



Whately Weather: Realtime Monitoring at the MacLeish Field Station

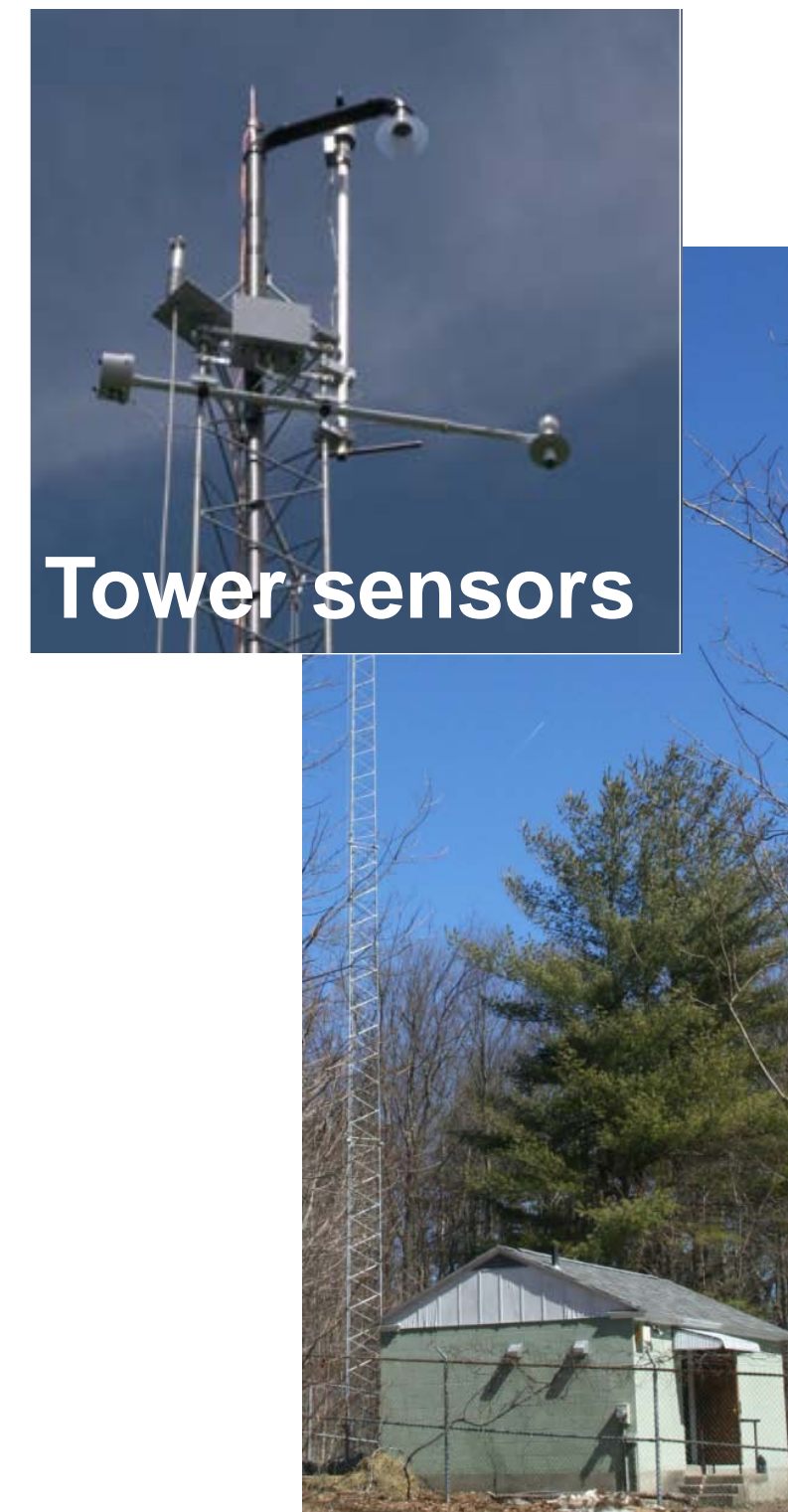


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Introduction



Tower sensors

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.

