
**APPENDIX E1.4. DATA STREAM PLAN: MONTEREY BAY AQUARIUM RESEARCH INSTITUTE,
DECEMBER 2023**

1. DATA AND INFORMATION TYPES

A. Provide a contextual description of the data stream.

Moorings are deployed and maintained by Monterey Bay Aquarium Research Institute (MBARI), 46044 was managed collaboratively by MBARI and NDBC.

Moorings M1 and M2 were deployed in 1989, while M0 was deployed in 2004. M2 and M0 were removed in November 2011 (access archived M0 and M2 data at [MBARI](#) (older data) or [CeNCOOS](#) (newer data) portals. All of these are collecting ocean and weather data from fixed locations and transmit to the web in real-time.

The M1 mooring was deployed in 1989 and is maintained by MBARI. The buoy is equipped with surface and subsurface ocean sensors as well as surface meteorology sensors. The buoy is located at 36.75 N, -122.03 W at a depth of 1000m. More information is available on the [MBARI website](#).

MBARI/NDBC 46044 was deployed in 2011, designed to replace M2 and NDBC buoy 46042. 46044 was removed at the end of the deployment in 2015. A variety of sensors have provided surface and subsurface water temperature, salinity and currents. Surface pH, CO₂, dissolved oxygen and chlorophyll fluorescence and meteorological data. 46044 is located at 36.6985 N, -122.378 W at a water depth of 1800m.

Phobos was attached to the Monterey Accelerated Research System (MARS) a cabled observatory at 900m depth in Monterey Bay.

The stations can be accessed through the CeNCOOS data portal: <http://l.axds.co/2GFgnM1>

B. How many station locations are there for this data stream?

There are 6 station locations:

M1, MB0HR, MB1HR, MB2HR, 46044, Phobos

C. What are the specific variables of the data.

The variables for station M1 include:

wind_speed,air_pressure,wind_from_direction,sea_water_temperature,sea_water_electrical_conductivity,air_temperature,sea_water_practical_salinity,relative_humidity

The variables for station MB0HR include:

wind_speed,wind_from_direction,sea_water_temperature,sea_water_electrical_conductivity,wind_speed_of_gust,sea_water_practical_salinity,direction_of_sea_water_velocity,sea_water_speed

The variables for station MB1HR include:

wind_speed,wind_from_direction,sea_water_temperature,sea_water_electrical_conductivity

y,wind_speed_of_gust,sea_water_practical_salinity,direction_of_sea_water_velocity,sea_w
ater_speed

The variables for station MB2HR include:

wind_speed,wind_from_direction,sea_water_temperature,sea_water_electrical_conductivit
y,wind_speed_of_gust,sea_water_practical_salinity,direction_of_sea_water_velocity,sea_w
ater_speed

The variables for station 46044 include:

wind_speed,sea_surface_dominant_wave_period,air_pressure,sea_surface_swell_wave_per
iod,wind_from_direction,sea_surface_swell_wave_significant_height,sea_surface_wind_w
ave_significant_height,sea_surface_wind_wave_to_direction,sea_surface_wave_significant
_height,wind_speed_of_gust,sea_surface_wind_wave_period,air_temperature,dew_point_te
mperature,sea_surface_wave_mean_period,sea_surface_swell_wave_to_direction,sea_surfa
ce_wave_to_direction

The variables for station Phobos include:

sea_water_temperature,sea_water_electrical_conductivity,mass_concentration_of_oxygen_i
n_sea_water,fractional_saturation_of_oxygen_in_sea_water,sea_water_practical_salinity

D. Provide information about the sampling platform or instrumentation.

The M1 buoy includes the following instrumentation:

Instrument	Parameter	Measurement depth
Current Profiler (300,150, 75 khz ADCP)*	Acoustic backscatter broadband, narrowband, long-ranger	Near surface (0-300, 8m bins)
CTD	Salinity, temperature	Near surface
Fluorometer, Transmissometer*	chlorophyll fluorescence, optical clarity	
MicroCat Thermistor String*	Temperature, Conductivity (10 depths)	10, 20, 40, 60, 80, 100, 150, 200, 250, 300m 10m,20m,40m,55m (M0)
MetSys	Relative air humidity, air temperature, wind speed and direction	Air
GPS*	Latitude, longitude	Air
CO2 Analyzer (LI 6252)*	Carbon dioxide	Air, near surface
Spectroradiometers OCR-100 HyperOCR Ed/Lu (M0)*	Upwelling radiance	Near surface 5m, 10m (M0)
Spectroradiometer, ASIMET Eppley precision pyranometer	Downwelling irradiance, upwelling radiance, PAR	Air, 10 m, 20 m

ASIMET Eppley precision infrared radiometer (pyrgeometer) *		
Nitrate (Satlantic-ISUS) (M0)*	Nitrate, temperature, salinity	Near surface

* = Not Currently ingested in CeNCOOS Data Portal

2. DATA PATHWAY

A. Is a data sharing agreement required?

Data are available publically. MBARI provides these data “as is”, with no warranty, express or implied, of the data quality or consistency. Data are provided without support and without obligation on the part of the Monterey Bay Aquarium Research Institute to assist in its use, correction, modification, or enhancement.

