THE NATIONAL DATA BUOY CENTER INTEGRATED OCEAN OBSERVING SYSTEM® DATA ASSEMBLY CENTER

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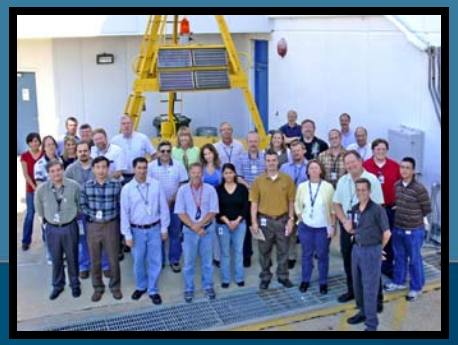
Data Management Services

- Constitute a Comprehensive End-to-End Process
  - Data Acquisition
  - Quality Control
  - Metadata Cataloging and Validation
  - Storage and Retrieval
  - Dissemination
- Support Field Service Operations



INTEGRATED OCEAN OBSERVING SYSTEM

IOOS

Why the NDBC DAC?

Platforms are placed in harsh and hard to reach environments.

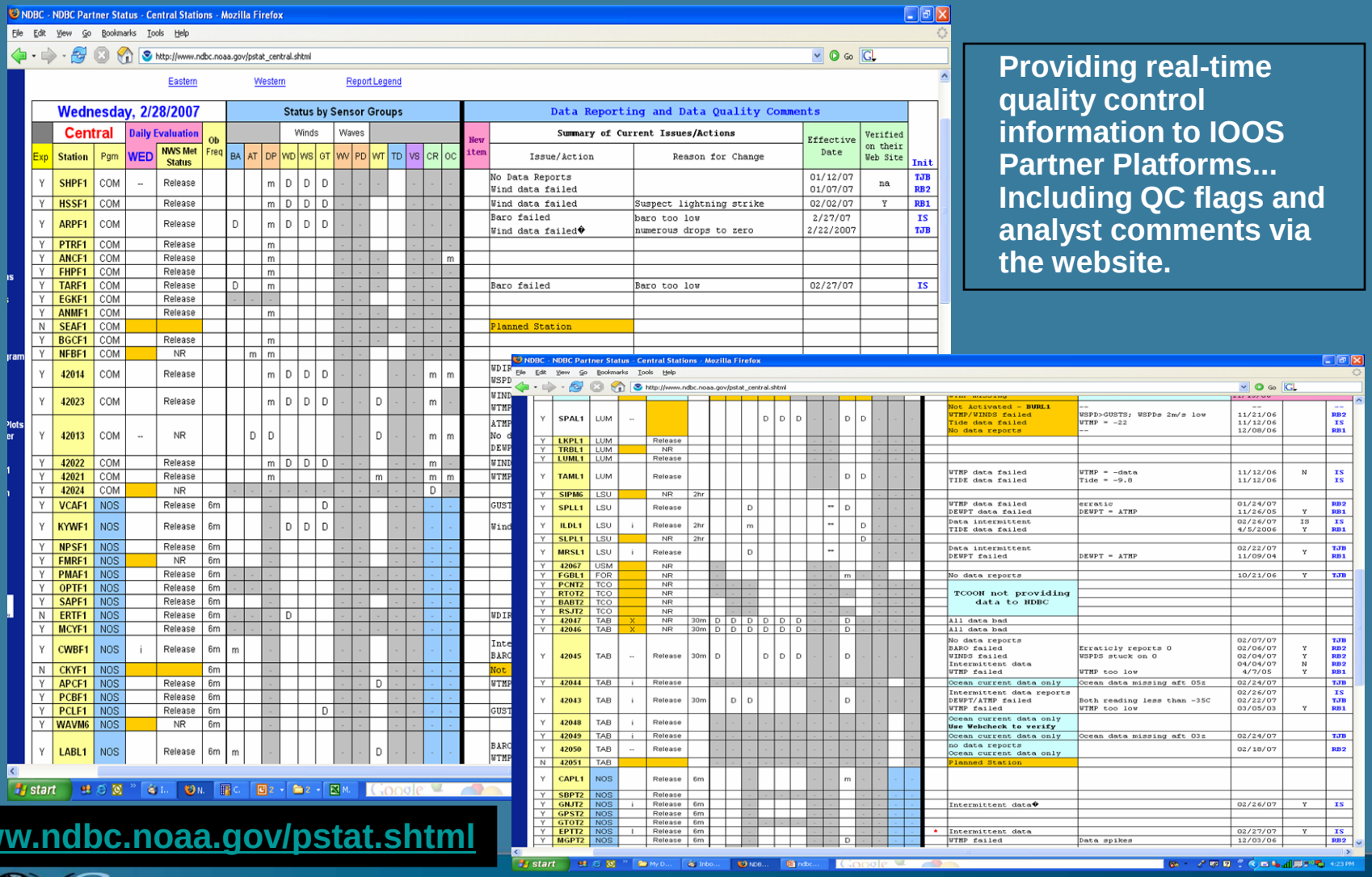
Station visits occur every two to three years. Platforms and instruments must be carefully monitored during station operations.

