

# The Research Vessel Surface Meteorology Data Center Archive

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[www.coaps.fsu.edu/WOCE](http://www.coaps.fsu.edu/WOCE)



## *Who we are*

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- ◆ 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*

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- ◆ To produce a subset from the R/V archive suitable for inclusion in a global marine data set (e.g., COADS)

# *Archive History*

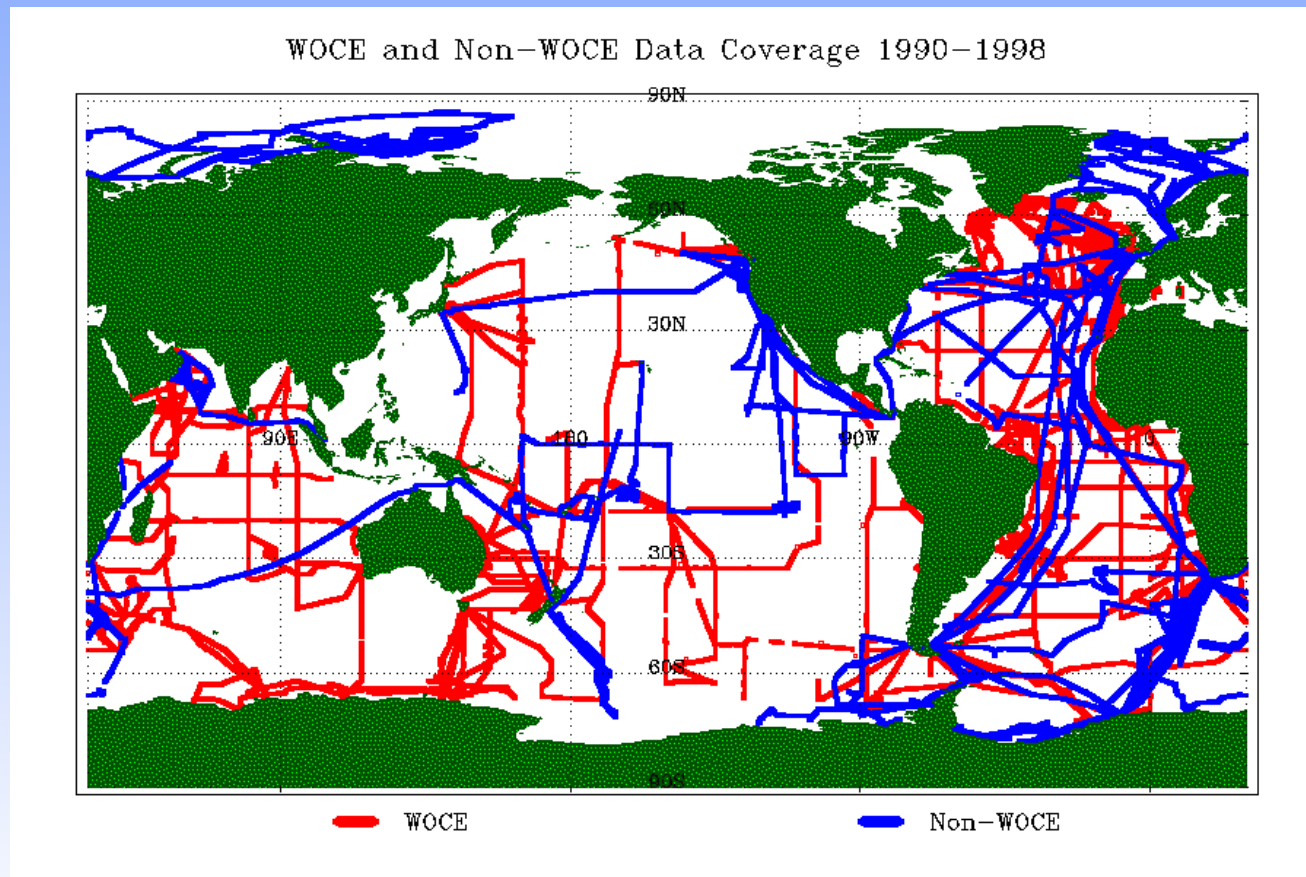
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- ◆ David M. Legler and James J. O'Brien formed the Data Assembly Center (DAC) for WOCE in 1993
  - ◆ WOCE archive contains meteorology data from over 400 hydrographic cruises
- ◆ Expanded early on to include all surface meteorology data from TOGA/COARE
- ◆ 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/>

