

CZOData Cyber-Seminar #2: 2014-03-17

Protocols for sharing CZOData: Part 1: Data Publication with a Capital P

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Data Publication: Definition

- Data publication with a small $\rightarrow p \leftarrow$
 - Sharing data via web sites or submission to databases
- Data Publication with the capital $\rightarrow P \leftarrow$
 - Publication of data as part of scholarly communication
 - Citable
 - Persistent access
 - Quality assurance (repository review or peer-review)

This is what we are talking about!

Data Publication: Why?

- Data access is key to science
 - Data are the nucleus of scientific collaboration
 - Scientific progress requires community that competes and collaborates in pursuit of common goals
 - Without access to the same materials no community exists
 - Data are needed for scientific replication
 - The value of an article that can't be replicated:?
 - Scholarly articles are summaries, not the actual research results
 - Experimental data expensive to verify, observational data impossible
 - Replication projects show: many published articles cannot be replicated



re-use



reproduce



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Linking Data to Publications through Citation and Virtual Archives

by [Micah Altman](#), Director of Research, MIT Libraries at MIT & The Brookings Institution on Sep 13, 2011



Prepared for the 2011 SSP 33rd Annual Meeting June 2011


accessible at
<http://www.slideshare.net/>



IEEA
INTEGRATED EARTH DATA APPLICATIONS

Data Publication: Why now?

- Exponentially increasing data volumes
- Rapidly expanding cyberinfrastructure capabilities to mine and analyze data
- New paradigms in publishing
- Growing enforcement of policies for open access to research data



“In the last decades, rapid technical developments, such as digital data and high-throughput techniques, dramatically changed the scholarly publishing paradigm. This requires new approaches in order to ensure availability and usability of science data.”

<http://www.icsu-wds.org/working-groups/data-publication>

Data Policies



the WHITE HOUSE PRESIDENT BARACK OBAMA

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February 22, 2013



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Executive Order -- Making Open and Machine Readable the New Default for Government Information

May 9, 2013

Obama issues Executive Order in support of open data

Timothy Vollmer, May 10th, 2013

Yesterday President Barack Obama issued an [Executive Order](#) requiring federal government information to be open and machine-readable by default. This Order is the latest in a series of actions going back to 2009 in support of increasing access to and transparency of government information.

In addition to the Executive Order, the White House released a [Memorandum](#) (PDF) explaining how federal government agencies will comply with the new open data policy.

This Memorandum requires agencies to collect or create information in a way that supports downstream information processing and dissemination activities. This includes using machine readable and open formats, data standards, and common core and extensible metadata for all new information creation and collection efforts. It also includes agencies ensuring information stewardship through the use of open licenses and review of information for privacy, confidentiality, security, or other restrictions to release.

It provides a forward-thinking set of guidelines for open data to be released by U.S. federal agencies:

Open data: For the purposes of this Memorandum, the term “open data” refers to publicly available data structured in a way that enables the data to be fully discoverable and usable by end users. In general, open data will be consistent with the following principles:



Executive Order on Open Data

[Seal Of The Executive Office Of The President](#) / Public Domain

Data Policies



National Science Foundation
Directorate for Geosciences (GEO)

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Geosciences



Directorate for Geosciences--Data Policies

The NSF brings transparency to its long-standing policy on dissemination and sharing of research results through the required inclusion of a data management plan with each project submission:

www.nsf.gov/pubs/policydocs/pappguide/nsf11001/qpg_2.jsp#dmp

Plans for the dissemination and sharing of research results will be traceable from the beginning to the end of a project (proposal, review, and annual/final report). The primary goal of this procedural change is to assure that products of research help NSF achieve its mission to promote the progress of science and engineering.

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Dissemination and Sharing of Research Results

NSF Data Sharing Policy

Investigators are expected to share with other researchers, at no more than incremental cost and within a reasonable time, the primary data, samples, physical collections and other supporting materials created or gathered in the course of work under NSF grants. Grantees are expected to encourage and facilitate such sharing. See [Award & Administration Guide \(AAG\) Chapter VI.D.4](#).

NSF Data Management Plan Requirements

Proposals submitted or due on or after January 18, 2011, must include a supplementary document of no more than two pages labeled "Data Management Plan". This supplementary document should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results. See [Grant Proposal Guide \(GPG\) Chapter II.C.2.i](#) for full policy implementation.

Data Policies



Council Meeting
San Francisco, CA
8 December 2013

AGU Publications Data Policy

First adopted by Publications Committee November 1993
[Revised March 1994, December 1995, October 1996]

To advance scientific exploration and discovery, and allow a full assessment of results presented in AGU's journals, all data necessary to understand, evaluate, replicate, and build upon the reported research must be made available and accessible whenever possible.

Data Publication: Why?

- Ensure proper citation of the data and credit to their creator(s)

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THE
**DATA CITATION
INDEXSM**
CONNECTING THE DATA TO
THE RESEARCH IT INFORMS

What is it?
VIEW VIDEO

THE
**DATA
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INDEXSM**
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The image shows a world map with various icons representing different types of data sources (buildings, trees, etc.) connected by lines, illustrating the global reach and interconnectedness of the Data Citation Index.