Failing anemometers, inaccurate barometer readings, low power levels, and irregular wave spectrums all contribute to poor marine weather/ocean observations, and the need for trained eyes to stop the data before they are released to the public.

Today's IOOS® Data Assembly Center

- Supports platform integration, test and deployment activities
- Maintains a centralized library of current parameter load files (metadata)
- Assigns WMO identifiers to release observations to the GTS
- Supports field deployments by monitoring platform during delivery
- Provides forecasts for weather and sea-state during field missions
- Constantly monitors the health and status of the platforms
- Reviews automated quality control flags and location status
- Ensure real-time data dissemination and reports any communication outages
- Maintains platform metadata for historical purposes
- Archives accurate datasets at NOAA's climate data centers

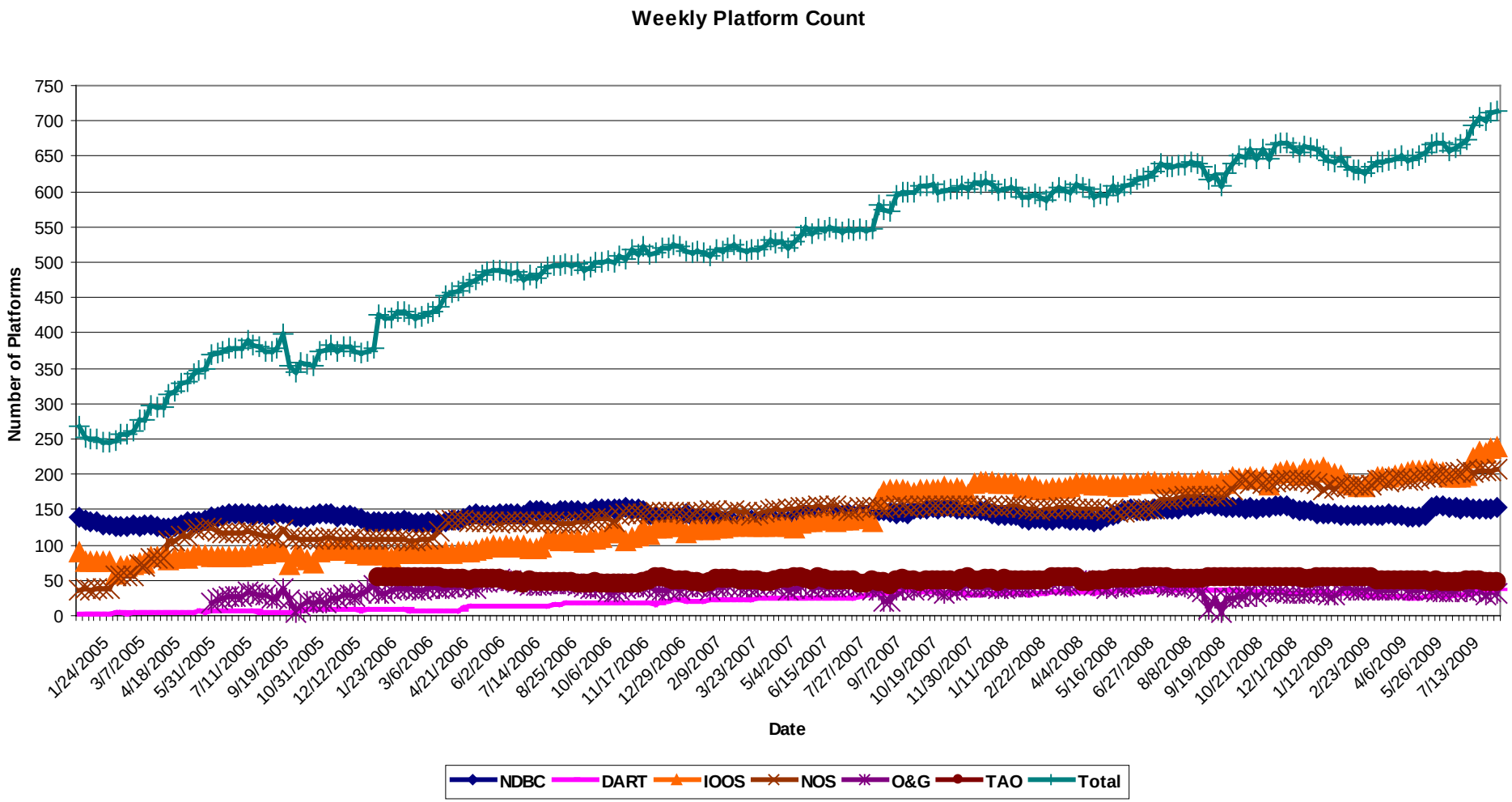
U.S. IOOS Partner Support



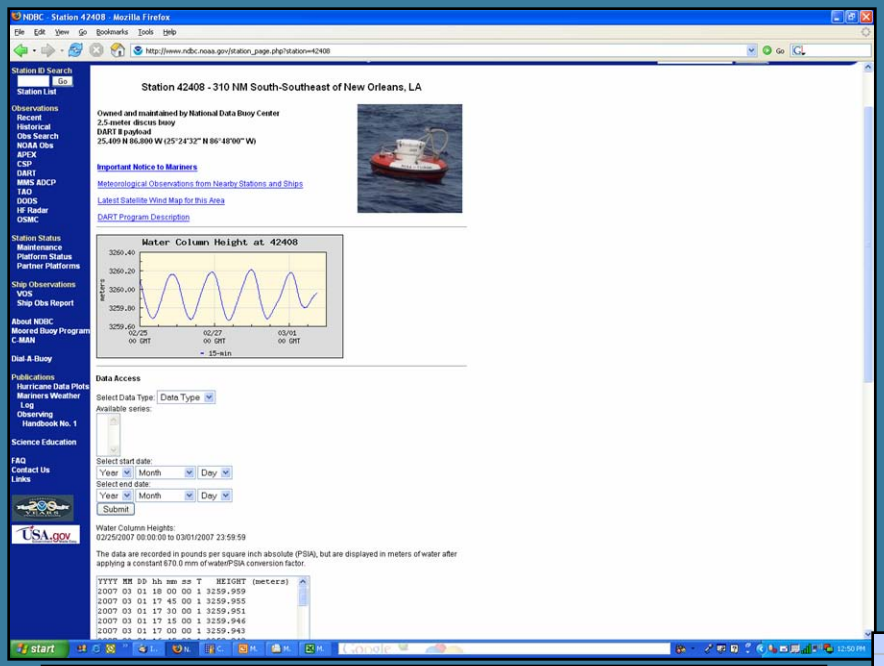
Providing real-time quality control information to IOOS Partner Platforms... Including QC flags and analyst comments via the website.

