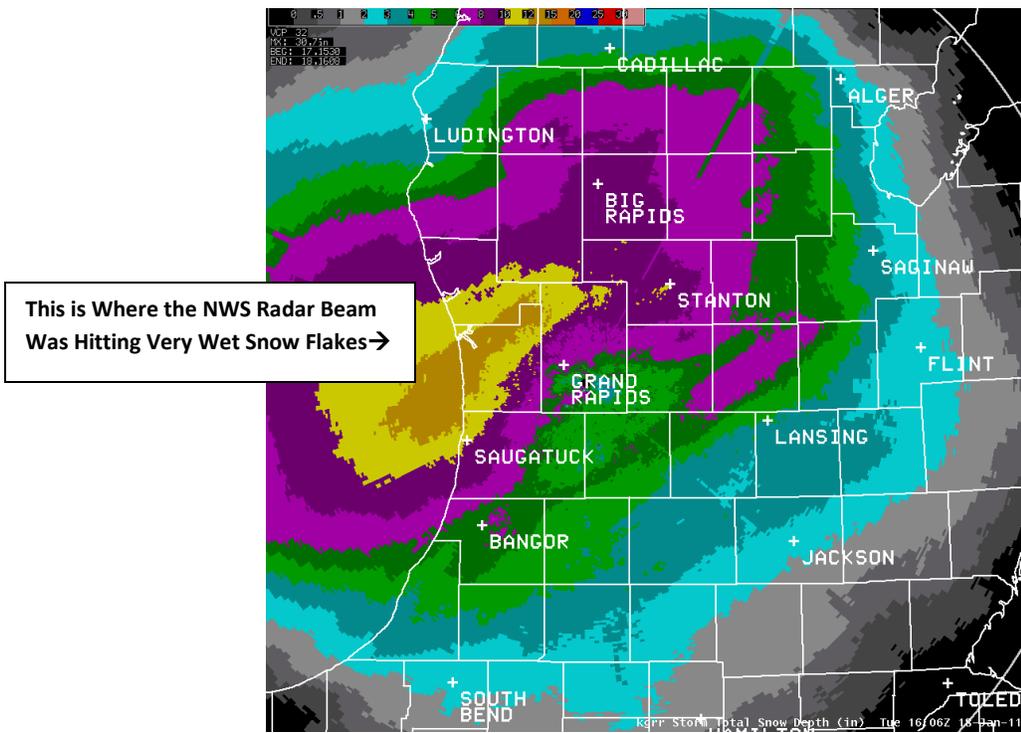


FIG. 4. Radar estimated snowfall ending at 11 AM January 18th, 2011. Color scale at the top is inches of snowfall.

What causes freezing rain and sleet?

Freezing rain occurs when there is rain where the air temperature near the ground is at or below freezing. This allows rain to freeze on contact with objects it touches, resulting in very hazardous icy travel conditions. If allowed to accumulate for a sufficiently long time, the weight of the ice can eventually damage or destroy trees, take down power lines, and even cause some structures to collapse.

Freezing rain occurs when warm air blowing from the south moves up and over cold air near the ground, resulting in a layer of warmer air aloft that is above freezing (Fig. 5). This allows precipitation that begins as snow to melt completely as it falls through the warm layer of air and reach the ground as liquid drops.

Sleet typically occurs in the vicinity of freezing rain where the warm layer is shallower or not as warm and the layer of cold air underneath is deep and cold. This causes snow to only partially melt as it falls through the warm layer and then re-freeze into pellets of ice before reaching the ground. Sleet is occasionally mistaken for small hail due to its appearance.

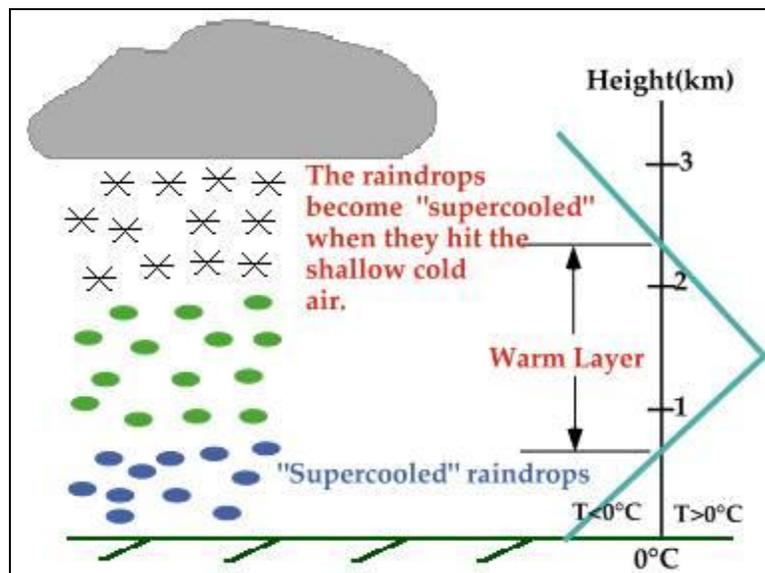


Fig. 5. Diagram of freezing rain. Water freezes at 0 degrees Celsius (32 degrees Fahrenheit).

