NORTHEASTERN STORM BUSTER

Emergency Manager & Storm Spotter Magazine

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DEPARTMENTS

A COMPLEX 2007-08 WINTER WEATHER SEASON

By Hugh W. Johnson IV
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The official winter season started off with a developing La Niña (cooling of the Pacific Ocean), the strongest one in more than 10 years. The La Niña continued throughout the winter season.

Lake effect snow and cold temperatures kicked off the month of December. Then, the season's first of many winter storms reared its ugly head on the evening and overnight of the 2nd and 3rd. A storm tracked through the Ohio Valley into New York State, ramming into a cold wedge of air over the Northeast. It brought a potpourri of wintry precipitation to the area in the form of snow, sleet and freezing rain. While the bark was generally worse than the bite, it still managed to bring a couple of inches of snow, and icing of up to a quarter of an inch thick. After a brief break in the action, there were colder than normal temperatures, but mostly dry conditions. A series of weak storms brought a little more ice and snow to the region from December 9th through the 11th, along with plenty of clouds. Then, an even bigger storm took a more southerly track, and brought the first major snowstorm of the season to the area on the 13th. 8.2" fell at Albany, with amounts exceeding a foot to the south. Just as we were finishing

SPRING SKYWARN TRAINING

Session information available at:

http://cstar.cestm.albany.edu:7775/skywarn/Talks.htm

cleaning up from this storm, a stronger and more complex one moved up the coast on the 16th, bringing heavy snow and sleet, which added up to over 8" locally, with some areas to the east exceeding a foot. Further south, some ice accumulated. But the parade of storms wasn't over yet. Another weak one brought a bit more snow on the 19th-20th, and the next storm took a track further westward through the western Ohio Valley, bringing more rain and some wind on the 23rd. Finally, the parade of storms took a siesta just in time for Christmas, but all the moisture left lots of clouds throughout the region. A little more snow followed, but the biggest storm of December (at least in terms of snow) buried the region with around 10 inches of snow on the 30th-31st. December 31st also saw the greatest snow depth at our office, with 12" on the ground.

When December was over, the 31.2" total made it the 7th snowiest December on record in Albany. In stark contrast, December 2006 saw only 0.3" of snow, the third least snowiest December on record! The total liquid equivalent precipitation of 4.74" was about 2" above normal. Temperatures averaged very close to normal, and it was exceptionally cloudy for much of the month.

January 2008 started out with more snow to ring in the New Year. While a Clipper did not bring much snow locally, close to a foot fell over portions of the southern Green Mountains of Vermont. A blast of Arctic air immediately followed, sending temperatures plummeting to their lowest levels of winter. Then, an early January thaw settled upon the region. By the second week of the month, a warm-up had ensued, and the temperature soared to a record-breaking 60º on the afternoon of the 8th. The next day, the temperature went even higher, to 62º, setting yet another record. Not only did some temperature records melt under the unusual warmth, but so did our extensive snow pack from Albany on south. The extensive snow pack never returned despite minor snow accumulations on the 14th, 15th, 18th and 24th. Temperatures cooled off quite a bit after the 9th, but remained persistently above normal. For a change, total precipitation was quite light, as only an inch accumulated during the entire month, well below normal. This was our driest January since 2001. Snowfall totaled only 7.8". This was our third consecutive mild January, as temperatures averaged more than 5 degrees above normal.