http://www.ndbc.noaa.gov/pstat.shtml

Growth of Platforms



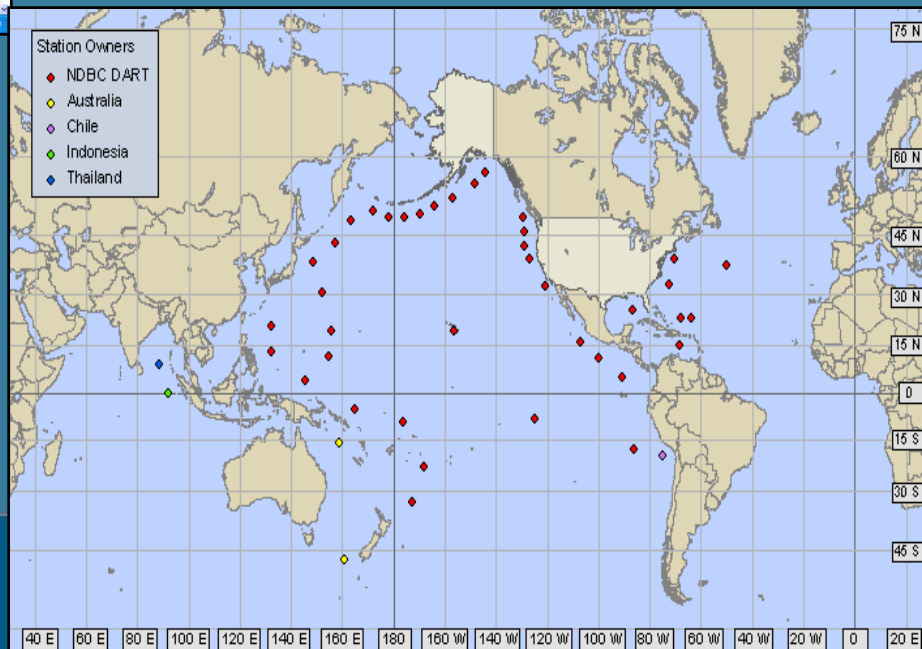
Tsunameter
Data Assembly Center



http://www.ndbc.noaa.gov/dart.shtml

The worldwide tsunami observation network also requires a real-time, data assembly center to provide continual monitoring and quality control of Deep-ocean Assessment and Reporting of Tsunamis (DART®) water pressure/height observations. The Data Assembly Center monitors the various real-time transmission of DART® messages depending on the operating mode of the bottom pressure recorder.

Transmission of real-time water level heights occurs when the tsunami detection algorithm is triggered by a seismic event, when interrogated by the NOAA Tsunami Warning Centers (TWCs) or NDBC, or at pre-scheduled intervals. The bottom unit transmits the messages to the surface buoy via underwater acoustics systems. The surface buoy is equipped with duplicate and independent communications systems to transmit data to the Iridium satellite and then on to the Iridium Gateway in Arizona, U.S., where the data to routed to the NDBC server.



