Discussion: Finding the Way Forward

Strawman ideas…..

Photo: Peter Guest, SHEBA, 1998,
http://www.weather.nps.navy.mil/~psguest/sheba/pictures/maui_rescue.html

Workshop Objectives

- Share results on applications that rely on fluxes, and look at flux requirements implied by applications.
- Share results on gridded flux products and regional observational (process) studies.
- Articulate a prioritized plan for improved fluxes.
- Disseminate findings:
  - *J. Climate* (AMS) special collection (submissions due October 1)
  - US CLIVAR Variations
  - EOS Workshop summary

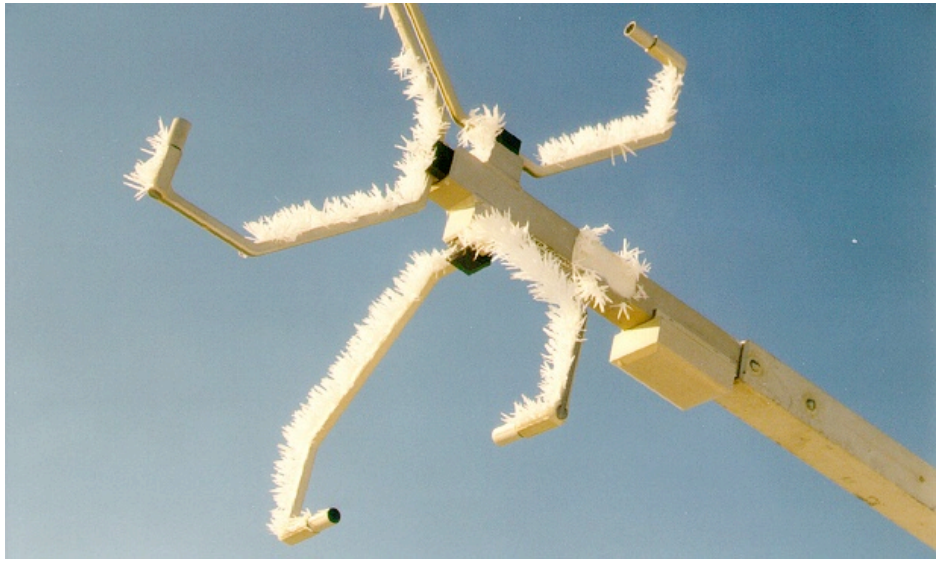

Photo: Peter Guest, SHEBA
http://www.weather.nps.navy.mil/~psguest/sheba/pictures/artsy.html

Disseminate results

- *J. Climate* (AMS) special collection (submissions due October 1)
  - Any high latitude contributions.
  - Need not have been presented here.
  - Other AMS journals OK too (*JPO*, *J. Tech*)
- US CLIVAR Variations/SEAFLUX
  - Encourage plenary speakers to write summaries (500-750 words, 1-2 figures), opporunity to editorialize.
- EOS Workshop summary, GEWEX, NASA NEWS

5 Strategies for Improving Fluxes

- Analyze existing data (mostly basic meteorological variables - temperature and humidity). Ensure data quality and make data more readily accessible.
- Expand field observations. Target direct flux observations and high-quality, high-temporal resolution data needed for satellite calibration/validation.
- Expand use of ships of opportunity and autonomous instruments.
- Make full use of satellite data, and expand the satellite observing system. Improve accuracy of flux related variables (e.g. air temperature, humidity, cloud properties.)
- Improve understanding of the physics underlying air-sea fluxes, and improve parameterizations.

Satellites

- Long-term objective for “Flux-Train” with surface wind (scatterometer), SST (microwave and infrared), near surface temperature and humidity (microwave and infrared profilers), near-surface wind (lidar), precipitation (scatterometer?).
- Before Flux-Train, will need to exploit existing data to limits. Encourage on-going work.
- Sensitivity tests. What do models and applications require of satellites in order to generate useful data? What are accuracy, precision, resolution specifications for in situ sensors? Sun synchronous multi-satellite (2/day obs) versus constellation?

Next generation SeaFlux

- SeaFlux (and GEWEX) original mandate through 2011. That's being extended, but this is still a juncture for evaluating objectives.
- Assessment. Focus on q_a and T_a (rather than fluxes). Need available data in one place, quality controlled. Can PODAAC serve as data repository? SURFA or SEAFLUX could hold gridded products. COAPS retain in situ data? WCRP guidelines, legacy, etc.
- Make sure products are put through tests with a variety of applications.
- Flux product intercomparison project (FIP?) (intercomparison of fluxes as applied to models and application efforts)
- Send representatives to MIP meetings….
- Pre-GHRSST activity.

Climate reanalysis

- Regional reanalysis focused on Arctic and Southern Ocean (some has already been done).
- Reanalysis with climate focus.
- Interdisciplinary reanalysis (IESA). Workshop in Baltimore, first week in November. Should have cross-fertilization between flux community and reanalysis community.

Observations (operational)

- Flux sensors on Gould to measure Drake Passage fluxes. [Fairall]
- Multiple buoys starting out. (4 OOI nodes/buoys planned; plus Meghan's Agulhas buoy) Propose sensors. Watch for data!
- Southern Ocean Observing System white paper: pushed for buoys and underway flux observations.
- Arctic Observing Network (SEARCH) mentions fluxes briefly. (Not in executive summary). Buoys, ships, ice stations.

Observations (process studies)

- New SHEBA-like program. Marginal ice? Year-round ice? Open water?
- Antarctic sea ice different from Arctic. Needs observations. Antarctic SHEBA!!
- High wind speed observations. (ESA initiative call for proposals coming in June 2011)
- Drake Passage ships next 2 years (space for instruments) (Russia)---geology mission but space. Open water or marginal ice.
- Potential for UAVs eventually. (In observing system documents.) Successful proof of concept in September 2009. Reluctance to use in high winds/hurricanes.
- Precipitation matters. Almost unknown over open water. Anything better than nothing. C-band radar?
- Priority field program? Planning workshop?
- Gas fluxes, gas fluxes through ice. More data, and finish analysis of IPY data.

Flux Accuracies and Applications