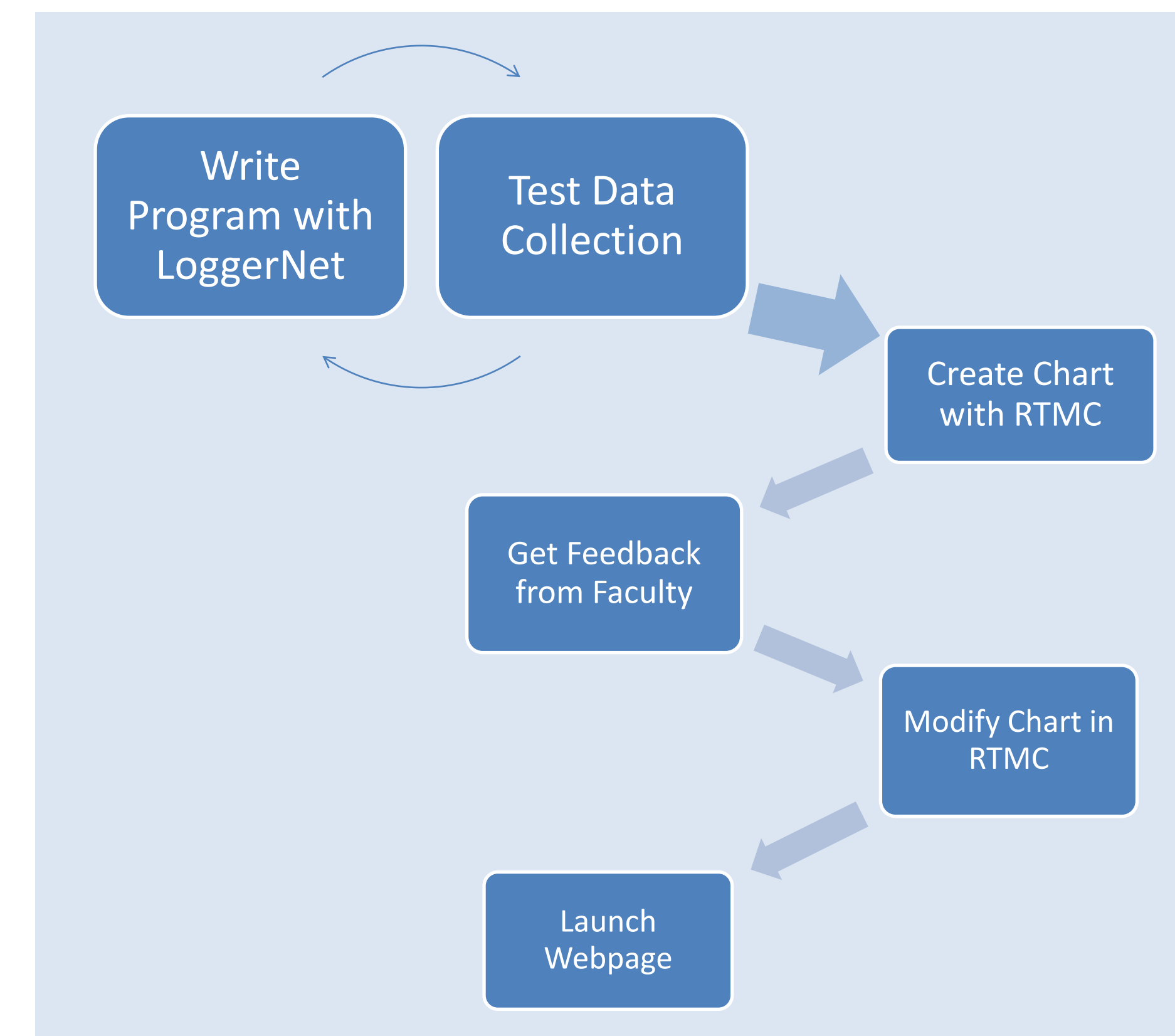
Parameter	Instrument
Precipitation (mm)	Tipping Bucket Rain Gauge
Temperature (°C)	Outdoor Thermocouple Indoor RH Sensors (2)
Wind Speed (m/sec) and Direction (azimuth)	Acoustic Doppler Anemometer
Solar Radiation (watts/sq. m)	Pyranometer
Barometric Pressure	Barometer
Relative Humidity	RH Sensor

Weather tower and ground sensors at the field station measure a variety of parameters.



