CeNCOOS Data Management Plan

Revised: January 21, 2017

Background
The goal of the CeNCOOS data management system is to curate multiple data streams from the sensors and models supported by CeNCOOS as well as from independent data providers, document the data using IOOS-approved metadata standards, provide these data to users via standard services, and archive the data at appropriate long-term archives. The CeNCOOS Data System is based on a service-oriented architecture that employs interoperable systems to enable data discoverability via web services and catalogs. The vision of CeNCOOS data management is to be recognized in the ocean data community as a trusted leader in data quality, interoperability and discoverability.

CeNCOOS partners with Axiom Data Science to provide a standards-based lifecycle data management framework that maximizes the discoverability, accessibility, and usability of data and information products and ensures their sustained use. CeNCOOS leverages Axiom's data systems that also support AOOS and SECOORA to use common infrastructure which enables the dedication of more funds to system advancements and innovation than would otherwise be possible. The relationship between CeNCOOS and Axiom is a collaborative partnership designed not only to serve the needs of CeNCOOS but also to allow for greater contributions to the larger IOOS community. CeNCOOS works closely with Axiom to develop data management plans, statements of work, facilitate the flow of data and ensure a coordinated end to end system. The standards and protocols, and annual work plans of the CeNCOOS DMAC subsystem are revised annually and reviewed by the CeNCOOS data management committee. Axiom implements recommended and standard practices as defined by the IOOS Data Management and Communications (DMAC) committee and more specifically those in the Guide for IOOS Data Providers, version 1.0 [2006]. These practices apply to data archive, data discovery, data serving (web-based browsing), data transport (binary access to data), metadata, IT security and data QA/QC. In addition, the system meets CeNCOOS data management practices that are guided by regional needs with a focus on quality, interoperability, trust and discovery.

CeNCOOS provides access to catalog-level information and to data sets via web services and via the CeNCOOS data portal. Both web services and the portal are administered by Axiom. The main web service is OPeNDAP, built around the Thematic Real-time Environmental Distributed Data Services (THREDDS) Server (TDS). Axiom maintains an ERDDAP server that also provides DAP and WMS capabilities. Axiom maintains a Sensor Observation Service (SOS) as part of the 52N installation and a THREDDS ncSOS service on the data archives. Axiom maintains a Geoserver for geospatial data. Geospatial datasets are accessible via OGC WFS and WMS services. Some data streams are provided to the Global Telecommunications

System (GTS) by providing the data via an intermediary such as NDBC which posts the data to the GTS. For each data stream, dissemination (access nodes) is described by one or more of the following terms: GTS, THREDDS, ERDDAP, SOS, WMS, CeNCOOS Portal, CeNCOOS Website.

Roles and Responsibilities

The data management team includes CeNCOOS staff (employed by the host institution), principals and staff at data Partner Axiom Data Science, and experts from other institutions who voluntarily serve on the data management committee. Their roles and responsibilities, including the committee's role, are described below. The co-investigators on the IOOS award and other grants received by the host institution have data management responsibilities that are described in the proposal sub-award statements of work.

Product Developer (Fred Bahr). The product developer's role is to produce data and information products, and to provide expert advice on the metadata and quality control of a broad range of coastal marine science observations. The expert role is augmented by CeNCOOS investigators and by partners who are experts in individual data streams (e.g., HFR, gliders, shore stations) including the data streams that they provide.

Data Management Technical Lead (Rob Bochenek, Axiom Data Science). The data management technical lead is responsible for implementing IOOS-recommended technologies for the collection, curation, delivery, and archive of CeNCOOS data. The technical lead advices CeNCOOS on the application of technologies that meet user and stakeholder needs and oversees their implementation.

Data Management Committee lead (Lynn DeWitt, NOAA). The lead of the Data Management committee serves as the point of contact and organizer for the data management committee. The data management committee provides guidance to CeNCOOS on both a strategic planning and operational level, regarding the acquisition, curation, and delivery of CeNCOOS data. The committee consists of data scientists and informatics experts who are familiar with coastal marine science data, standards and protocols for data stewardship (including IOOS recommended protocols) and familiar with existing and emerging technologies for the browse and visualization and delivery of scientific data.