Helping you to find,
access, and reuse data

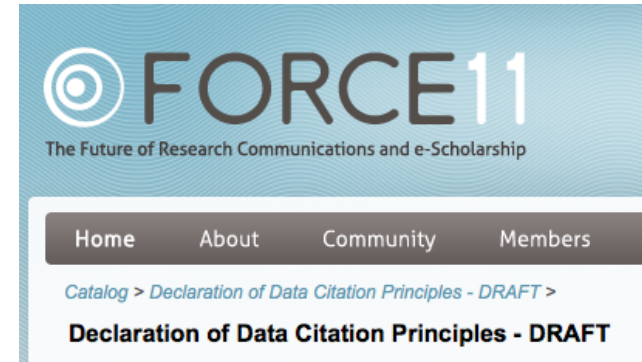
Why cite data?

We believe that you should cite data in just the same way that you can cite other sources of information, such as articles and books. Data citation can help by:

- enabling easy reuse and verification of data
- allowing the impact of data to be tracked
- creating a scholarly structure that recognises and rewards data producers

Data Citation Principles

<http://www.force11.org/datacitation>



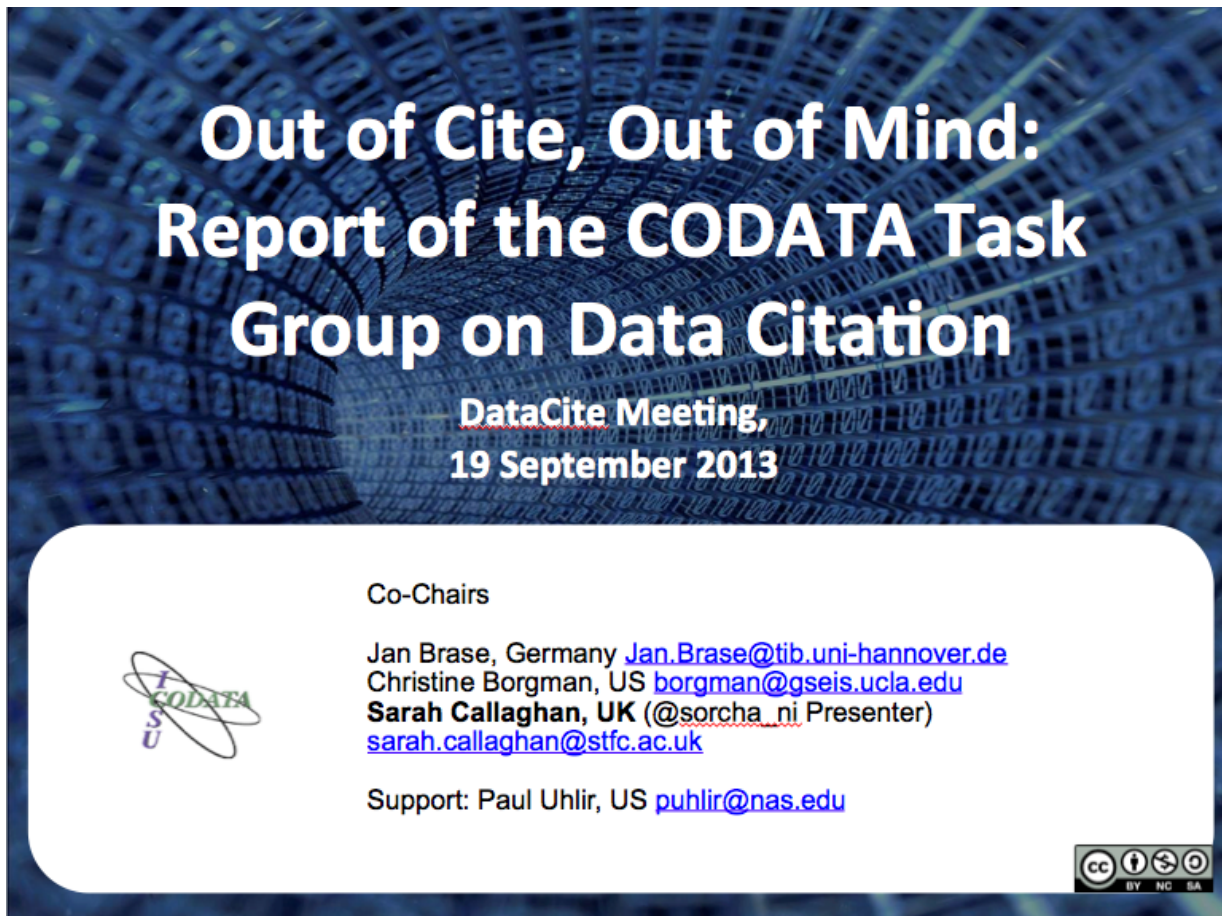
“Sound, reproducible scholarship rests upon a foundation of robust, accessible data. For this to be so in practice as well as theory, *data must be accorded due importance in the practice of scholarship* and in the enduring scholarly record.

In other words, data should be considered legitimate, citable products of research. Data citation, like the citation of other evidence and sources, is good research practice.”

