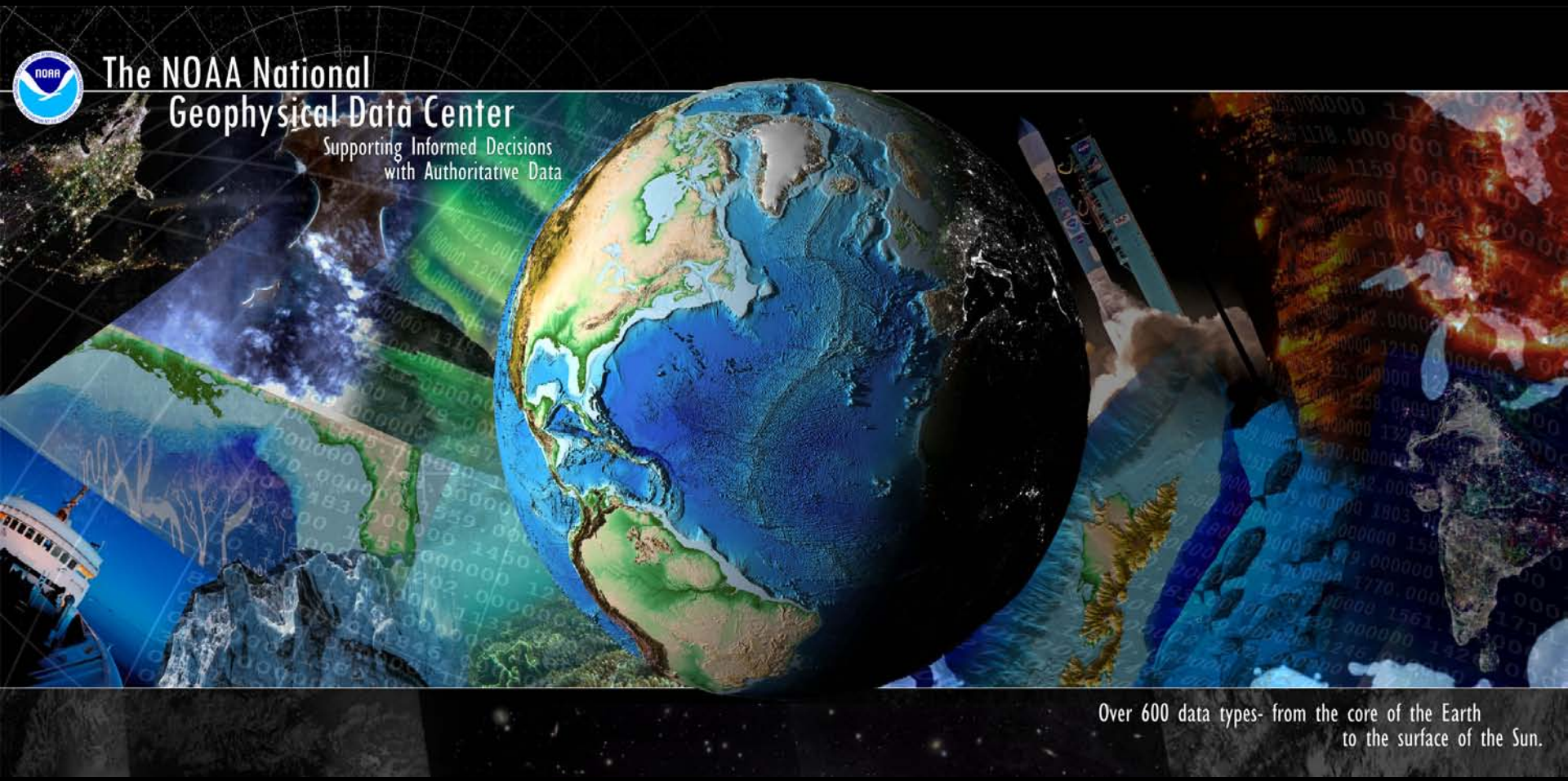
U.S. Department of Commerce

National Oceanic & Atmospheric Administration

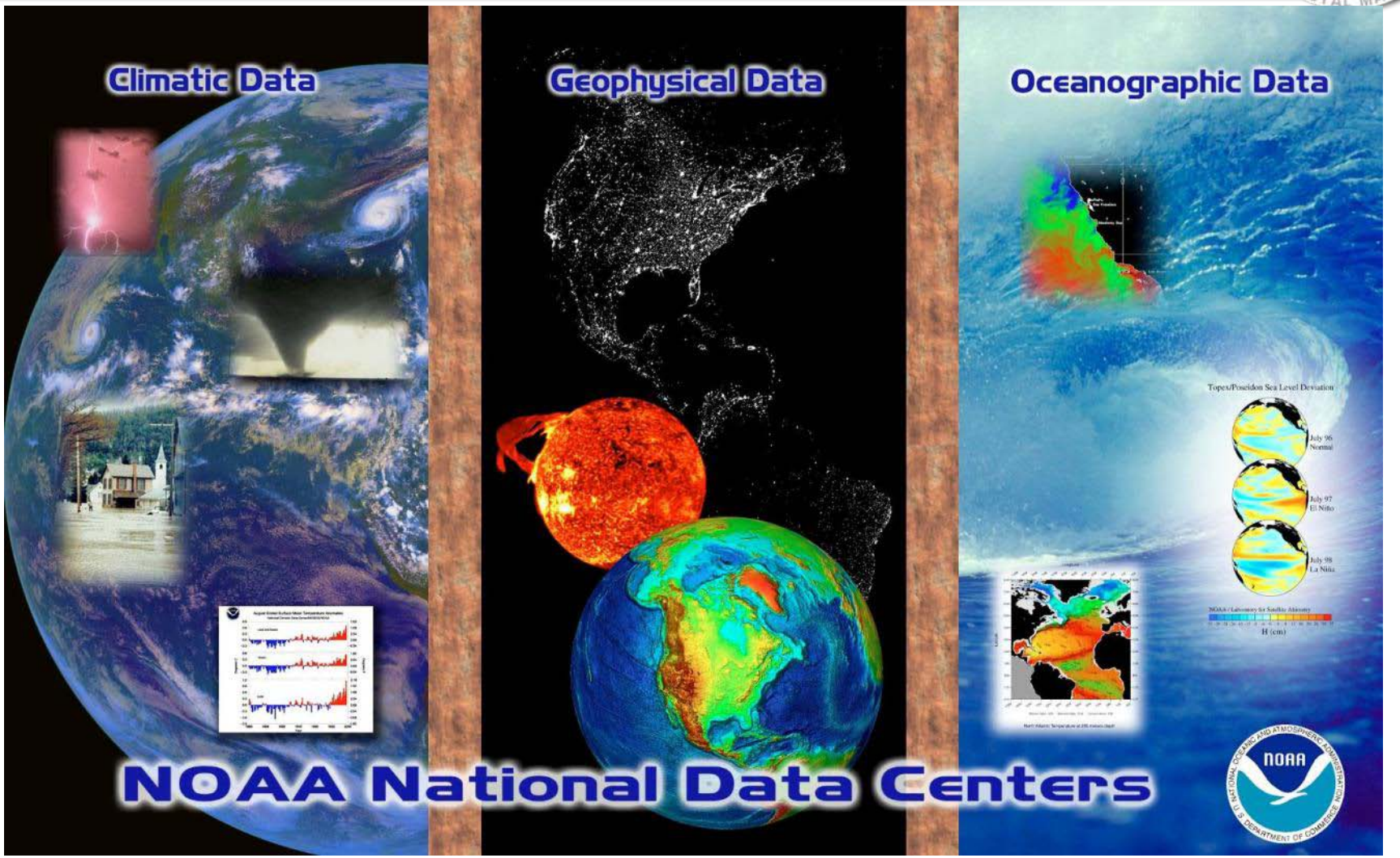


http://www.ngdc.noaa.gov/

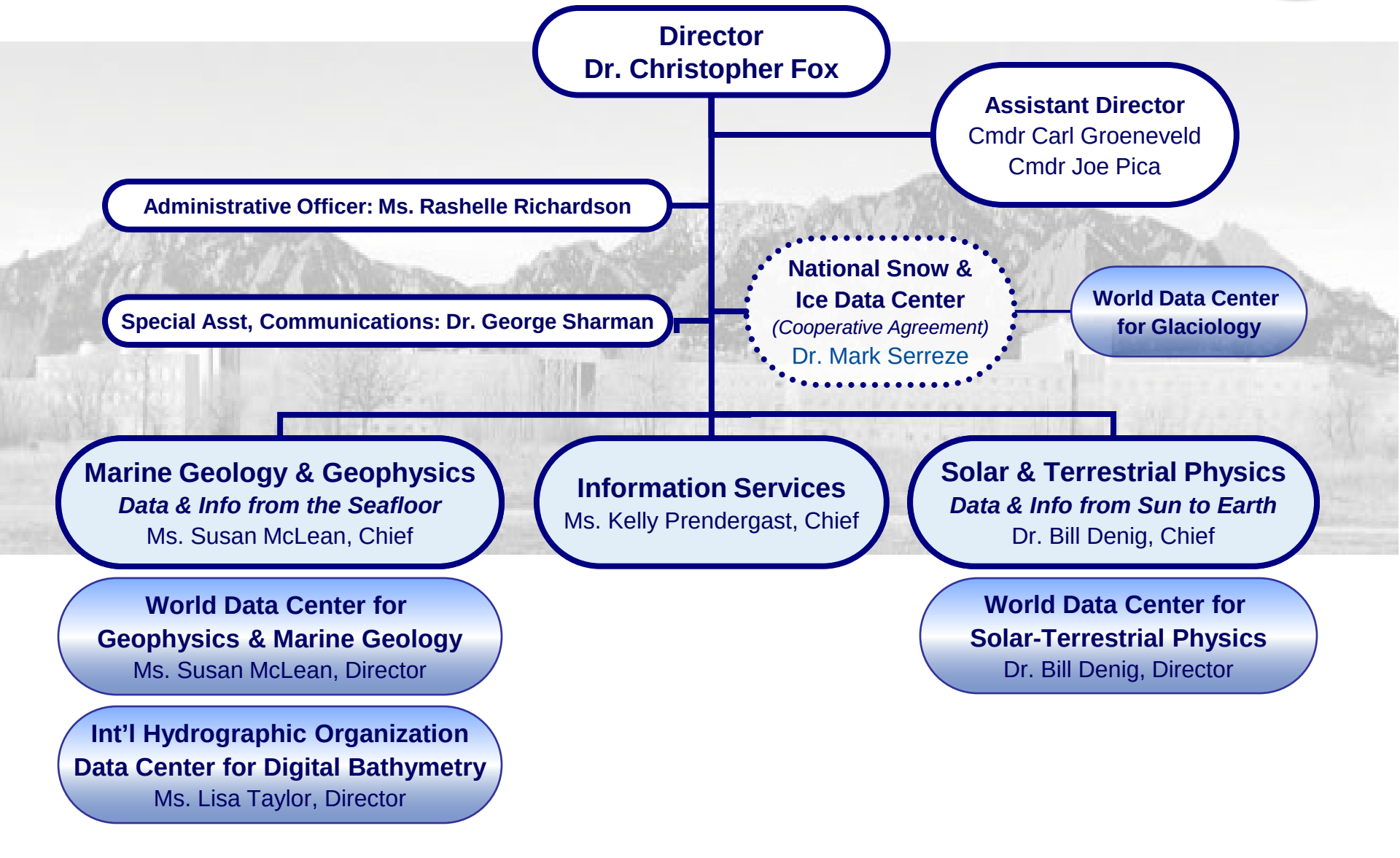
Outline

- Who are we?
  - NGDC's purpose, goals, and mission in context of OCM
- Geospatial Data Lifecycle
  - Primary and supporting roles
- OCM Data Types and Sources
  - Elevation data
  - Surface / subsurface data
- Success stories

