STORMBUSTER

A Newsletter for Emergency Managers & Storm Spotters

Summer Edition, 2003

The Cool Cloudy Spring of 2003

by Evan L. Heller

Climatologically speaking, the Spring of 2003 started off close to normal in Albany, but the monthly trend was toward increasingly lower than normal temperatures and sunshine, and increasing precipitation. It was also a season of well below normal severe weather and thunderstorm activity.

March kicked off the climatological spring season with wildly meandering daily temperatures. Low temperatures varied by as much as 26 degrees from one day to the next, high temperatures by as much as 21°. The high temperature for the month was 67°, on the 25th, while the low was -2°, on the 3rd. One more sub-zero reading, the last for the season, was set on the 7th, when the low reached -1°. Temperatures failed to exceed the freezing mark on the 3rd, 6th, 7th, 10th and 14th. The only daily record established for the month was a low maximum temperature of 20° on the 10th. The monthly average of 34.4° was only slightly below the normal for the month of 35.0°.

Precipitation occurred during 14 days in March, totaling 2.26", significantly below the normal for the month of 3.17". The most precipitation recorded during any given day was 0.55" , on both the 20th and 29th, the latter being part of the month's only event to produce over an inch of rain in one storm. There were 5.2" of snow. This was about half of the normal 10.2" for March. The most snow, 2.4", fell on the 13th. Greater amounts of snow fell during a winter storm which affected areas south of Albany on the 5th and 6th. As much as 8" was recorded in Dutchess County with that event, and this was preceded by freezing rain, which caused numerous accidents.

There were 7 completely sunless days during March, but this was well balanced by 7 days of 90% or greater possible sunshine. Thus, the 52% average possible sunshine minutes for the month was only 2% below the normal.

There was no severe weather during the month, but warming temperatures, high snow packs and significant rainfalls combined to produce minor flooding in the Albany area from the 19th to the 24th. Around one inch of rain on the 29th and 30th resulted in more minor flooding again to round out the month.

During April, the increasing lack of sunshine and the cooler than normal temperatures in Albany had become more apparent. The 44% of possible sunshine received was compared to the 54% normal for April. There were 11 days which were completely free of the sun, while only 5 days experienced 90% or greater possible sunshine minutes. In fact, the only day with the full amount of possible sunshine was on the 28th. The lack of sunshine must have assisted with keeping the temperatures below normal.

There were just 11 days in April during which the average daily temperature was above normal. Even so, while the average temperature for the month in Albany of 44.5° was 2.1° below the normal of 46.6°, it wasn't extreme enough to crack The Top 10 chart of coolest April temperatures. The warmest daily temperature reading was 86 degrees on the 15th, establishing a new record high for the date. The coldest reading was 13° on the 1st, the last day of the season below 20°. Temperatures failed to exceed the freezing mark on the 4th and 7th. A high temperature of only 29° on the 4th established a daily record for low maximum temperature for the date.

Precipitation for April totaled 2.89", slightly less than the normal 3.25". The wettest period was the first 5 days of the month, when nearly 2 inches of rain fell at Albany, but the greatest amount in one calendar day was 0.77" on the 26th. Precipitation occurred during 17 days of the month.

For the first two months of spring, there was no significant thunderstorm activity. A late-season winter storm produced significant ice and snow accumulations across eastern New York from the 4th to the 5th.

Albany caught the eastern edge of this system, picking up just shy of 3" of snow. The greatest amount of snow in one day, however, was 1.7" on the 7th. A trace of snow fell on the 24th, the last snowfall of the season. The 5.6" total for the month was exactly twice the normal for April. Areas in the Adirondacks picked up well over a foot of snow with this system. A strong backdoor cold front passed through the region on the 16th, creating a significant wind event, which broke up ice on Lake George and sent it into the sides of boats and docks, causing extensive damage.

Who knew May would be even more dismal than April? But with far greater than normal rainfall, and far lower than normal sunshine in Albany, it was. Normally, May is the sunniest of the three months of Spring, averaging 56% of the possible number of sunshine minutes. But the actual amount was only 37%, just two-thirds of the normal. There were four days with no sunshine, and five with 90% or more of the possible minutes, but 20 days had less than 50%. Although no official records are kept, this is likely one of Albany's Top 10 cloudiest Mays.

Adding to the gloom was the rainfall. Rain occurred on 19 days in April. Six days recorded over a half an inch of rain, the most, 0.88", occurring on the 11th. The total for the month was 5.08", well above the 3.67" normal.

Temperatures for the month averaged 56.8°, 1.3° below normal. The high temperature was 81°, on the 19th; the low, 31, on the 4th. This was the last freeze date of the season. There were no new daily records established.

There was only one significant severe weather day during the entire season. On May 1st, a line of thunderstorms moved into the Adirondacks and Mohawk Valley, producing strong winds and extensive property damage. A weak tornado was reported in Tribes Hill, Montgomery County. The activity had wound down considerably before reaching the Albany and Mid Hudson Valley regions. In Albany, thunderstorms also occurred on the 2nd and 11th. Other highlights of the month included: flooding produced from heavy rains and the last of the snow melt in the Helderbergs of western Albany County on the 13th and 14th, and; late frosts/freezes just west and north of Albany on the mornings of the 17th and 18th.

The average temperature in Albany for the Spring of 2003 was 45.2°, 1.4° below normal. Precipitation totaled 10.23", 0.14" above normal. Snowfall totaled 10.8", 2.3" below normal. Sunshine minutes totaled 44% of possible, compared to the normal of 55% of possible.

