Forschungsdaten-Repositorien

Vorlesung „Ausgewählte Aspekte digitaler Informationsversorgung“ (WS 15/16)

04.12.2017

Humboldt-Universität zu Berlin

Institut für Bibliotheks- und Informationswissenschaft (IBI)

Heinz Pampel

HELMHOLTZ-GEMEINSCHAFT

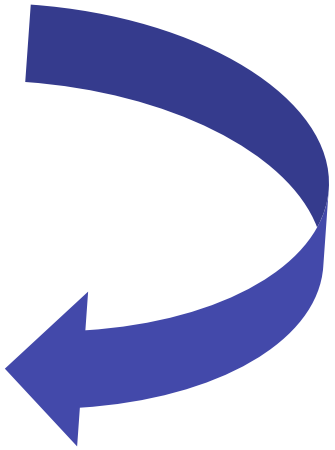
http://os.helmholtz.de

AGENDA

- Digitale Wissenschaft
- Policies
- Forschungsdaten-Repositorien

AGENDA

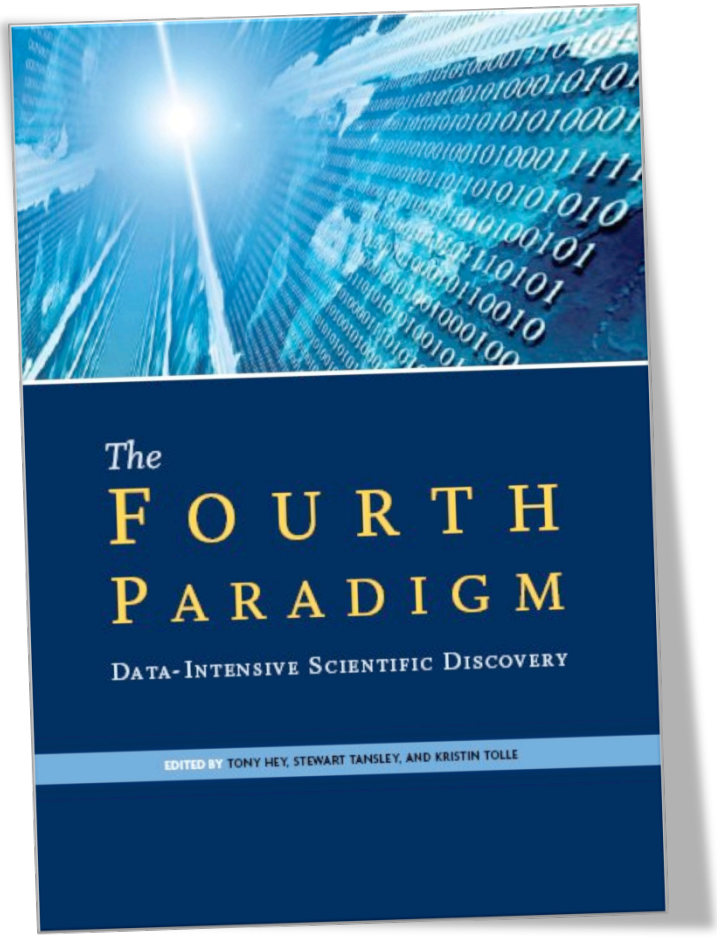
- Digitale Wissenschaft
- Policies
- **Forschungsdaten-Repositorien**



AGENDA

- **Digitale Wissenschaft**
- Policies
- Forschungsdaten-Repositorien

DIGITALE WISSENSCHAFT



WIRED MAGAZINE: 16.07

SCIENCE : DISCOVERIES

The End of Theory: The Data Deluge Makes the Scientific Method Obsolete

By Chris Anderson 06.23.08

Illustration: Marian Bantjes

THE PETABYTE AGE:
Sensors everywhere. Infinite storage. Clouds of processors. Our ability to capture, warehouse, and understand massive amounts of data is changing science, medicine, business, and technology. As our collection of facts and figures grows, so will the opportunity to find answers to fundamental questions. Because in the era of big data, more isn't just more. More is different.

"All models are wrong, but some are useful."

So proclaimed statistician George Box 30 years ago, and he was right. But what choice did we have? Only models, from cosmological equations to theories of human behavior, seemed to be able to consistently, if imperfectly, explain the world around us. Until now. Today companies

Anderson, C. (2008). The End of Theory : The Data Deluge Makes the Scientific Method Obsolete. Wired Magazine, (16.07). Retrieved from http://www.wired.com/science/discoveries/magazine/16-07/pb_theory

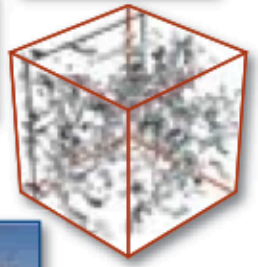
Hey, T., Tansley, S., & Tolle, K. (Eds.). (2009). The Fourth Paradigm. Data-Intensive Scientific Discovery (Version 1.). Redmond, Washington: Microsoft Research. Retrieved from http://research.microsoft.com/fourthparadigm/

DIGITALE WISSENSCHAFT

Science Paradigms

- Thousand years ago:
  science was **empirical**
  describing natural phenomena
- Last few hundred years:
  theoretical branch
  using models, generalizations
- Last few decades:
  a **computational** branch
  simulating complex phenomena
- Today: **data exploration** (eScience)
  unify theory, experiment, and simulation
  - Data captured by instruments or generated by simulator
  - Processed by software
  - Information/knowledge stored in computer
  - Scientist analyzes database/files using data management and statistics

$$\left(\frac{\dot{a}}{a}\right)^2 = \frac{4\pi G\rho}{3} - K\frac{c^2}{a^2}$$



Anderson, C. (2008
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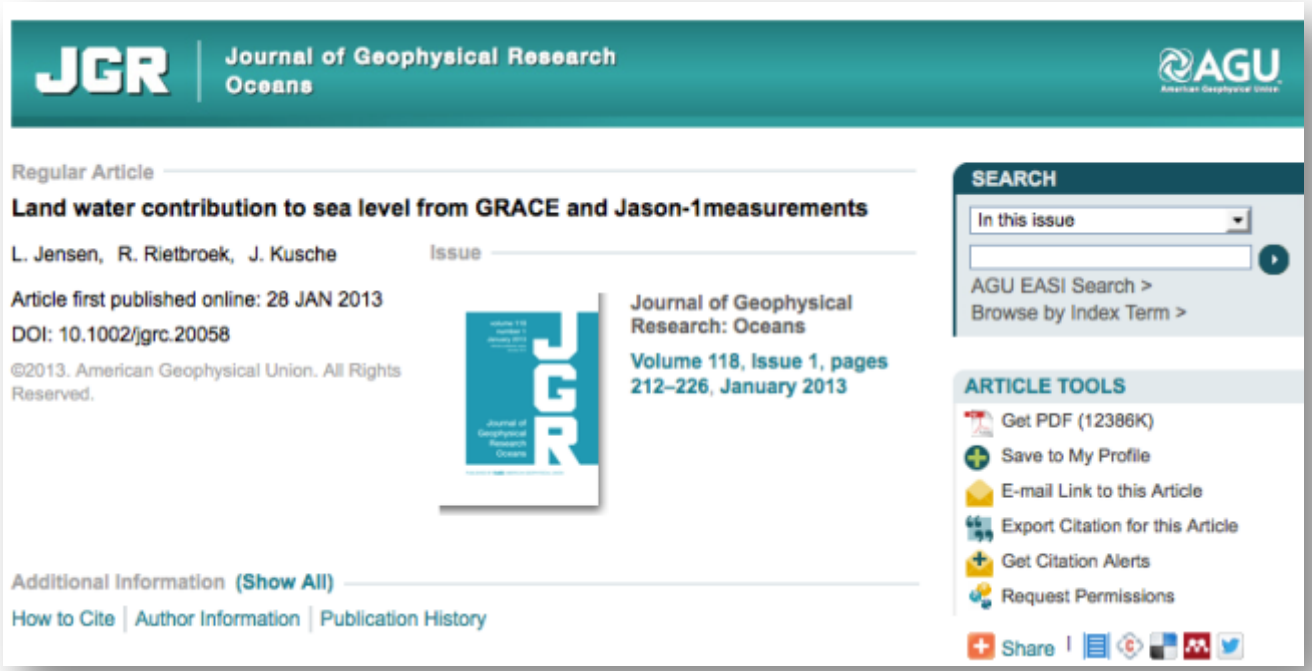
DIGITALE WISSENSCHAFT

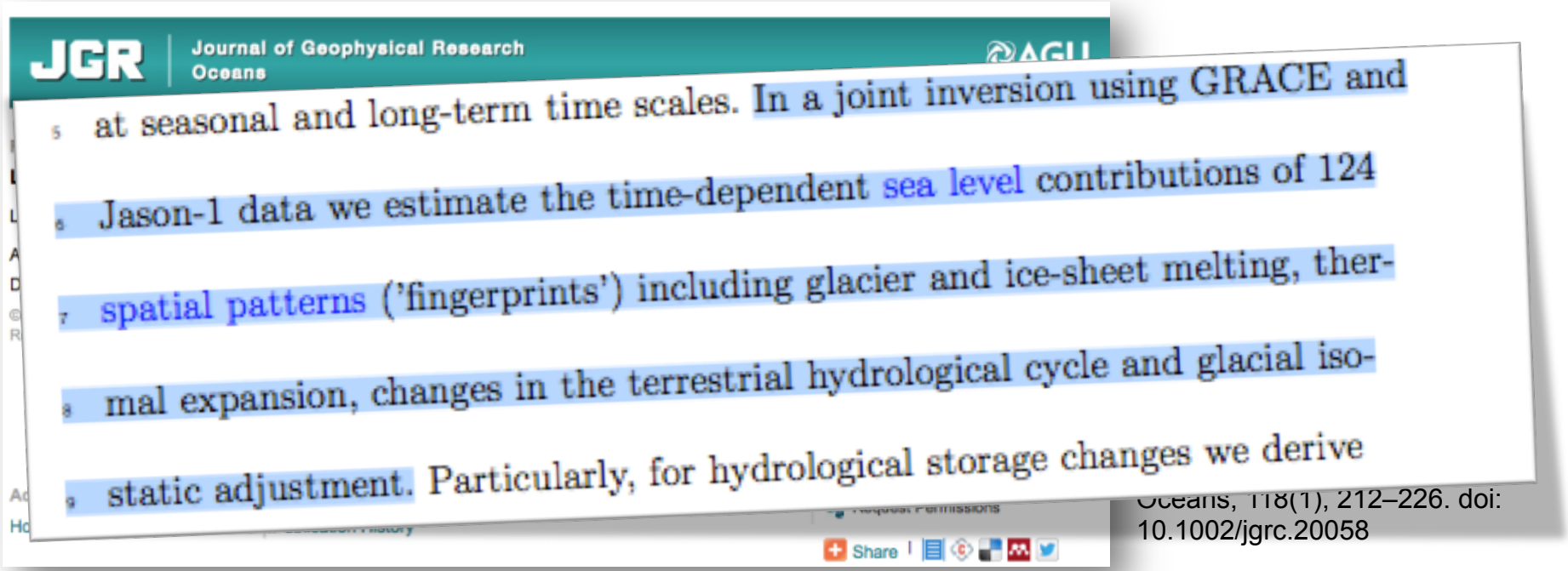
- „Data-Intensive Scientific Discovery“



Jensen, L., Rietbroek, R., & Kusche, J. (2013). Land water contribution to sea level from GRACE and Jason-1measurements. Journal of Geophysical Research: Oceans, 118(1), 212–226. doi:10.1002/jgrc.20058

