



The Madison Polar Climate & Weather Station (PCWS): A Status Report to the Community

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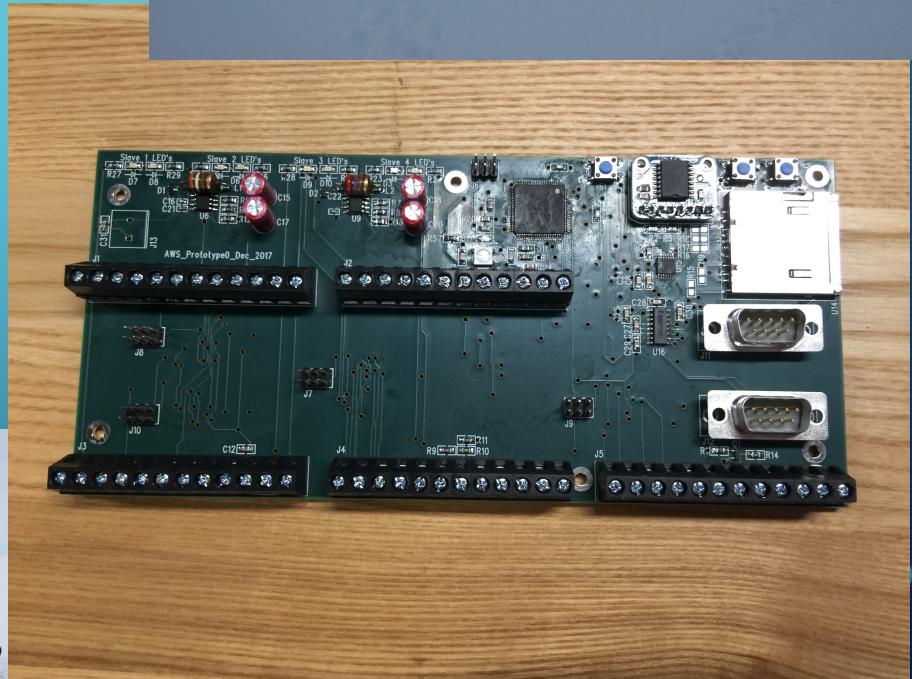
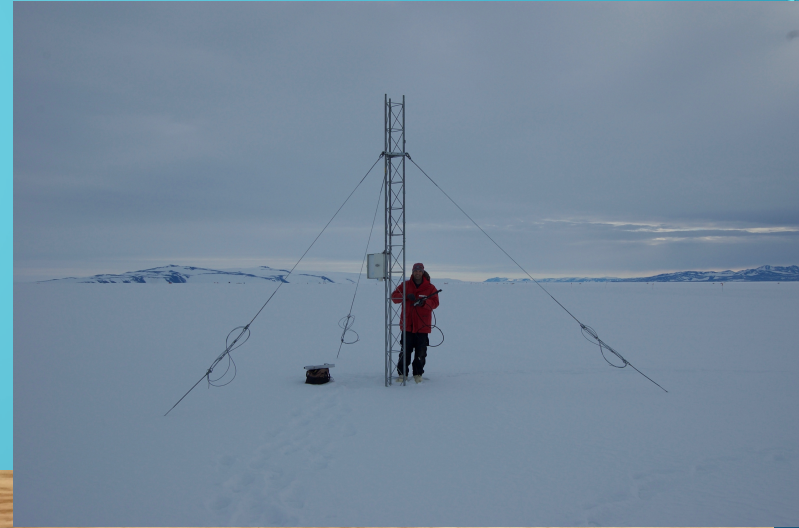
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OUTLINE