Local Storm Reports

PRELIMINARY LOCAL STORM REPORT...SUMMARY
NATIONAL WEATHER SERVICE GRAND RAPIDS MI
1143 AM EST TUE JAN 18 2011

..TIME...	...EVENT...	...CITY LOCATION...	...LAT.LON...
..DATE...	...MAG....	..COUNTY LOCATION..ST..	...SOURCE....
	..REMARKS..		
0623 PM	SNOW	HESPERIA	43.57N 86.04W
01/17/2011	M3.5 INCH	NEWAYGO MI	BROADCAST MEDIA
0623 PM	SNOW	MONTAGUE	43.42N 86.36W
01/17/2011	E2.5 INCH	MUSKEGON MI	BROADCAST MEDIA
0623 PM	SNOW	SHELBY	43.61N 86.36W
01/17/2011	E3.5 INCH	OCEANA MI	BROADCAST MEDIA
	MEASUREMENT WAS 3-4 INCHES.		
0656 PM	SNOW	BAILEY	43.28N 85.81W
01/17/2011	M1.5 INCH	MUSKEGON MI	PUBLIC
	PUBLIC REPORT PASSED ON BY WZZM 13.		
0714 PM	FREEZING RAIN	GRANDVILLE	42.91N 85.76W
01/17/2011	U0.00 INCH	KENT MI	PUBLIC
	FREEZING RAIN BEING REPORTED IN GRANDVILLE. NO AMOUNT GIVEN. PUBLIC REPORT THROUGH WZZM 13.		
0723 PM	FREEZING RAIN	FENNVILLE	42.59N 86.10W
01/17/2011	U0.00 INCH	ALLEGAN MI	PUBLIC
	FREEZING RAIN BEING REPORTED IN FENNVILLE. PUBLIC REPORT THROUGH WZZM 13.		
0724 PM	FREEZING RAIN	WYOMING	42.90N 85.71W
01/17/2011	U0.00 INCH	KENT MI	PUBLIC
	FREEZING RAIN BEING REPORTED IN WYOMING. PUBLIC REPORT THROUGH WZZM 13.		
0728 PM	FREEZING RAIN	DORR	42.73N 85.72W
01/17/2011	U0.00 INCH	ALLEGAN MI	TRAINED SPOTTER
	FREEZING RAIN BEING REPORTED IN DORR.		
0736 PM	FREEZING RAIN	EAST GRAND RAPIDS	42.94N 85.61W
01/17/2011	U0.00 INCH	KENT MI	NWS EMPLOYEE
	DRIVER EXPERIENCED MODERATE FREEZING RAIN BETWEEN EAST GRAND RAPIDS AND WYOMING.		
0736 PM	FREEZING RAIN	ALLENDALE	42.97N 85.95W
01/17/2011	U0.00 INCH	OTTAWA MI	TRAINED SPOTTER
0740 PM	FREEZING RAIN	ALLEGAN	42.53N 85.86W
01/17/2011	U0.00 INCH	ALLEGAN MI	TRAINED SPOTTER
	MIX OF FREEZING RAIN AND SLEET IN THE CITY OF ALLEGAN AT 730 PM.		
0740 PM	FREEZING RAIN	OTSEGO	42.46N 85.70W
01/17/2011	U0.00 INCH	ALLEGAN MI	BROADCAST MEDIA
	MIX OF FREEZING RAIN AND SLEET IN OTSEGO AT 725 PM.		
0811 PM	FREEZING RAIN	1 E HOLLAND	42.78N 86.09W
01/17/2011	E0.10 INCH	OTTAWA MI	TRAINED SPOTTER

AN ESTIMATED TENTH OF AN INCH OF ICE HAS ACCUMULATED ON CARS IN HOLLAND. MULTIPLE SPIN-OFFS ON INTERSTATE 196.

0831 PM SNOW TUSTIN 44.10N 85.46W
01/17/2011 M3.0 INCH OSCEOLA MI BROADCAST MEDIA

STORM TOTAL SNOWFALL THROUGH 820 PM.

0900 PM SNOW GREENVILLE 43.18N 85.26W
01/17/2011 M1.5 INCH MONTCALM MI TRAINED SPOTTER

STORM TOTAL SNOWFALL ENDING AT 845 PM. JUST BEGINNING TO MIX WITH SLEET.

0904 PM FREEZING RAIN ALLEGAN 42.53N 85.86W
01/17/2011 E0.10 INCH ALLEGAN MI TRAINED SPOTTER

SPOTTER IN ALLEGAN REPORTS VERY LIGHT FREEZING RAIN AND SLEET AT 9 PM. TOTAL ICE ACCUMULATION A TENTH OF AN INCH. ROADS ARE ICE COVERED AND VERY SLIPPERY.

