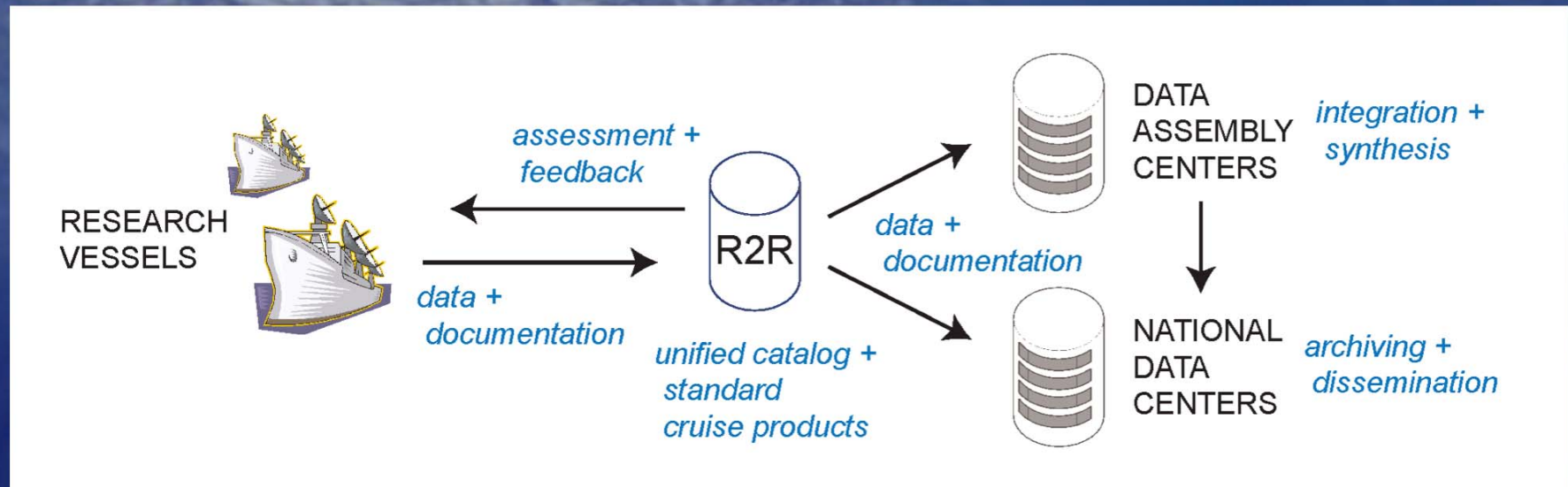


rvdata.us

Rolling Deck to Repository (R2R)

2011 RVTEC Report, Part 1

Program Goals

























For the U.S. Academic Fleet:

- Migrate all routine “underway” data to long-term repositories
- Create catalog of cruises and standard products
- Assess data quality and provide timely feedback to operators



Academic Fleet

Cruise Catalog

 Alpha Helix ★	 Atlantic Explorer ★	 Atlantis ★	 Blue Heron ★
 Cape Hatteras ★	 Clifford A. Barnes ★	 Corwith Cramer ★	 Endeavor ★
 F.G. Walton Smith ★	 Healy ★	 Hugh R. Sharp ★	 Ka'imikai-o-Kanaloa ★
 Kilo Moana ★	 Knorr ★	 Laurence M. Gould ★	 Marcus G. Langseth ★
 Maurice Ewing ★	 Melville ★	 Moana Wave ★	 Nathaniel B. Palmer ★
 New Horizon ★	 Oceanus ★	 Pelican ★	 Point Sur ★
 Polar Sea ★	 Robert C. Seamans ★	 Robert Gordon Sproul ★	 Roger Revelle ★
 Savannah ★	 Seward Johnson ★	 Thomas G. Thompson ★	 Wecoma ★

Status
Nov. 2011:

- 26 active-service RVs (all 21 UNOLS + 5 allied) submitting data

Oct. 2008

Langseth
(Healy)
Kilo Moana
Melville
Revelle

2009

Thompson
Sharp
Atlantis
Knorr

Oceanus
(Ka'imikai)
Barnes

Walton Smith

2010

Point Sur
Wecoma
(Cramer)
(Seamans)
Endeavor
New Horizon
Sproul
(Polar Sea)