Data Citation Principles (Force 11)

- **Importance:** Data should be considered legitimate, citable products of research. Data citations should be accorded the same importance in the scholarly record as citations of other research objects, such as publications.
- **Credit and attribution:** Data citations should facilitate giving scholarly credit and normative and legal attribution to all contributors to the data, recognizing that a single style or mechanism of attribution may not be applicable to all data.
- **Evidence:** Where a specific claim rests upon data, the corresponding data citation should be provided.
- **Unique Identification:** A data citation should include a persistent method for identification that is machine actionable, globally unique, and widely used by a community.
- **Access:** Data citations should facilitate access to the data themselves and to such associated metadata, documentation, and other materials, as are necessary for both humans and machines to make informed use of the referenced data.
- **Persistence:** Metadata describing the data, and unique identifiers should persist, even beyond the lifespan of the data they describe.
- **Versioning and granularity:** Data citations should facilitate identification and access to different versions and/or subsets of data. Citations should include sufficient detail to verifiably link the citing work to the portion and version of data cited.
- **Interoperability and flexibility:** Data citation methods should be sufficiently flexible to accommodate the variant practices among communities but should not differ so much that they compromise interoperability of data citation practices across communities.

Ongoing Debate & Development





Out of Cite, Out of Mind: Report of the CODATA Task Group on Data Citation

**DataCite Meeting,
19 September 2013**

Co-Chairs

Jan Brase, Germany Jan.Brase@tib.uni-hannover.de
Christine Borgman, US borgman@gseis.ucla.edu
Sarah Callaghan, UK (@sorchani Presenter)
sarah.callaghan@stfc.ac.uk

Support: Paul Uhler, US puhler@nas.edu



<http://www.slideshare.net>



Other Organizations Working on Data Citation

- International Council for Scientific and Technical Information (ICSTI)
- DataCite
- The Dataverse Network
- National Information Standards Organization (NISO)
- Creative Commons and Science Commons
- CENDI – U.S. interagency group focused on scientific and technical information issues and coordination of activities.
- Global Biodiversity Information Facility (GBIF)
- World Data System (WDS)
- STM-Association
- Digital Curation Center, UK
- Research Data Alliance (RDA)
- ... and many more

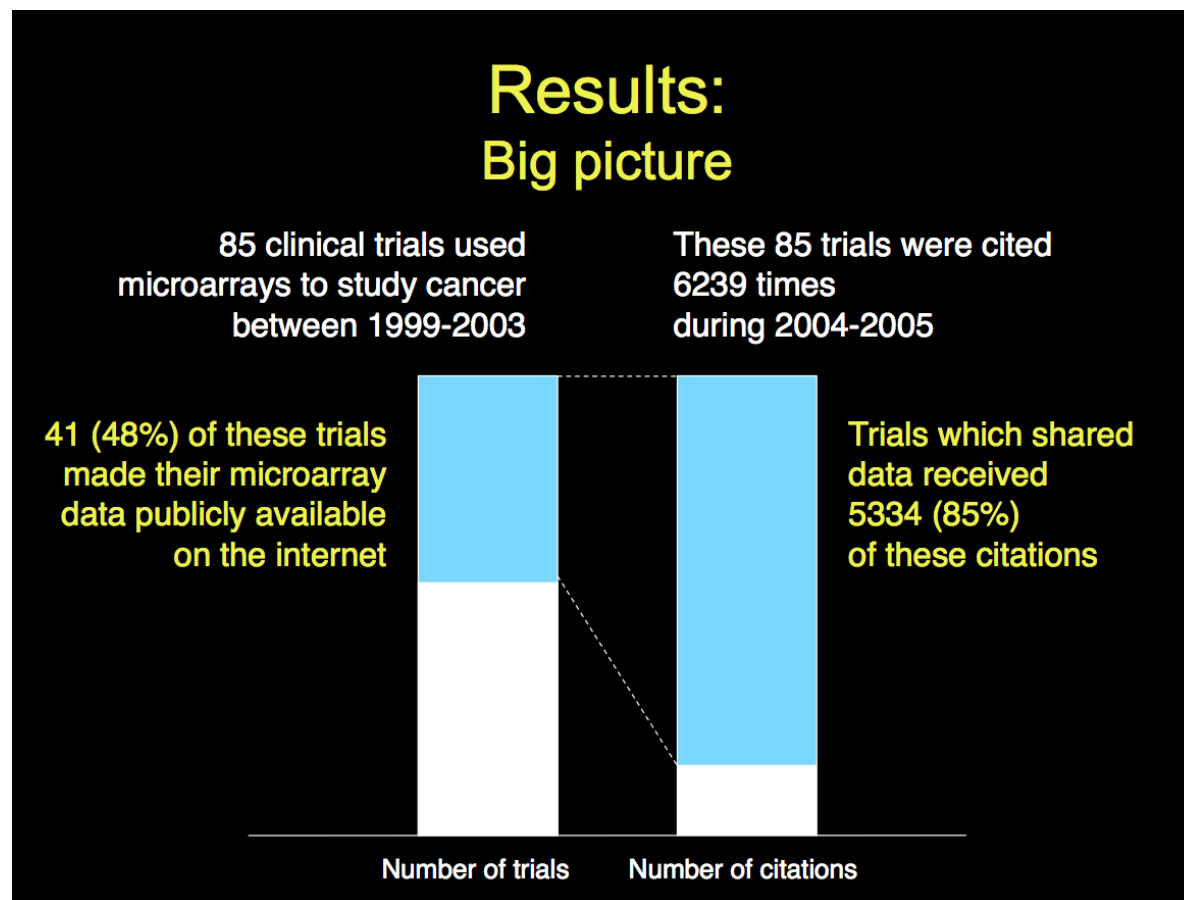
Data Citation Example

- Global Multi-Resolution Topography (GMRT) synthesis described by [Ryan et al., 2009](#).
- Its data DOI is 10.1594/IEDA/100001.
- Its citation would be: Ryan, William B.F. (2009): Global Multi-Resolution Topography (GMRT) synthesis. Integrated Earth Data Applications (IEDA). <http://dx.doi.org/10.1594/IEDA/100001>
- It can be accessed at the URL:
<http://dx.doi.org/10.1594/IEDA/100001>.
- The data set DOI is different from the DOI for the publication that cites the data set, [doi: 10.1029/2008GC002332](http://dx.doi.org/10.1029/2008GC002332).

