STORMBUSTER

A Newsletter for Emergency Managers & Storm Spotters

Spring Edition, 2003

The NWS goes Digital

By Dave Zaff

For over 100 years, National Weather Service (NWS) forecasters have prepared and disseminated official text forecasts. For nearly 50 years, the public Zone Forecast Product (ZFP) has served as the flagship in a large suite of text products. There are over 120 ZFPs created by forecast offices around the country, which are issued two to four times per day and updated more often when necessary. The ZFP describes forecast weather over county-sized areas for 12 and 24 hour periods of time out to seven days into the future.

Starting in October 2003, each NWS office will begin issuing digital forecasts with a 5 km resolution and high temporal resolution through 7 days. These forecasts will be a small subset of the National Digital Forecast Database (NDFD). From this national product, a variety of text products will still be generated by computers, including the ZFP. However, the basic digital nature of the forecast, as created by the forecaster, will allow users to interrogate individual points for specific weather elements.

The NWS Albany office is already using the Interactive Forecast Preparation System (IFPS) to produce digital datasets, which in turn are used by the computer to create a large set of text products, including the ZFP. Early graphical examples from the IFPS include the "Revised Digital Forecast" (RDF), viewable on the Internet as Graphical Forecast Tables, and several experimental graphics that depict weather across our service area in 2 dimensional images.

To view the RDF, visit our home page at http://www.erh.noaa.gov/aly/, and click on the point on the map you are interested in. Scroll down the page to the bottom of the current conditions section and click on "Graphical Forecast Table" to see the RDF for the point on the map where you clicked. To view the experimental graphical forecasts, from our home page, scroll down past the map of forecasts and click on the thumbnail map of our service area labeled "Experimental 2D Graphical Forecasts"

However, this is only the beginning. The NDFD will greatly expand the potential for user access to NWS data. As an example, a user (or vehicle) with a Global Positioning Systems (GPS) will soon be able to request hourly temperature forecast for the next 24 hours, or a complete worded forecast through 7 days at an exact point or latitude and longitude. As another example, via the Internet, users will be able to request various forecast formats at a point or set of points. Such formats include, but are not limited to: regular ZFP-like worded forecasts, tabular forecasts (similar to the RDF), or meteograms.

There are other uses for NDFD. Users will soon be able to obtain weather information along a path, and forecasts in other languages. "Smart appliances" (heating and cooling systems, or irrigation), will be able to interrogate the NDFD and alter their cycles in preparation for changing weather patterns. Since everything the NWS does is public domain, the data will also be available for custom applications development by private companies.

Some of these ideas will take some time to develop. However, like the RDF and other products on the Internet, many are already being demonstrated operationally in an experimental mode, and will be available within the next few years.

What is an "El Nino" Winter in the Northeast?

By Hugh Johnson

This past winter, which was colder and snowier than normal, included the warm phase of the El Nino/Southern Oscillation (ENSO), with a current of warm Pacific water migrating toward the coast of Chile. In contrast, five winters ago, our region was subjected to one of the strongest El Nino currents on

record. That winter was much milder. In fact, the winter of 97-98 was one of the mildest on record with a seasonal snowfall totaling only about half of the nearly 100 inches we had to dig out from this past winter. How could the same El Nino current bring such a drastically different type of winter to our area? The answer can be found in the many factors (including El Nino) that might alter the polar and subtropical jetstreams.

The Pacific is a vast ocean, by far the biggest on earth. The El Nino current only encompasses a small fraction of the total area of the Pacific Ocean. Scientists have discovered a much broader area of temperature anomalies covering a much larger portion of the ocean, called the Pacific Decadal Oscillation (PDO). While not as dramatic as the warmer, and more intense El Nino current, the PDO lasts in excess of a decade, sometimes up to thirty years! The PDO has two distinct cycles, warm and cold. We were in a warm cycle of the PDO from the late 70s to the mid 90s. During this time frame, winters in the Northeast were generally drier and milder and the hurricane seasons during the late summer and fall were less active. The PDO turned cold in the late 90s, for the first time in 20 years. When the PDO is in the "cool" state, positive ENSO or El Nino episodes are not as frequent, and when they do occur, not nearly as strong. Interestingly, the tropical storm season is also more active.