Data Manager (vacant). The data manager has overall responsibility for the acquisition, curation, and delivery of CeNCOOS data. The position requires previous experience with data curation, experience with coastal ocean observations, data curation including documentation, quality control, and the application of established protocols and standards, and knowledge of the IOOS-recommended technologies and protocols for data management and delivery. The data manager is responsible for coordinating data management planning and implementation with the IOOS program office and other regional associations, and in this role attends the annual

DMAC meeting and other IOOS data management coordination activities (e.g., monthly calls, report and standards review and development). The data manager liaises with CeNCOOS-supported data producers to ensure that appropriate guidelines are followed. The ultimate responsibility for the data management conducted by CeNCOOS-supported investigators rests with the CeNCOOS director who implements the sub-awards. CeNCOOS expects to fill the vacant data manager position by June 2017.

CeNCOOS Data Streams

The following sections describe data management for each data stream. The streams include high frequency radar, In-situ observing (buoys, fixed platforms, meteorological stations), and several singular data streams. Data obtained from Federal producers is not described unless the data are modified or re-formatted by CeNCOOS. Following guidance from IOOS, model data and legacy data are outside the scope of this data management plan. Legacy data (defined here as data that already exists, typically produced more than a month ago and/or produced for a discrete interval in the past); also called historical data in Axiom documentation) is not included in this plan. Consistent with IOOS expectations, CeNCOOS endeavors to apply QARTOD and other quality control and IOOS metadata standards to legacy data where feasible and as time and resources permit ("If it can be QC'd it should be"). The quality control and documentation of the real-time data streams are described below. Regarding the current status and implementation of QC, CeNCOOS has completed the documentation of the data sets by applying IOOS-recommended conventions for data documentation but has not yet applied QARTOD protocols to applicable data. The current level of quality control, and approach to quality control has been to support existing procedures developed by the data producers. CeNCOOS expects to apply QARTOD in a phased approach during the next three years, and complete the application of QARTOD to applicable data within three years. The expected completion date is February 1, 2020. In 2015-2016 CeNCOOS staff test-implemented the open-source QARTOD programs for shore station data. The 2016-2017 Axiom work plan describes initial implementation of QARTOD on shore-station data. Some QARTOD procedures will be applied at an enterprise level, meaning that Axiom and CeNCOOS staff will apply procedures to all appropriate data. In other cases QARTOD procedures will be applied by the data producers. The type of quality control applied will be described in the metadata. Where appropriate different levels of data (raw data, quality-controlled data, processed data) will be provided and archived.

The plans for each data stream include a description, the data flow (certification requirements Section f2), quality control procedures (certification requirements Section f3), adherence to the NOAA Data Sharing Procedural Directive (certification requirements Section f4), and the existing or planned archiving procedure (certification requirements Section f6). The development of unique products either by analysis re-formatting or subsetting is described under data flow, derived products.

High Frequency Radar

Description

The CeNCOOS high frequency radar network was developed by the Coastal Ocean Current Mapping Program (COCMP) established in 2002. The Site Reference document describes the sites. CeNCOOS adheres to the data processing and QC best practices described in the HFR references. The CeNCOOS network extends from the Oregon border to Point Conception, with sites operating at resolutions of 6km, 2km, and 1km, and 500m resolution (at some sites within San Francisco Bay). CeNCOOS supports the University of California, Davis (J. Largier, lead investigator), the Naval Postgraduate School (J. Paduan, lead), and CODAR Ocean Sensors (C. Whelan, lead) to operate sites that comprise the network.

Data Flow

All HFR sites supported by CeNCOOS use CODAR equipment and software, producing a standardized observing stream and file structure. The HFR_Progs toolbox developed and maintained at the Naval Postgraduate School in Monterey is used for some processing. Range Series data are archived locally by HF radar operator shared by request. The Radial Velocities data are transmitted in near real-time to the HF Radar Network (HFRNet) DAC in La Jolla, CA. Radial velocities are shared within the network hourly (approximately). Data are distributed in near real-time via HFRNet. Near real time total vectors (RTVs) are shared approximately within 3 hours. CeNCOOS retrieves HFR data from CORDC for ingest into the CenCOOS data portal and for the production of ancillary products.

