



# Rolling Deck to Repository (R2R)

## Status and New Developments -2020

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LDEO, FSU, SIO, WHOI



# R2R Services for the ARF

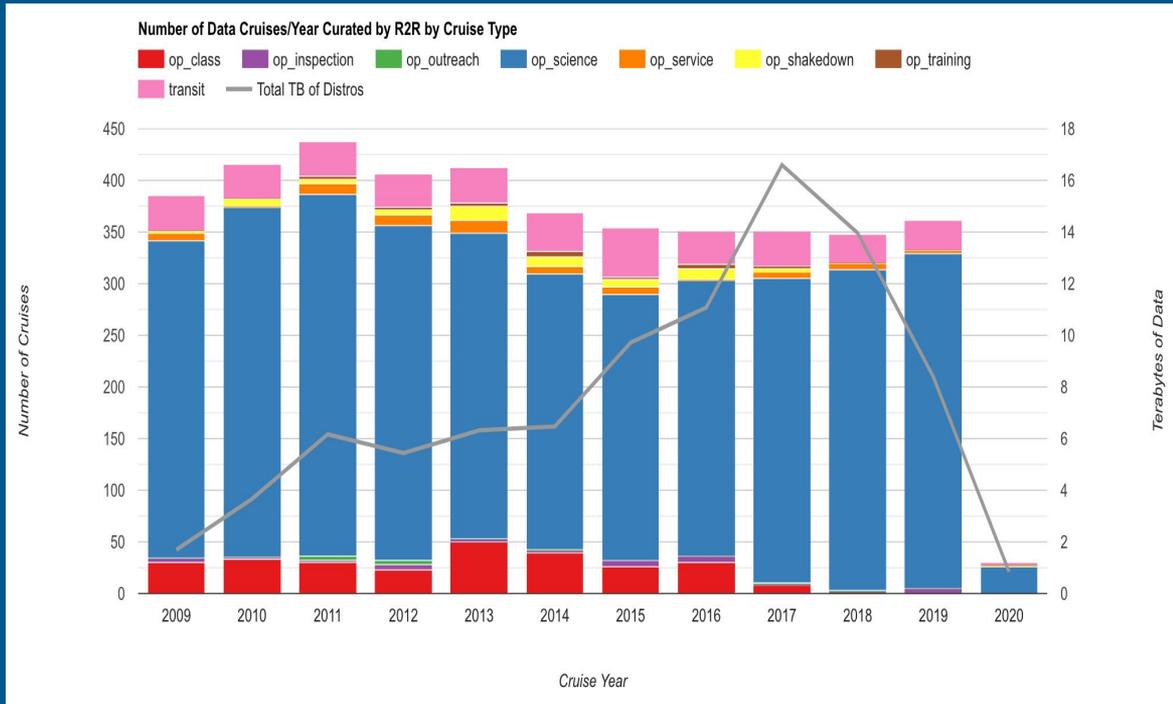
**Mission:** To support acquisition, documentation, preservation, and enhanced usability of the underway environmental sensor data from scientific cruises conducted with the U.S. Academic Research Fleet (ARF).

