

NDBC OceanSITES GDAC
William Burnett
NOAA National Data Buoy Center, Stennis Space Center, MS

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1. Abstract

The international community sponsors a coordination project called OceanSITES, a global network of ocean timeseries (or reference) sites located around the world’s oceans. The NOAA/National Data Buoy Center (NDBC) Data Assembly Center and OceanSITES have agreed to make the NDBC a Global DAC (GDAC), providing a shared and more secure capability together with the Ifremer/Coriolis GDAC in France. These GDACs will provide quality assurance/quality control, provide virtual access to the data, maintain a global timeseries dataset and synchronize catalogues on a periodic basis.

2. Project Summary

OceanSITES is the international project working towards the coordination and implementation of a global system of sustained multi-disciplinary timeseries observatories. Timeseries fill a unique gap in the sampling provided by other elements of the global ocean observing system, enabling co-located observations of many variables and processes in strategic or representative locations over long periods of time, with high temporal resolution, from (and including) the ocean surface to the seafloor. More information can be found at www.oceansites.org.

The scientific applications of such data are to monitor, detect, understand, and predict changes and related processes in the physical climate state of the ocean, the carbon cycle, and the ecosystem. Operational applications include detection of events, initialization and validation of assimilation products, delivery of constraints or reference data for forecasts (especially biogeochemical and ecosystem relevant ones). In addition there are a variety of technical applications, such as calibration and validation of data and products from other observing system elements.

OceanSITES, through its international steering team, has developed a rationale for timeseries observations and for needing a coordinated global network, and has defined a pilot project consistent with the needs and expectations of the sponsoring bodies GOOS, CLIVAR, and POGO. A major requirement for sites in the project is an open data policy. A global timeseries data management system is under construction via a subgroup of the OceanSITES steering team, including a data format coherent with other past and present efforts.

The in situ, time series-based OceanSITES program represents the logical next step in completing the Global Ocean Observing System. As such, the program now is an official component of the global system organized under JCOMM, and is also one of its action groups under DBCP. Much of the technology is available and many elements are in place already. The main challenge is coordination and assuring sustainability of the system, via common advocacy, recruiting a user base, and sharing the operation among communities and countries.

Starting in 2000, NDBC began obtaining and distributing observations from “partners.” These partners are designated as U.S. Integrated Ocean Observing System (IOOS) data providers. NDBC receives these marine meteorological, oceanographic (physical) and water quality observations in real-time, quality controls the observations and distributes the data via the Global Telecommunications System (GTS)/web services. NDBC also serves as the Data Assembly Center (DAC) for the Tropical Atmosphere Ocean (TAO) Pacific array and the tsunameter array which covers the Pacific, Atlantic and Gulf of Mexico. NDBC also quality controls and maintains data from 60 oil and gas platforms located in the Gulf of Mexico. Thus, NDBC is well suited to serve as a Global Data Assembly Center (GDAC) for OceanSITES, as well as an OceanSITES DAC.

NDBC supports these ~700 platforms by collecting, quality controlling and disseminating the observations in real-time to the Global Telecommunications System (GTS) and in delayed mode. Using the NDBC Observing System Monitoring Center (OSMC), OPeNDAP servers and ftp site – NDBC will act as a DAC for physical observations (marine weather and oceanographic – and possibly for biogeochemical variables) for a number of PIs in the United States. NDBC will also serve as the second OceanSITES GDAC and synchronize their OceanSITES files with Coriolis. NDBC proposed a form, similar to the form used to maintain the metadata from the 60 oil and gas platforms, to help maintain all the OceanSITES platforms.

3. Scientific Accomplishments

NDBC’s Data Assembly Center (DAC) serves as an OceanSITES DAC, handling observations from “provider” platforms such as India, Woods Hole, Scripps, MBARI, and TAO platforms.

The DAC responsibilities include:

- Sets up the OceanSITES “local” server according to the specifications approved by OceanSITES data management group, <ftp://data.ndbc.noaa.gov/data/oceansites/>
- Guarantees data availability from the provider platforms,
- Complies with the agreed upon OceanSITES format,
- Quality Controls real-time data according to OceanSITES agreed procedures,
- Provides the observations via the Global Telecommunications System (if requested by the provider),
- Provides the data on a FTP server for access by the GDACs, and
- Organizes the data processing, formatting, data transfer and update with the partner.