Derived products- The '8-day composite with Surface Currents' CeNCOOS web page shows a map of 8-day averaged SST with HF Radar surface current vectors from the last 25 hrs overlayed on top to show potential relationships between currents and SST or algae. The sources for the SST and chlorophyll a are: SST: NOAA Coast Watch Program and NOAA NWS Monterey Regional Forecast Office (satellite is POES AVHRR HRPT); Chlorophyll a: NOAA Coast Watch Program and the NASA Goddard Space Flight Center Oceancolor (G. Feldman).

Access: GTS, THREDDS, ERDDAP, SOS, WMS, CeNCOOS Portal, CeNCOOS Website, IOOS Catalog. The eight day product is only available on the CeNCOOS web site.

Quality Control

Quality control for HFR data in the CeNCOOS region is performed by the Coastal Observing Research Development Center (CORDC) following nationally-sanctioned procedures including the HFR QARTOD manual. The quality control applied by CORDC is described in the "HFRNet RTV Processing & Quality Control" document: (http://www.cordc.ucsd.edu/projects/mapping/documents/HFRNet_QC-RTVproc.pdf). The data management applied is described in the HF-Radar Network Portal Reference Guide: (http://www.cordc.ucsd.edu/projects/mapping/documents/HFRNet_Portal_RefGuide.pdf).

Data Sharing
HFR data and products are freely available for public use. Data sharing adheres to the NOAA Data Sharing Procedural directive by providing access to machine-readable data in a variety of formats and access points. Suggested acknowledgements are described in the metadata that accompanies the data.

Archive
HFR data produced by CeNCOOS are contributed to the national center, the Coastal Observing Research and Development Center (CORDC). CORDC will archive the data at NCEI. IOOS is working on a SIF between CORDC and NCEI. As described in the certification instructions, 'for data that is submitted to these national coordinated efforts, the RICE is not expected to establish their own SIF, archiving will go from the national servers to NCEI.'

Gliders

Description
CeNCOOS partly supports the operation of two gliders, one along the Trinidad line and one along the Monterey line (CALCOFI line 67). Both gliders are operated continuously for 2-3 month deployments (up to 5 months for the Trinidad glider), and hot-swapped with second glider to provide un-interrupted observing. CeNCOOS supports Oregon State University (J. Barth, lead) to operate the Trinidad line. CeNCOOS supports MBARI (F. Chavez) to operate the Monterey line.

Data Flow
CenCOOS supported glider data is submitted to the glider data assembly center (DAC). The DAC makes the data available via ERDDAP and THREDDS data access end-points and pushes the data to the GTS. During surfacing binary data files are sent from the glider via satellite. These files are converted to ASCII (one for each segment of the deployment). Trinidad data are converted to netCDF; up and down profiles split into individual netCDF files following glider DAC formats; the data are aggregated by the GDAC to one file and combined into a single file containing all data from the deployment. During this step, individual profiles are defined and converted to NetCDF. Glider data are transferred to the Glider DAC after the profiles are written to NetCDF. Deployments are registered using the Glider DAC Provider Page. Data is then uploaded via FTP. Data is then made available via Environmental Research Division's Data Access Program (ERDDAP) and THREDDS within 2 hours of being uploaded.

Derived products- The data for the Trinidad line active mission are processed to produce depth-distance sections for temperature, salinity, oxygen, fluorescence, optical backscatter. The sections are displayed as images on the CeNCOOS web site. The Monterey line data for the active mission (temperature, salinity, fluorescence, acoustic backscatter, N-S velocity, E-W velocity are displayed as images on the CeNCOOS site and the active mission and completed missions are available on a THREDDS server (legacy.cencoos.org).

Access: GTS, THREDDS, ERDDAP, SOS, WMS, CeNCOOS Portal, CeNCOOS Website, IOOS Catalog.