## 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



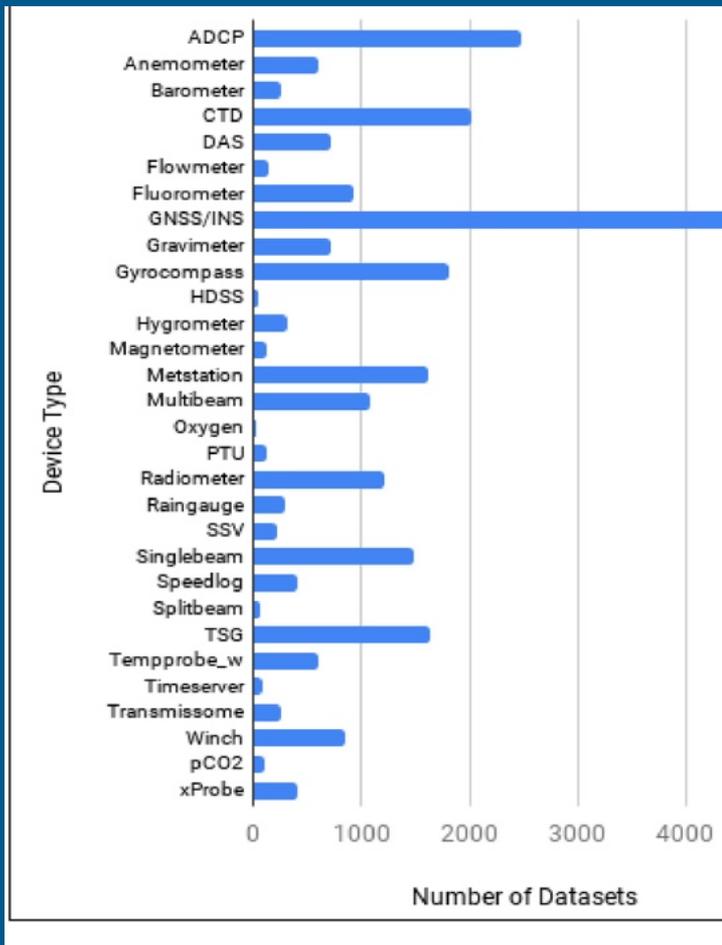
# R2R Cruise Catalog for the ARF



- 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

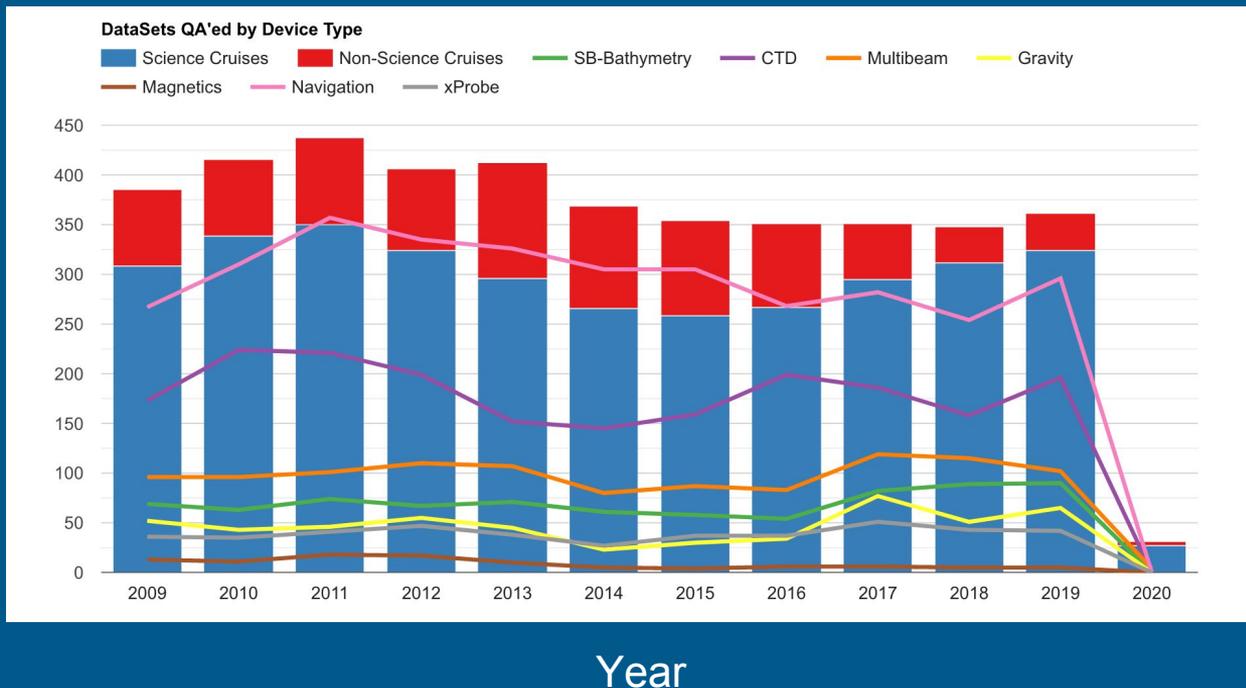
- 32 device types (break out, document, publish, bag, submit to NCEI/Glacier)
- >32,000 filesets from ARF since 2009



