NORTHEASTERN STORM BUSTER

Emergency Manager & Storm Spotter Magazine

Winter, 2006-07-*VOL. 12, NO. 1*
Evan L. Heller, Editor
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IN THIS ISSUE

DECEMBER 1, 2006: A BIZARRE WAY TO KICK OFF WINTER

Hugh Johnson
Meteorologist, NWS Albany

Meteorological winter began on a bizarre and interesting note across eastern New York and adjacent western New England. A backdoor cold front brought a shallow and chilly, modified arctic air mass down through the Hudson Valley. Temperatures at Albany remained around 40 degrees during much of the day, under a very gray sky. Meanwhile, east across the Berkshires of Massachusetts, and even into the southern Green Mountains of Vermont, temperatures had soared well into the 60s for the second day in a row. A potent upper-level low pressure system was moving across the Mississippi Valley, with a surface low in the Ohio Valley. Behind the low was the coldest arctic air of the season to date. The upper low, strengthening surface storm and backdoor cold front all converged right over our County Warning Area late on Friday, the 1st. As the surface storm wound up, warm, moist, unstable air surged northward up the Hudson Valley to about the Capital District, just as the cold arctic air was charging in from the west. A particularly strong vertical wind shear, going from southerly at the surface to northwesterly at about 10,000 feet, was in place. What resulted was an unusual summer-like display of Mother Nature's fireworks, i.e. thunderstorms, many of which became severe. Several lines of thunderstorms formed, converging just west of Albany Friday evening.

Our office issued a total of 18 Severe Thunderstorm Warnings, for almost our entire County Warning Area, and this was, by far, the most we'd ever issued in any December month. Officially, over 20 severe weather events took place across eastern New York, southern Vermont, western Massachusetts and northwest Connecticut. The damage included mainly downed trees and power lines, which resulted in spotty power outages. The only other December in recent memory with severe thunderstorms was back in 2000, when on the 17th, three instances of severe weather took place.

For the first time in National Weather Service Albany's history, we'd issued three Tornado Warnings in December. These were for Ulster, Dutchess and Litchfield Counties. While no tornadoes actually formed, in Dutchess County, New York, a four-mile swath of downed trees a hundred yards in width was caused by supercell thunderstorm straight line winds of as high as 80 mph. This swath paralleled State Route 308 near Rhinebeck. The supercell that had caused the swath of damage was the same one that had very recently spawned a tornado in northeast Pennsylvania. Estimated wind speeds with the line of storms that produced the supercell were as high as 85 mph. Another area of straight line winds downed hundreds of trees within a 1.5 mile long path near Lenox, in Berkshire County. Thunderstorm winds also caused structural damage to a house in Greendale, Columbia County.

Unfortunately, a fatality occurred in Ulster County, in the Village of Ellenville. However, this came before the thunderstorms actually hit, as a pressure-gradient wind ahead of the impending front was apparently strong enough to topple a tree onto a house with the person inside. Non-thunderstorm, or non-convective, winds also blew trees down in Greene and Rensselaer Counties of New York. A strong non-convective wind gust reached 58 mph at the Automated Surface Observing System (ASOS) site in Bennington, Vermont.

As strong as this storm was, it wasn't as potent as the high wind/severe thunderstorm event that pounded the area, particularly in Saratoga County, last February. That storm turned out to be the most convectively active February storm ever. The bottom line is that while our winters feature mainly ice and snow, severe thunderstorms can occur at just about any time of year.

BLACK ICE – THE INVISIBLE DANGER

Joe Villani
Meteorologist, NWS Albany

There are a number of weather hazards during the winter season that cause problems for drivers. Snow, sleet and freezing rain are all familiar occurrences throughout eastern New York and western New England, and most people are aware of the dangers associated with these types of wintry precipitation. And it's usually not challenging to be able to determine if roads might be slippery, since we can usually see when snow, sleet or freezing rain is falling on the ground, or hitting our windshields. On the other hand, black ice, equally as dangerous, is virtually invisible. It occurs mainly when weather conditions become clear and tranquil.

Let's take a closer look at black ice, and define what it is. Black ice is relatively clear ice that forms on ground surfaces, usually due to snow melting and re-freezing. Since it's almost invisible, it's difficult for drivers to recognize when it's covering a road. A ground surface that appears dry, but assumes slightly varying shades, might reveal the presence of black ice. When in poorly lit areas, black ice is nearly impossible to spot, and can cause serious, and possibly fatal, automobile accidents, particularly for the unwary. On roadways where black ice may be present, you should slow down, and avoid excessive braking. Also, make sure to leave plenty of space between your vehicle and the one in front of you. Many winter driving accidents occur as a result of motorists failing to use extra caution and to anticipate potentially hazardous road conditions.

Now we will discuss a few situations that are favorable for black ice formation. Even after a sunny day, black ice can cover a road. Snow mounds may melt after a day in the sun, with water trickling onto roadways, and re-freezing after sunset. Thus, drivers should never let their guard down, even if there's been no recent occurrence of wintry precipitation. Another way black ice can form is when it rains or snows during the daytime or evening with air temperatures just above freezing (32º F), with temperatures falling below freezing after sundown. While air temperature is an important factor in the formation of black ice, it's ground surface temperature that's the key indicator of black ice potential. Even when air temperatures are below 32º during the day, road surface temperatures may still be well above freezing. However, as soon as the sun sets, road temperatures can drop rapidly, causing a quick formation of black ice. People should be aware of black ice, especially during the evening, overnight and early morning hours when the air temperature is near or below 32º.

Not only do motorists need to be concerned about black ice, but so should pedestrians be concerned. Slipping on black ice while on foot can result in serious injury. I've had my own run-in with black ice. Back in college one evening, I slipped in a parking lot, on pavement that looked essentially dry. Fortunately for me, I landed on my back, avoiding serious injury. A friend of mine, however, wasn't so fortunate. He slipped on black ice on the steps just outside of his apartment, tearing his Anterior Cruciate Ligament, which then required surgery. So, as you can see, black ice can be very hazardous to people on foot, too.

In summary, perhaps snow, sleet and freezing rain get all of the headlines during the winter season, but black ice is a hidden danger that can be just as dangerous, to both drivers and pedestrians alike.