Quality Control

Quality control is performed by the glider DAC for both the Trinidad and Monterey glider lines. QC flags applied at OSU are forwarded through the netCDF file from CeNCOOS to the GDAC. Tests are done following QARTOD procedures for the following variables: pressure, temperature, salinity. https://gliders.ioos.us/static/pdf/Manual-for-QC-of-Glider-Data_05_09_16.pdf . The following variables are QC'ed in the Rudnick lab: velocity (depth-averaged and depth dependent), fluorescence, acoustic backscatter. After recovery of the glider QC is performed using first an automatic flagging range test, then a manual examination to confirm, add, or change QC flags.

Data Sharing

Glider data and products are freely available for public use. Data sharing adheres to the NOAA Data Sharing Procedural directive by providing access to machine-readable data in a variety of formats and access points. Suggested acknowledgements are described in the metadata that accompanies the data. The following statement accompanies the Monterey line glider data: The data may be used and redistributed for free but is not intended for legal use, since it may contain inaccuracies. Neither the data Contributor, ERD, NOAA, nor the United States Government, nor any of their employees or contractors makes any warranty, express or implied, including warranties of merchantability and fitness for a particular purpose, or assumes any legal liability for the accuracy, completeness, or usefulness, of this information.

Archive

Glider data produced by CeNCOOS will be contributed to the national glider data assembly center (DAC). The DAC will archive the data at NCEI. IOOS National Glider Data Assembly Center has submitted a Submission Information Form through the National Oceanographic Data Center (NODC). https://gliders.ioos.us/static/pdf/IOOS_National_Glider_Data_Assembly_CenterSIF.pdf

In Situ Observing (buoys, fixed platforms, meteorological stations)

Description

The In Situ observing system is designed to continuously acquire observations and make them available in near-real time and/or to acquire non-real-time data; to curate the data, providing quality control, data documentation, and processing of raw data into final versions; and to archive the data at appropriate long-term archives. CeNCOOS supports a network of fixed platforms, buoys, and meteorological stations that continuously acquire observations. The operating procedures including maintenance and data acquisition are described in the CeNCOOS Standard Operating Procedures document. The supported sites are listed

in the asset inventory included in the December IOOS Progress Report. In addition to supported sites, CeNCOOS also acquires real-time and non-real time data from un-supported partners. Relative to CeNCOOS supported sites, CeNCOOS has limited influence over the data management of non-supported sites. The data flow, QC, sharing, and archive described below refer primarily to the supported sites, and to the unsupported sites to the extent possible.

Data Flow

The flow of data from the sensor to CeNCOOS is heterogeneous and differs among CeNCOOS data providers. The differences in data flow result from differing sensors and telecommunication equipment, from the differing needs and resources of the data providers, and from historical precedents. Cellular modems, Internet, and radio are used to transfer data to CeNCOOS, Axiom, or intermediaries. Data transfer is described in the Standard Operating Plan. In some cases the host institutions supporting the observations receive the observations and thus act as intermediaries. Scripts have been written to acquire the data as it is received and incorporate existing and/or newly created metadata documentation.

Derived products- Anomaly (El Nino) web pages- Sixteen sites, including shore stations, and a subset of the NDBC buoys in the region, are analyzed to produce length-of-record daily mean temperatures and departures from the mean. The data are displayed as time series. The data used comes from data sets that are available through both the CeNCOOS data portal and from selected Federal Assets. Some of the QARTOD methods are applied to the data to remove some of the data from the computation. Additionally some of the data were inspected manually to remove suspect data. Since the underlying data are available through other endpoints, the derived are not made available here. Basic statistics are computed from the data (means and standard deviations).

Derived products- Oyster Conditions Dashboard- The Indian Island and Chevron Dock shore station time series data (water temperature, salinity, pH, Chlorophyll) are processed as four day averages and displayed along with the raw data as time series on a dashboard web page developed in response to user requests and guidance. An upwelling index based on Buoy 46022 winds is also calculated.

Derived products- Shore station web pages. Stations that report data in real-time have a latest conditions page displaying the most recent data in a dashboard format (latest observation) and a time series, plus detailed station information and data download pages accessible by links at the top of the web page.