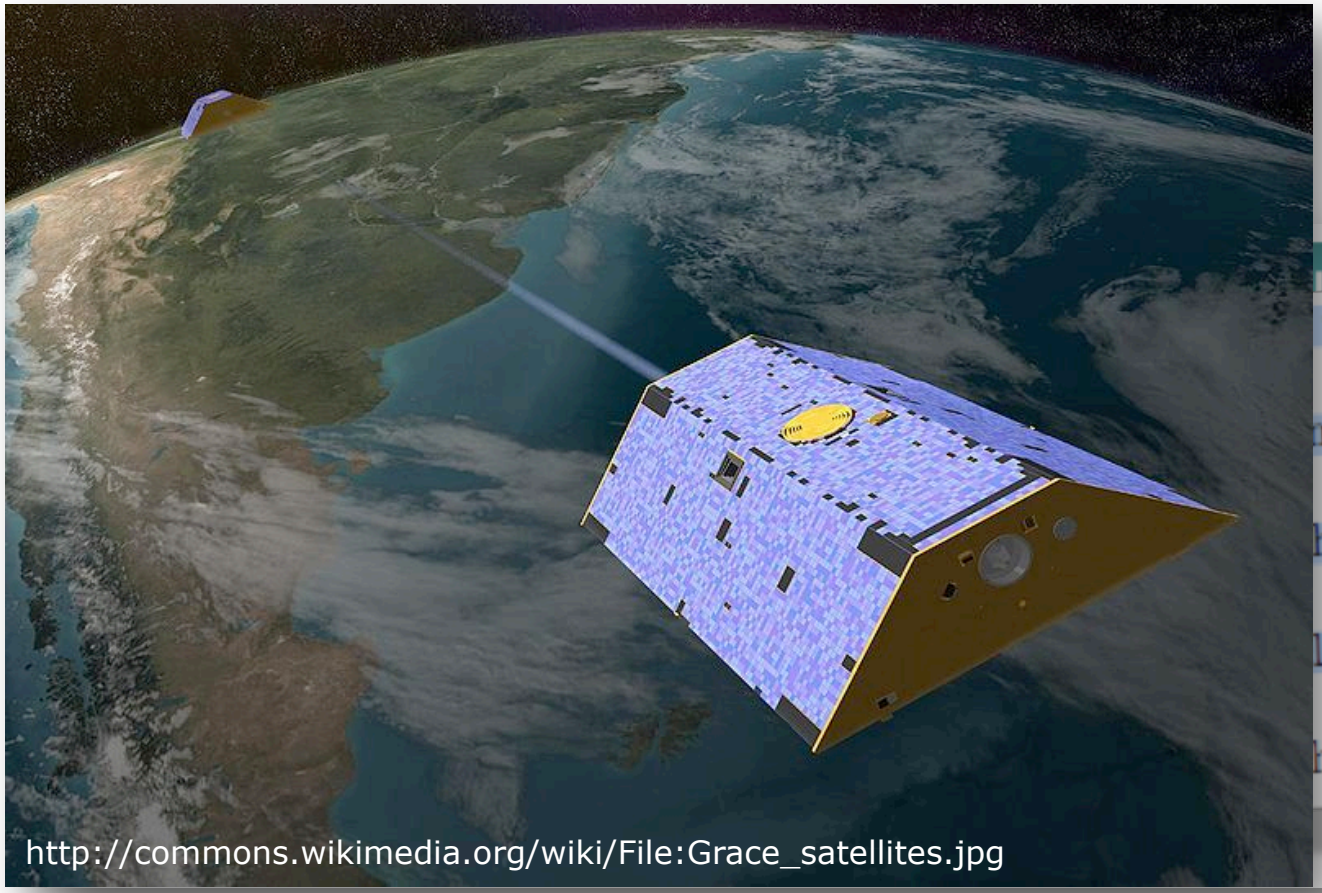
DIGITALE WISSENSCHAFT

- „Data-Intensive Scientific Discovery“



Oceans, 118(1), 212–226. doi: 10.1002/jgrc.20058

DIGITALE WISSENSCHAFT



http://commons.wikimedia.org/wiki/File:Grace_satellites.jpg

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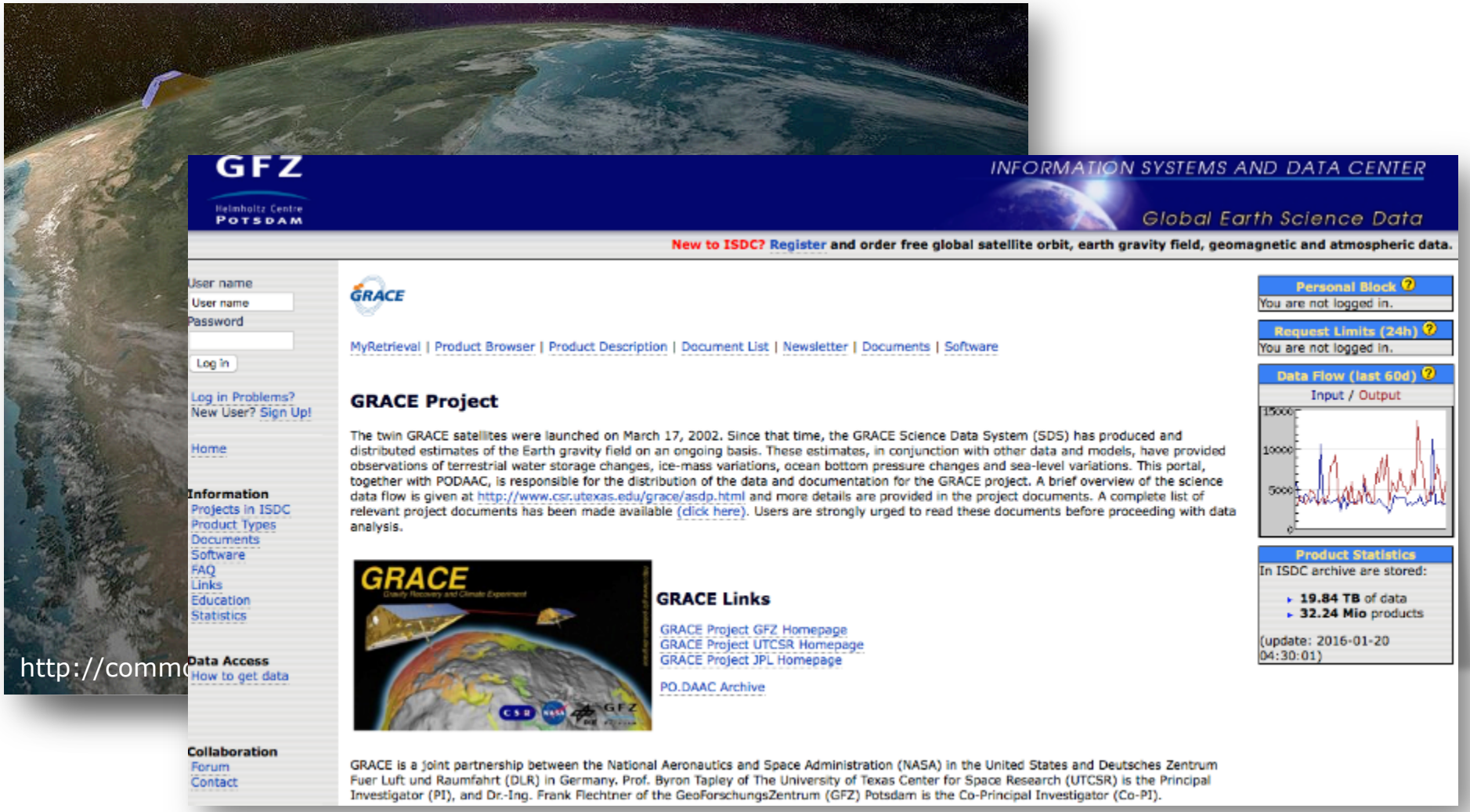
Oceans, 118(1), 212–226. doi: 10.1002/jgrc.20058

DIGITALE WISSENSCHAFT



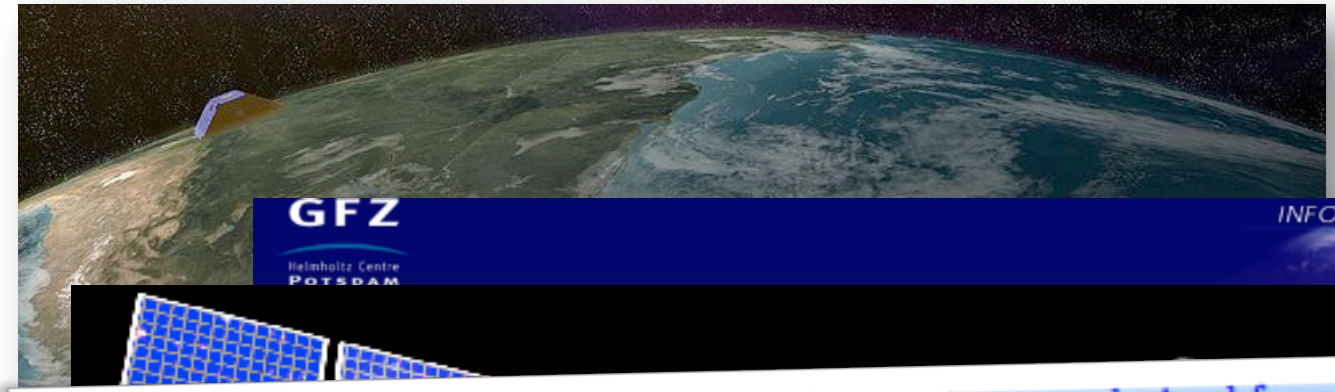
http://isdc.gfz-potsdam.de

DIGITALE WISSENSCHAFT

http://en.wikipedia.org/wiki/File:Jason1.png

http://isdc.gfz-potsdam.de

DIGITALE WISSENSCHAFT



GFZ
Helmholtz Centre
POTSDAM

INFORMATION SYSTEMS AND DATA CENTER

Global Earth Science Data

the steric contributions. The steric fingerprints are derived from gridded in-situ data from

Argo floats, bouys and CTD casts: we use a dataset from *Hosoda et al.* [2008] who provide

monthly global 1° grids of steric sea level height. Since the Argo data (temperature and

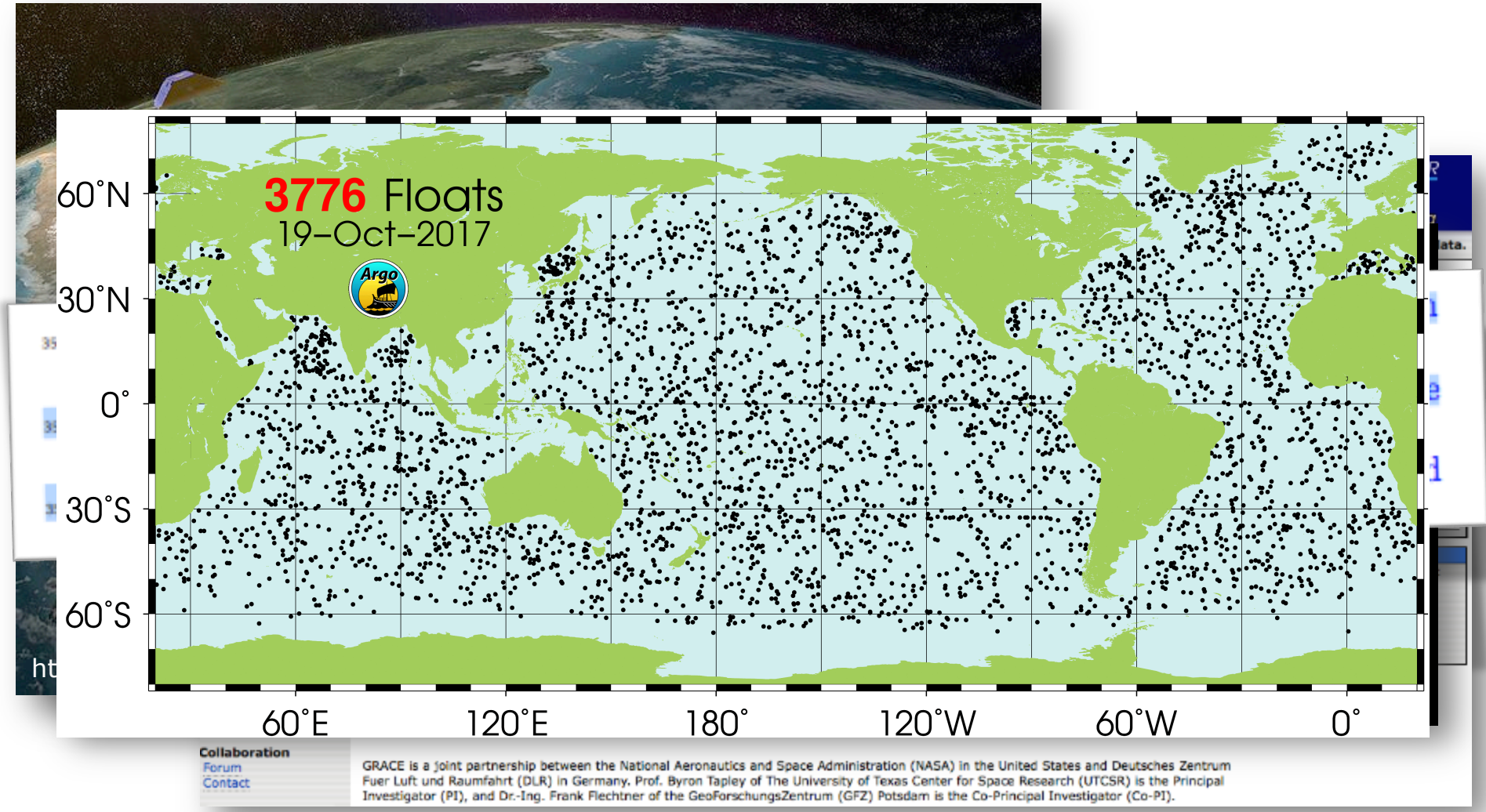
http://en.wikipedia.org/wiki/File:Jason1.png

Collaboration
Forum
Contact

GRACE is a joint partnership between the National Aeronautics and Space Administration (NASA) in the United States and Deutsches Zentrum Fuer Luft und Raumfahrt (DLR) in Germany. Prof. Byron Tapley of The University of Texas Center for Space Research (UTCSR) is the Principal Investigator (PI), and Dr.-Ing. Frank Flechtner of the GeoForschungsZentrum (GFZ) Potsdam is the Co-Principal Investigator (Co-PI).