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.

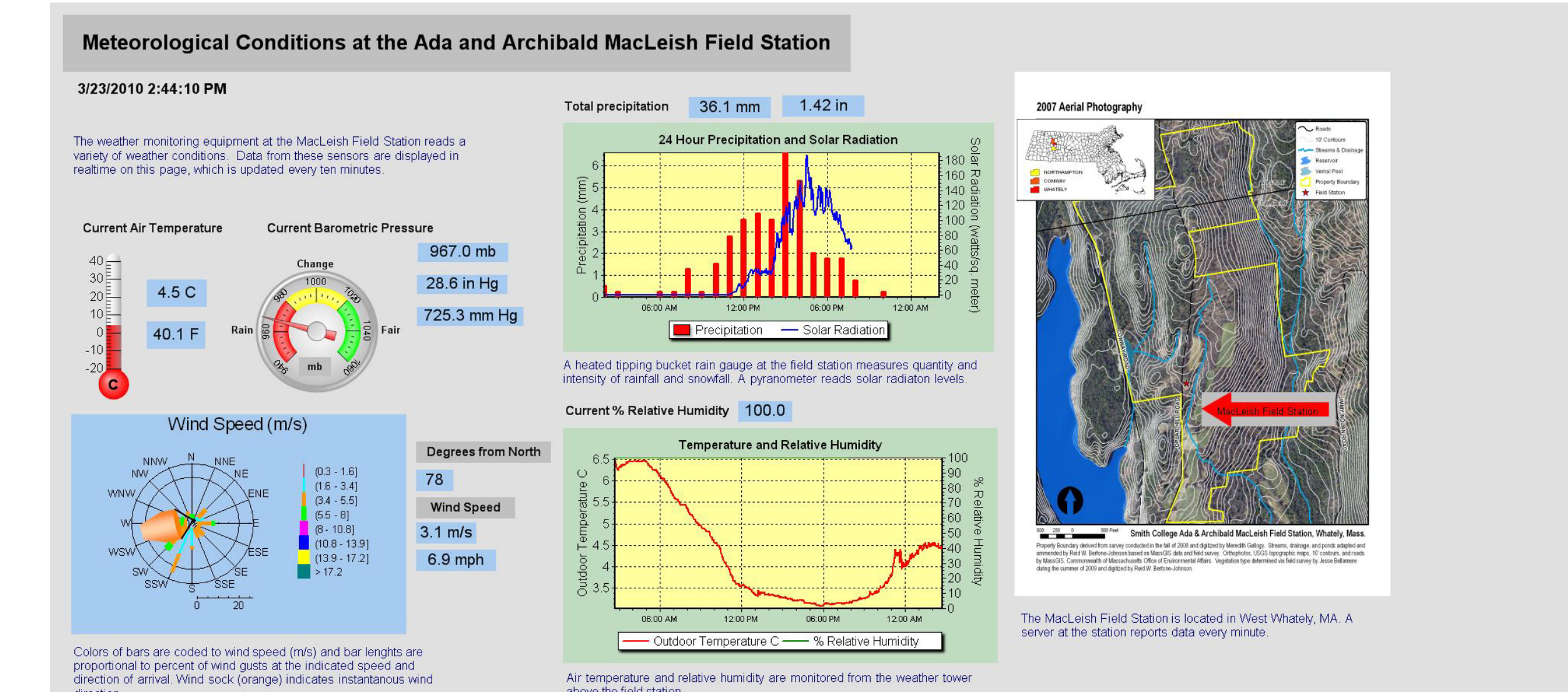
Methods



Programs were written for specific data collection probes using LoggerNet. Probes were tested in an indoor setting to ensure that data collection programs were functioning properly. Next, charts and figures were created using RTMC Pro, and faculty from the Landscape Studies, Biology, and Engineering departments were contacted for feedback. Based this feedback charts were modified, then the webpage was launched using RTMC Web.