As soon as February arrived, the weather pattern changed once more. It started out wet and stormy, and remained that way for the balance of the month. The first storm was mainly rain in Albany, but there was a mix of wintry slop further north and west. This was the first of seven significant storms that impacted our region. The next system came late on the 4th. A series of storms moved along a strong stationary front to our south, bringing over an inch of rain, along with more ice and snow, especially up north. Seasonably cold weather ensued, followed by an even bigger, mixed event, on the 12th and 13th, when a storm approached our region from the Ohio Valley. Initially, several inches of snow fell. Then, the precipitation transitioned to freezing rain, and produced some of the worst icing of the winter in the immediate Capital District…with as much as a third of an inch of ice accretion, while the surrounding hill towns received closer to an inch. There were spotty power outages. The next system was mostly a light rain event on the 17th and 18th. Our area enjoyed a brief warm-up on the 18th, as the temperature reached 56º, the highest reading of the month. Then on the 21st, a total lunar eclipse was visible on an unusually clear night. On the very next day came the fifth storm of the month, which turned out to be a fast-moving snow event producing several inches of the white stuff. The final storm of the month came after another brief dry respite with seasonable temperatures. This one, again, was mostly snow, but of the heavy and wet variety, with 5.6" piling up at Albany, the greatest snowfall of the month. Areas of the southern Greens picked up well over a foot of snow with this system. The month ended on a cold note as Arctic air combined with the fresh, cold snow pack to send temperatures to -2º F on the last day of the month, the leap year date. This was cold enough to establish our only record low temperature of the winter season, and our first new daily low temperature record since May 13, 2005!

February 2008 wound up being the second-wettest one on record at Albany, with 5.04" recorded, more than double the normal. Temperatures finished about a degree above normal, and the 15.8" monthly snowfall total was about 3 inches above normal.

How did our winter compare to a normal La Niña winter? December was close to the climatological average, drier compared to a typical La Niña winter. January was drier than normal, which is typical, but it was also milder than normal, which is a little unusual in that we usually have slightly colder than normal January temperatures during La Niña. February fit the La Niña mold, in that it was wet. However, snowfall during the month of February during the La Niña phase is usually well below normal, which was not the case this year.

THE SOMEWHAT WET, SNOWY AND MILD WINTER OF '07-'08

Evan L. Heller
Climatologist, NWS Albany

The Albany area experienced a mixture of climate scenarios that averaged out to a somewhat wetter than normal winter season, overall. Each of the three months of climatological winter was quite different. Temperature-wise, December started out well below normal, enough so that the above normal latter third of the month wasn't enough to get the average temperature for the month to be above normal. The average high for the month of 34.2º at Albany was 1.8º below normal, with the average low of 21.4º being 1.3º above. This resulted in a monthly mean of 27.8º, just 0.2º below normal. The warmest day was the 23rd, with a 42.5º daily mean. The high reading for the month, 51º, also occurred this day. The cold day was the 18th, with a daily mean temperature of 15.5º, as well as the month's lowest reading, 2º. The lowest high daily temperature reading for the month, 24º, occurred on the 17th, while the highest low, 36º, occurred on the 29th. The mercury dipped to freezing or lower on all but four days of the month, and the mercury failed to climb above freezing during 14 days of the month. There were no temperature records of any kind set during December of 2007.

Albany's December precipitation totaled 4.74", 1.98" above normal. There were an unprecedented 25 days with precipitation in December, on 18 of which it was measurable. A tenth of an inch or more fell on 8 of these days, and 0.25" or more on 5 of those. In fact, each of these 5 days had 0.50" or more. The only 1.00+" rain date was the 16th, when a record-shattering 1.30" fell. The previous record for the date was 0.76", set way back in 1902. There were no other precipitation records.

Snowfall for the month totaled 31.2" at Albany, and this was 18.4" above normal. The greatest amount of snowfall for the month occurred with the greatest amount of precipitation, when 8.6" fell on the 16th. The only daily record snowfall for the month, however, occurred on the 31st. The 7.9" total for that day broke the previous daily record for the 31st of 6.4º established way back in 1897. The 13th was the month's only other significant snow day, when 8.2" fell. December's 31.2" total makes it the 7th snowiest December in Albany since the beginning of snowfall records in 1885.

