

"A GREAT STORM IS UPON MICHIGAN" THE GREAT BLIZZARD OF 1978!

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As with the huge snowstorm of [December 1974](#) another even more powerful (in terms of intensity/ extent) storm is of strong interest to all meteorologists who have studied winter storms in the Great Lakes. This storm is also of interest and remembrance to many longtime residents of the Great Lakes, the Upper Ohio Valley and Ontario, Canada who had to deal with winter's full fury late in January of 1978. In addition, the storm certainly casts many memories for those of us who were on duty and worked during the storm...while being in awe of the development and subsequent immense strength of this great monster. With the 25th anniversary of this Great Blizzard at hand, it is worth taking a step back in time to re-live this monumental example of nature's fury.

While there are several contenders for the worst blizzard ever to hit the Great Lakes in relatively modern times (since 1870 when records began in Detroit), the immense and intense Blizzard of January 26-27th 1978 must rank at or near the top along with the [Great White Hurricane of 1913](#) with its similar track and powerfulness.

The incredible Blizzard of January 26-27th, 1978 evolved out of a winter that was infamous for cold and storms. The Winter of 1977-78 thus far had been one the coldest, since records began, in many areas from the Rockies eastward to the Appalachians. Mammoth blizzards occurred late in January and early February from the Midwest to the East Coast as strong Arctic plunges dove south into the country and met up with the warmer winds from the deep south. The winter of 1977-78 was similar to its predecessor (1976-77) in terms of cold. The main difference between the two winters, however, came in February. In 1977, temperatures moderated rapidly during February, while in 1978, the cold actually worsened - with several locations reporting their coldest recorded February to date. The Winter of 1977-78 is written down in the record books as Detroit's seventh coldest winter, Flint's fifth coldest and Saginaw's sixth. West of the Rockies, it was a different story as a dominant upper ridge of high pressure provided a relatively mild winter, with some stations even reporting one of their warmest winters on record.

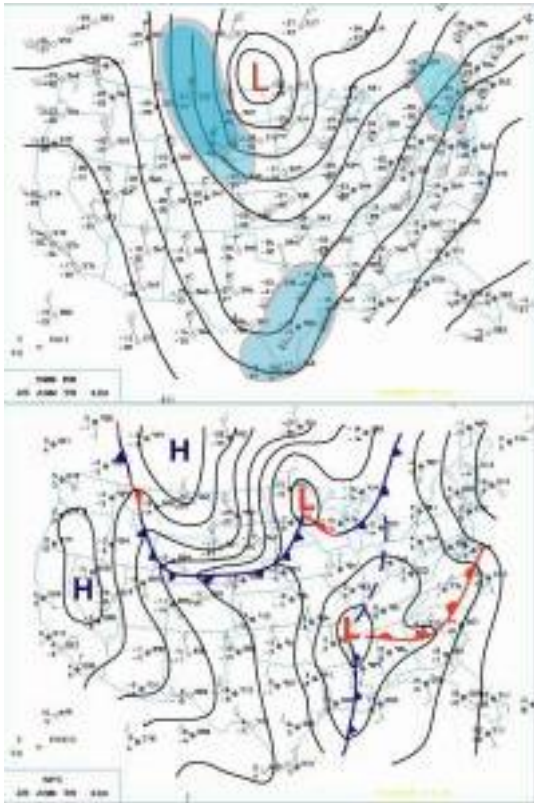
The Great Storm

Since there were some forecasted variances of the intensity and track of the storm, and considering the primitive model of the day (LFM - Limited Fine Mesh), forecasters did an admirable job in forecasting one of the most severe winter storms ever to hit the Great Lakes Region.

A Winter Storm Watch was posted as early as Tuesday night, the 24th, for the southern half of the Lower Peninsula for Wednesday Night into Thursday. Gale Warnings for the Great Lakes were hoisted

the following Wednesday morning, along with the Watch. A weaker system had moved through the region earlier during the day on Tuesday and already dropped some snow on the region (a Winter Storm Watch had been issued for this system as well, earlier on Monday, the 23rd). After Tuesday's snow, the headline on the Special Weather Statement that was issued by the NWS Tuesday evening read as follows: "Another Winter Storm Threatens Lower Michigan" and thus, a second Winter Storm Watch was officially posted.

