

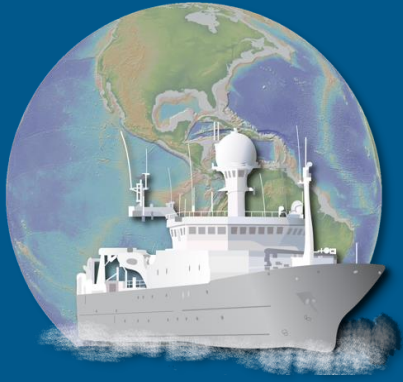
Rolling Deck to Repository (R2R)

Report 2018

S. Carbotte, O'Hara, S. D. Clark, J. Elya, V. Ferrini, K. McLain, C. Olson, C. Sellers, S. Smith, K. Stocks, L. Stolp

Lamont-Doherty Earth Observatory
COLUMBIA UNIVERSITY | EARTH INSTITUTE





R2R Mission & Services

Mission:

Stewardship of routinely-acquired
environmental sensor data
from U.S. academic research
vessels

Support:

NSF, ONR, SOI +NOAA

Services:

- Publish master cruise catalog
- Organize, archive, and disseminate original underway data and documents
- Assess data quality
- Create post-field data products
- Support at-sea event logging

Sensor Data Sets at R2R

Geophysics:

Echosounder* - 1,475
Gravimeter* - 846
Magnetometer* - 236
Multibeam - 1,616

Meteorology:

Anemometer* - 507
Barometer* - 231
Hygrometer* - 293
Radiometer* - 1,099
Rain Gauge* - 285

Complex Logging systems:

Acquisition Systems - 2,453
Meteorological Stations* - 1,665

Navigation:

GNSS/INS* - 5,232
Gyrocompass* - 1,634
Speed Log* - 362

Engineering:

Winch - 710
Timeserver - 36
Flowmeter - 87

Oceanography:

ADCP - 2,510
CTD* - 2,034
Fluorometer - 871
Oxygen - 20
pCO2 - 88
Sound speed - 232
Temperature* - 490
Transmissometer - 234
TSG - 1,508
XBT/XCTD - 584

Underlined - QA performed by R2R
* - data products generated by R2R
Data - sent to NCEI for archiving

Cruise data release

Via emails to Chief Scientists

Status:

- 90% response
 - 95% full release
 - 3% release by date
 - 2% release by device



Cruise	Vessel	Chief Scientist	Date start	Date end	Release Status
SKQ201810S	Sikuliaq	Hopcroft, Russell	2018-04-18	2018-05-05	

As chief scientist of SKQ201810S

your response is requested at this time. Please choose Option 1, 2, or 3 below, enter your email for verification, then click Submit. You can see the list of data from your cruise [\[here\]](#).

☒ Option 1: Release all routine underway data now.

☐ Option 2: Release all routine underway data on [YYYY-MM-DD]

☐ Option 3: Release individual datasets as stated below.

Please list the device and release date below along with any other instructions.

Your Email:

Impact: Contributions to Global Data Repositories and Collections

- ADCP: NOAA Global Ocean Currents Database
- TSG: NOAA Global Thermosalinograph Database:
- CTD & XBT: NOAA World Ocean Database
- Multibeam
 - NSF IEDA Global Multi-Resolution Topography (GMRT) synthesis
 - IHO Data Center for Digital Bathymetry via NCEI
- Real-time MET (SAMOS): International Comprehensive Ocean-Atmosphere Data Set (ICOADS)