0921 PM SNOW TWIN LAKE 43.37N 86.17W
01/17/2011 M2.8 INCH MUSKEGON MI TRAINED SPOTTER

SNOWFALL FROM 4 PM THROUGH 9 PM. SNOW DEPTH 14 INCHES. STILL ALL SNOW AS OF 915 PM.

0945 PM SNOW WHITE CLOUD 43.57N 85.77W
01/17/2011 M5.0 INCH NEWAYGO MI PUBLIC

1000 PM SNOW 1 SW SHELBY 43.60N 86.38W
01/17/2011 M5.0 INCH OCEANA MI TRAINED SPOTTER

STORM TOTAL. STILL SNOWING.

1017 PM SNOW 2 N MUSKEGON 43.25N 86.25W
01/17/2011 M4.5 INCH MUSKEGON MI TRAINED SPOTTER

SNOWFALL FROM NOON THROUGH 10 PM.

1017 PM SNOW GRAND HAVEN 43.06N 86.22W
01/17/2011 E3.0 INCH OTTAWA MI BROADCAST MEDIA

STORM TOTAL SNOWFALL THROUGH 10 PM.

1034 PM SNOW NORTON SHORES 43.16N 86.26W
01/17/2011 M4.0 INCH MUSKEGON MI TRAINED SPOTTER

STORM TOTAL SNOWFALL ENDING AT 10 PM.

1236 AM SNOW KENT CITY 43.22N 85.75W
01/18/2011 E4.0 INCH KENT MI BROADCAST MEDIA

STORM TOTAL SNOWFALL THROUGH MIDNIGHT.

0247 AM SNOW GRAND HAVEN 43.06N 86.22W
01/18/2011 M6.0 INCH OTTAWA MI TRAINED SPOTTER

STORM TOTAL SINCE NOON ON MONDAY.

0616 AM SNOW BALDWIN 43.90N 85.85W
01/18/2011 E6.0 INCH LAKE MI BROADCAST MEDIA

24 HOUR TOTAL AS OF 6 AM.

0616 AM SNOW CLARE 43.82N 84.77W
01/18/2011 E6.0 INCH CLARE MI BROADCAST MEDIA

24 HOUR TOTAL AS OF 6 AM.

0616 AM SNOW HERSEY 43.85N 85.44W

01/18/2011	M7.2 INCH	OSCEOLA	MI	TRAINED SPOTTER
	STORM TOTAL.			
0616 AM	SNOW	PARIS		43.77N 85.50W
01/18/2011	E4.0 INCH	MECOSTA	MI	BROADCAST MEDIA
	24 HOUR TOTAL AS OF 6 AM.			
0616 AM	SNOW	SCOTTVILLE		43.95N 86.28W
01/18/2011	E3.0 INCH	MASON	MI	BROADCAST MEDIA
	24 HOUR TOTAL AS OF 6 AM.			
0700 AM	SNOW	GRANDVILLE		42.91N 85.76W
01/18/2011	M1.2 INCH	KENT	MI	NWS EMPLOYEE
	STORM TOTAL.			
0705 AM	SNOW	MUSKEGON		43.22N 86.25W
01/18/2011	M6.5 INCH	MUSKEGON	MI	TRAINED SPOTTER
	STORM TOTAL AS OF 6 AM.			
0800 AM	SNOW	BIG RAPIDS		43.70N 85.48W
01/18/2011	M5.0 INCH	MECOSTA	MI	TRAINED SPOTTER
	STORM TOTAL.			
0800 AM	SNOW	3 N HOLLAND		42.83N 86.11W
01/18/2011	M3.0 INCH	OTTAWA	MI	TRAINED SPOTTER
	STORM TOTAL.			
0830 AM	SNOW	BRECKENRIDGE		43.41N 84.48W
01/18/2011	M2.5 INCH	GRATIOT	MI	TRAINED SPOTTER
	STORM TOTAL AS OF 8 AM.			
0900 AM	SNOW	CLOVERVILLE		43.19N 86.17W
01/18/2011	E6.0 INCH	MUSKEGON	MI	TRAINED SPOTTER
	STORM TOTAL AS OF 8 AM.			
0900 AM	SNOW	LUDINGTON		43.96N 86.45W
01/18/2011	M3.0 INCH	MASON	MI	TRAINED SPOTTER
	STORM TOTAL AS OF 3 AM.			
0909 AM	SNOW	3 WSW CANNONSBURG		43.04N 85.52W
01/18/2011	M3.0 INCH	KENT	MI	NWS EMPLOYEE
0940 AM	SNOW	GREENVILLE		43.18N 85.26W
01/18/2011	M3.4 INCH	MONTCALM	MI	TRAINED SPOTTER
	STORM TOTAL AS OF 9 30 AM.			
1057 AM	SNOW	HUDSONVILLE		42.87N 85.87W
01/18/2011	E1.5 INCH	OTTAWA	MI	TRAINED SPOTTER
	STORM TOTAL. LOST DEPTH DUE TO ZR.			