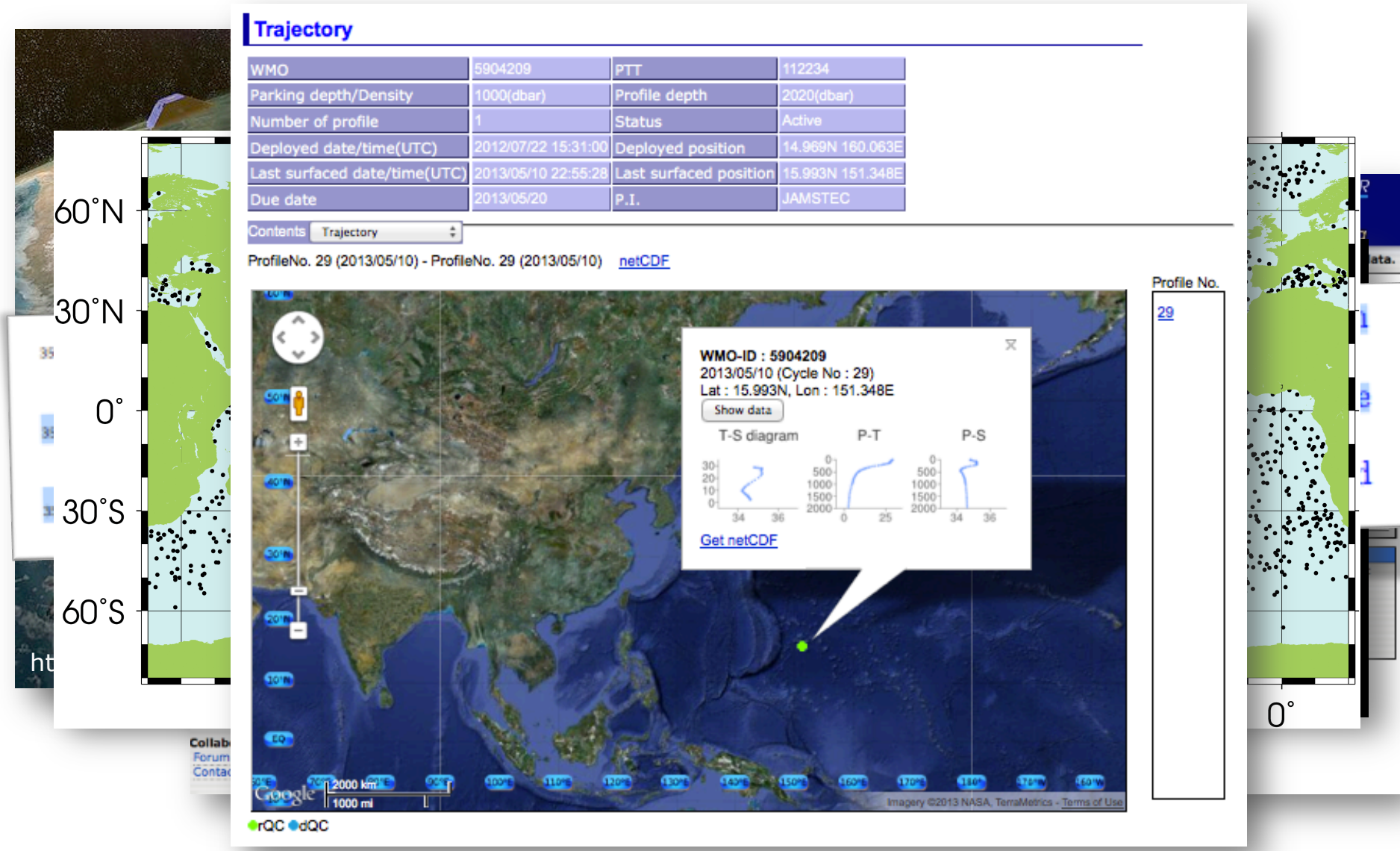
http://isdc.gfz-potsdam.de

DIGITALE WISSENSCHAFT



http://www.argo.ucsd.edu

DIGITALE WISSENSCHAFT



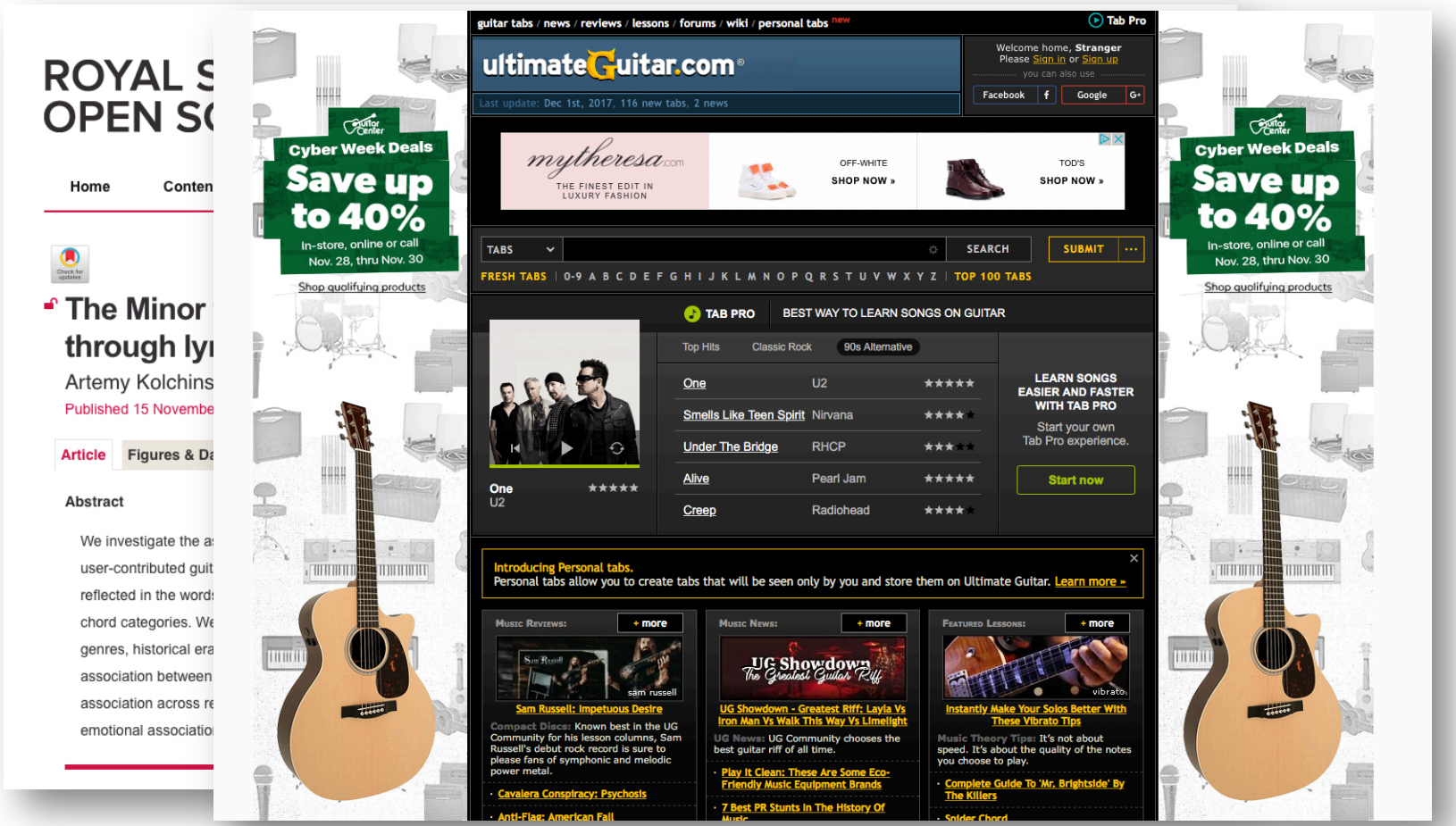
DIGITALE WISSENSCHAFT

- „Data-Intensive Scientific Discovery“

https://doi.org/10.1098/rsos.170952

DIGITALE WISSENSCHAFT

- „Data-Intensive Scientific Discovery“



https://www.ultimate-guitar.com

DIGITALE WISSENSCHAFT

- „Data-

ROYAL S
OPEN SC

Home Content

The Minor fa
through lyri

Artemy Kolchinsky

Published 15 November 2

Article Figures & Data

Abstract

We investigate the ass
user-contributed guitar
reflected in the words u
chord categories. We a
genres, historical eras
association between M
association across regi
emotional associations

3.4. Region

In this section, we evaluate the emotional content of lyrics from artists in different geographical regions. **Figure 6***a* shows that artists from Asia have the highest-valence lyrics, followed by artists from *Australia/Oceania*, *Western Europe*, *North America* and finally *Scandinavia*, the lowest valence geographical region. The latter region's low valence is probably due to the over-representation of 'dark' genres (such as metal) among Scandinavian artists [**55**].

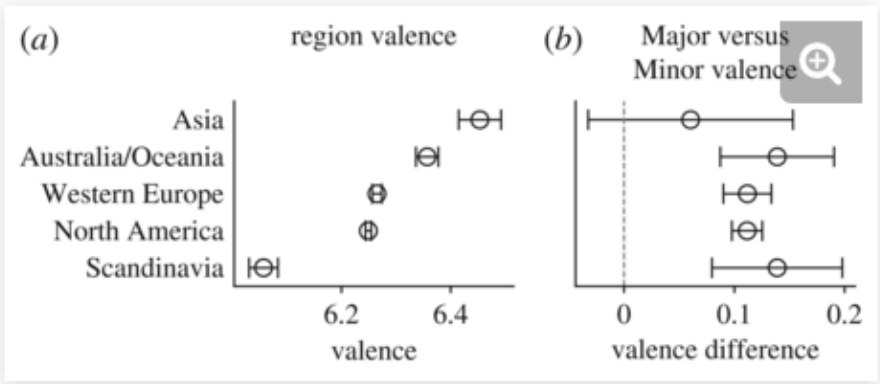


Figure 6. Download figure | Open in new tab | Download powerpoint

(*a*) Mean valence of lyrics by artist region. (*b*) Major versus Minor valence differences by artist region.

As in previous sections, we compare differences in valence of Major and Minor chords for different regions (**figure 6***b*). All regions except *Asia* have a higher mean valence for Major chords than Minor chords, while for the *Asian* region there is no significant difference.

DIGITALE WISSENSCHAFT

- „Data-

ROYAL S
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Home Content

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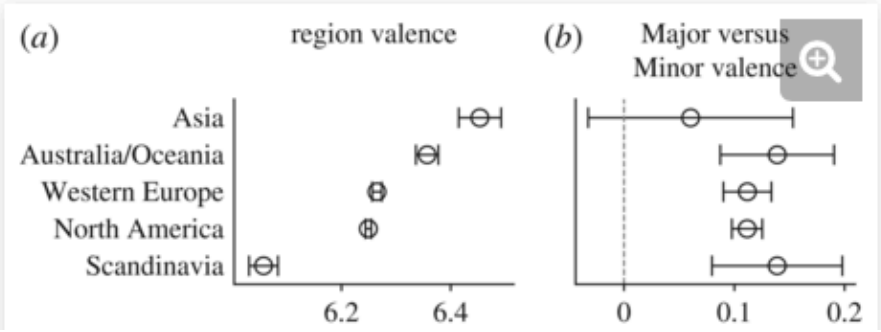


Data accessibility

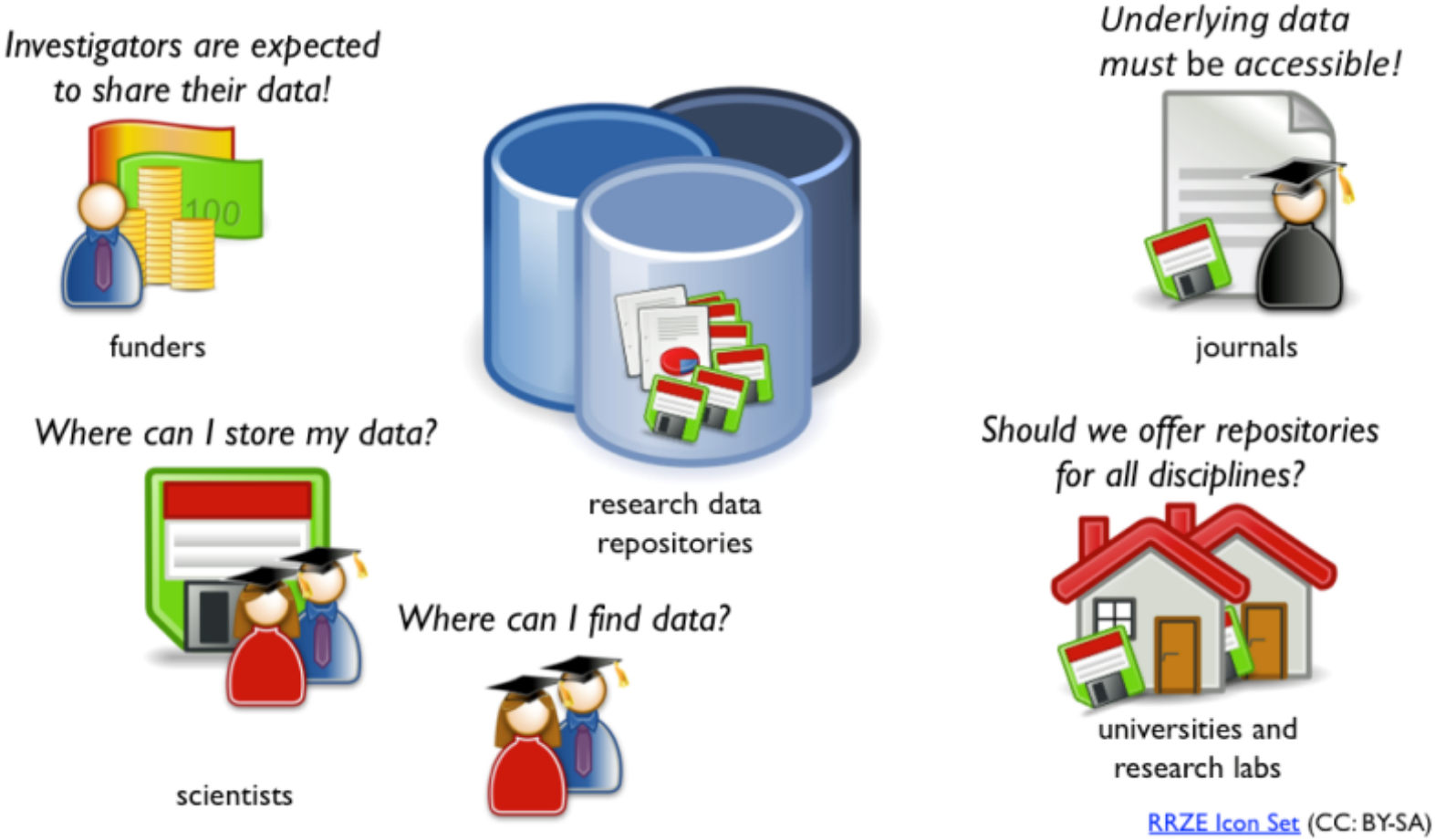
The datasets generated during and/or analysed during this study are available in the Figshare repository, https://doi.org/10.6084/m9.figshare.5413060.v1. Code for performing the analysis and generating plots in this manuscript is available at https://github.com/artemyk/chordsentiment.