Pelican
Savannah
Explorer
Hatteras



Oct. 2010

Blue Heron

Joined R2R

Cruise Catalog

	Nov. 2010	Nov. 2011
# Active-Service Vessels	26	26
# Cruises	1,960	2,217
# Files Preserved	6.5+ million	8.7+ million
# Datasets Submitted to Archives	84	638



Underway Data Profiles

Underway Data Profiles

Please report errors. (Last updated Nov. 8, 2011)

Note: These profiles are only used to process post-cruise data distributions. Discrepancies may be discovered and corrected during that post-cruise assessment.

Vessel: **Melville** - Device :

Melville Filter Vessel : [reset]

Vessel	Device Type	Make	Model	Location
Melville	adcp	RDI	OS-150	
Melville	adcp	RDI	OS-75	
Melville	ctd	Sea-Bird	SBE-911plus	
Melville	expendableprobe	Sippican	MK21	
Melville	fluorometer	WET Labs	WETStar	
Melville	gnss	Ashtech	ADU2	
Melville	gnss	Furuno	GP-150	
Melville	gnss	Trimble	NT-200D	
Melville	gnss	Trimble	Tasman	
Melville	gravimeter	Bell	BGM-3	
Melville	gyrocompass	Sperry	MK-35	
Melville	gyrocompass	Sperry	MK-37	
Melville	magnetometer	Marine Magnetics	Sea Spy	
Melville	metstation	SIO	MET-System	
Melville	multibeam	Kongsberg	EM122	
Melville	subbottom	Knudsen	320B/R	
Melville	tsg	Sea-Bird	SBE-45	
Melville	winch	(unknown)	(unknown)	

Searchable online inventory of underway instrument systems on each vessel, used to process data distros

Current inventory –

377 instrument systems

22 device types

141 unique make+models

on 26 in-service vessels

<http://www.rvdata.us/operators/profiles>

Instrument Systems

Expanded hierarchical system model:

> Vessel

> Acquisition Sys

> Device
(Type, Make, Model, Loc)

> Interface
(single "Talker")

> Subcomponent

Home » About R2R » Vocabularies

Vocabulary - Device Type

(authority=R2R)

Device Type	Directory	Description
<i>acqsys</i>	<i>[name]</i>	de/multiplexing and timetagging data acquisition system
<i>adcp</i>	<i>adcp</i>	(acoustic doppler current profiler) sonar measures water current velocities
<i>anemometer</i>	<i>wind</i>	measures wind speed and direction
<i>ctd</i>	<i>ctd</i>	integrated hydrographic system measures conductivity, temperature, pressure, etc.
<i>echosounder</i>	<i>echo</i>	sonar measures depth to seafloor or midwater reflectors - fathometer, fishfinder, etc.
<i>expendableprobe</i>	<i>xbt</i>	hand/deck-launched single-use probes - XBT, XCTD, XSV, XCP, etc.
<i>flowmeter</i>	<i>flow</i>	instrument that measures rate of water flow - can be mechanical, optical, electromagnetic, etc.
<i>fluorometer</i>	<i>fluoro</i>	measures fluorescence (usually for phytoplankton)
<i>gnss</i>	<i>gnss</i>	(global navigation satellite system) - GPS/WAAS, GLONASS, Galileo, etc.
<i>gravimeter</i>	<i>grav</i>	measures the Earth's local gravitational field
<i>gyrocompass</i>	<i>gyro</i>	compass with a motorized gyroscope that tracks true north (heading)
<i>hdss</i>	<i>hdss</i>	(hydrographic doppler sonar system) sonar measures water current velocities
<i>magnetometer</i>	<i>mag</i>	measure strength and/or direction of the Earth's magnetic field
<i>metstation</i>	<i>met</i>	integrated meteorological system measures temperature, pressure, humidity, etc.
<i>mru</i>	<i>mru</i>	(motion reference unit) measures pitch, roll, heave, and heading
<i>multibeam</i>	<i>multibeam</i>	multiple formed beam mapping sonar system
<i>pco2</i>	<i>pco2</i>	measures partial pressure of dissolved carbon dioxide
<i>radiometer</i>	<i>rad</i>	measures radiation - pyranometer, pyrhelimeter, pyrgeometer, albedometer, etc.
<i>raingauge</i>	<i>rain</i>	(udometer) measures amount of liquid precipitation
<i>speedlog</i>	<i>speedlog</i>	measures Doppler near surface vessel speed through water
<i>ssv</i>	<i>ssv</i>	sea surface sound velocimeter - typically input to multibeam
<i>subbottom</i>	<i>subbottom</i>	sonar profiling system for shallow sediment penetration
<i>thermometer</i>	<i>thermo</i>	measures air or water temperature
<i>timeserver</i>	<i>time</i>	reads actual time from a reference clock (GPS, WWVB, etc) and distributes to clients
<i>transmissometer</i>	<i>trans</i>	measures fraction of light absorbed or scattered by particles in water
<i>tsg</i>	<i>tsg</i>	(thermosalinograph) measures flow-through conductivity, temperature, etc.
<i>winch</i>	<i>winch</i>	measures wire tension, speed, payout, etc.