Continuing Changes to Doppler Radar

by Thomas A. Wasula

The Weather Surveillance Radar - 1988 Doppler (WSR-88D), also known as the Doppler radar, or NEXRAD (Next Generation Weather Radar), was first used by the National Weather Service (NWS) in 1988. The WSR-88D was installed at the Weather Forecast Office (WFO) at Albany in the Fall of 1993, and commissioned for operational use in Spring of 1995. Updates are continuously being made to the algorithms used to create radar products. An algorithm is a repetitious mathematical procedure that computers utilize, for instance, to relate the amount of rain falling from a storm to the returning radar energy. Many meteorological algorithms are used in the computer programs in the Radar Product Generator (RPG). The RPG is located at the NWS at Albany. The crucial products created by these programs are called derived products. These derived products are only as good as the algorithms that generate them.

In mid-May, the NWS at Albany loaded a new software build of the RPG that contained a few new algorithms and derived products. A new Data Quality Assurance (DQA) algorithm is being used, which was created under the supervision of the Federal Aviation Administration (FAA), one of the federal agencies which partnered with the NWS in acquiring the WSR-88D. This algorithm is applied to the base reflectivity and velocity data generated at the Radar Data Acquisition (RDA) site. It helps identify and remove ground clutter and data artifacts (i.e., sun spikes on the radar at sunrise and sunset). This algorithm also helps improve the High Resolution Vertically Integrated Liquid (HR VIL) derived product. The HR VIL product is a measure of the amount of water in the atmosphere, and aids forecasters in hail forecasting. Another new product resulting from the new algorithm is a new user selectable Layer Reflectivity Maximum (LRM) product. The new LRM product allows forecasters to define ranges in altitude where hail may form, based on maximum reflectivity (returned radar energy strength) values in that layer. The minimum layer thickness can be 1,000 feet. For example, a lower layer would be 0-24,000 feet, a middle layer, 24,000 to 40,000 feet, and an upper layer would be 40,000 to 70,000 feet. The mid-layer values will help determine where large hail potentially has formed. Forecasters can also glean significant storm structure information from this radar product, and spot areas of

icing or freezing precipitation. A new Digital Storm total derived Precipitation (DSP) product can now be used with 256 data levels to assist forecasters with radar rainfall estimates.

A new Hodograph product will provide wind direction and speed versus height information, so that forecasters can assess the potential for organized convection.

Finally, in this current software upgrade to the RPG, an enhanced and corrected version of the Radar Echo Classifier (REC) algorithm was installed. The REC algorithm generates clutter likelihood reflectivity and clutter likelihood Doppler velocity values, essentially making scientific estimates of where radar returns are questionable, and adjusting them accordingly. These values in the respective derived products will display lower values in areas of meteorological returns, thereby reducing the effects of non-meteorological radar energy reflectors.

In the future, several new products will be employed by the RPG of the WSR-88D at the NWS at Albany within the next few years.

There will be some new Volume Coverage Patterns (VCP's) that will significantly impact forecast operations. VCP's are the preset scanning strategy schemes and radar beam pulse lengths which forecasters can select to maximize the usefulness of radar information in a variety of meteorological situations. For example, a convective precipitation VCP produces 14 elevation angles in 5 minutes (less gaps in data with more angles to capture the vertical extent of thunderstorms), and a stratiform VCP produces 9 elevation angles in 6 minutes (focused in the lower elevations to capture widespread precipitation).

The NWS will be implementing 3 new VCP's within the next two years.

VCP Gamma will be used in situations of deep convection. It will produce 14 elevation angles of radar data in 4.1 minutes. It will provide better sampling of data at lower elevations near the ground, so critical low-level features in severe weather, such as tornadoes, can be seen better. More cells will be identified from one complete volume scan to another. VCP Gamma will also provide better estimates of rainfall and snowfall due to discrete sampling near the ground. Its installation is expected in 2004.

Two new algorithms expected in the spring of 2004 are a rapid update of the Tornado Detection Algorithm (TDA) at each elevation angle, and an improved Mesocyclone Detection Algorithm (MDA) to spot rotation within storms. The MDA will contain an attribute table of various parameters, a trend table, and critical time-height cross-sections. Severe weather analysis of individual thunderstorms will become more detailed and precise.

Two more VCP's are expected in the Fall of 2004. VCP - Beta will identify shallow convection well. It will capture "distant storms" better at the edge of the radar coverage area, work well with stratiform precipitation, and produce 12 elevation angles from 0.5° to 8.1° in 5 minutes. VCP Delta is called the future " fast evolution" VCP. It will be utilized primarily in severe weather situations. It will produce 6 elevation angles (0.5° to 6.5°) in 2.3 minutes, and is expected to better detect weak, short-lived tornadoes of the F0-F1 variety.

Finally, a Machine Intelligent Gust Front Algorithm (MIGFA), and a Snow Accumulation Algorithm (SAA), will be implemented in 2004 and early 2005. The MIGFA will be FAA sponsored, and will help pinpoint the positions of gust fronts. The algorithm will use velocity and reflectivity data to detect the gusts fronts. The derived product from this algorithm will help in both severe weather and aviation forecasting. The SAA will generate hourly snowfall and water equivalent products. User selectable time frames for snow and water equivalent amounts, as well as storm total snowfall amounts, will be available.

Overall, these ongoing algorithm updates will continue to evolve and enhance radar products, resulting in ever improving warning and forecast services.

WCM Words

by Dick Westergard

Spring SkyWarn classes were a success, with over 300 spotters trained. The names have all been entered into the database, and we are getting ready to print ID cards. Those who attended the sessions can expect to receive their new cards no later than early August.

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 May through October convective season - 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

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