Derived products- CeNCOOS Real-Time Winds. Real-time wind data for ten stations is processed and displayed on a web page alongside the COAMPS forecast winds, in order to provide an instantaneous and time-series comparison of model and observed winds. Meteorological data are pushed to CeNCOOS by FTP as ASCII files from the Naval Postgraduate School. The code was originally developed by the Jet Propulsion Laboratory with the help of Yi Chao. COAMPS data are pulled from the

GODAE server maintained by NRL MRY. Data are extracted from the forecast files at the location of the Met station locations. These are then placed into a database and plotted as a comparison. No QC has been applied to meteorological station data by CeNCOOS. Plots are archived locally at CeNCOOS with older data pushed to a longer term off-line storage. Data in the database are kept, the original ASCII files are not retained nor are the model files.

Access: GTS, THREDDS, ERDDAP, SOS, WMS, CeNCOOS Portal, CeNCOOS Website, IOOS Catalog. (Access to real-time winds is CeNCOOS website only).

Quality Control

The quality control currently applied to in-situ observing data is the existing QC or best-practices QC followed by each investigator and thus the QC varies among CeNCOOS-supported providers. All providers follow the manufacturers guidelines for operation with respect to deployment, servicing, maintenance, and calibration. Deviations are described in the metadata. Some instruments are configured to log a dataset that can be more complete than the real-time stream. These data are acquired (downloaded) when the sensors are serviced. The downloaded data are not typically contributed to the CeNCOOS data system. In some cases the investigators produce a processed or final version of the data that is different and improved with respect to the raw data or provisional data. In the past these data have not been contributed to CeNCOOS but beginning with the IOOS award in June, 2017, CeNCOOS expects that CeNCOOS-supported investigators will contribute a processed or final version of the data at the end of the project year in the event that one was produced.

CeNCOOS intends to implement QARTOD during year 1 of the IOOS award that concludes May 31, 2017.

The quality control for the burkolator at Hog Island was developed by CeNCOOS investigator T. Hill. Additional quality control is being developed as part of the IPACOA project and will be implemented in 2017. It is anticipated that these QC procedures will match AOOS, NANOOS, and SCCOOS burkolator procedures because these associations are part of the IPACOA project.

Quality control of meteorological data from two sources (MESONET and CeNCOOS shore stations) that are incorporated into the CeNCOOS data portal and web services is limited. CeNCOOS does not intend to archive these meteorological data. These meteorological data are provided in response to user requests for co-located or relevant observations, and so that CeNCOOS's powerful data access, sub-setting, and visualization tools can be applied. One source of meteorological data is the Mesonet array. The second source is a series of CeNCOOS-supported meteorological stations. Meteorological stations currently exist near the Santa Cruz Wharf and Moss Landing shore stations. The minimal nature of the quality control is documented in the metadata. This description of meteorological data does not apply to the Federal

sources (e.g., NDBC meteorological buoys). The Federal sources have extensive, documented quality control.

Data Sharing

Shore station data and products are freely available for public use. Data sharing adheres to the NOAA Data Sharing Procedural directive by providing access to machine-readable data in a variety of formats and access points. Suggested acknowledgements are described in the metadata that accompanies the data. Users are requested to acknowledge the source of the data (Central and Northern California Ocean Observing System) and credit the originators and the relevant citations listed in the metadata.

Archive

The National Centers for Environmental Information (NCEI) will be the archive for in situ observing data. CeNCOOS is working with the NCEI to develop a Submission Agreement that will fit this requirement. CeNCOOS is also actively working with NCEI to assist with the transfer and preservation of appropriate data types. The CeNCOOS DMAC Team has worked and consulted with several NCEI staff members, including Matthew Biddle, John Relph, and James Partain, on automating the submission of CeNCOOS-funded data assets to the NCEI. Matthew Biddle will advise the CeNCOOS Data Team staff on the data submission forms and all necessary procedures. CeNCOOS submissions for long-term archive at NCEI is limited to funded in-situ data from a handful of regional observing networks. Archival process with NCEI will be completed within 12 months of certification. Currently CeNCOOS is curating data for NCEI and making it available through a WAF located at http://ncei.axiomdatascience.com/cencoos/ (see list below) and a THREDDS server at ahttp://thredds.cencoos.org/thredds/catalog/cencoos/sensors/catalog.html.