Albany's average wind speed for December was 6.8 mph, 1.9 mph below normal. The average wind speed on the windiest day, the 17th, was 19.0 mph, and the average for the calmest day, being the very next day, was 1.2 mph. The peak wind was 47 mph from the west northwest on the 3rd. There were 5 clear, 11 partly cloudy and 15 cloudy days during the month, and dense fog occurred on the 13th, 16th, 20th, 23rd, 27th, 30th and 31st. Winter storms produced sleet on the 2nd, 3rd, 9th and 16th, and freezing rain on the 3rd, 9th, 10th, 11th and 16th.

Where December 2007 was snowy, January 2008 was relatively dry and mild. Only seven days were below normal. The mean temperature for the month was 27.6º, 5.4º above normal. The average high was 35.7º, 4.6º above normal, while the average low was 19.4º, 6.1º above. The year 1930 saw all three of its current-standing daily temperature records for January 8th go by the wayside. The 8th was the warm date, with a daily mean temperature of 54.5º that set a new daily mean record for the date. The previous record was 52.5º. The highest minimum reading for the month was also recorded on the 8th…49º, and this, too, was a new record, breaking 1930's 48º record for the date. The high temperature from the 8th was also broken, when the mercury topped out at 60º. The previous record was 57º. It was the next day, however (the 9th), that recorded the month's highest reading, 62º, and this set another daily record. The previous record for this date was 59º, from 1978. The same three types of temperature records broken on the 8th were broken again on the 9th. Therefore, the 41º high minimum achieved on the 9th broke the previous record of 38º, from 1937, and the 51.5º high mean temperature broke the 46.0º record, also from 1937. There were no other new temperature records of any kind for January. The coldest date was the 3rd, with a daily mean temperature of 2.5º. The lowest reading for the month, -5º, occurred on this date as well, as did the lowest maximum reading for the month, 10º. The only other date to fall below zero was the 4th, when the mercury dipped to -2º. The temperature bottomed out at or below freezing on all but 5 days of the month, while the thermometer failed to rise above freezing during 14 days of the month.

Precipitation for January totaled exactly one inch. This is 1.71" below normal. Consequently, January 2008 is now tied for Albany's 91st driest month since 1874. However, there are at least ten even drier February's. Precipitation fell during 22 days in January, on 9 of which it was measurable. A tenth of an inch or more fell on 4 of these days. The greatest daily amount

of precipitation was just 0.37", on the 11th. Snowfall totaled just 7.8" in January, 10.2" below normal, with the maximum daily amount of snowfall, 2.8", occurring on the 14th.

There were 10 clear, 17 partly cloudy and 4 cloudy days in January. The average wind speed for the month was 7.2 mph, 1.9 mph below normal. The peak wind for the month was 56 mph from the west southwest on the 9th. The 9th was also the windiest day, with a 17.2 mph average speed. The 1st was the calmest day, with an average speed of just 1.5 mph. Dense fog occurred on the 1st and 2nd, and freezing rain fell on the 18th and 29th.

February marked a return to above normal precipitation. The temperatures were closer to normal, but the snow to rain ratio was lower than for the previous two months. The result was an early start to the flooding season. The average high temperature was 33.7º, 0.6º below normal, and the average low was 18.8º, 3.1º above normal. This resulted in a mean temperature for the month of 26.2º, 1.2º above normal. Temperatures dipped to freezing or lower during all but one day during the month, while the mercury failed to climb above freezing on 11 days. The warm day of the month was the 18th, with a daily mean of 43.5º, and the warm reading for the month, 56º. The month's high minimum temperature, 33º, occurred on the 5th. The 28th was the cold day, with a daily mean of 11.0º, contributed, in part, by the low maximum reading of the month that day…17º. The coldest reading in February was -2º, which occurred on Leap Day…the 29th. With few opportunities for Leap Day to establish new records, the -2º was cold enough to do the job. The previous record was 0º, set in 1980.