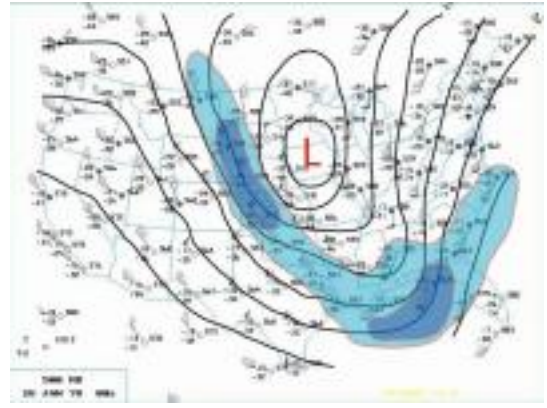
Meanwhile, the ingredients of what would later prove to be a truly fascinating yet vicious winter storm were coming together from different parts of the country. As with the "White Hurricane of 1913," the massive storm actually began as two smaller but distinct storms. A strong low pressure with an attending arctic airmass was entering the Northern Plains by way of Northern Minnesota on Tuesday evening (24th). At the same time, another developing low pressure system was taking shape over the eastern Texas/Louisiana area.



The phasing of two distinct jet streams aloft proved to be the key as to the subsequent strength and massive extent of the storm. A very strong and energetic Arctic impulse surged almost due south and plowed the Arctic front through the Northern Plains late on the 24th. At the same time, another very strong upper wind impulse surged south through southern Arizona. These two jet streaks made up the larger North American jet stream as a huge upper ridge of high pressure along the West Coast of the U.S. diverted the powerful Pacific Jet north into Northern Canada. This northern jet (containing a wind max of 110 knots) then dove due south, like on a giant roller coaster, across the western U.S. as the second, subtropical jet (with an even stronger wind max of 130 knots) surged across southwestern states. On Wednesday (25th), a deepening area of low pressure made its way east across the Gulf States into Georgia by evening ([surface](#) | [500mb](#)). Meanwhile, across the north, the Arctic front barreled east across the Upper Midwest into the Western Lakes by Wednesday evening.

Earlier that Wednesday morning, the Winter Storm Watch for Southeast Lower Michigan was changed to a Heavy Snow Warning, while a Travelers Advisory was issued for Western and Northern Lower Peninsula. Later, at the issuance of the evening forecast, the entire Lower Peninsula was upgraded to a Heavy Snow Warning. Meanwhile, a rapid deepening of the surface low over the southeast portion of the country also commenced on Wednesday evening. As the low intensified over Alabama and Georgia, Atlanta registered its lowest barometric pressure ever late on the 25th. At the same time, further north in Michigan, snow was falling over much of the Lower Peninsula. In and around the Ann Arbor and Metro Detroit, the snow mixed with or changed to light rain Wednesday night as slightly warmer air surged northwest into that area ahead of the deepening storm. While the storm was organizing in the lower