Controlled Vocabularies

- **Activity Type** *NEW*
- Country (ISO)
- Cruise Type (UNOLS)
- Cruise
- Device Type
- **Device Model** *NEW*
- Facility
- **File Format** *NEW*
- Fileset Type
- Gazetteer – Economic Zone (VLIZ)
- Gazetteer – Sea Area (IHO)
- Gazetteer – Undersea Feature
- Language (ISO)
- **Location Type** *NEW*
- Media Type
- Organization (IANA)
- Person
- Port (UNOLS)
- Processing Level
- Program
- Role Type
- Sample Type (USGS)
- State (FIPS)
- Vessel (ICES)

<http://www.rvdata.us/voc>



Long-Term Archiving



- Publish “Cruise-level” metadata records as ISO XML (19115-2)
- Publish controlled vocabs as SKOS XML - easily reusable
- Submit data to NOAA as “BagIt” packages (IETF draft standard)

Shared Semantics for Oceanographic Research: Development of Standard “Cruise-Level” Metadata

R. Arko¹, A. Milan², C. L. Chandler³, S. P. Miller⁴, V. L. Ferrini⁵, S. Mesick⁶, J. Mizo⁷, C. Paver⁸, B. Sullivan⁹, A. Sweeney⁹

Poster IN11A-1067
AGU Fall Meeting
December 13, 2010
<http://rtdata.us/> <http://noaa.gov/>

ABSTRACT

There is a general need in the ocean science community for a widely accepted standards-based “cruise-level” metadata profile that describes the basic elements of a seagoing expedition (e.g. cruise identifier, vessel name, operating institution, dates/ports, navigation track, survey targets, science party, funding sources, scientific instruments, daughter platforms, and data sets). The need for such a profile is increasingly urgent as seagoing programs become more complex and interdisciplinary; funding agencies mandate public dissemination of the resulting data; and data centers link post-field/derived products to original field data sets.

We are developing a standard implementation for cruise-level metadata that serves the needs of multiple U.S. programs, in an effort to promote interoperability and facilitate collaboration. Testbed development has focused on the Rolling Deck to Repository (R2R) and Extended Continental Shelf (ECS) programs – both tasked with routinely documenting and archiving large volumes of data from a wide array of U.S. research vessels – and draws from the cruise-level metadata profile published by the University-National Oceanographic Laboratory System (UNOLS) Data Management Best Practices Committee in 2008.

Our XML implementation is based on the ISO 19115-2 : 2009 standard for geospatial metadata, with controlled vocabulary terms directly embedded as Uniform Resource Identifier (URI) references that can be validated in e.g. ISO Schematron. Our choice of the ISO standard reflects ANSI’s adoption of the ISO 19115 North American Profile in 2009, and the adoption of ISO 19115 by related programs including the Integrated Ocean Drilling Program (IODP) and the SeaDataNet program in Europe.

