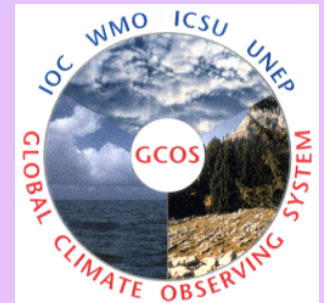


# Session 5: Wrap-Up

Workshop on "Reference Upper Air Observations  
for the Global Climate Observing System: Potential  
Technologies and Networks"

Seattle 22-24 May 2006



# Group Discussion Topics

- GCOS Perspective
- Overarching Principles
- Strawman Station Selection Criteria
- Strawman Instrumentation and Sampling Protocol
- Adjustments to Requirements Matrices
- Next Steps

# GCOS Perspective

- GCOS Reference Upper-Air Network (identifying long-term global climate monitoring as a prime motivation)  
Not necessarily current GUAN stations.
- Serves as a reference or anchor for observations from comprehensive network, including satellites. Does not provide global, spatially-representative coverage.
- Complementary to emerging GPS-RO observations that may serve as benchmark observations
- A world-wide network; broad international participation, following GRUAN criteria

# Overarching Principles

- Adherence to GCOS Monitoring Principles
  - Employ high-quality, proven instrumentation (not a testbed)
  - Changes are minimized and managed
  - Metadata
- Oversight by dedicated GCOS scientific personnel
  - Real-time, proactive monitoring of the health of the network
  - Instrument mentor/project scientist (as in ARM)
  - Site manager/technician for site
  - Real-time and retrospective research component
  - Peer-reviewed publication of plans, activities, results
- Network coordination/collocation (with other ground-based networks) to optimize resources and realize synergistic benefits
  - BSRN
  - NDACC network for the detection of atmospheric composition change
  - Aeronet
  - GAW Ozone (stratospheric)
  - Intl. Global Navigation Satellite System (GNSS) Service (IGS)
  - GOS
- Close coordination with satellite community
  - Joint advocacy of climate-quality observations
  - Independent Critical Authority (a la ASIC3)
  - Coordinated implementation of anchor-point concept
- Establish, as far as possible, traceability to SI units
- Data management, archive, and analysis component (to be fleshed out later)
- Data freely and rapidly available to scientific and operational community

# Strawman Station Selection Criteria

- Variety of climatic regimes, surface types (latitude, land/sea)
- Connection with involved scientific institute with adequate technical expertise
- Mix of low and high altitude sites
- Start with a few stations, chosen based on existing observing program and readiness
- First group could include: (GUAN, BSRN)
  - ARM TWP, SGP, NSA
  - Lindenberg
  - Camborne
  - Payerne
  - *Boulder, Sodankyla, Costa Rica, and Lauder (ozone and water vapor continuity)*
- Possible workshop among station managers at Lindenberg, to further assess best procedures and configurations
- Next focus on synergistic sites with existing upper-air capabilities as candidates

# Strawman Instrumentation and Sampling Protocols

- Define adequate site and ideal site
- Minimal (priority 1)
  - Standard surface variables (wind, p, T, U)
  - Redundant/simultaneous balloon-borne observations of T, WV with different measurement techniques
    - Ensuring continuity, and ability to make radiation corrections, of T data
    - Ensuring dynamic range of WV data
  - Both pressure and GPS/radar height for redundancy
  - Ground-based GPS receiver
- Better (for closure of radiative calculations) **NEEDS INPUT FROM SATELLITE COMMUNITY** (priorities 1 and 2)
  - Surface radiation variables via BSRN
  - Microwave radiometer
  - IR radiometer
    - Cloud observations
    - for radiance computation check (against sounding data)
- Ideal – meets all stated requirements
- Experimental uncertainty budget analysis for each instrument
- Sampling
  - Fixed times, day and night, but not necessarily 00 and 12 UTC
  - Synchronized to satellite overpasses

# Adjustments to Requirements Matrices

- Rectify inconsistency in **surface radiation** budget priority designation. All should be 2. Rectify range of surface radiation parameters. All values should be consistent with BSRN requirements. (E. Dutton)
- Close loophole in **water vapor** accuracy and precision requirements. Express in both mixing ratio units and percentage, consult Ohring et al. (H. Vomel, Hannu J.),
- Correct measurement range and vertical range of **temperature** measurements to encompass surface to stratopause.
- Vertical resolution (at low p) and accuracy of **pressure** (J. Wang)
- Values imply corrections to measurements, which need to be included in metadata.

# Next Steps/Timing

- Meeting report
  - Drafting begins this afternoon
  - Writing team to complete draft report (by Sept.)
  - Review by workshop participants
  - Review by broader community
- Presentations on Workshop Website
- GCOS/AOPC Ad Hoc Working Group on Reference Upper-Air Observations
  - Adopt/publish workshop reports
  - Prepare 1-2 pager for CIMO (meets 12/06, docs required 7/06) and CBS (meets 11/06) and GCOS, WOAP (8/06), CGMS/COSPAR (11/06)), Team on Satellite Calibration (Geneva 6/23/06)
  - Move this issue forward within GCOS and GEOSS
  - Identify potential data center
  - Liaise with satellite community
- Lindenberg Workshop