AGENDA

- Digitale Wissenschaft
- **Policies**
- Forschungsdaten-Repositorien

RAHMENBEDINGUNGEN

The Research Data Repositories Landscape



Grafik: re3data

POLICIES

- Variierende Termini:
  - EN: Data Sharing Policy, Open Data Policy, Data Policy etc.
  - DE: Resolution zu Forschungsdatenmanagement, Grundsätze zum Umgang mit Forschungsdaten, Leitlinie zum Umgang mit Forschungsdaten, Leitlinien zum Umgang mit digitalen Forschungsdaten, Data Policy etc.
- Variierende Schwerpunkte
  - Nachprüfbarkeit - Nachnutzung
- Variierende Verbindlichkeit
  - Aufforderung – Verpflichtung
- Jede Policy bedarf einer unterstützenden Infrastruktur

POLICIES

- Typen
  - Interdisziplinäre Policies
  - Disziplinäre Policies
  - Institutionelle Policies
  - Policies von Förderorganisationen
  - Policies von Journals und Verlagen
- Aktuelle wissenschaftspolitische Diskussion

INTERDISZIPLINÄRE

- Gute Wisse
  - Empfehlu
    - „Prim entlichungen sollen auf h in der Institution, wo si g aufbewahrt werd
    - „Die daten, die nicht auf halt bewahrt werden könn zte Aufb
  - Die GW en
    - Sieh http://... grundlagen_rahmenbedingungen/gwp/

Deutsche Forschungsgemeinschaft. (2013). Sicherung guter wissenschaftlicher Praxis. Denkschrift. Weinheim: Wiley-VCH. http://doi.org/10.1002/9783527679188

INTERDISZIPLINÄRE POLICIES

- Gute Wissenschaftliche Praxis
  - Empfehlung 7:
    - „Primärdaten als **Grundlagen für Veröffentlichungen** sollen auf haltbaren und gesicherten Trägern in der **Institution**, wo sie entstanden sind, **zehn Jahre** lang aufbewahrt werden."
    - „Die Institution kann für solche Primärdaten, die nicht auf haltbaren und gesicherten Trägern aufbewahrt werden können, in **begründeten Fällen** verkürzte Aufbewahrungsfristen vorsehen."
  - Die GWP ist Teil der DFG-Förderauflagen
    - Siehe hierzu: http://www.dfg.de/foerderung/grundlagen_rahmenbedingungen/gwp/

INTERDISZIPLINÄRE

- Berlin Decla … wledge in the Science
  - „**Open Ac** … **ssen** originäre wissensch … nso wie **Ursprung** … **terial**, digitale D … -Material und wissensch … Form.“
- Einige Vort …
  - Transpar … t)
  - Effizienz
  - Steigerun

Berlin Declaration on Open Acc … ba.mpg.de/lang/de/berlin-prozess/berliner-erklarung/

Berliner Erklärung über den offenen Zugang zu wissenschaftlichem Wissen

Vorbemerkung

Das Internet hat die praktischen und wirtschaftlichen Bedingungen für die Verbreitung von wissenschaftlichem Wissen und kulturellem Erbe grundlegend verändert. Mit dem Internet ist zum ersten Mal die Möglichkeit einer umfassenden und interaktiven Repräsentation des menschlichen Wissens, einschließlich des kulturellen Erbes, bei gleichzeitiger Gewährleistung eines weltweiten Zugangs gegeben.

Wir, die Unterzeichner, fühlen uns verpflichtet, die Herausforderungen des Internets als dem zunehmend an Bedeutung gewinnenden Medium der Wissensverbreitung aufzugreifen. Die damit verbundenen Entwicklungen werden zwangsläufig zu erheblichen Veränderungen im Wesen des wissenschaftlichen Publizierens führen und einen Wandel der bestehenden Systeme wissenschaftlicher Qualitätssicherung einleiten.

Im Sinne der Budapester Initiative (Budapest Open Access Initiative), der ECHO-Charta und der Bethesda-Erklärung (Bethesda Statement on Open Access Publishing) haben wir diese Berliner Erklärung mit dem Ziel aufgesetzt, das Internet als Instrument für eine weltweite Basis wissenschaftlicher Kenntnisse und menschlicher Reflektion zu fördern und die erforderlichen Maßnahmen zu formulieren, die von Entscheidungsträgern, Forschungsorganisationen, Förderinstitutionen, Bibliotheken, Archiven und Museen zu bedenken sind.

Ziele

Unsere Aufgabe Wissen weiterzugeben ist nur halb erfüllt, wenn diese Informationen für die Gesellschaft nicht in umfassender Weise und einfach zugänglich sind. Neben den konventionellen Methoden müssen zunehmend auch die neuen Möglichkeiten der Wissensverbreitung über das Internet nach dem Prinzip des offenen Zugangs (Open Access-Paradigma) gefördert werden. Wir definieren den offenen Zugang oder den ‚Open Access' als eine umfassende Quelle menschlichen Wissens und kulturellen Erbes, die von der Wissenschaftsgemeinschaft bestätigt wurden.

Die Vision von einer umfassenden und frei zugänglichen Repräsentation des Wissens lässt sich nur realisieren, wenn sich das Internet der Zukunft durch Nachhaltigkeit, Interaktivität und Transparenz auszeichnet. Inhalte und Software müssen offen zugänglich und kompatibel sein.

Definition einer Veröffentlichung nach dem Prinzip des offenen Zugangs (Open Access-Veröffentlichung)

Der offene Zugang als erstrebenswertes Verfahren setzt idealerweise die aktive Mitwirkung eines jeden Urhebers wissenschaftlichen Wissens und eines jeden Verwalters von kulturellem Erbe voraus. Open Access-Veröffentlichungen umfassen originäre wissenschaftliche Forschungsergebnisse ebenso wie Ursprungsdaten, Metadaten, Quellenmaterial, digitale Darstellungen von Bild- und Graphik-Material und wissenschaftliches Material in multimedialer Form.

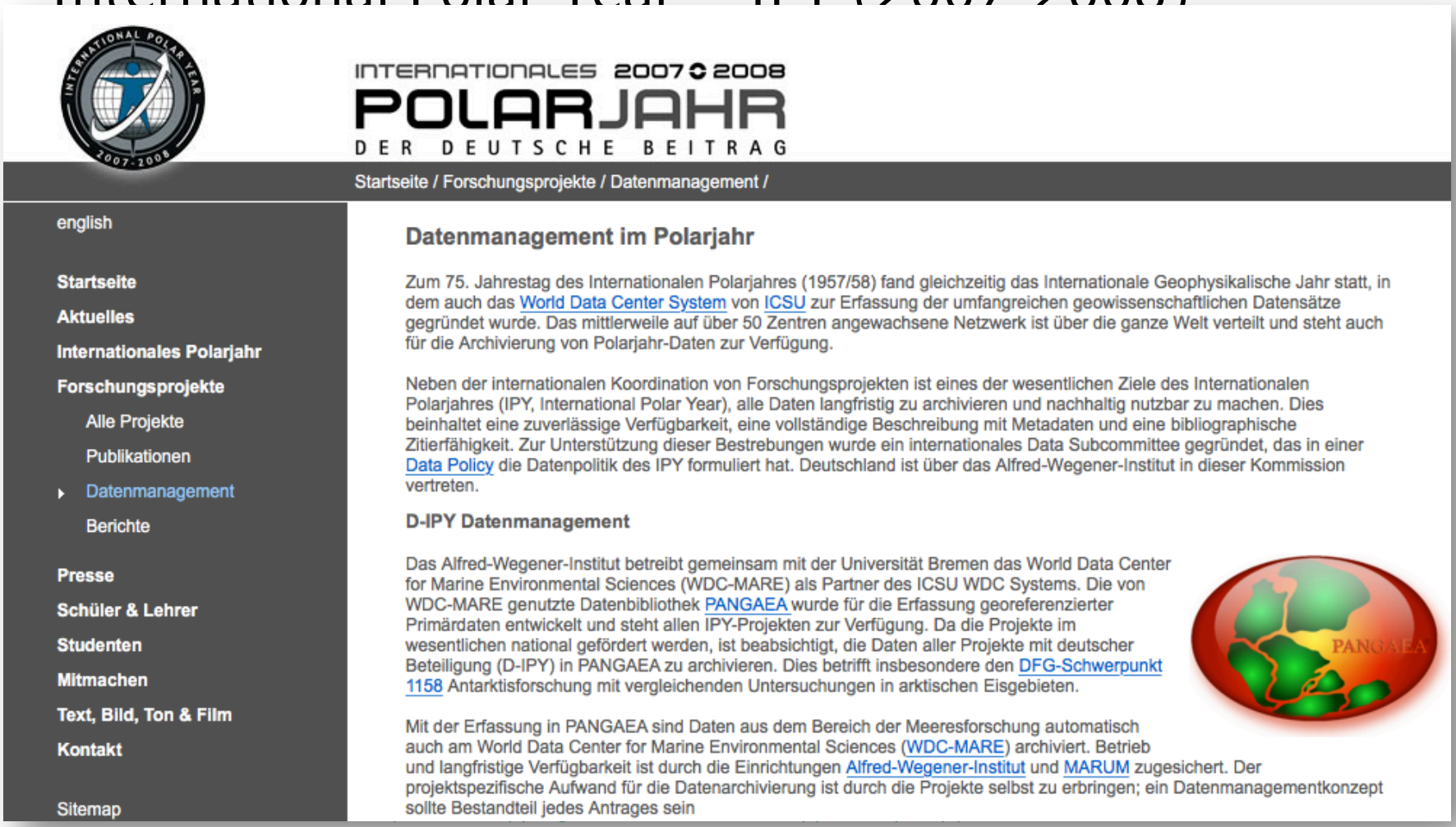
INTERDISZIPLINÄRE POLICIES

- Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003)
  - „**Open Access-Veröffentlichungen umfassen** originäre wissenschaftliche Forschungsergebnisse ebenso wie **Ursprungsdaten, Metadaten, Quellenmaterial**, digitale Darstellungen von Bild- und Graphik-Material und wissenschaftliches Material in multimedialer Form."
- Einige Vorteile der Offenheit:
  - Transparenz der Forschung (Nachprüfbarkeit)
  - Effizienz der Forschung (Nachnutzung)
  - Steigerung der Wertschöpfung (Transfer)

Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003). Retrieved from http://oa.mpg.de/lang/de/berlin-prozess/berliner-erklarung/

DISZIPLINÄRE POLICIES

- International Polar Year – IPY (2007-2008)



INTERNATIONALES 2007 2008
POLARJAHR
DER DEUTSCHE BEITRAG

Startseite / Forschungsprojekte / Datenmanagement /

english

- Startseite
- Aktuelles
- Internationales Polarjahr
- Forschungsprojekte
  - Alle Projekte
  - Publikationen
  - Datenmanagement
  - Berichte
- Presse
- Schüler & Lehrer
- Studenten
- Mitmachen
- Text, Bild, Ton & Film
- Kontakt

Sitemap

Datenmanagement im Polarjahr

Zum 75. Jahrestag des Internationalen Polarjahres (1957/58) fand gleichzeitig das Internationale Geophysikalische Jahr statt, in dem auch das World Data Center System von ICSU zur Erfassung der umfangreichen geowissenschaftlichen Datensätze gegründet wurde. Das mittlerweile auf über 50 Zentren angewachsene Netzwerk ist über die ganze Welt verteilt und steht auch für die Archivierung von Polarjahr-Daten zur Verfügung.

Neben der internationalen Koordination von Forschungsprojekten ist eines der wesentlichen Ziele des Internationalen Polarjahres (IPY, International Polar Year), alle Daten langfristig zu archivieren und nachhaltig nutzbar zu machen. Dies beinhaltet eine zuverlässige Verfügbarkeit, eine vollständige Beschreibung mit Metadaten und eine bibliographische Zitierfähigkeit. Zur Unterstützung dieser Bestrebungen wurde ein internationales Data Subcommittee gegründet, das in einer Data Policy die Datenpolitik des IPY formuliert hat. Deutschland ist über das Alfred-Wegener-Institut in dieser Kommission vertreten.