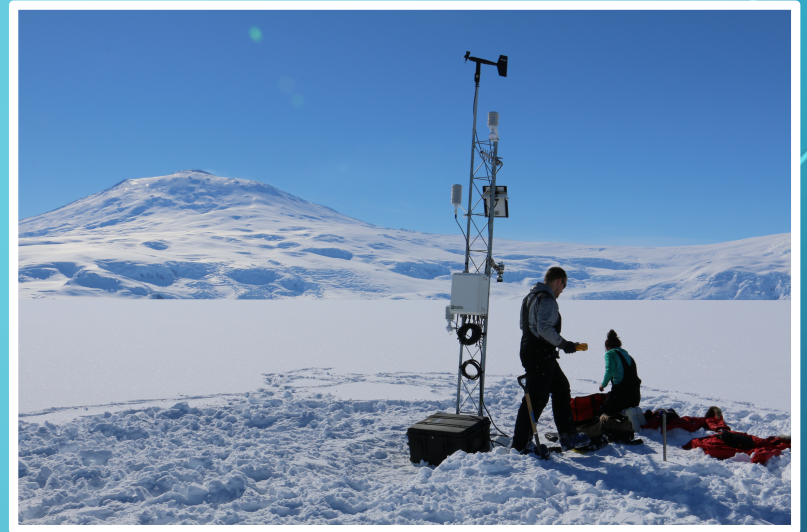
- Team members and field team
 - (partner with UW-Madison)
- Overview
- Status of the project
- Student Involvement
- Lessons Learned so far...
- Future plans



Slide from last year!

PROJECT GOALS

- The Madison AWS/PCWS
 - Generation of a new electronic core system
- Students involved in the project
 - One-of-a-kind experiences
- Impact in the Classroom
 - Unique data and observations to study weather and climate
- The Community
 - The AWS network becomes a community asset



Windless Bight AWS – Lee Welhouse and Carol Costanza
Photo Courtesy of Dave Mikolajczyk



TEAM MEMBERS

Madison College (To Date):

- 6 Electronics students
 - Proposal/prototype
 - Board design
 - Embedded Software Development
 - Soldering proto types
 - Sensor Verification
- 3 Atmospheric science students
 - AWS extremes
 - Monitoring
 - Freezer testing/characterization
- 3 faculty
- 1 staff member
 - Significant Purchasing/Inventory effort

UW-Madison Team:

- 1 faculty
- 3 Young Scientist Staff
- 2 Emeritus Staff



Forbes Filip with Andy Kurth's son

2017-2018 FIELD TEAM



PCWS SCHEMATIC & SENSOR SET

2 meters:

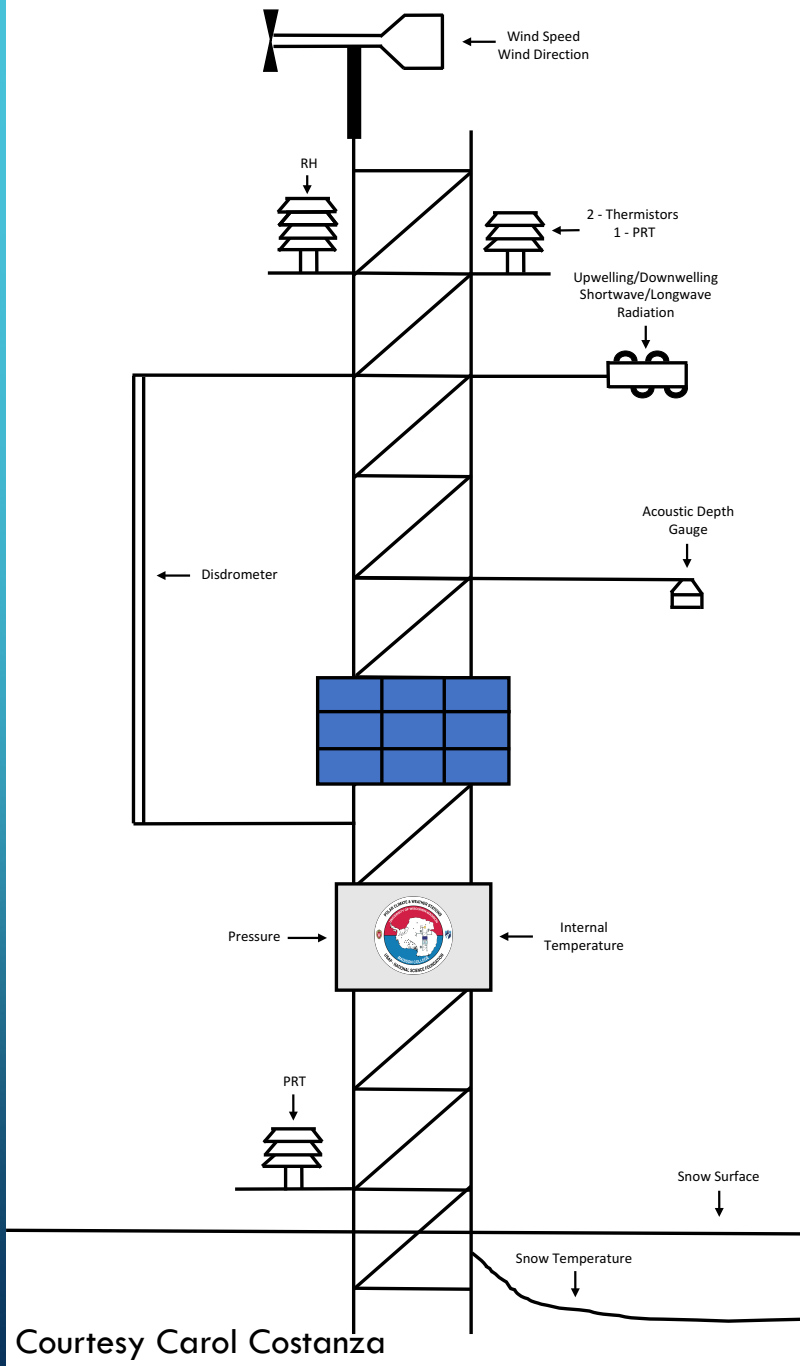
- 3 Temperature Sensors
 - One PRT, two Thermistors
- Relative Humidity
- Wind