Data Publication: Benefits

- **Scientific integrity**
 - publishing your data and citing its location in published research papers can allow others to replicate, validate, or correct your results, thereby improving the scientific record.
- **Increase the impact of your research**
 - those who make use of your data and cite it in their own research will help to increase your impact within your field and beyond it. Users of your data may include those in other disciplines, sectors, and countries.
- **Preserve your data for your own future use**
 - by preparing your data for sharing with others, you will benefit by being able to identify, retrieve, and understand the data yourself after you have lost familiarity with it, perhaps several years hence.

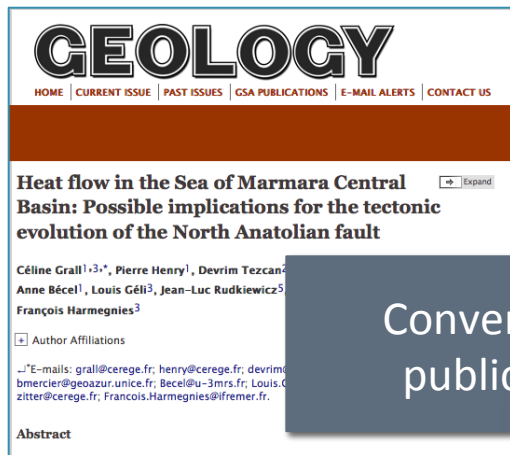
Data Publication: Benefits



from: Heather A. Piwowar, "Sharing Detailed Research Data Is Associated with Increased Citation Rate"

<http://precedings.nature.com/documents/361/version/1>

Data Publication: Options



Conventional
publication



Institutional
Repositories



Geoscience Data Journal

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Edited By: Dr R
Online ISSN: 20
Associated Title
Climatology, Me
Meteorological

Data Article

EarthChem Library

The EarthChem Library is a data repository that a
geoscience research (analytical data, data synthe

Open Access

Access to data in the EarthChem

Long-Term Archive

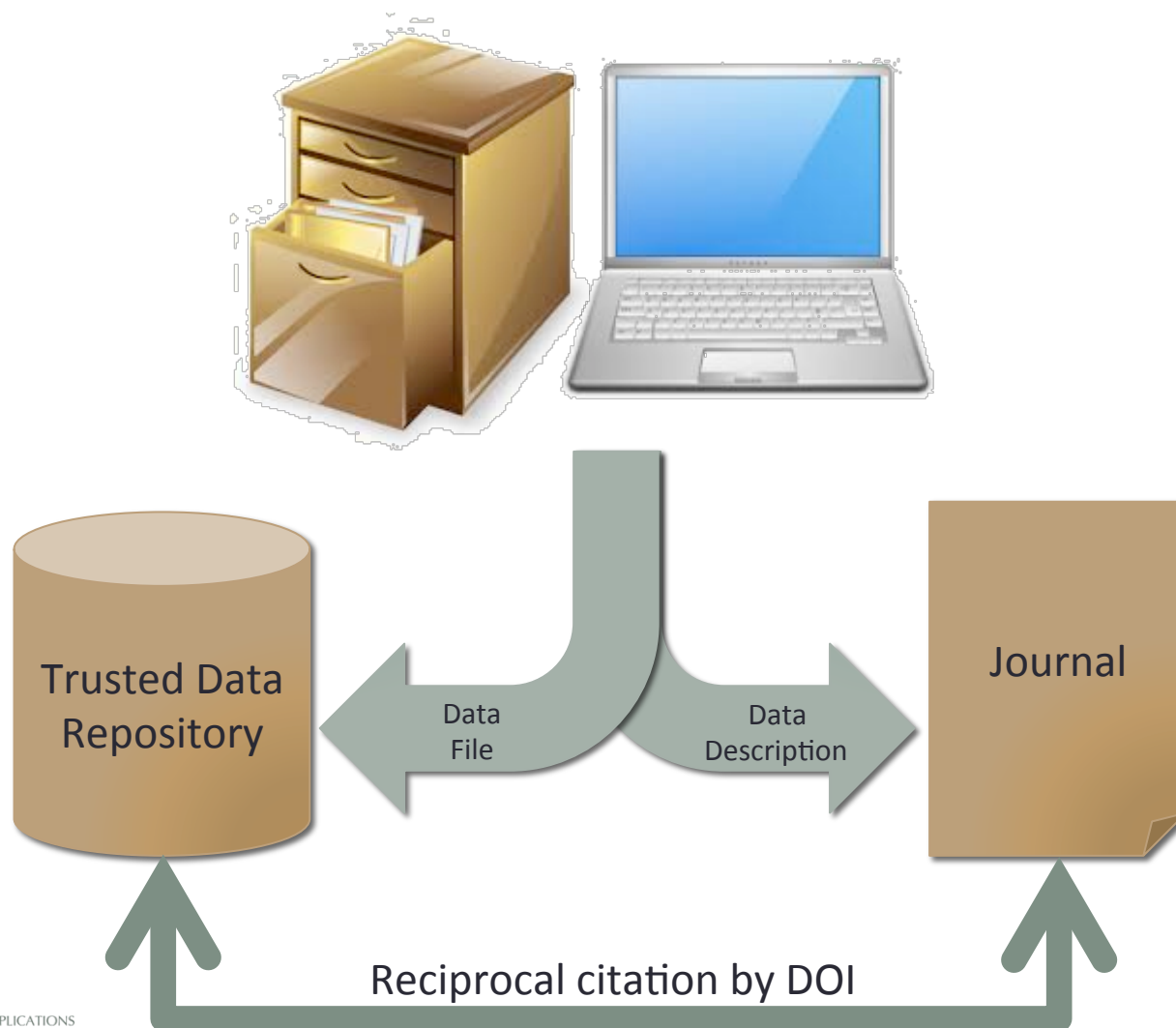
The EarthChem Library guarantees long-term availabilit

