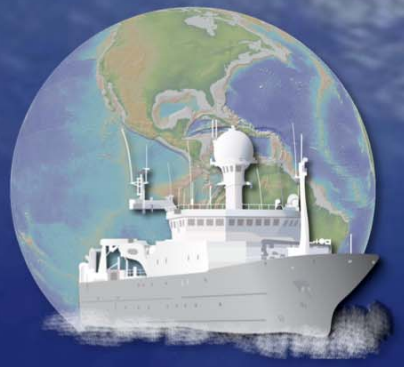


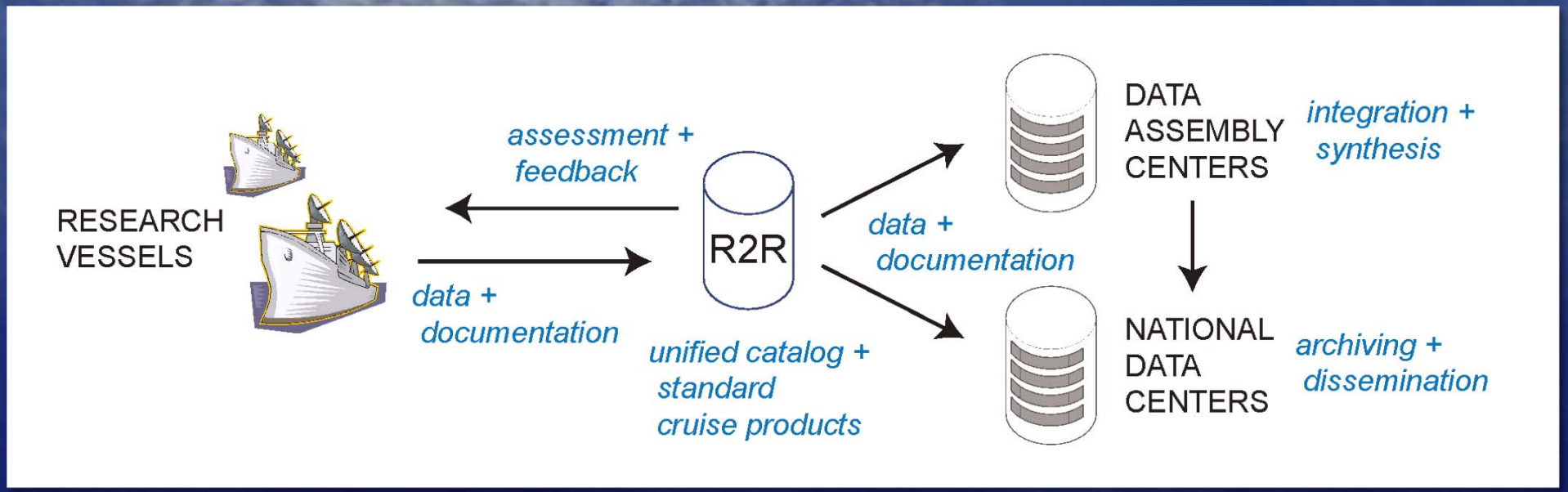
rvdata.us

Rolling Deck to Repository (R2R)

Presentation Outline

1. Mission + Goals
2. Tasks Performed (FGDC Lifecycle)
3. Data Types
4. Data Sources
5. Other Needs
6. Identifiable Gaps
7. Success Stories

Program Goals



- 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

Stakeholders

- NSF proponents
- Vessel operators
- NOAA National Data Centers
- UNOLS Office
- National Facilities, Data Assembly Centers, etc. serving oceanographic research
- User community

Stage 1 – Define

Requirements:

- Preserve exact copy of what vessel produced end-of-cruise (i.e. “what the science party took home”).
- “Break out” data into discrete sets, and submit to appropriate long-term repositories for archiving+dissemination.
- Assess quality of data, and create necessary documentation for others to re-use it.

