2010-11 Antarctic Automatic Weather station field season and technical plans for the future

Jonathan Thom
Antarctic Automatic Weather Station Program
Antarctic Meteorological Research Center
Space Science and Engineering Center
University of Wisconsin-Madison
2010-11 Field Work

- *Shockingly* successful season
- 16 stations visited
  - 6 additional by collaborators
- Utilized the Oden icebreaker to repair the AWS on Franklin Island.
- 6 new installations (2 on Ross Ice Shelf, 4 in West Antarctica).
- 5 weather station removals.
- Still have > 60 Argos IDs, want to decrease to ~50.
Tall Tower!

• Finally installed after 3 years.
• 100 ft tower located on the Ross Ice Shelf (~160 km from McMurdo)
• Installed for surface wind and energy balance studies
• Instrumentation
  – 30 m: wind, temperature, humidity, net radiation
  – 15 m: wind, temperature
  – 8 m: wind, temperature, humidity
  – 4 m: wind, temperature
  – ~3 m: acoustic depth gauge is installed
  – 2 m: wind speed, temperature
  – 1 m: wind speed, temperature
Tall Tower!

- Groups are welcome to propose to install instrumentation at this site.
- Tower installed and maintained by USAP contractor.
- Power provided by a UNAVCO 5 W power system
Equipment, instrumentation

• We are currently transitioning to Campbell Scientific CR1000 datalogger systems
  – Continue to use Wisconsin AWS 2B
• Side-by-side testing of CR1000 based system and old UW AWS system at Ferrell site (occupied since 1980)
• Some new (for us) instrumentation testing
  – Transition to Freewave in McMurdo area
  – Radiation sensors
  – On station data recording
  – Aspirated radiation shields on some future stations.
Issues with COTS

• Takes a long time to transition our network.
• Is the Campbell system the best choice?
  – These are systems built for many different types of data acquisition.
  – We are a relatively small customer of Campbell hardware.
    • We do not have any say in development.
    • Have limited knowledge of datalogger update cycle and how it will affect us.
  – Potentially operating outside CSI’s temperature specs in some locations.
    • Chamber tested CR1000 to -65°C measuring a precision resistor, PRT, and HMP155.
    • CR1000 operated during the entire test.
• Instrumentation has been consistent.
  – Vaisala humidity sensors.
  – R. M. Young wind sensors
  – Platinum resistance thermometers
  – Paroscientific pressure gauges
Future work . . . Collaborations

- Working with PASSCAL and UNAVCO to provide a weather station component with their installations.
- Likely working with ARRO/AGO to install weather station component.
- Future funding for AWS project will include collaborative proposals that target specific scientific questions.
Thank you!
http://amrc.ssec.wisc.edu

Acknowledgements:
National Science Foundation, Office Polar Program
grant #ANT-0944018

AWS Photos by Melissa Nigro and Jonathan Thom