



# THE *Ithacation*

**The Cornell Chapter of the American Meteorological Society  
Newsletter**

**Volume 6, Issue 3**

**February 2003**

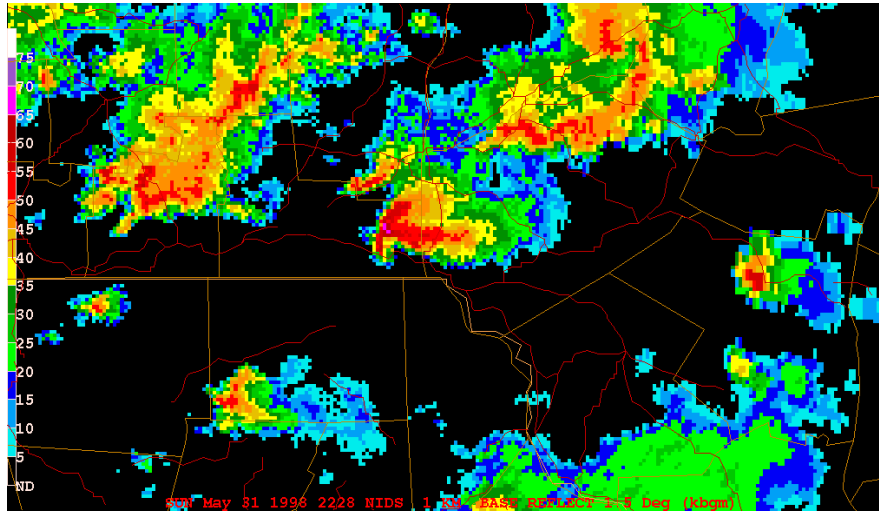
## AMS Annual Meeting - Week in Review

The 83rd Annual Meeting of the American Meteorological Society was held in Long Beach, CA on 9 - 13 February. This year's meeting was attended by over 2,500 individuals from all fields of meteorology, including many students. Some of the topics of this year's symposia and conferences included: Satellite Meteorology and Oceanography; Interactions of the Sea and Atmosphere; Education; Global Change and Climate Variations; The Fujita Scale and Tornado Damage Assessment; and Atmospheric Chemistry. Also held were the Second Annual Student Conference and a symposium to honor Drs. Robert and Joanne Simpson, who are both pioneers in many fields of meteorology, particularly tropical meteorology.

At the annual awards banquet, several local meteorologists were honored for their diverse contributions to the field. Dr. Wilfried H. Brutsaert of the Cornell School of Civil and Environmental Engineering was awarded the Jule G. Charney Award for "fundamental and far-reaching contributions to our understanding of the linkages between Earth's atmosphere and land surface." Dr. Brutsaert's research has included studies of hydrology, moisture transport, ground water mechanics, and many other microclimatology topics.

Also lauded was a team of meteorologists from the NWSFO Binghamton: Raymond Brady, Michael Jurewicz, David Morford, and Jeff Waldstreicher received the Award for an Exceptional Specific Prediction "for providing emergency management officials with accurate and timely warnings for the unusual outbreak of severe weather during 31 May - 2 June 1998." The outbreak of 1998 included several tornadoes in southern central New York and northern Pennsylvania, including a long-track F3 tornado

that cut through portions of Tioga, Broome, and Delaware counties. Thanks to the efforts of these diligent forecasters, no lives were lost in the outbreak.



*A tornadic supercell (center) moves through Broome County, NY on 31 May 1998*

All in all, the Annual Meeting was a great success, and a good time was had by all. Next year's meeting is scheduled to take place in Seattle, Washington on 11-15 January 2004. Hope to see you there!

## The Worst Central Massachusetts Nor' Easters

### **#1. Blizzard of '78**

The Blizzard of February 5-7, 1978 was the worst ever storm for southern New England. First, it caught people by surprise as they were expecting the storm to gradually push in throughout the day. But a wall of heavy snow blitzed the area late in the morning on the 5th. Most people were expecting a storm similar to that of January 20th, 1978, that had occurred just a couple weeks before. That storm dropped around 18-20 inches of snow in central MA but lacked the intense wind and snowfall rates of this storm. This gave people a false sense of security when meteorologists predicted another large storm. By the evening commute, most people knew they were in for trouble if they weren't already home by 4 or 5 pm. The snow fell at 3 to 4 inches per hour during the commute and cars began to get stuck and accidents started clogging the roads. Plows were now blocked off from clearing many of the main roadways and snow piled up around stranded

drivers. Some froze to death while trying to make it to safety in the blinding snow, and some got carbon monoxide poisoning as the snow buried their cars. Fortunately, most people eventually made it to safety. All told, 54 people lost their lives in Massachusetts.