NOAA National Data Centers



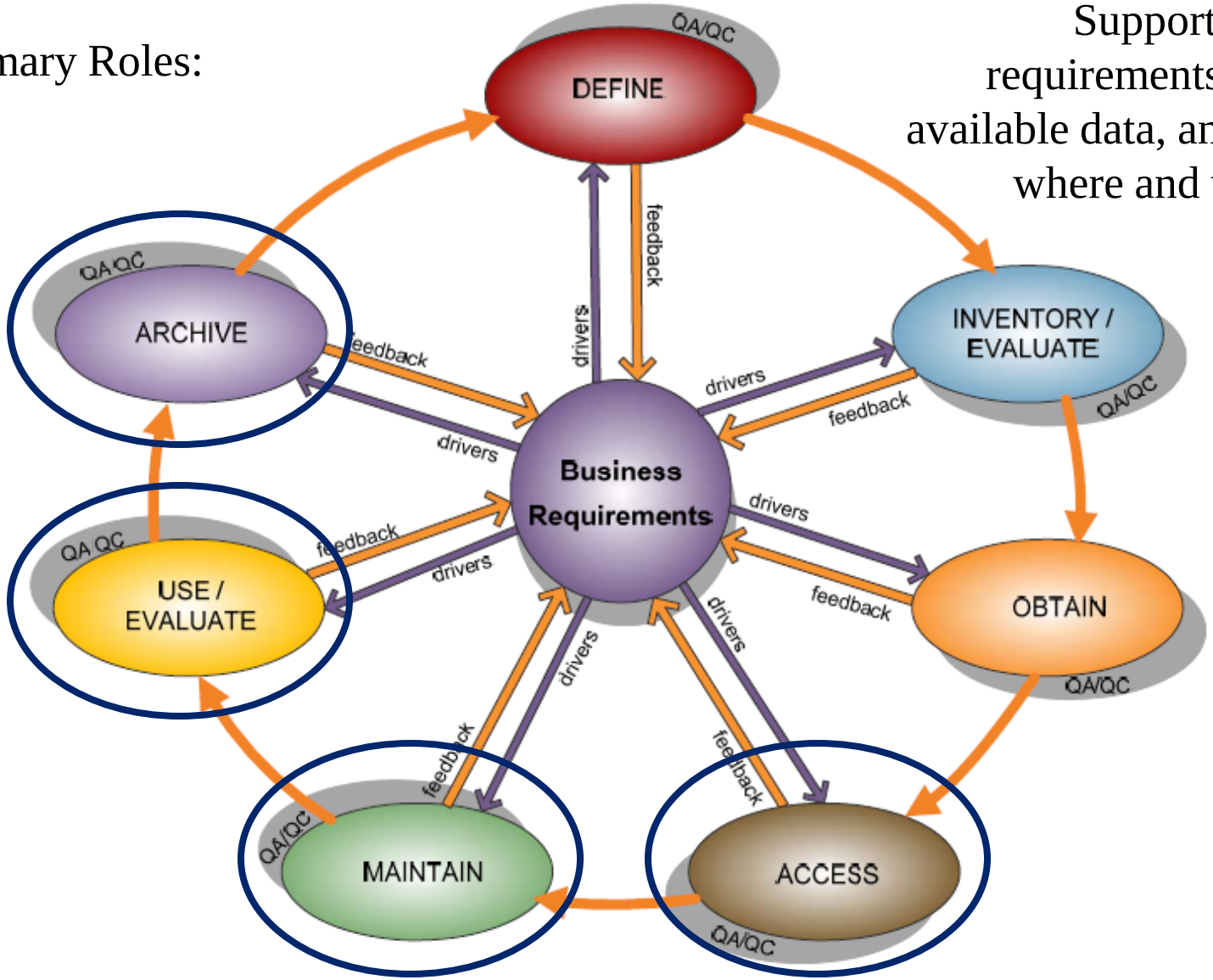
NGDC Organization



Geospatial Data Life Cycle – NGDC Primary Roles

Primary Roles:

Support *defining* data requirements, *inventorying* available data, and determining where and what to *obtain*

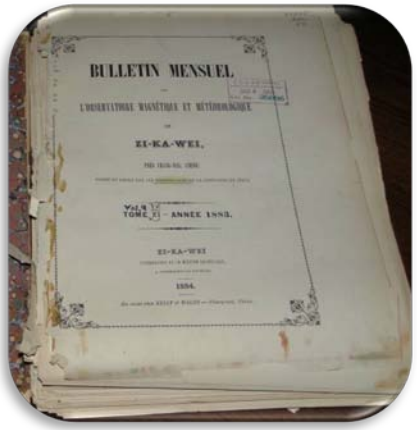


Data Archive - Mandates

Archive

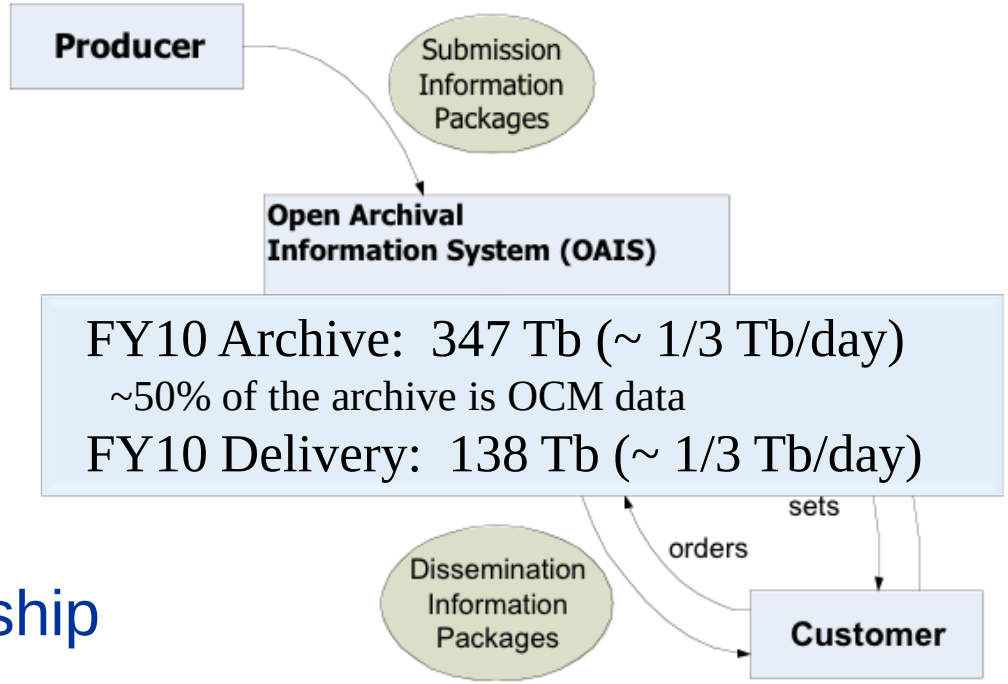
U.S. National Long-Term Archive for marine geological & geophysical data

