The SAMOS Data Assembly Center

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• **Current focus**: To improve the quality of meteorological and near-surface oceanographic observations collected in-situ on research vessels (R/Vs)

Science Goals:

- Creating quality estimates of the heat, moisture, momentum, and radiation fluxes at the air-sea interface
- Improving our understanding of the biases and uncertainties in global air-sea fluxes
- Benchmarking new satellite and model products
- Providing high quality observations to support modeling activities, process studies, and global climate programs

What is a SAMOS?

- Automated data logging system
 - Sampling interval of 1 minute or less
 - Continuous recording
 - Typically mounted on bow or on mast over wheel house



Courtesy: B. Walden, WHOI

- Typical observations:
 - Navigation: position, heading, course and speed over ground
 - Meteorology: true wind vector, air temperature, moisture, pressure
 - Oceanography: sea temperature, salinity, conductivity, florescence
- Additional capability:
 - Pitch, roll, heave, ship-relative winds, precipitation, multiple radiation components, visibility, ceiling height, swell and waves
 - Some direct flux measurements

SAMOS Data Collection

- Currently 24 R/Vs providing data when at sea
 - 16 operated by NOAA
 - *N. B. Palmer, Pisces* new in 2010
 - Additional UNOLS recruitment soon

| | | Number of ship days with data | | | |
|-------------------|----------------|-------------------------------|--------------------------|--|--|
| Vessel | Operator | 1/10/2007 - 30/9/2008 | 1/10/2008 - 30/9/2009 | | |
| Atlantis | WHOI | 296 | 299 | | |
| David Star Jordan | NOAA | 88 | 76 | | |
| Delaware II | NOAA | - | 84 | | |
| Fairweather | NOAA | 83 | 38 | | |
| Gordon Gunter | NOAA | 44 | 219 | | |
| Healy | USCG | 165 | 184 | | |
| Henry B. Bigelow | NOAA | 145 | 144 | | |
| Hi'ialakai | NOAA | 203 | 150 | | |
| Ka'imimoana | NOAA | 202 | 154 | | |
| Knorr | WHOI | 306 | 359 | | |
| Lawrence M. Gould | NSF/Raytheon | 260 | 331 | | |
| Miller Freeman | NOAA | 190 | 121 | | |
| Nancy Foster | NOAA | 178 | 147 | | |
| Oceanus | WHOI | 113 | 264 | | |
| Okeanos Explorer | NOAA | - | 35 | | |
| Oregon | NOAA | 85 | 183 | | |
| Oscar Dyson | NOAA | 214 | 201 | | |
| Oscar Elton Sette | NOAA | - | 99 | | |
| Polar Sea | USCG | - | 2 | | |
| Rainier | NOAA | 110 | 20 | | |
| Ronald H. Brown | NOAA | 161 | 173 | | |
| Southern Surveyor | IMOS/Australia | 85 | 168 | | |
| | | 2928 | 3451 | | |

FY2008 (top) vs. FY2009 (bottom)



SAMOS Shipboard Automated Meteorological and Oceanographic System

http://samos.coaps.fsu.edu

Flow of SAMOS Observations

- Legacy data flow:
 - ship tech → chief scientist → ?
- SAMOS Initiative automates data flow
 - Ensures consistent data stewardship
 - Keeps data and metadata together from ship → archive
- Detailed metadata is collected for all vessels.