1 to 1.5 meters:

- Acoustic Depth Gage
- 4 component radiation
- Disdrometer (??)
- Pressure

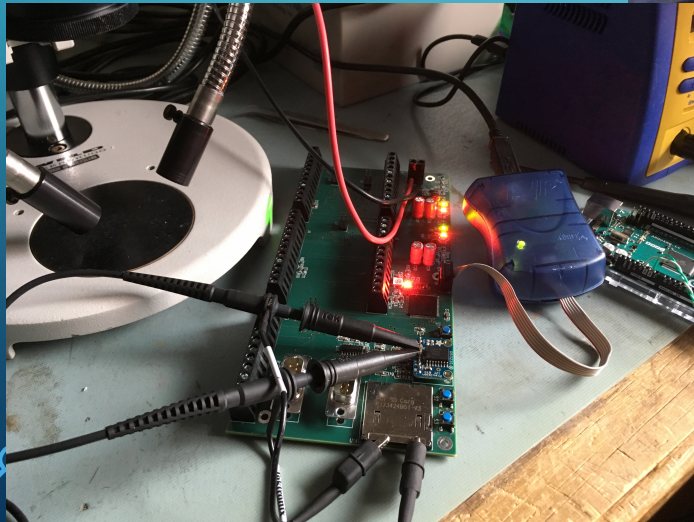
0 to 0.5 meters:

- 0.5 m Temperature
- Snow Temperature

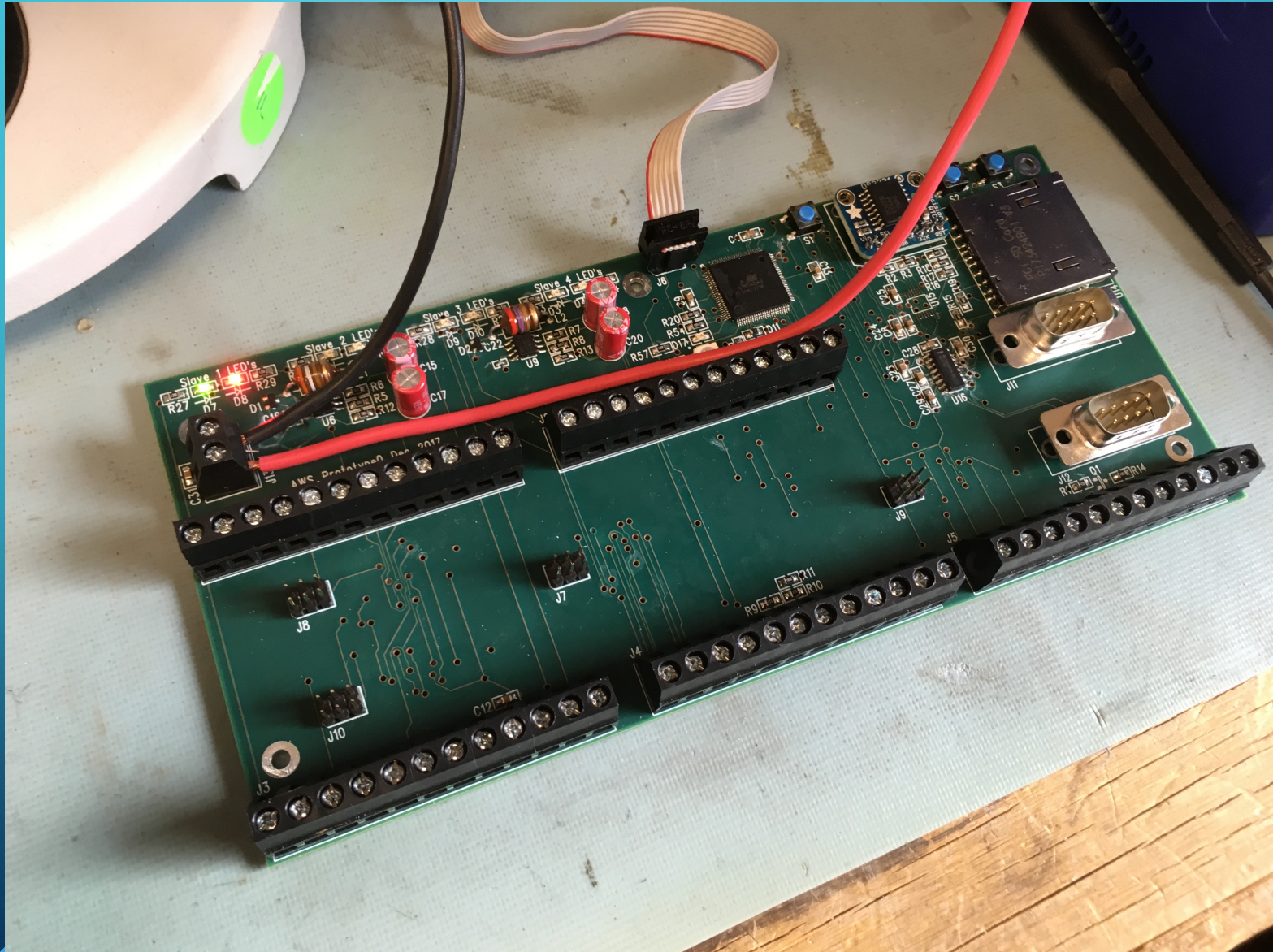


GOAL: BUILDING THE PROTO TYPE

- Build prototype 0.1
- Install at Willie Field AWS test site
- Certification of Sensors