Tropical Atmosphere Ocean Data Assembly Center

http://tao.noaa.gov

- Processing of Automated Distribution Service messages from Service Argos. It uses both the TAO calibration database and calibration files to convert raw data to engineering units and also calculates buoy positions. An automated real-time QC is performed for gross error checking and then the TAO database is updated with the corrected data.
- The TAO Real-time Data Monitoring Subsystem supports daily, weekly, and monthly QA/QC activities by providing on-demand data checking functionality to the DAC. In addition to the automated gross error checking, the real-time data monitoring subsystem provides on-demand reports for once-daily, thorough examination of all current buoy data and detailed review of the real-time data.
- The reports cover daily QC, platform transmissions, deployment, present positions, Argos positions, latitude/longitude time series, data plots, etc.

Voluntary Observing Ship (VOS) Project

The United States Voluntary Observing Ship Project Mission
The mission of the Voluntary Observing Ship (VOS) project is two-fold: (1) to collect and disseminate critical real-time maritime weather observations through the recruitment and support of ships to fulfill National needs and International agreements supporting commerce, forecasts and warning programs, and the Safety Of Life At Sea (SOLAS) worldwide, and (2) to define the global climate and help measure extreme weather events, climate variability, and long-term climate changes. VOS operates at no cost to the vessel, with communication charges, observing equipment and reporting supplies furnished by the National Weather Service.

Port Meteorological Officers

Port Meteorological Officers (PMOs) support observing programs aboard Voluntary Observing Ships. They are responsible for recruitment of new vessels as observers, and also for ensuring the quality of observations from vessels actively participating in the program.

http://www.vos.noaa.gov

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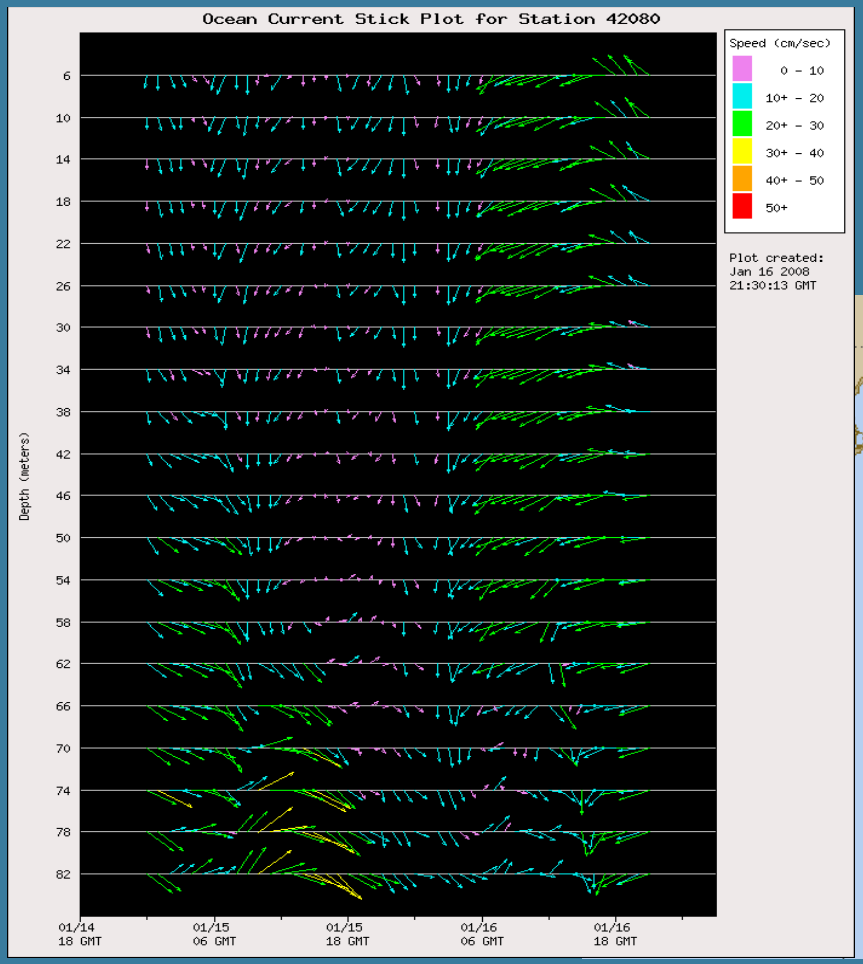
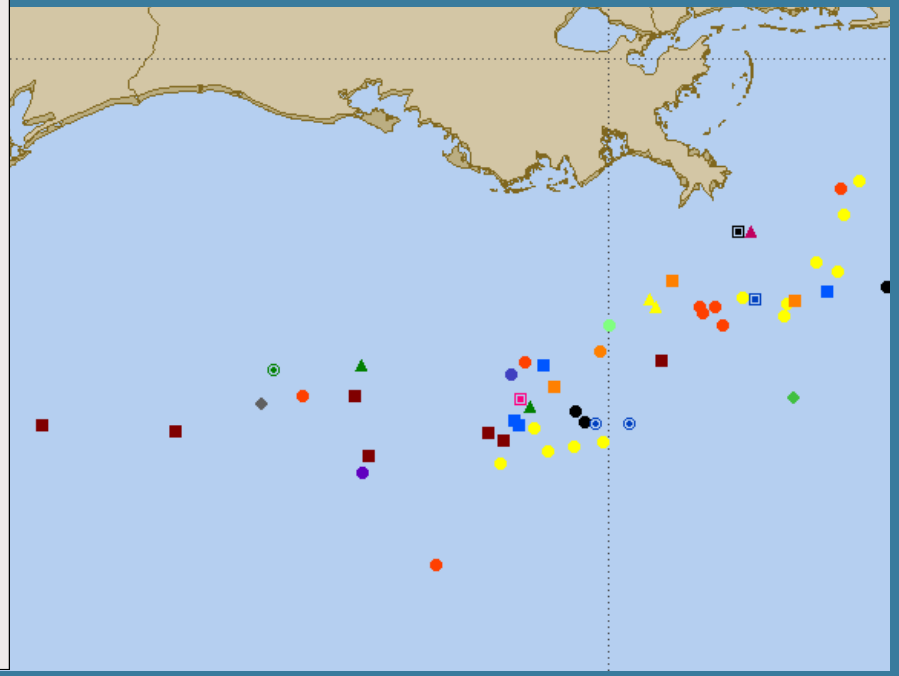
Oil and Gas Partners