WHERE DID ALL THE HURRICANES GO?

Ingrid Amberger
Climatologist, NWS Albany

The 2006 Atlantic Hurricane Season was predicted to be above normal. The initial forecast issued in May was for 13-15 named storms, of which 8-10 would be Category 1 or 2 hurricanes, and 4-6 would be major (Category 3+) hurricanes. The updated forecast issued in August reduced the numbers to 12-14 named storms, 7-9 being Category 1 or 2 hurricanes, and 3-4 being major hurricanes. The season ended near normal with 9 named storms, 5 being Category 1 or 2 hurricanes, and 2 being major hurricanes. A normal season has 11 named storms, 6 Category 1 or 2 hurricanes, and 2 major hurricanes.

In June, Tropical Storm Alberto formed, and in July, Tropical Storm Beryl. In August, there were 3 storms, including the first hurricane of the season: Tropical Storms Chris and Debby, and Hurricane (Category 1) Ernesto. In September, the climatological peak of the hurricane season in the Atlantic basin (Figure 1), four storms formed, including the season's three major hurricanes: Florence, Gordon and Helene (all Category 3), and Isaac (Category 1).

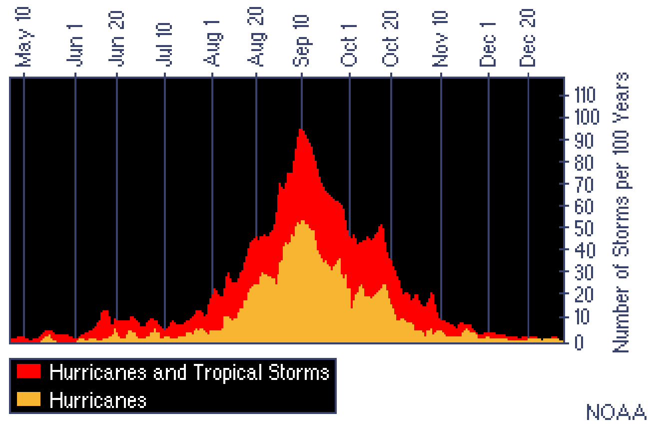


Figure 1

So what happened? First, we need to review the ingredients necessary for the formation of tropical cyclones: 1) a pre-existing surface disturbance with thunderstorms; 2) warm ocean temperatures of at least 80 degrees Fahrenheit to a depth of 150 feet, and; 3) relatively light winds aloft (low vertical wind shear). (Refer to Figure 2.)

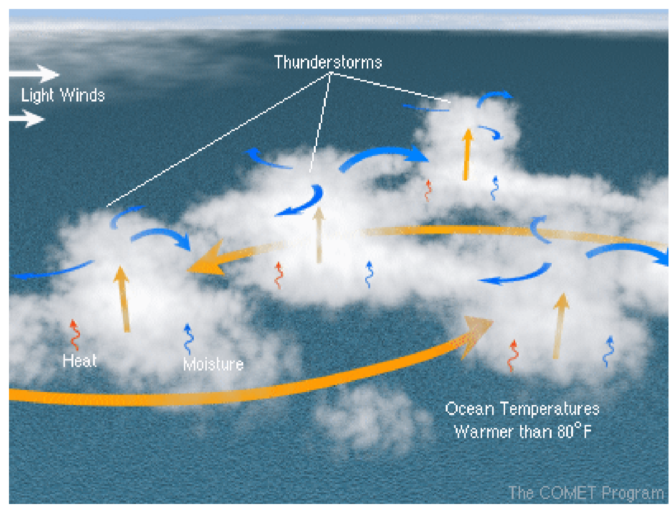


Figure 2

The vertical wind shear played a vital role in the 2006 season. If the winds aloft remain relatively light (little or no wind shear), the tropical cyclones can remain intact and continue to strengthen. However, strong wind shear inhibits development by tearing (shearing) storms apart. There are two types of vertical wind shear: directional and speed. Directional wind shear is the change in wind direction with height (Figure 3), and speed wind shear is the change in wind speed with height (Figure 4).

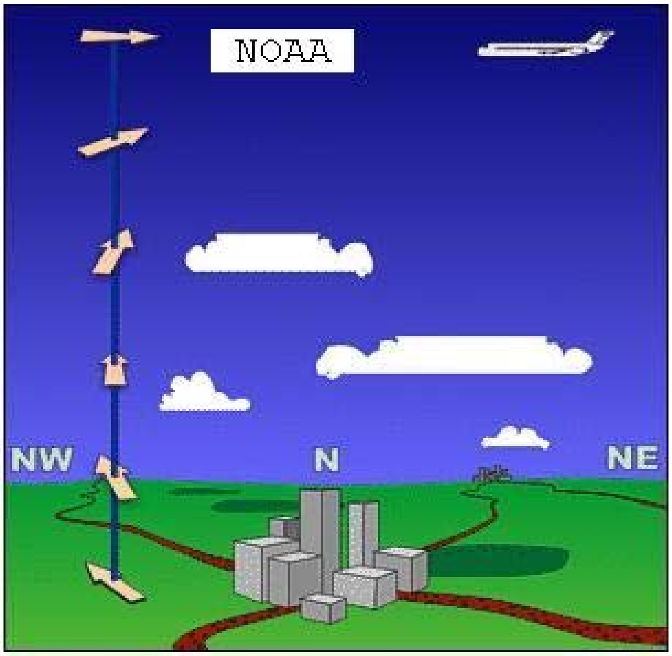


Figure 3

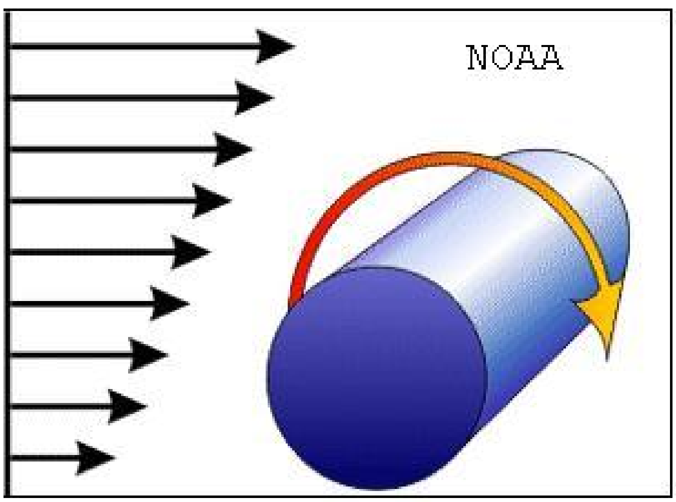


Figure 4

In September, scientists at the NOAA Climate Prediction Center reported that El Niño conditions had developed in the tropical Pacific. The El Niño developed quickly, and the atmosphere responded rapidly. El Niño is the large-scale ocean-atmosphere climate phenomenon linked to a periodic warming of sea surface temperatures (SST) across the central and east-central equatorial Pacific. This warming influences pressure and wind patterns across the tropical Atlantic (Figure 5).