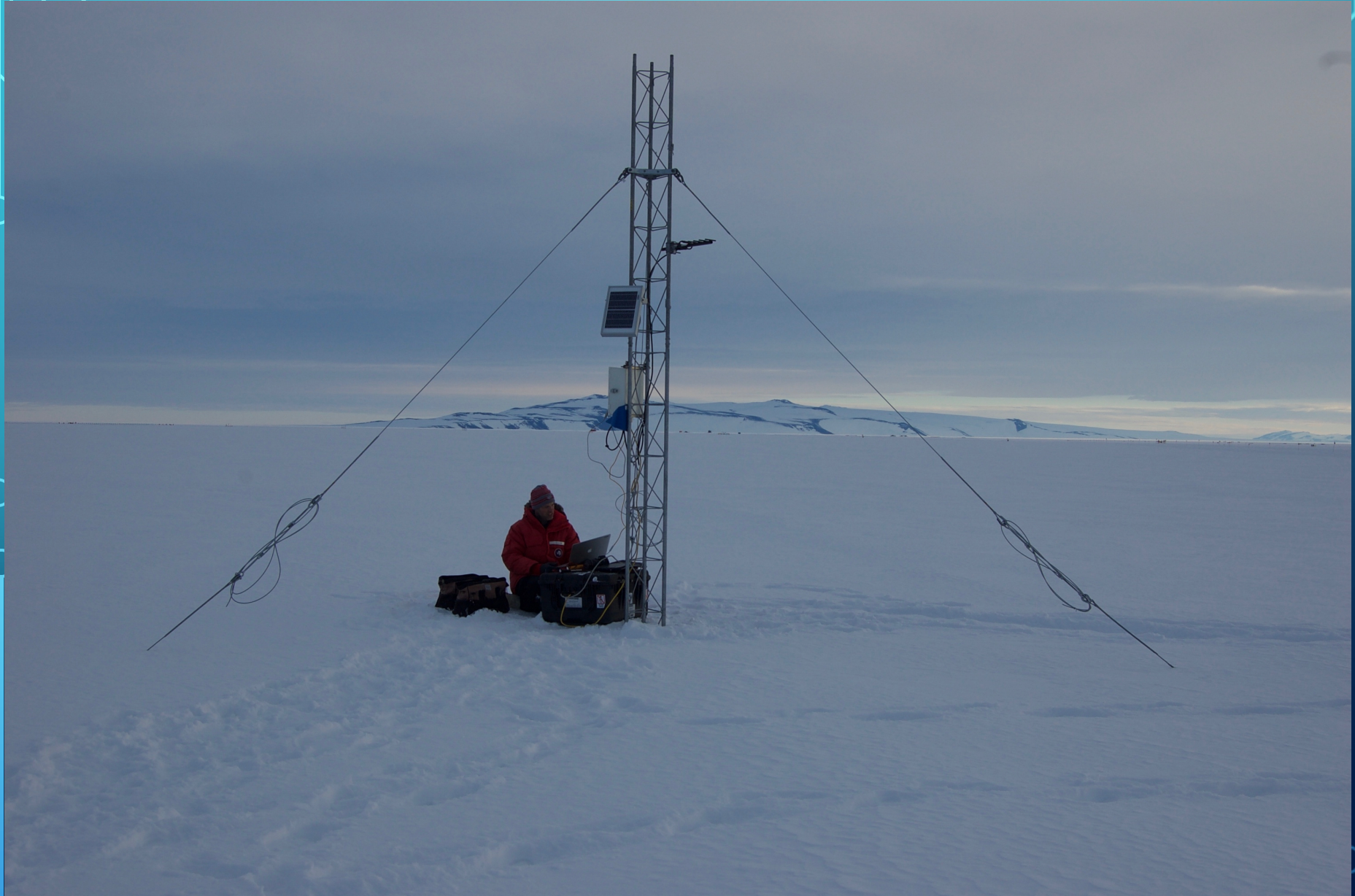
PROTO TYPE VERSION 0.1



FIELD WORK ACCOMPLISHED at Willie Field AWS Test site

- Installation of prototype board:
 - It is running!
 - No communications working (due failure with the Freewave Network during the installation)
- Installation of Thermistor Sensor on Wisconsin AWS
 - Side-by-side comparison with Platinum Resistance Thermometer (PRT)