Winds gusted to near 80 mph during the peak of the storm and drifted the snow up to rooftops. The storm stalled just southeast of Nantucket as it reached its peak intensity of 984mb on February 6th. A 1052mb high pressure was situated just north of Lake Superior making for a ridiculous pressure gradient that caused the high winds. Snow removal was a nightmare as there were already about 1-2 feet of snow on the ground in central MA before the storm started depending on the location making the streets already narrow with snow banks. Snowfall in central MA ranged from 20-36 inches with the highest amounts on the southeast side with 36 inches in Milford. Worcester airport officially received 20.2 inches with 27 inches on the SW edge of town. The storm gave Boston its single greatest storm total to date of 27.1 inches. To the east, the coastline experienced its worst damage ever from the high tides and 20 foot waves. Massachusetts' worst storm left its mark as the state was paralyzed for over week after the storm ended on February 7th to go along with \$500 million in damage.

*Plow trucks from Massachusetts turned around at the Rhode Island state line following the '78 storm.*



## **2. Blizzard of December 11-12, 1992 (the Downslope Nor' Easter)**

One of the most destructive Nor' Easters to hit New England is also one of the least recognized, mostly due to the lack of snowfall in the coastal cities and also because it was overshadowed by the March 1993 Superstorm later that winter. The storm didn't start off very ominously as a strong but not very cold high pressure slid off to the east in Nova Scotia while low pressure developed rapidly off the Virginia coast. Heavy rain

spread over much of central MA around daybreak on the 11<sup>th</sup>, with some snow in the highest elevations above 1,000 feet. The forecast was for rain to change to snow in the high terrain of central MA and with 6-12 inches of accumulation. As forecasted, the rain changed quickly to heavy wet snow across most of central MA late morning and began accumulating very quickly. But by 8pm, there was already close to 10 inches in Worcester and the storm wasn't close to being over. Meteorologists realized that evening that it was going to be a historical storm for this small area.

The strengthening low to the south along with the high moving off the coast to the northeast created howling due east to east-northeast winds, as opposed to more northerly winds, which upsloped into Worcester county and then downsloped into the Connecticut River valley to the west. This caused enhanced precipitation over Worcester county, but to the west in the valley, there was downslope warming and drying, hence giving the storm the nickname "Downslope Nor' Easter". The same phenomenon occurred over the Hudson River valley in the Albany area with the Berkshires to their east. A light rain fell in the valleys and heavy rain along the coast while heavy wet snow piled up in central MA overnight into the 12th. Central MA saw some of their worst winter weather conditions ever that night with 50-60mph winds whipping the heavy wet snow with gusts to 70mph. Off to the east; the coastline saw its worst damage since the Blizzard of '78. Most of the area lost power during the 12th as the weight of the wet snow dropped trees and powers lines everywhere.

The storm stalled about 100 miles south of Block Island on the 12th, finally pushed east that night and was gone by Sunday the 13th. The snowfall amounts and gradients were staggering. Worcester finished with 32.1 inches including 28.1" in 24 hours, while Springfield MA, just 40 miles to the west in the Connecticut River valley finished with no snow at all aided by the downslope effect. Other totals were 42 inches at Mt. Wachusett in Princeton and 36 inches in Paxton, which borders Worcester to the west. Even though the storm occurred on a Friday into Saturday, schools and businesses were shut down until Thursday the next week. While many people won't remember the December 1992 storm, the people in Central MA will never forget it.