Data Registration with DOI

Subjects in the Library can be identified, shared, and

Disciplinary
Repositories

Data Publication “Best Practice”



Journal Guidelines: Examples

“Elsevier encourages authors to deposit raw experimental data at relevant data repositories.”

<http://www.elsevier.com/about/content-innovation/database-linking>

“AGU encourages authors to identify and archive their data in approved data centers.”

AGU Data Policy, approved by AGU Council Dec 8, 2013

Repository Requirements

“The use of published digital data, like the use of digitally published literature, depends upon the ability to identify, authenticate, locate, access, and interpret them.”

Report of the CODATA - ICSTI Task Group on Data Citation Standards and Practices: “OUT OF CITE, OUT OF MIND”

- Open access
- Long-term preservation
- Persistent & unique identification
- Data quality assurance (peer-review?)

➡ Deposition of data in ‘Trusted Repositories’

A forthcoming experiment in data publication

Posted on December 3, 2013 by John Kratz

What we're doing:

Some time next year, the CDL will start an experiment in data publication. Our version of data publication will look like lightweight, non-peer reviewed dataset descriptions. These publications are designed to be flexible in structure and size. At a minimum, each document must have six elements:

- Title
- Creator(s)
- Publisher
- Publication year
- Identifier (e.g.DOI or ARK)
- Citation to the dataset

This bare bones document can expand to be richly descriptive, with optional items like subject keywords, version number, spatial or temporal range, collection methods, and as much description as the author cares to supply.



Like these dapper gentlemen, as small or as large as needed...

From The Public Domain Review.

Domain-Specific Repositories

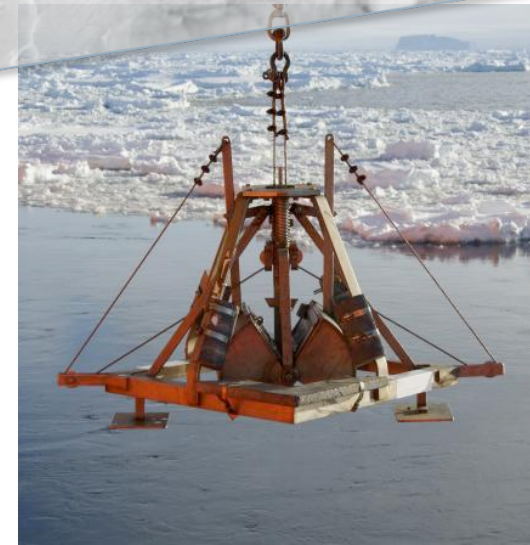
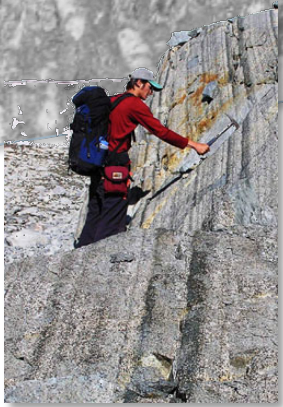
- Are best poised to ensure 'Fitness for Re-use' through domain-specific data stewardship
- Must ensure professional data curation services
 - Long-term archiving & access
 - Persistent, unique identification
 - Discoverability (metadata registration)
- Must integrate with the 'scholarly communication ecosystem'

Adding Value: Domain-Specific Data Stewardship

- Development, maintenance, and promotion of domain-specific, community-based standards for data and metadata
 - Provenance documentation, uncertainties, semantics (vocabularies, taxonomy), formats
- Domain-specific guidelines, software tools, and user support/training that facilitate data submission
- Harmonization & integration of data for advanced analysis
- Mapping of data to standards-based interfaces for interoperability

IEDA: A Multi-Disciplinary Microcosm

- geochemistry, marine geophysics, marine geology, geochronology, and more
- sensor data versus sample-based observations & experiments
- raw data (e.g. multi-beam), field data, lab data, derived data, samples
- gridded data, point data, time-series data, maps, photos, and more
- file sizes vary from a few kilobytes to terabytes





IEDA Infrastructure

- Cooperative Agreement with NSF
 - Sustainable funding
 - Formal community governance & guidance
- Disciplinary expertise
- Professional data management policies & procedures
 - Persistent identification of data & samples (DOI, IGSN)
 - Standards-compliant metadata catalog
 - Long-term archiving agreements with National Geophysical Data Center & Columbia University Libraries
 - Risk management
- “Accreditation” as member of the World Data System

IEDA Repository Services

- Rich and standards-compliant metadata catalog
- Data publication with DataCite (Registration with DOI)
- Online data submission tools
- QA/QC of datasets and metadata
- Storage & risk management of submitted data
- Long-term preservation (via partners)
- Cross-referencing with journals, data citation index, etc.