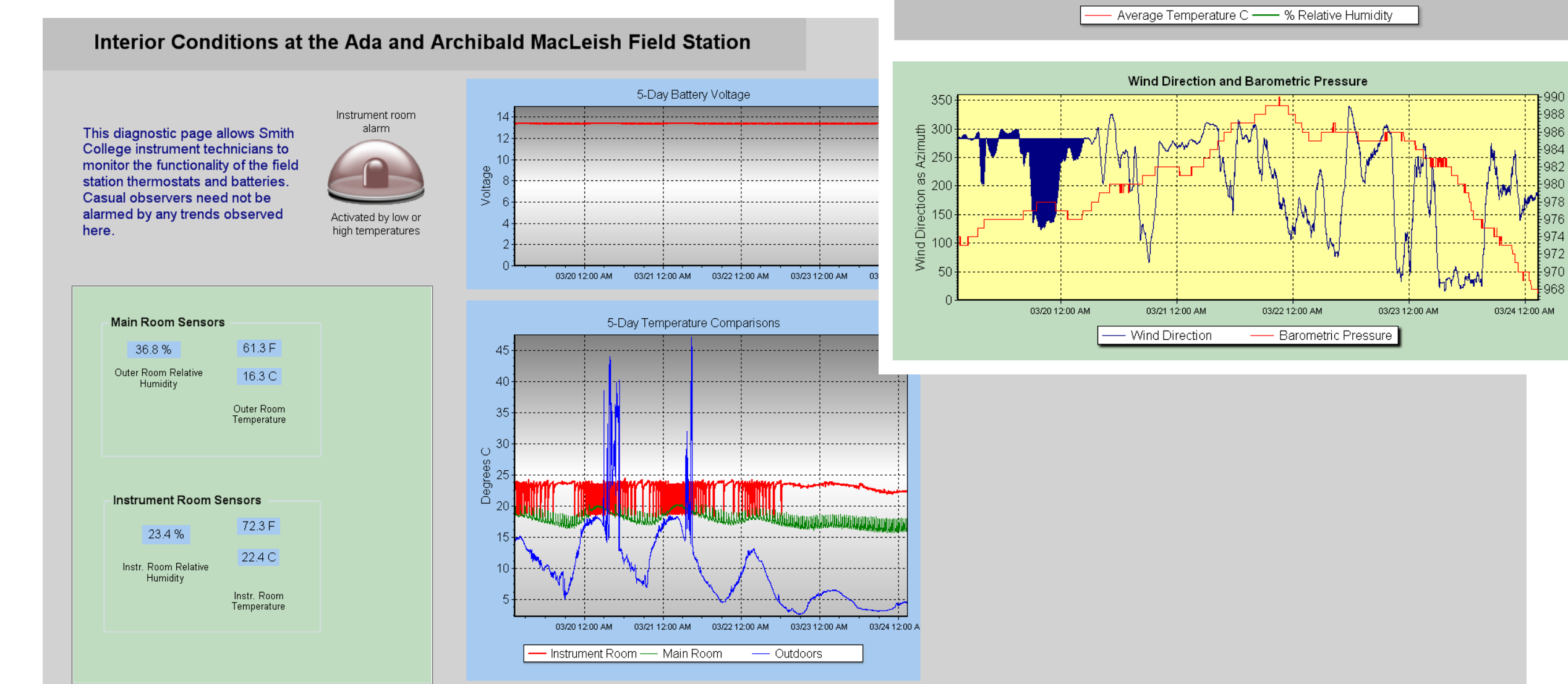
Final Layout

<http://macleish.smith.edu>



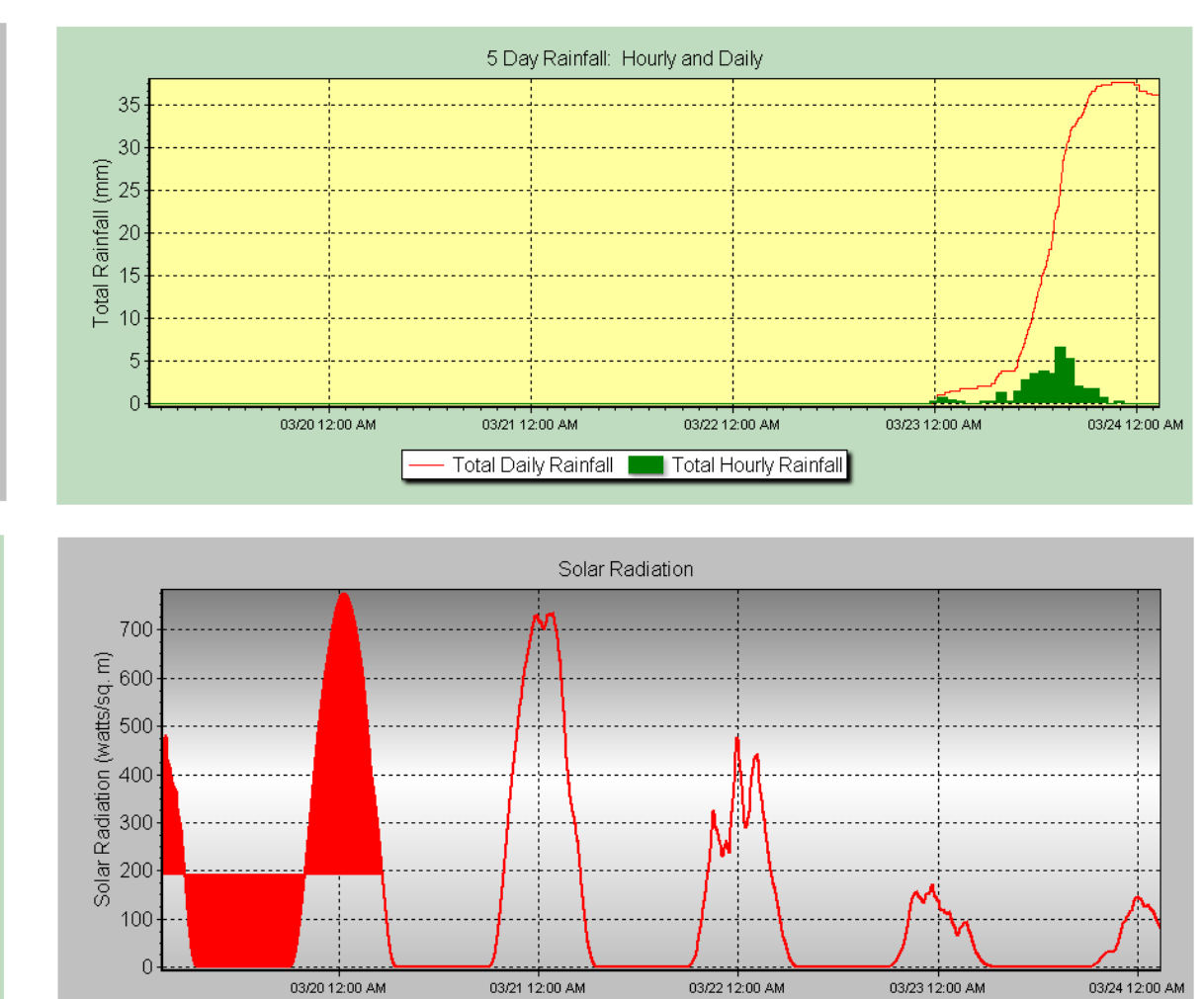
Page Two

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



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 Three

Provides data pertinent to the health of the instrumentation environment.