- *P.L. 373 – **Data collection and stewardship for hydrographic, topographic, tides, currents, geodetic, geomagnetic, gravity, seismological* and "related" data***
- *NSF Ocean Sciences Data & Sample Policy – **Archive for UNOLS / R2R***
- *NOAA Admin Order 212: Management of Environmental & Geospatial Data & Information – **Archive for NOAA Geophysical Data***
- ***New: NOAA Rolling deck To Repository –*** new procedures to prevent the inadvertent loss of non-navigation specific geophysical data acquired aboard all NOAA ships



Data Archive - Standards

- Comply with NARA standards for Archive
  - Physical Environment
  - Two Copies
  - Data Security
  - Media Migrations
  - Exercising the Archive
- Adopted the Open Archival Information System (OAIS) Reference Model – partnership for data management
  - Responsibilities and functions
  - Ensure information preserved and independently understandable



Partnership between data provider, archive, and data user

Partnership with Users

Use / Evaluate

- Metadata as means to convey use / limitations
  - Annual review of metadata to ensure accurate
- Support customer queries, provide technical reports, tools, and derive products
  - We are users as well as providers for our data
- Gaps / areas for improvement
  - Common vocabulary (ship names, instruments, CS/PI, data type, etc.)
  - Community-agreed upon quality indicator for OCM data, i.e. red-orange-yellow-green
  - Consistency

Ensuring Viability – 100 year goal

Maintain

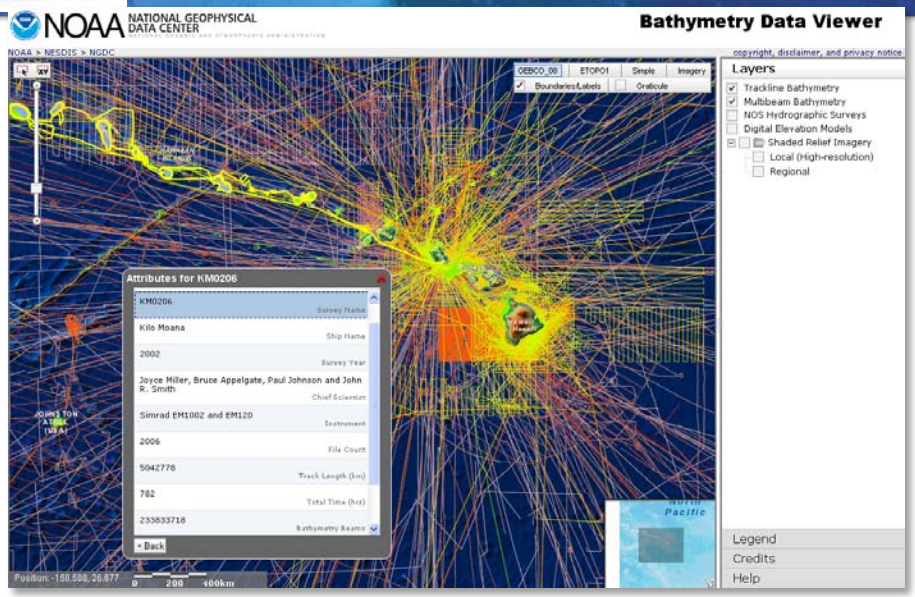
- Follow standard procedures for retention, migration (media and format), verification, and review of archive
- Regular, planned cycle for hardware and software maintenance
- Configuration control for data, hardware, and software
- Business plan and external reviews
  - GAP: Open-source archive formats

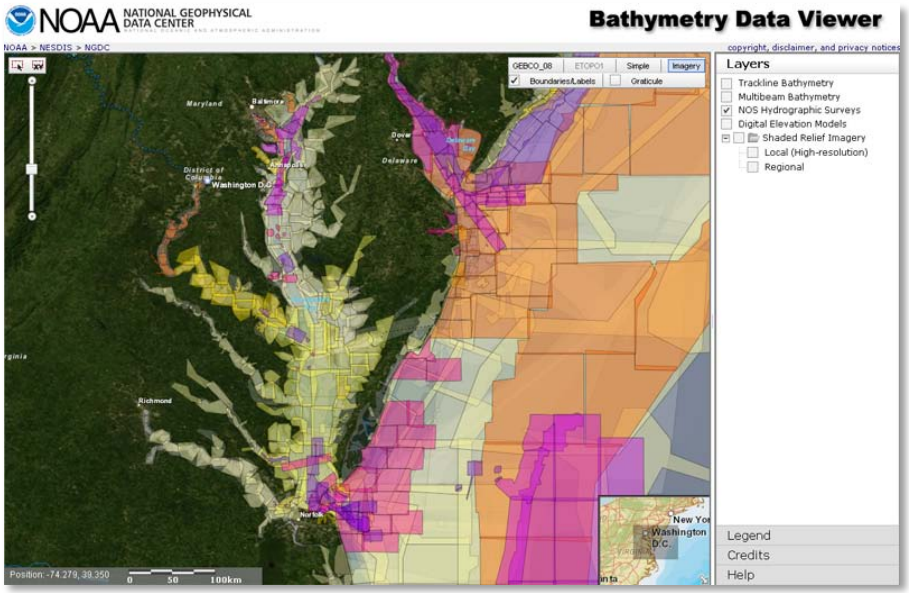
Delivering Data to the User

Access

- Infrastructure Investments
  - 10 Gigabits/second bandwidth to deliver data
  - 140 servers for ingest, archive, delivery of data
  - Robotic tape system and dual archive
- Spatially-enabled databases
- Standards-based web services
- Validate metadata in FGDC / ISO standards
- Employ community and common data formats
  - GAP: Adopt open-source delivery formats

