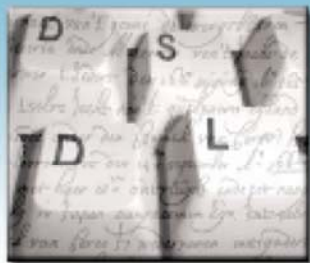


# The Digital Library as a Catalyst for Collaboration: Voyages Across Disciplinary and Institutional Boundaries with SIOExplorer

Stephen Miller  
Scripps Institution of Oceanography

Ardys Kozbial  
UCSD Libraries

Digital Scholarship / Digital Libraries  
Emory University, Atlanta  
November 2, 2007



DIGITAL SCHOLARSHIP  
DIGITAL LIBRARIES



Council on Library and Information Resources

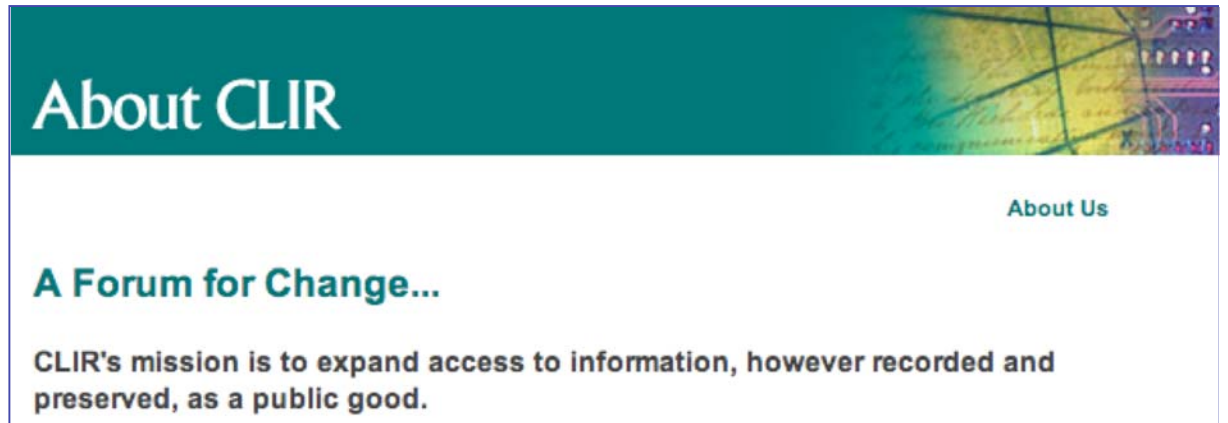


<http://www.metascholar.org/events/2007/dsd/>

# Researchers and Supercomputer Centers

Panel Discussion

Synergy



Faculty, Librarians, Information Technologists

Digital scholarship products

Digital library systems

“Best Practices” for collaboration

Lessons learned from case studies

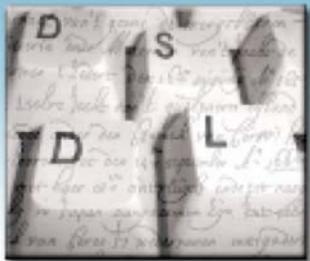
Strength, weakness of each community

Barriers to collaboration

Technical, social, financial

Ideal advances

Transformative technology and institutional relationships



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# What is SIOExplorer?

## Collaboration

Scripps Institution of Oceanography  
San Diego Supercomputer Center  
UCSD Libraries



John Helly,  
Computer Scientist, SDSC

Capt. Tom Desjardins,  
R/V Revelle



**SDSC**  
SAN DIEGO SUPERCOMPUTER CENTER



Deborah Day, Archivist, UCSD Libraries,  
Floating Digital Library Workshop, New Zealand - Samoa, 2002

# SIOExplorer Digital Library

Best practice -  
federated collections  
Cruises  
Photo archives  
Seamounts  
Educator's  
Geological samples

753 cruises  
102,000 digital objects

795,351 file downloads  
last year (206 GB)