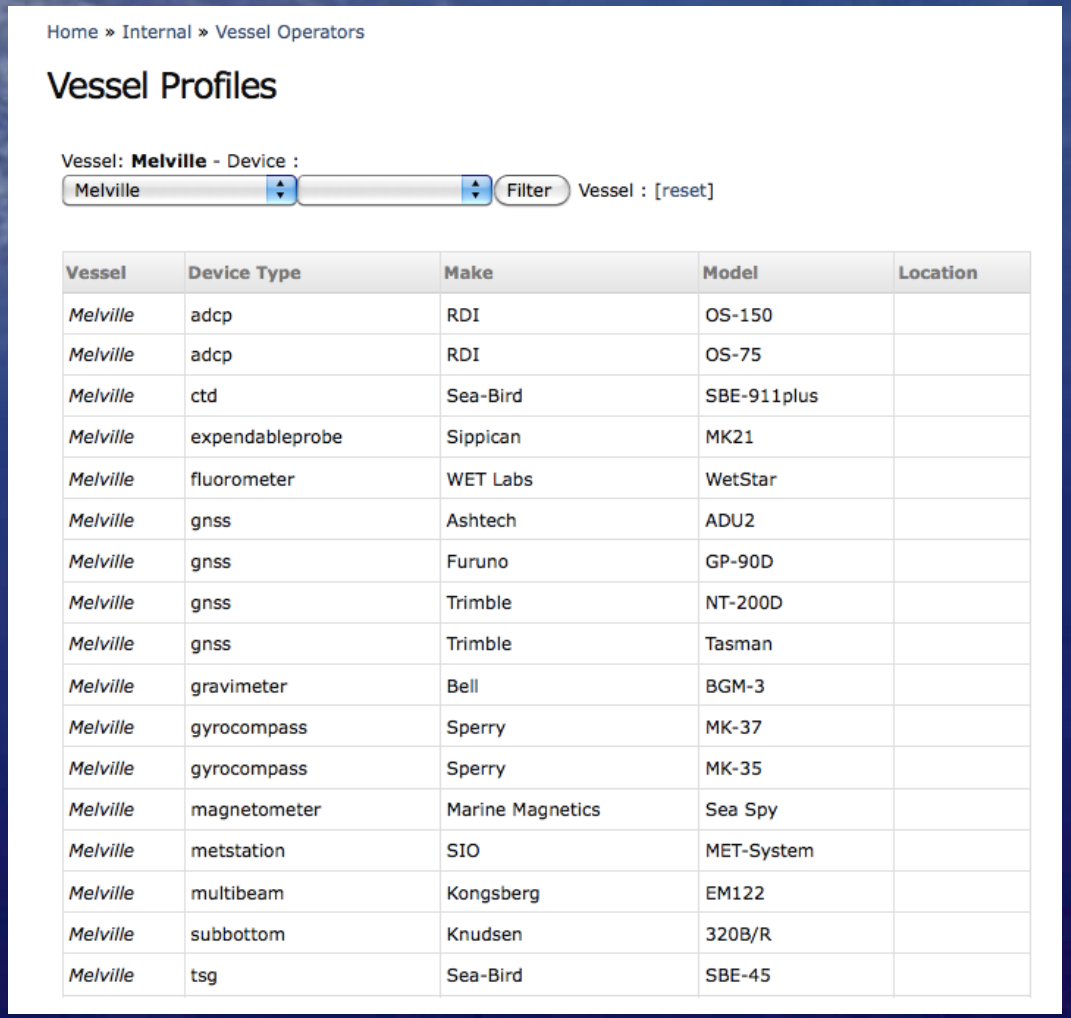
Stage 2 – Inventory/Evaluate

R2R catalog includes:

- Inventory of vessels (operator, vessel class, operating characteristics, reference frame, etc).
- Inventory of instrument systems (vessel, instrument class, make+model, installation/calibration, data types, file formats, etc).
- Inventory of cruises (vessel, ports/dates, abstract, navigation track, personnel list, funding awards, etc).
- Inventory of datasets (cruise, instrument system, checksum manifest, quality assessment, etc).

Vessel Profiles

Searchable inventory of underway instrument systems on each vessel



Home » Internal » Vessel Operators

Vessel Profiles

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-90D	
Melville	gnss	Trimble	NT-200D	
Melville	gnss	Trimble	Tasman	
Melville	gravimeter	Bell	BGM-3	
Melville	gyrocompass	Sperry	MK-37	
Melville	gyrocompass	Sperry	MK-35	
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	

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

Stage 3 – Obtain

- Establish procedure for submission of end-of-cruise data distributions directly from vessel operators – varies with vessel schedule and capabilities.