For the same reason, a daily snowfall record was also broken on Leap Day. The scant 0.8" of snowfall for the day actually broke the existing record, which was just 0.6", from 1984. This amount was but a small portion of the month's 2.9" above normal 15.8" total. The snowiest day was the 26th, when 4.8" fell. It, however, was not a record amount. The 5.04" total rainfall that fell at Albany during February was a whopping 2.77" above normal, and it is Albany's second-wettest February on record. However, since there are no February months in the list of all-time wettest months, this one obviously escapes this list as well. Rain fell on 19 days in February, on 14 of which it was measurable. A tenth of an inch fell on 10 or more of these days, with 0.25" or more on 7 of those, and 0.50" or more on 4 of these. The only daily 1.00+ inch amount was a record. The 1.21" which fell on the 6th broke the 0.85" record for the date from 1955.

The average wind speed for February was 7.5 mph, 1.7 mph below normal. The peak wind was 54 mph from the west northwest on the 10th. The 11th was the windiest day, with an average speed of 16.5 mph, while the 8th was the calmest day, with an average speed of only 0.6 mph. There were 6 clear, 12 partly cloudy and 11 cloudy days during February. Dense fog occurred on the 10th, 18th, 26th and 27th. Sleet fell on the 1st, 7th, 12th and 13th, and freezing rain, on the 1st, 6th, 7th and 13th.

For the season, the average high temperature was 34.5º, 0.7º above normal, and the average low was 19.9º, 3.5º above normal. This resulted in a seasonal mean temperature of 27.2º, 2.1º above normal. Precipitation totaled 10.78", 3.04" above normal, and snowfall totaled 54.8", 11.3" above normal. There were no new seasonal records.

STORM BASED WARNINGS

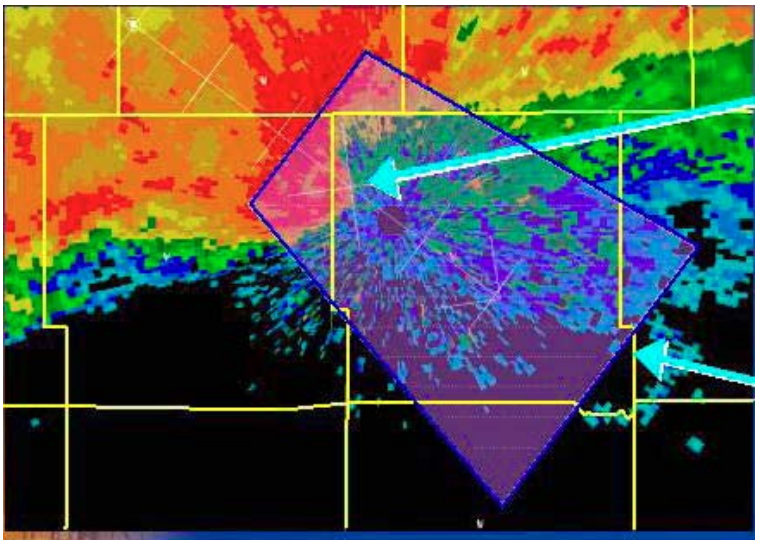
Brian Montgomery
Senior Forecaster, NWS Albany

The National Weather Service continues with enhanced warning technologies to save lives and reduce the economic impacts of storms. The most recent enhancement is Storm Based Warnings. These warnings are more geographically specific, to highlight the communities that could potentially be impacted by tornadoes, severe thunderstorms, flash floods and marine hazards. Previously, such warnings were issued for entire counties, needlessly warning people who were not under any threat of severe weather. Now, the National Weather Service in Albany pinpoints the specific areas within a county which are under a threat. These Storm Based Warnings commonly reference known landmarks such as highways or rivers.

Storm Based Warnings (SBW) show the specific meteorological or hydrological threat area, and are not restricted to geopolitical boundaries. By focusing on the true threat area, 'warning polygons' improve National Weather Service warning accuracy and quality. Storm Based Warnings promote improved graphical warning displays, and, in partnership with the private sector, support a wider warning distribution, through cell phone alerts, pagers, and web-enabled Personal Data Assistants

(PDAs), for example. The media can display the polygons showing the public where the area of maximum threat is, and better depict who or what is at greatest risk.