Figure 5

During El Niño, the easterly trade winds (winds along the equator that blow from east to west) weaken, allowing warm water in the western Pacific to migrate eastward across the central and east-central equatorial Pacific (Figure 6).

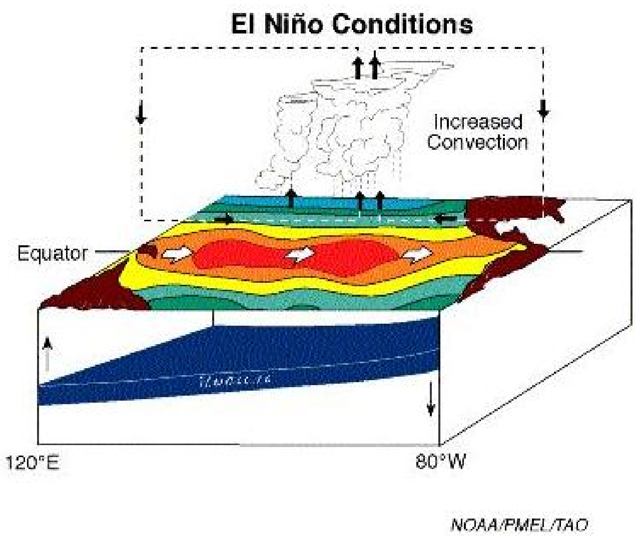


Figure 6

The top image in Figure 7 shows the average sea surface temperatures for the week, centered on September 20, 2006. They had warmed to 28-30 degrees Celsius, or 82-86 degrees Fahrenheit. The bottom image shows the anomalies, and departures averaging about one degree C above normal. This warming causes major shifts in the patterns of tropical precipitation, pressure and winds, and these changes affect the position and intensity of the jet streams, which affects the storm tracks and weather across the United States.

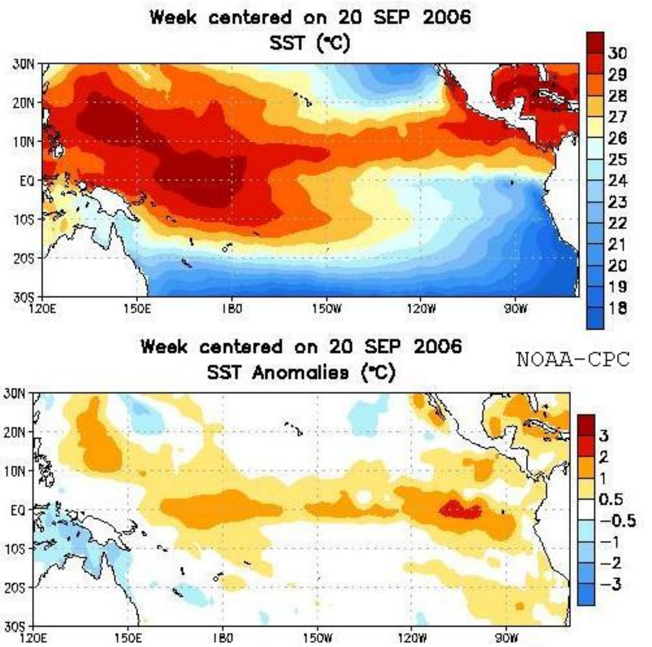


Figure 7

El Niño, combined with the large-scale weather over the eastern United States, produced prolonged sinking air in the mid and upper levels of the atmosphere in 2006, and wind shear over the Atlantic Ocean, Gulf of Mexico and Caribbean Sea was higher than anticipated. These conditions minimized thunderstorm activity, which inhibited tropical cyclone formation. Tropical cyclone tracks were kept away from the United States, as low pressure dominated along the east coast. (Refer to Figure 8.)

Figure 8

EL NIÑO: WHAT IS IT, AND WHAT IMPACTS CAN IT HAVE ON OUR WEATHER?

Kevin S. Lipton
Meteorologist, NWS Albany

This winter, many climate and weather experts will be using two words rather frequently-*El Niño*. That's because there's indeed a moderate El Niño episode underway across the central and eastern Pacific Ocean, and it's currently forecast to persist well into the late winter, and possibly, early spring months. But what exactly is 'El Niño', and how can it affect weather conditions here in the northeast? These are just a couple of the issues that will be addressed here.

An El Niño episode actually refers to a pool of abnormally warm water that develops across the central and eastern equatorial Pacific Ocean, as shown in Figure 1, and it usually occurs roughly every 3 to 7 years. The exact cause of an El Niño episode is still up for debate, but one of the key factors is weaker than normal easterly trade winds across the equatorial Pacific Ocean, which allows warmer water from the west to propagate eastward. Under normal conditions, these trade winds are keeping warmer water entrenched in the western equatorial Pacific Ocean, allowing cooler water to progress eastward, and upward from a lower depth, reaching the surface somewhere in the eastern Pacific Ocean. However, when these easterly trade winds weaken (or even reverse), as during El Niño, the pool of very warm water that piles up across the western Pacific Ocean is what shifts eastward. When the water temperatures across a large portion of the central and eastern Pacific Ocean become abnormally warm for several months, an El Niño episode is considered to be underway. Although many might think this warmer than normal water would be welcome, it actually can have an adverse effect on sea life, since warmer water tends to hold less oxygen and other vital nutrients than colder water. This reduction in oxygen can cause a significant loss of sea life. The warming can further adversely affect the larger ecosystem across the eastern Pacific Ocean. Other animals, such as birds, rely on fish for food, and a decrease in the fish population can then lead to either a reduction in the bird population or a change in migratory patterns for birds who may be forced to search for food elsewhere. Over the centuries, Peruvians have noted that these events have had a tendency to begin in late December, near Christmas, hence giving them the Spanish name 'El Niño', for 'Little Boy/Christ Child'.