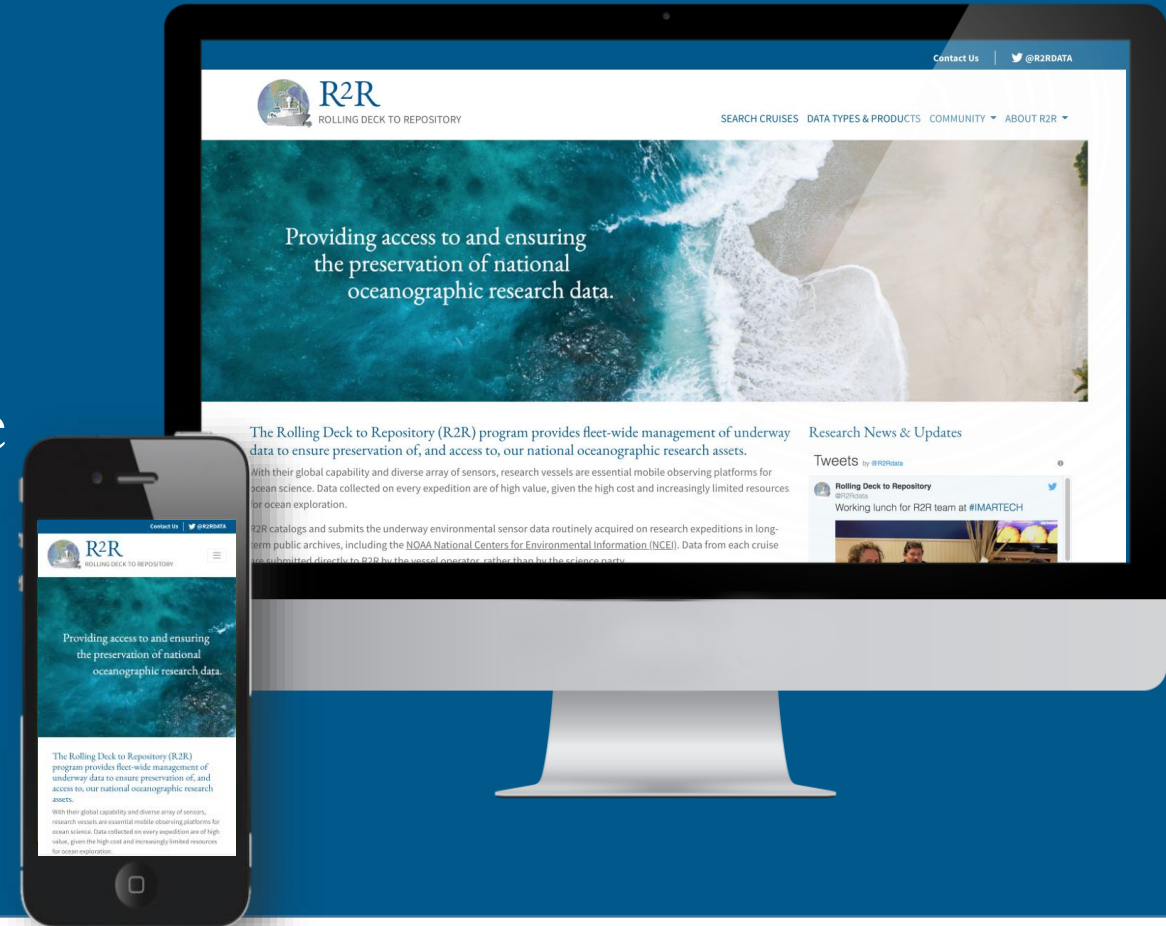


New Developments


- Event Logger Accessible through R2R Catalog
- R2R Processed Products Submission pipeline to NCEI
- Redesigned Web Site
- New Cruise/Dataset Search
- Documenting Time Sources
- CTD Processed Products

Website Redesign Goals

- Modernize look and feel
- Simplify navigation & access
- Responsive pages
- Migrate to API-driven architecture
- Simplify maintenance
- Enhance Social Media presence



Home Page prod.rvdata.us (in testing)

 Rolling Deck to Repository (R2R)

Supported by: NSF | NOAA | ONR | SOI

HomeAbout R2R ▾Cruise CatalogSearchQA DashboardNewsContact UsInternal ▾

Catalog Status

(In Service) Vessels: 26

Cruises: 7132

Archived Files: 30399732

October 18, 2018

News

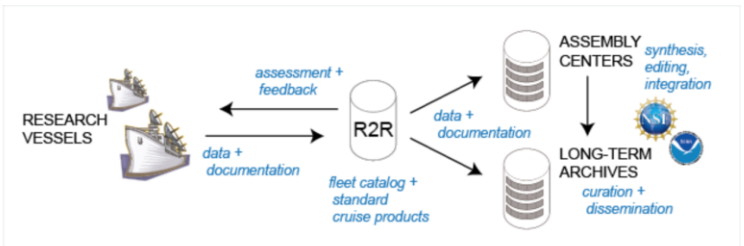
- R2R at 2017 RVTEC Meeting 10/24/2017
- R2R at 2016 AGU Meeting 12/12/2016
- R2R at 2016 RVTEC Meeting 11/01/2016
- R2R at 2016 INMARTECH 10/04/2016
- R2R at 2016 Ocean Sciences Meeting 02/22/2016

[more](#)

Overview


With their global capability and diverse array of sensors, research vessels are essential mobile observing platforms for ocean science. Data collected on every expedition are of high value, given the high cost and increasingly limited resources for ocean exploration. The Rolling Deck to Repository (R2R) program provides fleet-wide management of [underway data](#) to ensure preservation of, and access to, our national oceanographic research assets.

R2R routinely [catalogs](#) and deposits data in long-term public archives, including the NOAA National Centers for Environmental Information ([NCEI](#)) (for data) and [Chronopolis](#) (for documents). Data from each cruise are [submitted](#) directly to R2R by the vessel operator, rather than by the science party.




R2R provides essential documentation and standard [products](#) for each expedition, as well as tools to document shipboard data acquisition activities while underway. Post-cruise [quality assessment](#) of selected underway data types is supported, including feedback to ship technicians. Assessment of underway meteorological data is implemented in [near-real-time](#) in partnership with the SAMOS program at FSU.