- Create standard set of post-cruise products:
    - “master” cruise-level metadata record
    - operations report
    - quality-controlled shiptrack navigation
    - event log (where available)

Stage 4 – Access

- Maintain central fleet-wide catalog of vessels, instrument systems, cruises, and datasets.
- Deploy Web services requested by community –
  - catalog+vocabulary records
  - map+feature services
  - gazetteer-based searches
- Create “reciprocal links” to partner data centers that serve related data sets.

Stage 5 – Maintain

- Quarterly+annual reporting to NSF + mid-term (2 ½ year) external review.
- Site visits +ongoing engagement with operators, vessels, and scheduling offices.
- Submission Agreements and ongoing collaborative development with NGDC+NODC.
- Annual reporting to UNOLS Council and Standing Committees (RVTEC, RVOC).
- Present results at inter/national conferences +engage with disciplinary specialists.

Stage 6 – Use/Evaluate

R2R QA/QC includes:

- *Near-real-time* quality control of MET/TSG data – SAMOS
- *Post-cruise* quality control of navigation data
- *Post-cruise* quality assessment of other data types

QA/QC results included in archival metadata, and published online with alerts to operators.

Stage 7 – Archive

- Original cruise data, standard post-cruise products, and associated metadata routinely submitted to NGDC+NODC for archival and dissemination.
- R2R catalog links to NGDC+NODC for data downloads.
- Periodic review of holdings and procedures per terms of NGDC+NODC Submission Agreements.

Estimate ~400 cruises and ~6,000 datasets per year.

Device Types

- R2R catalog is organized by *device* type (instrument system).
- Device types are mapped to *data* types.
- OCM framework data types – bathymetry and subbottom.

Home » About R2R » Technical Details » Vocabularies

Vocabulary - Device Type

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

Academic Fleet

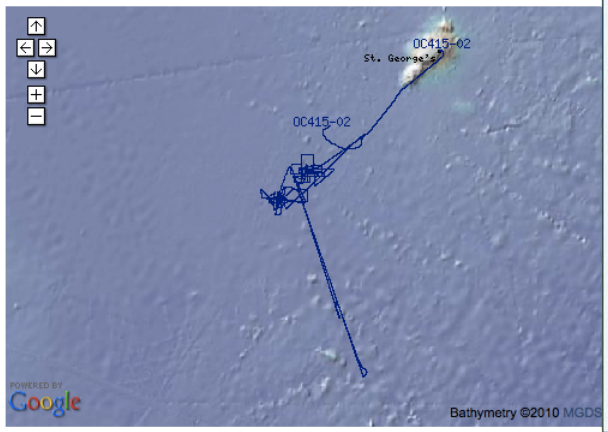
- 26 RVs (21 UNOLS +5 allied)
- 2,056 cruises cataloged
- 6.9+ million files archived

Joined R2R

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*

Reciprocal Linking

Cruise Catalog: OC415-02



Operator: Woods Hole Oceanographic Institution
Vessel: Oceanus

Cruise ID	Start Date	Start Port	End Date	End Port
	Details			
OC415-02	2005-07-18	St. George's	2005-08-04	St. George's
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

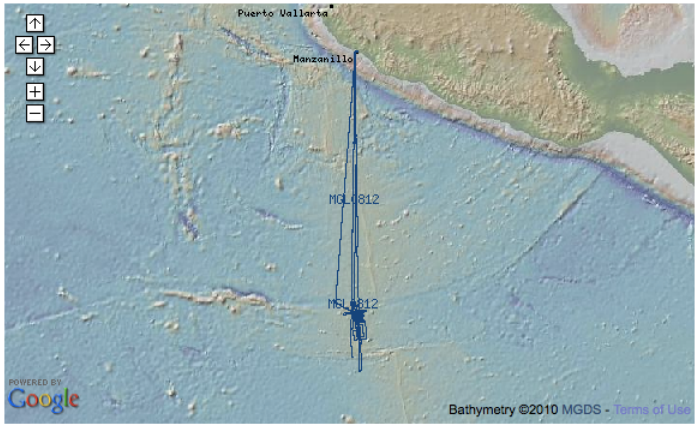
EDDIES project 2005 Tracer 1 cruise
Funded by: NSF OCE-0241310
Original cruise data are available from the » NSF R2R data catalog