Apply quality control to real-time ADCP data from deep-water oil platforms and rigs.





http://www.ndbc.noaa.gov/maps/ADCP_WestGulf.shtml

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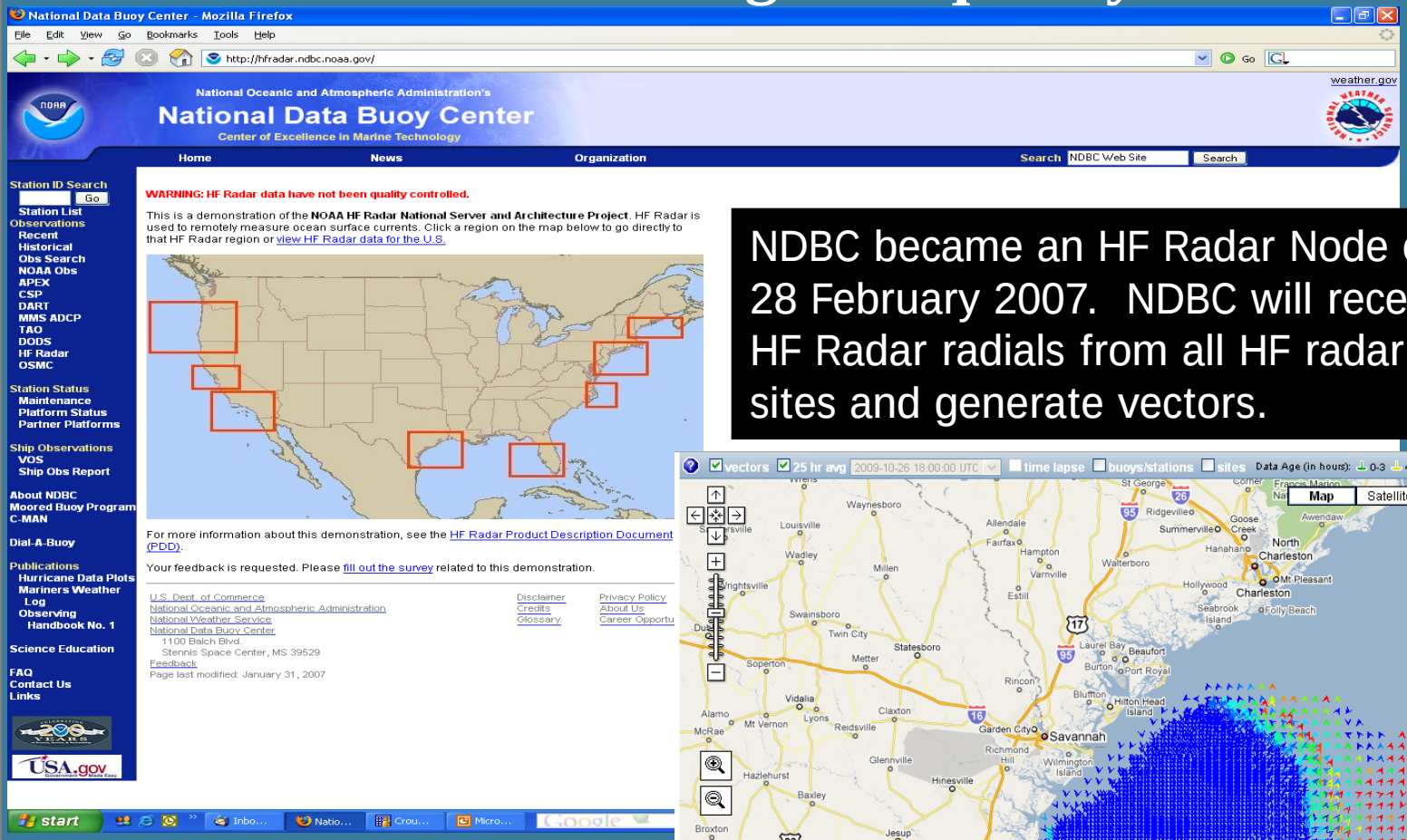
NOAA IOOS® High Frequency Radar