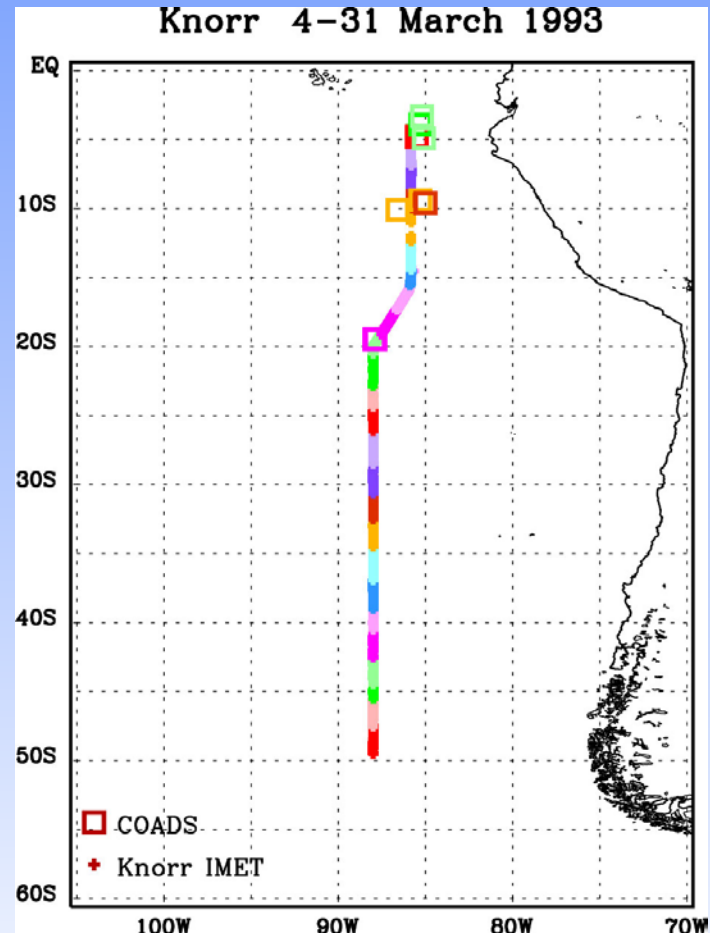
# *R/V data coverage*

- ◆ Our archive contains high-time resolution (<15 min.) meteorology data for over 100 cruises
- ◆ Cruises cover all parts of the global oceans



