

## 1. DATA AND INFORMATION TYPES

### A. Provide a contextual description of the data stream.

Data collection from pier mounted instruments measuring oceanographic variables at the Cal Poly Pier and Morro Bay Pier in San Luis Obispo was supported by multiple awards to California Polytechnic State University, San Luis Obispo and an award from NOAA's Integrated Observing System to the Central and Northern California Ocean Observing System at the Monterey Bay Aquarium Research Institute (NA21NOS0120090).

The Cal Poly Pier Met station (WMO: cpxc1) is located at the end of the Cal Poly Pier, which is owned by California Polytechnic State University of San Luis Obispo and located in San Luis Obispo Bay, CA. An Aanderra Auto Weather Station (AAWS) has been operated on site since 2003. The instrument was replaced with a Gill Maximet weather station recently. The instrument reports the following data: air temperature, wind speed and direction, wind gust, barometric pressure, precipitation, dew point, net atmospheric radiation, relative humidity, solar radiation, and visibility. The instrument is maintained and operated by San Luis Obispo Science and Ecosystem Alliance (SLOSEA), part of the Cal Poly Center for Coastal Marine Sciences. Data for this station can be accessed through the CeNCOOS data portal: <http://l.axds.co/2sSnVJz>

The Cal Poly Pier Shore station is located at the end of the Cal Poly Pier, which is owned by California Polytechnic State University of San Luis Obispo and located in San Luis Obispo Bay, CA. A profiling sensors package is attached to the pier and continuously profiles the water column from 0 to 11 meters over in a span of 13 minutes, providing near real-time measurements of: depth, temperature, conductivity, salinity, chlorophyll, bioluminescence, backscatter, and turbidity. The instrument is maintained and operated by San Luis Obispo Science and Ecosystem Alliance (SLOSEA), part of the Cal Poly Center for Coastal Marine Sciences. Data for this station can be accessed through the CeNCOOS data portal: <http://l.axds.co/2ChXCjS>

Morro Bay T-Pier (WMO: MBXC1) station is located at the mouth of the Morro Bay, CA and owned by California Polytechnic State University of San Luis Obispo. A water quality monitoring station is fixed at 2 meters below MLLW line and reports in near realtime the following variables: depth, temperature, conductivity, salinity, dissolved oxygen, chlorophyll, turbidity, and nitrate. The instrument is maintained and operated by San Luis Obispo Science and Ecosystem Alliance (SLOSEA), a part of the Cal Poly Center for Coastal Marine Sciences. Data for this station can be accessed through the CeNCOOS data portal: <http://l.axds.co/2oo3Nub>

Morro Bay BS1 Met station is located in the back of Morro Bay, CA and owned by California Polytechnic State University of San Luis Obispo. The station is mounted on a large tripod, resting on the seafloor. A Nova Lynx 100 Weather Station is fixed at 3 meters

above MLLW to a pole extending from the tripod and reports the following in near real-time: wind speed, wind direction, air temperature, barometric pressure, precipitation, relative humidity, and solar radiation. The Nova Lynx weather station has been replaced with a Gill Maximet weather station that records the same variables in real-time. The instrument is maintained and operated by San Luis Obispo Science and Ecosystem Alliance (SLOSEA), a part of the Cal Poly Center for Coastal Marine Sciences. Data for this station can be accessed through the CeNCOOS data portal: <http://laxds.co/2EMzOC7>

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

There are 4 station locations:

Morro Bay - T Pier (MBXC1) 35.3708° N, 120.859° W

San Luis Bay - Cal Poly Pier MET (cpxc1): 35.170° N, 120.741° W

San Luis Bay - Cal Poly Pier Shore: 35.170° N, 120.741° W

Morro Bay BS1 Met: 35.3338°N, 120.847°W

**C. What are the specific variables of the data.**

The variables for station Morro Bay - T Pier (MBXC1) include:

sea\_surface\_height\_above\_sea\_level, sea\_water\_pressure, mass\_concentration\_of\_chlorophyll\_in\_sea\_water, sea\_water\_temperature, sea\_water\_electrical\_conductivity, mass\_concentration\_of\_oxygen\_in\_sea\_water, mass\_concentration\_of\_oxygen\_in\_sea\_water\_optical, mole\_concentration\_of\_nitrate\_in\_sea\_water, fractional\_saturation\_of\_oxygen\_in\_sea\_water, fractional\_saturation\_of\_oxygen\_in\_sea\_water\_optical, sea\_water\_practical\_salinity, turbidity, sea\_water\_ph\_reported\_on\_total\_scale.

The variables for station San Luis Bay - Cal Poly Pier MET (cpxc1) include:

wind\_speed, air\_pressure, solar\_radiation, atmosphere\_net\_rate\_of\_absorption\_of\_energy, wind\_from\_direction, lwe\_thickness\_of\_precipitation\_amount\_cm\_time\_sum\_over\_PT2M, lwe\_thickness\_of\_precipitation\_amount, wind\_speed\_of\_gust, air\_temperature, dew\_point\_temperature, relative\_humidity, visibility\_in\_air.