| Device                | Number |
|-----------------------|--------|
| ADCP                  | 2,856  |
| CTD                   | 2,275  |
| Gravimeter            | 820    |
| Magnetometer          | 128    |
| MultiBeam             | 1464   |
| Subbottom             | 2495   |
| Other (Nav, MET, etc) | 21,924 |

# Automated Post-Cruise Quality Assessment/ Data Documentation

# Cruises



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

Possible due to  
standardization and  
routine submission

# Automated Quality Assessment

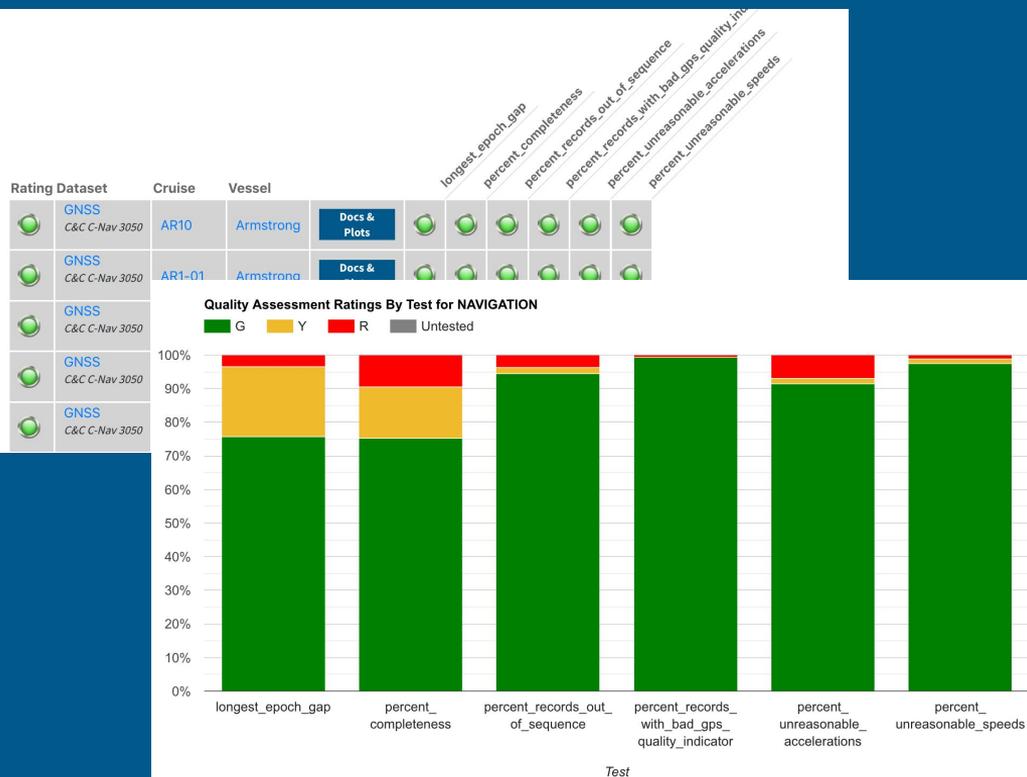
Goals: to identify suspicious data

1. File/metadata integrity (exists, size, format, within temporal/spatial bounds)

2. Device specific tests.

Examples for Nav:

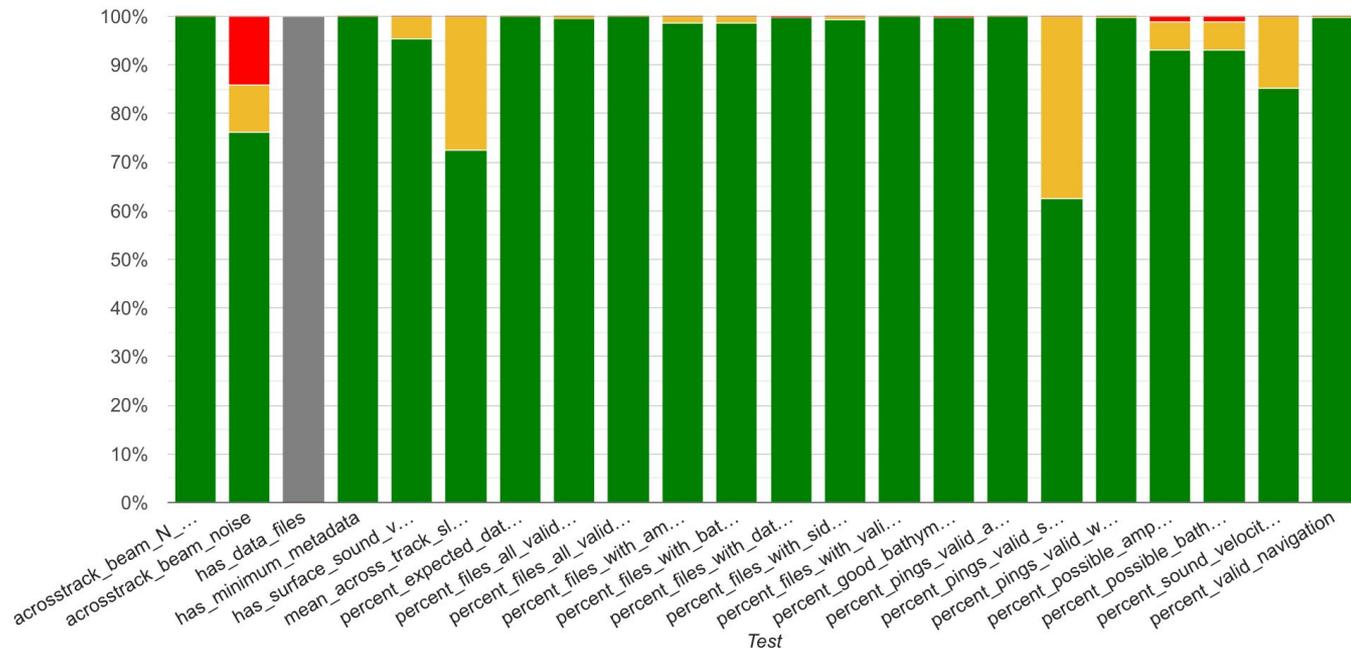
- Time gaps
- % Completeness
- Out of Sequence
- Unreasonable Accelerations



