

Rolling Deck to Repository (R2R):

































Working with Int'l Partners to Improve Data Discovery and Access

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R2R Program

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

Mission:

Provide uniform stewardship of routinely-collected environmental sensor data from the US academic research fleet

26 active service vessels

~400 primary sensor systems

~400 cruises/year

(cont.)

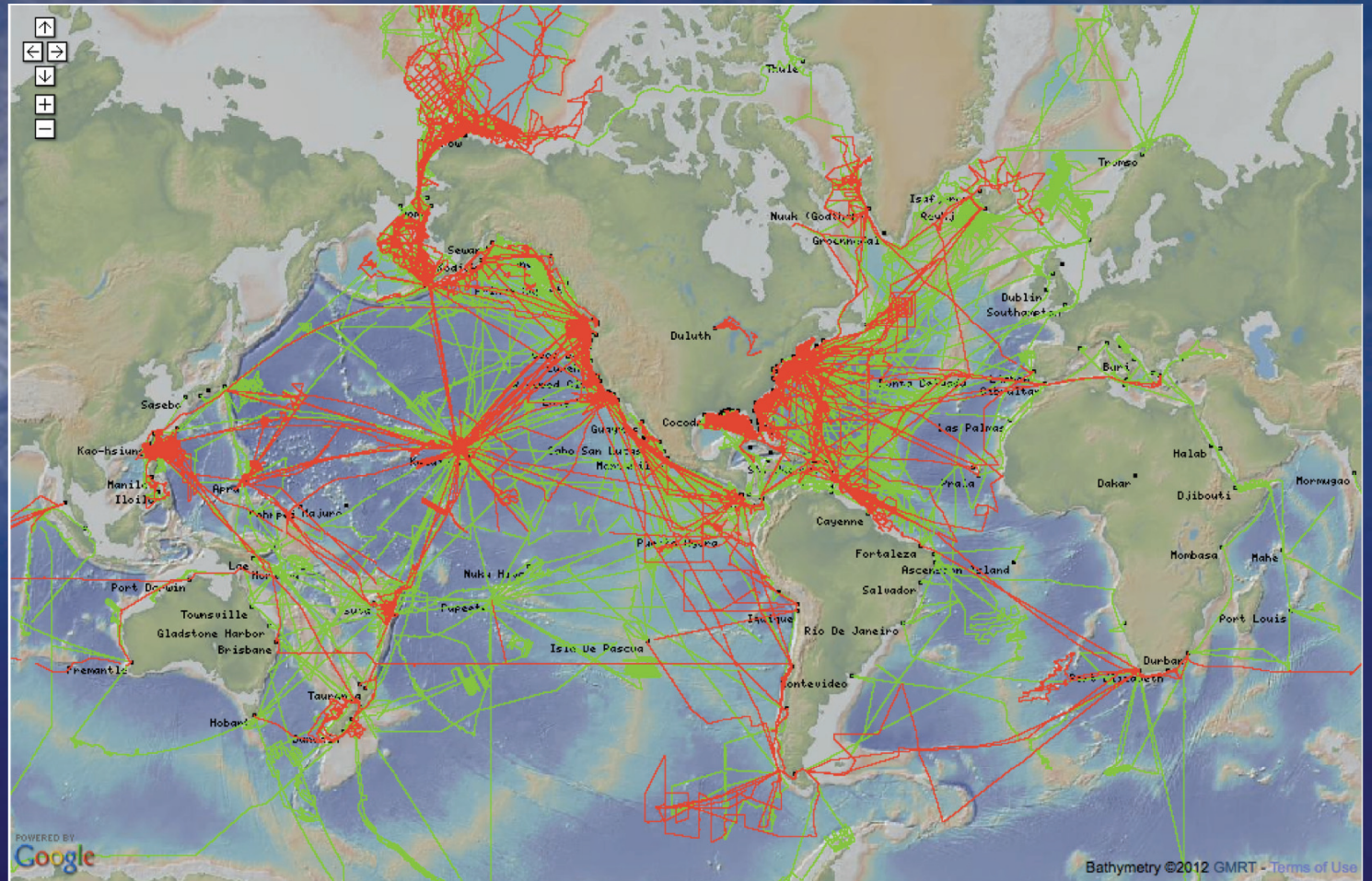
R2R Program

- Collaborative
(technicians, schedulers, curators, scientists, developers, etc)
- Multi-disciplinary
(oceanography, geophysics, meteorology)
- Global
(R/Vs work around the world in rivers, lakes, oceans)