Links to Journals

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Earth and Planetary Science Letters
Volume 190, Issues 3–4, 15 August 2001, Pages 251–266

Mantle thermal structure and active upwelling during continental breakup in the North Atlantic

W. Steven Holbrook^a, H.C. Larsen^b, J. Korenaga^c, T. Dahl-Jensen^b, I.D. Reid^b, P.B. Kelemen^d, J.R. Hopper^b, G.M. Kent^e, D. Lizarralde^f, S. Bernstein^b, R.S. Detrick^d

^a Department of Geology and Geophysics, University of Wyoming, Laramie, WY 82071-3006, USA
^b Danish Lithosphere Centre, Øster Voldgade 10, DK1350 Copenhagen, Denmark
^c Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA 02139, USA
^d Department of Geology and Geophysics, Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
^e Scripps Institution of Oceanography, University of California, San Diego, CA 92093, USA
^f School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA 30332, USA

MGDS MARINE GEOSCIENCE DATA SYSTEM

IEDA INTEGRATED EARTH DATA APPLICATIONS

Data Sets Referenced by DOI 10.1016/S0012-821X(01)00392-2

Holbrook, W.S., H.C. Larsen, J. Korenaga, T. Dahl-Jensen, I. Reid, G. Kent, J. Hopper, P. Kelemen, S. Bernstein, R. Detrick and D. Lizarralde, 'Mantle thermal structure and active upwelling during continental breakup in the North Atlantic', *Earth Planet. Sci. Lett.*, 190: 251–266, 2001, DOI 10.1016/S0012-821X(01)00392-2. (View Reference)

1 data set found for this DOI.

Seismic Reflection/Refraction Data Sets

Data Type	File Format	Data Quality	Instrument Information	Locale	Expedition/Compilation	Investigator(s)
Seismic Reflection/MCS (Segy, Raw)	SEG-Y	0	Array Seismic/MCS Line Log	Greenland Margin	EW9607 (1996)	Holbrook

Hosted by Marine Geoscience Data System at Lamont-Doherty Earth Observatory of Columbia University
 This site licensed under Creative Commons Attribution-NonCommercial-Share Alike 3.0 | Acknowledgements | Part of the IEDA Data Facility

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Earth and Planetary Science Letters

Volume 233, Issues 3–4, 15 May 2005, Pages 391–409



<http://dx.doi.org/10.1016/j.epsl.2005.02.029>

Bibliographic information

Citing and recommended articles

Applications and tools

Data for this Article



IEDA EarthChem
Earth geoscience data

Grand Comore Island: A well-constrained “low $^3\text{He}/^4\text{He}$ ” mantle plume

Cornelia Class^a, Steven L. Goldstein^{a, c}, Martin Stute^{a, d}, Mark D. Kurz^b, Peter Schlosser^{a, c}

^a Lamont-Doherty Earth Observatory

^b Woods Hole Oceanographic Institution

^c Department of Earth and Environmental Sciences

^d Department of Environmental Sciences



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Article

DOI: 10.1016/j.epsl.2005.02.029

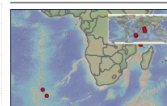
Title: GRAND COMORE ISLAND: A WELL-CONSTRAINED “LOW $^3\text{He}/^4\text{He}$ ” MANTLE PLUME

Journal: EARTH PLANET. SCI. LETT.

Author: CLASS C.; GOLDSTEIN S. L.; STUTE M.; KURZ M. D.; SCHLOSSER P.

Pub. Year: 2005

Sample Locations:



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Data for this article

Records: 46

Source Database(s): GEOROC

Data @ EarthChem Portal: [Download Data](#)

SAMPLE ID	SOURCE	IGSN	DETAIL	LATITUDE	LONGITUDE	LOC PREC	MIN AGE	AGE	MAX AGE	MATERIAL	TYPE	COMPOSITION	ROCK NAME	SiO2	ThO2	Al2O3	Fe2O3	Fe2O3T
KG4	GEOROC	DETAILS	-11.35	43.2	0.01					WHOLE ROCK	VOLCANIC	MAFIC	BASANITE					
KG3	GEOROC	DETAILS	-11.35	43.2	0.01					WHOLE ROCK	VOLCANIC	MAFIC	BASANITE					
KG1	GEOROC	DETAILS	-11.35	43.2	0.01					WHOLE ROCK	VOLCANIC	MAFIC	BASANITE					
G18A	GEOROC	DETAILS	-11.35	43.2	0.01					WHOLE ROCK	VOLCANIC	MAFIC	BASANITE					
G16	GEOROC	DETAILS	-11.35	43.2	0.01					MINERAL	VOLCANIC	MAFIC	BASANITE					
G16	GEOROC	DETAILS	-11.35	43.2	0.01					MINERAL	VOLCANIC	MAFIC	BASANITE					
G14	GEOROC	DETAILS	-11.35	43.2	0.01					WHOLE ROCK	VOLCANIC	MAFIC	BASANITE					