### **3. April Fool's Day Blizzard 1997**

This storm is one that many of us who live in the Northeast remember, but it

treated central MA especially brutally. The rest of the winter had been mild and March the 30th was no different with highs well into the 50s and a few 60s in some spots. When meteorologists talked of a possible snowstorm for the 31st into April 1st, most people took it with a grain of salt and figured it wouldn't be that bad. It was almost April, after all. But the meteorologists would have the last laugh. Residents of central MA woke up to heavy rain on the morning of the 31st with temperatures in the middle 30s. But by 10am, Worcester had changed over to heavy wet snow and it started accumulating rapidly. Thunder and lightning accompanied the snow in early afternoon as the storm strengthened extremely rapidly east of NJ and then stalled for about 12 hours south of Martha's Vineyard when it reached its max intensity of 979mb. Winds of 40-50mph were common during the storm to go along with the heavy wet snow. Temperatures nudged just below 30F overnight to allow for the snow to accumulate much better.

From about 6pm the 31st to 6am April 1st, central MA saw probably its heaviest 12 hour snowfall on record. There were about 6 inches of snow on the ground by 6pm on March 31st, but by 6am on the 1st of April, Worcester residents awoke to 33 inches of snow on the ground to establish a new single storm record as the storm finally pulled away; a cruel April Fools joke to those who had enjoyed the mild winter. The only saving grace was that the snow melted quickly as warm April temperatures returned to the region a few days later. Other snowfall totals include 27 inches in Jaffrey, NH, about 35 miles north of the city; 30 inches in Shrewsbury; and 36 inches in Milford. To the east, Boston received 25.4 inches of snow to break their all time 24 hour snowfall record, making it their 2nd greatest single storm total behind the Blizzard of '78.

### **Honorable Mention:**

1. **Blizzard of 1888**- Central MA missed the worst of the storm on March 11-14, but the storm must have been pretty bad if they were spared with "only" 32 inches of snow in Worcester. The Hudson River valley in New York received 40-50 inches in what is widely considered the worst ever storm for the Northeast outside of New England.
2. **Valentine's Day Storm 1962**- A powerful coastal low tracked SE of New England and clobbered Worcester with 24.7'' of snow, with close to 30'' in some spots of central MA. Providence, RI also received its 3rd highest storm total of 18.9''.

3. **March 3rd 1960 Storm**- This was a huge storm that affected a large part of the country as it tracked out of Missouri, joined by a secondary low that exploded off the east coast and moved near Nantucket as an extremely powerful low. Central MA saw 20-30 inches, with 22.5 at Worcester airport. Interestingly, Nantucket Island, of all places, received 31'' even though the storm moved very near them. The storm developed so rapidly that it probably occluded as it reached Nantucket, allowing them to receive mostly snow. Boston saw 19.8'' for their 5th greatest single storm snow total.

4. **March 4-6 2001 "Media Hype Storm"**- Everyone who lives in the Mid-Atlantic region knows where the nickname for this storm came from. Just 36 hours before the onset of the storm, it looked like many of the major cities would get their biggest snowfall on record, only to have Washington and Philadelphia receive nothing. Boston managed only 9.8 inches. One of the few places where the forecast verified well was most of interior New England including central MA where Worcester received 22.1 inches of snow, with 31 inches in Paxton and 30 inches in Jaffrey, NH.

5. **March 1993 Superstorm**- The worst of this widely memorable storm was far west of central MA back into central NY and the Appalachians, where over 3 feet of snow fell in many spots. The coastal cities generally got less than 10 inches. But central MA actually fared quite well with 20.1 inches at Worcester airport and around 2 feet in several other locations to go along with winds gusting to 70mph at times causing plenty of tree damage. The storm passed just west of Boston at 960mb on March 13th causing most of southern New England to get dry slotted and precip to change to rain on the coast. Aided by some upslope on the strong ENE winds, central MA still experienced one of its worst storms. It was hard on the snow removal budget as just 3 months earlier had been the December 1992 storm. - *Will Schwartz*

## The Weather of 2002: A Topsy-Turvey Year

Severe drought, record snowfall, a near-category five landfalling hurricane, and a sparse tornado season were among the meteorological highlights of 2002. Here is a look back at the year's biggest weather stories:

## **A Very Snowy Start**

Although the winter of 2001-2002 will go down as one of the mildest on record for the nation, it nevertheless saw some major snow events (albeit not for Ithaca!). The year began with the final gasp of an extremely active period of lake effect snowfall in Western New York. One tradition carried on by the National Weather Service Buffalo office is to name each winter's lake effect storms based on a theme. This year's theme was birds, and this storm earned the moniker "Bald Eagle," and rightly so. From 24 December 2001 to 1 January 2002, steady snow bands produced by westerly winds blowing over Lakes Erie and Ontario dumped incredible amounts of snow on portions of Upstate New York. By the time it was over, parts of the Buffalo area had receive around 80+ inches of the cold white stuff, while portions of the Tug Hill region southeast of Watertown received upwards of 10 feet.