NDBC became an HF Radar Node on 28 February 2007. NDBC will receive HF Radar radials from all HF radar sites and generate vectors.

http://hfradar.ndbc.noaa.gov

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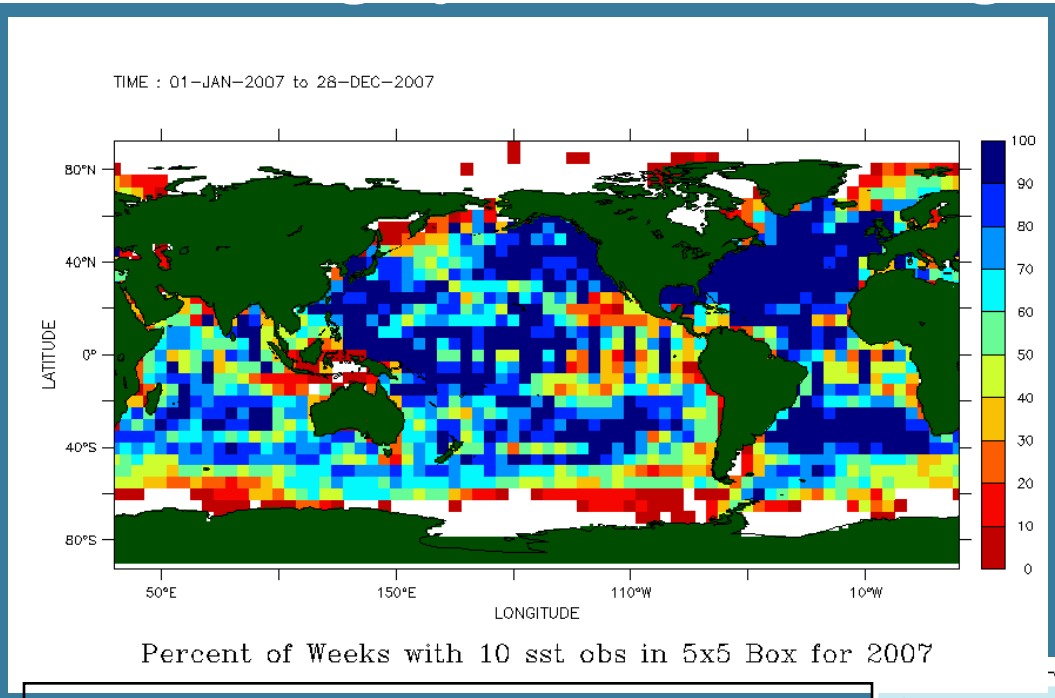
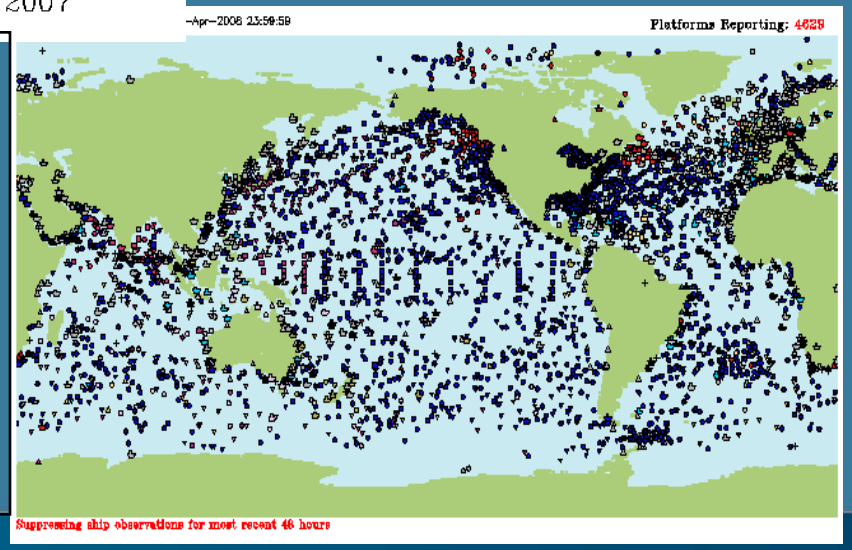
Observing System Monitoring Center / OPeNDAP

