#### OCEAN OCEAN OBSERVATORIES INITIATIVE INITIATIVE

#### Endurance Array (EA) Data QA/QC Activities

#### October 13, 2020

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as some for a







### **EA Data Team**

- Christopher Wingard *Mooring and profiler data* transfers, ingestion, QA/QC, annotations, and asset management.
- Craig Risien QA/QC, in-depth assessments, and communications.
- Russell Desiderio asset management, QA/QC, and indepth assessments.
- Stuart Pearce Glider data transfers, ingestion, QA/QC, annotations, and asset management.
- And a host of others!





#### **Oregon Inshore Surface Mooring Bottom** Camera (25 m)





July 26, 2020 5:30 PM PDT

#### July 27, 2020 5:30 PM PDT





#### July 29, 2020 5:30 PM PDT







# **Current EA Data and QA/QC Activities/Priorities**

- QARTOD Test Implementation adding test data and assisting with development.
- Dissolved Oxygen (DO) Data Reviews extending early September review for webinar to cover all EA DO data collected to date.
- Bio-Acoustic Sonar Echograms assisting in development of echograms for all OOI bio-acoustic sonar sensors.
- Preload Metadata Reviews updating and correcting variable level attributes and metadata.
- Pressure Working Group Correcting WFP pressure records.
- Glider Data Finalizing Glider DAC code and correcting issue with latitude and longitude records.











### **QARTOD Test Implementation**

- Gross Range test now implemented for all EA CTDBP datasets.
- Shared code to develop Climatology test limits based on a harmonic analysis of annual and semiannual cycles fit to monthly mean observations from 3+ years worth of data.
- Values for Climatology tests for most EA CTDBP (temperature and salinity) have been created, need to add to tables.
- Climatology test staged to production, needs final review prior to release (compare results versus expectations for selected data sets). Next 3 weeks.
- EA will begin work during this quarter and extending beyond to create Gross Range and Climatology test values for other instruments. Prioritizing carbon cycle (pCO2 and pH) and dissolved oxygen sensors first.
  - Collect all available data (delivery methods, streams, formats, annotations, discrete samples). • HITL assessments with creation, updating and application of annotations (suspect/fail). • Gross Range test values based on vendor documentation, with user range based on mean ± 3 standard

  - deviations of the collected and cleaned data.
  - Climatology test values based on curve fit ± 3 standard deviations of the collected and cleaned data.











# **EA Dissolved Oxygen Review**

- Added methods to <u>ooi-data-explorations/python</u> code to download dissolved oxygen (DO) data from EA surface moorings (applicable to comparable data for Global and Pioneer arrays).
- Reviewed DO data from Spring 2019 to present (introduction of UV biofouling control) for EA in preparation for webinar.
- Updated/created a combined 69 annotations noting data issues.
- Created notebooks demonstrating how to access dissolved oxygen data as well as annotations and shipboard discrete sample data.
- Created 10-minute presentation on accessing EA surface mooring DO data (posted to OOI web site).
- Will be extending review to encompass all EA DO data from surface moorings and the CSPP.









Identified and corrected significant bug impacting the DO calculation for some uncabled instruments (total of 109 spread across the Endurance, Pioneer and Global arrays).







# **Bio-Acoustic Sonar Echograms**

- Bio-acoustic sonar instruments are deployed at multiple sites across OOI, but data is not available via OOINet (datasets are too large).
- Code exists to generate echograms from this data, but in poor shape (failed for cabled, not implemented for uncabled).
  - Variable ranges, small temporal range (< 1 day), large file size.
- ZPLS Working Group formed to address these and other issues.
- Adopted <u>echopype</u> (OS python code developed by Wu-Jung Lee at UW-APL) to convert and process all bio-acoustic sonar data, producing echograms with consistent ranges and larger temporal coverage (5-7 days). *Emphasis on highlighting patterns of abundance and diurnal cycles.*
- Code developed by James Kuo at WHOI for uncabled assets, Chris Wingard extending to cover cabled assets.
- Converted data will be available in NetCDF files (Zarr).



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### **Preload Metadata Review**

- other attributes used to define parameters in OOINet.
- with a focus on CF Metadata compliance.
- are opaque (e.g. dosta abcdjm cspp tc oxygen could become dissolved oxygen).
  - Do no harm! Variable names will not change unless necessary.
- Completed initial review of variables for the PCO2A instrument.
- Final review process.
  - Double check updates.
  - changed.
- Will integrate into the larger QC process.





• Preload is the database of variable names, units, descriptions, standard names, long names, and

• The Preload Metadate Review is focused on updating/correcting these variable level attributes (e.g. converting non-standard unit strings to interoperable equivalents, °C to degrees Celsius)

Additionally, will create new variable names to be used in the NetCDF files where existing names

• Setup process and schedule for notifications regarding any variable names that may be







### **Pressure Working Group and Glider Data**

- Pressure Working Group
  - Errors in how pressure records were being derived and assigned to profiling instruments.
    - Replacement of existing pressure records with interpolated records (results  $\neq$  1:1).
    - Incorrect time records (CTD record for the WFP).

  - Pressure Working Group formed to address and correct these, and other pressure related errors. • All EA CSPP data were corrected early in summer 2020.
  - A fix was put into place for the Coastal WFP on 2020-09-10. EA WFP datasets were corrected 2020-09-17.
- Glider DAC and Latitude/Longitude Issues
  - Code to push OOI glider data to the <u>IOOS Glider DAC</u> is complete and shared with CG.
  - Current EA telemetered glider data is being posted to the DAC. Historical replays are complete.
  - Issue identified with how latitude and longitude data was reported in the glider data files within OOINet. Addressed over the course of Summer 2020 with a fix put into place 2020-09-10.
  - As of 2020-10-12, all EA glider data has been purged and re-ingested.











## **Other Accomplishments and Next Steps**

- Other Accomplishments
  - Finalized python tools for accessing the OOI M2M API and published to Github Developed Matlab GUI (thanks to Sheri White for testing!) to access, download, plot and
  - annotate data for HITL QC reviews
  - question/answer format. Collaborating with WHOI colleagues via Github
  - Updated 1.0 python ingest scripts from 2.7 to 3 and converted to using CLI inputs rather than • Completed Tech Refresh assessment of the PHSEN in close collaboration with all MIOs
- Next Steps
  - Complete in-depth reviews of PHSEN and DOSTA datasets and use cleaned data to develop QARTOD Gross Range and Climatology test values
  - Use completed echogram code to generate echograms for all EA bio-acoustic sonar data and start developing annotations where applicable
  - Continue Preload Metadata Reviews
  - Continue active participation in all cross-MIO teams











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### Questions?