Results

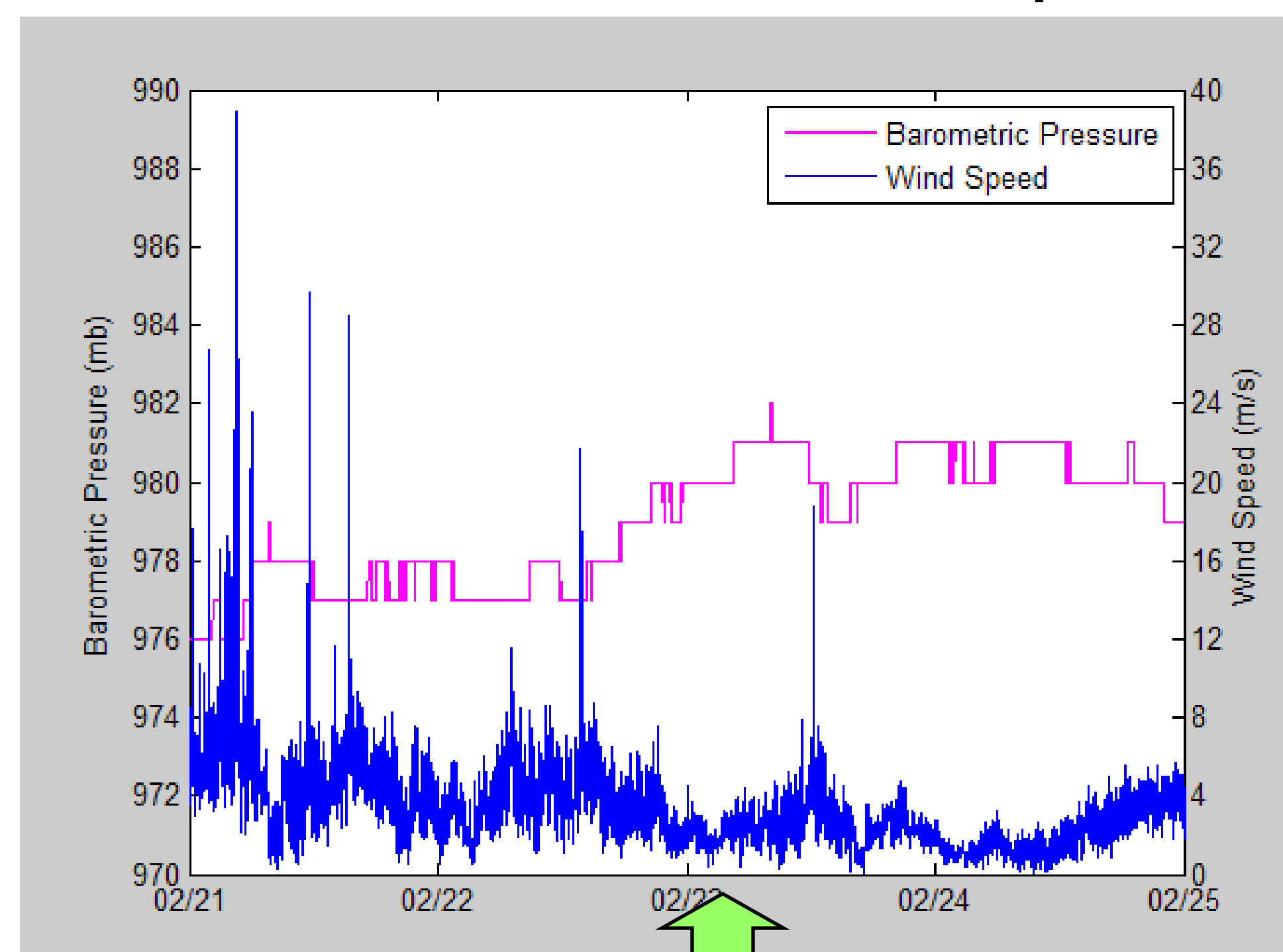


From The Green Court Gate

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).

Indicates time *t*, or the expected time that trees on the Smith campus broke under heavy snows.

