Ice Storm Climatology in Eastern New York and Western New England

John S. Quinlan
NWS Albany, NY
Number of Days with Freezing Rain at Gloversville, NY
1949-55; 1980-86
Average 7.4 Days/Year

Number of Days with Freezing Rain

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
<tr>
<td>Days</td>
<td>32</td>
<td>22</td>
<td>12</td>
<td>5</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>26</td>
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</table>
Number of Days with Freezing Rain at Little Falls, NY
1941-57; 1982-96
Average 7.1 Days/Year
Number of Days with Freezing Rain at Albany, NY
1945-2000
Average 6.9 Days/Year

Number of Days with Freezing Rain
123 71 57 100 0 0 0 0 0 0 0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Months

Number of Days with Freezing Rain
Number of Days with Freezing Rain at Poughkeepsie, NY
1949-54; 1974-78
Average 6.5 Days/Year
Figure 1. Average number of hours per year with freezing rain in the United States.

(Source: Tamara G. Houston, NCDC)
Number of Hours with Freezing Rain at Albany, NY
1930-2001
Average 19.9 Hours/Year
Ice Storms
Our Single Greatest Hazard!
East Coast Ice Storms

1. Setting the stage:
   High pressure banks cold air against mountains. Weak storm sends warm air northeast.

2. The ice storm:
   Warm air flowing above cold air condenses into rain that falls through cold air and freezes.

(Source: USA Today)
Ice Accretion Measurement

- Ice Accretion occurs when rain or drizzle falls with surface temperatures at or below freezing. This is commonly called freezing rain or freezing drizzle.
- Ice Accretion is usually measured on a flat metal surface, if this is not available break off a very small branch or twig from a tree. Use a ruler to measure the thickness of ice in tenths of an inch. If there is only a small amount of Ice Accretion which is less than a tenth of an inch report it as Trace (T). If there is no Ice Accretion report it as zero (0.0).
- It is best to use the NWS Snow Stick or an Engineering Ruler that is graduated in tenths of an inch to measure Ice Accretion. If you only have a desk ruler or a yardstick, you will need to round the value to the nearest tenth of an inch (i.e. 0.25” would be rounded to 0.3”, 0.125” would be rounded to 0.1”).
Ice Accretion Examples

In this case the Ice Accretion is 5/16”, which is the average of 3/16” on the right side of the branch and 7/16” on the left side of the branch. This would then be rounded to the nearest 0.1”, resulting in 0.3” of Ice Accretion.

In this case the Ice Accretion measured from the top of the metal post is 0.5”.

Photos: Neil Stuart  
NWS Albany  
12/11/08 (top), 1/15/07 (bottom)
Advisory Criteria for Freezing Rain/Drizzle

Eastern Region
Any Accretion
2008 Changes to Winter Weather NWS Services

- **Winter Advisories Old**
  - Freezing Rain
  - Lake Effect Snow
  - Lake Effect Snow and Blowing Snow
  - Wind Chill
  - Winter Weather
  - Snow
  - Snow and Blowing Snow
  - Sleet
  - Blowing Snow

- **Winter Advisories New**
  - Freezing Rain
  - Lake Effect Snow
  - Wind Chill
  - Winter Weather

- **Winter Warnings Old**
  - Blizzard
  - Ice Storm
  - Lake Effect Snow
  - Wind Chill
  - Winter Storm
  - Heavy Snow
  - Sleet

- **Winter Warnings New**
  - Blizzard
  - Ice Storm
  - Lake Effect Snow
  - Wind Chill
  - Winter Storm

*Watches Unchanged: Blizzard, Winter Storm, Lake Effect Snow, and Wind Chill*
Ice Storms in ALY CWA
1993-2008 (27 Events)

- 3/9-10/94
- 1/6-7/95, 2/28/95
- 11/26/96
- 2/4-5/97, 3/14/97, 11/14/97
- 1/15-16/98, 1/23-24/98

- 2/14/00, 2/18-19/00
- 1/31/02, 3/26/02, 11/16-17/02
- 1/1-2/03, 4/4-5/03
- 1/15-16/07, 3/1-2/07, 12/2-3/07
- 2/12-13/08, 3/4-5/08, 3/7-9/08, 3/18-21/08, 12/11-12/08
Number of Ice Storms 1993-2008
(1.7 Events/Year)

Months of Occurrence

JAN 9
FEB 5
MAR 7
APR 1
MAY 0
JUN 0
JUL 0
AUG 0
SEP 0
OCT 0
NOV 3
DEC 2
Ice Storm December 11-12, 2008