Improving Delivery Services



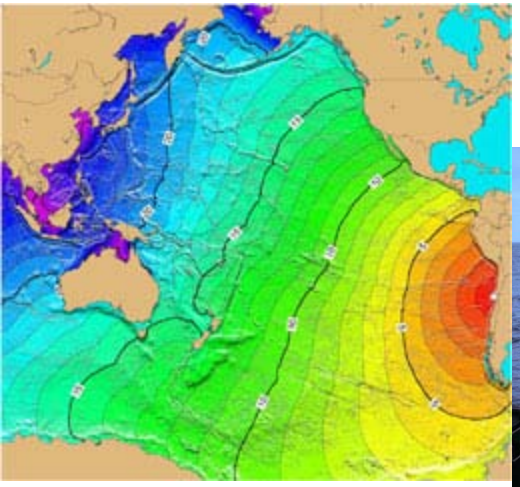


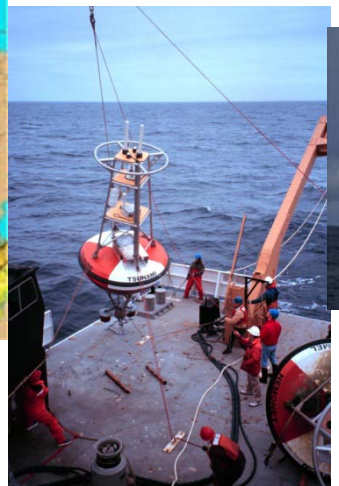
- ESRI ArcGIS Server map services (replacing ArcIMS services)
- Map services accessible via standards-based interfaces:
  - REST
  - SOAP
  - WMS
  - WFS
- Implemented using the ArcGIS JavaScript API
- Improved speed, search capabilities, and cartography

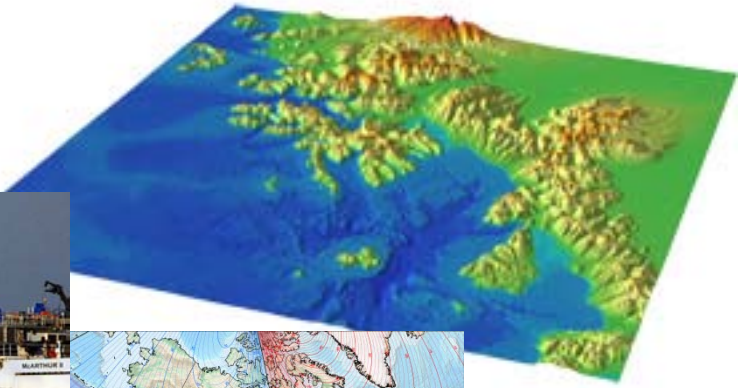
What Data Do We Manage?

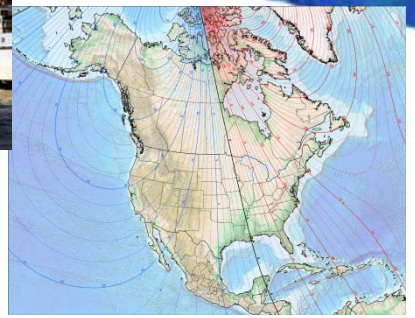
NGDC's MGG Division provides long-term scientific stewardship for geophysical data supporting:

- Coastal hazard warning & mitigation
- Ocean & coastal mapping
- Definition of the U.S. outer continental shelf
- Magnetic field modeling