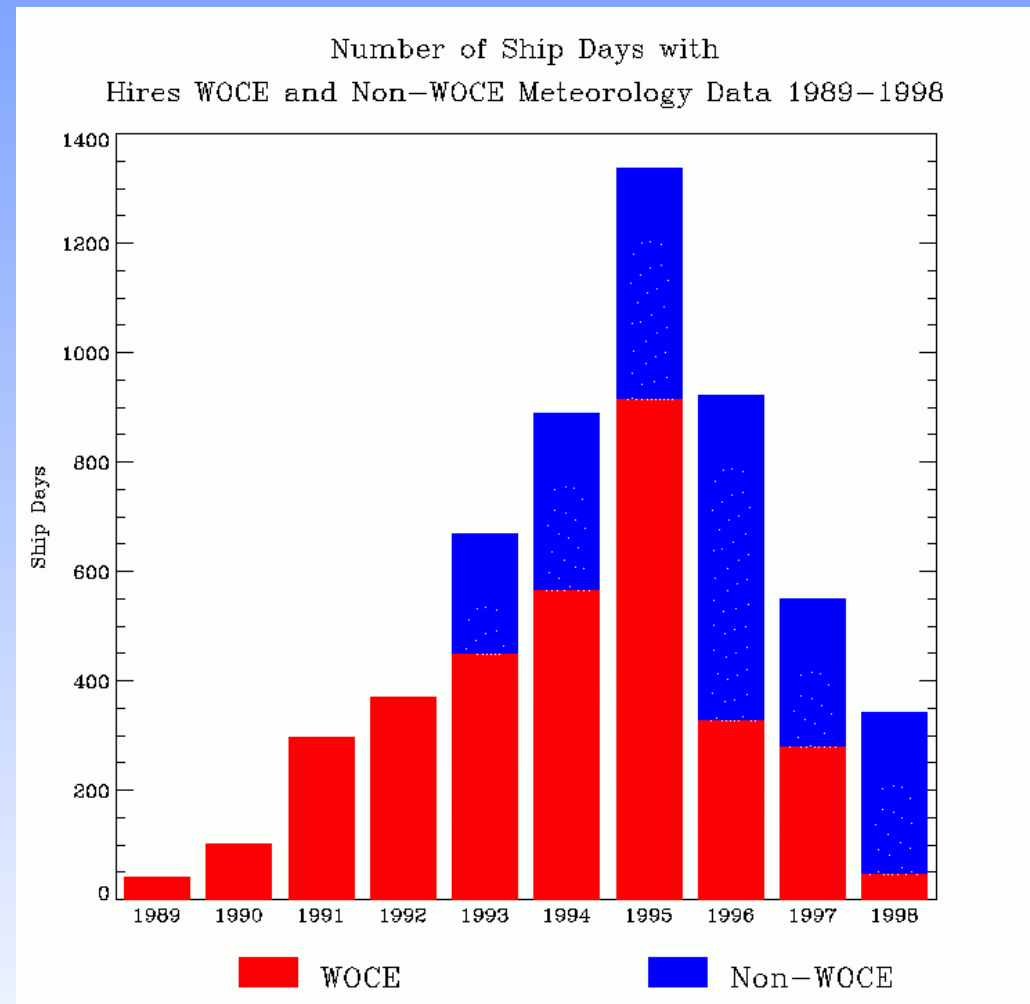
# R/V data coverage

- ◆ 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



## *R/V data format*

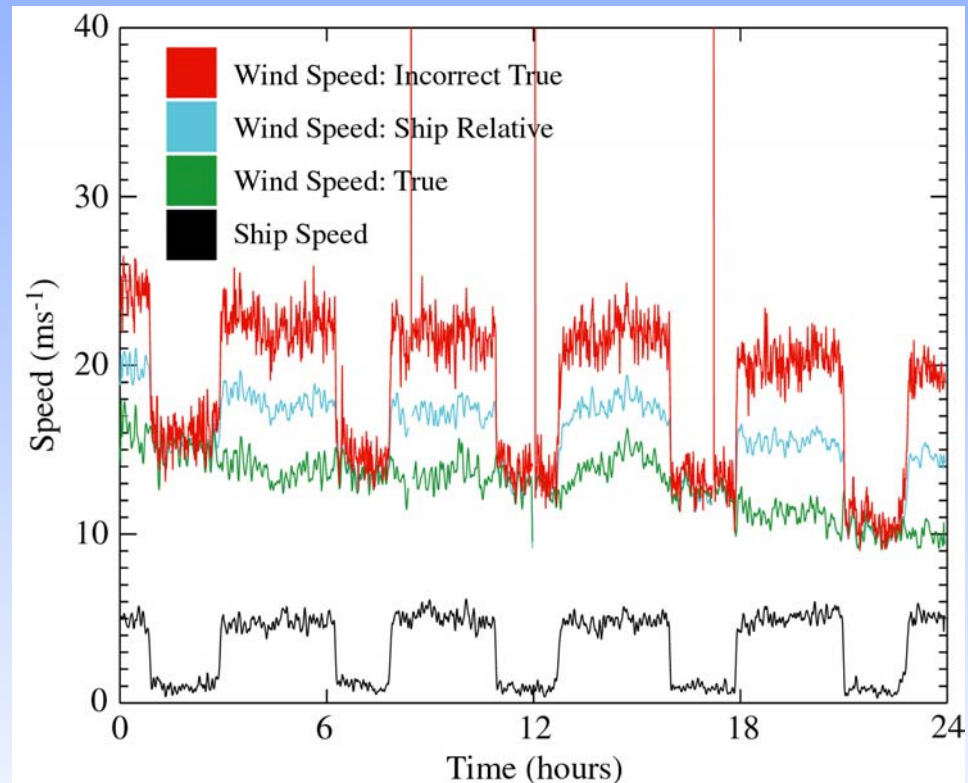
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- ◆ All R/V data are available in netCDF or ASCII formats.
- ◆ Files contain detailed metadata that include instrument height and sensor type, units, time averaging period, ship ID, cruise ID (when available), and the facility that provided the data.
  - ◆ 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