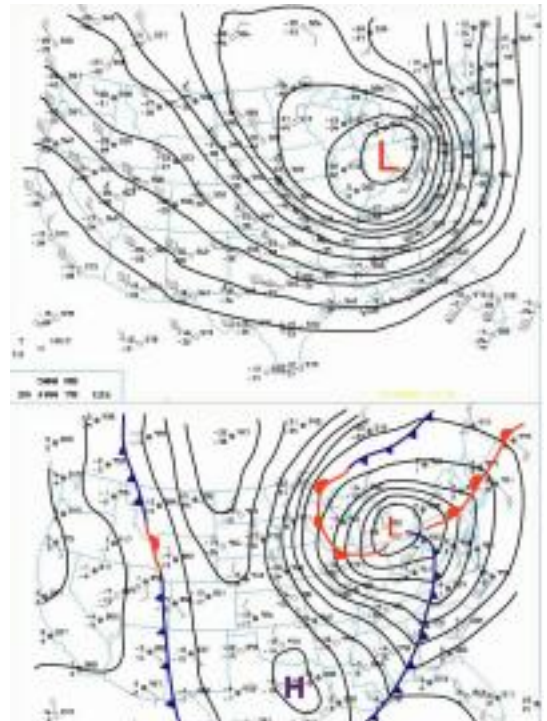
levels of the atmosphere over Georgia, the Subtropical and Arctic jet aloft began to merge and phase over the Southeast part of the country. This [merging of jet streaks](#) contained a wind max of 150 knots which helped induce a rapid intensification of the Georgia Low as it surged northward into West Virginia early on the 26th. Record low barometric pressures were set all along its path as an ominous track (trough) began to materialize toward the Eastern Great Lakes.



Bands of heavier snow spread north into much of Southern Lower Michigan during the very early morning hours of the 26th. Rain continued to fall, however, over the extreme southeast corner of Lower Michigan. At 1 AM EST, rain was observed at Detroit Metro Airport with the temperature comfortably above freezing at 36 degrees. Further north at Flint, however, sleet and freezing rain were falling as the temperature hovered around freezing. Air pressure tendencies were noted as falling rapidly /PRESFR/ and continued that way for several hours (in fact, several stations in this storm's path had to re-adjust their barographs for station pressures traces that were BELOW initial chart scale).

The aforementioned Arctic cold front that was across the Western Great Lakes advanced steadily east into Lower Michigan as the main southern low underwent explosive deepening (this low's central pressure fell 40 millibars in 24 hours)! The central pressure was recorded at 28.28 inches as it tracked north across eastern Ohio, just west of Cleveland, at 7AM EST. As the low moved out over Lake Erie, the Arctic cold front over Southeast Lower Michigan was pulled sharply east into its mammoth cyclonic circulation. Any residual rain over Southeast Lower Michigan quickly changed to heavy snow and blowing snow during the pre-dawn hours of the 26th. As the Arctic front plowed through the Cleveland area, the wind gusted to an incredible 82 mph! As the Arctic air flooded the Cleveland area, the temperature dropped from a relatively balmy 44 degrees at 4AM EST to a bitterly cold 7 degrees by 1000 AM EST.

Blizzard Warnings were hoisted across much of the Great Lakes and Upper Ohio Valley Region by daybreak Thursday. The center of the huge storm ([surface | 500mb](#)) continued to trek north northwest across Southwest Ontario (roughly between Chatham and London) while Detroit measured its lowest pressure reading at 28.34 inches at 650 AM EST. The incredibly deep center made its way north along the St. Clair River with Sarnia ON reporting the lowest pressure on land at 28.21 inches. Not only was the depth of this mammoth storm's center very impressive, so too was the extent of low pressure from its center. Even locations that were far removed from the storm's center also reported record low pressures. Stations such as Cincinnati OH, Rochester NY and Toronto ON and even as far east as Wilmington N.C., all recorded record low pressure readings from this monster. In fact, at Toronto, where





records go back as far back as 1840, the lowest pressure reading of 28.40 inches broke the old record of 28.57 inches by 0.17 inches. In addition, dozens of other cities, with records going back a century, also recorded their lowest pressure reading of all time or, for at least the month of January. This massively intense storm was responsible for strong wind gusts as far away from the center as Boston /72 MPH/ and Chesapeake Bay Bridge /90 MPH/ with even damaging winds reported as far south as Tallahassee FL.