As for weather, this aforementioned warming during El Niño also tends to shift weather patterns around over the Pacific Ocean and other parts of the globe, as the overall energy exchange between the ocean and lower atmosphere is altered. One pronounced change is that thunderstorms, usually associated with low pressure over the normally warmer waters of the western Pacific Ocean, shift eastward, in association with the eastward displacement of the warmer water below. This can then alter the jet stream that lies north and east of the Pacific Ocean, which the continental United States is downwind from. In general, during an El Niño episode, the jet stream often 'splits' over the eastern Pacific Ocean, with one stream entering southern Canada, and the other, sometimes referred to as the subtropical jet stream, traversing the southern United States, and bringing stormy weather to such places as California and Texas. In addition, as the frequency of storms coming in from the Pacific Ocean increases during the winter months, increasingly mild air is often drawn into the U.S. and Canada, which also results in a reduction in the amount of cold, continental air normally present at still higher latitudes. So, milder winters are often the result, particularly across the northern Plains, Great Lakes states and southern Canada. Of course, this doesn't guarantee that there'll be no snow or cold throughout the winter months – it just favors less snow and cold than would normally be expected across these regions.

So, what about the northeast? Well, the intensity and northward extent of the warming diminishes somewhat, but statistics do show that at least some of this warmth reaches the northeast states. Some more memorable winters that were heavily influenced by El Niño episodes include the winters of 1982-83 and 1997-98, the latter episode of which is considered one of the strongest ever recorded. Although these winters tended to be rather mild in the northeast, they also had locally heavy snow associated with them. In fact, in Albany, the total snowfall for the 1982-83 winter was 75.0 inches, while for the 1997-98 winter, it was 52.3 inches. Normal annual snowfall for Albany is 62.7 inches. Thus, despite warmer than normal temperatures, snowfall can be quite variable across the northeast during winters in which an El Niño episode is occurring.

The expectation of the current El Niño to persist through this winter is heavily weighted in the forecast of winter-season temperatures across the United States as depicted by the Climate Prediction Center of NOAA. As can be seen in Figure 2, the odds are largely in favor of temperatures averaging above normal levels for the period December through February (this 3-month period being referred to as either 'meteorological winter' or 'climatological winter') across much of the northern Plains and Great Lakes region. These odds diminish somewhat over the northeast states, but still lean in favor of above normal temperatures. Interestingly, the odds of warmer than normal temperatures are much lower over the southeastern U.S. This is due to the fact that above normal cloudiness and rainfall normally associated with an active southern branch of the jet stream typical during the winter months in El Niño episodes is expected to keep this region a bit cooler than would normally be expected.

So, the next time you come across the words 'El Niño', you should now have a basic understanding of what it is, and how it may impact the weather across the U.S. Via your computer, you can keep tabs on the status of the current El Niño episode by going to: CPC: Expert Assessments - ENSO Diagnostic Discussion. At this site, you can access the latest reports, and obtain current water temperatures and other climate information for the central and eastern Pacific Ocean.

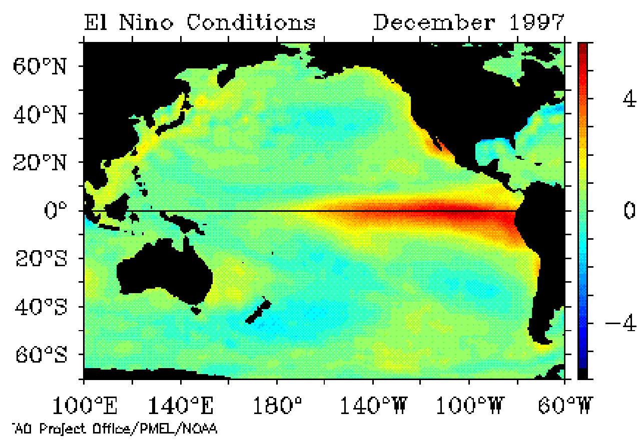


Figure 1. Anomalies in sea surface temperatures associated with an El Nino episode.

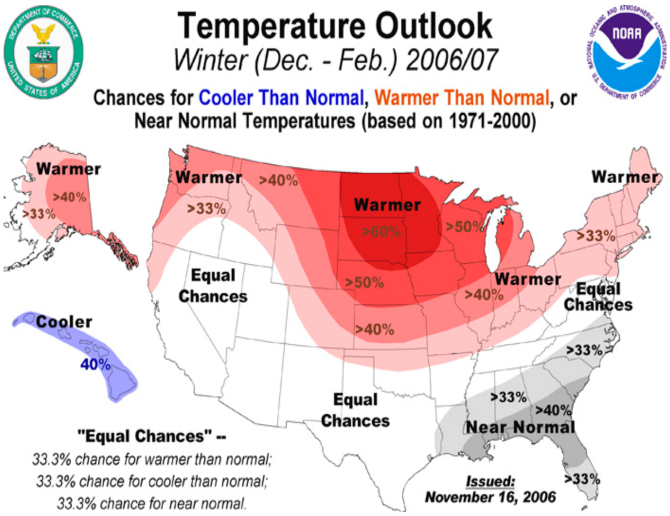


Figure 2. Climate Prediction Center Temperature Forecast for Winter 2006-07.

THE 'NO SNOW' FALL OF '06

Evan L. Heller
Climatologist, NWS Albany

The Fall of '06 wasn't an especially dry season, but above normal temperatures, particularly during November, resulted in a greater ratio of rain to snow amounts than can normally be expected in Albany during autumn.