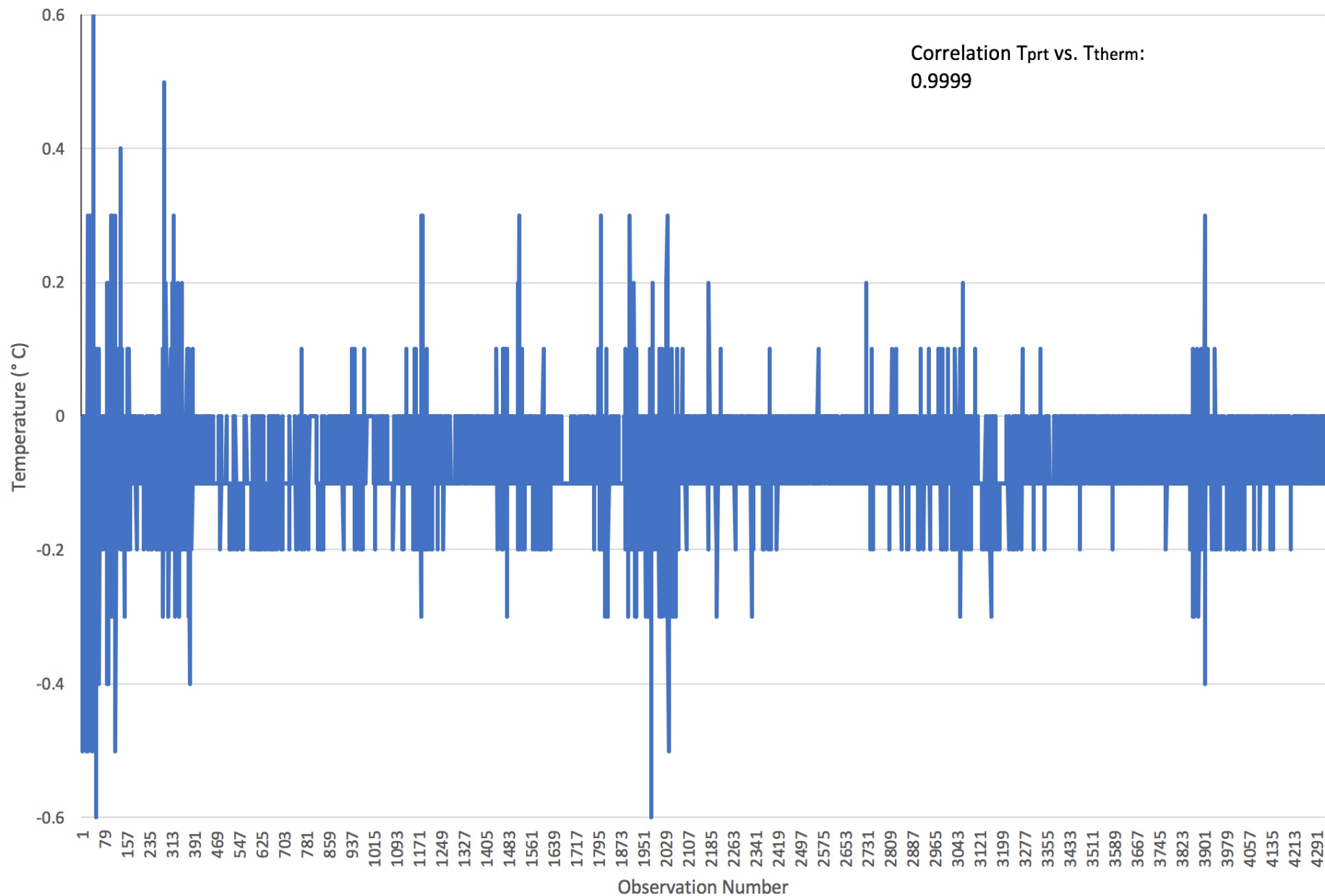
2017-2018 FIELD SEASON INSTALLATION AT WILLIE FIELD AWS TEST SITE






Willie Field AWS Platium Resistance Thermometer vs. Thermister Difference - June 2018

by Theresa Cody



WEB SITE

- About the project
- Publications
 - Including technical...
 - (More to come....)
- Courses
- Participants
- Coming soon:
 - Data
 - Links to real-time displays (via AMRC/UW-Madison)



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- Antarctica Interest Form

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ANTARCTIC METEOROLOGY PROJECT

The National Science Foundation awarded Madison College a Major Research Instrumentation Grant to create and build the next generation automatic weather station (AWS) for extreme polar climates, particularly Antarctica.

The goal of this project is to develop, test, and deploy a new polar automatic climate and weather observing station for use in remote polar regions, particularly the Antarctic. With a more capable electronic core, the focus of the new system is to make meteorological observations with climate-level quality measurements. The new system will host a first-of-its-kind onboard calibration system for temperature observations.

WEATHER STATION


PUBLICATIONS

PARTICIPANTS

COURSES

Automatic weather stations (AWS) are used around the world to observe the weather and atmospheric conditions where people can't always be recording the observations themselves or even just as frequently. These stations have many types of instruments to do this, including:




- Anemometer (measures wind speed and direction)
- Barometer (measures pressure)
- Batteries
- Communications and antenna
- Disdrometer (measures precipitation size and speed)
- Electronic core
- Radiation sensor
- Relative humidity sensor
- Solar panel
- Sonic ranging sensor (measures snow depth)
- Temperature sensors



These measurements are stored and saved to be used for analysis to learn more about the weather at different locations and create climate records once there is at least 30 years worth of data.

The use of AWS in Antarctica is extremely helpful since there aren't people stationed there year-round, nor are there enough people to observe over the entire continent. AWS allow us to see what it is like on the cold continent and to help forecasters predict the weather for people who are stationed in Antarctica and those who are flying so they know when it is safe to travel. The data from the weather stations also allows researchers from many different fields learn more about different aspects of the continent.