R2R Catalog

As of Sep. 2013



IMDIS Report	# Vessels	# Cruises	# Files (Data+Docs)
2010	17	1,395	4.8 M
2013	26	3,254	14.2 M



Core Services

- Inventory cruises in a central catalog
- Upload sensor data from vessels; organize and document; deposit to long-term (NOAA) archives
- Assess quality of selected datasets
- Create quality-controlled products incl. shiptrack navigation, real-time met/ocean, geophysical profiles
- Provide tools for at-sea event logging
 - > *Session # 3, Poster # 170*

(cont.)

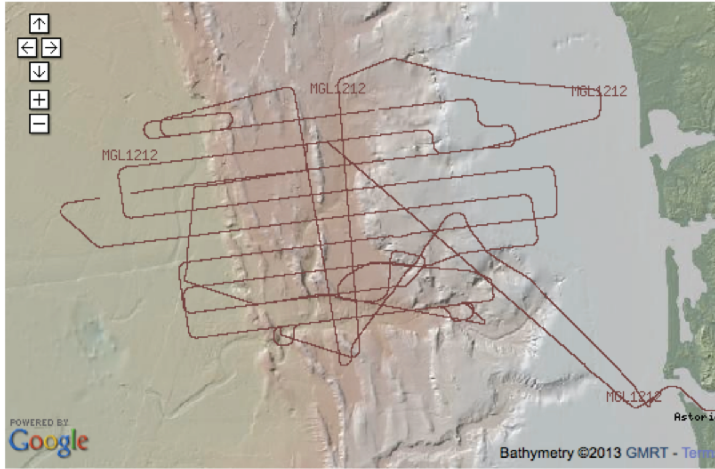
Core Services

Example: R/V Langseth cruise MGL1212

Cruise Catalog: MGL1212 | Rolling Deck to Repository (R2R)

Home

Cruise Catalog: MGL1212



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

Cruise ID	Start Date	Start Port	End Date	End Port
MGL1212	2012-07-12	Astoria	2012-07-23	Astoria

Project: Cascadia Open-Access Seismic Transects (COAST) (Info)

*Cruise Summary
+ Underway Data in
R2R Catalog*

Marine Geoscience Data System: Seismic Field Data

www.marine-geo.org/tools/search/SeismicField.php?id=MGL1212

MGL1212 MGDS Seismic Field Data

Seismic Metadata

- [Seismic Acquisition Parameters](#)
- [Seismic Line Information \(MCS\)](#)

Seismic Field Data

Seismic SEGD Data

No LDEO Seismic shot time logs currently online.

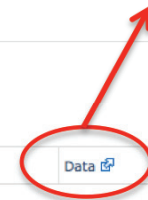
- [UKOOA - P190 Navigation Data \(Unprocessed\)](#)
- [UKOOA - P190 Navigation Data \(Processed\)](#)
- [UKOOA - P294 Acquisition Data](#)

Other Related Data

[Seismic Acquisition File \(TAR bundle of seismic information files - Spectra shot logs\)](#)

Attachments

- [Log:MCS Lines](#)
- [Log:Daily Field](#)
- [Log:MCS Observer Watch](#)
- [Log:Navigation Watch](#)
- [More Information:Cruise Blog \(HTML\)](#)
- [Report:Science:Cruise](#)
- [Report:Technical:MCS Sequence Configuration](#)
- [Report:Technical:MCS Tow Offset Configuration](#)
- [Report:Technical:Data Collection Summary](#)