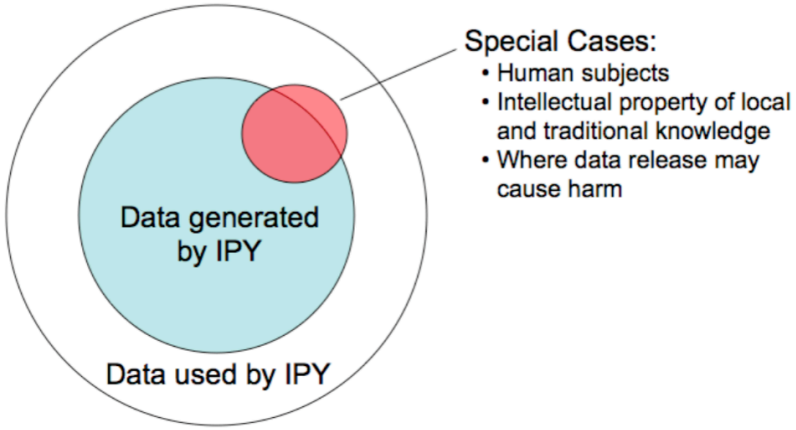
D-IPY Datenmanagement

Das Alfred-Wegener-Institut betreibt gemeinsam mit der Universität Bremen das World Data Center for Marine Environmental Sciences (WDC-MARE) als Partner des ICSU WDC Systems. Die von WDC-MARE genutzte Datenbibliothek PANGAEA wurde für die Erfassung georeferenzierter Primärdaten entwickelt und steht allen IPY-Projekten zur Verfügung. Da die Projekte im wesentlichen national gefördert werden, ist beabsichtigt, die Daten aller Projekte mit deutscher Beteiligung (D-IPY) in PANGAEA zu archivieren. Dies betrifft insbesondere den DFG-Schwerpunkt 1158 Antarktisforschung mit vergleichenden Untersuchungen in arktischen Eisgebieten.

Mit der Erfassung in PANGAEA sind Daten aus dem Bereich der Meeresforschung automatisch auch am World Data Center for Marine Environmental Sciences (WDC-MARE) archiviert. Betrieb und langfristige Verfügbarkeit ist durch die Einrichtungen Alfred-Wegener-Institut und MARUM zugesichert. Der projektspezifische Aufwand für die Datenarchivierung ist durch die Projekte selbst zu erbringen; ein Datenmanagementkonzept sollte Bestandteil jedes Antrages sein

DISZIPLINÄRE POLICIES

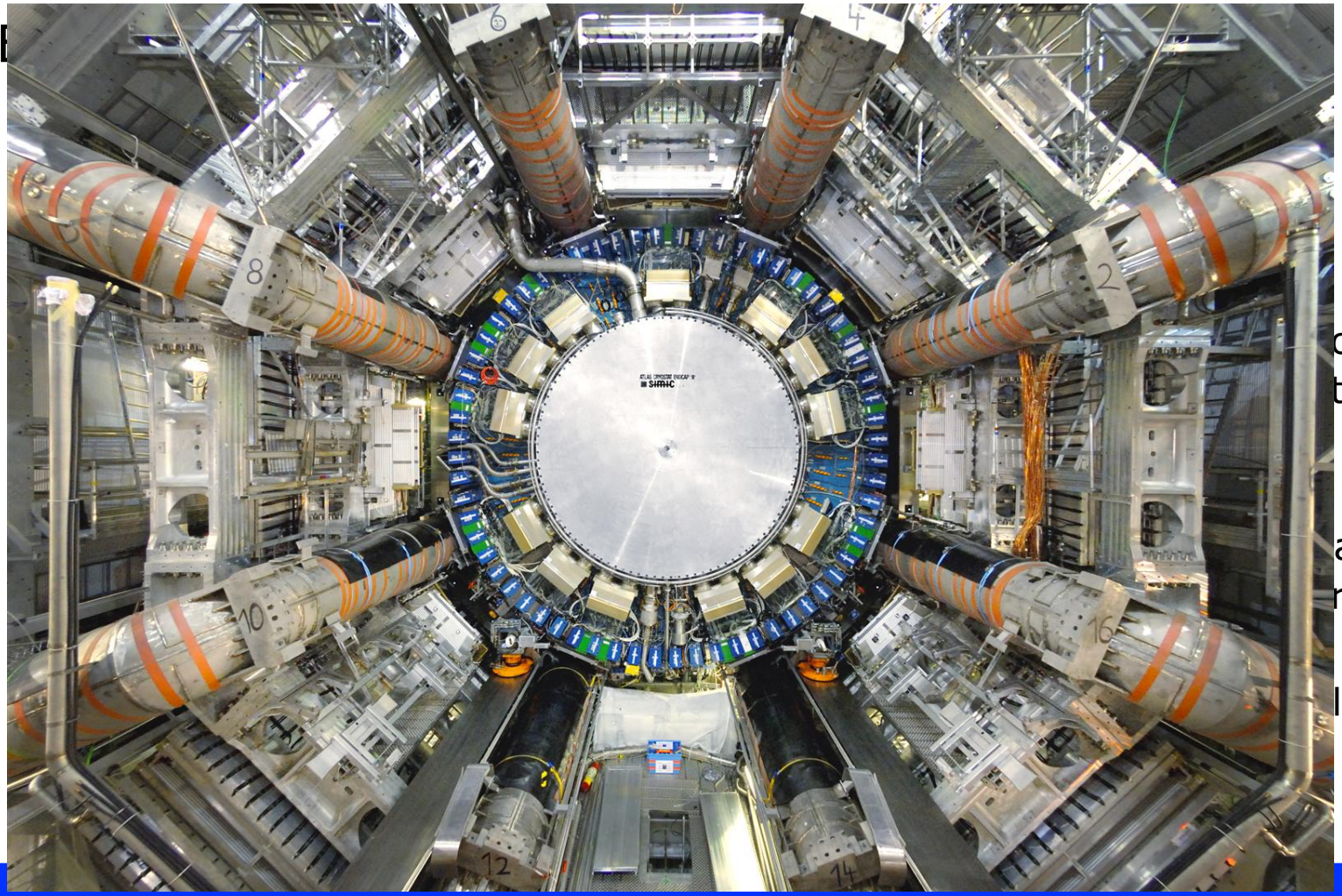
- International Polar Year – IPY (2007-2008)
  - „in order to maximize the benefit of data gathered under the auspices of the IPY, the IPY Joint Committee **requires that IPY data**, including operational data delivered in real time, **are made available fully, freely, openly, and on the shortest feasible timescale**."
  - Ausnahmen:



http://classic.ipy.org/Subcommittees/final_ipy_data_policy.pdf

DISZIPLINÄRE POLICIES

- Large Hadron Collider (LHC)
  - E



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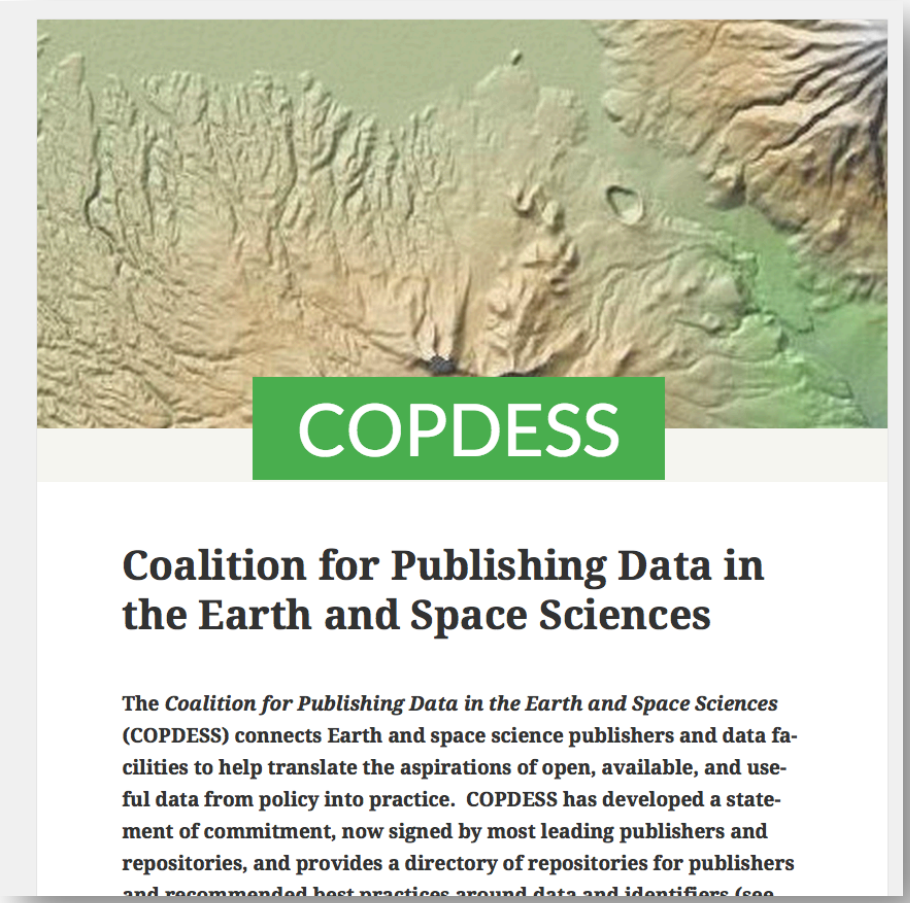
DISZIPLINÄRE POLICIES

- Large Hadron Collider (LHC)
  - Beispiel: ATLAS Data Access Policy, 2014
    - Policies for Different Data Levels:
      - Level-1. Published results: „**All** are openly available, **without restriction** on use by external parties beyond copyright law and the standard conditions agreed by CERN."
      - Level-2. Outreach and Education: „ATLAS recognizes the vital role of outreach and education, and participates in and encourages outreach and education activities, and makes **selected data available** for them."
      - Level-3. Reconstructed data: „ATLAS recognizes the potential value of making its reconstructed (level-3) data openly available **after reasonable embargo** periods."
      - Level-4. Raw data: „It is not practically possible to make the full raw data-set from an experiment of the scale of ATLAS usable in a meaningful way outside the collaboration."

https://twiki.cern.ch/twiki/pub/AtlasPublic/AtlasPolicyDocuments/A78_ATLAS_Data_Access_Policy.pdf

DISZIPLINÄRE POLICIES

- Initiativen in den Fächern: Geowissenschaften



http://www.copdess.org/statement-of-commitment/

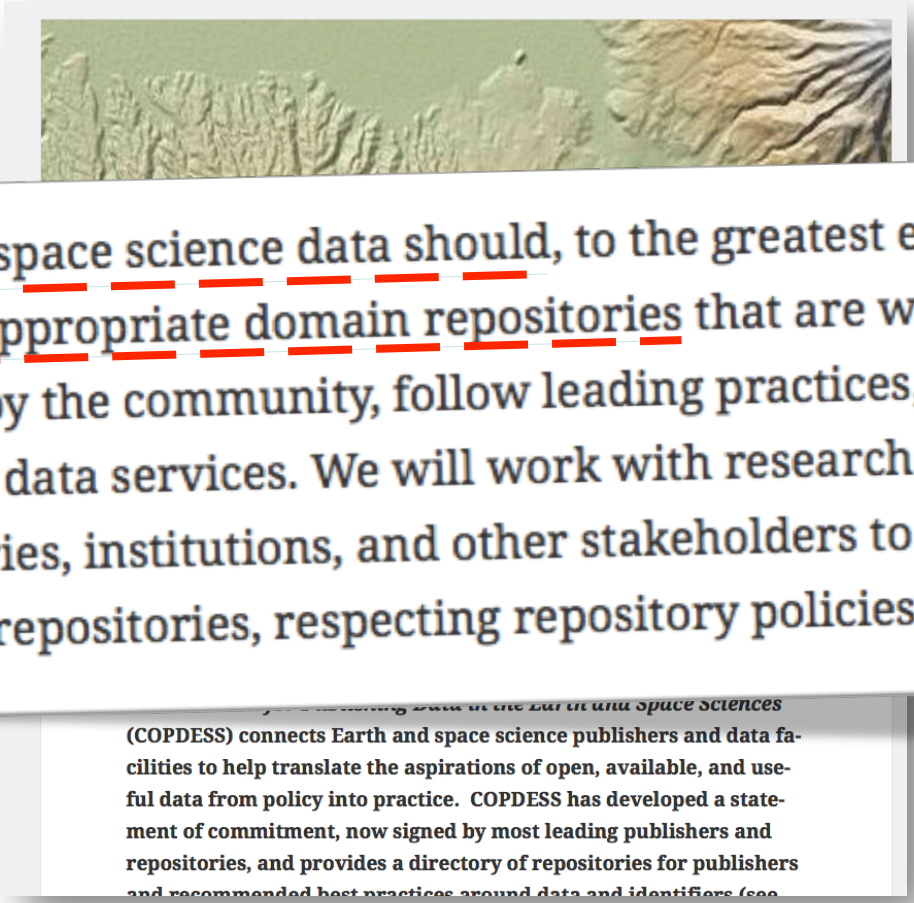
DISZIPLINÄRE POLICIES

- Initiativen in den Fächern: Geowissenschaften

http://www.copdess.org/statement-of-commitment/

DISZIPLINÄRE POLICIES

- Initiativen in den Fächern: Geowissenschaften



- Earth and space science data should, to the greatest extent possible, be stored in appropriate domain repositories that are widely recognized and used by the community, follow leading practices, and can provide additional data services. We will work with researchers, funding agencies, libraries, institutions, and other stakeholders to direct data to appropriate repositories, respecting repository policies.