We envision a hierarchical framework where a single “cruise-level” record is linked to multiple “dataset-level” records that may be published independently. Our results published online will include a best practices guide for authoring records; recommended controlled vocabularies; example records; a set of Schematron rules for enhanced validation; and a set of stylesheets for crosswalking and viewing records in other formats. We draw from existing international standard dictionaries/gazetteers where possible including ICES (platforms), UNOLS (ports), IHO (sea areas), GEBCO (undersea feature names), and VLEZ (economic zones).

METADATA STRUCTURE
(XML, XSD)

(TEXT VIEW)

(TEXT VIEW)

CONTROLLED VOCABULARIES

EXAMPLE RECORD
(XML VIEW)

BEST PRACTICES:

- Vocabularies are encoded as W3C Simple Knowledge Organization System (SKOS) XML.
- Use URL-style URIs, with “?” (not #) to delimit terms.
- Differentiate classes (e.g. deviceType) from instances (e.g. device) as discrete concepts.
- Encode unique identifiers as `pref:label` (alphanumeric lower case only with no special characters), full name as `alt:label`, synonyms as `hidden:label`, and mappings as `exact:match`.
- Routinely validate records per “FootParty” conventions:
 - no unresolvable URIs or invalid characters
 - no missing `pref:labels`
 - no “loose concepts” (lacking `top:Concept` or `broader`)
 - no disjoint OWL classes
 - consistent use of labels (`pref:label`, `alt:label`, and `hidden:label` are disjoint plain literals, with only one `pref:label` per language)
 - consistent mapping properties
 - consistent semantic relations
- Use `dc:terms` :issued and `modified` dates for versioning.
- Use `dc:description` for additional metadata (following SeaDataNet convention).

NEXT STEPS

- Add vocabulary mappings to other systems (e.g. SeaDataNet platforms, ports, devices)
- Deploy SPARQL endpoint for programmatic search.



National Digital Stewardship Alliance

<http://www.ngdc.noaa.gov/mgg/ecs/metadata/cruise/>
and
<http://www.rvdata/voc>



Cruise Navigation

- R2R standard quality-controlled navigation products –
 - Best (full) resolution
 - 1-minute sampled
 - Control point (trackline fit)
- Plan to facilitate Foreign Clearance data requests –
 - Add map layer with EEZ bounds to Cruise Catalog
 - Routinely calculate track segments inside EEZs from 1-minute navigation
 - Offer option to download files inside EEZ for data types where QA complete

Cruise Catalog

Rolling Deck to Repository (R2R)

Home About R2R Cruise Catalog News Contact Us Internal

Catalog Status
 (In Service) Vessels: 26
 Cruises: 2163
 Archived Files: 8033881
 October 25, 2011

Search

Home

Cruise Catalog: MV0903

Operator: Scripps Institution of Oceanography
 Vessel: Melville

Cruise ID	Start Date	Start Port	End Date	End Port
MV0903	2009-02-27	Manila	2009-03-21	Manila

Project: Philippines Straits Dynamics Experiment (PhilEx) - Regional IOP 2009 Cruise

SCIENCE PARTY

Gordon, Arnold	Scientist, Chief	Lamont-Doherty Earth Observatory
----------------	------------------	----------------------------------

FILE MANIFEST

Original file manifest submitted by vessel

Contributed documents eg. Cruise Reports

Data sets broken out and delivered to NOAA Data Centers

FILE SETS

Device Type	Make [,Model [,Location]]	Files	Archive Status
acqsys (adcp)	Hawaii UHDAS	List	(submitted to NODC)
ctd	Sea-Bird SBE-911plus	List	
expendableprobe	Sippican MK21	List	NGDC Download
gnss	Ashtech ADU2	List	(submitted to NGDC)
gnss	Furuno GP-90D	List	(submitted to NGDC)
gnss	Trimble NT-200D	List	(submitted to NGDC)
gravimeter	Bell BGM-3	List	(submitted to NGDC)
metstation	SIO MET-System	List	(submitted to NODC)
multibeam	Kongsberg EM120	List	NGDC Download

R2R PRODUCTS

- Navigation: 1 Minute
- Navigation: Best Resolution
- Navigation: Control Points