*Seismic Data
in partner system*



Open Access

Goal: Provide R2R Catalog content that is

- Authoritative
(complete and correct, with persistent unique identifiers)
- Accessible
(lightweight, standard interfaces)
- Interoperable
(mapped to international / community vocabularies)

Open Access *(cont.)*

Publish Catalog content in multiple formats, per user demand:

1. ISO 19115-2 Metadata records

2. OGC Web Services

> *Session # 1, Talk # 2*

3. W3C “Linked Open Data” + SPARQL endpoint



4. DOI-DataCite Metadata records *(new!)*

all using standard vocabularies

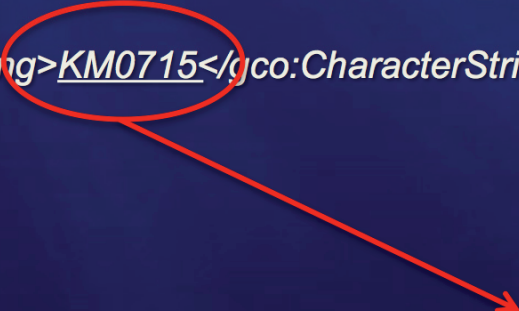
Open Access:

ISO Metadata

- R2R publishes *fieldSession* (Cruise) level records; eventually *series* (Dataset) and perhaps also *dataset* (File/Sample)
- Embed shiptrack geometry as GML object in Cruise record
- Replace *gco:CharacterString* (text) with *gmx:Anchor* (URI) for controlled vocabulary terms where possible eg.

```
<gmd:MD_Identifier>
  <gmd:code>
    <gco:CharacterString>KM0715</gco:CharacterString>
  </gmd:code>
</gmd:MD_Identifier>

<gmd:MD_Identifier>
  <gmd:code>
    <gmx:Anchor xlink:href="http://linked.rvdata.us/resource/cruise/KM0715"
      xlink:actuate="onRequest">KM0715</gmx:Anchor>
  </gmd:code>
</gmd:MD_Identifier>
```



Open Access: (cont.) ISO Metadata

Replace existing Web Folder with GeoNetwork Portal that offers

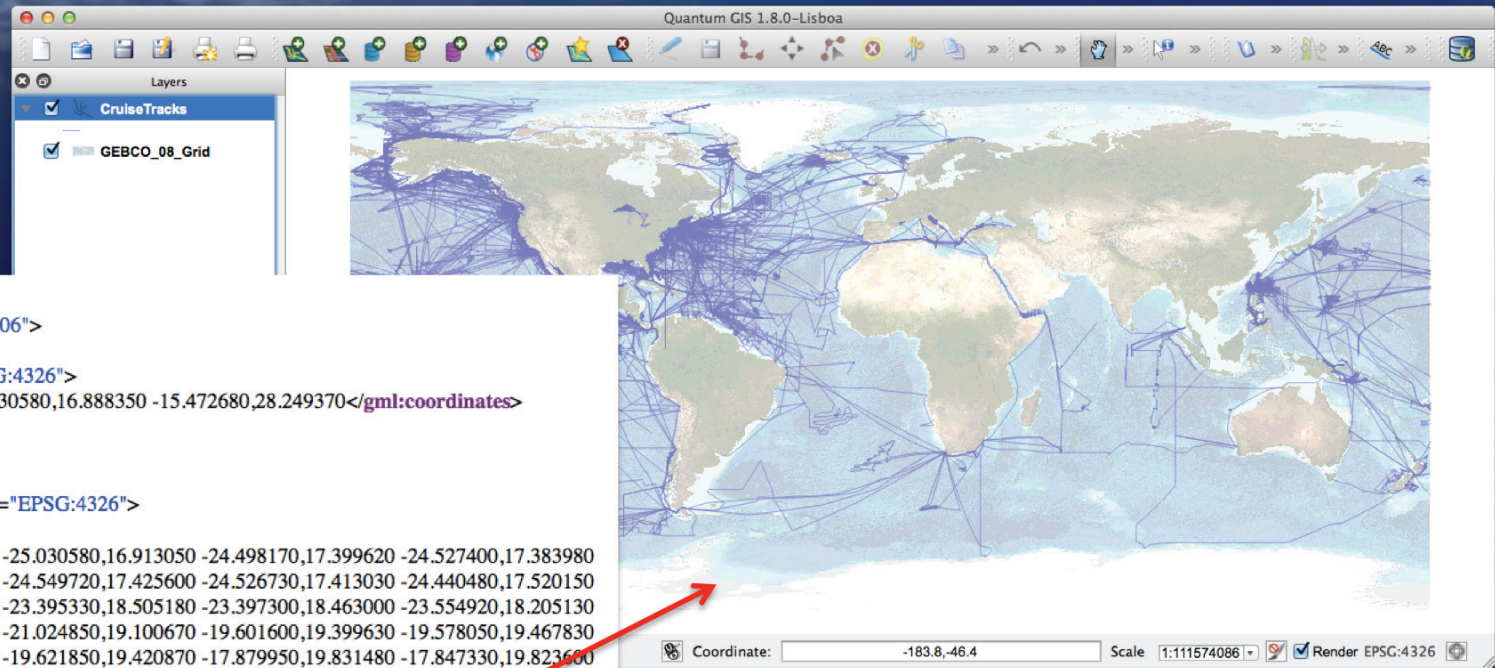
- standard Catalog access protocols (CSW, PMH, RSS, etc)
- record version control
- Chief Scientist login to edit records and add supplemental content