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

Reciprocal Linking *(cont.)*

Cruise Catalog: MGL0812



Operator: Lamont-Doherty Earth Observatory
Vessel: Marcus G. Langseth

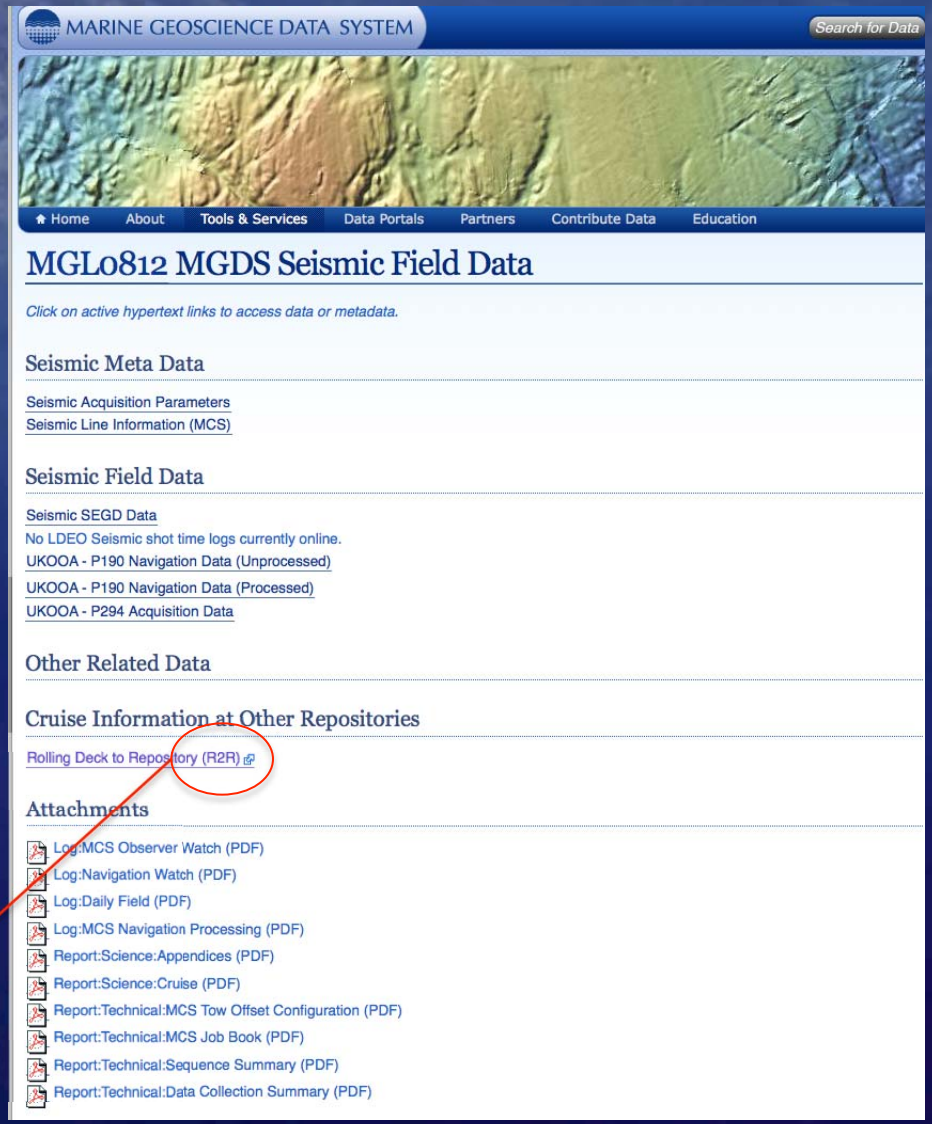
Cruise ID	Start Date	Start Port	End Date	End Port
	Details			
MGL0812	2008-06-29	Manzanillo	2008-08-21	Manzanillo
Inventory	*Project:* 3-D/4-D Seismic Imaging of the Magmatic-Hydrothermal System at East Pacific Rise 9-50'N (Info)			