# *R/V quality control*

- ◆ 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.*)



## *R/V superobs*

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- ◆ 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)

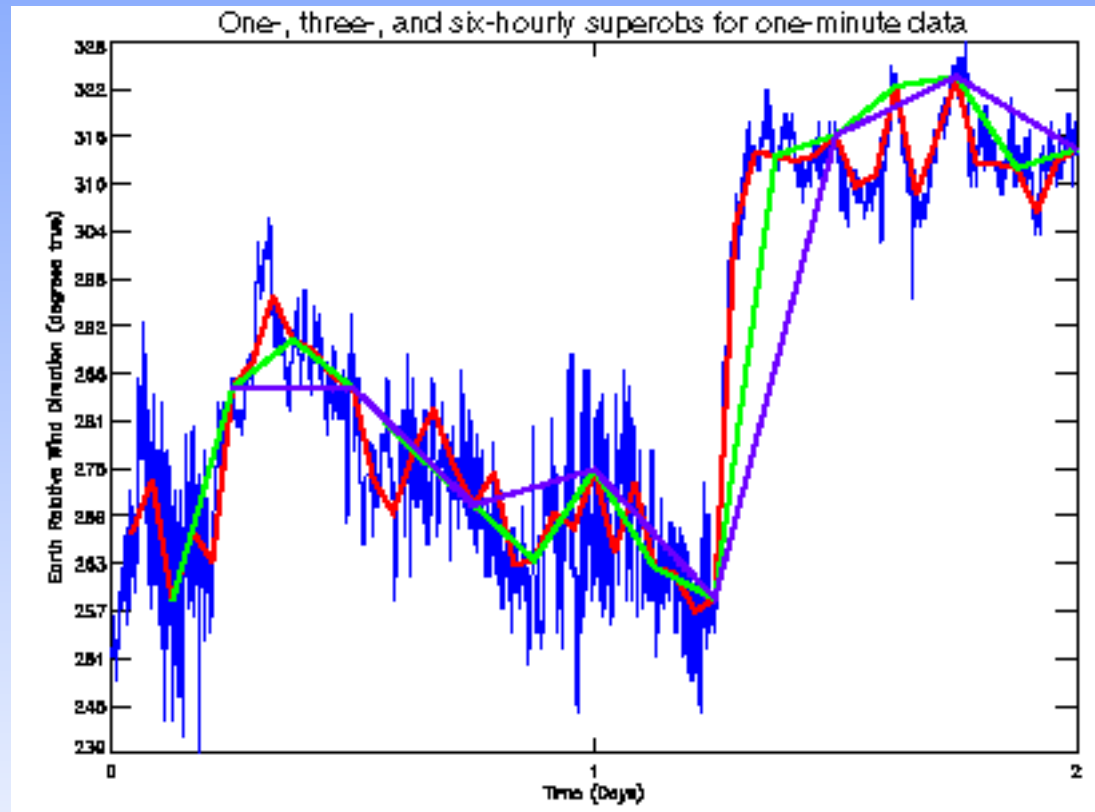
## *R/V superobs*

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- ◆ 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*