 R2R
ROLLING DECK TO REPOSITORY

SEARCH CRUISES DATA TYPES & PRODUCTS COMMUNITY ▾ ABOUT R2R ▾



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

The Rolling Deck to Repository (R2R) program provides fleet-wide management of underway data to ensure preservation of, and access to, our national oceanographic research assets.


With their global capability and diverse array of sensors, research vessels are essential mobile observing platforms for ocean science. Data collected on every expedition are of high value, given the high cost and increasingly limited resources for ocean exploration.


R2R catalogs and submits the underway environmental sensor data routinely acquired on research expeditions in long-term public archives, including the NOAA National Centers for Environmental Information ([NCEI](#)). Data from each cruise are submitted directly to R2R by the vessel operator, rather than by the science party.

R2R provides essential documentation and standard products for each expedition, as well as tools to document shipboard data acquisition activities while underway. Post-cruise quality assessment of selected underway data types is provided,

Research News & Updates

Tweets by @R2Rdata

 Rolling Deck to Repository @R2Rdata Working lunch for R2R team at #IMARTECH



Searchable Cruise Catalog

Rolling Deck to Repository (R2R) Supported by: NSF | NOAA | ONR | SOI

Home About R2R Cruise Catalog Search QA Dashboard News Contact Us Internal

Catalog Status
(In Service) Vessels: 26
Cruises: 7132
Archived Files: 30399732
October 18, 2018

Cruise Search

Vessel: (ANY)
Cruise: (quick select of recent cruises from the last ~three years)
Dates: 1950 01 01 From 2020 12 31 To
Program: (broad community initiative, typically decadal-scale or greater)
Campaign: (series of closely-related cruises for a single project)
Partner: (repository that holds additional content related to a cruise)













Rolling Deck to Repository (R2R) Supported by: NSF | NOAA | ONR | SOI

Home About R2R Cruise Catalog Search QA Dashboard News Contact Us Internal

Catalog Status
(In Service) Vessels: 26
Cruises: 7132
Archived Files: 30399732
October 18, 2018

Cruise Catalog

Browse by Ship (below) or Search by Term.

 Alpha Helix (retired)	 Atlantic Explorer	 Atlantis	 Blue Heron
 Cape Hatteras (retired)	 Clifford A. Barnes	 Conwith Cramer	 Endeavor
 Eltanin (retired)	 F.G. Walton Smith	 Falkor	 FLIP







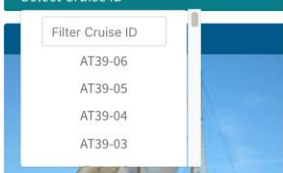

Rolling Deck to Repository (R2R) Supported by: NSF | NOAA | ONR | SOI

Home About R2R Cruise Catalog Search QA Dashboard News Contact Us Internal

Search Cruises

Search by Keyword (ex. cruise id, device type, vessel name) GO

Vessels Data Sets

 Alpha Helix Select Cruise ID	 Atlantic Explorer Select Cruise ID	 Atlantis Select Cruise ID	 Blue Heron Select Cruise ID
 Cape Hatteras	 Clifford A. Barnes	 Eltanin Filter Cruise ID AT39-06 AT39-05 AT39-04 AT39-03	 FLIP

Documenting Time Sources

- Inventory time servers throughout the fleet
- Relationships between time sources and devices

Status

Time Servers

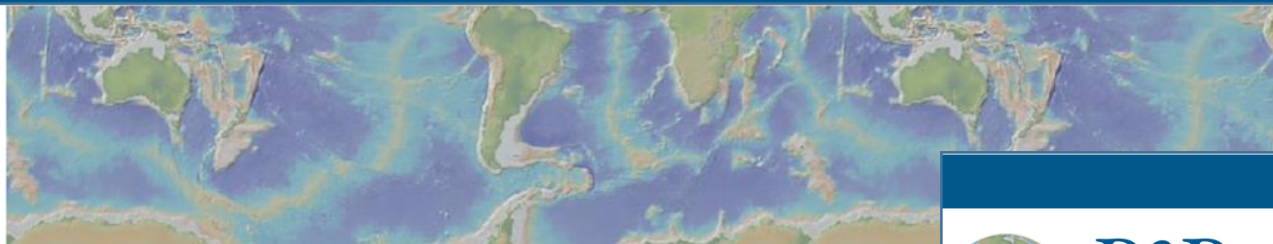
- 21 vessels surveyed
- 20 timeservers across 13 vessels
- 4 don't have time servers

Devices

- Devices mapped to their time sources across 8 vessels
- 147 devices mapped to a time source

Cruise ID

AR29 ▾



CRUISE ID	SUMMARY	START DATE	START PORT	END DATE
AR29	Project: SBF phys/bio Chief: McGillicuddy, Dennis	2018-04-16	Woods Hole, Massachusetts	2018-04-16

R2R PRODUCTS
(Post-Field Processed)

[Elog](#)