The season climatologically opened September 1st, with temperatures that were within a few degrees of normal during the first week. Thereafter, general day-to-day temperature variations increased. This trend was most profound during the last three days of the month when the mean daily temperature dove from 65.0º to 47.5º. When averaged out in the end, September was, all-in-all, a pretty normal month, with its average daily mean temperature of 61.1º being just 0.5º above normal. This figured from an average daily high temperature of 70.0º, 1.3º below normal, and an average daily low of 52.2º, 2.3º above normal. The precipitation, too, was in the ballpark of normalcy. The 3.87" total rainfall for the month was just 0.56" above normal. Almost half of this total (1.83") fell during the 29th, breaking the previous daily precipitation record for the date of 1.65" from way back in 1874.

The warmest days in September were the 9th and 18th. The mean temperature was 69.0º both days. These same two days also recorded the same high temperature for the month…80º. The mildest low temperature occurred on the 14th, however, when the mercury got down to only 61º. The coldest day of September was, not too surprisingly, the 30th, the mean (mentioned in the paragraph above) being the result of the date also having the month's low reading of 35º, and the month's low maximum temperature of 60º.

Rain days were scattered about during September, with rain falling on 14 days, on 12 of which it was measurable. A tenth of an inch or more occurred during 8 days, 0.25" or more on just 3 of these, and 0.50" or more on 2 of those. There were 10 clear, 14 partly cloudy and 6 cloudy days in September, and a thunderstorm occurred on the 9th. Dense fog occurred on the 6th, 12th, 15th, 16th, 18th and 22nd. The peak wind speed was 39 mph, from the west southwest on the 9th. The average wind speed for the month was 5.6 mph, the windiest day, the 28th, with an average wind speed of 11.8 mph. The calmest day was the 12th, with an average wind speed of 1.1 mph.

October split the difference with September on mean monthly temperature, winding up being 0.5º below normal. The average high and average low both wound up being even closer to normal for October than they had gotten for September. The 58.5º average high for October was 1.2º below the mark, while the 39.0º average low was just 0.2º above normal. More significant was the amount of precipitation received. The 4.95" total was 1.72" above normal. This total amount included two days with an inch or more, both of which established new daily records for their respective dates of occurrence. The maximum daily amount for the month of 1.60" on the 28th broke the 1.51" record from 1987, and the 1.02" total on the 1st broke the 1.00" record from 1966.

October was a see-saw kind of a month as far as daily temperatures go. The warmest day of the month was the 4th, with a mean daily value of 63.5º, but the warmest reading for the month occurred on the 9th, and it was 77º. The high minimum temperature was 53º, on the 18th. The growing season officially ended on the 13th when the temperature dipped below freezing for the first time. The coldest day of the month, with a mean of 38.0º, was the 27th, and the low reading of the month also occurred on the 27th, it being 26º. The low maximum temperature for the month of 47º first occurred on the 23rd, and was repeated again on the 24th and 26th. Days dipping to freezing or below numbered six, and October marked the 2nd consecutive month with no temperature records.

Precipitation fell during 15 days in October, on 11 of which it was measurable. A tenth of an inch or more fell during 6 days, with 0.25” or more on 5 of these, and 0.50” or more on 4 of those. There were 13 clear, 10 partly cloudy and 8 cloudy days. There were no thunderstorms, and dense fog occurred on the 1st, 3rd, 4th, 7th and 8th. The peak wind speed was 48 mph, from the west southwest on the 29th. The average wind speed for the month was 6.9 mph, and the windiest day was also the 29th, with an average wind speed of 19.7 mph. The calmest day was the 8th, with an average wind speed of just 0.3 mph.

November was, by far, the most above-normal of the three months for temperature. The 44.6º monthly mean was 5.4º above normal. This tied the 8th warmest November, was the 7th warmest mean maximum November, and the 9th warmest mean minimum November. And both the average high and average low for the month were just as much above normal. For the former, it was 52.6º, 5.1º above normal, and for the latter, it was 36.6º, 5.8º above. Despite this fact, nine days of the month were actually <u>below</u> normal. Precipitation-wise, November was the most normal of the months, but the precipitation did not translate to snow. The 3.13” total was 0.18” below normal, and there were no precipitation records. The first trace of snow occurred on the 2nd, and additional traces fell on the 3rd, 4th and 19th. For the 4th, this resulted in a record tie for the date, with the previous trace of snow on the 4th having fallen just two years prior. The trace for the month is 5.1” below normal.

The warm day of the month was the 16th. The mean temperature was 61.0º. This was also the date with the only daily temperature record for the season. The 71º high reading broke the previous record high for the day of 70º, established in 1990. The high minimum temperature reading for the month actually occurred on the very last day, and was the highest minimum temperature since September 28th. The 21st was the coldest day in November, with a mean temperature of 32.5º, but the coldest reading occurred on the 25th, when the mercury dipped to 22º. The low maximum temperature for the month was 39º, on the 20th. There were a total of 10 days during which the mercury dipped to freezing or below.

There were 16 days of precipitation in November, and it was measurable on all but 3 of those days. A tenth of an inch or more fell during 6 days, with 0.25” or more on 4 of these, and 0.50” or more on 3 of those. The 8th was the month’s inch or greater rain date, with a 1.04” total. The 30 days of November were split evenly three ways amongst clear, partly cloudy and cloudy days. There were no thunderstorms, and dense fog occurred on the 15th and 26th. The peak wind speed was 40 mph, from the south on the 16th. The average wind speed for the month was 6.4 mph, and the windiest day was the 17th, with an average wind speed of 13.5 mph. The calmest day was the 15th, with an average wind speed of just 0.6 mph.