SCIENCE PARTY

Mutter, John	Scientist, Chief	Lamont-Doherty Earth Observatory
Canales, Juan Pablo	Scientist, Co-Chief	Woods Hole Oceanographic Institution
Carbotte, Suzanne	Scientist, Co-Chief	Lamont-Doherty Earth Observatory
Nedimovic, Miaden	Scientist, Co-Chief	Dalhousie University

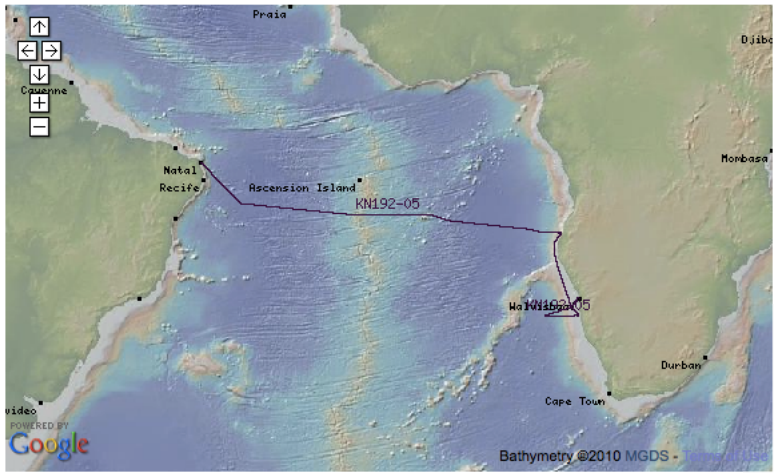
RELATED DATA

Academic Seismic Portal at LDEO (Info)	Data
Marine Geoscience Data System (Info)	Data



Reciprocal Linking *(cont.)*

Cruise Catalog: KN192-05



Operator: Woods Hole Oceanographic Institution
Vessel: Knorr

Cruise ID	Start Date	Start Port	End Date	End Port
	Details			
KN192-05	2007-11-16	Natal	2007-12-13	Walvisbaai

Inventory

Project: Interactions of Cobalt and Iron with in situ Cyanobacterial Physiology in the South Atlantic

SCIENCE PARTY

Saito, Mak	Scientist, Chief	Woods Hole Oceanographic Institution

RELATED DATA

Shipboard Automated Meteorological and Oceanographic System (Info)	Data

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

SAMOS

Shipboard Automated Meteorological and Oceanographic System

Data Availability

The purpose of this page is to allow the user to get a rough idea of the quality of data for a particular day and 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 cruise KN192-05 you can visit the Rolling Deck to Repository page.

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

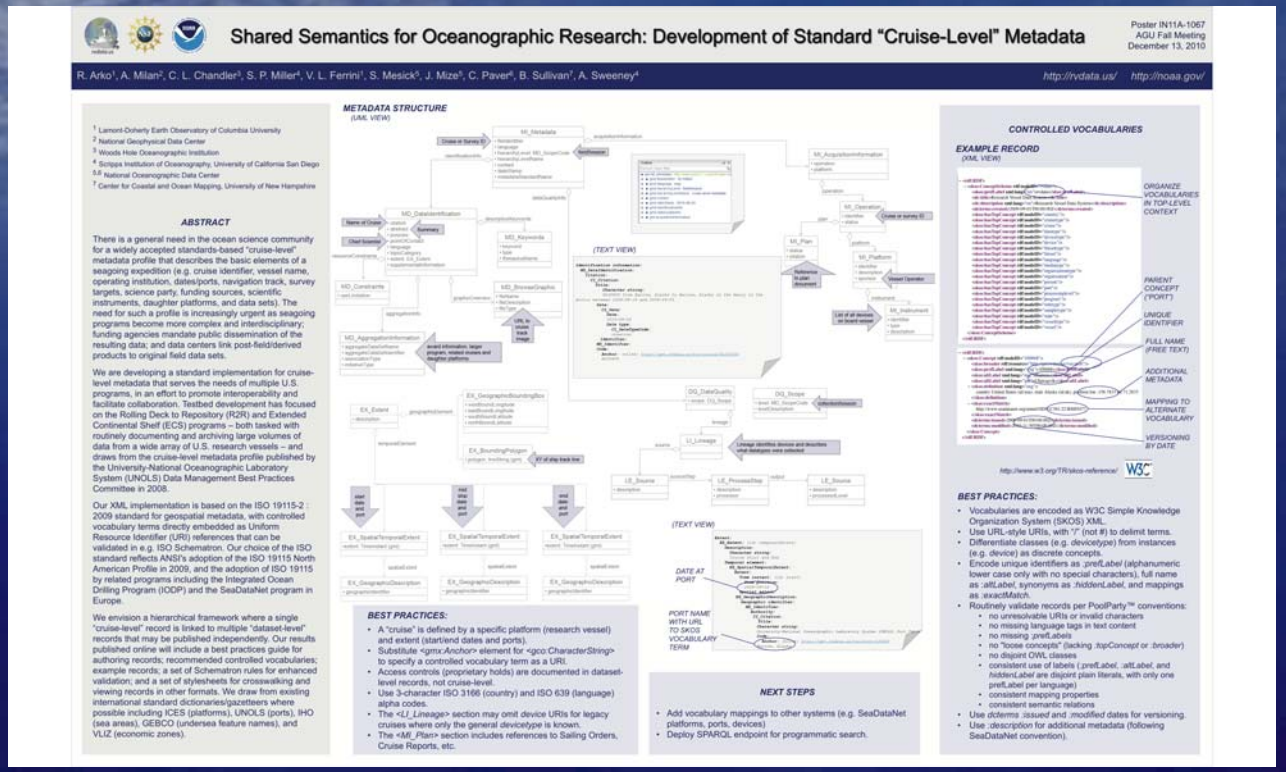
	KN192-05
11/16/2007	
11/17/2007	
11/18/2007	
11/19/2007	
11/20/2007	
11/21/2007	
11/22/2007	
11/23/2007	