THE NATIONAL SCIENCE DIGITAL LIBRARY

A screenshot of the 'Cruise Viewer v.2005050729' application window. The window title is 'A console for the SIOExplorer project'. It features a 'File Help' menu, an 'Expert Level' selector (1-4), and a search input field. Below the search field is a 'Collections' list with checkboxes for 'SIO Cruise collection', 'SIO Photo Archives', 'EarthRef Seamounts collection', 'Educator's collection', and 'SIO Marine Geological Samples'. A 'Submit Search' and 'Clear' button are at the bottom of this section. On the right, a 'Results' pane shows a tree view with 'Results (92443 files)', 'Cruises', and 'Seamount'. Under 'Seamount', several atolls are listed with their file formats and sizes: Kuria Atoll (.grd, 1446 KB), Kuria Atoll (.jpg, 262 KB), Tabiteuea Atoll (.grd, 0 KB), Tabiteuea Atoll (.jpg, 195 KB), Abaiang Atoll (.grd, 5770 KB), Abaiang Atoll (.jpg, 722 KB), Majuro Atoll (.grd, 5770 KB), and Majuro Atoll (.jpg, 624 KB). The main area is a map of the Pacific Ocean with a dense network of colored lines representing cruise tracks. A 'Tools' sidebar on the left contains icons for navigation and map manipulation. At the bottom, a status bar indicates 'Click and drag the mouse on the map to pan.', 'Map: Global Topography', and 'Latitude: -7.248 Longitude: 171.063'.

<http://SIOExplorer.ucsd.edu>

# Preserve the complete context of an expedition

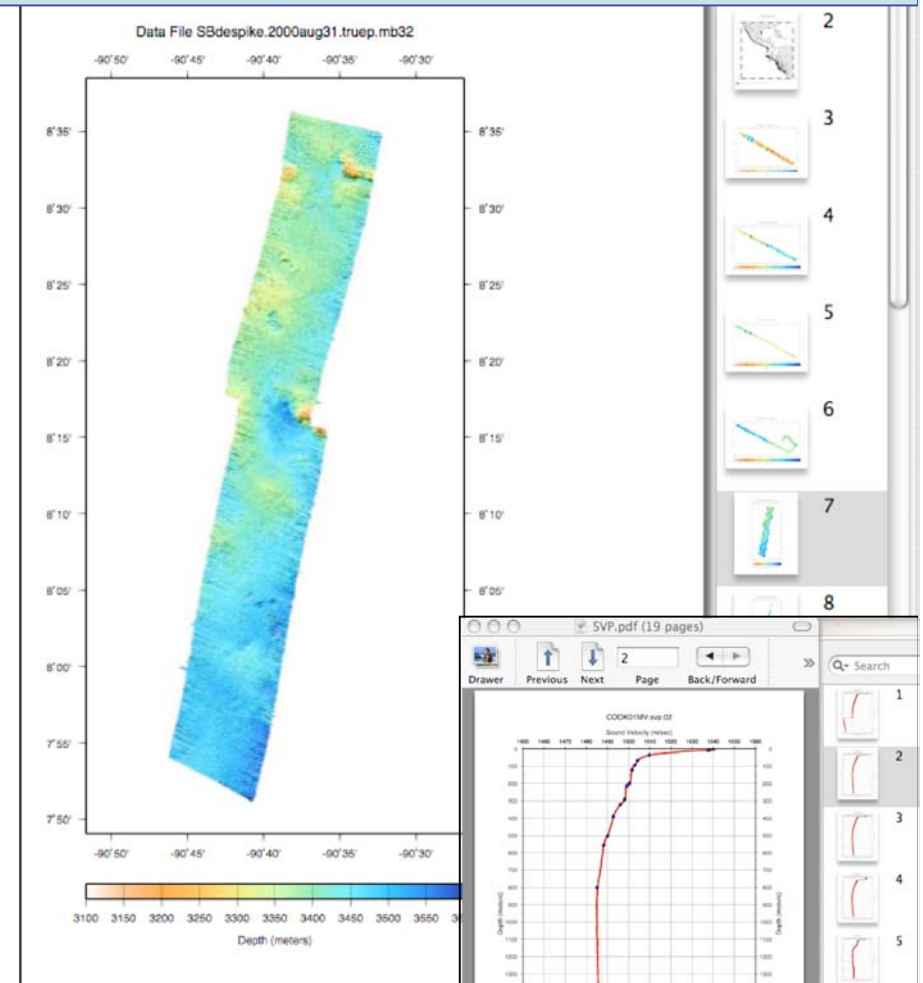
Best Practice - metadata and data to meet the unforeseen needs of future scholars