The typical Storm Based Warning is one-quarter the size of the typical county-wide warning, thus allowing Emergency Managers to make better decisions concerning what resources may be required, and where. Law enforcement and fire departments will know which areas need to be put on alert. Schools and businesses can more accurately determine whether or not they may need to activate their tornado procedures, and close down operations. Other government agencies and customers, such as the aviation community, are able to make better risk assessments. For example, airport operators are better able to ascertain whether or not they need to temporarily shut down an airport if they are within the warning polygon.



Example of Storm Based Warnings and the Warning Polygon

In summary, instead of issuing warnings by county, your National Weather Service Forecast Office in Albany is now able to narrow the focus to a portion of a county (or counties) that have the greatest threat for being impacted by an actual severe weather event. The warned area is defined by latitude and longitude coordinates, and is depicted by polygons (as illustrated above). Utilizing Doppler radar (amongst other tools available to National Weather Service meteorologists), the calculated movement of severe storms can be indicated through use of this technique. This information is appended to the bottom of Storm Based Warning products. Below is an example of appended information to warnings:

LAT...LON 3600 8562 3599 8565 3588 8566 3584 8578
3586 8584 3583 8591 3578 8596 3571 8613
3581 8619 3591 8615 3609 8571
TIME...MOT...LOC 1917Z 245DEG 45KT 3591 8585

For audio broadcasts, portions of counties are described by compass points (e.g. northeast, south central, etc.). The use of familiar landmarks such as highways or rivers also help describe the warned area. Warning polygons can shrink in area, but never expand. If a severe storm is expected to track outside of the current warning area, a new Storm Based Warning is issued for the region currently at risk. When severe weather is no longer expected, warnings will be allowed to expire. If you have any additional questions or concerns, please fell free to contact us. Be sure to have an Internet bookmark on the Storm Prediction Center web page at: www.spc.noaa.gov and www.weather.gov/albany.

OUR TRIP TO ALBANY INTERNATIONAL AIRPORT

Hugh W. Johnson IV
Meteorologist, NWS Albany

Evan L. Heller
Meteorologist, NWS Albany

NWS Albany employees were treated to a tour of Albany International Airport on Tuesday, January 8th. Our goal was to see how our forecasts and products were being utilized, and to observe airport operations in different departments. Several airport employees were kind enough to guide us through the extensive tour, which lasted about 2 hours.

Upon our arrival at the tower facility on this record-breaking warm winter's day, we were first taken up to the FAA Terminal Radar Approach Control (TRACON) room. We learned that as many as 1,100 planes a day fly in and out of the airport, although the average is actually closer to 400. The air traffic controllers are responsible for the lowest 10,000 feet of airspace in and around the airport. Beyond 10,000 feet, Boston Air Traffic Control takes over. While we were in the TRACON room, we saw the better part of a dozen

planes "in action" on their new, modern radar scopes.

We were informed that a ceiling of 500 feet or lower severely impacts take-offs and landings on Runway 28, as it's the shorter runway (7,200 feet vs. 8,500 feet for Runway 01/19). Low IFR ceilings usually preclude the use of Runway 28, unless south winds are especially strong as this would pose a crosswind problem on runway 01/19. There is also no Runway Visual Range (RVR) for Runway 28. Runway 19 has a 2,400-foot RVR threshold, making it a Category II runway. Most of the smaller aircraft exclusively use the longer Runway 01/19.

We were advised of a significant dilemma Airport Operations frequently encounters during the winter months: After a significant snowstorm, how quickly can Airport Operations clear Runway 28 before a significant west wind (if any) develops behind the departing low pressure area, creating snow drifts? They need to plow Runway 28 before the wind kicks in and creates the drifts. Airport operations rely on our products, and this is the reason Operations often calls both prior to the beginning of, and at the end of, a snowstorm.