The DMAC team has initiated the archiving process with NCEI, and has begun filling out the Request to Archive, ISO Metadata, and Data Submission Agreement Documents.

Table: Web accessible folders containing data to be archived at NCEI, January 2017. This represents 80% of the CeNCOOS data sources:

cencoos_humboldt/	15-Jan-2017 01:00
cencoos_indianisland/	15-Jan-2017 01:01
cencoos_monterey/	15-Jan-2017 01:00
cencoos_tiburon/	15-Jan-2017 01:00
edu_calpoly_marine_morro/	15-Jan-2017 01:01
edu_calpoly_marine_sanluis_shore/	15-Jan-2017 01:01
edu_humboldt_hbc/	15-Jan-2017 01:01
edu_humboldt_tdp/	15-Jan-2017 01:01
edu_sfsu_cma/	15-Jan-2017 01:00
edu_ucdavis_bml_bml_wts/	15-Jan-2017 01:00
edu_ucdavis_bml_fpt_wts_latest/	15-Jan-2017 01:00
edu_ucdavis_bml_hog_island_oyster/	15-Jan-2017 01:01
edu_ucsc_scwharf1/	15-Jan-2017 01:01
mlml_mlml_sea/	15-Jan-2017 01:01

Automatic Identification System (AIS) Ship Tracking

Description

The automatic identification system is an automatic tracking system used to track vessels. AIS integrates a standardized VHF transceiver with a positioning system such as a GPS receiver to transmit time, location, and vessel characteristics. Vessels with AIS transceivers can be tracked by AIS base stations located along coast lines. AIS transceivers are not placed on all vessels. Vessels over 300 gross tonnage and all passenger vessels transmit position information. CeNCOOS acquires and displays AIS data that are made publically accessible by the Naval Postgraduate School (NPS) Department of Oceanography (http://www.oc.nps.edu/~cwmiller/AIS/). The NPS program goal is to identify ships transitting the Monterey Bay National Marine Sanctuary, Cordell Bank National Marine Sanctuary, and the Gulf of the Farallons National Marine Sanctuary. The goal of the CeNCOOS AIS data product is to produce a near-real time map of vessels in the Monterey region during the most recent six hour period using the data made available by NPS. The AIS map was developed in response to user requests for a real-time map. Because the goal is limited to the map, and because CeNCOOS is acquiring data already made available by a Federal provider (NPS), no effort is made to add documentation or perform quality control or archive the data. The data management and access is intended to be limited to the map.

Data Flow

AIS data are received by UDP from the five AIS receivers maintained by the Naval Postgraduate School. Data is also extracted from the AIS data received by the single receiver maintained by MBARI at Mt Toro. A regional and temporally-reduced subset of the data are acquired by CeNCOOS. Data North of 45°N and south of 22°N are ignored. The data are sampled every 2 minutes to reduce the volume of data pushed to the browser, to reduce the possibility of crashing the browser. The most recent 6 hours of data are retained for plotting. The CeNCOOS plot shows the location of the ships, coded by ship type, their position during the past six hours, and the associated descriptive information.

Access: CeNCOOS Website.

Quality Control

Quality control is not applied to the AIS data (see goals above). There is no QARTOD Manual for AIS data. If QC is considered for AIS data several problems need to be addressed: 1) We are only plotting a subset of the data so we don't have the full track to QC. 2) we have don't necessarily have all the positions available due to holes/drop outs of the data. 3) We don't check if the track goes over land. 4) We have no way of confirming that the MMSI is actually the correct number associated with the name of the ship and vice versa.

Data Sharing

The visual display of ship locations is freely available for public use.

Archive

AIS data are not archived.

Point Reyes Wave Climatology

Description

A graph of the daily average significant wave height at Pt. Reyes is created from CDIP buoy 029 located 22 NM west of Pt. Reyes, CA, using the real time data made available by the Coastal Data Information Program (CDIP). The graph also shows the daily wave heights for each year since 1997. A long-term mean is derived from all except the current year.

Data Flow

The data are obtained from a Federal Asset (wave buoy) and QC has been applied. The data are plotted annually to show current data and the past data. The past data give an estimate of the variability of the data without computing a mean or standard deviation. Data are not archived as the underlying data are available from CDIP.