Waters in the eastern Pacific have a cold/warm cycle of their own, referred to as the Eastern Pacific Oscillation (EPO). A positive cycle usually means colder water near the Gulf of Alaska while warmer temperatures are found off the California coast. This setup allows for high pressure to reside to the west of California and low pressure further north. The flow between these systems tends to flood the country with relatively mild Pacific air. On the other hand, when the EPO is negative, high pressure builds over the Gulf of Alaska, forcing the polar jetstream to buckle downstream across the eastern half of the country, allowing for cold air masses to sink south. The EPO has been positive since the last El Nino episodes, and indeed those winters were all milder than normal. This winter, the EPO fluctuated at first, but switched to negative by January.

Another consideration in the overall circulation is the behavior of temperatures in the North Atlantic Ocean. While much smaller than the Pacific, the North Atlantic Ocean undergoes two phases of its own and is, of course, a lot closer to us. When the waters are warmer than average in the mid latitudes of the North Atlantic, and colder both near the north pole and equator, the North Atlantic Oscillation (NAO) is in a positive phase. In this phase, a strong low pressure tends to become stationary between Iceland and Greenland while high pressure sets up shop near the Azores. The low serves as a pump, pushing all the bitterly cold Canadian air masses away from North America. Also, during a positive phase, both the polar jetstream and subtropical jetstream tend to separate and flatten, both factors not conducive for the development of nor'easters.

In contrast, during the negative phase of the NAO, colder temperatures are found at mid latitudes, while relatively warmer waters migrate toward both the north pole and equator. On the weather map, high pressure is found between Iceland and Greenland, with low pressure to the south. The high, often referred to as the Greenland Block, acts like a huge rock in the stream (in this case the prevailing westerlies). Frigid arctic air is blocked from exiting North America. At the same time, the polar and subtropical jetstreams are forced to turn northeastward along the coast, an important ingredient for the formation of nor'easters.

This past winter, the NAO was in its negative phase. The moderate El Nino produced a series of powerhouse subtropical jetstreams which, in turn, aided in the development of potent storms originating in the Pacific. These storms migrated across the country, then redeveloped off the eastern seaboard. Due to the Greenland block, the storms were forced to hug the coast and produced blockbuster snow and ice storms throughout the winter. Research has shown an El Nino winter, along with a negative NAO, produces some of the best blockbuster east coast storms on record.

Winds in the stratosphere, 12 miles over the Pacific, tend to switch direction every couple of years. During the past year, these winds blew from a westerly direction. A westerly direction has been shown to favor a negative NAO during El Nino winters. This cycle of changing stratospheric winds is referred to as the Quasi-Biennial Oscillation (QBO). During the previous El Nino winter of 97-98, the NAO was positive, the EPO was positive and the QBO was negative (producing easterly winds aloft) which is why that winter was very different from the past one.

A lot more research needs to be done to fully understand how the circulations in the ocean and atmosphere interact, so we can accurately forecast them. However, scientists already know that a strong

partnership exits between the two. Our current El Nino has been weakening, as it usually does during the early spring. The jury is still out on whether El Nino will return next winter. However, as you can see, the characteristic of our winters is determined by a lot more than just the El Nino.