The next part of the tour took us up into the tower. Rarely are there more than two controllers working in the tower at once. The controllers explained the procedures involved in guiding aircraft into and out of the airport.

Then we went back downstairs, where an FAA employee showed us an interesting video of how the national airspace was impacted during the unfolding of 9/11. He explained that controllers across the country were required to maintain a minimum of 3 miles of airspace between each aircraft while bringing them into the nation's airports. Amazingly, thousands of planes were safely brought down without even one reaching into another's 'bubble'. He also showed us a video demonstrating how profoundly even isolated thunderstorms can disrupt air traffic, even if they are well-forecast.

For the first time, we were taken on a trip around the airport grounds. We rode in a shuttle bus, and traversed much of the 1,200 acre site. We were shown the GRE (Ground Run Exposure), a facility where they repair aircraft. We also saw the 'Fuel Farm' and the State Police Air Maintenance facility. We were told that much of the area is marshy, and that a portion of the field is frequently shrouded in fog. The airport is located near the junction of the Mohawk and Hudson Rivers, which impacts the airfield by providing the moisture to create locally dense fog. We also visited the 'Snow Farm', where snow removal from the runways and surrounding terminals adds up to an increasingly huge snow mound as winter progresses. We saw that the snow dome was easily 20 feet high, despite the fact that there was no leftover snow pack on this unseasonably mild day. It was our understanding that during the snowiest winters, the snow dome can easily encompass the entire parking lot (which looked to be larger than a football field!). After over 100 inches of snow officially fell at Albany during the winter of 2002-03, (for our 3rd snowiest winter on record), come June, the snow dome had to be forced to melt, as it appeared it would not do so in time for the following winter.

We then checked out the Airport Operations Building, where workers receive our Airport Weather Warnings, augment the Automatic Surface Observing System (ASOS), take EMS calls, deal with Lost and Found, and monitor airport security. Finally, we paid a visit to the official ASOS site.

Our tour guides expressed their appreciation for our quality forecasts, and complimented us on our Area Forecast Discussions (AFDs). Hugh asked if there was anything we can do better regarding the discussions. They said they were fully pleased with our AFDs. The tour was very enlightening, and gave everyone an opportunity to put a face with a name. Our heartfelt thanks go out to our Albany International Airport tour guides, who took the time out of their busy schedules to help provide us with a better understanding of how our day-to-day interactions with them impact one other.

NWS Albany personnel with Albany International Airport's Automated Surface Observing System (ASOS) in the background (1/8/08).
Pictured (l. to r.): Hugh Johnson; Evan Heller; Kim Sutkevich; Brian Frugis; Thomas Wasula, and; Brian Montgomery.

WCM Words

Raymond G. O'Keefe
NWS Albany Warning Coordination Meteorologist

Spring Skywarn training sessions are on the web! I invite everyone to attend a training session this season. Our record number of attendees for a season is 421 set during the 2006 season. I want to reach 500 trained spotters this season. I need your help. We've scheduled 19 classes, so I know there is a session near you. For a complete list of Skywarn training sessions see:
http://cstar.cestm.albany.edu:7775/skywarn/Talks.htm.

Hope to see you at a class.

From the Editor's Desk

We had a very active winter season, especially the latter part of it. Storm after storm affected our area with either significant snow or a wintry mess. Our first two articles recap our active season in detail. Our other offerings this issue include information on enhancements we've made in the way we issue our warnings, and finally, an article about our latest field trip to Albany International Airport.

SKYWARN sessions are no longer being specifically listed in Northeastern StormBuster. This season's listings may be found by clicking on the link located on the front page of our website, or you can go directly to the listings by clicking on the link:
http://cstar.cestm.albany.edu:7775/skywarn/Talks.htm

The cold weather is not giving up without a fight, but before you know it, the feeling of spring will be in the air. Enjoy the season!