Being Prepared for and Reacting to Hazardous Weather in Central New York

By Scott Steiger (meteorology professor), Nicholas Rodick, and Bruno Rojas (Meteorology seniors/LESPaRC forecast leaders)

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Current Conditions: websites

New York Mesonet (webcams):  
http://nysmesonet.org/mesonow#network=nysm&stid=oswe

SUNY Oswego Chermack tower (visibility):  
http://www.oswego.edu/met_class/tower/index.html

Radar, satellite, and more:  http://weather.rap.ucar.edu/

Weather apps: RadarScope, LiveDoppler9
Accurate Weather Forecasts

National Weather Service (Buffalo/Binghamton):
-Advisories, snowfall maps, Winter weather link

Social media: @NWSBuffalo, @SteigerScott
Interpreting Weather Observations and Forecasts

How to interpret 30%?: it will snow on 30% of days like what is predicted tomorrow

What is freezing rain? Sleet? Heavy snow?
How would you interpret these advisories??  Compare with the snow forecast on the previous slide.
Lake-effect Snow (LES, our main weather hazard): Single-banded storms (on Radar)

LLAP (long lake-axis-parallel) band east of Lake Ontario in Feb. 2013. Image from syracuse.com
Lake-Effect Using Radar and Surface Observations

• When tracking lake-effect, radar is critical to understanding the current situation. The radar will show dBZ (decibel relative to Z) values.

• “Reflectivity” is the amount of transmitted power returned to the radar receiver after hitting precipitation.

• The challenging thing with lake-effect is the band(s) don’t extend high above the ground and sometimes the radar beam doesn't hit the main part of the lake-effect band. As a result, even what appears as low reflectivity values can produce heavy snow. This is why using webcams and surface observations are also critical in combination with radar to see what is truly happening.
When the radar beam doesn't overshoot the lake-effect band, the following snowfall rates can generally be assumed:

<table>
<thead>
<tr>
<th>dBZ Values</th>
<th>Snowfall Rate</th>
<th>Expected Visibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10 dBZ (Light Blue on most radar images)</td>
<td>Flurries (&lt;0.1 in/hr)</td>
<td>3.1-5 Miles</td>
</tr>
<tr>
<td>11-20 dBZ (Darker Blue)</td>
<td>Light-Moderate Snow (0.1-1 in/hr)</td>
<td>0.76-3 Miles</td>
</tr>
<tr>
<td>21-35 dBZ (Green)</td>
<td>Moderate-Heavy (1.1-2 in/hr)</td>
<td>0.26-0.75 Mile</td>
</tr>
<tr>
<td>36+ dBZ (Yellow)</td>
<td>Heavy (2 in/hr or greater)</td>
<td>&lt;0.25 Mile</td>
</tr>
</tbody>
</table>
Lake-effect Snow: multi-bands

Lighter snows, wider area covered

Lake-effect snow east of Lakes Michigan and Superior on Dec. 22, 1998. Image from UWYO.
Lake-effect Snow (LES) Climatology

- LES often occurs during the late fall and winter months
  - Peak season for Lake Ontario typically December-January
- All of the Great Lakes produce LES
  - Upstream connections occasionally enhance Lake Ontario LES
- Similar to the lake-effect process, sea-effect snow occurs in other regions of the world
  - Atlantic Canada
  - Sea of Japan
  - Black Sea
Lake-effect Research at SUNY Oswego

- Several studies related to lake-effect processes have been conducted using data collected during the OWLeS (Ontario Winter Lake-effect Systems) Project (NSF, $4M).
  - Misovortices
  - Lightning
  - DOW and Wyoming King Air data correlation
The Lake-effect Storm Prediction and Research Center (LESPaRC) is a SUNY Oswego student-run organization (overseen by Scott Steiger) that forecasts for Central and Northern NY during the winter season of November to April.

- Forecasters are assigned one day of the week to produce forecasts, twice on that day (4x a day during Active Mode)
- Forecasts are delivered to the NY DOT and a number of school districts
- Co-Forecast Leaders write forecast discussions prior to significant events
- LESPaRC is a 24/7 operation
WELCOME TO THE LAKE-EFFECT STORM PREDICTION AND RESEARCH CENTER
**LesPacRc: sample products**

