Data Management Plan: NANOOS Glider Operations OSU

I. Type of data and information created

1. **What data will you collect or create in the research?**
   Contextual statement describing what data are collected and relevant URL (IOOS Certification, f 2)
   Since its inception in 2006, the OSU Glider Research Lab collects near real-time physical environmental data as part of NANOOS in the coastal US Pacific northwest. Gliders collect observations along cross-shelf transects from nearshore to the deep ocean at one or more locations. In all cases, these data are transmitted from the glider to our lab at Oregon State University in Corvallis, OR, where the data are processed and disseminated.

2. **What data types will you be creating or capturing?**
   The program captures *in situ*, subsurface temperature, salinity, pressure, chlorophyll fluorescence, CDOM (colored dissolved organic matter) fluorescence, backscatter, dissolved oxygen, and depth-averaged water-column velocity measurements from an autonomous underwater vehicle glider platform.

3. **How will you capture or create the data?**
   Describe how the data are ingested (IOOS Certification, f 2)
   The data are captured using an unpumped SeaBird Electronics SBE43 CTD, a WETLabs Eco Puck, an Aanderaa optode, and the glider navigation system. The glider-based observations are transmitted via iridium to our lab at Oregon State University in Corvallis, OR, and an internal compact flash card stores the data, available upon recovery.

   Describe how data are managed (IOOS Certification, f 2)
   The data are managed at the Oregon State University Glider Research Lab in Corvallis, OR. The data are stored on local computers and pushed out to NODC.

   Describe the data quality control procedures that have been applied to the data. (IOOS Certification, f 3)
   The data processing and quality-control procedures for profile data received from Seaglider deployments defined in Seaglider Quality Control Manual document: https://ioos.noaa.gov/wp-content/uploads/2015/10/Manual-for-QC-of-Glider-Data_05_09_16.pdf, Appendix D

   The overall data quality control process is patterned after the Argo data processing scheme (Schmid, *et al*, 2007 and Argo, 2010). In particular, an initial fully-automated quality control process, described in this manual, produces a NetCDFformat file for each profile sufficient for deposit to any national repository, such as the National Oceanographic Data Repository (NODC). This process corresponds to Argo's 'real-time' quality control procedure.

This is followed, by a manual review of each profile by one or more trained oceanographers, leading to possible adjustments to the automated results and hence resubmission. This process corresponds to the Argo 'delayedmode' quality control procedure. A preliminary manual adjustment mechanism is presented in this document. Additional information about oceanographic data quality control may be found in the references. The basic seawater property calculations used throughout rely upon formulas taken from Unesco's joint panel on oceanographic tables and standards, described in Unesco, 1981 and Fofonoff, *et al*, 1983.

As a NANOOS Observing System provider, we follow industry best practices and manufacturer guidance where applicable, to calibrate, operate, and maintain the equipment used in this effort, and will provide documentation of this upon request.

Further, we maintain equipment inventories, shipping logs, and instrument maintenance history logs, as appropriate, that are available upon request.

4. **If you will be using existing data, state that fact and include where you got it. What is the relationship between the data you are collecting and the existing data?**
   N/A

Data Management Plan: NANOOS Glider Operations OSU

II. Expected schedule for data sharing

Adheres to the NOAA Data Sharing Procedural Directive. The System is an operational system; therefore the RICE should strive to provide as much data as possible, in real-time or near real-time, to support the operation of the System. (IOOS Certification, f 4)

Once data have been acquired, they are telemetered to shore, converted to the IOOS Glider DAC format and submitted to the Glider DAC. The data are also post-processed, and quality controlled by the OSU Glider Research Lab and then the complete data set is made publicly available. Final submission of both raw data and processed data are to NODC.

1. **How long will the original data collector/creator/principal investigator retain the right to use the data before opening it up to wider use?**
   N/A

2. **How long do you expect to keep the data private before making it available? Explain if different data products will become available on different schedules (Ex: raw data vs processed data, observations vs models, etc.)**
   N/A

3. **Explain details of any embargo periods for political/commercial/patent reasons? When will you make the data available?**
   N/A

Data Management Plan: NANOOS Glider Operations OSU

III. Standards for format and content

1. **Which file formats will you use for your data, and why?**
   How can the information be accessed? (IOOS Certification, f 2)
   Data can be accessed from the IOOS Glider DAC Using tabledap to request data and graphs from tabular datasets:
   https://data.ioos.us/gliders/erddap/tabledap/index.html

   Details and available file formats are described in the document:
   https://data.ioos.us/gliders/erddap/tabledap/documentation.html

2. **What file formats will be used for data sharing?**
   All of the above.

