REGIONAL DATA STREAM PLAN: KING ISLAND WAVE BUOY, AUGUST 2016

1. DATA AND INFORMATION TYPES

A. Provide a contextual description of the data stream.

The King Island wave buoy (NDBC WMO Station 48114) data stream consists of coastal environment measurements taken 30 NM west of King Island, AK in the Bering Sea. The buoy streams real-time information on waves, air surface temperature, and sea surface temperature on an hourly basis. The station is operated by AOOS, and logistically supported by NOAA, the Norton Sound Economic Development Corporation, and Alaska Sea Grant.

This buoy is seasonally deployed (summer only) due to its high latitude location, and currently is not in the water (season 2016). However, the buoy is planned to be deployed in 2017. AOOS developed this Data Stream Plan to describe the future deployment and required real-time QC implementation.

Website URL: Historical Sensor: Source: Alaska Ocean Observing System: http://portal.aoos.org/#module-metadata/0cbe63ce-87aa-11e3-acbf-00219bfe5678/467dd946-87aa-11e3-9eb2-00219bfe5678

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

1

The King Island Buoy - WMO ID 48114

C. What are the specific parameters of the data.

Parameters include GPS, date, time, water temperature, wave height, wave direction, wave periodicity, and air temperature.

D. Provide information about the sampling platform or instrumentation.

The platform is a wave and meteorological buoy (AXYS Watchmate buoy equipped with a Triaxys (three-axis) directional wave sensor system).

2. DATA PATHWAY

A. Is a data sharing agreement required?

Data are available publically.

B. In which format(s) are data received by AOOS?

The data are received as Iridium emails with attached binary file to lance@axiomalaska.com. An example message includes:
$W5M5A,160718,172500,810d01d7496193a5,3,0.01,0.02,25,17,57*17

Example: Here is a file created in the data ftp. This file is created by taking the one line from the iridium attachment and adding to this file. Decoding this file is some work. There

are three types of lines in the file. You can tell the line-type by the 5th column. The 5th column will have either 1, 2, or 3 for the type. The "*19" at the end of the line is the checksum (ignore this).

Type 1:
column headers:"$W5M5A", "yyMMdd","HHmmss", "device ID", "type ID", "lat", "lon", "air_temp", "wind_spd_1", "wind_dir_1", "wind_gust_1", "wind_spd_2", "wind_dir_2", "wind_gust_2", "water_temp"
example
$W5M5A,140819,090000,810d01d7496193a5,1,6500.2533N,16844.8520W,10.9,,,,,,,10.0*19

Type 2:
column headers: "$W5M5A", "yyMMdd","HHmmss", "device ID", "type ID", <Do not know what the other columns are>
example
$W5M5A,160616,091000,810d01d7496193a5,2,12.45,12.54,0.08,,-0.05,3.5,12.32,1466067575,22084,5,105,0,0,,74.91,945236*0C

Type 3:
column headers:"$W5M5A", "yyMMdd","HHmmss", "device ID", "type ID", "sig hgt", "max hgt", "period", "direction", "spread"
example $W5M5A,160615,172500,810d01d7496193a5,3,,,,,*1B

C. **How can the information be accessed?**
The data are available through the AOOS 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. Data are also available for exploration in the AOOS portals via interactive, graphical visualizations.

E. **Describe how the data are ingested(e.g. the flow of data from source to AOOS data portals) and any transformations or modifications made to share data in the AOOS data portal.**
Data are downloaded from the source to the AOOS 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 AOOS 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 AOOS 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. Refer to Appendix I for CF standards.

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?
After AOOS performs standard QC checks and stores data in sensor service cache, data are sent from sensor service cache to NDBC. Data are shared in the AOOS portals with descriptive narratives describing the data and linking back to the NDBC website where FGDC-compliant metadata are available.

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?
Alaska Ocean Observing System

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)
AOOS Funded Wave Buoy, NGO

  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 (2017 +)

Historical (up through 2016)

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

QARTOD status for this Data Stream varies by parameter.

1. Three of the five required tests are currently applied to all parameters: Syntax, Gross Range, and Time-Gap Tests (see 3G below).
2. One of the five required tests is applied to wave period: Syntax Test.

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

When deployed in 2017, AOOS will implement the relevant Group 1 required QARTOD QC checks in addition to the three QC tests already performed automatically by AOOS (Syntax, Gross Range, and Timing Gap tests). Historical King Island Buoy data currently have been QC'd by AOOS using these standard tests for the reported wave parameters (wave height, wave direction). Data that do not pass these tests are removed from display and from the data access files. Planned real-time QARTOD tests on Wave parameters:

1. All wave parameters: Long-term time series flat line and series rate of change tests;
2. Wave period parameter: gross range test.
3. Surface water temperature parameter: improved time-gap test, and location test.

The Climatology Test is more rigorous, and currently, the AOOS Data System does not have the historical data in place to perform meaningful climatology tests on non-federal sourced weather assets. It is a test that may be considered after there are 7+ years of data in the AOOS archive.

AOOS does not serve wave spectra, therefore, no spectra tests are required.

AOOS expects historical data (2011, 2013-2015) will have the additional QARTOD QC tests applied to the record as is done to the real-time data, to provide consistency in the long-term archive.

QARTOD implementation is expected in June 2017.

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

Some QC.

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

Data are converted on the buoy computer to output engineering values for waves and temperature. After data are ingested, AOOS applies 3 standard QC tests:

1. Syntax Test: checks for parity errors by testing if data can be extracted from the

downloaded or scraped data. If no data can be extracted, the test fails, and no data are accessed, served or stored for that record.

2. Gross Range Test: This test checks data values against minimum and maximum values defined for the following parameters (Appendix H): Wave height range (0-20 meters); wave direction range (-360 to 360 degrees); surface water temperature (20-135 deg F). Wave Period is currently not gross range tested by AOOS. A gross range tests is completed for air temperature range (-130 to 135 deg F). Values outside of the prescribed parameter ranges are rejected and replaced with missing value flags in data storage connected to access points and the graphic displays.

3. Time-Gap Check: AOOS implements a "time-gap check" that informs observational assets (e.g., weather stations) displayed on its "Real-Time Sensor Map". If no data are received from an existing observational station for four hours, the icon on the map changes from a scaled color to a small grey-shade dot. If no data are received from an existing observational station for one week, the asset is automatically removed from the map, although assets are still made available on a historical sensor map.

    a. **Provide a link to any documented procedures.**
         AOOS Data Assembly Center and Data Management Subsystem Plan, Section 4.4.4.

G. Describe the data control procedures that were applied by AOOS.
Refer to Section 3C and 3F for details.

    a. **Provide a link to any documented procedures.**
         AOOS Data Assembly Center and Data Management Plan (2016).

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?
Though AOOS provides these data to the National Data Buoy Center, AOOS is responsible for archiving these data with NCEI via a planned, automated pathway.

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

C. Describe any transformation necessary for data preservation.
NetCDF

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