The Cold Snowy Winter of 2002-03

By Hugh W. Johnson and Evan L. Heller

December 2002 began on a cold note in Albany, with the first eleven days of the month much colder than normal. In fact, our coldest night of the month, with a low temperature of 4° Fahrenheit, occurred on the morning of the 9th. A very small amount of snow kicked off the month in Albany, but the region's first major snowstorm of the season took place on the 5th, with the heaviest snowfall accumulations well south of Albany. Poughkeepsie picked up 8.8" of snow, while Albany received around 3. A second snowstorm, from the evening of the 11th through the morning of the 12th, was the result of a more potent nor'easter, and dumped more than a foot of snow on portions of the northern Catskills and the Mohawk Valley. To the south, it was more of an ice and sleet storm with just a few power outages. Albany received just over 6" of heavy wet snow on top of a little sleet and ice. After this second storm, temperatures averaged above normal from the 12th through the 16th, allowing much of the snow to melt, especially in valley locations. An Alberta Clipper on the 16th brought even more snow, followed by much colder temperatures from the 17th to the 19th. Thereafter, average temperatures remained above normal through month's end with only the 27th colder than normal. The mildest reading was 51° on the 20th. Freezing rain in the Lake George region that day turned into rain showers by later in the day as temperatures climbed.

The big story for the month was the Christmas Day Storm. An unusually potent nor'easter formed in the southern branch of the jetstream and exploded as it slipped off the New Jersey coast Christmas Day, continuing on to east of Cape Cod. This storm rewrote the history books. The 19.2" of snow that fell Christmas Day shattered the old record of 13.8" set in 1978. The melted water equivalent of 1.79" was a new record for the date as well. Christmas 2002 is now our whitest ever. The storm ended early the next day. Albany's storm total of 21.0" made it the 4th greatest December snowstorm on record, the 9th greatest snowstorm ever, and the heaviest snowfall since the Superstorm of 1993. Even more snow fell in the Mohawk Valley, with 34" at Cedarville, in Herkimer County. The majority of snow from this storm fell in about a 15 hour period. An intense band of snow, producing snowfall rates of up to 5 inches per hour, fell for several hours across the Mohawk Valley east into portions of the Greater Capital District. Wind accompanied the storm, producing near-blizzard conditions across the higher terrain. The New York Thruway was closed for a while between Albany and Syracuse.

December 2002 averaged 27.0°, exactly one degree below the thirty-year normal. It was a wet month in general, with 3.97" of rain and melted snow, 1.21" above normal. The 33.2" snowfall total made this the 5th snowiest December on record. December 2002 is Albany's 16th snowiest month of all-time.

The New Year rang in mild with some showers. Our warmest reading for January, 41°, took place right after midnight. From that point on, it was all downhill. Later on New Year's Day, the third major nor'easter of the winter season was underway. What started out as a cold rain turned into the worst ice storm of the winter for many. Ice over half an inch thick brought down trees and power lines across the higher terrain. While the ice storm was not as bad in valley locations, there were still problems such as spotty power outages. As the air turned colder, the freezing rain changed to sleet and, eventually, snow. Most places experienced only a minor accumulation of snow, about an inch or two. Before anyone could fully recover from this storm, the winter's second biggest snowstorm took aim on our region. For some folks, however, it was actually bigger than the Christmas Day storm. Another nor'easter churned up the coast on the 3rd and 4th. While this storm was not as potent as the Christmas day one, it moved much slower, bringing over 30 hours worth of continuous snowfall to the region. The snow came down heavy at times, at a rate of up to 3 inches an hour, and even included some thunder in the Gloversville area. Much of the time, the snow fell lightly. Even so, Albany recorded a 20.8" total, which made this storm the second greatest January snowstorm on record, and the 10th greatest snowstorm ever. Also, it was only the second time in Albany history that two 20+ inch snowstorms fell during any one winter season. Two new daily snowfall records, 12.0" on the 3rd and 8.8" on the 4th, were established, as was the daily melted precipitation record of 1.51" on the 4th. Since the lion's share of this storm fell over the weekend, disruptions to businesses and transportation were minimized. But this storm did bring destruction.