NDBC also serves as a Global Data Assembly Center (GDAC) with France's Ifremer /Coriolis (who is also a GDAC for the Argo floats). The GDAC responsibilities include:

- Provides a virtual or centralized access to the data that are served by the DACs,
- Checks all files daily using the "File Checker" software,
- Maintains the OceanSITES catalogue, and
- Synchronizes the catalogues with the second GDAC daily.

PERFORMANCE METRICS

Number of files managed by OceanSITES GDAC on 1 October 2010: **195**

Number of files managed by OceanSITES GDAC on 1 October 2011: **1026**

Performance Increase of ~5x over the year.

Number of new OceanSITES platforms added to the OceanSITES GDAC in 2011: **85**
(this includes the 55 TAO legacy stations – previously only four were provided)

A sampling of the platforms shows the varied agencies, countries and capabilities that OceanSITES provides:

- BATS from Bermuda Institute of Ocean Sciences (in progress)
- LINE-W from WHOI
- NTAS from WHOI
- Stratus from WHOI
- TAO legacy from NDBC
- W1M3A from CNR CONSIGLIO NAZIONALE DELLE RICERCHE
- MBARI from Monterey Bay Aquarium Research Institute
- MOVE from Scripps Institution of Oceanography
- CCE1 from Scripps Institution of Oceanography
- CIS from IFM-GEOMAR
- ANTARES from Universite de la Mediterranee
- DYFAMED from Laboratoire d'Océanographie de Villefranche
- ESTOC from MARUM
- E1M3A from HELLENIC CENTER FOR MARINE RESEARCH (HCMR)
- PYLOS from HELLENIC CENTER FOR MARINE RESEARCH (HCMR)
- E2M3A from National Institute of Oceanography and Experimental (EuroSITES)
- KEO from PMEL (in progress)
- HOT from University of Hawai'i School of Ocean and Earth Science and Technology (in progress)
- K276 from Leibniz Institute for Baltic Sea Research Warnem

- STATION-M from Bjerknes Centre for Climate Research

Updated and published OceanSITES Users Manual 1.2 document – this document serves as the critical basis for formatting all OceanSITES observations in an approved CF convention metadata format.

Worked closely with the Pacific Marine Environmental Laboratory (PMEL) to develop OceanSITES data feeds for the NOAA Kuroshio Extension Observatory (IEO) – a platform that provides observations that create complex data management issues.

Worked closely with China’s First Institute of Oceanography (FIO) to include their “Bai-Long” TAO-hybrid buoy in the OceanSITES data framework.

Completed the synchronization software for all OceanSITES catalogues. NDBC and Ifremer are now successfully synchronizing OceanSITES observations on a daily basis. This was an enormous accomplishment which took five years to formally complete.

Redesigned the GDAC FTP distribution and developed an OceanSITES Top Level Directory (<ftp://data.ndbc.noaa.gov/data/oceansites>). Implemented standard designated site codes and platform codes for each of the DACs.

Developed NetCDF Requirements for carbon data that follows CF1.x standards and OceanSITES User Manual 1.2 requirements. Developed requirements for over 10 carbon variables including standard names, unites, valid_min, valid_max, sensor names and serial numbers.

Continued to develop Google Ocean/OPeNDAP/SensorML interfaces for all OceanSITES observations. Utilize existing THREDDS Data Server at NDBC to deliver NetCDF files via OPeNDAP. Integrated OceanSITES artifacts by advanced user interfaces like Google Ocean.

Held three virtual meetings in 2011 using WebEx software. These meetings ensured success for the above items. One meeting was held at 3:00 am Eastern to accommodate OceanSITES members in Asia, India and Australia.

Managed and facilitated the OceanSITES 2011 Data Management Team meeting in La Jolla, California in November 2011.

Maintenance and Operations

- Continued to serve as the Co-Chair of the OceanSITES Data Management Committee and as a member of the Executive Committee.
- Operated the FTP OceanSITES server to host partner observations (DAC),
- Obtained observations from India, MBARI, Woods Hole and Scripps and converting the observations into OceanSITES format (DAC),

- Operated the OceanSITES OPeNDAP/Thredds server and providing OceanSITES observations through the server (GDAC),
 - <http://dods.ndbc.noaa.gov/thredds/catalog/data/oceansites/catalog.html>