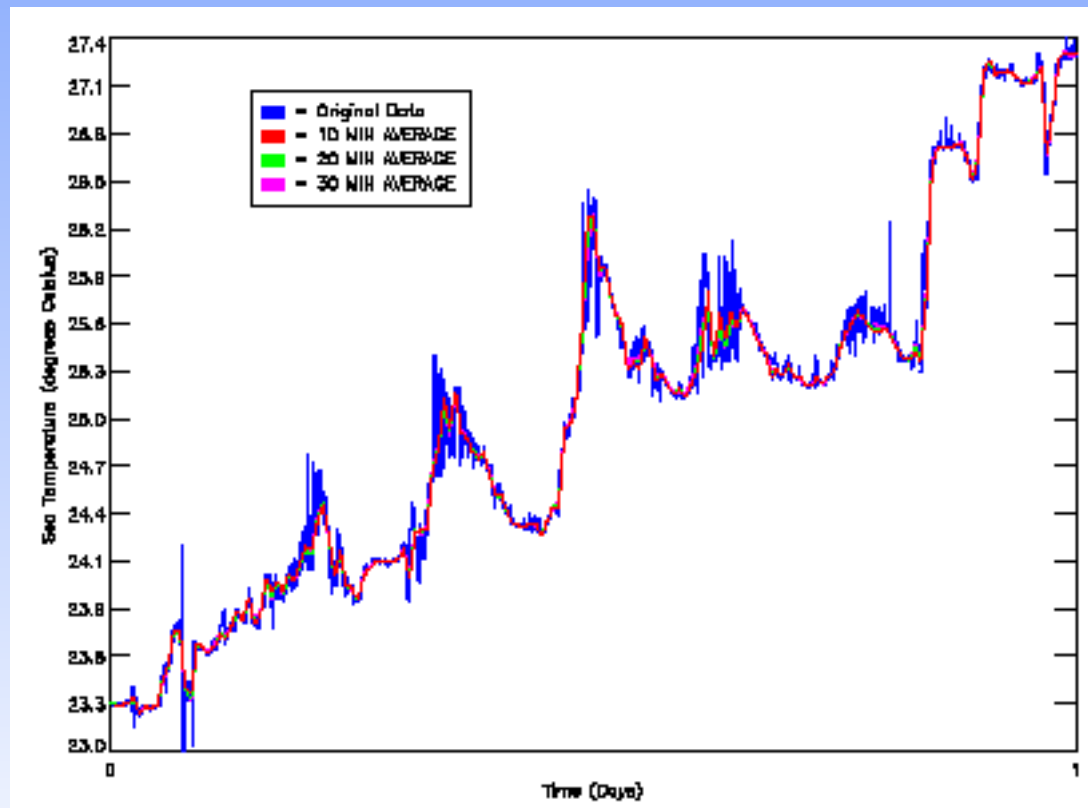
- ◆ Desire a reasonable measure of atmospheric variability
- ◆ One-minute data (blue) provide too much detail when compared to standard marine observations
- ◆ Standard three (green) or six (purple) hourly superobs lack desired content.
- ◆ Hourly superobs (red) provide a good compromise