If you have any questions or comments, please [let us know!](#)



FIELD SEASON PLANS

2018-2020

- Side by side testing of existing AWS and new PCWS systems:

1. South Pole (Skiway)

- Cold location

2. Marilyn AWS

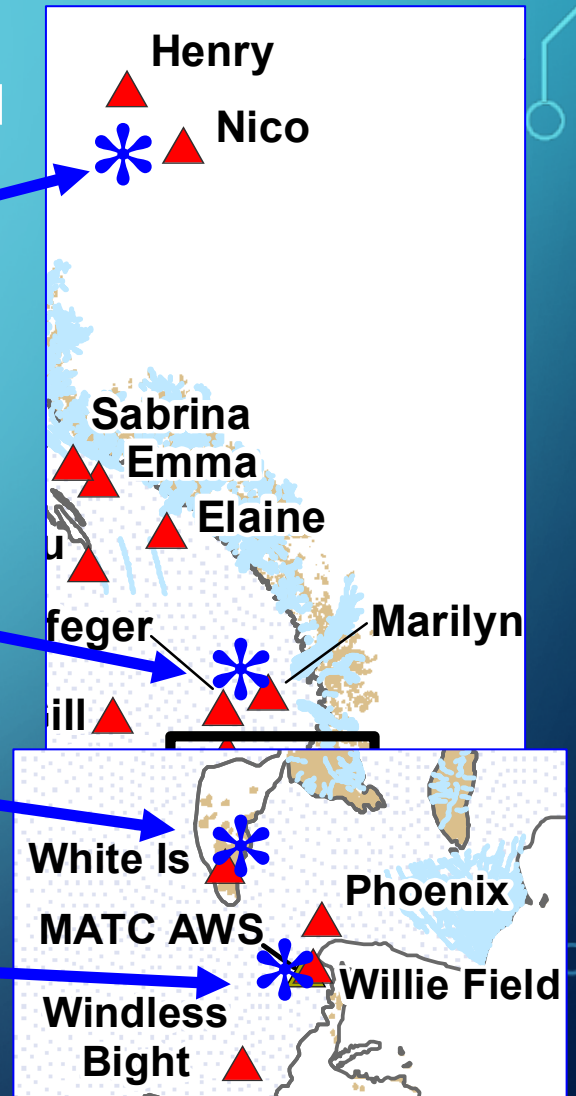
- Large Relative Humidity variations

3. White Island AWS

- Windy location

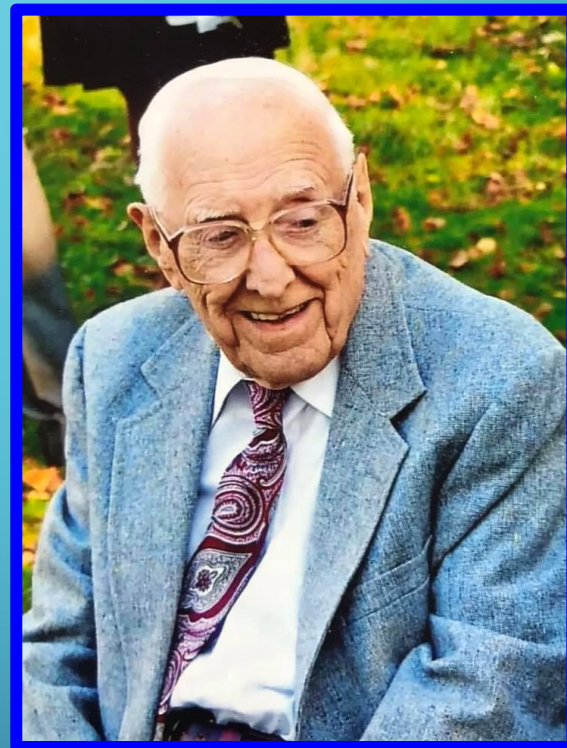
4. Willie Field AWS

- Test site
- Replace existing system





In Memory of my Grandfather, 1915-2017



THANK YOU!
QUESTIONS?

Thanks to NSF Geoscience Directorate, Office of Polar Programs
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