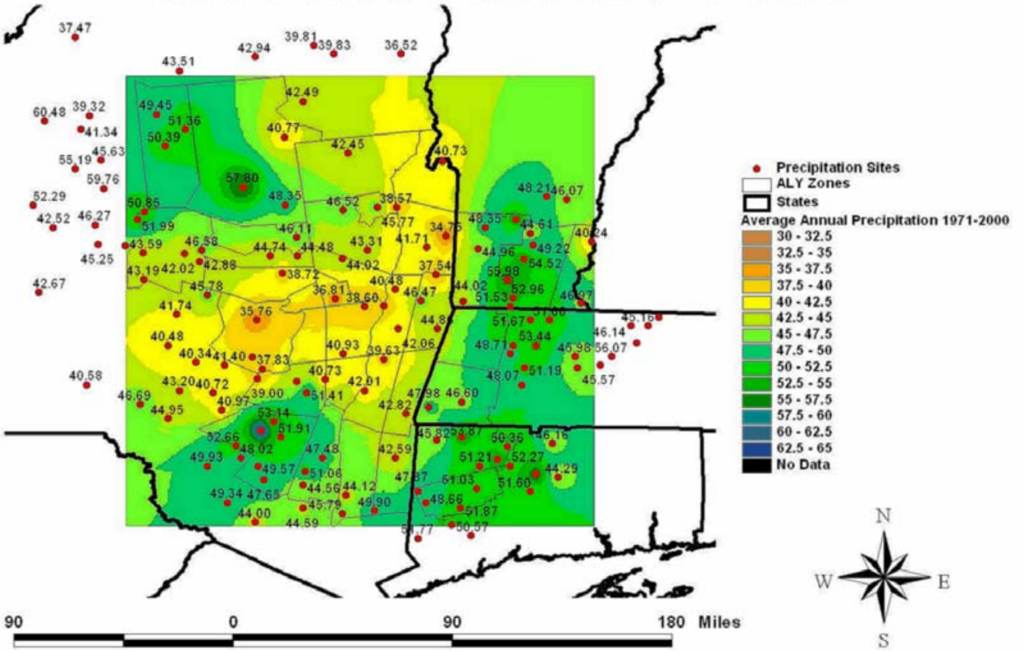
So, the average high temperature for the season was 60.4º, and this was 0.9º above normal. The average low of 42.6º was 2.8º above. This resulted in a seasonal mean of 51.5º, 1.8º above normal. The 11.95” seasonal precipitation total was 2.10” above normal, and the scant trace of snowfall was 5.3” below normal.

30-YEAR NORMAL RAINFALL AND SNOWFALL MAPS

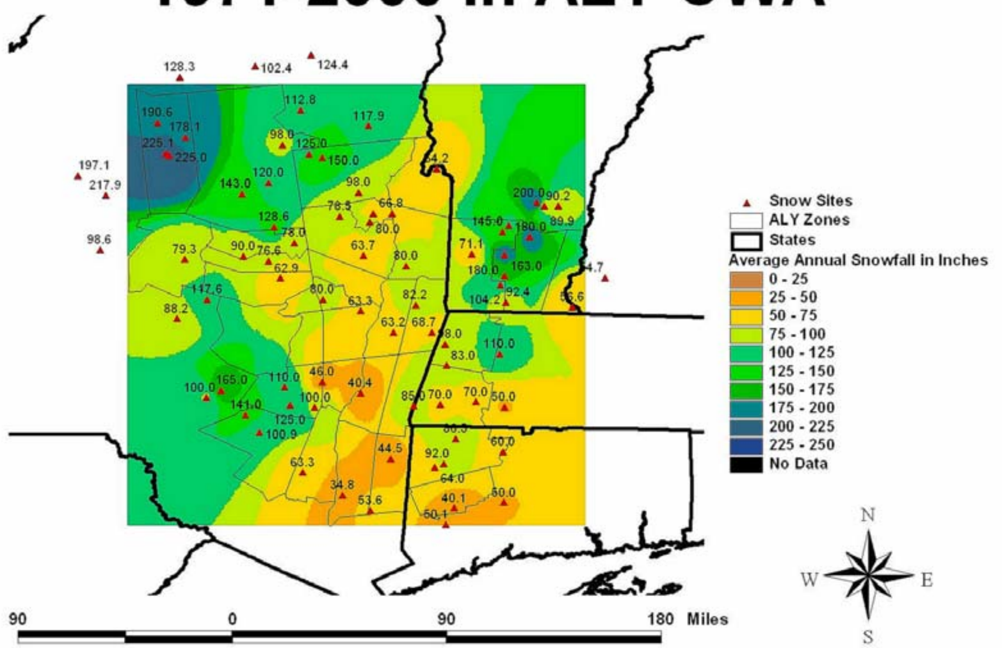
John S. Quinlan
Senior Meteorologist, *NWS Albany*

Many of you are probably interested in precipitation normals in your area, but have had difficulty finding data. Using Geographical Information Systems (GIS) to analyze precipitation data within the Albany County Warning Area over the latest 30-year climatological period (1971-2000), it has been possible to create maps of 30-year normals for rainfall and snowfall. The maps follow on the next page. The units are in inches, with the warmer colors representing lower amounts, and the cooler colors representing higher amounts. An examination of the data reveals that the location receiving the most precipitation is Slide Mountain, with 63.61 inches of water equivalent annually, while the location having the least is Salem, with 34.75 inches. The location with the most snowfall is Old Forge, with 225.1 inches of snow annually, while the location having the least amount of snow is Poughkeepsie, with 34.8 inches. These maps are also scheduled for inclusion on our webpage in the near future.

Average Annual Precip. in Inches 1971-2000 in ALY CWA



Average Annual Snowfall in Inches 1971-2000 in ALY CWA



WINTER HYDROLOGY

Steve DiRienzo
Service Hydrologist, NWS Albany

Winter weather poses a significant challenge to the monitoring and forecasting of the Albany area's hydrologic conditions. There are several reasons for this, including: ice on the rivers that may jam; floats in stilling wells that become frozen in ice; ice that forms in lines that use pressure to monitor river stage, and; the presence of ground frost. Many precipitation gages don't do a good job measuring the liquid equivalent of snowfall, and so, snow surveys to measure the water contained within ground snow pack are important.

River ice will form when water temperatures drop to near freezing, and the daily average air temperatures remain below freezing. The daily average, or mean, temperature is simply the daily high temperature plus the daily low temperature, divided by 2. For example, if today's high temperature was 36°F, and the low temperature was 14°F, the average temperature would be 25°F. River ice can cause a multitude of problems, including unrepresentative river stage readings, and ice jams.

Ice jams come in two basic varieties: freeze-up and break-up. Freeze-up jams usually occur in early to mid-winter during extreme cold weather. According to local studies, it takes 3 consecutive days with daily *average* temperatures below 0°F to get freeze-up jams. This type of cold weather usually occurs only across the northern part of the Albany Forecast Area. For break-up jams to occur, ice of around one foot thickness is necessary, with a daily average temperature of 42°F or more. Water rising due to rain or snowmelt breaks up the ice into large chunks which can jam under bridges, or at bends in the rivers.