Challenges

- Lack of fleet-standard directory structure for cruise data
- Lack of standard/universal controlled vocabularies

Shared Semantics

- ISO 19115-2:2009 implementation of “cruise-level” metadata
- Joint R2R/NOAA development
- Presented at AGU Fall 2010 (Arko, Milan, et al.)



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

Poster IN11A-1067
AGU Fall Meeting
December 13, 2010

R. Arko[1], A. Milan[2], C. L. Chandler[3], S. P. Miller[4], V. L. Ferrini[1], S. Mesick[5], J. Mize[5], C. Paver[6], B. Sullivan[7], A. Sweeney[4]

http://rvdata.us/ http://noaa.gov/

[1] Lamont-Doherty Earth Observatory of Columbia University
[2] National Geophysical Data Center
[3] Woods Hole Oceanographic Institution
[4] Scripps Institution of Oceanography, University of California San Diego
[5,6] National Oceanographic Data Center
[7] Center for Coastal and Ocean Mapping, University of New Hampshire

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 VLIZ (economic zones).

METADATA STRUCTURE
(UML VIEW)

(TEXT VIEW)

BEST PRACTICES:

- A “cruise” is defined by a specific platform (research vessel) and extent (start/end dates and ports).
- Substitute *<gmx:Anchor>* element for *<gco:CharacterString>* to specify a controlled vocabulary term as a URI.
- Access controls (proprietary holds) are documented in dataset-level records, not cruise-level.
- Use 3-character ISO 3166 (country) and ISO 639 (language) alpha codes.
- The *<LI_Lineage>* section may omit device URIs for legacy cruises where only the general *devicetype* is known.
- The *<MI_Plan>* section includes references to Sailing Orders, Cruise Reports, etc.

NEXT STEPS

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

CONTROLLED VOCABULARIES

EXAMPLE RECORD
(XML VIEW)

ORGANIZE VOCABULARIES IN TOP-LEVEL CONTEXT
PARENT CONCEPT (“PORT”)
UNIQUE IDENTIFIER
FULL NAME (FREE TEXT)
ADDITIONAL METADATA
MAPPING TO ALTERNATE VOCABULARY
VERSIONING BY DATE