As Bald Eagle was winding down, another snowy situation was brewing in the Southeast. On 2 and 3 January, a center of low pressure formed over and moved out of the Gulf of Mexico. It was greeted by a blanket of cold air over the Southeastern states, and started dumping rain, ice, and snow. Although areas from Louisiana to Virginia were hit, the heaviest snow was confined to a narrow band in Central North Carolina, with Chapel Hill registering a foot and some rural areas reporting 14". Causing more far-reaching problems was a combination of 4.5" of snow accompanied by sleet and freezing rain in the Atlanta area, which was enough to shut down Hartsfield International Airport, making for nationwide travel headaches.

Snow totals for the 2001-2002 season were heavily biased towards the lakeshore areas, as per normal. The town of Highmarket on the Tug Hill was the big "winner" in New York with 291.3". The national (ground-level) winner was Marquette, Michigan on Lake Superior, which reported a whopping 319.8", far eclipsing their average of 184.5". Also of note was the 40.7" of snow that Mount Washington, New Hampshire reported in May of 2002. This was their third highest monthly total for the season, with only December and January's totals exceeding. Mt. Washington received a total of 320.6" for the season, barely beating out Marquette for the true national "golden snowball." At the other end of the snowfall scale, Central Park in New York City reported a meager 3.5" for the season, far less than their average of 22.4".

## **The Hot, Dry Summer**

For much of 2002, drought conditions were legion in the U.S. A huge ridge of high pressure over the Central U.S. dominated the weather patterns for much of the year, leading to severe to extreme drought conditions for several areas. Portions of the East Coast from the Carolinas to New Jersey and New York imposed water restrictions upon their residents, some of which were not lifted until near the end of the year. In the “breadbasket” regions, agricultural losses soared into the hundreds of millions of dollars, especially in the Great Plains. With many regions reporting rainfall deficits of three to six and as high as 10 or more inches, wildfires began to blaze. Devastating were fires in the Pacific Northwest, where Oregon reported 2,631 separate fires; and in Central Colorado, where the infamous Hayman fire near Denver burned over 200,000 acres, making it the largest fire in Colorado history. In sad irony, one of the few areas to escape the extreme drought was South Central Texas, which was battered by several tropical systems between July and October, resulting in a near-repeat of the devastating floods brought on by Tropical Storm Allison in 2001.

Heat also added to the agony of drought for many folks. For the Northeast, the summer of 2002 was not only hot but unusually humid as well, with dewpoints reaching as high as a staggering 77 degrees in Burlington, Vermont on 2 July. In the West, a heat wave that smothered the region from 7-14 July shattered over 500 daily maximum temperature records. Burns, Oregon registered its all-time high of 107 degrees on 12 July, and numerous other locations saw triple-digit heat as well. Other locations that reported all-time highs that summer were Bismarck, North Dakota (111 degrees on 29 June) and Reno, Nevada (108 degrees on 10 **and** 11 July). Not surprisingly, the summer of 2002 went down as the nation’s third hottest on record

## **Where Did the Tornadoes Go?**

2002 saw some tornado records broken, but they were, for the most part, underscored rather than topped. The first two months saw just 10 twisters. Oklahoma – which is normally a national contender in numbers of tornadoes – saw just 16 tornadoes during the entire year. The first tornado fatality occurred in Wayne City, Illinois in an F3 tornado on 21 April – the latest first tornado fatality in nearly 100 years. A preliminary estimate is that the U.S. received 840 tornadoes in 2002, which is the least counted since

1988. Like 1988, however, the strongest and deadliest storms held off until the seemingly most innocuous time: November.

On 10 November, a strong cold front aided by a tongue of unusually warm, moist air and a strong low-level meridional jet spawned a major outbreak of severe weather over much of the East-Central U.S. Along with widespread reports of wind damage and large hail, an estimated 70 tornadoes tore through the Ohio Valley and Southeast, resulting in about 35 fatalities. Among the hardest – hit areas was Van Wert, Ohio, where an F4 tornado ripped apart homes and killed two people. Also hard-hit were portions of Tennessee, including the towns of New Union, Crossville, and Mossy Grove, which all endured strong tornadoes. In Alabama, seven people died, mostly in mobile homes, as a tornado hit near the town of Saragossa.