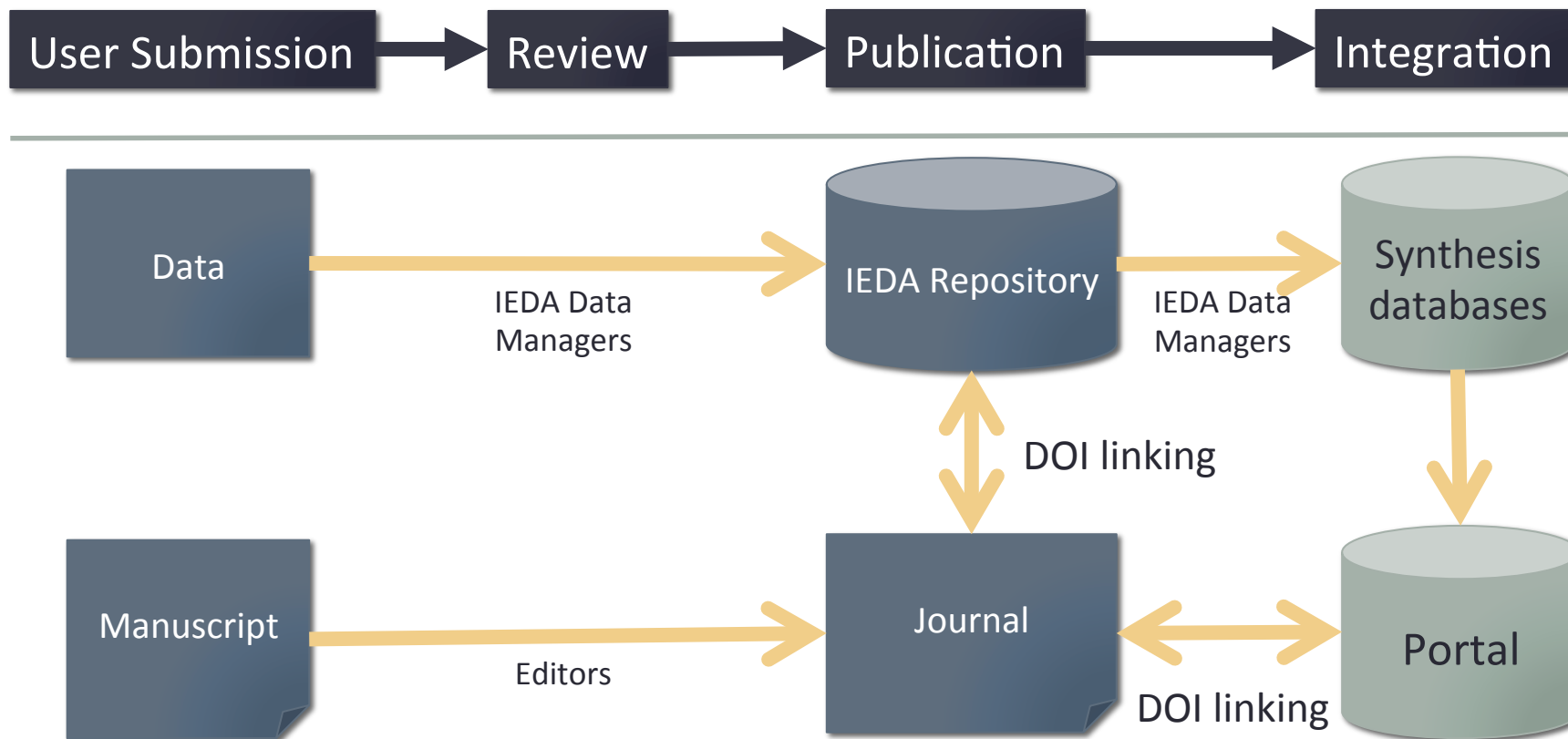


IEDA Repository Services

- Investigator support
 - Data Management Plan tool
 - Data Compliance Report tool
- User Support
 - Online submission tools
 - Data templates
 - Tutorials & Help pages
 - YouTube videos
 - Personal assistance (info@iedadata.org)
 - Workshops, webinars, etc.

<http://www.iedadata.org/help>

IEDA Data Publication Process



[Dataset](#)

Christina River Basin - Stream Suspended Sediment (1993-2012)

TSS concentrations and elemental/isotopic composition (starting 2005) of baseflow and stormflow.


Variables: Solids_ total suspended, carbon to nitrogen molar ratio, carbon_ particulate organic, nitrogen_ particulate organic, nitrogen-15 stable isotope ratio delta

Date Range: (1993-2012)

Dataset Creators/Authors: Aufdenkampe, A.K.; Newbold, J.D.; Anderson, B. A.; Richardson, D.; Damiano, S.G.

