Whately: Realtime Monitoring at the MacLeish Field Station

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Introduction

The MacLeish Field Station at the Smith College Experimental Forest monitors various atmospheric conditions. A new web page (http://macleish.smith.edu) streams this data in realtime for public viewing. Constructing this webpage involved creating meaningful data display formats using RTMC Pro software.

Methods

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation (mm)</td>
<td>Tipping Bucket Rain Gauge</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>Outdoor Thermocouple</td>
</tr>
<tr>
<td>Wind Speed (m/sec) and Direction</td>
<td>Acoustic Doppler Anemometer</td>
</tr>
<tr>
<td>Solar Radiation (Watts/sq. m)</td>
<td>Pyranometer</td>
</tr>
<tr>
<td>Barometric Pressure</td>
<td>Barometer</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>RH Sensor</td>
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</tbody>
</table>

The weather station is located in the southern portion of a 200 acre plot of mixed field and forest. Instrument data from the tower is sent to a computer in the weather station building.

Results

In the early morning of February 23rd, 2010, a heavy wet snow and sudden freeze event destroyed several trees on the Smith Campus. Did these snows reach the Smith College Experimental Forest? Weather monitoring data indicated that no snows fell in Whately that night (see right).

Barometric Pressure and Wind Speed

- All graphs were created in MatLab.
- Indicates time t, or the expected time that trees on the Smith campus broke under heavy snows.

Temperature and Relative Humidity

- At time t the temperature dropped to -5 C and then quickly rose ten degrees to 5 C. At the same time, the relative humidity rose from 50% to 75% and then swiftly dropped back to 50%. On 2/24/10 the relative humidity rose drastically to 100%.

Precipitation and Solar Radiation

- Precipitation (snow) started at Whately 8 hours after the destructive precipitation event at Smith. Four millimeters of precipitation fell on 2/24/10 and 34 millimeters fell on 2/25/10.

Page One

Dials and charts are designed to provide current data to the casual observer. This page provides weather station background and location and explains how specialized charts (such as the wind rose) may be read.

Page Two

Provides 5-day meteorological records for more in-depth analysis.

Page Three

Provides data pertinent to the health of the instrumentation environment.

Summary

This webpage functions to demystify goings-on at the MacLeish Field Station and allow researchers remote observation of weather patterns and storm events. Displays using multiple units and familiar graphics make these pages readable by a variety of audiences. This page can serve as an educational tool at K-12 schools and also to provide short-range data to the scientific community at Smith College.

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