# Multibeam QA

Quality Assessment Ratings By Test for MULTIBEAM

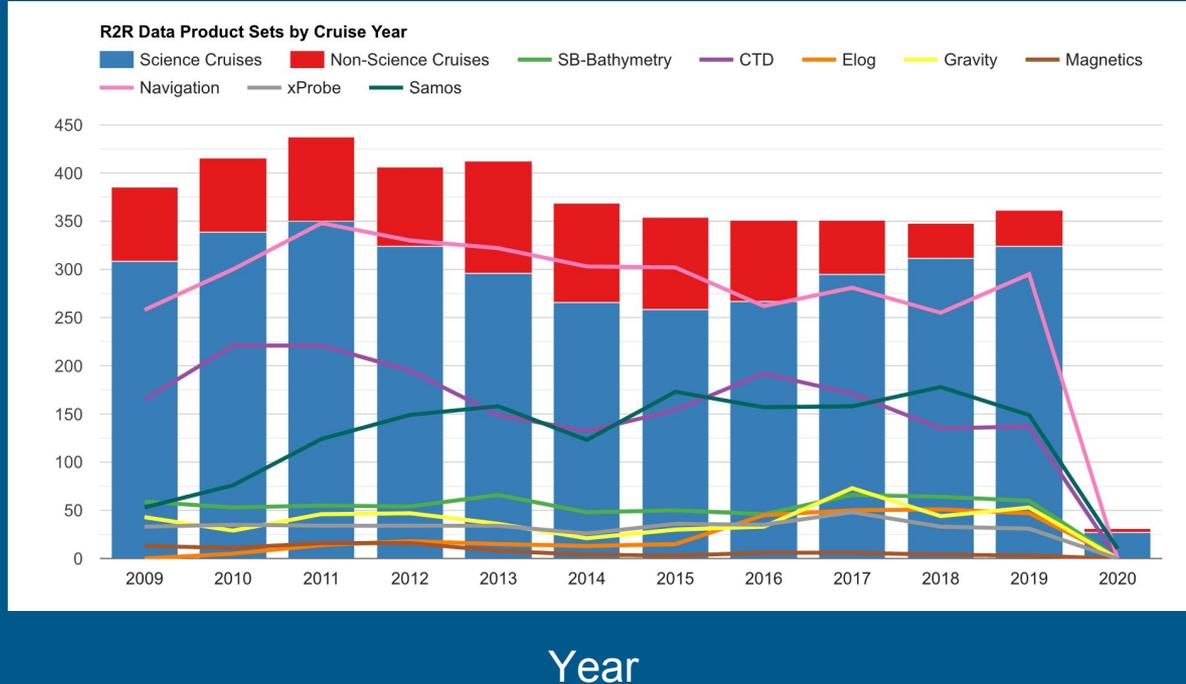
■ G ■ Y ■ R ■ Untested



- High across-track beam noise: outerbeams (not narrowing swath)
- High across track slope
- Missing surface sound velocity
- Missing valid sonar draft

# R2R Data Products

# Cruises



Final Navigation

Evaluation Products for:

Subbottom

Gravity

Magnetics

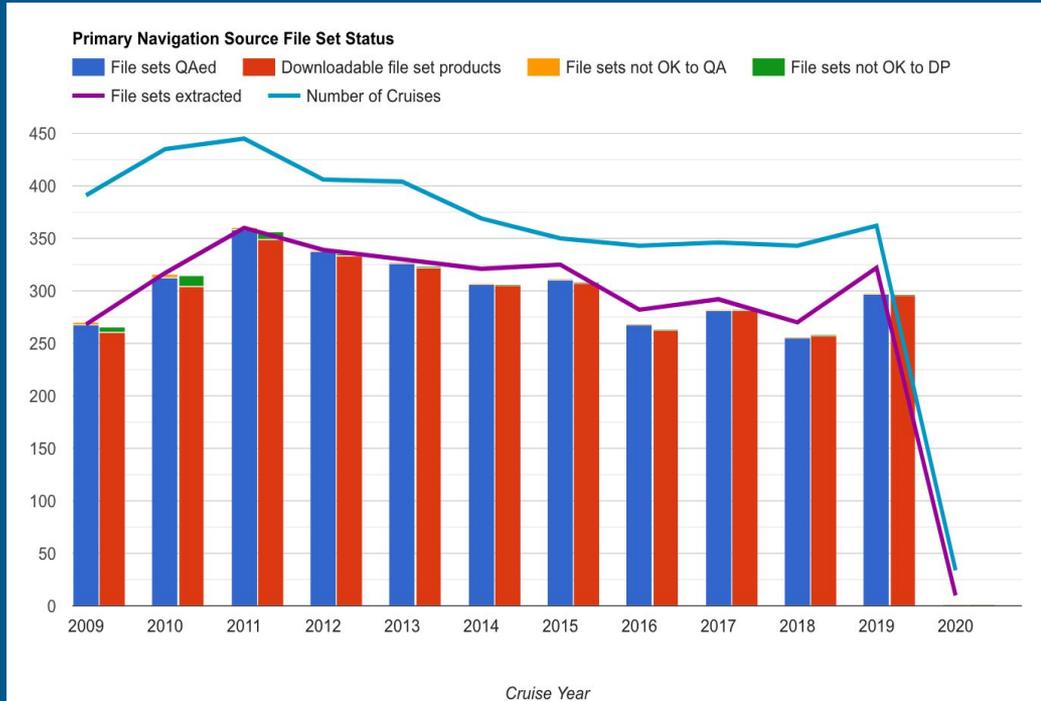
CTD

XBT

Elog – Sampling Log

MET via SAMOS

# Navigation Products

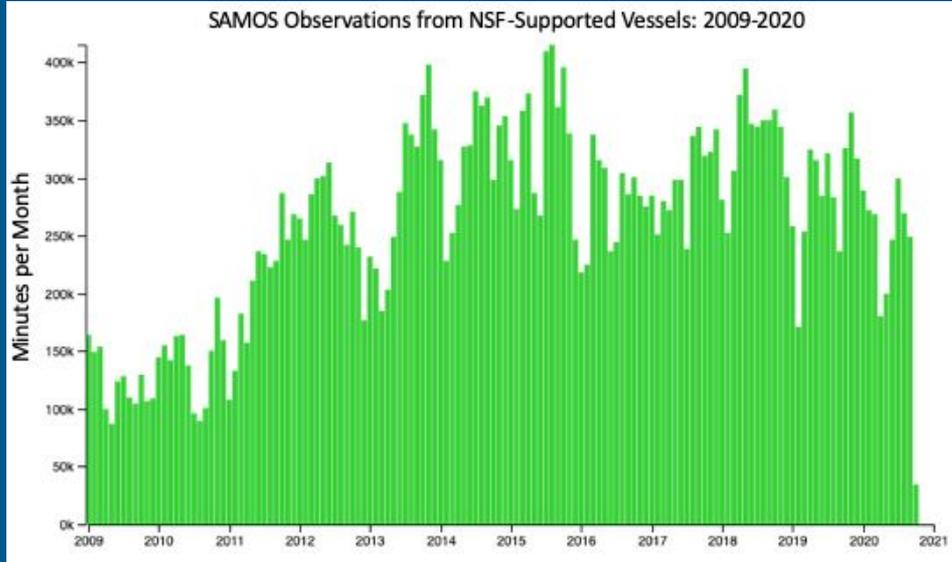


Standalone nav serves two main purposes

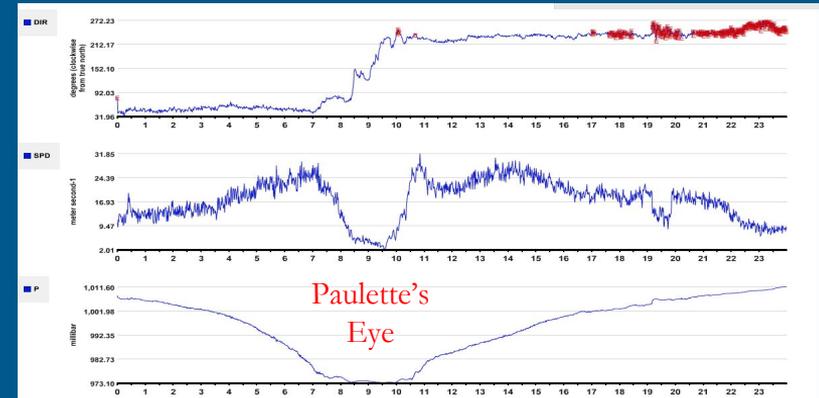
- Cruise track & determining spatiotemporal bounds of cruise
- Providing lat/lon information for datasets that only have timestamps