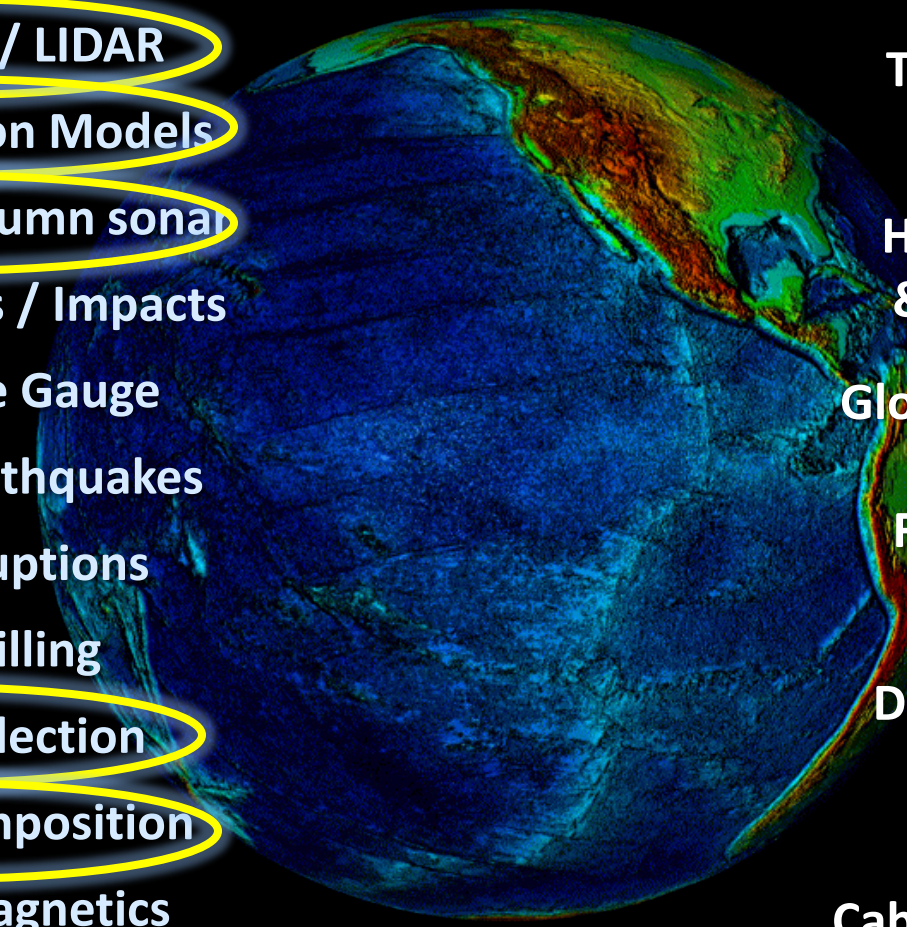




Data & Information

DATA TYPES

- Bathymetry / LIDAR
- Digital Elevation Models
- SSS / Water column sonar
- Tsunami Events / Impacts
- DART & Tide Gauge
- Significant Earthquakes
- Volcanic Eruptions
- Ocean Drilling
- Seismic Reflection
- Sea Floor Composition
- Gravity & Magnetics
- Magnetic Field Models



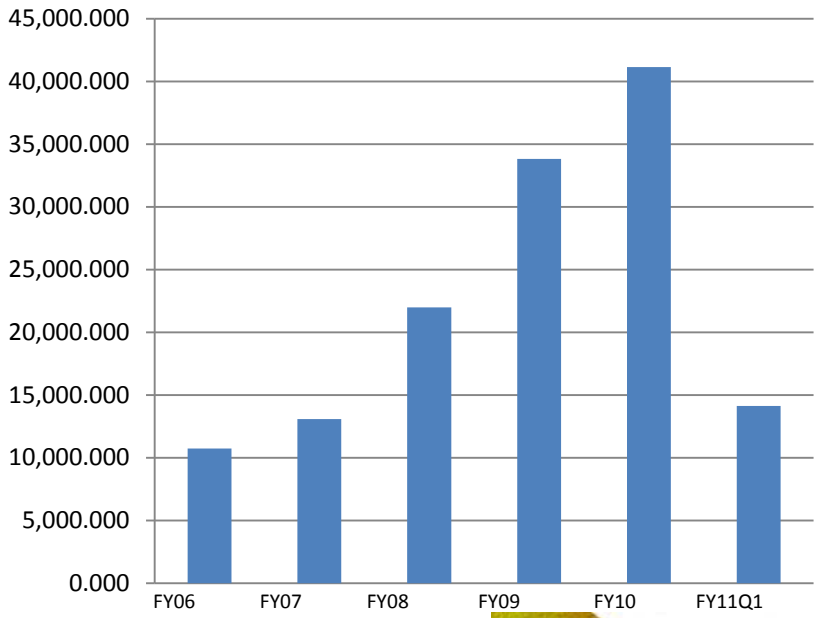
APPLICATIONS

- Tsunami Inundation Modeling
- Hazards Assessment & Economic Impact
- Global Change Research
- Fisheries / Habitats
- Ocean Mapping
- Defense Applications
- Navigation
- Cable & Pipeline Routing
- Minerals Exploration

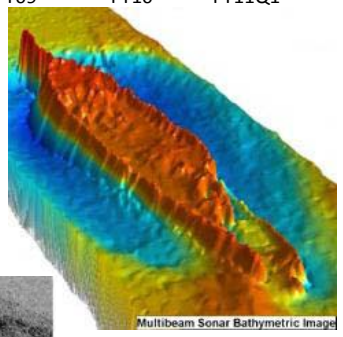
NOS Hydrographic Survey Data

Covering the U.S. coastal waters and EEZ

- 128.77 TB in Archive
- 2.8 TB of Current Online Holdings
  - 1.1 TB of Products
  - 1.7 TB of GSF Data



- 7,049 Surveys (300+ in the last year alone)
  - 84 Million Soundings
  - 435,429 Features
- 3,072 Bathymetric Attributed Grid (BAG) Files (1,800 in the last year alone)
- 9,562 NOS Descriptive Reports
- 23,400 Final Smooth Sheet Images
- 16,425 Records in the Hydrographic Survey Metadata Database

