The Research Vessel Surface
Meteorology Data Center Archive

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www.coaps.fsu.edu/WOCE
Who we are

posium

Data center specializing in the quality review of meteorological data collected on research vessels (R/Vs)

- Recent focus is on high time resolution (1-15 min. intervals) data from automated instrument systems

- We employ quality control procedures developed in-house to create value added data products

- We freely distribute all products to science community and apply them to current scientific problems
Objective

- To produce a subset from the R/V archive suitable for inclusion in a global marine data set (e.g., COADS)
David M. Legler and James J. O’Brien formed the Data Assembly Center (DAC) for WOCE in 1993

- WOCE archive contains meteorology data from over 400 hydrographic cruises

- Expanded early on to include all surface meteorology data from TOGA/COARE

- Late 1990s, added data from select international, UNOLS, and NOAA R/Vs

- With expansion beyond WOCE, renamed archive R/V Surface Meteorology Data Center (RVSMDC)

http://www.coaps.fsu.edu/RVSMDC/
Our archive contains high-time resolution (<15 min.) meteorology data for over 100 cruises.

Cruises cover all parts of the global oceans.
R/V data coverage

- Excellent R/V data coverage outside main shipping lanes
- *Knorr* cruise track covering 28 days west of South America
- Only a handful of merchant ship observations available for the same time period (within 1 deg. of *Knorr* cruise track)
R/V data coverage

- Collection of automated weather data steadily increased in the 1990s
- Hundreds of days with quality evaluated ship observations are available
- Expansion to non-WOCE cruises has added substantial data to our archive
All R/V data are available in netCDF or ASCII formats.

Files contain detailed metadata that include instrument height and sensor type, units, time averaging period, ship ID, cruise ID (when available), and the facility that provided the data.

- Metadata collection has been a focus of our center
- Accurate metadata are essential for scientific application of the observations

The missing value used in our files cannot be confused with any valid R/V navigation or meteorology data.
Automated and visual quality control adds consistency to the observations (Smith et al. 1996, COAPS Rep. 96-1)

- Visual inspection identifies severe flow distortion, sensor heating, and acceleration errors.

- Quality control led to major improvements in automated marine weather observations (e.g., true winds, Smith et al. 1999, *J. Atmos. Oceanic Tech.*).
RVSMDC plans to create a subset of automated R/V data for inclusion in global marine data sets (e.g., COADS).

What can we provide?

- **Standard data**: True wind speed and direction, pressure, dry air, wet-bulb, dewpoint, and sea temperatures, and some cloud height

- **Supplemental data**: Ship-relative wind direction and speed, relative and specific humidity, rain rate, radiation (many types), and high-resolution navigation (latitude, longitude, heading, speed and course over ground, speed over water)
R/V superobs

- How best to create superobs?
- Temporal frequency of subset?
- Length of average at subset times?
- Multiple sensor platforms?
- How to incorporate RVSMDC flags?
- Metadata issues?
R/V superobs: frequency

- Desire a reasonable measure of atmospheric variability
- One-minute data (blue) provide too much detail when compared to standard marine observations
- Standard three (green) or six (purple) hourly superobs lack desired content.
- Hourly superobs (red) provide a good compromise
We found little variation in hourly superobs when using centered 10, 20, and 30 minute averages.
R/V superobs: quality flags

- RVSMDC currently applies alphabetic flags at a parametric level (one flag for each observation)

- Suspect data currently treated as missing

- Alternative: create average flag for superob
Metadata is central to scientific application of marine data. We archive instrument type, location, height, original units, measurement type (pressure, sea temp., radiation), etc. How best to maintain these elements in a combined marine data set?
Future: RVSMDC Archive

- Funded to expand R/V archive to include surface meteorological data from NOAA R/Vs Ronald Brown and Ka’imimoana and automated observations from select Volunteer Observing Ships.

- Provide superobs from automated R/V archive for inclusion into global marine data resource.

- Continue to seek additional resources to archive more UNOLS and international R/V data.