The State of Maryland, still reeling from the violent College Park tornado of September 2001, experienced another bout of tornado activity on 28 April as an F4 storm plowed through the town of La Plata, southeast of Washington. The storm there killed five people and caused \$115 million in damages, and was followed by a spectacular family of waterspouts over Chesapeake Bay.



*A pair of waterspouts over Chesapeake Bay on 28 April 2002*

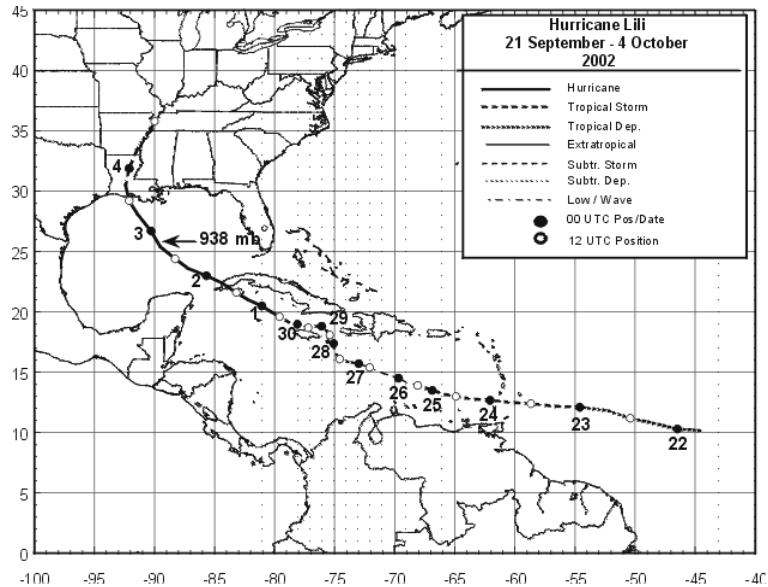
While the 2002 tornado season was slow in some respects, it was devastating for a few locations. Ironically, the death toll for the year was 55 – the highest since 1999.

## A Busy Hurricane Season

The 2002 hurricane season featured twelve named storms, four of which became hurricanes, two of them major (category 3 or stronger). The first storm of the year, Tropical Storm Arthur, was classified as a tropical depression very near Cape Fear, North Carolina on 14 July. It then meandered offshore, growing to tropical storm intensity on the 15<sup>th</sup> before moving further away from the coast. It was classified as extratropical on 16 July just south of Newfoundland.

The next storm, Tropical Storm Bertha, was one of several storms in 2002 to cause problems for Gulf Coast residents, particularly those in Louisiana and Mississippi. It was classified as a tropical storm just before it made landfall on 4 August near Boothville, Louisiana. Storm tides of 3-4 feet above normal were observed along the southern Louisiana coast around the time of landfall. Rainfall from the storm was generally in the 1 to 4 inch range, although a few locations received much more. The highest storm totals were 10.25 inches at both Norwood, Louisiana and Pascagoula, Mississippi.


The strongest and most publicized landfalling storm of the year was Hurricane Lili, which became a hurricane on 30 September, shortly before moving over the western tip of Cuba. After moving back into the Gulf, it intensified further into a category four storm on 3 October and set its sights on Southern Louisiana. Although it appeared as if Lili would be the first major hurricane to make landfall in the Gulf Coast since Opal in 1995, it weakened



considerably just prior to making landfall later on the 3<sup>rd</sup> and came ashore as a category one storm. Nevertheless, storm tides of 10 to 12 feet above normal were reported at many

South Louisiana locations, and rainfall reached almost 9 inches in some spots. Total damages from Lili reached \$860 million in the U.S.

- Katherine Nunn

** *	<u>Ithacation - February 2003</u>	** *
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