Solar and IR Radiation Measurements From the CIRPAS Twin Otter During RACORO

Chuck Long

PNNL, Richland, WA

Anthony Bucholtz

Naval Research Laboratory, Monterey, CA

Broadband SW and LW

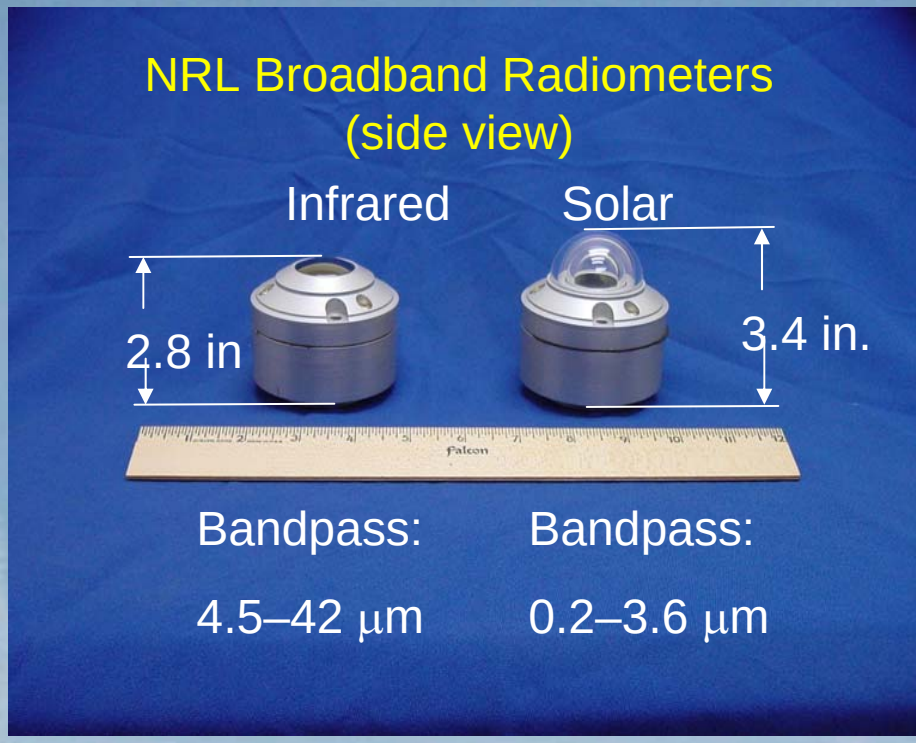
Measurements:

- **Upwelling and Downwelling Solar and IR irradiance**

Instrumentation:

Modified Kipp & Zonen CM-22 pyranometers and CG-4 pyrgeometers optimized for aircraft use:

- **Re-made back housing**
- **Amplification of signal at sensor**
- **Run in current loop mode (to minimize noise in long cables)**
- **Interior of sensor evacuated (to prevent interior condensation/frosting)**



SPN-1 Total and Diffuse SW

- Measures Total and Diffuse SW with no moving parts
- Eliminates need for sun-relative azimuthal orientation
- Uses 7 detectors and a patented shading pattern
- 0.2 - 0.3 sec 95% response time
- Will use for correcting for tilt

Solar Spectral Irradiance and Radiance

Measurements:

- Upwelling and Downwelling Solar Spectral Irradiance
- Downwelling Narrow FOV (2-3 deg) Solar Spectral Radiance

Instrumentation:

NPS owned Hobi Labs HydroRad-300:

- **Fiber optic based spectrometer**
- **Wavelength Range: 350-850 nm**
- **Resolution: 0.30 to 0.35 nm**
- **Adjustable integration time from 21 ms to 20 s**
- **Mounting configuration:**
  - **one irradiance collector looking up**
  - **one irradiance collector looking down**
  - **one radiance collector looking up**
- **Previously mounted on CIRPAS Twin Otter**

18.3”

HydroRad-300

Extended mountings

Other Radiometers

- Up/down MFR
  - with 1.6 micron channel added
- Up/down IRT

- Radiometer comparison standard set
  - Will be run at SGP during campaign
  - Broadband SW and LW radiometers