3. **What metadata/ documentation will be submitted alongside the data or created on deposit/ transformation in order to make the data reusable?**
   All glider data sets are described by detailed metadata, which is continuously updated and available online from the tabledap Federal Geographic Data Committee (FGDC) compliant metadata and ISO 19115 metadata are included in XML formats.
   https://data.ioos.us/gliders/erddap/tabledap/index.html

4. **What contextual details (metadata) are needed to make the data you capture or collect meaningful?**
   All metadata include:
   1. Identification_Information
   2. Data_Quality_Information
   3. Entity_and_Attribute_Information
   4. Distribution_Information
   5. Metadata_Reference_Information

5. **How will you create or capture these details?**
   OSU seaglider data FGDC metadata is generated by querying OPeNDAP and Data Access Protocols (DAP):
   https://www.opendap.org/
   https://www.opendap.org/pdf/ESE-RFC-004v1.2.pdf

6. **What form will the metadata describing/documenting your data take?**
   OSU seaglider data sets are described by detailed metadata in a number of formats from tabular datasets (https://data.ioos.us/gliders/erddap/tabledap/):
   - FGDC XML - cdip.ucsd.edu/data_access/metadata
   - ISO 19115 XML - NetCDF http://thredds.cdip.ucsd.edu

Data Management Plan: NANOOS Glider Operations OSU

7. **Which metadata standards will you use and why have you chosen them? (e.g. accepted domain-local standards, widespread usage)**
   FGDC and ISO 19115 metadata are both accepted standards and mandated by the US Federal Government.

Data Management Plan: NANOOS Glider Operations OSU

IV. Polices for stewardship and preservation

1. **What is the long-term strategy for maintaining, curating and archiving the data?**
   Points of contact- Individuals responsible for the data management and coordination across the region (CV's attached); (IOOS Certification f 1.i)
   Jack Barth, Principal Investigator
   541-737-1607
   jack.barth@oregonstate.edu

   R. Kipp Shearman, Principal Investigator
   541-737-1866
   shearman@coas.oregonstate.edu

   Anatoli Erofeev, Faculty Research Assistant
   541-737- 4656
   aerofeev@ceoas.oregonstate.edu

   Identify the procedures used to evaluate the capability of the individual (s) identified in subsection 997.23(f)(1) to conduct the assigned duties responsibly. (IOOS Certification, f 1.iii)
   Oregon State University has a process in place for personnel evaluation. These evaluations are on file with OSU Human Resources. All personnel listed have received excellent evaluations.

2. **Which archive/repository/database have you identified as a place to deposit data?**
   Documents of the RICE's data archiving process or describes how the RICE intends to archive data at the national archive center (e.g., NODC, NGDC, NCDC) in a manner that follows guidelines outlined by that center. Documentation shall be in the form of a Submission Agreement, Submission Information Form (SIF) or other, similar data producer-archive agreement (IOOS Certification, f 6).
   Integrated Ocean Observing System (IOOS): https://gliders.ioos.us/
   We are also submit data to the National Oceanographic Data Center (NODC).

3. **What procedures does your intended long-term data storage facility have in place for preservation and backup?**
   Local redundant HDD storage at the OSU Glider Lab including several QNAP backup systems

4. **How long will/should data be kept beyond the life of the project?**
   Data are indefinitely stored.

5. **What data will be preserved for the long-term?**
   All data are publicly available and preserved.

Data Management Plan: NANOOS Glider Operations OSU

6. **What transformations will be necessary to prepare data for preservation / data sharing?**
   Raw data are decoded and formatted, analyzed and quality controlled.

7. **What metadata/ documentation will be submitted alongside the data or created on deposit/ transformation in order to make the data reusable?**
   FGDC standard metadata are available per deposit and transformation. NetCDF files have complete metadata and quality control flags.

8. **What related information will be deposited?**
   none

Data Management Plan: NANOOS Glider Operations OSU

V. Procedures for providing access

1. **What are your plans for providing access to your data? (on your website, available via ftp download, via e-mail, or another way)**
   Describe how data are distributed including a description of the flow of data through the RICE data assembly center from the source to the public dissemination/access mechanism. (IOOS Certification, f 2 and 4)
   via email

2. **Will any permission restrictions need to be placed on the data?**
   OSU glider data and products are freely available for public use. When referenced, please provide a link to the OSU Glider Research Lab homepage.
   Examples:
   1) Standard html:
      Data courtesy of OSUGRL
   2) Offline references, choose the appropriate form from the recommended acknowledgements below.
      - Short form (figure captions, etc.)
        "... data from J. Barth and K. Shearman, OSU Glider Research Lab."
      - Longer form (in text)
        "...data were furnished by the J. Barth and K. Shearman, OSU Glider Research Lab, College of Earth, Ocean, and Atmospheric Science, Oregon State University."

3. **With whom will you share the data, and under what conditions?**
   Data are publicly available.

4. **Will a data sharing agreement be required?**
   In general, a data sharing agreement will not be required. However, data should be properly acknowledged.

5. **Are there ethical and privacy issues? If so, how will these be resolved?**
   N/A

6. **Who will hold the intellectual property rights to the data and how might this affect data access?**
   The funding agency and Oregon State University through a contractual agreement.

VI. Previous published data