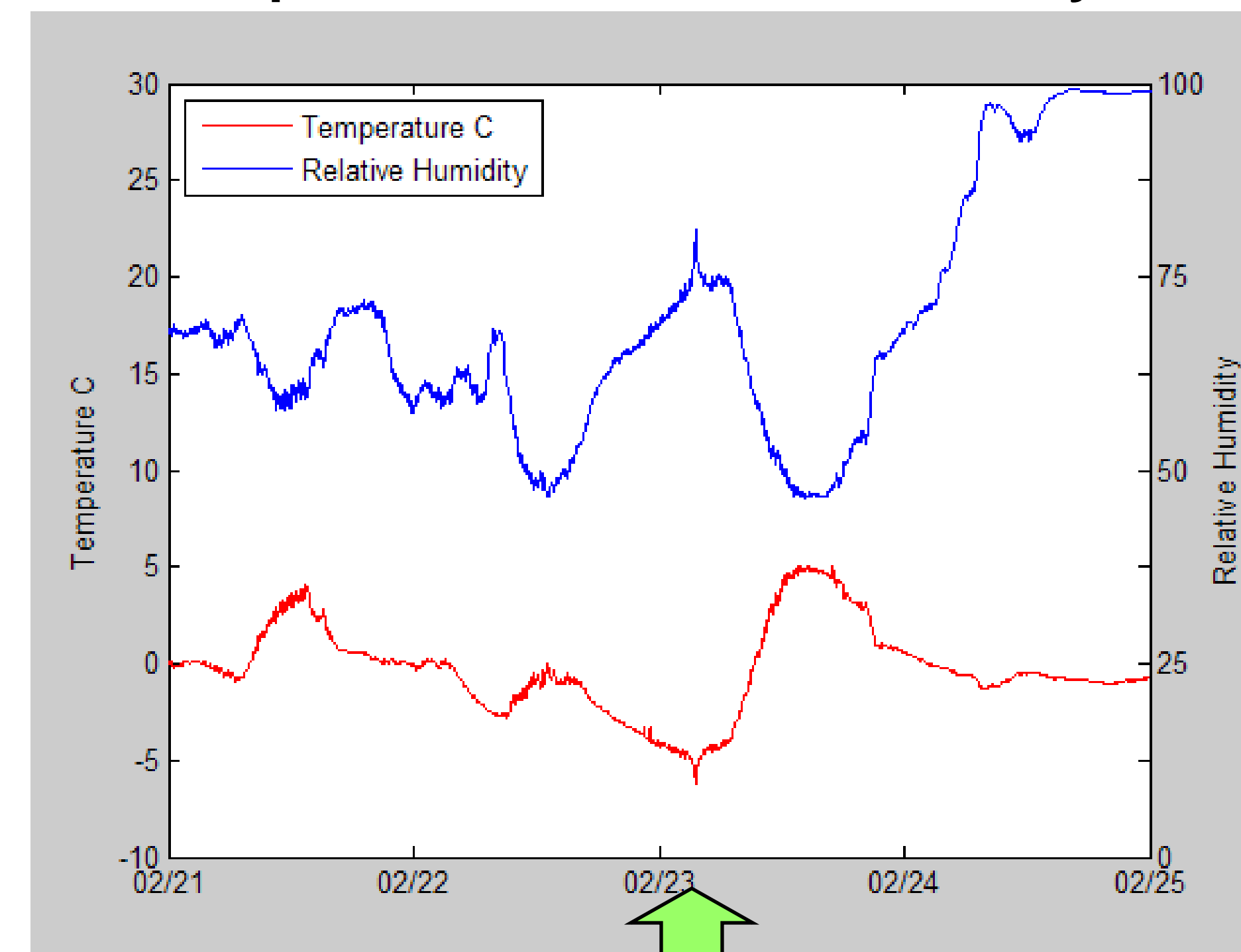
Barometric Pressure and Wind Speed



All graphs were created in MatLab.

