Endurance Array Current Data and QA/QC Activities

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Endurance Data Team

Data Team Lead

 Christopher Wingard – Data transfers, ingestion, QA/QC, annotations, and asset management.

Data Team

- Craig Risien QA/QC, in-depth assessments, and communications.
- Russell Desiderio asset management, QA/QC, and in-depth assessments.
- Stuart Pearce Glider operations and data management.



Photo credit: Aimee Williams, OSU undergraduate Artist at Sea

• And a host of others!



Endurance Data Team Responsibilities

- Asset Management
 - Entering required metadata (cal, deployment info, etc) into OOINet.
- Data Ingestion/Availability
 - Ingesting/re-ingesting data into OOINet.
 - Ensuring data flow from platform to shore to science users.
- Data QC
 - Monitoring deployed assets and reporting status.
 - Identifying/resolving issues with instruments/data.
 - Assist in development of automated data QC and conduct HITL data QC.
 - Annotating data in OOINet for instrument/data issues, metadata changes.
- Supporting program (working groups, enhancements) and users (Help Desk)



Asset Management (Critical Metadata Review)

- Surface and Profiler Moorings
 - Completed review of all calibration and deployment data
 - Identified **1** missing calibration file and **2** files with incorrect information out of a total of **830** files reviewed.
 - Renamed **319** files from earlier Omaha formatting (deployment versus calibration date).
 - Updated deployment information for **5** moorings (2 each start and stop date/times, and 1 latitude/longitude).
 - Gathering documentation to populate common reporting spreadsheet and generate annotations.
- Coastal Surface Piercing Profilers (CSPP)
 - Completed review of all calibration and deployment data
 - Identified **3** files with incorrect information out of a total of **213** files reviewed.
 - Renamed **40** files from earlier Omaha formatting (deployment versus calibration date).
 - Gathering documentation to populate common reporting spreadsheet and generate annotations.
- Gliders
 - On-going review of all calibration and deployment data
 - Part of process to push all glider data to the <u>Glider Data Assembly Center (DAC)</u> and mark as complete for release to <u>NCEI</u>. Completed through late 2017.
 - Prior to July 2019, only pushing recovered glider data sets.
 - Now pushing both telemetered (decimated) and recovered.
 - Review encompasses deployment metadata and the PAR sensor scaling factor (CRM). Aanderaa optode internal salinity setting and other critical metadata is embedded directly in the glider data files.
 - Gathering documentation to populate common reporting spreadsheet and generate annotations.



Data Ingestion/Availability

- Surface and Profiler Moorings
 - Current for telemetered data. Endurance 12 telemetered ingests were activated in most cases less than 1 week after deployment (shortest turn around to date).
 - Recovered Endurance 11 data still being downloaded, will be complete and ready to upload week of 2019-11-18.
- Coastal Surface Piercing Profilers (CSPP)
 - Deployed and recovered complete and current.
- Gliders
 - Need to purge and re-ingest all engineering data streams in OOINet (Redmine ticket 13182).
- Gap Analysis
 - 1.0 Identified backlog completed January 2019, comprised of 161 datasets.
 - Comparing all data available on local, internal server versus data available via M2M system.
 - Identified 3% of data available (combined 4599 days) was missing from system.
 - Principal cause was development of new parser/drivers for new datasets (e.g. transition of Nitrate sensor (NUTNR) from the older Satlantic ISUS to the newer Satlantic SUNA).
 - Secondary cause was due to telemetry or instrument failures (e.g. METBK) and need to restart/rerun ingest system.
 - Additionally, identified bugs in dataset parsers (METBK, PCO2W recovered instrument and VEL3D).



Data QA/QC: "Weekly" Workflow





- *Missing: Means to create similar process and statistics for gliders and CSPP.*
- Goal: Utilize processes and applications Axiom brings to the project to update this workflow and extend to cover gliders and CSPP.
- CSPP and glider hardware failures are recorded in Redmine.



Data QA/QC: QARTOD

- Participation in bi-weekly meetings
- Gross Range Test
 - Populate table with sensor and user ranges for all instances of CTDs for Endurance
 - Temperature, practical salinity, conductivity and pressure
 - CTDBP (moorings, 12).
 - CTDPF (profiler mooring and CSPP, 5).
 - GTDGV (gliders, 12).
 - 16 unique entries replicated out to a total of 116 entries.
 - Sensor range from vendor documentation.
 - User range from regional averages +- 5 standard deviations.
- Next!



Data QA/QC: Tools

- Developing <u>python and Matlab code</u> code to download OOI data from M2M system to facilitate data explorations.
 - Profiler explorations (<u>https://github.com/IanTBlack/DivemasterApp</u>).
 - Completed extensive review of CSPP data available for Oregon and Washington inshore profilers.
 - Working through data from Oregon and Washington shelf profilers.
 - Extending Time Availability.
 - Developing prototype data reports.
 - Reviewed CTD and fluorometer instruments and drafted 90 annotations for upload to system. Working to incorporate/update with existing annotations and to include notes and comments from Rutgers OOI 1.0 Data Review.
 - Used to download data for delivery to <u>GOA-ON</u> and <u>NVS</u>.







Data QA/QC: Algorithm Updates

- ADCP 3-Beam Solution
 - Developed additional code to implement a 3beam solution for the RCA ADCP (programmed in beam coordinates) to address cases where 1 of the 4 beams may (<u>as has currently happened</u>) fail.
- pH Point-to-Point Variability
 - Exploring vendor supplied pH algorithm to address artificially induced point-to-point variability. Working with new code provided by vendor to update existing algorithm.



Date





Going Forward: Near Term (2-3 Weeks)

- Glider purge/re-ingest to address updated data sets (Redmine ticket 13182) and missing latitude/longitude variables.
- Populate QARTOD Gross Range Test table for all Endurance CTD instruments.
- Communicate Endurance Critical Metadata review findings through common spreadsheet.
- Upload recovered Endurance 11 data and initiate ingests.



Going Forward: Longer Term

- Reviewing, in collaboration with vendor, pH algorithm (<u>falsely introduces point-to-point variability</u>). Will transition older algorithm to newer version provided by vendor.
- Continue review of all Endurance data sets to develop complete annotation records (integration with existing annotations and notes/comments from Rutgers OOI 1.0 Data Review).
- Participation in OOI Working Groups.
 - PMO/Axiom site visit December 19-20, 2019
 - Data Team meeting January 7-9, 2020.
- Instrument tech refresh
 - Create strawman process to review instruments and create metrics of instrument performance (part and parcel of larger QA/QC process).



Questions?