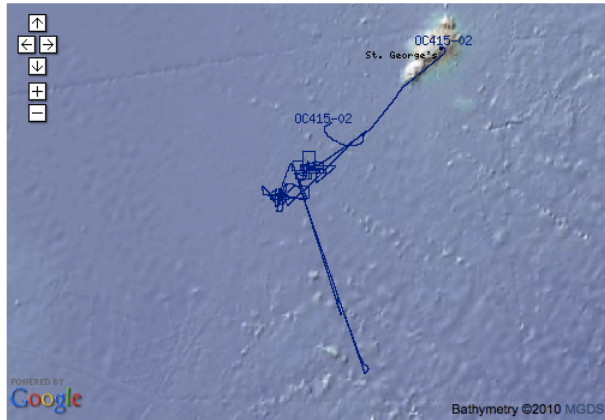
RELATED DOCS

- Science Cruise Report (Leg 1)
- Science Cruise Report (Leg 2)

R2R Products eg. Navigation

Reciprocal Linking

Cruise Catalog: OC415-02



Operator: Woods Hole Oceanographic Institution
Vessel: Oceanus

Cruise ID	Start Date	Start Port	End Date	End Port
OC415-02	2005-07-18	St. George's	2005-08-04	St. George's
Details				
Inventory				
Project: Eddies Dynamics, Mixing, Export, and Species (EDDIES) (Info)				
SCIENCE PARTY				
Ledwell, James	Scientist, Chief	Woods Hole Oceanographic Institution		
RELATED DATA				
Biological and Chemical Oceanography Data Management Office (Info)				Data

BCO-DMO

Biological and Chemical Oceanography Data Management Office

[Home](#)
[Data](#)
[Resources](#)
[About Us](#)
[Contact](#)

Database

- Welcome
- Programs 16
- Projects 130
- Deployments 799
- Instruments 199
- Datasets 4032
- People 1039
- Affiliations 227
- Funding 34
- Parameters 1097

Data Access

- Geospatial access

Platform deployment: OC415-02

Platform: R/V Oceanus
 Project: Eddies Dynamics, Mixing, Export, and Species composition (EDDIES)
 Type: vessel
 Deployment: **OC415-02**
 Synonyms: OC415-2, OC415_T1, EDDIES 2005 Tracer 1
 Coordinated deployments: None
 Start date: 7/18/2005
 End date: 8/4/2005
 Location: Sargasso Sea
Locations table:
 List

Deployment report: None

▼ **Description**
 EDDIES project 2005 Tracer 1 cruise
 Funded by: NSF OCE-0241310
 Original cruise data are available from the » [NSF R2R data catalog](#)

► **Datasets associated with this platform deployment**
 ► **People associated with this platform deployment**

©2008 Biological and Chemical Oceanography Data Management Office.
 Funded by the U.S. National Science Foundation

Partner systems:

- ASP (marine seismics)
- BCO-DMO (bio/chem ocean)
- IMLGS (marine samples)
- MGDS (marine geo)
- SAMOS (marine met/tsg)

etc.



Reciprocal Linking (cont.)

Cruise Catalog: HLY1002 | Rolling Deck to Repository (R2R)

www.rvdata.us/catalog/HLY1002

Rolling Deck to Repository (R2R)

Home About R2R Cruise Catalog News Contact Us Internal

Catalog Status
 (In Service) Vessels: 26
 Cruises: 2217
 Archived Files: 8697775
 November 13, 2011

Search

Home

Cruise Catalog: HLY1002

Operator: United States Coast Guard
 Vessel: Healy

Cruise ID	Start Date	Start Port	End Date	End Port
HLY1002	2010-08-02	Dutch Harbor	2010-09-06	Barrow

Project: Joint U.S./Canadian Extended Continental Shelf (ECS) Survey (Info)

- SCIENCE PARTY
- FILE MANIFEST
- FILE SETS
- RELATED DATA

Index to Marine & Lacustrine Geological Samples (Info) [Samples](#)
 Shipboard Automated Meteorological and Oceanographic System (Info) [Data](#)

