# BREAKOUT SESSIONS

## Session 1A: Handling Atmospheric Information in Some Key Meteorological Disciplines—Climate

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### Synopsis

1. Opening Remarks:

- Prof. Rasmusson:
  - In scientific terms the climate community is no longer viewed as a component of meteorology. Rather, meteorology is a component of an integrated land/atmospheric/ocean-climate/chemical/biological system. Therefore, physical meteorological data is just one component of a broad array of climate system data.
  - There is no dedicated "operational" global climate observing system. Climate activities use data from operational systems. However, there are distinct differences between data for weather applications and data for climate applications:

| Data for weather applications | Data for climate applications |
|---|---|
| Emphasis on real-time. Products quickly obsolete. Value of data decreases with time, weak motivation for archiving | Emphasis on longer-term, retrospective analysis (except initial conditions for climate forecasts). Value of climate data increases in value with time. This provides strong motivation for archiving data, post-use QC of data |

  - Non-real-time operational observation networks include:
    - ◊ Regional mesonets
    - ◊ Drought monitoring (USDA) systems, including Surface/subsurface monitoring (T, soil moisture), Surface radiation (SURFRAD)
    - ◊ Ice/snow cover
    - ◊ Satellite monitoring of land/surface conditions
  - Climate data products include current climate conditions/diagnostics and climate predictions.

- There is a need for an inventory of observations that are being produced but that are not currently available in real-time. Constraints on distribution include real-time transmission, QC, and cost.

- Dr. Schiffer:
  - The NRC report: A Climate Services Vision
    - ◊ Underscores the national need for (a) improved climate observations and forecast systems and (b) effective planning to promote transitions from research to operations.
    - ◊ Recognizes the need for investment to establish a strong ocean and atmospheric community in the US.
    - ◊ Emphasizes need for stronger collaborative efforts in developing community predictive models and institutionalizing the transition process.
    - ◊ Is consistent with the BASC 21st Century report imperatives, i.e., need to
      - – Develop specific plan for optimizing global observations taking into account wide range of requirements for weather, climate, air quality, and predictive models.
      - – Seek commitment for new capabilities to observe critical variables such as water (all phases), wind, aerosols, and chemical constituents.
  - The 10 climate monitoring principles (Karl, et al. 1995):
    - ◊ Management of network change
    - ◊ Parallel testing
    - ◊ Metadata
    - ◊ Data quality and continuity
    - ◊ Integrated environmental assessment
    - ◊ Historical significance
    - ◊ Complementary data
    - ◊ Climate requirements
    - ◊ Continuity of purpose
    - ◊ Data and metadata access
  - Absolute calibration and stability in measurements are essential.

2. <u>Group Discussion</u>:

- Based on experience with the USGCRP Data Group, a decision must be made on what data will be funded so that it will be available for purposes other than what was originally intended.
- On the need for a global climate monitoring network.
  - NOAA OAR's CMDL network is a climate monitoring network but it is geographically limited.
  - NCDC archives surface observational data, including ASOS and COOP data. Doing well with temperature data, but precipitation data is a concern due to the variability in rain gauge capabilities and siting issues.
  - In addition to the data available from systems like ASOS and COOP the climate community needs soil moisture and solar radiation.

- Global Climate Observing System shortfalls:
  - Need for integrated global observing system (well-articulated).
  - Existing CMDL station are geographically limited.
  - Climate record depends upon existing operational components (*in situ* and space-based) but there are known problems, such as humidity and precipitation.
- Future System – Climate Reference Data Network not fully funded – should look at dual-use, providing data for research and in real-time for operations.
- Satellite system making progress – NPOESS station keeping and improved calibration.
- Many parallel efforts underway – need to foster better coordination between operators and users (USGCRP, WCRP, …).
- Need to consider other sources of information, e.g., state transportation, local mesonets, etc…(include calibration and transformation of data).

3. <u>Recommendations:</u>

- Fully fund Climate Reference Data Network, explore dual-use (real-time data for operations).
- Identify impediments to real-time transmission of data from climate observation systems (dual-use).
- Need for integrated global observing system.
  - Consolidation of requirements
  - Prioritization is essential
- Inventory sources of data for climate record.
- Identify impediments to data sharing.
- Improved coordination required among ongoing efforts that are in parallel. Need to rely on:
  - Data assimilation for products
  - Integrated systems (end-to-end)
  - Instrumentation development (new concepts, improved calibration)