Access: CeNCOOS Website.

Quality Control

Prior to being used to create this graph, wave data are quality controlled by CDIP using QARTOD and additional tests described in the CDIP Quality Control Tests: Waves. No additional QC is performed prior to making this product.

Data Sharing

The graph is freely available. CDIP data and products are freely available for public use. When referenced, a link to the CDIP homepage is suggested.

Archive

The wave height graph is not archived. The data on which the graph is based are archived at NCEI by CDIP.

Monterey Bay Aquarium Seawater Intake

Description

Real time observations from the Monterey Bay Aquarium seawater intake are acquired and provided via the data portal. Acquisition began in Summer 2016 and the data flow, quality control, and archive are being developed. Temperature, conductivity, pH, and oxygen saturation are acquired. The time series extends from 1995 to present.

Data Flow

Data flow and distribution (access nodes) are being developed.

Access: CeNCOOS Portal. Additional access points are being developed.

Quality Control

Procedures being developed for shore stations will be applied to this data.

Data Sharing
Shore station data and products are freely available for public use. Data sharing adheres to the NOAA Data Sharing Procedural directive by providing access to machine-readable data in a variety of formats and access points. Suggested acknowledgements are described in the metadata that accompanies the data. Users are requested to acknowledge the source of the data (Central and Northern California Ocean Observing System) and credit the originators and the relevant citations listed in the metadata.

Archive
Procedures being developed for shore stations will be applied to this data.

Monterey Bay Aquarium Research Institute Moorings M1, OA1, OA2
Description
Real time observations from the Monterey Bay Aquarium Research Institute Mooring M1 are acquired and distributed in the Portal and on CeNCOOS web pages as graphs and tables. Temperature, conductivity, salinity, ADCP currents, wind speed and direction, and barometric pressure are acquired. Observations from two ocean acidification moorings (OA1, OA2) operated by MBARI are acquired and distributed via the CeNCOOS web pages but not the Axiom Portal. OA1 and OA2 are experimental, ephemeral deployments and not considered long term observing streams. The location, sensor suite, and sampling protocols change from one deployment to the next for OA1 and OA2.

Data Flow
Data flows from the M1 mooring via radio to MBARI receivers, where the data is ingested into the MBARI MBARI shore side data system. NetCDF files produced by the shore side data system are acquired by Axiom and imported into the data portal. Other files from the shore side data system, with some QC performed, are displayed on the CenCOOS web pages. CeNCOOS plans to acquire the processed quality-controlled data at six month or annual intervals and update the raw data in the portal with the processed versions. This plan is under development.

Access: CeNCOOS Portal and CenCOOS web pages.

Quality Control
Quality control is provided by MBARI investigators. A limited set of QC is performed real-time, and additional QC is performed using the instrument-saved files that are recovered every 6 months. Procedures being developed for shore stations will be applied to the real-time data stream from M1.

Data Sharing
Shore station data and products are freely available for public use. Data sharing adheres to the NOAA Data Sharing Procedural directive by providing access to machine-readable data in a variety of formats and access points. Suggested

acknowledgements are described in the metadata that accompanies the data. Users are requested to acknowledge the source of the data (Central and Northern California Ocean Observing System) and credit the originators and the relevant citations listed in the metadata.

Archive

These data will be archived by MBARI investigators.

References

Coastal Data Information Program. CDIP Quality Control Tests: Waves. http://cdip.ucsd.edu/documents/index/product_docs/qc_summaries/waves/waves_table.php?&xtab=CDIP. Accessed 1/27/2017.

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IOOS. Guide for IOOS Data Providers, accessed at https://geo-ide.noaa.gov/wiki/index.php?title=IOOS_DIF_DATA_PROVIDER_GUIDE, Accessed 1/27/2017.

NOAA Environmental Data Management Committee, 2011. NOAA Data Sharing Policy for Grants and Cooperative Agreements Procedural Directive Version 1.0. https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Sharing_Policy_v1.pdf

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END OF DATA MANAGEMENT PLAN DOCUMENT