<table>
<thead>
<tr>
<th>Time</th>
<th>Weather Conditions</th>
<th>Snowfall Rates</th>
<th>Temperature</th>
<th>Wind</th>
<th>Wind Chill</th>
<th>Visibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00 AM</td>
<td>Mostly Cloudy</td>
<td>None</td>
<td>24°</td>
<td>SW 10-15 mph</td>
<td>11-14°</td>
<td>10 Miles</td>
</tr>
<tr>
<td>1:00 AM</td>
<td>Mostly Cloudy</td>
<td>None</td>
<td>23°</td>
<td>SW 10-15 mph</td>
<td>10-13°</td>
<td>10 Miles</td>
</tr>
<tr>
<td>2:00 AM</td>
<td>Cloudy</td>
<td>None</td>
<td>23°</td>
<td>W 10-15 mph</td>
<td>10-13°</td>
<td>10 Miles</td>
</tr>
<tr>
<td>3:00 AM</td>
<td>Snow Showers</td>
<td>Trace-0.1 in/hr</td>
<td>22°</td>
<td>W 10-15 mph</td>
<td>9-12°</td>
<td>3-5 Miles</td>
</tr>
<tr>
<td>4:00 AM</td>
<td>Snow Showers</td>
<td>Trace-0.1 in/hr</td>
<td>22°</td>
<td>W 10-15 mph</td>
<td>9-12°</td>
<td>3-5 Miles</td>
</tr>
<tr>
<td>5:00 AM</td>
<td>Snow</td>
<td>0.25-0.5 in/hr</td>
<td>23°</td>
<td>W 10-15 mph</td>
<td>10-13°</td>
<td>0.5-1 Miles</td>
</tr>
<tr>
<td>6:00 AM</td>
<td>Heavy Snow</td>
<td>1-2 in/hr</td>
<td>23°</td>
<td>W 10-15 mph</td>
<td>&lt;25 Miles</td>
<td>&lt;25 Miles</td>
</tr>
<tr>
<td>7:00 AM</td>
<td>Heavy Snow</td>
<td>2-3 in/hr</td>
<td>24°</td>
<td>W 10-15 mph</td>
<td>&lt;25 Miles</td>
<td>&lt;25 Miles</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Heavy Snow</td>
<td>1-2 in/hr</td>
<td>24°</td>
<td>W 10-15 mph</td>
<td>&lt;25 Miles</td>
<td>&lt;25 Miles</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>Snow</td>
<td>0.5-1 in/hr</td>
<td>25°</td>
<td>W 10-15 mph</td>
<td>12-15°</td>
<td>0.25-0.5 Miles</td>
</tr>
<tr>
<td>10:00 AM</td>
<td>Snow</td>
<td>0.25-0.5 in/hr</td>
<td>26°</td>
<td>W 10-15 mph</td>
<td>13-16°</td>
<td>0.5-1 Miles</td>
</tr>
<tr>
<td>11:00 AM</td>
<td>Snow Showers</td>
<td>0.1-0.25 in/hr</td>
<td>27°</td>
<td>W 10-15 mph</td>
<td>15-18°</td>
<td>1-3 Miles</td>
</tr>
<tr>
<td>Noon</td>
<td>Snow Showers</td>
<td>Tr-0.1 in/hr</td>
<td>28°</td>
<td>W 10-15 mph</td>
<td>16-19°</td>
<td>3-5 Miles</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>Snow Showers</td>
<td>Tr-0.1 in/hr</td>
<td>29°</td>
<td>NW 10-15 mph</td>
<td>17-20°</td>
<td>3-5 Miles</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>Snow Showers</td>
<td>Tr-0.1 in/hr</td>
<td>30°</td>
<td>NW 10-15 mph</td>
<td>18-21°</td>
<td>3-5 Miles</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Snow Showers</td>
<td>Tr-0.1 in/hr</td>
<td>30°</td>
<td>NW 10-15 mph</td>
<td>18-21°</td>
<td>3-5 Miles</td>
</tr>
</tbody>
</table>

(SUNY Oswego LesPacRc website)
Meteorologist on Call: Matthew Seymour Email: mseymour@oswego.edu
Alerts: Winter Weather Advisory in effect until 4pm
Forecast Discussion: A band of lake-effect snow is projected to gradually move southward through this period. Within the core of the snow band, snowfall rates of 2-3 in/hr are possible, making for very low visibility. Gusty winds of 10-20mph may cause some areas of blowing and drifting. Temperatures will slowly rise through the 20s.
Level of Confidence: High
A heavy lake effect snow band will push southward through the morning as a disturbance crosses the area. Significant snowfall rates can be expected during its passage. Temperatures will slowly rise through the 20s to around 30 this period.

Next update: 12:00 PM
Suggestions and Questions?

- Please consider multiple sources when making a decision based on weather forecasts
- Campus Preparation and Response to Hazardous Weather Task force?