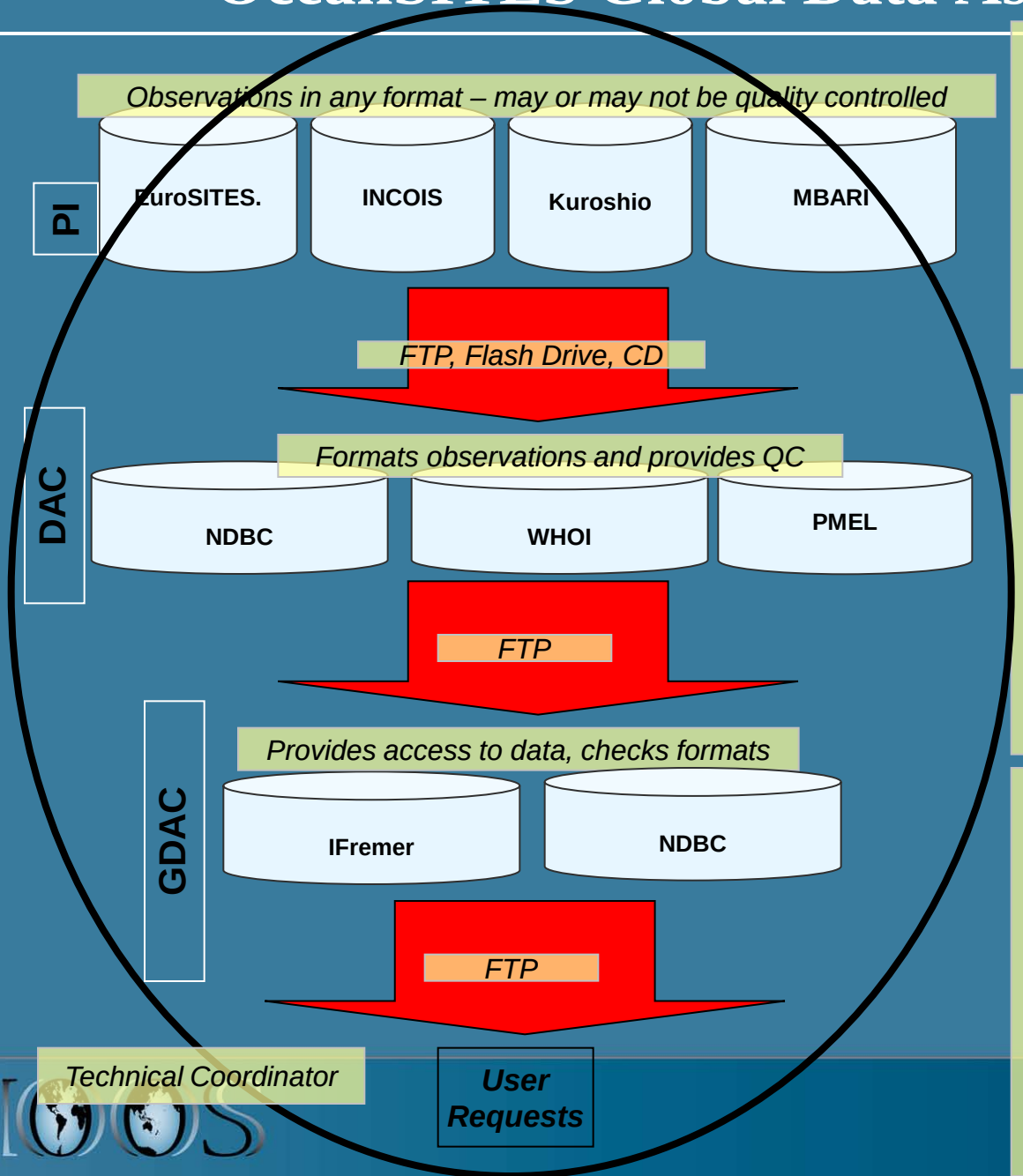


http://www.osmc.noaa.gov

Understanding climate variability requires the development, maintenance and evaluation of a sustained global climate observing system. The purpose of the Observing System Monitoring Center (OSMC), which is being funded by the National Oceanic and Atmospheric Administration's (NOAA) Office of Climate Observation (OCO), is to provide a tool that will assist managers and scientists with monitoring the performance of the global in-situ ocean observing system, identifying problems in real-time, and evaluating the adequacy of the observations in support of ocean/climate state.