Cruise HLY1002 samples in the Index to Marine and Lacustrine Geological Samples (IMLGS) | ngdc.noaa.gov

www.ngdc.noaa.gov/geosamples/leg.jsp?leg=HLY1002&src=R2R

NOAA > NESDIS > NGDC > MGD > Marine Geology & Geophysics > Sample Index

NOAA NATIONAL GEOPHYSICAL DATA CENTER
 NATIONAL SCIENCE FOUNDATION
 DIVISION OF OCEAN SCIENCES

Index to Marine & Lacustrine Geological Samples

The Database Contains Information on 11 Samples/Holes from Cruise/Leg HLY1002

Repository Link	Ship/ Platform	R2R Data Link	Sample Data Link	Device	Latitude	Longitude	Water Depth (m)	Collection Date	IGSN Link
ECS	Healy	HLY1002	HLY1002-1GB-1	core, gravity	71.31787	-143.99828	2530	20100811	ECS003000
ECS	Healy	HLY1002	HLY1002-1P-1	core, piston	71.31747	-143.9997	2538	20100812	ECS003001
ECS	Healy	HLY1002	HLY1002-1TC-1	corer, trigger wt.	71.31747	-143.9997	2638	20100812	ECS003002
ECS	Healy	HLY1002	HLY1002-2P-1	core, piston	70.9591	-144.05238	1157	20100812	ECS003003
ECS	Healy	HLY1002	HLY1002-2TC-1	corer, trigger wt.	70.9591	-144.05238	1157	20100812	ECS003004
ECS	Healy	HLY1002	HLY1002-3P-1	core, piston	81.57966	-134.4779	3070	20100825	ECS003005
ECS	Healy	HLY1002	HLY1002-3TC-1	corer, trigger wt.	81.57966	-134.4779	3070	20100825	ECS003006
ECS	Healy	HLY1002	HLY1002-4P-1	core, piston	75.58413	-140.09293	3700	20100831	ECS003007
ECS	Healy	HLY1002	HLY1002-4TC-1	corer, trigger wt.	75.58413	-140.09293	3700	20100831	ECS003008
ECS	Healy	HLY1002	HLY1002-5P-1	core, piston	76.54377	-128.62745	2081	20100902	ECS003009
ECS	Healy	HLY1002	HLY1002-5TC-1	corer, trigger wt.	76.54377	-128.62745	2081	20100902	ECS003010

Search the Index to Marine & Lacustrine Geological Samples

SAMOS - Cruise Data Availability

samos.coaps.fsu.edu/html/cruise_data_availability.php?submit=search&sort=overall&cruises[HLY1002&data=1

About Accuracy Data Access Literature Ship Recruiting Tools & Utilities Training Workshops

Shipboard Automated Meteorological and Oceanographic System

Cruise Data Availability

The purpose of this page is to allow the user to get a rough idea of the quality of data for a over a date range of a given cruise for a particular ship. In some cases multiple files may exist for a single day and ship. In these cases quality is calculated for the overall day, meaning an overall quality for the pieces as a whole are calculated. To see the quality of each piece individually click on the colored box aligning the ship and day desired.

For more information on the cruises you can visit the Rolling Deck to Repository at the following link(s):
[HLY1002 at R2R](#)

Good Data (0-5% flagged as suspect)
Use with Caution (5-10% flagged as suspect)
Use with Caution (>10% flagged as suspect)
No Data Available

Cruises

Contract All | Expand All

HLY1002 (NEPP)