## Authoritative version of all cruise observations

Support multiple disciplines  
Quality controlled data and metadata  
“One stop shopping”  
All SIO cruises since 1950

## What's available

Reports  
Cruise, QC with profiles, logbooks  
Navigation  
Underway gravity, magnetics (mgd77)  
Multibeam swath data  
Also grids, plots, visualization files  
Subbottom profiler  
Current profiler ADCP, HDSS  
Meteorology  
XBT, CTD, SVP  
Samples



\*\*\* Hydrocast - GoFlow \*\*\*

0446 260800 0 HCGF B Go FLOW rinse

0604 260800 0 HCGF E Go FLOW rinse

UCSC 17-13.79N 107-44.33W g COOK01MV

UCSC 17-14.53N 107-43.53W g COOK01MV

# 6 Case Studies

## Digital Library as Catalyst

1. Enabling new data products
2. Enabling new activities - UN Law of the Sea
3. Multi-institution archiving
4. Supporting “big international science”
5. Advancing the academic fleet
6. Building a community - Marine Metadata

# 1. Enabling new data products

Perhaps most widely used Earth science data product of the decade

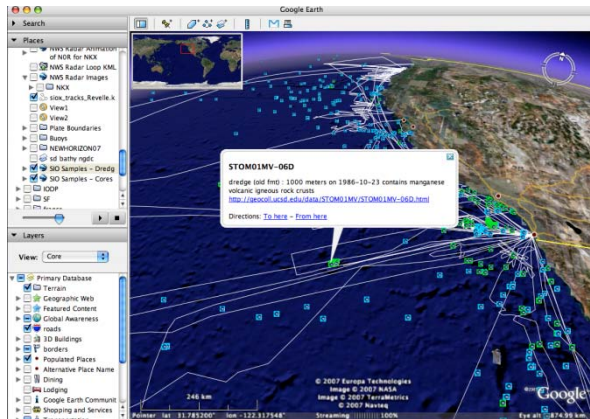
Global Topography model

Combine satellite altimetry with ship depth soundings

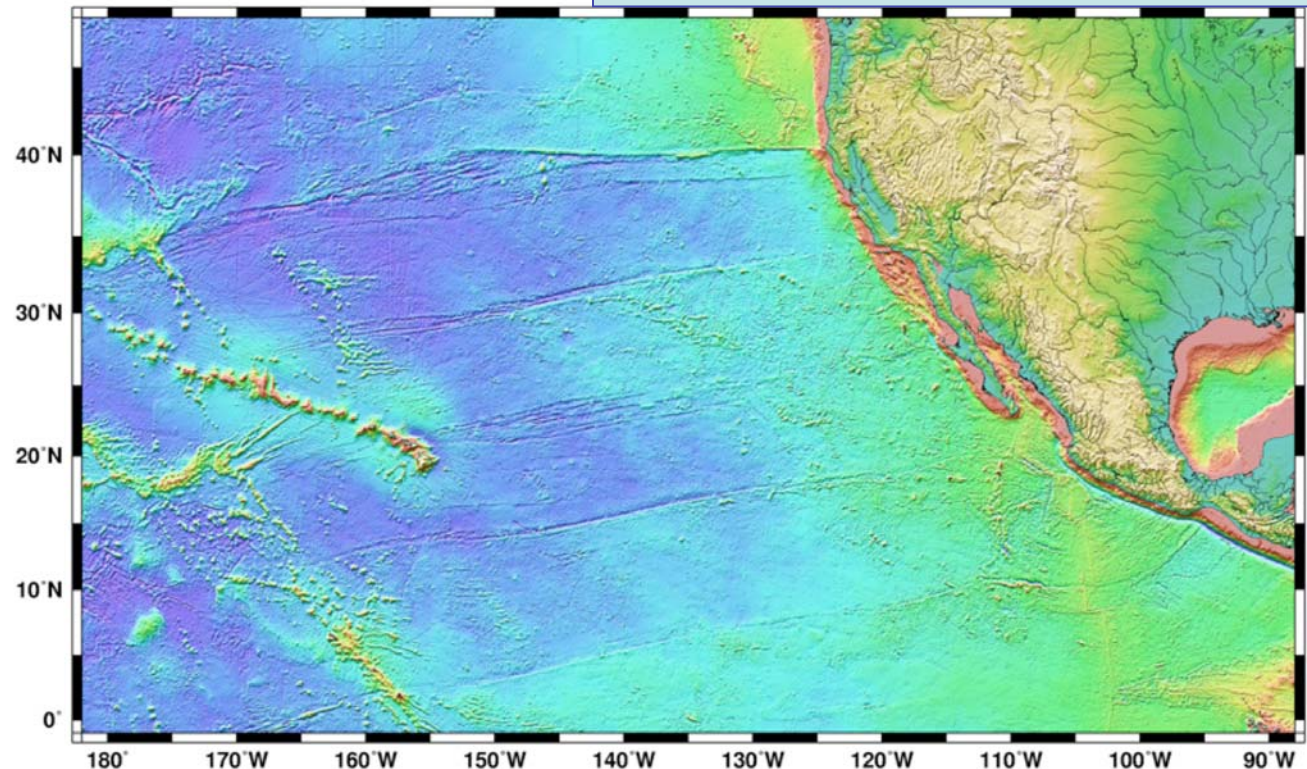