OceanSITES Global Data Assembly Center

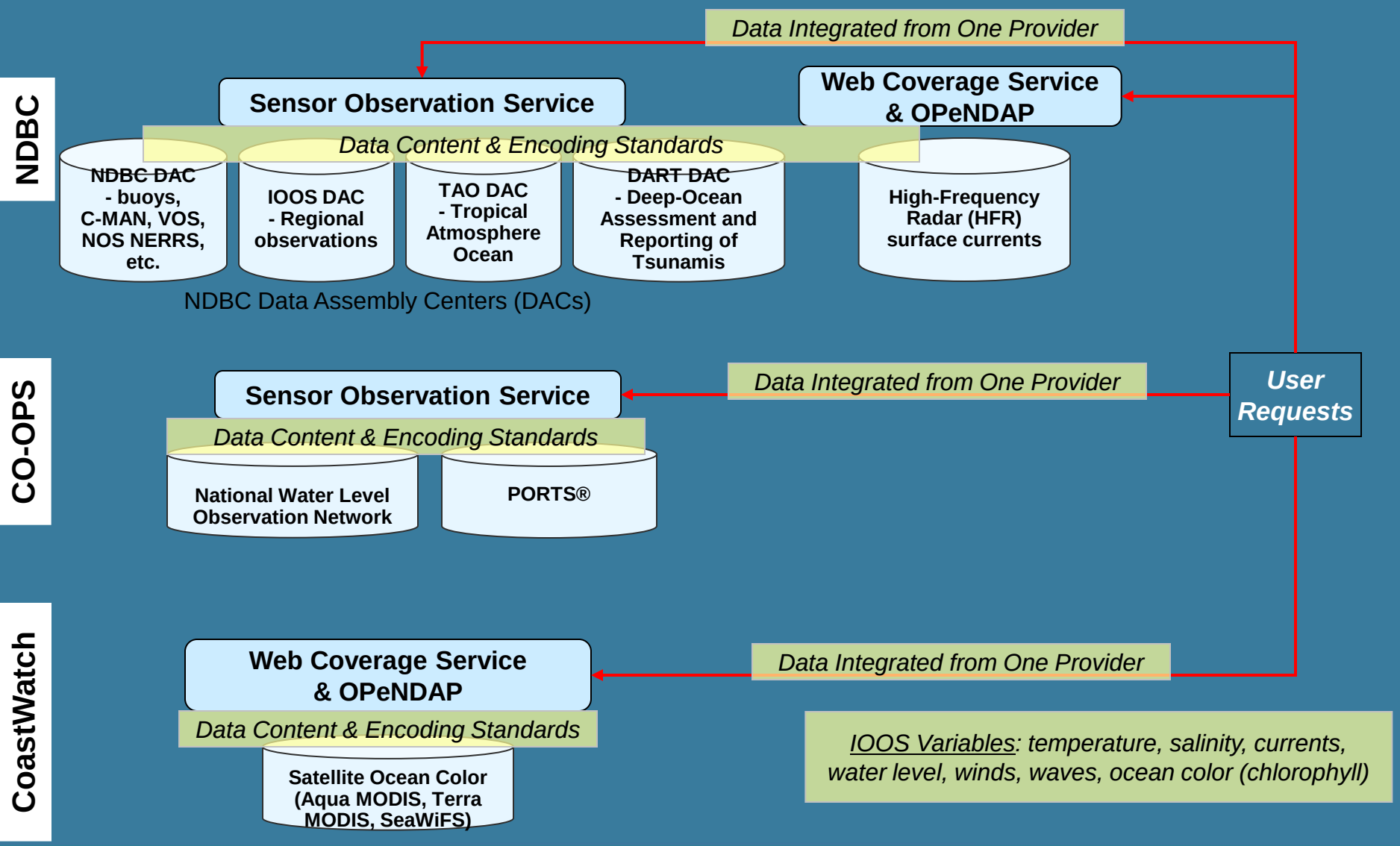


- *Maintains specific OceanSITES platforms,*
- *Determines what observations are released to GTS,*
- *Assures that the platform is available and provides reliable information,*
- *Provides the DAC with the observations in any format the DAC is willing to take, and the metadata necessary to serve as an OceanSITES platform, and*
- *Quality Controls (QC) post-recovery data according to OceanSITES agreed procedures.*

- *Sets up the OceanSITES server according to the specifications approved by OceanSITES DM group,*
- *Guarantees data availability from the PI platforms,*
- *Translates the data to the OceanSITES format,*
- *Quality Controls real-time data according to the minimum OceanSITES agreed procedures,*
- *Provides the observations via the GTS (if requested by the PI),*
- *Provides the data on a FTP server for access by the GDACs*

- *Provides centralized access to the DAC data*
- *Ensures no data are excluded at the GDAC level, and full high-frequency data sets are available,*
- *Keeps only the best version of the data. Additional products like interpolated data are separate optional sets,*
- *Check all files daily using the "File Checker" software,*
- *Maintains the OceanSITES catalogue, and*
- *Synchronizes the catalogues with the second GDAC periodically (at least daily).*

DIF Data Provider Status



Data Assembly Center "Opportunities"

- Standardization – National and International
  - NOAA IOOS Data Integrated Framework
  - National Data Management and Communications (DMAC)
  - Quality Assurance of Real-Time Ocean Data (QARTOD)
    - 17 – 19 November 2009 in Atlanta Georgia (!)
  - OceanSITES, Argo Float, Drifters, MyOcean
- "Tsunami" of observations from moored buoys, gliders, cable arrays
  - Ocean Observing Initiative (OOI) – Regional Scale Network, Coastal and Global Scale Nodes and CyberInfrastructure
  - OceanObs'09 – Goals and Objectives
  - WMO Information Systems (WIS)
- Metadata – capturing, maintaining and disseminating and <u>BUFR by 2012</u>
  - SensorML and ISO 19115
- "New" observations – biogeochemical
- Archiving observations

Summary

- “Quality Goes In Before Data Goes Out.”
- QUALITY requires constant monitoring of the health and physical condition of the marine network to ensure viability.
- Monitoring requires
  - Automated Quality Control – 24x7x365
  - Manual Quality Control
  - Real-time and Delayed-mode
  - Quality Assurance, Standards, Interoperability, Flags
- Future
  - Sensor quality control and direct release to GTS
  - Quality Control from gliders, cables and moored platforms – instantly
  - Worldwide – Integrated - System

Thank you!

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