Coastal & Global Scale Nodes (CGSN)
Data QA/QC Review

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CGSN Data Team

Data Team Leads

• Sheri N. White – Data Team Lead
• Al Plueddemann – PI/PS
• Andrew Reed – Data Science Manager QA/QC*

Data Team Support

• Peter Brickley – Operations
• Stephanie Petillo – Software
• Jennifer Batryn – Instrumentation
• Allen Smith – Instrumentation
• Collin Dobson – Operations, gliders
• James Kuo – Subsurface Moorings
• John Lund – Subsurface Moorings
• Rebecca Travis – Config. Management

* Full-Time Data Team members

~2 FTE effort on Data QA/QC in OOI2.0 (Oct 2018-Sept 2019)
CGSN Data Team Responsibilities

- **Asset Management**
  - Entering required metadata (cal, deployment info) into OOINet

- **Data Ingestion/Availability**
  - Ingesting/re-ingesting data into OOINet
  - Ensuring data flow from platform to shore to science users

- **Data QC**
  - Identifying/resolving issues with instruments/data
  - Implementing automated and HITL (Human In The Loop) data QC

- **Annotation**
  - Annotating data in OOINet for instrument/data issues, metadata changes
Asset Management

• Improving asset management processes
  • Double-checking all entered metadata through GitHub
    • Using a dedicated fork and branches for calibrations and deployments
  • Developing automated processes for capturing calibration coefficients
    • To prevent manual entry errors, and speed up the process
  • Documenting Standard Operating Procedures (SOPs)

• Added or Updated ~223 CSV files in PYI of OOI2.0
  • New calibrations, new deployments
CGSN Critical Metadata Review

• Conducted review of all historic Metadata in OOINet

• Scope of work
  • Calibration Coefficients – 2749+ calibration files, 30804+ calibration coefficients
  • Platform Deployments
    • Moorings – 27 moorings, 162 total deployments
    • Gliders – 52 Gliders, 145 total deployments
    • AUVs – 2 AUVs, 15 total deployments
  • Assets
    • 1062 Instruments in inventory (sensor_bulk_load)
    • ~300 Mooring control components (eng_bulk_load)
CGSN Critical Metadata Review

• Efforts include creation of automated tools for metadata checks

• Tools were necessary due to volume of instrumentation and number of calibration coefficients
  • For example: hundreds of CTDMOs (Conductivity Temperature Depth - Mooring); Large arrays of coefficients for the OPTAA sensors (Optical Attenuation & Absorption)

• Scripts will be used for on-going Asset Management updates
  • To streamline and reduce manual entry errors
CGSN Critical Metadata Review Process

**Calibration CSV Review**

- GitHub cal CSVs
- Vendor docs (PDF, .cal, etc.)

1. **All files Exist**
   - Yes → **Filenames Correct**
   - No → **Record Issue in Log Sheet**

2. **Filenames Correct**
   - Yes → **Coefficients Correct**
   - No → **Record Issue in Log Sheet**

3. **Coefficients Correct**
   - Yes → **Verified**
   - No → **Record Issue in Log Sheet**

**Two Part Process:**

1. Identify Issues
2. Implement Changes

- **Update CSV files**
- **Local (ooicgsn) Pull Request Review x2**
- **ooi-integration Pull request**

![Diagram](image-url)
CGSN Critical Metadata Review Process

Platform Deployment CSV Review

GitHub deployment CSVs
Config Sheets & Mooring Logs

- Deploy Date / Time Correct
  - Yes
  - No

- Lat / Lon Depth Correct
  - Yes
  - No

- All S/Ns Correct
  - Yes
  - No

Record Issue in Log Sheet

GitHub CSVs:
- bulk_load
- Vessel Cruise Information
- Deploy

Verify

- Update CSV files
- Local (ooicgsn) Pull Request Review x2
- ooi-integration Pull request

Record Pull Request #
CGSN Critical Metadata Review Status

• Need for metadata review:
  • Non-data impacting: 40% of files have issues related to consistency of naming files
  • Data impacting: 14% of calibration files show errors

• Metadata Review Status:
  • Data impacting: Currently 100% of calibration files reviewed, >90% of updates implemented
  • Non-data impacting: Remaining administrative work for calibration CSVs will be completed in November 2019
Data Ingestion/Availability

• Data ingestions
  • OOI 1.0 known ingestion backlog complete:
    • 25 streams ingested
    • Will perform further ingestions as dictated by Redmine ticket review
  • OOI 2.0 data ingestions:
    • >1500 streams ingested
    • 96% of available ingestions completed
    • Pioneer 12 recovered data ingestions in process