(COPDESS) connects Earth and space science publishers and data facilities to help translate the aspirations of open, available, and useful data from policy into practice. COPDESS has developed a statement of commitment, now signed by most leading publishers and repositories, and provides a directory of repositories for publishers

http://www.copdess.org/statement-of-commitment/

INSTITUTIONELLE POLICIES

- Hochschulen in Deutschland:
  - Universität Bielefeld, 2013
  - Georg-August-Universität Göttingen, 2014
  - Humboldt-Universität zu Berlin, 2014
  - Universität Heidelberg, 2014
  - Christian-Albrechts-Universität Kiel, 2015
  - Bergische Universität Wuppertal, 2015
  - Technische Universität Darmstadt, 2015
  - Universität Kassel, 2017

http://www.forschungsdaten.org/index.php/Data_Policies#Institutionelle_Policies

INSTITUTIONELLE POLICIES

- Außeruniversitäre Einrichtungen in Deutschland
  - Deutsches GeoForschungsZentrum GFZ, 2016
  - Helmholtz-Zentrum Berlin (HZB), 2016
  - Karlsruher Institut für Technologie (KIT), 2016

- Ressortforschungseinrichtungen in Deutschland
  - Robert Koch-Institut, 2015

http://www.forschungsdaten.org/index.php/Data_Policies#Institutionelle_Policies

INSTITUTIONELLE POLICIES

- Außeruniversitäre Einrichtungen in Deutschland
  - Deutsches GeoForschungsZentrum GFZ, 2016
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  - Karlsruher Institut für Technologie (KIT), 2016
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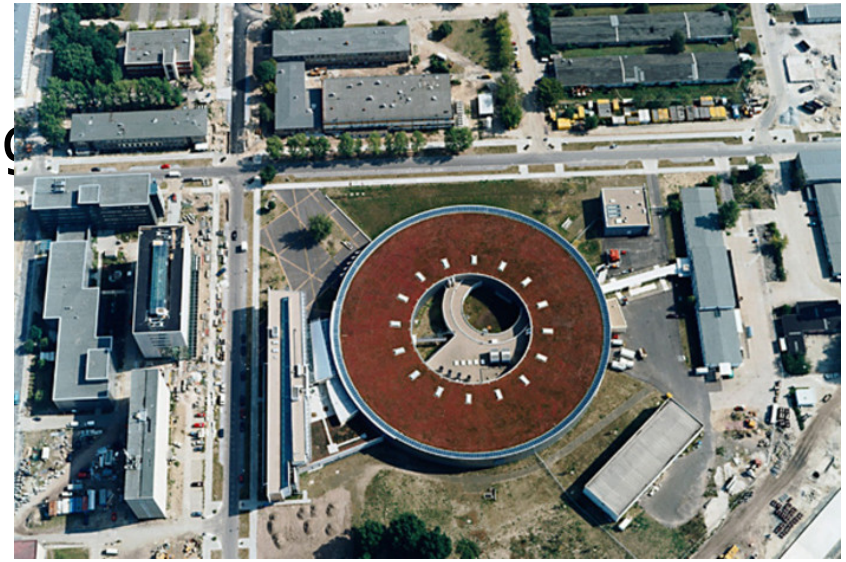
  - Robert Koch-Institut, 2015



http://www.forschungsdaten.org/index.php/Data_Policies#Institutionelle_Policies

INSTITUTIONELLE POLICIES

1. General principles

1.1 This policy sets the rules for the management of scientific data collected by public research at HZB's large-scale facilities. This includes the ownership of, the curation of and access to the data.

1.2 Acceptance of this policy is a condition of the award of beamtime.

1.3 For the data from proprietary research, users must make a separate agreement with HZB management how they wish their data to be managed before the start of any experiment.

3.5 Access to raw data and the associated metadata is restricted to the experimental team for a period of five years after the end of the experiment. Thereafter, it will become openly accessible. Any member of the experimental team that wishes their data to remain restricted access for a longer period will be required to make a special case to HZB management. Data can always be made openly accessible earlier on simple request of any member of the experimental team, if no other member objects.

https://www.helmholtz-berlin.de/pubbin/vademecumdatei?did=326

INSTITUTIONELLE POLICIES

- Außeruniversitäre Einrichtungen
  - **Deutsches GeoForschungsZentrum GFZ, 2016**
  - Helmholtz-Zentrum Berlin (HZB), 2016
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  - Robert Koch-Institut, 2015

INSTITUTIONELLE POLICIES

- Außeruniversitäre Einrichtungen
  - **De** **2016**
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  - Rob

GFZ
Helmholtz-Zentrum POTSDAM

Helmholtz-Zentrum Potsdam
Deutsches GeoForschungsZentrum

Grundsätze zum Umgang mit Forschungsdaten am Deutschen GeoForschungsZentrum GFZ

- **Wir bekennen uns zu den Prinzipien eines offenen Umgangs mit Wissen, Ergebnissen und Technologien.**
- **Wir wahren die Grundsätze und Regeln guter wissenschaftlicher Praxis.**
- **Wir eröffnen der geowissenschaftlichen Gemeinschaft die Nutzung unserer Infrastruktur und tragen zu nationalen und internationalen Diensten bei.**
- **Wir initiieren und koordinieren nationale und internationale geowissenschaftliche Netzwerke.**

(Auszüge, Leitbild - Strategieschrift GFZ 2014)

Qualitätsgesicherte Forschungsdaten bilden einen Grundpfeiler wissenschaftlicher Erkenntnis und können unabhängig von ihrem ursprünglichen Erhebungszweck vielfach die Grundlage weiterer Forschung sein. Die nachhaltige Sicherung und Bereitstellung von Forschungsdaten dient daher nicht nur der Prüfung früherer Ergebnisse, sondern in hohem Maße auch der Erzielung künftiger Ergebnisse mit dem Ziel, die Qualität, Produktivität und Wettbewerbsfähigkeit der Wissenschaft zu fördern und bildet eine elementare Grundlage für den Wissenstransfer.

Wissenschaftliche Anerkennung: Die Bereitstellung von Forschungsdaten zur weiteren Nutzung ist eine Leistung, die nicht nur der Wissenschaft, sondern der Gesellschaft insgesamt zu Gute kommt. Das GFZ erkennt diesen zusätzlichen Aufwand als Teil der Forschungsleistung an und sieht sich in Zukunft national und international weiter dem Ziel verpflichtet, dies zu fördern.

Sicherung und Zugänglichkeit: Das GFZ unterstützt die langfristige Sicherung und den grundsätzlich offenen Zugang zu Forschungsdaten aus öffentlich geförderter Forschung. Dies geschieht in Übereinstimmung mit auf dem Gebiet der Förderung und Durchführung von Forschungsaufgaben tätigen internationalen Organisationen und wird vom GFZ durch entsprechende Angebote unterstützt.

www.gfz-potsdam.de

HELMHOLTZ GEMEINSCHAFT

Dabei sind die wissenschaftlichen und rechtlichen Interessen der Forscherinnen und Forscher zu beachten. Verpflichtungen gegenüber Dritten – etwa vertragliche Vereinbarungen mit Kooperationspartnern - sind zu berücksichtigen. Grundsätzlich sollen standardisierte real-time Daten im Rahmen von internationalen Netzwerken sofort und unmittelbar zugänglich sein. Die Zugänglichkeit von Daten und Datenprodukten (prozessierte Daten) kann durch angemessene Embargofristen für maximal bis zu drei Jahren nach Projektende temporär eingeschränkt werden, um entsprechende wissenschaftliche Auswertungen, Publikationen und Qualifikationsarbeiten im Vorfeld zu ermöglichen. Zur Klärung von Embargofragen wird ein Datenbeirat gebildet.

Eine Nachverfolgung der Nutzung kann ermöglicht werden.

Zitierbarkeit und Publikation: Der offene Zugang zu Forschungsdaten wird am GFZ in der Regel auf dem Weg der zitierbaren Datenpublikation gewährleistet.

Lizenzen: Bei einer Übertragung von Nachnutzungs- oder Verwertungsrechten soll darauf geachtet werden, dass die Forschungsdaten für wissenschaftliche Zwecke frei zugänglich bleiben. Die Wahl einer offenen Lizenz (für Forschungsdaten: Creative Commons) zur einfachen Nachnutzung wird daher empfohlen.

Forschungsdateninfrastrukturen: Das GFZ stellt eine Forschungsdaten-infrastruktur zur Verfügung, die das Archivieren der Daten, den Austausch mit Kooperationspartnern, die Datenpublikation und die Langzeiterhaltung der Daten unterstützt. Fachspezifische Lösungen im nationalen und internationalen Kontext können dabei eingebunden werden.

Eine sachgerechte Nutzung von Forschungsdaten setzt voraus, dass sie in standardisierter Form bereitgestellt, dokumentiert und ausreichend mit Metadaten versehen werden. Auf der Basis von internationalen Standards sind Metadatenkataloge unter Berücksichtigung fachspezifischer Anforderungen so zu entwickeln, dass auch eine interdisziplinäre Nutzung möglich ist. Die Vernetzbarkeit der Forschungsdaten, sowie deren Nachnutzungspotential stehen im Mittelpunkt dieser Aufbereitung. Zugleich ist den jeweiligen Lebenszyklen und Nutzungsszenarien der Forschungsdaten im konkreten Forschungsfeld Rechnung zu tragen.

Qualifizierung: Den Forschenden am GFZ, einschließlich der Doktoranden, wird in Ausbildungs- und Unterstützungsangebot zum professionellen Forschungsdatenmanagement bereitgestellt, das an den spezifischen Erfordernissen der unterschiedlichen Fachdisziplinen ausgerichtet ist.

Verantwortlichkeit: Die Verantwortung für den sachgerechten Umgang mit Forschungsdaten liegt bei der Leitung der Organisationseinheiten (Sektionen).

Umsetzung: Diese Grundsätze sind Basis aller Forschungsdaten-relevanten Aktivitäten des GFZ.

Rahmenbedingungen: Das GFZ unterstützt und fördert nationale und internationale Erklärungen zum Umgang mit Forschungsdaten.

(Stand: 2016)

Deutsches GeoForschungsZentrum GFZ (2016): Grundätze zum Umgang mit Forschungsdaten am Deutschen GeoForschungsZentrum GFZ. Retrieved from: https://media.gfz-potsdam.de/gfz/wv/doc/16/GFZ_Daten_Grundsaetze+Erg_de.pdf

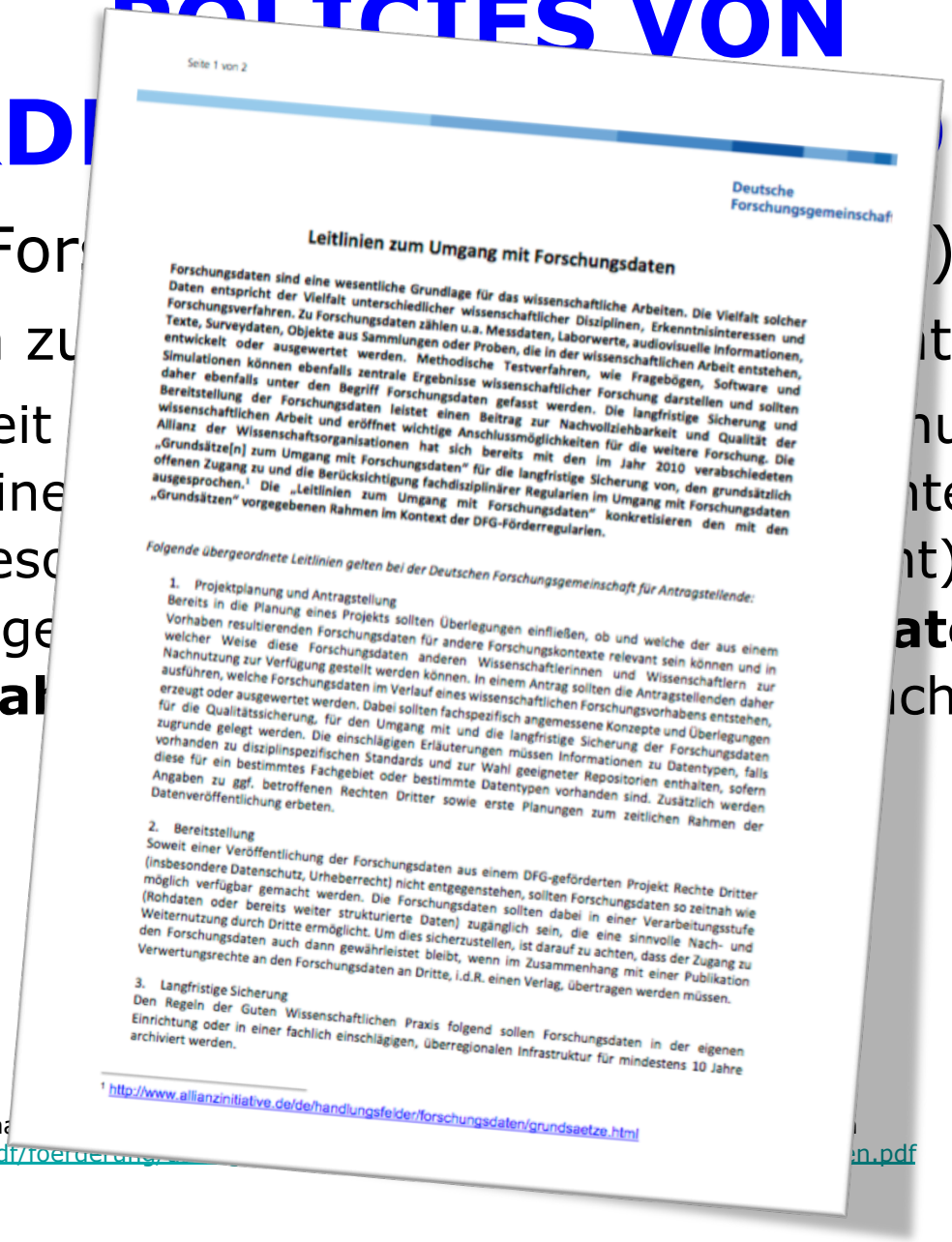
POLICIES VON FÖRDERORGANISATIONEN

- Deutsche Forschungsgemeinschaft (DFG)
  - Leitfaden für die Antragstellung, 2014
    - „**Wenn aus Projektmitteln** systematisch **Forschungsdaten** oder Informationen gewonnen werden, die für die Nachnutzung durch **andere** Wissenschaftlerinnen und Wissenschaftler **geeignet** sind, **legen Sie bitte dar**, ob und auf welche Weise **diese für andere zur Verfügung gestellt** werden. Bitte berücksichtigen Sie dabei auch - sofern vorhanden - die in Ihrer Fachdisziplin existierenden **Standards** und die Angebote existierender **Daten-repositorien** oder Archive."

http://www.dfg.de/formulare/54_01/54_01_de.pdf

POLICIES VON FÖRDE…NEN

- Deutsche For…)
  - Leitlinien zu…ten, 2015
    - „Soweit …ungsdaten aus eine…te Dritter (insbesc…t) nicht entgege…**aten so zeitnah**…cht werden."