The screenshot displays the GeoNetwork OpenSource web portal. The browser address bar shows 'map.rvdata.us/geonetwork/'. The page header includes the 'GeoNetwork OpenSource' logo and the tagline 'Geographic data sharing for everyone'. Navigation links for 'Home', 'Contact us', 'Links', 'About', and 'Help' are visible. A search bar contains the text 'LatMix'. Below the search bar is a world map with a search icon and a '- Any -' dropdown menu. A 'Search' button is located to the right of the map. The main content area displays search results for 'LatMix', showing two records: 'CH0910' and 'EN494'. Each record includes an abstract, keywords, schema, and extent. The abstract for both records is 'Scalable Lateral Mixing and Coherent Turbulence (LatMix)'. The keywords are 'EARTH SCIENCE > Oceans'. The schema is 'iso19139'. The extent for 'CH0910' is '-76.68477 31.54495 -74.68410 34.71812' and for 'EN494' is '-76.70439 31.56873 -72.55811 34.71764'. A 'Metadata' button is visible below each record. The footer of the page includes the 'GeoRSS' logo.

Open Access: OGC Services

Publish Cruise track control points as Web Feature Service (WFS)
with embedded URIs

<http://get.rvdata.us/wfs?service=wfs&version=1.0.0&request=getcapabilities>



```
-<gml:featureMember>
- <ms:CruiseTracks fid="41770506">
- <gml:boundedBy>
- <gml:Box srsName="EPSG:4326">
- <gml:coordinates>-25.030580,16.888350 -15.472680,28.249370</gml:coordinates>
- </gml:Box>
- </gml:boundedBy>
- <ms:msGeometry>
- <gml:LineString srsName="EPSG:4326">
- <gml:coordinates>
-25.005000,16.888350 -25.030580,16.913050 -24.498170,17.399620 -24.527400,17.383980
-24.500900,17.400530 -24.549720,17.425600 -24.526730,17.413030 -24.440480,17.520150
-23.912350,17.992720 -23.395330,18.505180 -23.397300,18.463000 -23.554920,18.205130
-21.484170,19.018730 -21.024850,19.100670 -19.601600,19.399630 -19.578050,19.467830
-19.596120,19.386820 -19.621850,19.420870 -17.879950,19.831480 -17.847330,19.823600
-17.701220,19.888130 -17.449880,19.933680 -17.508020,19.918370 -17.544950,19.945230
-15.586400,28.249370 -15.472680,28.249120
- </gml:coordinates>
- </gml:LineString>
- </ms:msGeometry>
- <ms:CruiseID>OC449-03</ms:CruiseID>
- <ms:CruiseURI>http://linked.rvdata.us/resource/cruise/OC449-03</ms:CruiseURI>
- </ms:CruiseTracks>
- </gml:featureMember>
```