The variables for station San Luis Bay - Cal Poly Pier Shore include:

mass\_concentration\_of\_chlorophyll\_in\_sea\_water, sea\_water\_temperature, bioluminescence, sea\_water\_density, sea\_water\_electrical\_conductivity, sea\_water\_practical\_salinity, transmissometer, turbidity.

The variables for station Morro Bay BS1 Met include:

air\_pressure, solar\_radiation, wind\_from\_direction, precipitation\_increment\_cm\_time\_mean\_over\_PT2M, air\_temperature, relative\_humidity, wind\_chill\_temperature

**D. Provide information about the sampling platform or instrumentation.**

The Cal Poly Pier Met Station is fixed to the end of the Cal Poly Pier at ~17 meters above MLLW. The station consists of the following instruments:

Aanderaa weather station (wind speed/direction, air temperature, relative humidity, barometric pressure, precipitation, net atmospheric radiation, solar radiation)

Further information can about the instrumentation can be found at:

[https://www.cencoos.org/wp-content/uploads/2020/03/cencoos\\_Standard\\_Operating\\_Procedures.pdf](https://www.cencoos.org/wp-content/uploads/2020/03/cencoos_Standard_Operating_Procedures.pdf)

The San Luis Bay Shore Station is located at the end of the Cal Poly Pier. The instrument profiles the from the sea surface to the sea floor (~11 meters) every 30 minutes and is controlled using a custom built labview program. The instrument contains the following sensor package:

Seabird 19+ CTD (conductivity, salinity, temperature, depth)

Wetlabs FLNTUS (chlorophyll/backscatter)

Gill Maximet weather station (wind speed/direction, air temperature, relative humidity, barometric pressure, precipitation, solar radiation)

Further information can about the instrumentation can be found at:

[https://www.cencoos.org/wp-content/uploads/2020/03/cencoos\\_Standard\\_Operating\\_Procedures.pdf](https://www.cencoos.org/wp-content/uploads/2020/03/cencoos_Standard_Operating_Procedures.pdf)

The Morro Bay Shore Station MB1 consists of a suite of sensors attached to the northern T-Pier in Morro Bay. The instruments are fixed at 2 meters below MLLW and contains the following sensors:

Seabird HydroCAT (conductivity, salinity, temperature, depth, oxygen, chlorophyll, backscatter)

Seabird SeaFET (pH)

Nexsens X2 (datalogger/telemetry)

The Morro Bay BS1 met Station is located in the southern end of Morro Bay and is fixed to a pole that sits approximately 3 meters above MLLW. The station contains the following sensor package:

Gill Maximet weather station (wind speed/direction, air temperature, relative humidity, barometric pressure, precipitation, solar radiation)

Seabird HydroCAT (conductivity, salinity, temperature, depth, oxygen, chlorophyll, backscatter)

Seabird SeaFET (pH)

Nexsens X2 (datalogger/telemetry)

For sampling procedure and more information refer to:

[https://www.cencoos.org/wp-content/uploads/2020/03/cencoos\\_Standard\\_Operating\\_Procedures.pdf](https://www.cencoos.org/wp-content/uploads/2020/03/cencoos_Standard_Operating_Procedures.pdf)

## **2. DATA PATHWAY**

### **A. Is a data sharing agreement required?**

The data may be used and redistributed for free but is not intended or 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.

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

Data are transmitted to Axiom using SSH communication with a Cloud server for the data.

**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 original?**

Data are shared as CSV and through ERDDAP via the CeNCOOS data portal. Data are also available for exploration in the CeNCOOS portals via interactive, graphical visualizations. Data are available from web harvest via the CeNCOOS website to the originator's THREDDS site.

**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 Sub-system. 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 JavaScript Object Notation (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 climate and forecast (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:

Morro Bay - T Pier (MBXC1)

[https://erddap.cencoos.org/erddap/tabledap/edu\\_calpoly\\_marine\\_morro.html](https://erddap.cencoos.org/erddap/tabledap/edu_calpoly_marine_morro.html)

San Luis Bay - Cal Poly Pier MET (cpxc1)

<https://erddap.cencoos.org/erddap/tabledap/san-luis-bay-cal-poly-pier-met.html>

San Luis Bay - Cal Poly Pier Shore

<https://erddap.cencoos.org/erddap/tabledap/san-luis-bay-cal-poly-pier-shore.html>

Morro Bay BS1 Met

[https://erddap.cencoos.org/erddap/tabledap/edu\\_calpoly\\_marine\\_morro\\_bay\\_met.html](https://erddap.cencoos.org/erddap/tabledap/edu_calpoly_marine_morro_bay_met.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?**

California Polytechnic State University 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)**

University

**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: Morro Bay - T Pier (MBXC1), San Luis Bay - Cal Poly Pier MET (cpxc1), Morro Bay BS1 Met, San Luis Bay - Cal Poly Pier Shore

**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 and attenuated signal 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.
- E. What is the status of the reported data? (e.g. raw, some QC, incomplete, delayed mode processed but not QC'd)**  
QARTOD by Axiom.
- F. Describe the data control procedures that were applied by the originator.**  
Originator provides no explicit QC. If the instrument is not returning reasonable values in their estimation the instruments are recovered and others are deployed. No explicit QC flags are passed with the data. Data are monitored daily by the originator.
- a. Provide a link to any documented procedures.**  
N/A
- 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