http://www.w3.org/TR/skos-reference/

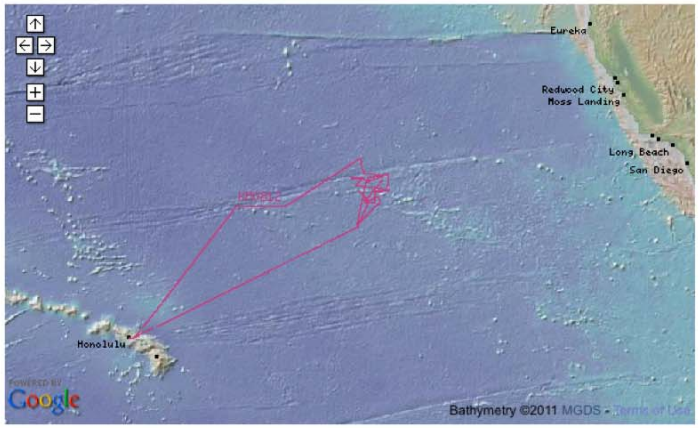
BEST PRACTICES:

- 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 *.../prefLabel* (alphanumeric lower case only with no special characters), full name as *:altLabel*, synonyms as *:hiddenLabel*, and mappings as *:exactMatch*.
- Routinely validate records per PoolParty™ conventions:
  - no unresolvable URIs or invalid characters
  - no missing language tags in text content
  - no missing *:prefLabels*
  - no “loose concepts” (lacking *:topConcept* or *:broader*)
  - no disjoint OWL classes
  - consistent use of labels (*:prefLabel*, *:altLabel*, and *:hiddenLabel* are disjoint plain literals, with only one *prefLabel* per language)
  - consistent mapping properties
  - consistent semantic relations
- Use *dcterms :issued* and *:modified* dates for versioning.
- Use *:description* for additional metadata (following SeaDataNet convention).

NGDC Pathway

Multibeam data submitted by R2R

Cruise Catalog: KM0812



Operator: University of Hawaii
Vessel: Kilo Moana

Cruise ID	Start Date	Start Port	End Date	End Port
	Details			
KM0812	2008-07-01	Honolulu	2008-07-22	Honolulu
Inventory	*Project:* North Pacific Subtropical Gyre (NPSG) Silica Cycling			

SCIENCE PARTY

Brzezinski, Mark	Scientist, Chief	University of California, Santa Barbara

FILE SETS

Device Type	Make [,Model [,Location]]	Files	Repository	
adcp	RDI OS-38	List	NODC	Download
adcp	RDI WM-300	List	NODC	Download
multibeam	Kongsberg EM1002	List	NGDC	Download
multibeam	Kongsberg EM120	List	NGDC	Download

Cruise File List

http://www.ngdc.noaa.gov/nndc/struts/results?op_0=eq&v_0=NEW1301&t=101378&s=8&d=70&d=75&d=76&d=7

NOAA > NESDIS > NGDC > MGG > Multibeam Bathymetry — privacy policy

NOAA NATIONAL GEOPHYSICAL DATA CENTER

Multibeam Bathymetric Data

KM0812 Data File List

These data are not to be used for navigation.

Downloads may take a long time, depending on file size and data transfer rates.

Download All Files | <---Click here to package and download all files listed below