UNDERWAY DATA SETS	DEVICE TYPE	MAKE-MODEL [LOCATION]
	ADCP	Hawaii UHDAS
	CTD	Sea-Bird SBE-911+
	Fluorometer	WET Labs WETStar
	GNSS	C&C C-Nav 3050



R2R

ROLLING DECK TO REPOSITORY

Vessel

Neil Armstrong

Device

Device Type: ctd
Device Make: Sea-Bird Electronics, Inc.
Device Model: SBE-911+
NOAA Docucomp id: [12410cb2-3103-4bc7-861c-e47cd8e0c34b](#)
NERC sensor term: <http://vocab.nerc.ac.uk/collection/L22/current/TOOL0058/>

Device Time Source

Make: de.oceanwaves
Model: [ES-185E/NTP](#)



Format

Fileset processing level: Raw
Fileset format id: 100073



R2R

ROLLING DECK TO REPOSITORY

Advisory 2018



[Oceanus](#)

Status: **Active**

R2R code: **OC**

Operator id: **edu.oregonstate**

Call sign: **WXAQ**

Set a Vessel Date:

2018

Submit

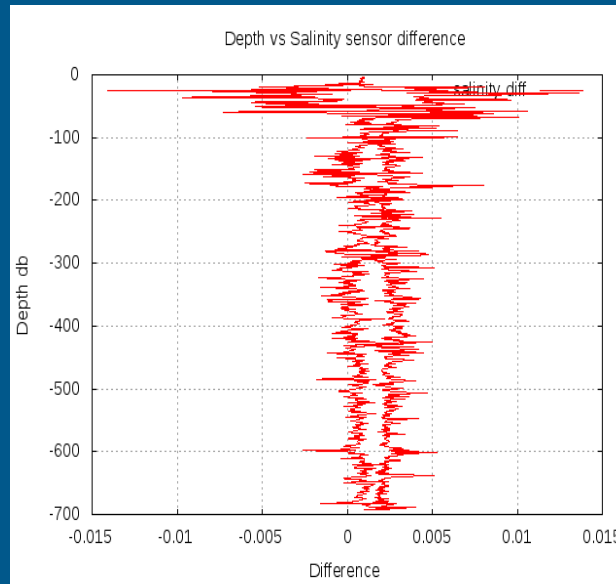
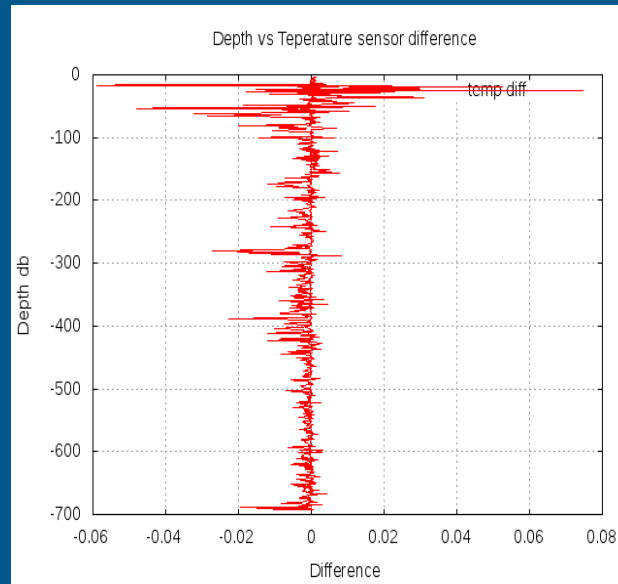
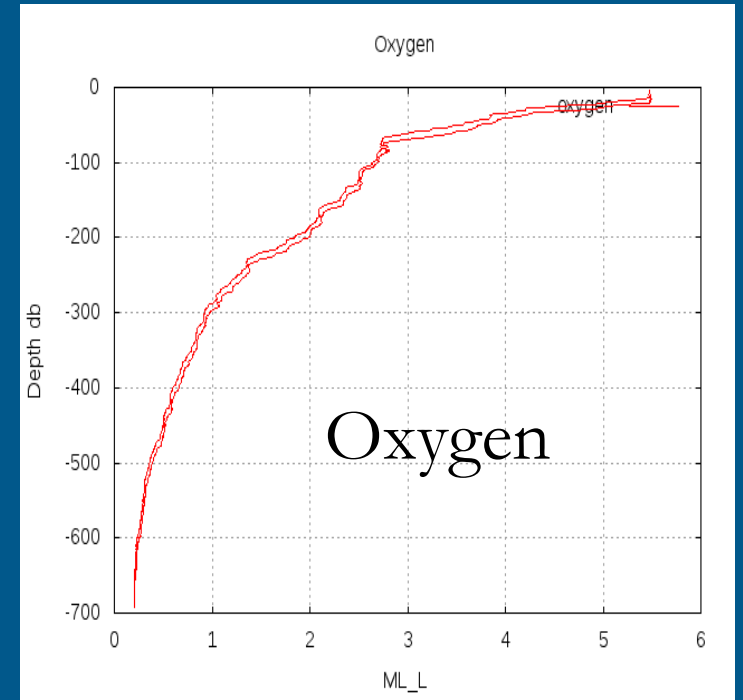
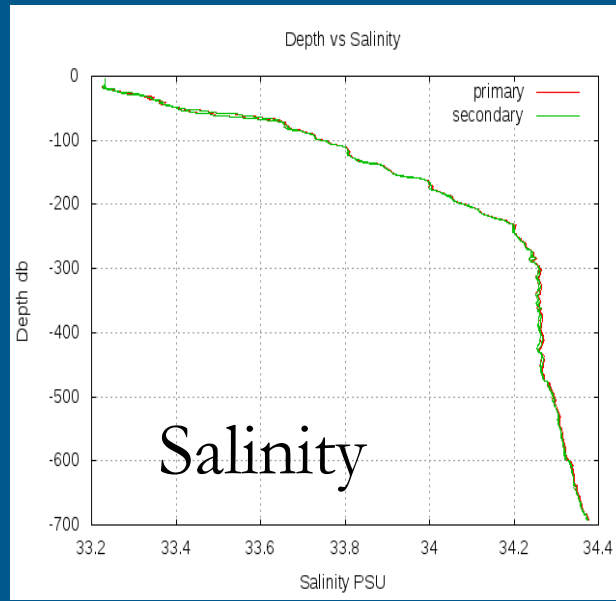
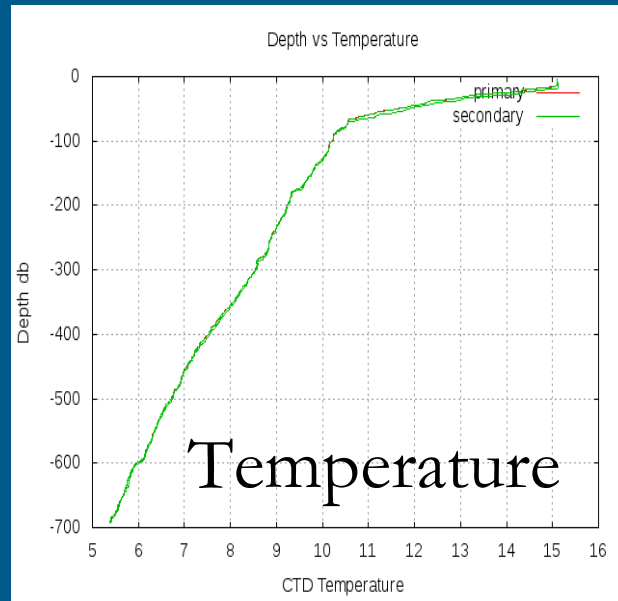
R2R ID	Device Type	Make/Model	Time source	Fileset count	Tools
100521	acqsys	Hawaii UHDAS		106	Edit Unols+
100523	adcp <small>parent device:100521</small>	- RDI WM-300		.	Edit Unols
100522	adcp <small>parent device:100521</small>	- RDI OS-75		.	Edit Unols
100505	anemometer	Gill WindObserver II (bow)	100777	64	Edit Unols
100261	ctd	Sea-Bird SBE-911plus		121	Edit Unols
100507	fluorometer	WET Labs WETStar	100777	107	Edit Unols
100509	gnss	Furuno GP-90 (bridge)	100777	47	Edit Unols+