First generation was immense effort

Second generation easily mined multibeam sonar from digital library

Transform faculty research



Common basemap in journal articles and Google Earth

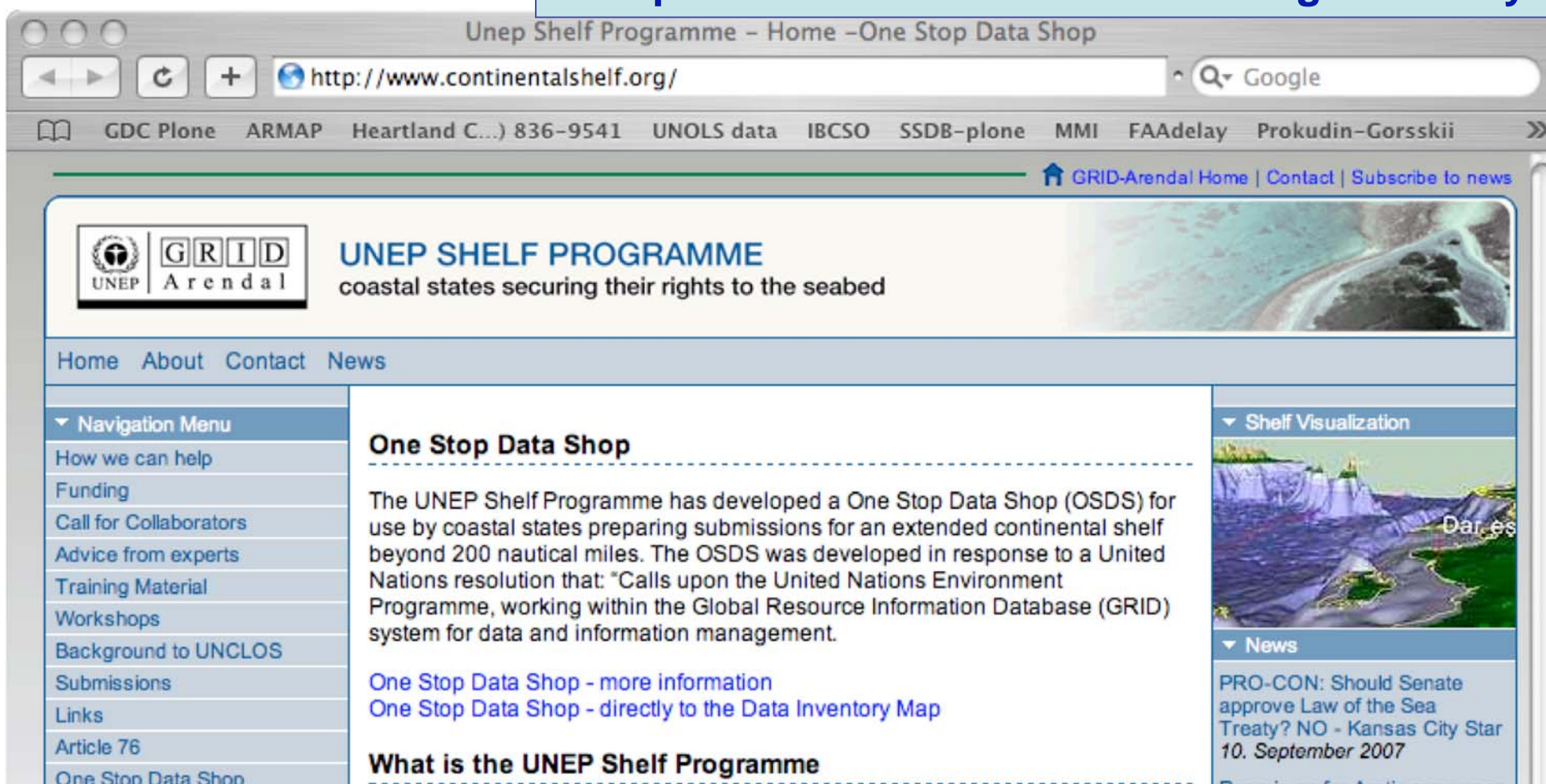




## 2. Enabling new activities - UN Law of the Sea

Previously, nations had to track down data from researchers  
United Nations Environment Programme has harvested data from SIOExplorer  
Helps guide claims, especially for less developed nations

**New product created at no cost to digital library**



The screenshot shows a web browser window with the address bar displaying <http://www.continentalshelf.org/>. The browser's address bar also shows a search engine (Google) and a search button. The browser's address bar also shows a search engine (Google) and a search button. The browser's address bar also shows a search engine (Google) and a search button.

The website header includes the UNEP logo and the GRID-Arendal logo, with the text "UNEP SHELF PROGRAMME" and "coastal states securing their rights to the seabed". The header also includes a navigation menu with links for "Home", "About", "Contact", and "News".

The main content area features a "One Stop Data Shop" section. The text in this section reads: "The UNEP Shelf Programme has developed a One Stop Data Shop (OSDS) for use by coastal states preparing submissions for an extended continental shelf beyond 200 nautical miles. The OSDS was developed in response to a United Nations resolution that: 'Calls upon the United Nations Environment Programme, working within the Global Resource Information Database (GRID) system for data and information management.'"

Below the main text, there are two links: "One Stop Data Shop - more information" and "One Stop Data Shop - directly to the Data Inventory Map".

The sidebar on the left contains a "Navigation Menu" with the following items: "How we can help", "Funding", "Call for Collaborators", "Advice from experts", "Training Material", "Workshops", "Background to UNCLOS", "Submissions", "Links", "Article 76", and "One Stop Data Shop".

The sidebar on the right contains a "Shelf Visualization" section with a 3D map of a coastal shelf and a "News" section with a headline: "PRO-CON: Should Senate approve Law of the Sea Treaty? NO - Kansas City Star 10. September 2007".