Cruise OC449-03
trackline
geometry

R2R Catalog
displayed in
QGIS desktop
client

Open Access: Linked Open Data



Example: Index to
Marine and Lacustrine
Geological Samples
(IMLGS)

IMLGS
Dredge record

IMLGS
Cruise record

link to Int'l Geo
Sample Number
(IGSN)

IMLGS
Platform record

link to R2R
Cruise ID

link to ICES
Ship Code

The screenshot shows three overlapping browser windows from the IMLGS Linked Data portal. The top window displays a 'Dredge record' for ECS:Healy:HLY1202:HLY1202-DR1:dredge, rock, with a table of properties and values. The middle window shows a 'Cruise record' for Healy HLY1202 Link(s), listing various properties like 'cruise_data_link' and 'cruise_link_level'. The bottom window shows a 'Platform record' for Healy, listing properties like 'platform_date_added' and 'platform_ices_code'. Red circles highlight specific values: '20120917' in the dredge record, 'HLY1202' in the cruise record, and '2009-12-29T00:00:00' and '317' in the platform record. Red arrows point from these circles to external links: 'link to R2R Cruise ID' (pointing to the cruise record), 'link to Int'l Geo Sample Number (IGSN)' (pointing to the dredge record), and 'link to ICES Ship Code' (pointing to the platform record).



Open Access:

Dataset DOIs



R2R policy to publish DOIs for

- original field datasets from ship's enviro sensors
- standard R2R products (quality-controlled navigation, geophysical profiles, etc)
- cruise reports submitted by chief scientists

DataCite provides int'l standard DOI metadata kernel, vocabularies, best practices

www.datacite.org



Vocabularies



Work ongoing to reconcile R2R terms with int'l/ standard terms from NERC Vocabulary Server eg.

- Map vessels to SeaVoX platform categories (L06) and ICES platform codes (C17)
- Map ports to SeaDataNet keyword types (L19) and gazetteer (C38)
- Map devices to SeaDataNet device categories (L05) and BODC device catalog (L22)
- Map data types to BODC parameter groups (P02) and units (P06)

vocab.nerc.ac.uk



Int'l Collaboration

R2R participates in global/ community forums

- Int'l Oceanographic Data and Information Exchange (IODE)
eg. Workshop on Data Publication, Oct. 2012
- Research Data Alliance (RDA)
eg. Interest Group on Marine Data Harmonization
- Ocean Data Interoperability Platform (ODIP)

> *Session # 1, Talk # 3*



R2R in ODIP



US NSF-funded work package includes:

- Capacity Building
 - Participate in ODIP Technical Workshops + Steering
 - Upgrade R2R infrastructure to publish content into existing int'l systems
- Promoting Standards and Emerging Technologies
 - Align R2R content with int'l metadata standard formats and vocabularies
 - Publish content as Linked Open Data
- Workforce Development
 - Engage students in ODIP workshops and prototypes



R2R in ODIP *(cont.)*



Use Case	Action
Expedition Planning	Publish R2R Cruise Summary Reports (SDN ISO) in GeoNetwork portal
Quality Control	Harmonize QC flags and parameter codes among eg. SAMOS, IODE-JCOMM, SeaDataNet
Event Logging	Harmonize formats and vocabularies among eg. EUROFLEETS and UNOLS/R2R
Time-series Integration	Publish met/ocean data from SAMOS as Linked Open Data, and map to Cruise datasets
Data Publication	Upgrade R2R DOI metadata to include geospatial extents and ORCID iDs





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