100508	gnss <small>Primary Navigation</small>	Ashtech ADU5 (bow)	100777	105	Edit Unols
100510	gyrocompass	Sperry MK-37	100777	107	Edit Unols
100511	ptu	Vaisala PTU300 (03stb)	100777	106	Edit Unols
100513	radiometer	RMR Co. PRP (metmast)	100777	87	Edit Unols+
100514	radiometer	Biospherical QSR-2200 (metmast)	100777	77	Edit Unols
100506	singlebeam	Knudsen 3260		170	Edit Unols
100518	tempprobe_water	Sea-Bird SBE-38 (fwdintake)	100777	106	Edit Unols
100517	tempprobe_water	Sea-Bird SBE-48 (bow)	100777	64	Edit Unols
100777	timeserver	SyncServer S350		36	Edit Unols+
100519	transmissometer	WET Labs C-Star	100777	91	Edit Unols
100520	tsg	Sea-Bird SBE-45	100777	107	Edit Unols+

i R2R must have accurate device and data directory and filename information to break out data correctly. Please use View/Edit to verify the details of each device on your vessel. If you need to retire a device, you can do so within the View/Edit page for that device. If you need to add a new device, please go to the UNOLS device catalog (R2R is updated from UNOLS)

CTD Programmatic Level 1 DP

The raw CTD data is processed using the following Seabird modules

- Datcnv
 - The raw data is converted from hex to ascii.
- Cell Thermal Mass
 - Perform conductivity thermal mass correction. Cell Thermal Mass uses a recursive filter to remove conductivity cell thermal mass effects from the measured conductivity.
- Binavg
 - The data is averaged into 1db bins. The pressure bins are calculated with no interpolation.