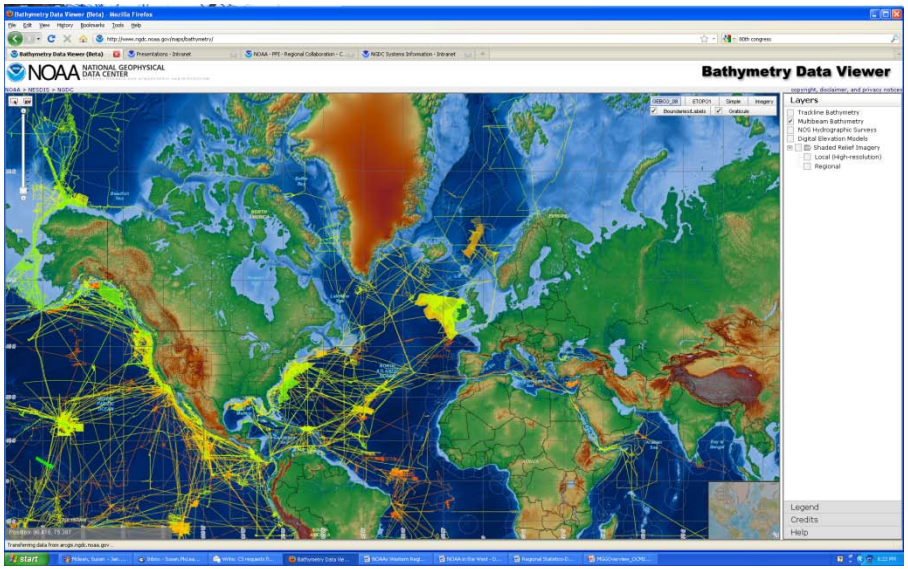

Multibeam Sonar Bathymetric Image

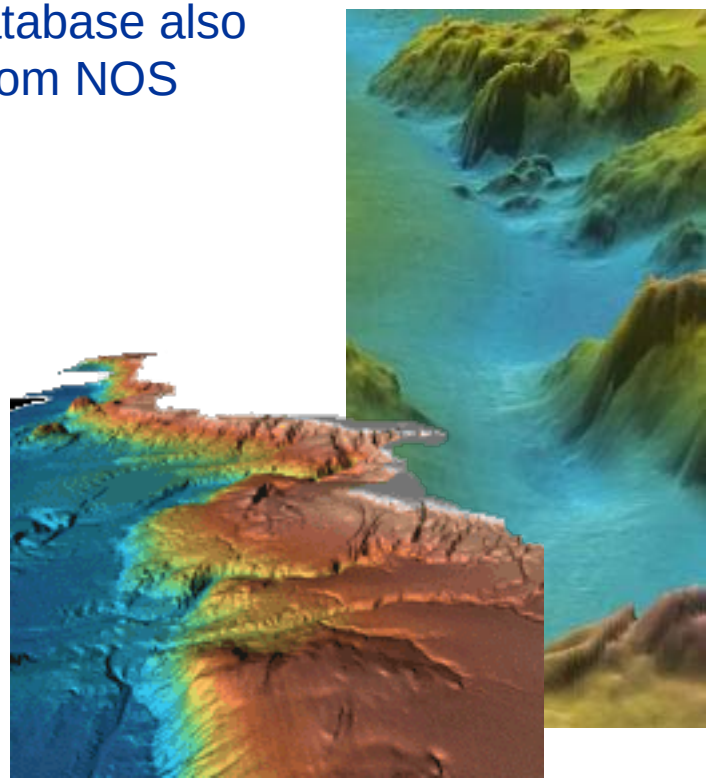

Side Scan Sonar Image

Multibeam Bathymetry

Blue water, UNOLS, and international data (non-navigation)

- +9.6 million nautical miles of ship tracklines from +1,490 surveys
- In addition to deepwater data, the multibeam database also includes hydrographic multibeam survey data from NOS
- UNOLS R2R National Archive





http://www.ngdc.noaa.gov/maps/bathymetry/

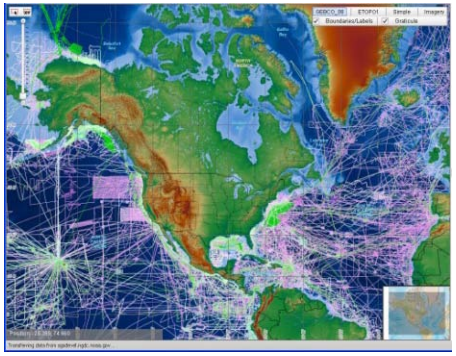
IHO Data Center for Digital Bathymetry

NGDC operates a worldwide digital data bank of oceanic soundings on behalf of the Member Countries of the International Hydrographic Organization (IHO)

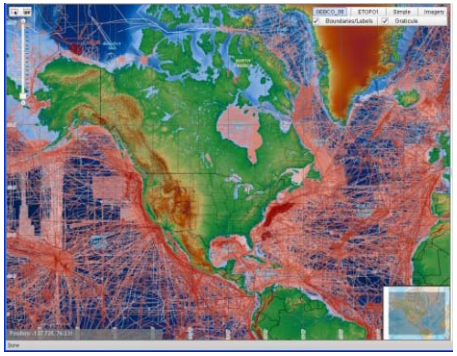
- Focuses on oceanic regions with depths greater than 100 meters
- Provides data free of charge to the IHO Member's international projects
- Quality control check for physical principles and metadata
- Maintenance of digital inventories for bathymetric data
- Collaboration with international organizations on exchange formats and standards to expedite bathymetric data exchange

http://ngdc.noaa.gov/mgg/bathymetry/iho.html

Marine Geophysical Trackline Data

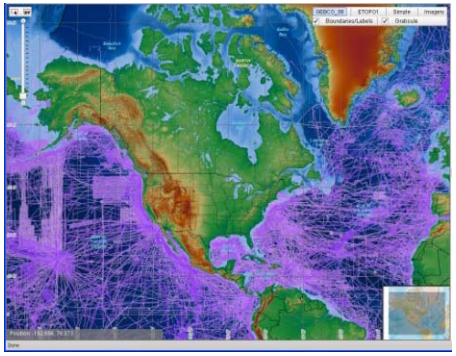


Seismic



Bathymetry

Gravity



Magnetics

	Number of cruises	Trackline miles (millions)	Digital MGD77 records (millions)
Bathymetry (single beam)	5017	16.2	50.8
Magnetics	2712	8.9	24.4
Gravity	1907	6.7	22.3
Seismic	1522	6.2	digital & analog
TOTAL HOLDINGS	**5465**	**18.5**	**75.6**

Marine Geophysical Trackline Data

RECENT (5 yrs) contributors of data

Cruises	Contributor
85	New Zealand
77	Australia
53	Japan
19	Brazil
16	U of New Hampshire
15	BOEMRE
15	US Navy
14	ODP/TAMU
4	NOAA
4	SIO
3	Oregon St
3	USGS