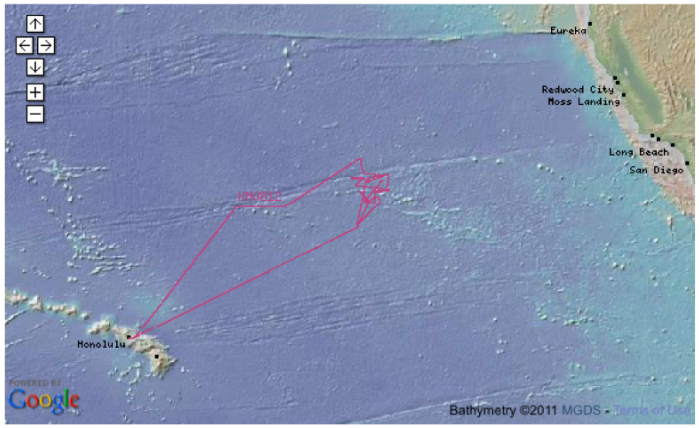
File Name (click to view/download)	File Size	Description
Multibeam Files ---- MBSystem Cruise Summary		
Version 1 Full Resolution----		
em1002-183-194842-0001.mb56.gz	5.1 MB	Simrad current multibeam vendor format
em1002-183-200342-0002.mb56.gz	4.1 MB	Simrad current multibeam vendor format
em1002-183-201842-0003.mb56.gz	4.2 MB	Simrad current multibeam vendor format
em1002-183-203342-0004.mb56.gz	3.7 MB	Simrad current multibeam vendor format
em1002-183-204842-0005.mb56.gz	3.9 MB	Simrad current multibeam vendor format
em1002-183-210343-0006.mb56.gz	3.5 MB	Simrad current multibeam vendor format
em1002-183-211843-0007.mb56.gz	3.6 MB	Simrad current multibeam vendor format
em1002-183-213343-0008.mb56.gz	4.3 MB	Simrad current multibeam vendor format
em1002-183-214843-0009.mb56.gz	4.4 MB	Simrad current multibeam vendor format
em1002-183-220343-0010.mb56.gz	3.4 MB	Simrad current multibeam vendor format
em1002-183-221843-0011.mb56.gz	2.8 MB	Simrad current multibeam vendor format
em1002-183-223343-0012.mb56.gz	2.7 MB	Simrad current multibeam vendor format
em1002-183-224844-0013.mb56.gz	0.9 MB	Simrad current multibeam vendor format
em120-183-195349-0001.mb56.gz	3.4 MB	Simrad current multibeam vendor format
em120-183-200850-0002.mb56.gz	3.3 MB	Simrad current multibeam vendor format
em120-183-202350-0003.mb56.gz	3.2 MB	Simrad current multibeam vendor format
em120-183-203850-0004.mb56.gz	3.0 MB	Simrad current multibeam vendor format
em120-183-205348-0005.mb56.gz	3.0 MB	Simrad current multibeam vendor format
em120-183-210849-0006.mb56.gz	2.8 MB	Simrad current multibeam vendor format
em120-183-212349-0007.mb56.gz	2.8 MB	Simrad current multibeam vendor format
em120-183-213849-0008.mb56.gz	3.6 MB	Simrad current multibeam vendor format
em120-183-215349-0009.mb56.gz	3.2 MB	Simrad current multibeam vendor format
em120-183-220850-0010.mb56.gz	2.8 MB	Simrad current multibeam vendor format
em120-183-222350-0011.mb56.gz	2.5 MB	Simrad current multibeam vendor format
em120-183-223850-0012.mb56.gz	2.7 MB	Simrad current multibeam vendor format
em120-183-225350-0013.mb56.gz	2.5 MB	Simrad current multibeam vendor format
em120-183-230851-0014.mb56.gz	1.4 MB	Simrad current multibeam vendor format
em120-183-232351-0015.mb56.gz	1.1 MB	Simrad current multibeam vendor format
em120-183-233851-0016.mb56.gz	1.2 MB	Simrad current multibeam vendor format
em120-183-235349-0017.mb56.gz	1.2 MB	Simrad current multibeam vendor format
em120-184-000849-0018.mb56.gz	1.1 MB	Simrad current multibeam vendor format
em120-184-002331-0019.mb56.gz	1.2 MB	Simrad current multibeam vendor format
em120-184-003850-0020.mb56.gz	1.2 MB	Simrad current multibeam vendor format
em120-184-005350-0021.mb56.gz	1.2 MB	Simrad current multibeam vendor format
em120-184-010850-0022.mb56.gz	0.5 MB	Simrad current multibeam vendor format

http://www.rvdata.us/catalog/KM0812

NODC Pathway

ADCP data submitted by R2R

Cruise Catalog: KM0812



Operator: University of Hawaii
Vessel: Kilo Moana

Cruise ID	Start Date	Start Port	End Date	End Port
	Details			
KM0812	2008-07-01	Honolulu	2008-07-22	Honolulu
Inventory	*Project:* North Pacific Subtropical Gyre (NPSG) Silica Cycling			

SCIENCE PARTY

Brzezinski, Mark	Scientist, Chief	University of California, Santa Barbara

FILE SETS

Device Type	Make [,Model [,Location]]	Files	Repository	
adcp	RDI OS-38	List	NODC	Download
adcp	RDI WM-300	List	NODC	Download
multibeam	Kongsberg EM1002	List	NGDC	Download
multibeam	Kongsberg EM120	List	NGDC	Download

http://www.rvdata.us/catalog/KM0812