Welcome!

• Major issues to cover:
  – ARM Pyrgeometer calibrations and reprocessing (ECR-00781)
  – Ventilation issues (ECO-00991)
  – Cold (Arctic) climate operations issues
  – Surface radiation measurements ideas/recommendations for new SGP configuration
  – Other?
Ventilation Issues

• “ARM Radiometer Ventilation Issues: An Appeal for Diligence and Improvement” (Oct 2012)

• Issues:
  – Directing Air Flow Around the Domes
  – Adequate Air into the Fans
  – 12V DC High Speed Fans
  – Daily Operations
Controlling flow

We want all the air forced out around the dome…

NOT let it out the cable slot or around the sun shield, etc.
Fan and air flow

Fan cannot blow air if flow to it is blocked!
Some solutions:

- Plug the cable slot
- Replace sun shield if not tight seal
- Remove fan screen and use larger area screening
- Provide greater area for air to flow into ventilator
DC vs AC Fans

DC fans produce significantly smaller and “better behaved” night time offsets.
Operations

• Listen, do you hear the fans running?
• Hold your palm over the dome (not touching dome): do you feel the air flow? Does it feel like strong flow?
• Is the cable slot sealed?
• Is the screen plugged up?
Cold Climate Operations Issues

• The following is from a summary report to the BSRN at the 2012 Workshop held in Potsdam, Germany, from the BSRN Cold Climate Issues Working Group
Cold Climate Issues Working Group Update
Chuck Long for the CCIWG

Sunrise at Atqasuk, Alaska
It’s a cold world out there!

Storm Peak Lab riming, CO, Oct 10, 2010
Cold Climate Issues

• Instruments impacted by meteorological conditions: snow, frost, rime, etc.

• Other issues include:
  – Thermopile sensitivity at cold temperatures
  – Hazardous conditions for personnel
    • Cracking of electrical cables due to cold temps
  – Possibly shifting bases for instrument stands
  – Etc.
NSA IOP Tests Performed

• Two different fan output flow volumes
  – Standard speed and high speed (18/44 CFM)
• AC vs. DC powered ventilator heaters
• Optimal heater placement inside ventilator (IR effects versus mitigation)
• Various heater designs
• Effects of insulation on sun shield
  – More heat to dome
Radiometer Dome and Shield Accumulation

• PIR most susceptible to rime accumulation on sun shield
  – Or wind direction effect?
• Snow accumulation for all
Conclusions

• Eppley ventilator sun shield too flat on top for optimal cold climate use
• Higher speed fans are better
• Better design would have steeper sun shield and air flow more directed over dome
• Heating helps, but insufficient for all cases
  – Balance between heating and increased IR offset effects
Gert: New ventilator design

15 Watt ventilator with a strong air stream not touching the body of the instrument but only the dome. Additional heating option just before the outlet not needed.
Ventilation blocking: Jungfraujoch, Sonnblick Mountain Observatory
Internal heating

Significant riming and “100 year” snow

SPN-1 virtually unaffected

Recommend as ancillary radiometer?

SPN resistance to snow

- It snowed!
- SPN-1 not buried
- Recommend as ancillary radiometer?
  - Serve as QC tool for components
  - Serves as “best estimate” when primary contaminated

SIRTA site, near Paris France, Jordi Badosa and Martial Haeffelin