• Data availability
  • Continuous operational review of OOINet, VisualOceans, OMS++
  • Adapting OSU ERDDAP scripts to assess data availability (Gap Analysis)
CGSN Ingestion Process

Telemetered Data

Asset Management Updates (required prior to Active Ingestion)

Platform Deployed & Telemetering Data

PSS Data Check

Yes

No

PSS - omsds1 – CI – OOI raw data archive

Yes

No

Data Server Sync

Yes

No

Test Ingestion

Yes

No

Active Ingestion

Process Monitoring

Ingestion Tracking Sheet: "ONGOING_REP"

Ingestion will persist until platform is recovered

Troubleshooting by Ops Team

Platform Shore Server

OOINet
CGSN Ingestion Process

Recovered Data

Asset Management Updates (required prior to Active Ingestion)

Platform Recovered & Data Downloaded

- PSS/Limbo
  - Data Uploaded and Verified
    - Yes
    - No

  - Recovery Checklists Completed
    - Yes
    - No

  - Data Server Sync
    - Yes
    - No

- PSS/Limbo - omsds1 – CI – OOI raw data archive

- Local machine

- OOINet

- Active Ingestion

- Process Monitoring

Troubleshooting by Ops Team

Completion of Recovered Data Ingestion

Ingestion Tracking Sheet: “COMPLETED”
Data QC

• Operations and Data Monitoring
  • Implemented formal weekly CGSN field operations review
    • Assignment of engineering & data actions, and updating OMS++ infrastructure and instrument alarming
  • Implemented formal weekly CGSN Data Team meetings
    • Assigning/Coordinating data tasks and prioritizations

• Addressing issues via OOI Data Team working groups
  • QARTOD, ADCP (Acoustic Doppler Current Profiler), Communications, Ticketing, Ship-Based Discrete Sampling, etc.

• Working high-nail issues (common failures, Redmine tickets) assigned to CGSN:
  • Helpdesk tickets from Science Users
  • Operations & Hardware tickets generated from CGSN weekly ops reviews
Annotations/Communications

• Annotations are generated as a result of Data Team efforts
  • Monitoring operations of platforms
  • Monitoring data quality of instruments
  • Changes to Critical Metadata that affect data

• Number of annotations created or updated in OOI2.0
  • 170 operational annotations created/updated (24+ more identified to be done)
  • 109 data annotations created/updated (2+ more identified to be done)

• Working on processes for notifying the community about Data Issues
  • Data Communications Working Group has drafted user announcement on Metadata Review, agreed on website location and alternate delivery methods
CGSN Accomplishments To Date

• Full-time CGSN Data QC hire in November 2018 (Andrew Reed)
• Instituted a weekly CGSN Data Team Meeting
• Attended OOI Data Team Workshop at UW in January 2019
• Completed re-ingestion of backlog from OOI1.0
• Created a common format/spreadsheet for OOI Ship-based Discrete Sampling data across the program
  • Consulted with BCO-DMO (Biological and Chemical Oceanography Data Management Office) on format and community standards
  • Continuing implementation of new format for all past data
  • Enables ingestion of discrete sampling data into OOI Net
• Supported development of new CSV format for inductive ADCPs
CGSN Accomplishments To Date

• Successful Asset Management updates and Data Ingestion for:
  • Pioneer 11, 11a, 11b, 11c, 12, 12a, 12b, 12c, 13; Southern Ocean 5;
    Irminger 5, 6; Papa 6, 7 cruises

• Coordinated a cross-MIO workflow for release of asset management updates to OOINet

• Completed Critical Metadata Review for all data affecting issues

• Supported generation/deployment of single reporting format of Metadata Updates to the OOI user community

• Engaged with IOOS on QARTOD standards
  • Attended IOOS DMAC (Data Management & Communication Subsystem) QARTOD code sprint in Ann Arbor in October 2019
CGSN Plan Going Forward

• Continue weekly OOI & CGSN meetings to identify work and tasking
• Complete administrative activities on Metadata Review
• Evolution of OMS++ system to improve mooring and data monitoring (alerts & alarms, data visualization)
• Support technical refresh activities including data quality review of individual instruments
• Continue to develop and implement automated processes for metadata and data review, support implementation of first QARTOD test in 1Q PYII
• Start hiring process for Data Operations Manager to support day-to-day QA/QC monitoring, ingestion, and annotation activities
Questions