MAJOR contributors of data

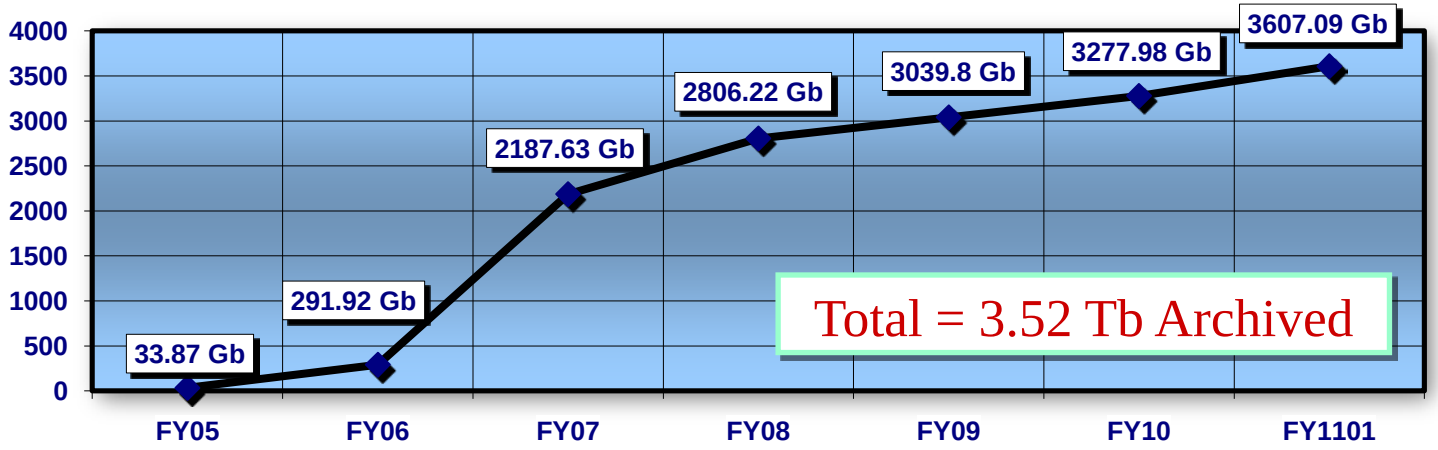
Cruises	Contributor
747	SIO
687	LDEO
533	UK
480	NOAA
410	Japan
341	US Navy
291	USGS
247	France
230	U of Hawaii
151	Canada
135	New Zealand
119	ODP/TAMU

Major challenge: Quality metadata

Major success: ECS common seismic metadata template adopted NOAA-USGS-UNOLS-BOEMRE

Marine Geology Data

Archive Volume



Designated National Long-term Archive for Data Collected with NSF Funds

- US Component of the Integrated Ocean Drilling Program (IODP
- Index to Marine and Lacustrine Geological Samples

Designated Long-term Archive for NOAA Marine Geologic Data

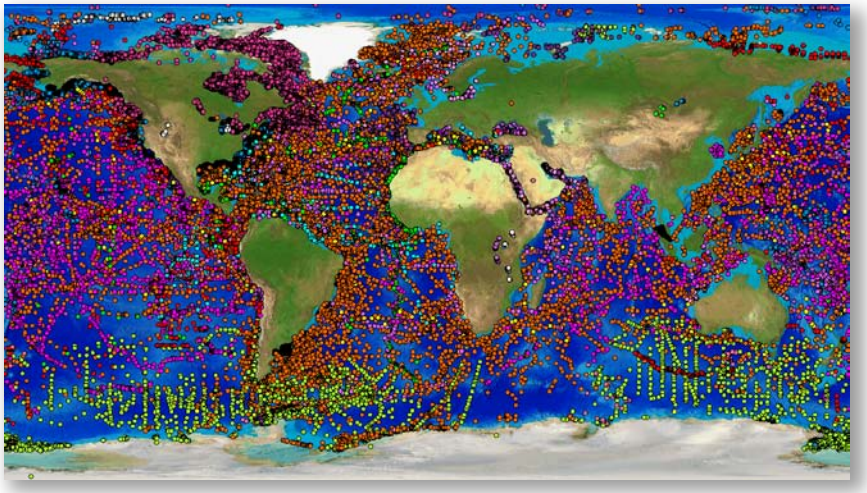
- NOS bottom type
- Ocean Exploration

Archive of Historic Data Sets Compiled by National /International Sources

Marine Geology Data

Index to Marine and Lacustrine Geological Samples

Partner Repositories Store Samples, Code & Contribute Data



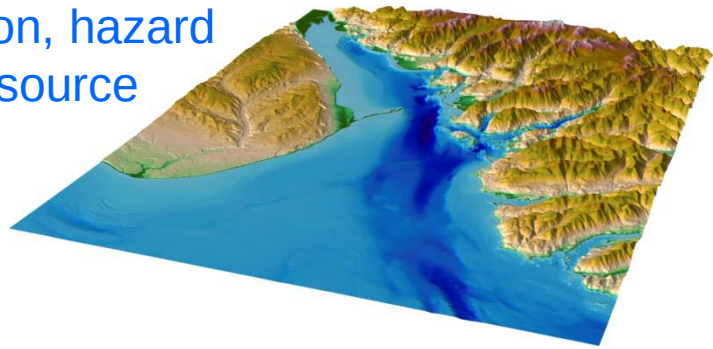
191,750 Seafloor/lakebed Cores, Grabs, Dredges, Drill sites

Metadata, Descriptions, Data, Images, Related Links

WFS, WMS, Web Map, & Text Interfaces

Success Stories

- California Seafloor Mapping Project
  - State – Federal Partnership to plan, collect, & share data
  - NOAA supported data planning, collection, processing & archive
  - USGS & CSUMB developed base map & science products, support EBM
  - Estimated cost savings of $14M
- UNOLS Rolling deck To Repository
  - UNOLS (LDEO, NSF, partner ship and science centers) acquire, describe, deliver, and process data
  - NOAA archives, inventories, and distributes
- “Hydropalooza” Federal – Alaska Kachemak Bay
  - 12 new surveys collected to support navigation, hazard assessment, fisheries and habitat, coastal resource management
- IOCM – UNH - ECS



Summary

- NGDC is 1 of 3 NOAA National Data Centers
- Our strengths are long-term archive, metadata, and web-service delivery of OCM data
- Partnerships with UNOLS R2R, Science Centers, and Academia, essential to support the full Geospatial Life Cycle
- OCM data are one of the fastest growing data streams stewarded by NGDC