Seite 1 von 2

Deutsche Forschungsgemeinschaf

Leitlinien zum Umgang mit Forschungsdaten

Forschungsdaten sind eine wesentliche Grundlage für das wissenschaftliche Arbeiten. Die Vielfalt solcher Daten entspricht der Vielfalt unterschiedlicher wissenschaftlicher Disziplinen, Erkenntnisinteressen und Forschungsverfahren. Zu Forschungsdaten zählen u.a. Messdaten, Laborwerte, audiovisuelle Informationen, Texte, Surveydaten, Objekte aus Sammlungen oder Proben, die in der wissenschaftlichen Arbeit entstehen, entwickelt oder ausgewertet werden. Methodische Testverfahren, wie Fragebögen, Software und Simulationen können ebenfalls zentrale Ergebnisse wissenschaftlicher Forschung darstellen und sollten daher ebenfalls unter den Begriff Forschungsdaten gefasst werden. Die langfristige Sicherung und Bereitstellung der Forschungsdaten leistet einen Beitrag zur Nachvollziehbarkeit und Qualität der wissenschaftlichen Arbeit und eröffnet wichtige Anschlussmöglichkeiten für die weitere Forschung. Die Allianz der Wissenschaftsorganisationen hat sich bereits mit den im Jahr 2010 verabschiedeten „Grundsätze[n] zum Umgang mit Forschungsdaten" für die langfristige Sicherung von, den grundsätzlich offenen Zugang zu und die Berücksichtigung fachdisziplinärer Regularien im Umgang mit Forschungsdaten ausgesprochen.[1] Die „Leitlinien zum Umgang mit Forschungsdaten" konkretisieren den mit den „Grundsätzen" vorgegebenen Rahmen im Kontext der DFG-Förderregularien.

Folgende übergeordnete Leitlinien gelten bei der Deutschen Forschungsgemeinschaft für Antragstellende:

1. Projektplanung und Antragstellung

Bereits in die Planung eines Projekts sollten Überlegungen einfließen, ob und welche der aus einem Vorhaben resultierenden Forschungsdaten für andere Forschungskontexte relevant sein können und in welcher Weise diese Forschungsdaten anderen Wissenschaftlerinnen und Wissenschaftlern zur Nachnutzung zur Verfügung gestellt werden können. In einem Antrag sollten die Antragstellenden daher ausführen, welche Forschungsdaten im Verlauf eines wissenschaftlichen Forschungsvorhabens entstehen, erzeugt oder ausgewertet werden. Dabei sollten fachspezifisch angemessene Konzepte und Überlegungen für die Qualitätssicherung, für den Umgang mit und die langfristige Sicherung der Forschungsdaten zugrunde gelegt werden. Die einschlägigen Erläuterungen müssen Informationen zu Datentypen, falls vorhanden zu disziplinspezifischen Standards und zur Wahl geeigneter Repositorien enthalten, sofern diese für ein bestimmtes Fachgebiet oder bestimmte Datentypen vorhanden sind. Zusätzlich werden Angaben zu ggf. betroffenen Rechten Dritter sowie erste Planungen zum zeitlichen Rahmen der Datenveröffentlichung erbeten.

2. Bereitstellung

Soweit einer Veröffentlichung der Forschungsdaten aus einem DFG-geförderten Projekt Rechte Dritter (insbesondere Datenschutz, Urheberrecht) nicht entgegenstehen, sollten Forschungsdaten so zeitnah wie möglich verfügbar gemacht werden. Die Forschungsdaten sollten dabei in einer Verarbeitungsstufe (Rohdaten oder bereits weiter strukturierte Daten) zugänglich sein, die eine sinnvolle Nach- und Weiternutzung durch Dritte ermöglicht. Um dies sicherzustellen, ist darauf zu achten, dass der Zugang zu den Forschungsdaten auch dann gewährleistet bleibt, wenn im Zusammenhang mit einer Publikation Verwertungsrechte an den Forschungsdaten an Dritte, i.d.R. einen Verlag, übertragen werden müssen.

3. Langfristige Sicherung

Den Regeln der Guten Wissenschaftlichen Praxis folgend sollen Forschungsdaten in der eigenen Einrichtung oder in einer fachlich einschlägigen, überregionalen Infrastruktur für mindestens 10 Jahre archiviert werden.

[1] http://www.allianzinitiative.de/de/handlungsfelder/forschungsdaten/grundsaetze.html

Deutsche Forschungsgemeinscha…
http://www.dfg.de/download/pdf/foerderung/…en.pdf

POLICIES VON FÖRDERORGANISATIONEN

- Deutsche Forschungsgemeinschaft (DFG)
  - Leitlinien zum Umgang mit Forschungsdaten, 2015
    - „Soweit einer Veröffentlichung der Forschungsdaten aus einem DFG-geförderten Projekt Rechte Dritter (insbesondere Datenschutz, Urheberrecht) nicht entgegenstehen, **sollten Forschungsdaten so zeitnah wie möglich verfügbar** gemacht werden."

Deutsche Forschungsgemeinschaft. (2015). Leitlinien zum Umgang mit Forschungsdaten. Retrieved from http://www.dfg.de/download/pdf/foerderung/antragstellung/forschungsdaten/richtlinien_forschungsdaten.pdf

POLICIES VON FÖRDERORGANISATIONEN

- Europäische Kommission: HORIZON 2020, 2016

29.3 Open access to research data

***[OPTION for actions participating in the open Research Data Pilot**: Regarding the digital research data generated in the action ('**data**'), the beneficiaries must:*

(a) deposit in a research data repository and take measures to make it possible for third parties to access, mine, exploit, reproduce and disseminate — free of charge for any user — the following:

(i) the data, including associated metadata, needed to validate the results presented in scientific publications as soon as possible;

*(ii) other data, including associated metadata, as specified and within the deadlines laid down in the '**data management plan**' (see Annex 1);*

(b) provide information — via the repository — about tools and instruments at the disposal of the beneficiaries and necessary for validating the results (and — where possible — provide the tools and instruments themselves).

EC (2016). Horizon 2020 Annotated Model Grant Agreements. Version 2.2. 2. Retrieved from http://www.kowi.de/Portaldata/2/Resources/horizon2020/ga/h2020-annotated-mga.pdf

POSITION DER VERLAGE

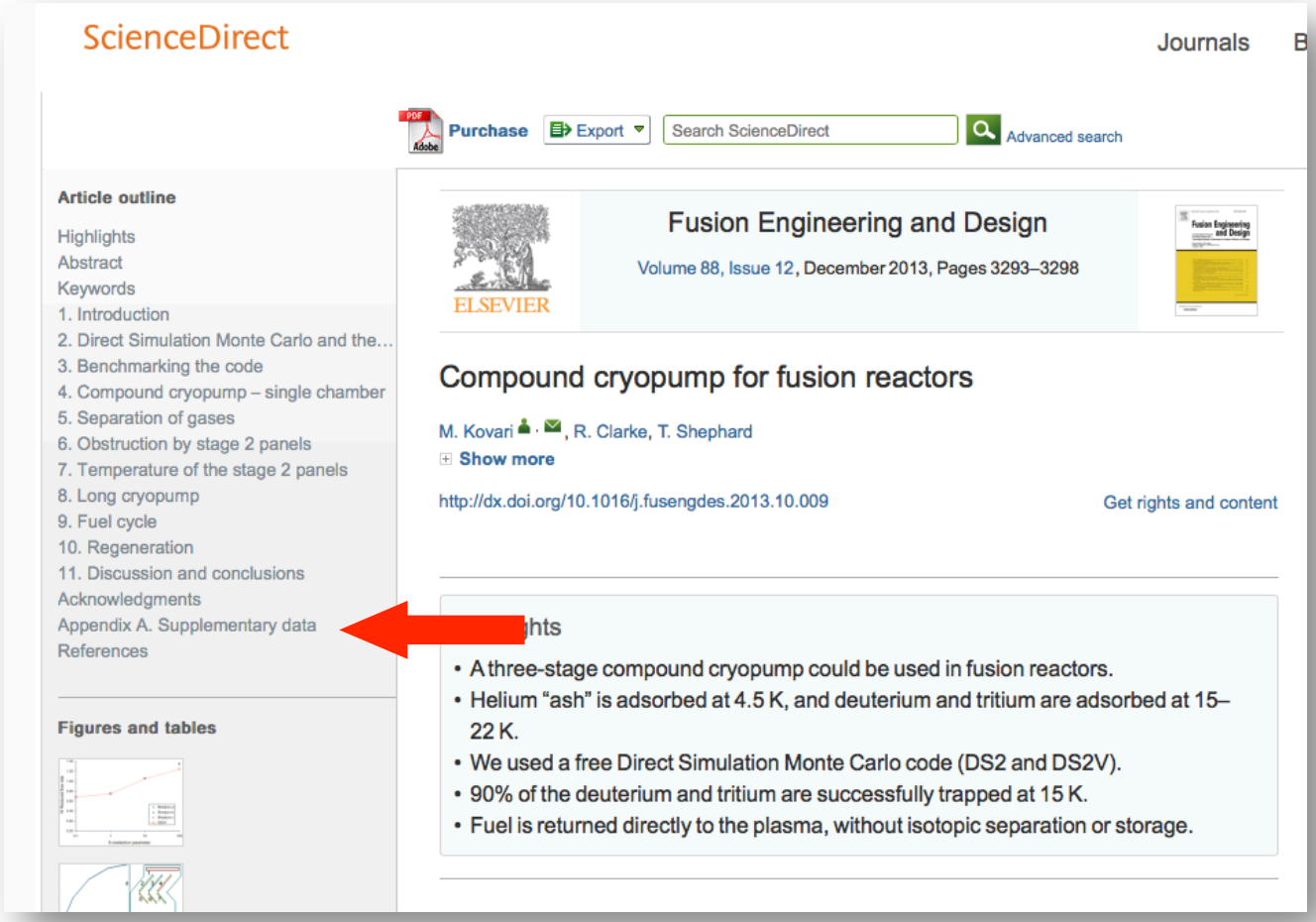
- Brussels Declaration on STM Publishing, 2017

  - **„Raw research data should be made freely available to all researchers**. Publishers encourage the public posting of the raw data outputs of research. Sets or sub-sets of data that are submitted with a paper to a journal should wherever possible be made freely accessible to other scholars“