# 3. Multi-Institution Archiving

Impossible without help of WHOI Library

Integrate  
SIO, SDSC, WHOI  
tools and data

30 years of WHOI cruises  
4258 Alvin submersible  
dives  
Jason ROV surveys

Add SIO Deep Tow

Interoperable  
digital libraries  
SIO  
WHOI  
Oregon State



# 4. Supporting “big international science”

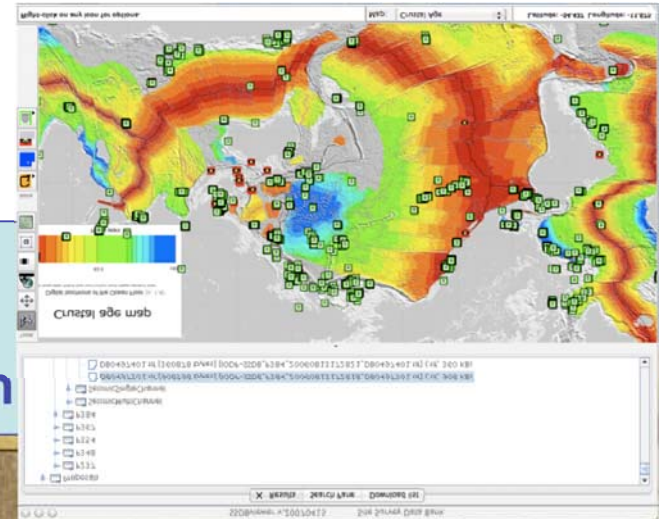
## Integrated Ocean Drilling Program (IODP)

1000 scientists, 40 nations, \$144M budget FY2008

Japan invests \$600M in new drilling vessel

Enable decades of collaboration

Ideas, proposals, research, operations, education



**IODP**  
INTEGRATED OCEAN  
DRILLING PROGRAM

Glossary | Newsletter | Search | Site Map | Login

Home | About IODP | Funding Agencies | IODP-MI | SAS | IOs | Program Partners | Calendar | Contact

*The Arctic Coring Expedition armada—drillship and icebreakers—near the North Pole.*  
Photo credit: IODP, by Martin Jakobsson.

Explore Our Mission  
Ships/Platforms  
Expeditions  
Scientific Publications  
Meeting Reports  
News/Media  
Education  
Initial Science Plan  
FAQ  
Glossary

NEWS HIGHLIGHTS | CURRENT EXPEDITIONS | FEATURED PUBLICATIONS | EVENTS

# Site Survey Data Bank

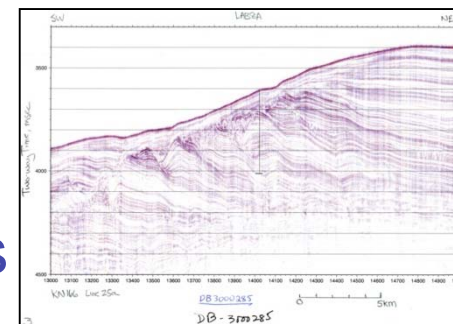
Based on SIOExplorer technology

Proponents upload data across Internet

Replace tons of analog documents

Avoid paper shuffle during review panels

**SDSC**  
SAN DIEGO SUPERCOMPUTER CENTER



**Transformative Technology - convert physical archives to digital library system**



<http://ssdb.iodp.org>

# 5. Advancing the academic fleet

## University-National Oceanographic Laboratory System (UNOLS)

Forum for funding agencies, operators, scientists

61 member institutions

27 research vessels

Submersibles (manned and unmanned)

Towed vehicles

Aircraft

Seafloor instruments

**Opportunity for national approach**  
**UNOLS Committee on Data Management**  
**Best Practices <http://data.unols.org>**



**Research Vessels,  
Aircraft & Facilities**



**About  
UNOLS**

**Committees**

**Meeting Calendar  
& Information**

**Publications &  
Reports**

**UNOLS Office**  
Moss Landing Marine Laboratories  
8272 Moss Landing Road  
Moss Landing, CA 95039

Phone: (831) 771-4410  
Fax: (831) 632-4413

# 6. Building a community - Marine Metadata

More than 350 working scientists, worldwide

Common Body of Knowledge

Social, technical networking

Clearinghouse for  
Guidance  
Case Studies  
Content resources  
Standards  
Tools