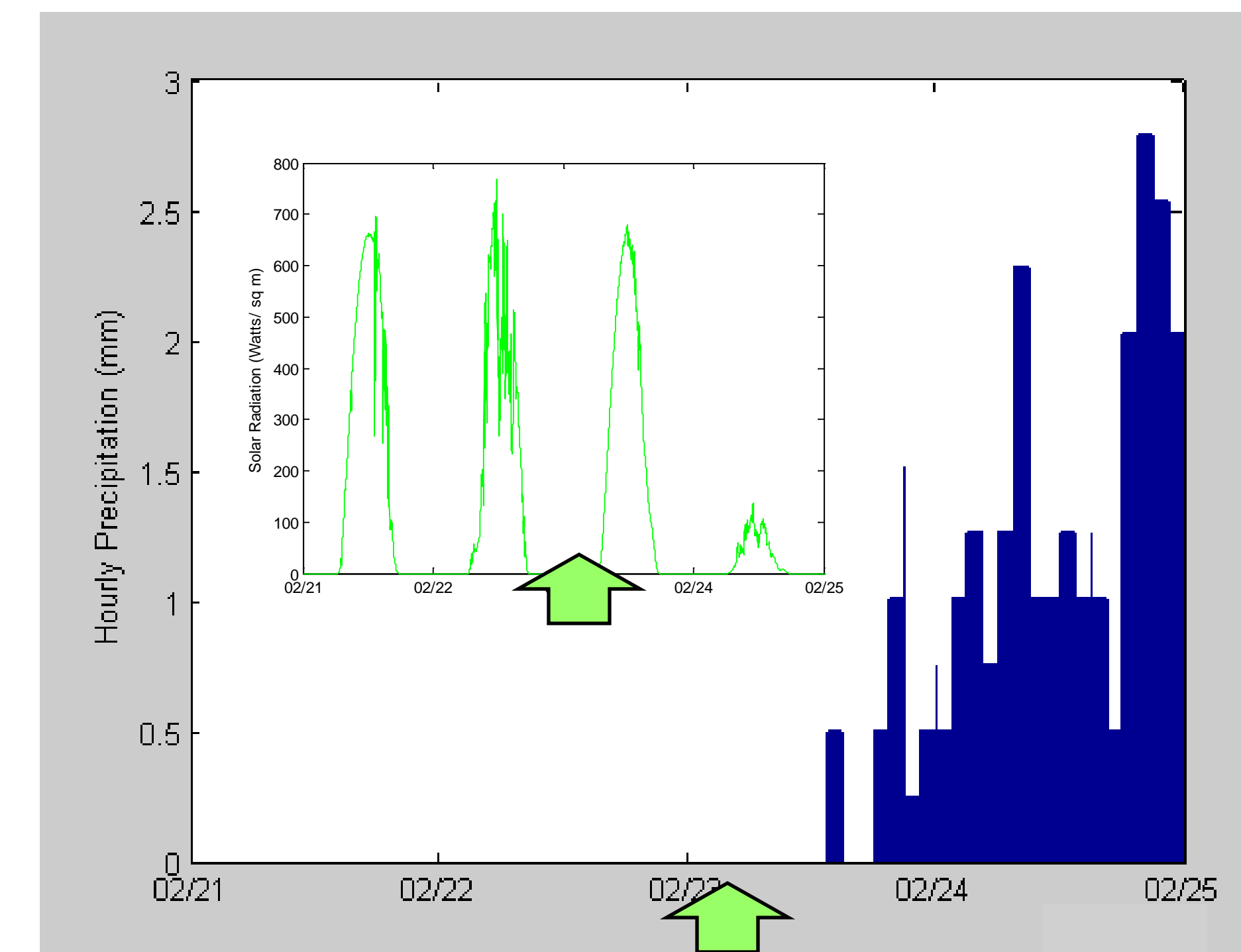
At time *t* (indicated by the green arrow) barometric pressure rose slightly in Whately and wind speed did not exceed 4 m/sec. No large gusts occurred until the afternoon of 2/23/10.

Temperature and Relative Humidity



Also 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.

Weather data shows that the Smith heavy snow event did not (concurrently) affect Whately, but likely was at least a temporally localized occurrence.

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.

Acknowledgements

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