	HLY1002
08/02/2010	
08/03/2010	
08/04/2010	
08/05/2010	
08/06/2010	
08/07/2010	
08/09/2010	
08/10/2010	
08/11/2010	



Event Logger

- Version 1 deployed to 7 vessels including multi-ship/shore programs

AT18-06, AT18-12

CH0511

EN494

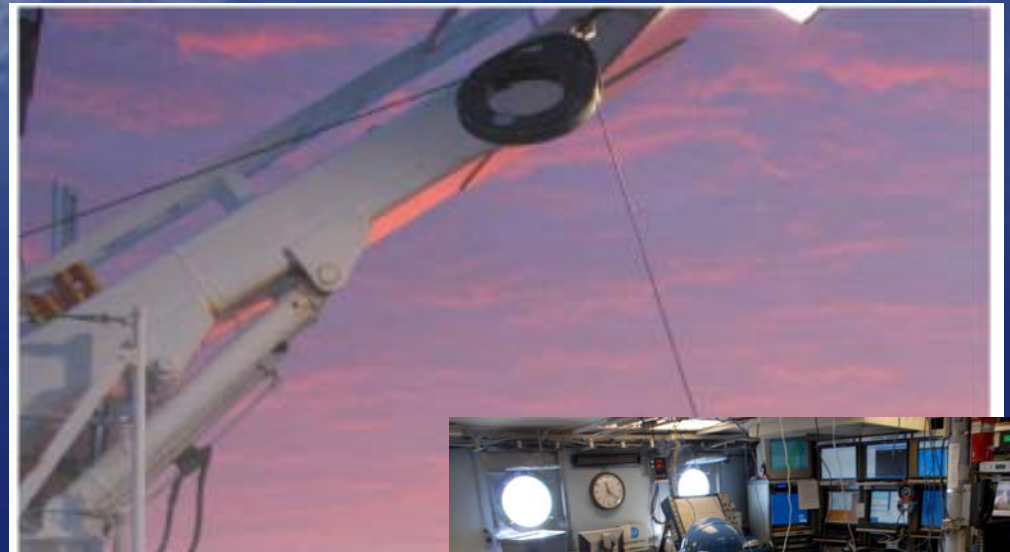
KN200-02, KN203-04, KN204-01

MV1108

OC467-01, OC471, OC473,

OC475

TN268



Latest logs online:

<http://elog.rvdata.us:8011/>

- Version 2 will include Web-based configuration generator

Real-time MET/TSG

- SAMOS recruitment of vessels for 1.0 data transfer

Atlantic Explorer *

Atlantis

Cape Hatteras * (pending)

Healy

Kilo Moana *

Knorr

Laurence M. Gould

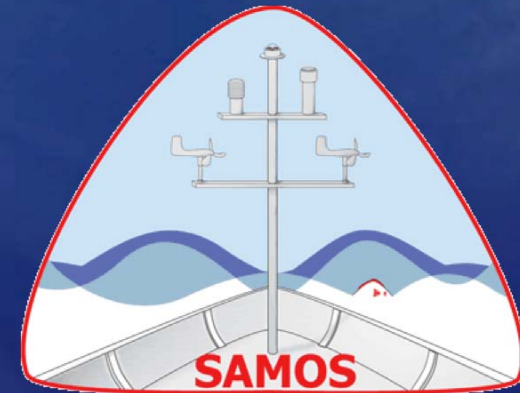
Melville *

Nathaniel B. Palmer

Oceanus

Roger Revelle *

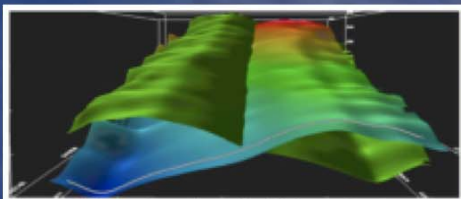
* R2R funded effort



- Published specification for vessel coordinate systems

<http://www.rvdata.us/operators>

- Development of 2.0 real-time data transfer protocol



Quality Assessment

- MET/TSG – SAMOS cont. routine assessment of real-time data and operator feedback, working on “R2R-standard” QA roll-up report (*partner: COAPS*)
- Multibeam – completed development of code for assessment and report, moving to fleetwide production; prototype Web Dashboard (*partner: MAC*)
- Gravity/Magnetics – development underway, to be presented at AGU Dec. 2011 (*partner: PFPE*)
- ADCP – development underway, initial results to be presented at OS Feb. 2012 (*partner: UH*)
- CTD/XBT – development underway (*partner: BCO-DMO*)

Outstanding Issues

- Need to provide file manifests with data submissions
- Need to archive full-resolution GPS data
- Need to provide subbottom data to archives in SEGY format

and

- How long to leave a copy of cruise data on the ship?

<http://www.rvdata.us/catalog>



info@rvdata.us