SAMOS Shipboard Automated Meteorological and Oceanographic System

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SAMOS Data Processing

- Ship to Shore
 - Data transmitted in daily email attachment via broadband satellite comms.
 - Previous day's data sent near as possible to 0000 UTC.
- Automated processing
 - Combines vessel metadata with daily observations
 - Conducts preliminary quality evaluation
- Analyst visually monitors data from each vessel (not 24/7)
- Research quality products developed with additional visual quality evaluation



SAMOS Data Serving

- Data distribution
 - http://samos.coaps.fsu.edu/
 - Direct access to metadata for all participating vessels
 - Graphical tools will allow users to search for available data and quality information.
 - New THREDDS server
- Archival
 - Agreement in place with NODC (U.S.) and NCAR for long term archival of all observations.
 - Soon provide data to ICOADS

Data Availability

The purpose of this page is to allow the user to get a rough idea of the quality of data for a particular day and ship. In some cases multiple files may exist for a single day and ship. In these cases quality is calculated for the overall day, meaning an overall quality for the pieces as a whole are calculated. To see the quality of each piece individually click on the colored box aligning the ship and day desired.

| Click here | e to download | data | | | | | | | | |
|----------------|---|-------|-------------|--------------------|---|---|----------------|-------|--|--|
| | Good Data (0-5% flagged as suspect) | | | | Use v | Use with Caution (5-10% flagged as suspect) | | | | |
| | Use with Caution (>10% flagged as suspect | | | | No Data Available | | | | | |
| | | | | | | | | | | |
| | | | | | | LAURENCE | NATHANIEL | RON | | |
| | ATLANTIS | HEALY | HI'IALAKAI | KA'IMIMOANA | A KNORR | M. GOULD | PALMER | BROWN | | |
| 03/15/09 | | | | | | | | | | |
| 03/14/09 | | | | | | | | | | |
| 03/13/09 | | | | | | | | | | |
| 03/12/09 | | | | | | | | | | |
| 03/11/09 | | | | | | | | | | |
| 03/10/09 | | | | | | | | | | |
| 03/09/09 | | | | | | | | | | |
| 03/08/09 | | | | | | | | | | |
| 03/07/09 | | | | | | | | 1 | | |
| 03/05/09 | | | | | | | | 1 1 | | |
| 03/04/09 | | | | | | | | | | |
| 03/03/09 | | | | | | | | 1 1 | | |
| 03/02/09 | | | | | | | | | | |
| 03/01/09 | | | | | | | | | | |
| | | | | | | | | | | |
| Data Dow | nload | | | | - | | | | | |
| Data Typ | e | | • All data | | Good data | a only (0-5% f | lagged as susp | bect) | | |
| Choose a | a ship | | | Ĥ | EALY (NEPP) | - | | | | |
| or multiple st | hips (ctri-click or | | | H K | HI'IALAKAI (WTEY) KA'IMIMOANA (WTEU) | | | | | |
| аурю коў-сі | loky, or no snips | | | KI LI N R | KNORR (KCEJ) LAURENCE M. GOULD (WCX7445) NATHANIEL PALMER (WBP3210) RON BROWN (WTEC) | | | | | |
| Dates | | | • All dates | | Specified Range | | | | | |
| Compres | sion | | | | .tar.gz 🗘 | | | | | |
| Click dov | wnload | | | | download | | | | | |

http://samos.coaps.fsu.edu

Services Provided

- Routine data quality evaluation by experienced marine meteorologists
 - At sea notification of data problems
 - Near real-time distribution of science observations
- Metadata tracking (and inclusion into all data files)
- Decision support for vessels wishing to improve their sensor suites and/or instrument exposure
 - Contribute to new research vessel design
- On board evaluation of ship-installed SAMOS via comparison to NOAA/ESRL portable flux standard

For your consideration...

- What works
 - Seeking input from all parties responsible for data (at sea technicians, data centers, scientists, government)
- Where problems arise
 - Assuming manual updates to metadata are sufficient
 - Expecting scientists to send data to DAC
 - Including data management as part of science proposals
- What is needed
 - Coordinated tracking of cruises (Ship, PI, what sampled)
 - A funded mechanism to bring underway DACs together (e.g., WOCE DPC)
 - Recommendation for routine surface observations to support GO-SHIP (e.g., PAR, Oxygen, Florescence, etc.)
 - Infrastructure to manage bottle samples for TSG cal/val

Questions?



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