<MMI /> Marine Metadata Interoperability

you are here: home → guides

navigation

- Home
- For Scientists
- For Developers
- For Everyone
- Guides
- Getting Started with Metadata
- Metadata standards
- Vocabularies: dictionaries, ontologies, etc
- Technical Tools
- MMI Case Studies
- What's new in the MMI Guides?
- References
- Projects
- General Information
- Contact Us
- Events
- Add Content

news

UNOLS Research Vessel Metadata Survey

MMI Guides

Resources to help you navigate the world of marine metadata

Welcome to the MMI Guides

In the pages that follow, you'll find information about standards, controlled vocabularies, technical tools, case studies, and much more. Each of these documents has been prepared by practicing scientists and technologists. The guides are designed to share with you our experience, and our 20/20 hindsight.

If, in the process of reading our guides, you need additional information, or if you'd like contribute your experiences with marine metadata, [please let us know!](#)

We hope you find this section informative and useful

– MMI Guides Editorial Group

by [Caryn Neiswender](#) — last modified

Related content

- Table of Contents
- Getting Started with Metadata
- Metadata standards
- Vocabularies: dictionaries, ontologies, etc
- Technical Tools
- MMI Case Studies
- Additional Resources
- Acronym Dictionary
- What's new in the MMI Guides?

Log in to add comments

Opportunity for librarians to join collaboration

<http://marinemetadata.org>

This was all good news so far ...



Analyze our strengths and weaknesses

What are the barriers?

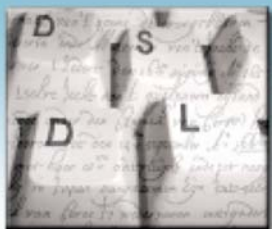
Technical

Social

Financial

# Our strengths and weaknesses

Collaboration Scorecard	Faculty	Library	Information Technology (CS)
Research frontier rapid response	Green	Orange	Green
Approach external funding agencies	Green	Orange	Green
Metadata and information technology	Red	Green	Green
Sustainability	Red	Green	Red
Work collaboratively	Red	Green	Red
Heritage of preservation	Red	Green	Red
Others to be added in discussion ...			



DIGITAL SCHOLARSHIP  
DIGITAL LIBRARIES



# Competencies Leveraged

Faculty	Libraries	SDSC
<ul style="list-style-type: none"><li><input type="checkbox"/> Domain expertise</li><li><input type="checkbox"/> Data collection</li><li><input type="checkbox"/> Taxonomies</li><li><input type="checkbox"/> Ontologies</li><li><input type="checkbox"/> Data reuse</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Archives</li><li><input type="checkbox"/> Metadata management</li><li><input type="checkbox"/> Discovery tools</li><li><input type="checkbox"/> Culture of service</li><li><input type="checkbox"/> Culture of trust</li><li><input type="checkbox"/> Project management</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Grid storage</li><li><input type="checkbox"/> Grid services</li><li><input type="checkbox"/> Data management</li><li><input type="checkbox"/> Data preservation</li><li><input type="checkbox"/> Format migration</li><li><input type="checkbox"/> Data mining</li></ul>

# What Libraries Bring to the Table

- Data acquisition, ingest layer
  - Selection, taxonomy, ontology, metadata, workflow
- Preservation layer
  - Archival retention, format migration, quality assurance, trust
- Physical layer
  - Storage, network security, reliability standards
- Service layer
  - Discovery, retrieval, data mining, data visualization
- Management layer
  - Administration, budget, policy, development

# Library Strengths

- Significant expertise
  - Metadata
  - Archival management
  - Policy development
- Organizational experience and stability
  - Process and results driven
- Culture of trust
  - Responsible guardians of the cultural record
  - Service oriented
  - Respectful of privacy and intellectual property