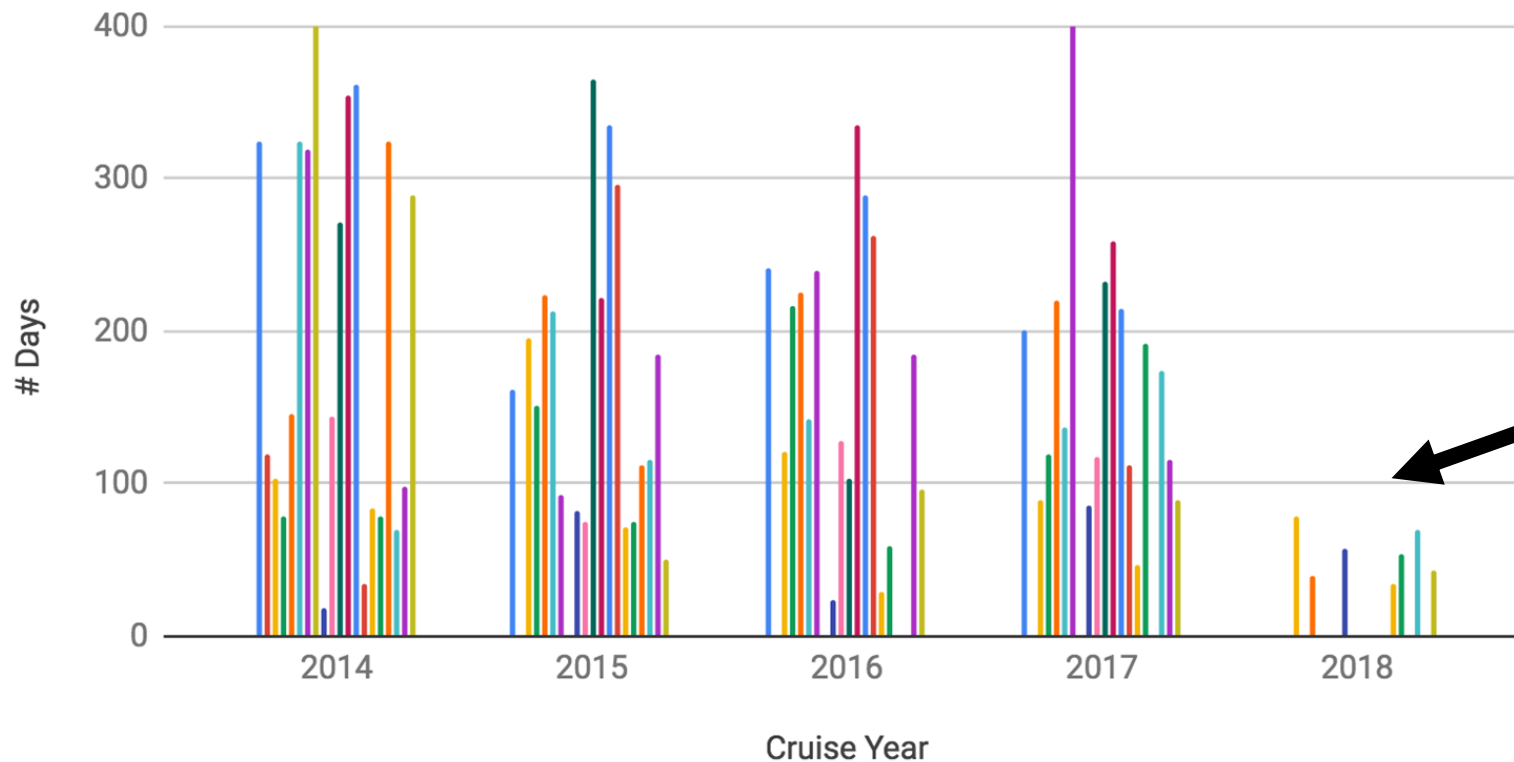


Challenges

Arrival of Cruise Data at R2R

Number of days between end of cruise and data delivery to R2R

Colored by Operator



R2R is working with operators and UNOLS to develop best practices that will speed transfer of cruise data from the vessel to R2R.

Note that most 2018 data sets have not yet arrived at R2R.

Need both data and cruise metadata to process cruises.

Event Logger Deployments

June 2017- July 2018 :

Vessel	# Cruises	Affiliation
RV Neil Armstrong	13	WHOI/UTRGV/Skidaway
RV Atlantis	4	WHOI/OSU/ONR
RV Endeavor	4	WHOI/URI
RV Roger Revelle	5	UW/OSU/TAMU
RV Sikuliaq	7	NSWC/UAF/UMD_CES

R2R Backup Cloud Costs

R2R is storing copies of the original data submission distro on Amazon Web Services (AWS).

Monthly AWS charge nearly double so far this year.