## *R/V superobs: averaging*

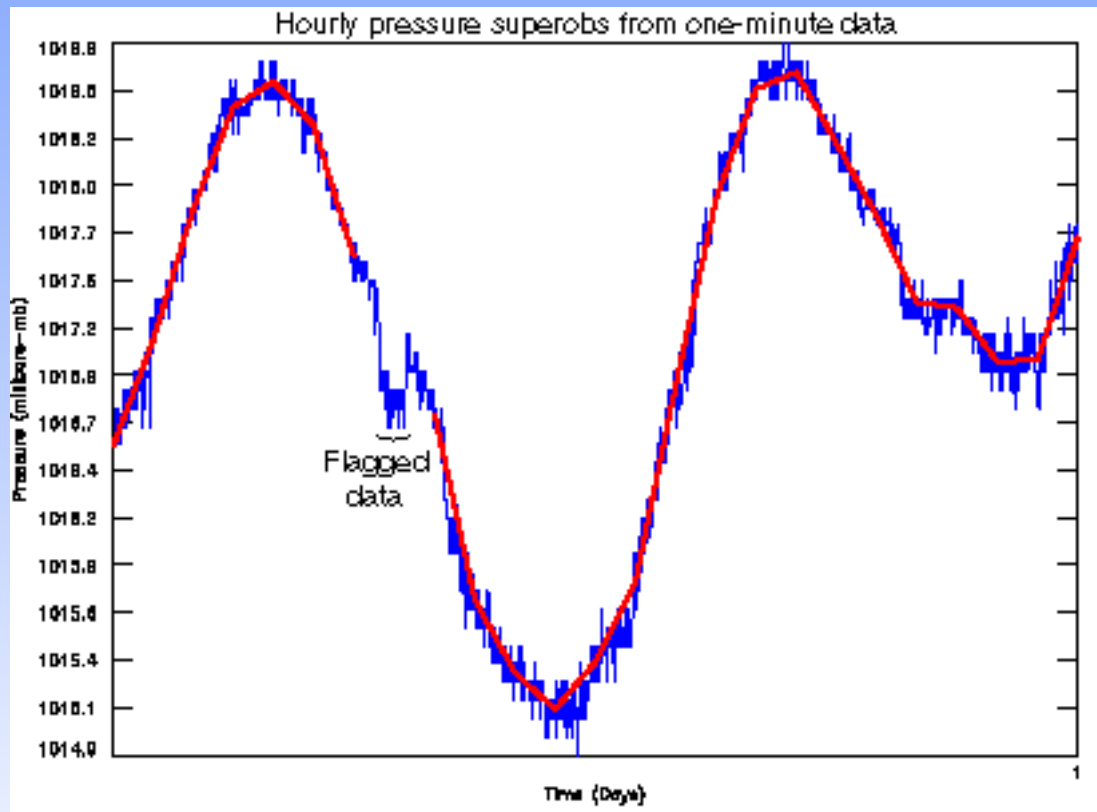
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- ◆ We found little variation in hourly superobs when using centered 10, 20, and 30 minute averages



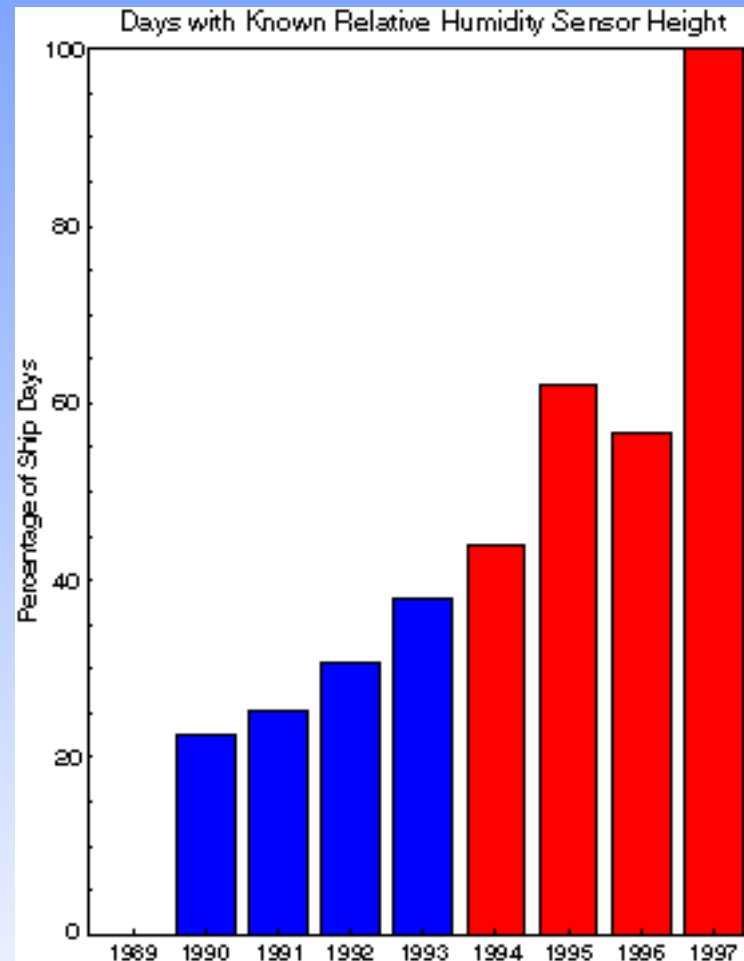
# *R/V superobs: quality flags*

- ◆ 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



## *R/V superobs: metadata*

- ◆ 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*

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- ◆ 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