It produced little wind, except over the higher terrain of Litchfield and Berkshire Counties. In most other areas, the lack of wind coupled with the fact that the snow was rather wet, allowed huge amounts of snowfall to accumulate on the already glazed-over evergreen trees, bringing them or their limbs down onto power lines, and resulting in power losses to as many as 30,000 residents, mainly in the towns of New Scotland and Guilderland. The unusually heavy snow load also caused some roofs to collapse. After this storm, the remainder of the month was quiet as far as major snowstorms were concerned. But the combination of lake-effect snow and a seemingly endless supply of Alberta Clippers produced measurable nuisance type snowfall through the 13th. Measurable snow fell 13 days in a row, and measurable precipitation, beginning on the 29th of December, fell for 15 straight days! If one counts a trace as a precipitation event, Albany endured 21 consecutive days of precipitation from December 28th through January 17th! The most noteworthy lake-effect event produced 18" of snowfall near Old Forge, Herkimer County on the 11th and 12th. An event on the 20th produced less snow, nevertheless, the whiteout conditions were enough to close the New York State Thruway west of Utica for a time.

A polar vortex over eastern Canada strengthened and began hurling one arctic air mass after another our way through the balance of January. For the first time since February 8th, 2000, the temperature dipped below zero, late on the 17th. Then, by sunrise on the 18th, Albany had bottomed out at 12° below zero, the coldest reading since 1996, though not a record. Many other places were a lot colder, as low as minus 30°! The month saw a total of 10 temperatures zero or below, with -12° being the coldest, occurring on both the 18th and 28th. Interestingly, in spite of the cold, no new records were set. A major deep freeze took place from the 10th to the 31st, as the temperature in Albany remained below freezing for 22 consecutive days. This was a tie for the 7th longest deep freeze ever. Two periods of three or more consecutive days of low temperatures of zero or below, once known as cold waves, occurred from the 17th to the 19th, and again from the 21st to the 24th.

January averaged 15.5° (5.7° below normal), the coldest January in 9 years, and a tie for the 22nd coldest month in Albany since official Weather Service records began in 1874. Precipitation totaled 3.45", 0.74" above normal. The snowfall totaled 32.2", making this the 6th snowiest January, and the 18th snowiest month, on record.

February began with a brief thaw across the region, and a little rain. The first five days averaged above normal, with the 2nd remaining above freezing all day long. But the ground hog wasn't fooled by this. He saw his shadow and promptly retreated. Little did we realize that he had correctly predicted six more weeks of winter, practically to the day! The thaw was indeed over with by the 5th. The region managed to escape with little flooding. Another deep freeze followed from the 10th to the 18th, including 3 mornings of sub-zero minimums, a cold wave from the 14th to the 16th. The only record daily temperature of any kind for the entire winter was established on the 16th when the high reached only 4°, a low maximum record. The President's Day Storm, the last major winter storm of the climatological season, followed on the 17th. One to two feet of snow fell across most of our region, with 12.9" the official tally at Albany. Yet another daily snowfall record occurred, on the 17th, with 11.9" of new snow recorded. Because the third blockbuster snowstorm of the season also fell on a holiday, transportation disruptions were minimized. After the storm, temperatures climbed back above freezing for several days, reaching 47° on the 21st, the mildest reading for the month. Some rain followed on the 22nd, but again, it was not enough to produce any significant flooding. Mercuries tumbled back below freezing after that, bottoming out at 3° below zero on the 26th. That gave Albany a total of 4 below zero mornings during the month of February, with 6° below being the coldest of them, on Valentine's Day. February, as a whole, averaged 21.1°, nearly 4° below normal, putting it in a tie for the 86th coldest month of all-time. It was the 5th consecutive month with below normal temperatures, and the season came to a close as being the coldest winter in 9 years. Precipitation for the month was 2.15", very close to the normal of 2.27". The snowfall for the month was 16.7", only slightly higher than normal.

As of this release, our official snowfall total for the snow season (July 1st-June 30th) was 97.7", making it, thus far, the snowiest season in over 30 years, and the 4th snowiest on record. Albany has had a continuous snow cover since Christmas day, while many places across the higher terrain have not seen bare ground since way back on November 16th! The average temperature for the season was 21.2°, 3.0° below normal, and the precipitation total of 9.57" is 1.74" above normal.