As the Arctic air circulated throughout the storm while it made its way over Lake Huron, the lowest pressure was reached around 950 millibars or a hurricane-like 28.05 inches! "A Great Storm is Upon Michigan" read the headline of the 800 AM EST Special Weather Statement issued by the National Weather Service Forecast Office in Ann Arbor that Thursday /26th/ morning. Heavy snow and blizzard conditions were extensive as wind gusts in excess of 35 mph whipped the snow into huge drifts across much of Southeast Lower Michigan. Other areas of Eastern Michigan, Indiana and Ohio reported near hurricane-force winds, heavy snow and temperatures hovering between zero and 10 above, resulting in extreme blizzard conditions. These conditions later expanded further east into Pennsylvania and West Virginia and prevailed into the night (26-27th) across much of the Eastern Great Lakes, Southern Ontario and the Upper Ohio Valley. With the storm generating copious amounts of snow and very strong winds, whiteout conditions were widespread. All land and air traffic came to a stand still in the affected regions. Several major roads were closed for at least two to three days, if not longer, while clean up got underway. Numerous NWS employees were stranded at work, home, or on the road somewhere between the two. Several employees worked double shifts into at least Friday (some longer) because of the impassable roads with others simply unable to get to work.

The Blizzard Warnings were allowed to die across Michigan during the forenoon hours of Friday, the 27th. Record 24 hour snowfall totals from the storm included, 16.1 inches at Grand Rapids, 15.4 inches at Houghton Lake and 12.2 at Dayton, OH. Snowfalls for the entire storm (25-27th) included a whopping 30.0 inches at Muskegon (some of which was Lake Michigan enhanced), 19.3 inches at Lansing and 19.2 at Grand Rapids. Snowfalls were less over Southeast Lower Michigan (mainly because of the rain that fell for a period) and included 9.9 inches at Flint and 8.2 inches at Detroit.

The following is a quote from the summary written about the storm by Meteorologist in Charge, C.R. Snider on January 30th, 1978 at the National Weather Service Ann Arbor:

"The most extensive and very nearly the most severe blizzard in Michigan history raged throughout Thursday January 26, 1978 and into part of Friday January 27. About 20 people died as a direct or indirect result of the storm, most due to heart attacks or traffic accidents. At least one person died of exposure in a stranded automobile. Many were hospitalized for exposure, mostly from homes that lost power and heat. About 100,000 cars were abandoned on Michigan highways, most of them in the southeast part of the state."

The employees of the National Weather Service Forecast Office in Ann Arbor had just set up shop at the new quarters at the Ann Arbor Federal Building a WEEK before the storm hit. The forecast staff had transferred from the Detroit Metropolitan Airport Office while the observing and radar staff remained at the airport. The majority of employees still lived in and around the metro Detroit area and all major roads between Detroit and Ann Arbor were blocked for approximately 18 hours due to the storm. Several employees put forth efforts beyond the call of duty, stated Mr. Snider in his storm report.

Yet, as mentioned earlier, the Winter was not yet over by any means as the month of February (after the storm) was brutally cold across much of country. The below normal temperature departures of February 1978 were strikingly similar to that of January 1978 (and in some places, February was actually colder). The average temperature for Detroit that winter came in at just 20.5 degrees /normal 27.1/ which again, made it the seventh coldest winter on record. Snowfall totaled a hefty 61.7 inches which made the winter of 1977-78 the eighth snowiest winter on record at Detroit. Flint's average temperature of 19.1 degrees made it the fifth coldest winter on record, but Flint received less snow than Detroit with 50.6 inches /19th snowiest/. Saginaw's winter average temperature of 17.9 degrees made it the sixth coldest winter on record and was accompanied by 55.6 inches of snow, making it the just the 20th snowiest winter.

This article is dedicated to Fred Keyes, a longtime employee of the National Weather Service in Southeast Lower Michigan. With his retirement at hand, his never ending enthusiasm for weather forecasting will be greatly missed by his peers, here and far in the National Weather Service, and the general public. Fred worked with the National Weather Service for nearly 30 years and saw more than his share of notable weather events such as the Thanksgiving Weekend Storm of 1974, the above "Storm of 1978" and the Blizzard of 1999...just to only name a few. On behalf of the staff at the National Weather Service Office Detroit/Pontiac, may peace, health, happiness and perfect weather be yours in your "golden years", Fred.

Additional References:

Weatherwise

Monthly Weather Review