Contact: Sara Geleskie Damiano, Stroud Water Research Center, 970 Spencer Road, Avondale, PA 19311, sgeleskie@stroudcenter.org

Field Area: [Boulton Run](#) | [Christina River Basin](#) | [Forest Endmember: Spring Brook](#) | [White Clay Creek @ SWRC](#) | [Construction Endmember: White Clay Creek below landfill](#) | [Lower White Clay Creek](#) | [Agricultural Endmember: South Branch Doe Run](#)

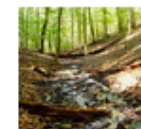
 [Water Chemistry](#)
 [Geomorphology](#)
 [Biogeochemistry](#)
 [Hydrology](#)
 [Geochemistry / Mineralogy](#)
[Christina](#)
[Description](#)
[Keywords](#)
[Citation](#)
[Publications](#)
[Acknowledgements](#)

Description

Total suspended solids (TSS) and Volatile Suspended Solids (VSS) from White Clay Creek near the Stroud Water Research Center, Avondale, PA, USA. The purpose is to quantify export of inorganic and organic particulate matter from the 725-hectare watershed. Samples consist of those taken at monthly intervals, normally the first Wednesday of each month regardless of weather or flow conditions and those taken after precipitation events. The monthly samples are manual grab samples collected in 5-L polyethylene "space saver" bottles from a few centimeters below the surface and without disturbance to the stream bed. The event samples were collected in response to precipitation of 20 mm or more using an ISCO automated sampler which collected 1-L samples in polyethylene bottles at hourly intervals through an intake approximately 20 cm above the bed. Each of approximately four events per year are represented by approximately 10 samples selected from the hourly series to characterize the rise, peak, and falling limb of the hydrograph. Additional events are represented by the three samples nearest peak flow.

CZO Field Areas


[Boulton Run](#)

[Christina River Basin](#)

[Forest Endmember: Spring Brook](#)


Data

 [Christina River Basin - Stream Suspended Sediment 1993](#)

(.csv) [Data Level 1](#), [Metadata](#)

CZO Data Use Policy – Draft v.0.3.5

1. **Use our data freely.** All *CZO Data Products** except those labeled *Private*** are released to the public and may be freely copied, distributed, edited, remixed, and built upon under the condition that you give acknowledgement as described below. Non-CZO data products — like those produced by USGS or NOAA — have their own use policies, which should be followed.
2. **Give proper acknowledgement.** Publications, models and data products that make use of these datasets must include proper acknowledgement, including citing datasets in a similar way to citing a journal article (i.e. author, title, year of publication, name of CZO “publisher”, edition or version, and URL or DOI access information. See <http://www.datacite.org/whycitedata>).

CZO Data Use Policy – Draft v.0.3.5

3. Let us know how you will use the data. The dataset creators would appreciate hearing of any plans to use the dataset. Consider consultation or collaboration with dataset creators.

**CZO Data Products.* Defined as a data collected with any monetary or logistical support from a CZO.

***Private.* Most private data will be released to the public within 1-2 years, with some exceptionally challenging datasets up to 4 years. To inquire about potential earlier use, please contact us.

[http://criticalzone.org/national/data/access-czo-data-1national/
#DataUseAgreement](http://criticalzone.org/national/data/access-czo-data-1national/#DataUseAgreement)

CZO Data Sharing Policy-Draft v.0.2.5

All CZO investigators and collaborators who receive material or logistical support from a CZO agree to:

1. **Share data privately within 1 year.** CZO investigators and collaborators agree to provide CZO Data Products* — including data files and metadata for raw, quality controlled and/or derived data — to CZO data managers within one year of collection of samples, in situ or experimental data. By default, data values will be held in a *Private CZO Repository***, but metadata will be made public and will provide full attribution to the Dataset Creators†.
2. **Release data to public within 2 years.** *CZO Dataset Creators†* will be encouraged after one year to release data for public access. Dataset Creators may chose to publish or release data sooner.

CZO Data Sharing Policy-Draft v.0.2.5

3. **Request, in writing, data privacy up to 4 years.** CZO PIs will review short written applications to extend data privacy beyond 2 years and up to 4 years from time of collection. Extensions beyond 3 years should not be the norm, and will be granted only for compelling cases.
4. **Consult with creators of private CZO datasets prior to use.** In order to enable the collaborative vision of the CZO program, data in *Private CZO Repositories*** will be available to other investigators and collaborators within that CZO. Releasing or publishing any derivative of such private data without explicit consent from the *Dataset Creators*† will be considered a serious scientific ethics violation.

CZO Data Sharing Policy-Draft v.0.2.5

- * *CZO Data Products*. Defined as data collected with any monetary or logistical support from a CZO. Logistical support includes the use of any CZO sensors, sampling infrastructure, equipment, vehicles, or labor from a supported investigator, student or staff person. CZO Data Products can acknowledge multiple additional sources of support.
- † *Dataset Creators*. Defined as the people who are responsible for designing, collecting, analyzing and providing quality assurance for a dataset. The creators of a dataset are analogous to the authors of a publication, and datasets should be cited in an analogous manner following the emerging international guidelines described at <http://www.datacite.org/whycitedata>.

CZO Data Sharing Policy-Draft v.0.2.5

**** *Private CZO Repository.*** Defined as a password-protected directory on each CZO's data server. Files will be accessible by all investigators and collaborators within the given CZO and logins will be maintained by that local CZO's data managers. Although data values will not be accessible by the public or ingested into any central data system (i.e. CUAHSI HIS), metadata will be fully discoverable by the public. This provides the dual benefit of giving attribution and credit to dataset creators and the CZO in general, while maintaining protection of intellectual property while publications are pending.

Copyrights



Attribution



Attribution-ShareAlike



Attribution-NoDerivs



Attribution-NonCommercial



Attribution-NonCommercial-ShareAlike



Attribution-NonCommercial-NoDerivs

Copyrights

Three “Layers” Of Licenses



Open Access to Judgments: Creative Commons licences and the Australian Courts

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THANK YOU