WCM Words

by Dick Westergard

StormBuster is a newsletter primarily for our trained SkyWarn spotters. Reader articles, or suggested topics, are always welcome. Do you have any ideas? Drop me an e-mail or a snail mail note.

The usual reminder of what we'd like you to call us about during the convective season, (May through October) the reporting criteria are - 1) Tornadoes, water spouts, funnel clouds, wall clouds. 2) Damaging Winds (58 mph or more). 3) Any hail. 4) Damaging lightning. 5) Flooding, including bankfull or near bankfull streams. 6) Measured rainfall - 1.5 inches or more in 4 hours.

Get your reports to the National Weather Service by the quickest means possible. Possible communications links include: Amateur Radio, the 800 number you were given at your training, and the "Severe Weather Report" form on the internet at: http://cstar.cestm.albany.edu:7775/Severe_WX

Due to the high cost of printing and mailing hard copies, StormBuster is now exclusively an electronic newsletter. If you, or any of your friends who are spotters do not have home access to the web, let me know. I will try to find a local public access point where they can view StormBuster. If you, or any of your friends who are spotters, have any difficulties viewing this electronic version, please drop me an e-mail. If you or a friend do not currently get e-mail notification when StormBuster is posted, please drop me an e-mail. I'll be happy to add more names to my e-mail list of spotters.

E-Mail: **RICHARD.WESTERGARD@noaa.gov**

Spring SkyWarn Classes Scheduled

by John Quinlan

Seventeen Spotter Training sessions are scheduled during April and May. Pre registration is required, in order to avoid exceeding the capacity of the particular venue. You can register on line by visiting our home page at: **http://www.erh.noaa.gov/aly/** and clicking on the "Spring Skywarn Training Sessions" link at the top of the page. If you do not have internet access, you may also register by calling 518-435-9580, and selecting menu option 7. The dates and locations are:

Bennington, VT - April 5, 10 AM to Noon
Bennington Free Library - 101 Silver St.
Schoharie, NY - April 10, 7 to 9 PM
Training Rm Public Safety Facility - 1 Depot Lane
Kingston, NY - April 15, 7 to 9 PM
Hose #5 Fire House - 830 Ulster Ave.
Fonda, NY - April 16, 7 to 9 PM
County EMO Office - 74 Broadway
Herkimer, NY - April 17, 6:30 to 8:30 PM
911 Center near Herkimer County Comm. College
Ballston Spa, NY - April 19, 10 AM to Noon
Fire Training Center - 6010 County Farm Rd.
Torrington, CT - April 24, 6:30 to 8:30 PM
City Hall 2nd Floor Auditorium - 140 Main St.
Averill Park, NY - April 29, 7 to 9 PM
Sand Lake Town Hall - 8428 Miller Hill Rd.
Fort Edward, NY - May 3, 10 AM to Noon
Office of Emergency Services - 383 Broadway
Townshend, VT - May 6, 6:30 to 8:30 PM
Grace Cottage Hospital - Route 35
Johnstown, NY - May 7, 7 to 9 PM
County Fire Training Center - 133 Sun Valley Rd.
Schenectady, NY - May 10, 9:30 to 11:30 AM
McChesney Room, County Library - Clinton St.
Pittsfield, MA - May 13, 7 to 9 PM
Emergency Management Office - Tyler St.
Queensbury, NY - May 14, 7 to 9 PM
Warren County Municipal Center - Route 9.
Albany, NY - May 13, 7 to 9 PM
CESTM 1st Floor Auditorium - 251 Fuller Rd
Hudson, NY - May 19, 7:30 to 9:30 PM
John L. Edwards Elementary School - State St.
Indian Lake, NY - May 21, 6:30 to 8:30 PM
Town Hall Assembly Room - Pelon Rd.