Ice jams tend to recur at preferred locations, and they can lead to river flooding. Water can back up behind a jam, which acts like a dam, flooding property along the river. This temporary ice dam may break suddenly, sending a wall of ice and water downstream, which can result in flash flooding. In addition, the ice itself may physically damage or destroy property along the river as it scrapes its way downstream.

Ground frost is another product of cold weather. Frost in the ground develops when soil temperatures cool to near freezing, and daily average air temperatures are below freezing. Extreme cold weather, with little or no snow on the ground, will lead to deep frost depths. Such ground frosts can lead to water main breaks, as water freezes in the pipes. Another problem when the ground is frozen is increased runoff from rain or snowmelt. Frozen ground increases the chance that rain and/or snowmelt will lead to flooding or flash flooding.

As mentioned earlier, snow surveys to measure the water equivalent of snow on the ground are important. Snow, when it melts, acts like rainfall, and even without rain, melt from a deep snow pack can cause flooding. Many of our cooperative observers and cooperators provide the National Weather Service (NWS) with ground Snow Water Equivalent (SWE) measurements. The NWS will occasionally make SWE measurements during the off weeks, and in areas not covered by our cooperators and observers.

Spotters and cooperators, as always, are an important link between the NWS and ground truth information. The U.S. Army Cold Regions Research and Engineering Laboratory River Ice Guide can be found at: http://www.crrel.usace.army.mil/ierd/tectran/IEnews15.pdf.

River ice can be reported to the Albany NWS office at: http://cstar.cestm.albany.edu:7775/Hydrology/hyd_forms/ICE_REPORT.htm. Any and all reports of river ice and ground frost depths are always appreciated.

A VISIT TO THE ALBANY INTERNATIONAL AIRPORT TOWER

Hugh Johnson
Meteorologist, NWS Albany
and
Evan L. Heller
Meteorologist, NWS Albany

On Thursday, December 7th, six meteorologists from the Albany Forecast Office paid a visit to the FAA tower at Albany International Airport (ALB), as part of an outreach field trip arranged by NWS Albany's Aviation Program Leader, Hugh Johnson.

Inside the tower building, FAA Specialist Susan Zurlaski gave us an hour-long tour, which started with a stop inside the radar room. There, several individuals track aircraft either arriving within five miles of the airport, or departing until they reach an altitude 10,000 feet. One of the controllers was curious as to why we contact them for approval prior to any balloon launch, even though our Forecast Office is a good four miles from the airport. One of the meteorologists in attendance, NWS Albany's Upper Air Program Leader, Evan Heller, indicated that because upper air balloons show up unidentified on aircraft radar, this protocol was negotiated between our office and the FAA operations in Albany as a security measure borne out of 9/11. One of the controllers told us that, due to Marginal Visual Flight Rules (MVFR) weather conditions moving into the area, General Aviation air traffic was very light on this day. Using radar displays, controllers can determine an aircraft's flight number, type, airspeed, altitude, and a number of other things, when approaching, and while within, ALB's airspace. The radar screens also show precipitation in six intensity levels. They're also good at revealing approaching thunderstorms and thunderstorm gust fronts. Hugh wanted to know if they make good use of our Terminal Aerodrome Forecasts (TAFs). They affirmed that they are indeed utilized, and found to be very useful. Overall, they expressed satisfaction with the accuracy of our TAFs, whilst also understanding that they cannot be designed for 100 percent accuracy. After all, weather is not an exact science.

Susan then took us to the top of the tower, which involves an elevator climb to a certain floor level inside the building, followed by a further stair climb into the tower operations area, where three more controllers were on duty when we arrived. On a clear day, a beautiful panorama affords controllers views as far north as the southern Adirondacks of New York, and 40 miles east, to Mount Equinox, in southern Vermont. The closer Helderbergs and northern Catskills are even more readily viewable. Unfortunately, due to the MVFR conditions on this day, most of the mountains were obscured from view. One of the controllers gave us a real-time computer-screen view of the numerous current incoming flights from busy airports like John F. Kennedy International in New York, and O'Hare International in Chicago. We all found it amazing that there would be so many inbound and outbound flights in progress at once that involved just ALB and these two other airports. Then he pointed out how many aircraft were presently on final approach to ALB from anywhere - just one! Hugh wondered how many total flights typically arrive and depart on any given day. The answer: between 200 and 600! And yet, this is but a tiny fraction of the number seen at the busier hub airports of larger cities! We were also able to see the ALB Automated Surface Observing System (ASOS) equipment just off to the side of one of the runways.

The airport has two runway strips, 01/19 and 10/28. Runaway 19 is the preferred runway, as it has approach lights and an Instrument Landing System (ILS). It has 6,000 feet of usable runway for landing, and up to 7,600 feet for take-off. At the opposite end, Runway 01 is preferred when the wind is blowing from a northerly component. Runway 28 had recently been extended to 8,500 feet, but with still no approach lights. However, this runway is a preferred departure runway. Runway 10 is not especially preferred for landing, because on this runway, an aircraft is forced to land coming over a knoll a short distance behind the approach end of the runway. If a westerly wind should happen to kick in, which is a fairly common occurrence, this knoll can effect a bit of a stall. The friction imparted by this knoll tends to force the wind to slow and slope downward, adversely affecting an incoming aircraft by forcing it to also slow and dip. Also, because of this issue, the touchdown point is extended further up the runway, reducing the usable runway distance for landing in this direction. The threshold for switching from Runway 19 to Runway 28 is a change in wind to a westerly component, blowing at a speed of 10 knots or more. The controllers keep close tabs on the winds, and also use our TAFs to plan ahead. They also receive our Airport Weather Warnings (AWW) off a nearby fax machine. These AWWs warn of impending hazards to aircraft, such as thunderstorms, high winds, heavy snow and freezing rain.

Susan escorted us back downstairs, and the tour concluded. We thanked her for a 'tour well done', and also thanked all the controllers for taking the time to speak with us. It was an educational, fun and enlightening experience for all.

WHAT HAPPENS TO BUGS IN WINTER?