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

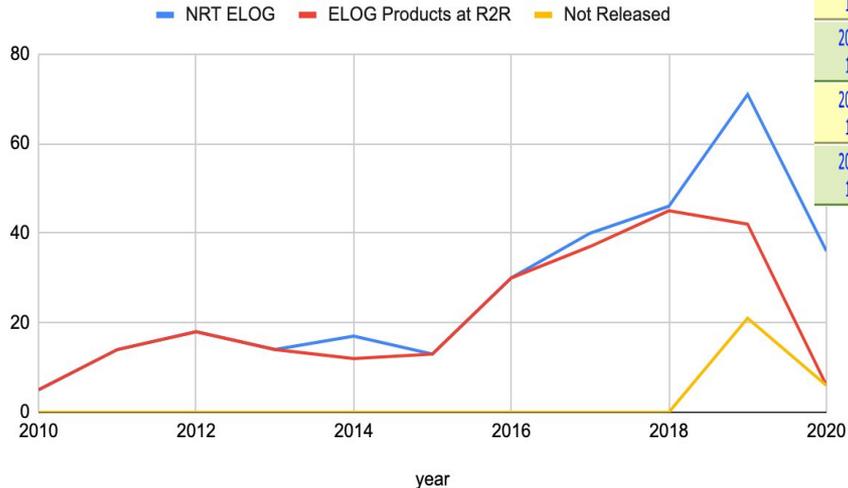


# Support for Acquisition: R2R ELOG

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

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

R2R ELOG USE AND STATUS



|                     |                                     |         |     |     |     |           |            |             |                          |
|---------------------|-------------------------------------|---------|-----|-----|-----|-----------|------------|-------------|--------------------------|
| 2019/07/07 12:35:02 | Attune Flowcytometer                | end     | NaN | NaN | NaN | 39.799803 | -70.829022 | tCrockford1 | fixing leak in pump      |
| 2019/07/07 12:35:55 | underway science seawater diaphragm | service | NaN | NaN | NaN | 39.797496 | -70.829631 | tCrockford1 | stop to fix leak at pump |
| 2019/07/07 13:01:13 | Attune Flowcytometer                | start   | NaN | NaN | NaN | 39.750731 | -70.829584 | tCrockford1 |                          |
| 2019/07/07 13:01:53 | underway science seawater diaphragm | start   | NaN | NaN | NaN | 39.750707 | -70.829548 | tCrockford1 |                          |

- 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

# Transmissometer Best Practices

- Completed and published best practice document for underway C-Star Transmissometers
  - Contributed to International Ocean Data Exchange Ocean Best Practices Service
  - Smith, S.R., et al 2020: Best Practices for Shipboard Underway Transmissometers. Version 1. 13pp.

<https://doi.org/10.25607/OBP-790>



SeabirdC-Star  
Transmissometers  
(datasheet\_cstar.pdf)

- 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

**R2R**  
ROLLING DECK TO REPOSITORY

SEARCH CRUISES DATA TYPES & PRODUCTS QA DASHBOARD COMMUNITY ▾ ABOUT R2R ▾

Nathaniel B. Palmer Home / Search / Nathaniel B. Palmer / NBP1901

Operator: USAP Marine Operator Cruise DOI: [10.7284/307977](#)

**Nathaniel B. Palmer**

Cruise ID  
NBP1901 ▾

| CRUISE ID | SUMMARY   | START DATE | START PORT          | END DATE   | END PORT            |
|-----------|---|------------|---------------------|------------|---------------------|
| NBP1901   | Project: Estimation Of Antarctic Ice Melt<br>Using Stable Isotopic Analyses Of Seawater,<br>Initiation Of The Antarctic Slope Front In West Antarctica<br>Chief: Dunbar, Robert | 2018-12-21 | Punta Arenas, Chile | 2019-01-23 | Punta Arenas, Chile |

| PROCESSED PRODUCTS | DATA TYPE       | DEVICE TYPE(S)  | PRODUCER                      | FORMAT                  | DATA |
|--------------------|-----------------|---|-------------------------------|-------------------------|------|
|                    | JG0FS           | acqsys (HOBI HydroDAS)<br>gyrocompass (Yokogawa CMZ700B)<br>tsg (Sea-Bird SBE-45 [#1])<br>metstation (USAP RVDAS Metstation)<br>ins (Kongsberg Seapath 330+)<br>singlebeam (Knudsen 3260 [Depth]) | USAP Marine Operator          | <a href="#">jg0fs</a>   | ☰ ⓘ  |
|                    | MGD77           | ins (Kongsberg Seapath 330+)<br>gravimeter (Bell BGM-3)<br>singlebeam (Knudsen 3260 [Depth])  | USAP Marine Operator          | <a href="#">mgd77</a>   | ☰ ⓘ  |
|                    | MGDS Navigation |   | Marine Geoscience Data System | <a href="#">mgdsnav</a> | ☰ ↗  |