• Ice Accumulation 0.5 to 1 inch in many areas.
• 4 deaths (3 from carbon monoxide poisoning, 1 from being struck by trees).
• Over 1.6 million customers lost power (almost a week after the storm still 100,000 customers without power).
• Most schools closed on Friday, December 12th.
• The American Red Cross opened multiple shelters around the Capital District.
<table>
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<tr>
<th>LOCATION</th>
<th>STORM TOTAL</th>
<th>TIME/DATE</th>
<th>COMMENTS</th>
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<td>LITCHFIELD COUNTY...</td>
<td>0.50</td>
<td>132 PM 12/12</td>
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<td>Winsted</td>
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<tr>
<td>Peru</td>
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<td>220 PM 12/12</td>
<td>WXNET 6</td>
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<td>Menands</td>
<td>0.75</td>
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<td>NWS/CESTM</td>
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<td>1/20-22/59</td>
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<td>$74.0</td>
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Losses are expressed in 2000 dollar values, except for the 2008 Ice Storm.
Ice Storm Jan 5-10, 1998

- 44 people died, many from hypothermia.
- 945 people were injured.
- Over 4.5 million people lost power.
- About 600,000 people had to leave their homes.
- 130 major power transmission towers were destroyed and more than 30,000 utility poles fell.
- Millions of trees were brought down by the freezing rain.
- Worst disaster in history of Canada.
- Damage totals 4.5 billion dollars.

(Source: John Gyakum, McGill Univ.)
Formation Of The Ice Storm

Anatomy of an Ice Storm

1. One after another through the week, three warm-air masses move up from the Gulf of Mexico, taking moisture north to Ontario and Quebec.

2. A stationary mass of cold air forces the warm air to rise, causing precipitation to begin.

3. Precipitation falls in different forms depending on the temperature of the air that it meets on the way down:

   - Warm air melts snow into rain over Quebec and eastern Ontario. The bank of cold air supercools it N keeping it in liquid form but a few degrees below 0. When it hits cold objects on the ground, it freezes quickly N this is freezing rain.

   - Precipitation falls through cold air over PE.I., causing a snow storm.

Diagrams are schematic and not to scale.
Sources: Weather By Day, Environment Canada

(Source: CMC, The Globe and Mail)
Ice Storm 98’ “El Niño Signature”

• The sub-tropical jet stream in the southern United States in combination with a stagnant ridge of high pressure in the Atlantic and a shallow layer of cold air in the St. Lawrence Valley, helped to set the stage for prolonged periods of freezing rain in the northeast.

• For five continuous days, this jet stream was diverted towards southern Quebec, bringing an abundant amount of rain northward.

• Northeasterly flow at the lower levels in the atmosphere, in the St. Lawrence Valley and the Ottawa Valley, maintained a shallow layer of cold air at the surface.

(Source: John Gyakum, McGill Univ.)
Ice Storm 98’ Photos

(Source: CMC and NWS BTV)
Ice Storm 98’ Video
Counties Declared Federal Disaster Areas Ice Storm 1998

Counties Designated for Federal Disaster Aid (FEMA)
January 1998

- Ice damage
- Flooding damage

Source: USGS Forest Services
December 3-6, 1964

- Ice accumulations of 0.75 to 1.5 inches.
- Temperatures 26 to 31 degrees F.
- Many schools closed for a week.
- Hundreds of thousands without power for up to two weeks.

- Hardest Hit Areas were East Central New York and a belt from Northeast to Southwest Massachusetts.
<table>
<thead>
<tr>
<th>Year</th>
<th>Accretion</th>
<th>Damage</th>
<th>Outages</th>
<th>Deaths</th>
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<td>1921</td>
<td>up to 4”</td>
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<tr>
<td>1942</td>
<td>up to 3”</td>
<td></td>
<td></td>
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<tr>
<td>1964</td>
<td>0.75-1.5”</td>
<td>271.3M</td>
<td>0.2 M</td>
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<tr>
<td>1998</td>
<td>up to 5”</td>
<td>4.5 B</td>
<td>4.5 M</td>
<td>44</td>
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<tr>
<td>2008</td>
<td>0.50-1.0”</td>
<td>74 M</td>
<td>1.6 M</td>
<td>04</td>
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</table>
Some Interesting Statistics

- Actual losses are even greater as this total excludes non-insured losses.
- Majority of winter storm losses
  - 60% of winter storm losses within the U.S.
  - $226 million mean total annual cost.
After the November 27-29, 1921 ice storm in Rhode Island

Source of Photos: NOAA Historical Photo Collection (From “The heavy hand of winter on trees and wires.” An ice storm in Rhode Island. In, “The Realm of the Air” by Charles F. Tolman, 1931, Library Call Number M-0039 T1159)

January 5-9, 1998 Ice Storm

Montreal (January 8, 1998)

A special thanks to Patrick McDonnell for this photo. Additional photos can be found at http://hometown.aol.com/badice98/IcestormDiary/Icestormtext.html.
Questions?