Kevin S. Lipton
Meteorologist, NWS Albany

As the weather gets colder, and the days, shorter, we usually see fewer and fewer bugs around outside, until finally one day – they all seem to be gone. But where did they go? Perhaps they've taken cover inside our warm homes until the balmy weather returns come spring.

Insects, like snakes, are cold-blooded. This means that their body temperatures are dependent on the temperature of their environments. This is different than for warm-blooded animals, such as humans, whose bodies strive to maintain relatively steady internal temperatures, independent of the surrounding environment. Thus, for insects, cold weather can severely impact their daily lives, even to the point of causing death. So, with this sensitivity to external temperatures, how in the world can insects survive the winter? Well, different insect species have their own ways of coping with colder weather. One method of coping is by simply migrating to a warmer location. But only some species of winged insects can do this. Butterflies are one type of insect that migrate to warmer climes. For example, the Monarch Butterfly migrates to areas of northern Mexico in the winter, and other types of butterflies migrate to areas of the southern United States.

Another way in which some insects survive the winter is by slowing their activities down to a dormant state. This state is known as 'diapause'. During this state, insects are inactive – all activities are temporarily suspended. Insects neither grow nor develop in this state, and their metabolic rates are kept just high enough to barely keep them alive. This is essentially a 'hibernation' state. Additionally, insects deplete much of the water content from their bodies, diminishing the chances of them freezing to death. Perhaps more interestingly, many hibernating insects actually build up glycerol in their bodies during the fall, which acts as an antifreeze during the cold winter months.

Honeybees cluster tightly together in hives during winter months, vibrating their wing muscles to keep the temperature of the hive warmer than the outside. Where do they get the energy to do this? From the honey they collect during the warmer months!

Many other insects remain alive throughout winter via a process known as 'overwintering'. There are various ways in which they accomplish this. Immature larvae, like caterpillars, for instance, overwinter by sheltering themselves under heavy covers of leaf litter, while grubs tend to burrow more deeply into the soil. Other insects overwinter as nymphs, existing in a smaller, immature form of their parents. These nymphs sometimes overwinter in the waters of ponds and streams, even beneath ice. They can even feed and grow during the winter months. Some of these nymphs include dragonflies and stoneflies, as well as springtails. In fact, springtails can sometimes be seen on the snow pack during relatively mild days in winter. Their hopping motion gives them the nickname 'snow flea'.

Several other insects and insect-like creatures overwinter inside eggs which are deposited by adults during the fall. Spiders, for instance, lay their eggs in fall, with the spiderlings remaining encased in egg sacs until the warm weather returns. Of course, the easiest way for an insect to overwinter is by seeking shelter in a warmer environment, which many spiders and ladybugs do during the late fall when they enter homes.

Needless to say, insects do not simply disappear when the colder weather arrives. Although many do not survive the long, harsh winter, many insects do remain alive, only in a less active state, becoming more active when spring returns. Or, they simply move to a more conspicuous location. So, if you're ever wondering where all the bugs have gone, just look a little closer, and you might find them! But don't expect them to move terribly fast.

ALBANY HOSTS SKYWARN EC WORKSHOP, CREATES SKYWARN AWARD

John S. Quinlan
SKYWARN Coordinator, NWS Albany

The Weather Forecast Office at Albany, New York held its Fall 2006 SKYWARN Emergency Coordinator's meeting on November 18, 2006. Myself, SKYWARN Program Leader; Ray O'Keefe, WCM, and; Stephen DiRienzo, Service Hydrologist, hosted 16 representatives from the SKYWARN Emergency Coordinator (EC) community. The SKYWARN EC Workshop was attended by representatives from the following Counties in the Albany Forecast Area: Albany, Berkshire, Columbia, Greene, Herkimer, Litchfield, Montgomery, Rensselaer, Schenectady, Schoharie and Warren, and by representatives from the State of Connecticut. The workshop focused on the typical major winter weather threats in the Albany FA (ice storms, nor'easters, blizzards, lake effect snow and high winds), and on winter hydrology. Presentations were given on winter weather hazards, major winter flood events, and ice jams. In addition, a presentation was given by Tim Long, Schenectady County SKYWARN EC, on the Schenectady Amateur Radio

Association's (SARA) ice jam monitoring program on the Mohawk River. And Herkimer County SKYWARN EC Hank Crofoot gave a presentation on SKYWARN operations within his county.

WFO Albany has decided to create a SKYWARN Award to honor the memory of our late Data Acquisition Program Manager, and avid amateur radio enthusiast, Steve Pertgen. The Stephen R. Pertgen Memorial SKYWARN Award will be created in the near future to annually recognize an Outstanding SKYWARN Volunteer. This award, consisting of a small plaque, will be given to the recipient. In addition, a memorial consisting of a plaque with a picture of Steve, and brass name plates of the recipients, will be hung on a wall in the lobby of the National Weather Service Forecast Office in Albany. The plaques will be designed by Hank Crofoot.

WCM Words

Raymond G. O'Keefe
NWS Albany Warning Coordination Meteorologist

What a great StormBuster Edition! We have contributions from seven different NWS Albany authors. Lots of great articles here. I didn't know about the diapause state for bugs. I hope you enjoy reading StormBuster. If you have comment, please pass them along to me: raymond.okeefe@noaa.gov.

This fall the National Weather Service in Albany trained over 100 Skywarn spotters. For the 2006 year, over 500 Skywarn spotters have been trained. Starting this spring, we provided winter training during our severe weather sessions. Although, the winter season is off to a slow start, remember when the snow flies to report your snowfall information to us. Snowfall reports are *very* important during and after the event.

Finally, have a Happy and Safe Holiday Season.

From the Editor's Desk

The holiday season is upon us once again. And if the fall season was any indication of what we're in for this winter, it could wind up feeling like a relatively short season. We have a number of articles dealing with our recent unusually non-winter-like weather, and other interesting winter weather-related topics. This is perhaps our biggest regular issue of Northeastern StormBuster to date. I'd like to thank all those who've made these generous contributions, as well as my team partners, Ray O'Keefe and Ingrid Amberger, for helping get this and every issue of Northeastern StormBuster out to you. Enjoy the reading, have a pleasant holiday season, and we'll be back with more informative and entertaining reading in the spring.