B. In which format(s) was data received by CeNCOOS?

The data are available from the originator as follows:

M1: Downloaded as tabular data from

<http://dods.mbari.org/opendap/hyrax/data/ssdsdata/deployments/m1/>

Others: One-time manual import of NetCDF file(s) from SAIC Archive

C. How can the information be accessed?

The data are available through the CeNCOOS data portal, where it can be downloaded or explored through interactive visualizations. Specifically, data are available from two unique access points:

- File Downloads (CSV)
- ERDDAP

D. What file formats will be used for sharing data, if different from the original?

Data are shared as CSV and through ERDDAP. Data are also available for exploration in the CeNCOOS portals via interactive, graphical visualizations.

E. Describe how the data is ingested(e.g. the flow of data from source to CeNCOOS data portals) and any transformations or modifications made to share data in the CeNCOOS data portal.

Data are downloaded from the source to the CeNCOOS storage. Custom Java, Scala, and Python scripts are used to convert data formats suitable for internal and external interoperability services. Data are made available in the CeNCOOS portals through the access points and via graphic displays generated through internal JSON-format data requests from these services.

Graphic displays include a mapping service, customized interactive visualizations, and time-series plots of the unit values wherein each parameter is graphed independently. Back-end scripts handle the conversion of visualized data from CF standards to other,

non-CF units that may be requested by the user. Data files may be downloaded by the user from the CeNCOOS data portal. A user request for a CSV file request pulls the data from the server cache. A user request for ERDDAP pulls data from the ERDDAP service using the same cache. For this data, no CF-standard names or units exist, therefore custom names of abundance_of_{scientific_name} were used.

Summary statistics generated within the interactive graphical displays may be requested by the user. Summary statistics may include minimum, maximum and mean values. Seasonal statistics, available on time series longer than 3 years, include mean, and 10th and 90th percentiles. Note: the number of points visually available to interactive users from the source data are limited when necessary using temporal binning, such as daily, weekly, monthly, seasonally and yearly.

F. What metadata or contextual information is provided with the data?

Metadata are shared in the CeNCOOS portals with descriptive narratives describing the data and linking back to the originator's site. Metadata are also available via ERDDAP:

M1: https://erddap.cencoos.org/erddap/tabledap/org_mbari_m1.html

MB0HR: https://erddap.cencoos.org/erddap/tabledap/saic_mb0hr.html

MB1HR:

<https://erddap.cencoos.org/erddap/tabledap/m1-mooring-historic-data-montere.html>

MB2HR: https://erddap.cencoos.org/erddap/tabledap/saic_mb2hr.html

G. Are there ethical restrictions to data sharing?

No

a. If so, how will these be resolved?

N/A

H. Who holds intellectual property rights (IPR) to the data?

Monterey Bay Aquarium Research Institute and CeNCOOS

I. Describe any effect of IPR on data access.

None

3. DATA SOURCE AND QUALITY CONTROL

A. Indicate the data source type (i.e. Federal, Non-Federal, University, State Agency, Local Municipality, Military Establishment (branch), private industry, NGO, non-Profit, Citizen Science, Private individual)

Metadata are shared in the CeNCOOS portals with descriptive narratives describing the data and linking back to the originator's site. Metadata are also available via ERDDAP:

M1, MB0HR, MB1HR, MB2HR, <http://1.axds.co/2GFgnM1>

a. If Federal data source, were changes applied to the data?

N/A

b. If Yes, describe any changes to the data that require documentation?

N/A

B. Indicate the data reporting type (e.g. real-time, historical).

Real-time:

M1

Historical:

MB0HR

MB1HR

MB2HR

C. If real-time, list the QARTOD procedures that are currently applied.

The QARTOD tests that have been applied to the data by CeNCOOS are: timing gap, syntax, location, gross range, climatology, spike, rate of change, flat line, multi-variate, attenuated signal and neighbor test. Refer to CeNCOOS Data Management System plan for details.

D. If real-time, list the QARTOD procedures that are planned for implementation.

No further QARTOD tests are planned for the data.

E. What is the status of the reported data? (e.g. raw, some QC, incomplete, delayed mode processed but not QC'd)

Some QC by the originator.

F. Describe the data control procedures that were applied by the originator.

Temperature, salinity, humidity, air pressure, and wind speed data are flagged using 2.25 biweighted standard deviations from the biweight mean. The method is based upon that outlined by John R. Lanzante in International Journal of Climatology Vol 16 pp. 1197-1226 (1996).

a. Provide a link to any documented procedures.

Information about MBARI data quality control flags can be found:

<https://www.cencoos.org/m1-data-qc-methods/>

G. Describe the data control procedures that were applied by CeNCOOS.

Refer to Section 3.C of the CeNCOOS Data Assembly Center and Data Management Plan.

a. Provide a link to any documented procedures.

N/A

H. List the procedures taken for data that could not be QC'd as directed.

N/A

4. STEWARDSHIP AND PRESERVATION POLICIES

A. Who is responsible for long-term data archiving?

Data was aggregated for visualization and exploration with other layers in the CeNCOOS data portal. If the data provider chooses to archive these data at a national archive in the future, they may do it directly, or using the CeNCOOS-facilitated pathway to NCEI.

B. Which long-term data storage facility will be used for preservation?

Real-time and near real-time data are automatically archived to NCEI from CeNCOOS.

Archived datasets can be viewed at

<https://www.ncei.noaa.gov/access/integrated-ocean-observing-system/>

For more information about CeNCOOS archival practices see [DMP Section 4.8 Data Archival](#)

C. Describe any transformation necessary for data preservation.

Data are formatted to NCEI specifications for archival. See [DMP Appendix H1.1 NCEI Archival Agreement](#) for descriptions of NCEI archival methods.

D. List the metadata or other documentation that will be archived with the data.

N/A