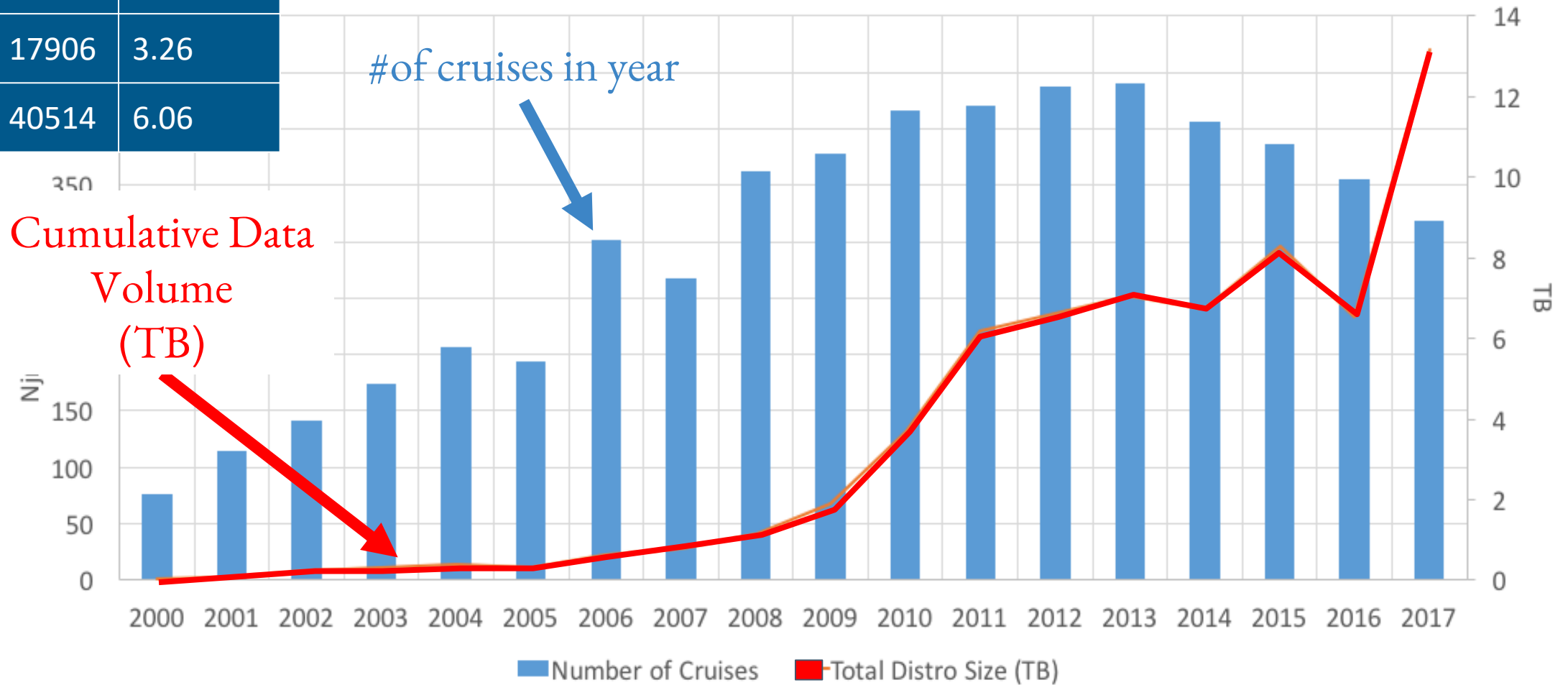
It is difficult to plan long term.