NOTE: Products generated by R2R should be used for evaluation only. Quality of products by other organizations is unknown. [Contact R2R](#) with questions or requests.

| UNDERWAY DATA SETS | DEVICE TYPE     | MAKE-MODEL [LOCATION] | DOI | DATA |
|--------------------|-----------------|-----------------------|-----|------|
|                    | Acquisition Sys | HOBI HydroDAS         |     | ☰ ⓘ  |
|                    | ADCP            | Hawaii UHDAS          |     | ☰ ⓘ  |

# 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

Server  
https://service.rvdata.us/api

**award** Operations related to Awards

**GET** /award/ Finds awards based on parameters

**GET** /award/award\_id/{award\_id} Finds an award based on the award ID

**GET** /award/cruise\_id/{cruise\_id} Finds an award based on the cruise ID

Base URL: https://service.rvdata.us/api/award/cruise\_id/  
Examples:  
\* https://service.rvdata.us/api/award/cruise\_id/AE0903  
\* https://service.rvdata.us/api/award/cruise\_id/AE0903&award\_id=0752366

Parameters Try it out

| Name                           | Description   |
|--------------------------------|---------------|
| cruise_id<br>string<br>(path)  | The cruise ID |
| award_id<br>string<br>(query)  | The award ID  |
| agency_id<br>string<br>(query) | The agency ID |

Responses

| Code | Description          | Links    |
|------|----------------------|----------|
| 200  | successful operation | No links |

application/json

Example Value Model

|                  |                                |                |
|------------------|--------------------------------|----------------|
| Multibeam Sonar  | Kongsberg EM122                | 10.7284/133749 |
| Multibeam Sonar  | Kongsberg EM122 (water column) | 10.7284/133750 |
| Singlebeam Sonar | Knudsen 3200                   | 10.7284/133737 |
| Speed Log        | Furuno DS-80                   | 10.7284/133744 |
| SSV              | AML MicroSV                    | 10.7284/133746 |
| TSG              | Sea-Bird SBE-45                | 10.7284/133746 |

NOTE: This data set inventory may not be complete. Please Contact R2R with questions or requests.

CRUISE DATA AT OTHER SYSTEMS

|                                      |             |                    |
|--------------------------------------|-------------|--------------------|
| R2R                                  | NOTE SYSTEM | DATA               |
| Academic Seismic Portal (Info)       |             | Seismic Field Data |
| Marine Geoscience Data System (Info) |             | Marine Geo.Data    |

Additional Cruise Information

SCIENCE PARTY +

FILE MANIFEST

# R2R ELOG CLIENT

Elog Event Entry

Cruise ID: TN382

Choose Author Short Name: Please Select ▾

Choose Instruments:

Search...

| Instruments  | Selected Instruments |
|--------------|----------------------|
| Ship         |                      |
| Jason        |                      |
| Sentry AUV   |                      |
| Piston Corer |                      |

Next

- 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

Select An Instrument

Ship

Jason

Home

Select An Action for Ship

startCruise

endCruise

startTransect

endTransect

other

Home

# 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



R2R

ROLLING DECK TO REPOSITORY

[www.rvdata.us](http://www.rvdata.us)

UNOLS Council 2020

# Acknowledgements

Lamont-Doherty Earth Observatory  
COLUMBIA UNIVERSITY | EARTH INSTITUTE



SCRIPPS INSTITUTION OF  
OCEANOGRAPHY

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