# Technical obstacles

Data complexity

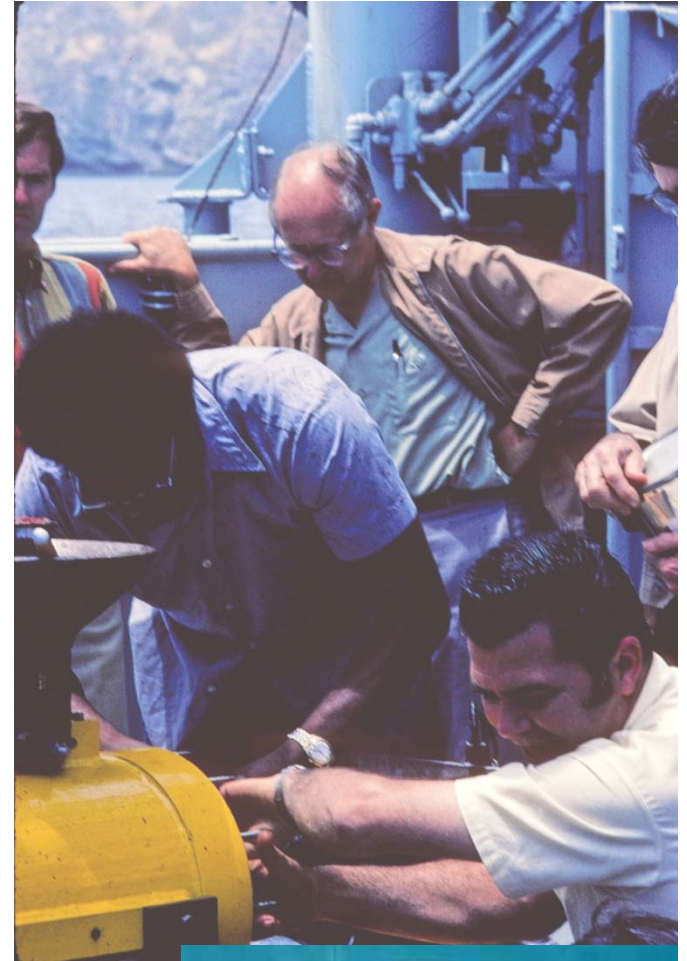
More challenging than data volume

Data quality

Preservation

Metadata quality

Auto-harvesting and collection building



**Endangered species**

# Social obstacles

Very few people love metadata

Lack of communication

Scientists and librarians

**Advances may come with next generation**

Lack of metadata sophistication

Data providers

Data users

“Not invented here” syndrome



# Financial obstacles



Competition for limited resources

Conflict archiving vs. new field programs

NSF success ratio 15%

Sustainability

Research grants 1-3 years

Preservation treated as emergency activity

# State-of-the-Art Advances



2001 research community alone



2007 research/supercomputer/library collaboration



# Looking Forward: New Organizational Structure

- Digital Preservation Initiatives
  - Intersection of UCSD Libraries and SDSC
  - Part of Production Services at SDSC
  - Team members: David Minor, Robert McDonald, Chris Jordan, Ardys Kozbial
  - Working across departments in teams



# Looking Forward: Tensions

- Customer infatuation with technology
  - LC pilot project
  - Mass Transit with CDL
- Unfunded mandate
  - California Cooperative Oceanic Fisheries Investigations
  - A project fraught with possibilities



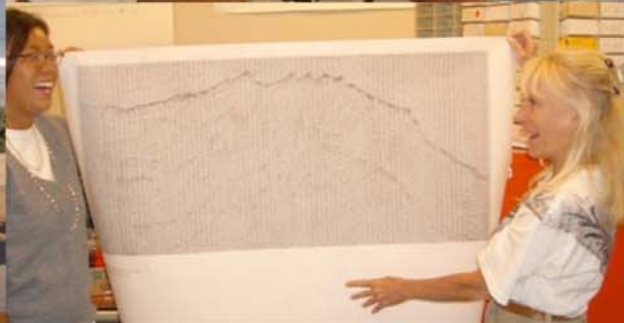
GDC

Geological Data Center



SDSC  
SAN DIEGO SUPERCOMPUTER CENTER

# It's a group effort ...



The LIBRARY of CONGRESS