Feb	\$298
Mar	\$327
Apr	\$398
May	\$395
Jun	\$410
Jul	\$412
Aug	\$412
Sep	\$412

EK80 Data Volume

Cruise Year	Files	Size (TB)
2016	17906	3.26
2017	40514	6.06

R2R Data Volumes



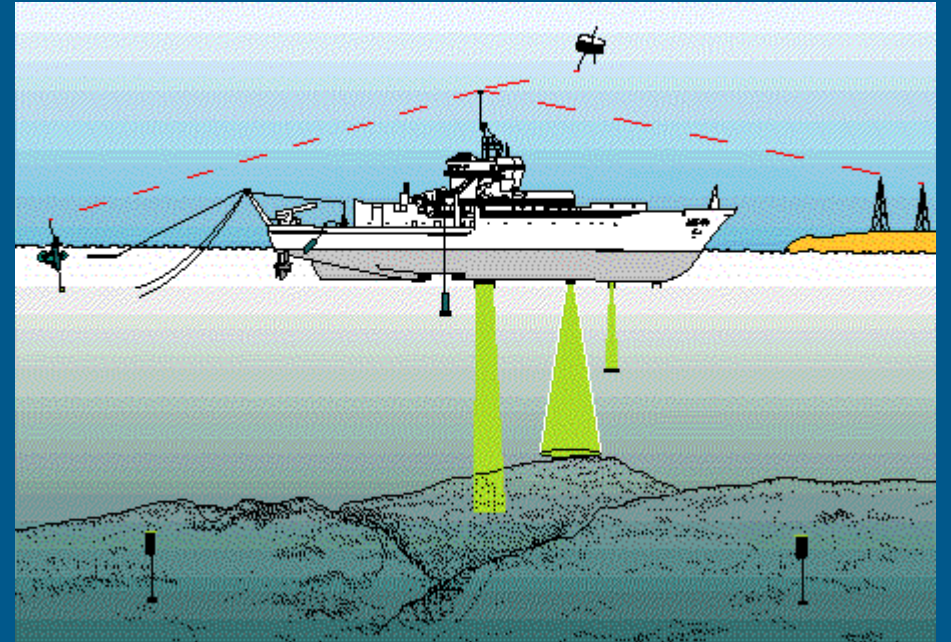
Big Data Sources

Current

- EK80 echosounder
- EM710/712 multibeam
- EM122 multibeam in water column mode

Prospective

- GeoCam HD still imagery
- WaMoS wave radar
- (Video)



Large Volume Data Challenges

Storage: Cost of local hardware

Effort: Person time to move data and manage systems

Performance: Network issues re downloading large data sets.

R2R-led Breakout Session at INMARTECH 2018-10-16 (International Marine Technicians)

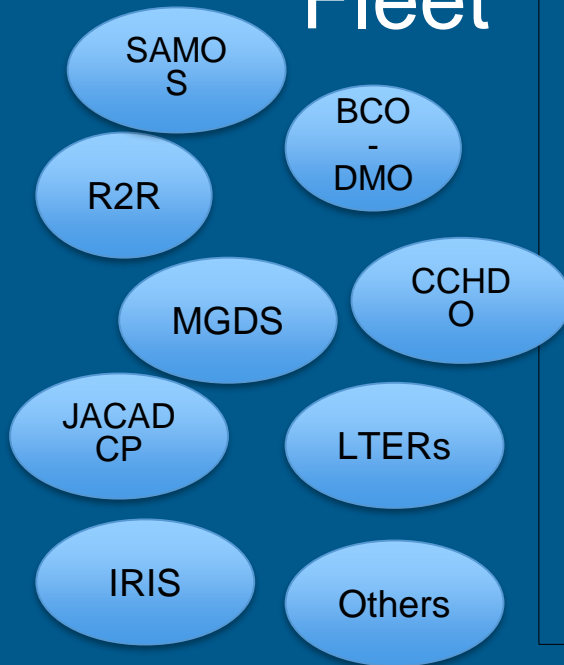
"Planning for data growth: a community discussion"



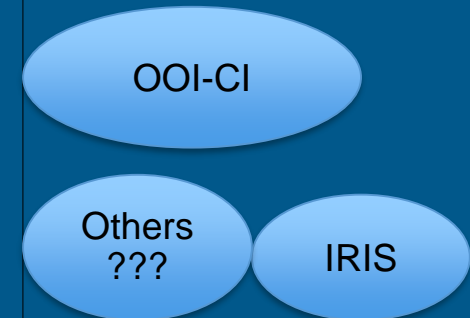
- ~30 participants
- Concerns: storing data on vessel, moving data off vessel (time!), storage on shore, transfer to R2R.

Field data preservation across ocean science

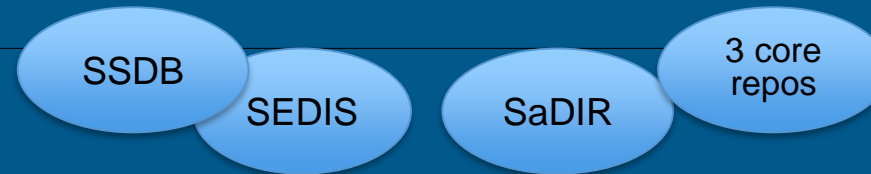
Research Fleet



OOI



IODP



Research Fleet: Spectrum of Data

Research expeditions involve a variety of data collection activities:

- Specialized marine operator (eg Marine seismic, OBSIP, NDSF, other submersibles/towed vehicles, gliders, drones)
- Science party instrumentation (eg current meter, sediment traps, chemical/physical probes etc)
- Operational/Underway (eg bathymetry, MET, ADCP, subbottom etc)

Research Fleet: Spectrum of Field Data

Research expeditions involve a variety of data collection activities:

- Specialized marine operator (eg Marine seismic, OBSIP, NDSF, other submersibles/towed vehicles, gliders, drones) ---- **Disciplinary Repo (partial, needs growing)**
- Science party instrumentation (eg current meter, sediment traps, chemical/physical probes etc) --- **Disciplinary Repo: (partial field, derived with publications)**
- Operational/Underway (eg bathymetry, MET, ADCP, subbottom etc) ----- **R2R**

Acknowledgements

Lamont-Doherty Earth Observatory
COLUMBIA UNIVERSITY | EARTH INSTITUTE



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

