Rolling Deck to Repository (R2R)

Status and New Developments -2020

S. O’Hara, D. Clark, J. Elya, C. Olson, R. Hudak, S. Smith, K. Stocks, L. Stolp, S. Carbotte
LDEO, FSU, SIO, WHOI

www.rvdata.us
R2R Services for the ARF

Mission: To support acquisition, documentation, preservation, and enhanced usability of the underway environmental sensor data from scientific cruises conducted with the U.S. Academic Research Fleet (ARF).

Core Services

1. Digital curation & preservation for all routinely operated sensors

2. R2R Cruise Catalog - resource for discovery of information and data

3. Data documentation/QA and Level 1/2 data products to broaden access
R2R Cruise Catalog for the ARF

- 20 Active Service Ships (global, regional, coastal)
- R/V Falkor and Nautilus
- All expeditions since 2009 (30 ARF ships)
- ~350 ARF cruises/year at present
Environmental Data Curated

- 32 device types (break out, document, publish, bag, submit to NCEI/Glacier)
- >32,000 filesets from ARF since 2009

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Number</th>
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<tbody>
<tr>
<td>ADCP</td>
<td>2,856</td>
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<tr>
<td>CTD</td>
<td>2,275</td>
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<tr>
<td>Gravimeter</td>
<td>820</td>
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<tr>
<td>Magnetometer</td>
<td>128</td>
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<tr>
<td>MultiBeam</td>
<td>1464</td>
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<tr>
<td>Subbottom</td>
<td>2495</td>
</tr>
<tr>
<td>Other (Nav, MET, etc)</td>
<td>21,924</td>
</tr>
</tbody>
</table>
Automated Post-Cruise Quality Assessment/Data Documentation

- Navigation
- Multibeam
- Subbottom
- Gravity
- Magnetics
- CTD
- XBT

Possible due to standardization and routine submission.
Goals: to identify suspicious data
1. File/metadata integrity (exists, size, format, within temporal/spatial bounds)
2. Device specific tests. Examples for Nav:
   - Time gaps
   - % Completeness
   - Out of Sequence
   - Unreasonable Accelerations
Multibeam QA

- High across-track beam noise: outerbeams (not narrowing swath)
- High across track slope
- Missing surface sound velocity
- Missing valid sonar draft
- Navigation/time
R2R Data Products

Final Navigation
Evaluation Products for:
- Subbottom
- Gravity
- Magnetics
- CTD
- XBT

Elog – Sampling Log
MET via SAMOS
Navigation Products

Standalone nav serves two main purposes
- Cruise track & determining spatiotemporal bounds of cruise
- Providing lat/lon information for datasets that only have timestamps

Standalone navigation for ~85% of UNOLS cruises.
Support for Acquisition: Near RT QA/QC of MET and TSG via SAMOS

- 12 recruited vessels (Atlantic Explorer, Atlantis, Kilo Moana, Neil Armstrong, Pelican, RG Sproul, Roger Revelle, Sally Ride, Sikuliaq, TG Thompson + NB Palmer and LM Gould)
  - 3 retired vessels (Knorr, Melville, New Horizon)

- 20 operators feedback exchanges in past year
  - Resolved over a dozen MET/TSG sensor issues

- Dockside observations can be valuable
  - Hurricane Paulette’s eye captured passing the Atlantic Explorer 14 Sept. 2020
Support for Acquisition: R2R ELOG

R2R ELOG can be used by technicians and scientists to capture device metadata and sampling events during a cruise.

- Next gen Fitlets are being rolled out to the ships
- Currently installed on: AE, AR, OC, TN
- Working to install next-gen software on a VM
- New features: Upload instruments/persons from a previous cruise; Drag/Drop instruments; calendar feature to grab GPS data when entering an event late; misc bug fixes

Sampling events, provide installation information, new calibration values, comments to explain gaps in data etc
Transmissometer Best Practices

- Completed and published best practice document for underway C-Star Transmissometers
  - Contributed to International Ocean Data Exchange Ocean Best Practices Service

- Developed by R2R led working group (scientists and operators from USCG, NOAA, R-DESC, LDEO).

- Contents:
  - What data to record and provide to users (based on science needs)
  - Basic C-Star Transmissometer calculations
  - Essential instrumental metadata
  - Cleaning and in-situ calibration of underway transmissometers
  - Best practices for sensor installation and storage between cruises
New Developments 2020
New Ships in R2R

Antarctic vessels R/V NB Palmer and L Gould now handled through R2R

Data prior to 2020 will be registered over the next 2 years
Support for Interoperability

- APIs to support machine-to-machine access to R2R Cruise Catalog
- Documented webservices,
- Support for search by cruiseID, ship, fileset type, format etc
- Supports reciprocal linking to other repos
R2R ELOG CLIENT

- New, easy to use platform
- Just need the web URL (no app download required!)
- Choose your name and the instruments you will use most often
- Personalized ‘home screen’
- Large buttons to prevent accidental clicking
- Once submitted, event goes directly into the main Eventlog
R2R R-DESC Collaboration Workshop

- Focused on increasing collaboration between R2R and R-DESC
  - Held virtually in May 2020
  - Planning for RCRVs coming into fleet in next few years.

- Topics:
  - Reviewed planned RCRV underway devices and data acquisition system (CORIOLIX)
  - How to map RCRV devices into R2R
  - Planning for R2R and SAMOS data flow and life cycle
  - Best practice development
  - Possible contributions to Operator and Science Trials

- Outcomes
  - Establish joint working groups to develop best practices for CTD and underway flow-through systems
  - Collaborate on use of controlled vocabularies for devices and event logging
  - Provide feedback to R-DESC on CORIOLIX to optimize for R2R
  - Develop shore-side data exchange prototypes for SAMOS and post-cruise R2R data pathways.
    - Test with real instrumentation before it gets integrated on RCRVs
Acknowledgements

Providing access to and ensuring the preservation of national oceanographic research data.