http://www.stm-assoc.org/public-affairs/resources/brussels-declaration/

POSITION DER VERLAGE

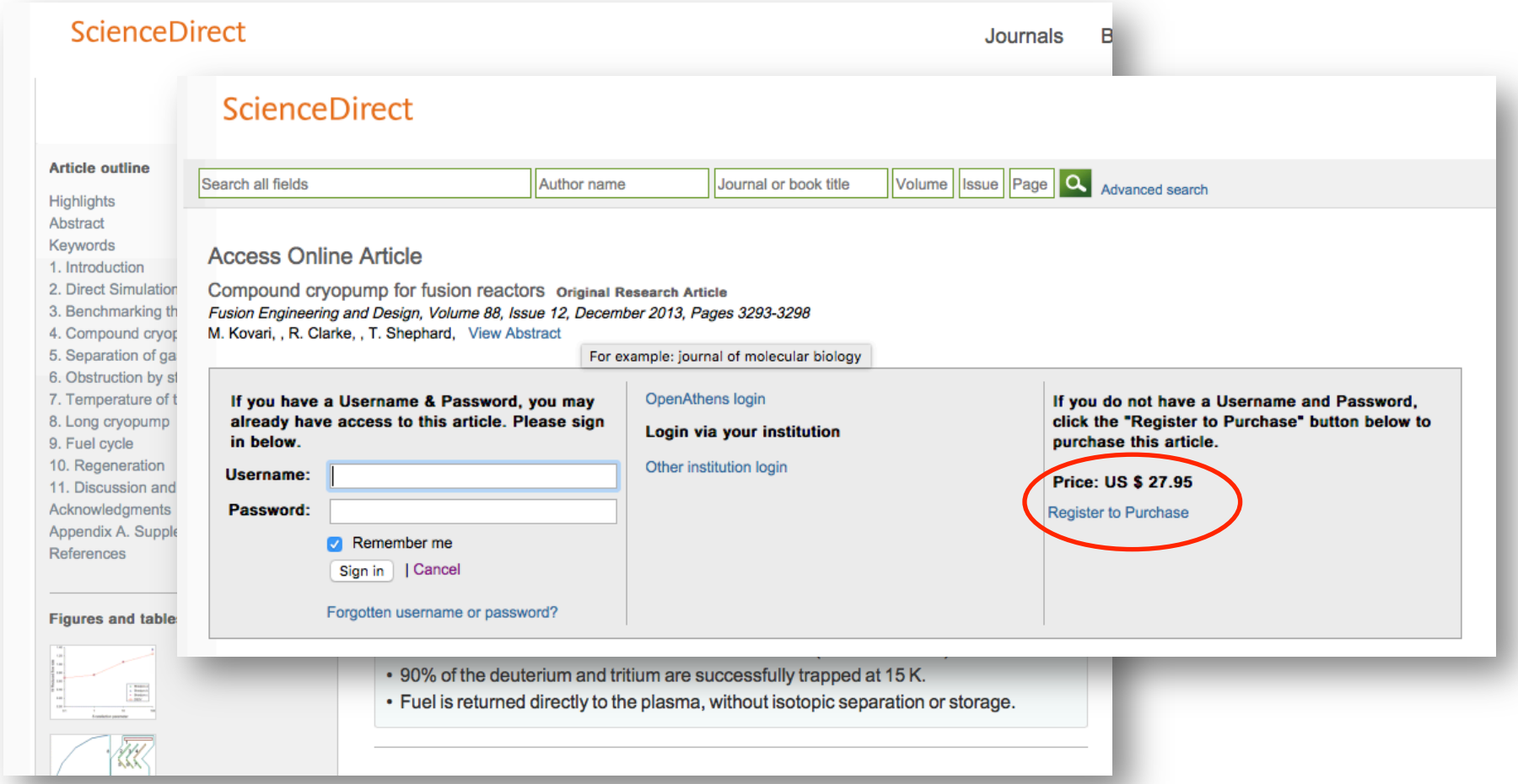
- Blick in die Praxis: Elsevier



http://www.stm-assoc.org/public-affairs/resources/brussels-declaration/

POSITION DER VERLAGE

- Blick in die Praxis: Elsevier



http://www.stm-assoc.org/public-affairs/resources/brussels-declaration/

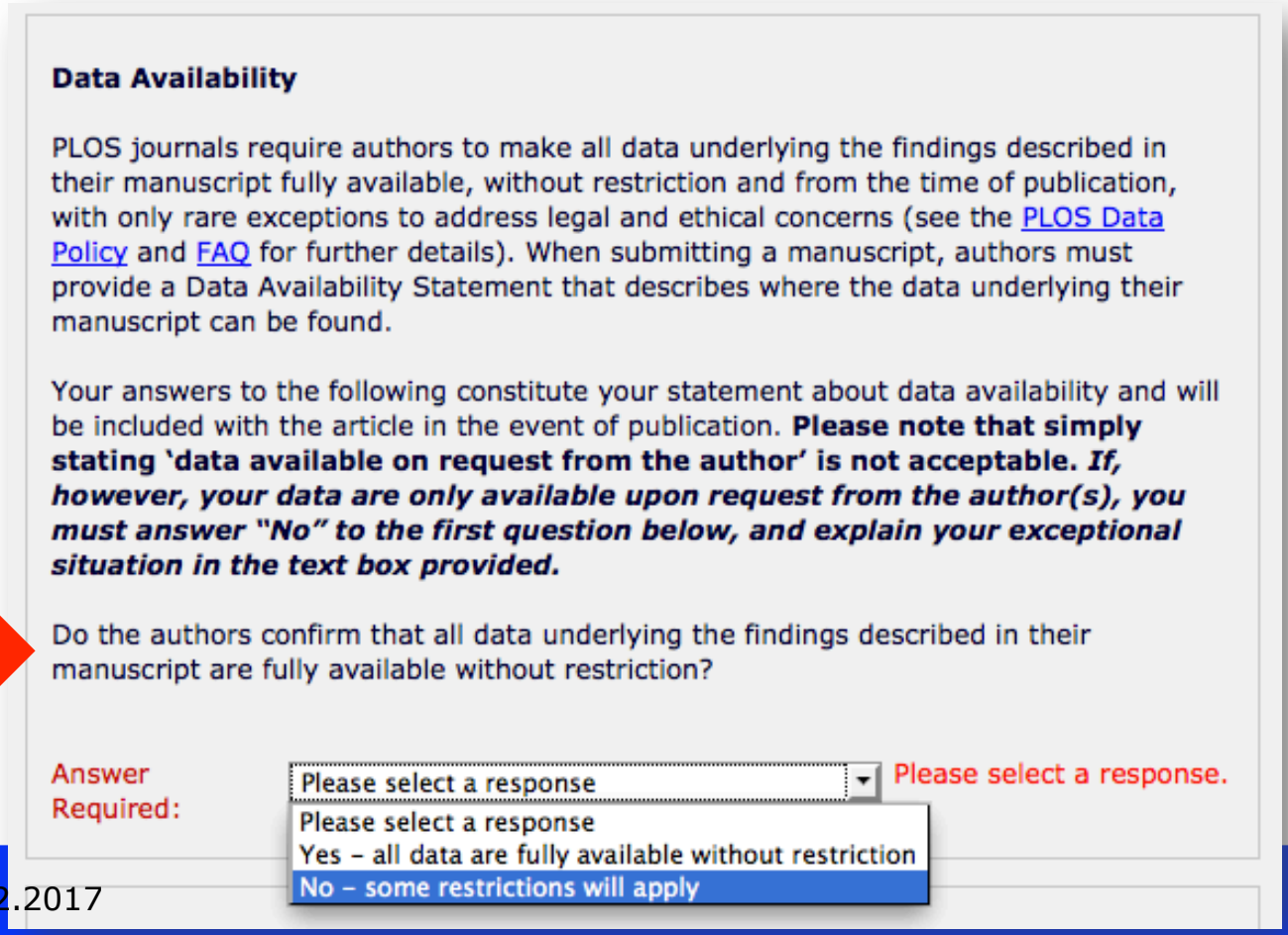
POLICIES VON JOURNALEN

- PLOS, 2014
  - „PLOS journals require authors to make all **data underlying the findings** described in their manuscript **fully available** without restriction, with rare exception [...]. “
  - „When submitting a manuscript online, authors must provide a **Data Availability Statement** describing compliance with PLOS's policy. If the article is accepted for publication, the data availability statement will be published as part of the final article.“
  - „**Refusal** to share data and related metadata and methods in accordance with this policy **will be grounds for rejection**.“

PLOS. (2014). PLOS Editorial and Publishing Policies. Retrieved from http://www.plosone.org/static/policies#sharing

POLICIES VON JOURNALEN

- Verankerung im Einreichungsprozess
  - Beispiel PLOS ONE



Data Availability

PLOS journals require authors to make all data underlying the findings described in their manuscript fully available, without restriction and from the time of publication, with only rare exceptions to address legal and ethical concerns (see the PLOS Data Policy and FAQ for further details). When submitting a manuscript, authors must provide a Data Availability Statement that describes where the data underlying their manuscript can be found.

Your answers to the following constitute your statement about data availability and will be included with the article in the event of publication. **Please note that simply stating 'data available on request from the author' is not acceptable. *If, however, your data are only available upon request from the author(s), you must answer "No" to the first question below, and explain your exceptional situation in the text box provided.***

Do the authors confirm that all data underlying the findings described in their manuscript are fully available without restriction?

Answer Required: Please select a response — Please select a response.

Please select a response
Yes – all data are fully available without restriction
No – some restrictions will apply

Please describe where your data may be found, writing in full sentences. **Your answers should be entered into the box below and will be published in the form you provide them, if your manuscript is accepted.** If you are copying our sample text below, please ensure you replace any instances of XXX with the appropriate details.

Verlagsplattform

Öffentliches Repositorium

Sonstiges

- If your data are all contained within the paper and/or Supporting Information files, please state this in your answer below. For example, "All relevant data are within the paper and its Supporting Information files."
- If your data are held or will be held in a public repository, include URLs, accession numbers or DOIs. For example, "All XXX files are available from the XXX database (accession number(s) XXX, XXX)." If this information will only be available after acceptance, please indicate this by ticking the box below.
- If neither of these applies but you are able to provide details of access elsewhere, with or without limitations, please do so in the box below. For example:

  "Data are available from the XXX Institutional Data Access / Ethics Committee for researchers who meet the criteria for access to confidential data."
  "Data are from the XXX study whose authors may be contacted at XXX."

* typeset

Answer Required:

Character Count: 0

Limit 20000 characters

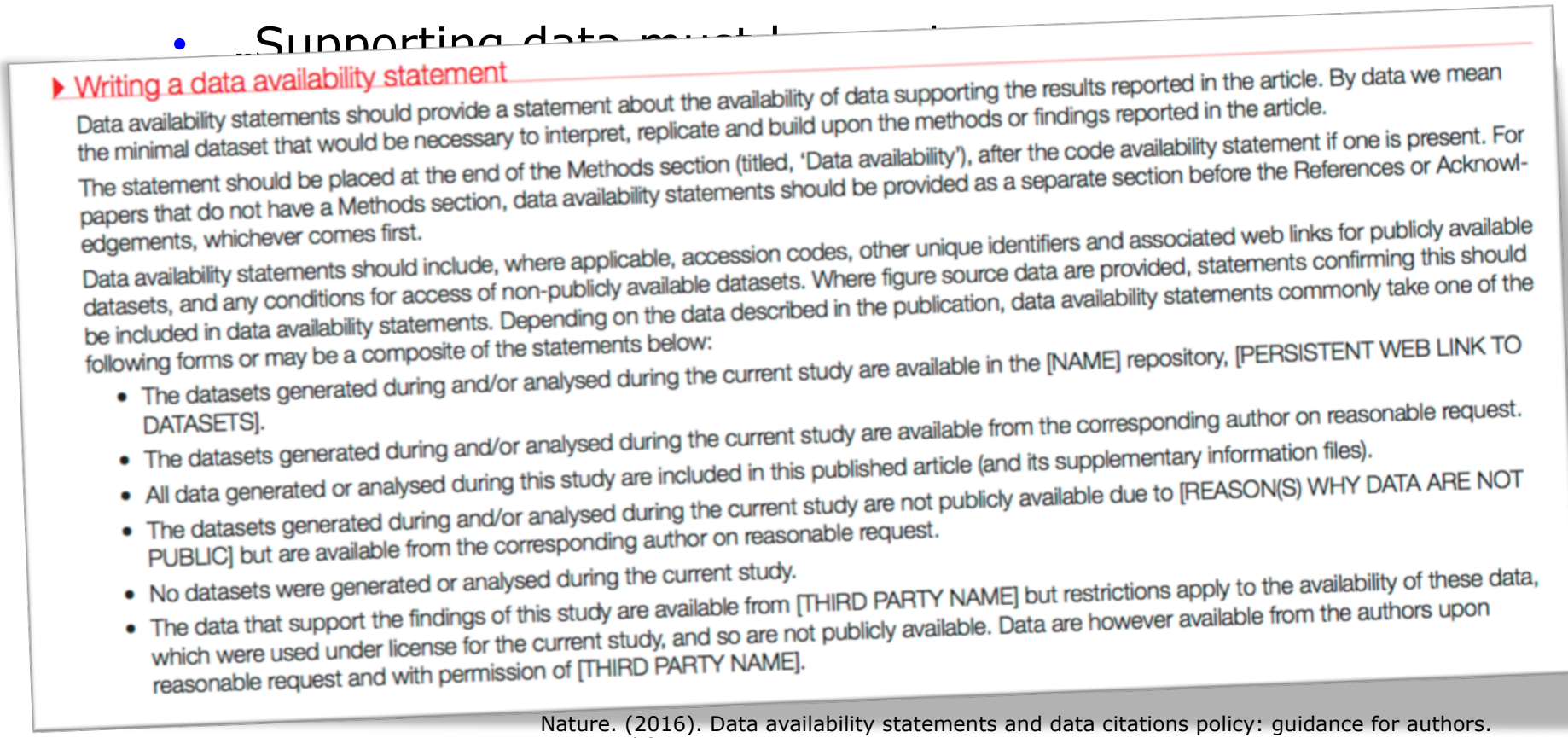
POLICIES VON JOURNALEN

- Nature, 2016
  - „Supporting data must be made available to editors and peer-reviewers at the time of submission for the purposes of evaluating the manuscript. All manuscripts reporting original research published in Nature journals must include a **data availability statement**. [...] The preferred way to share large data sets is **via public repositories**. “

Nature. (2016). Availability of data and materials. Retrieved from http://www.nature.com/authors/policies/availability.html

POLICIES VON JOURNALEN

- Nature, 2016
  - Supporting data must



Writing a data availability statement

Data availability statements should provide a statement about the availability of data supporting the results reported in the article. By data we mean the minimal dataset that would be necessary to interpret, replicate and build upon the methods or findings reported in the article.

The statement should be placed at the end of the Methods section (titled, 'Data availability'), after the code availability statement if one is present. For papers that do not have a Methods section, data availability statements should be provided as a separate section before the References or Acknowledgements, whichever comes first.

Data availability statements should include, where applicable, accession codes, other unique identifiers and associated web links for publicly available datasets, and any conditions for access of non-publicly available datasets. Where figure source data are provided, statements confirming this should be included in data availability statements. Depending on the data described in the publication, data availability statements commonly take one of the following forms or may be a composite of the statements below:

- The datasets generated during and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS].
- The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.
- All data generated or analysed during this study are included in this published article (and its supplementary information files).
- The datasets generated during and/or analysed during the current study are not publicly available due to [REASON(S) WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.
- No datasets were generated or analysed during the current study.
- The data that support the findings of this study are available from [THIRD PARTY NAME] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [THIRD PARTY NAME].

Nature. (2016). Data availability statements and data citations policy: guidance for authors. Retrieved from http://www.nature.com/authors/policies/data/data-availability-statements-data-citations.pdf

POLICIES VON JOURNALEN

- Nature, 2016
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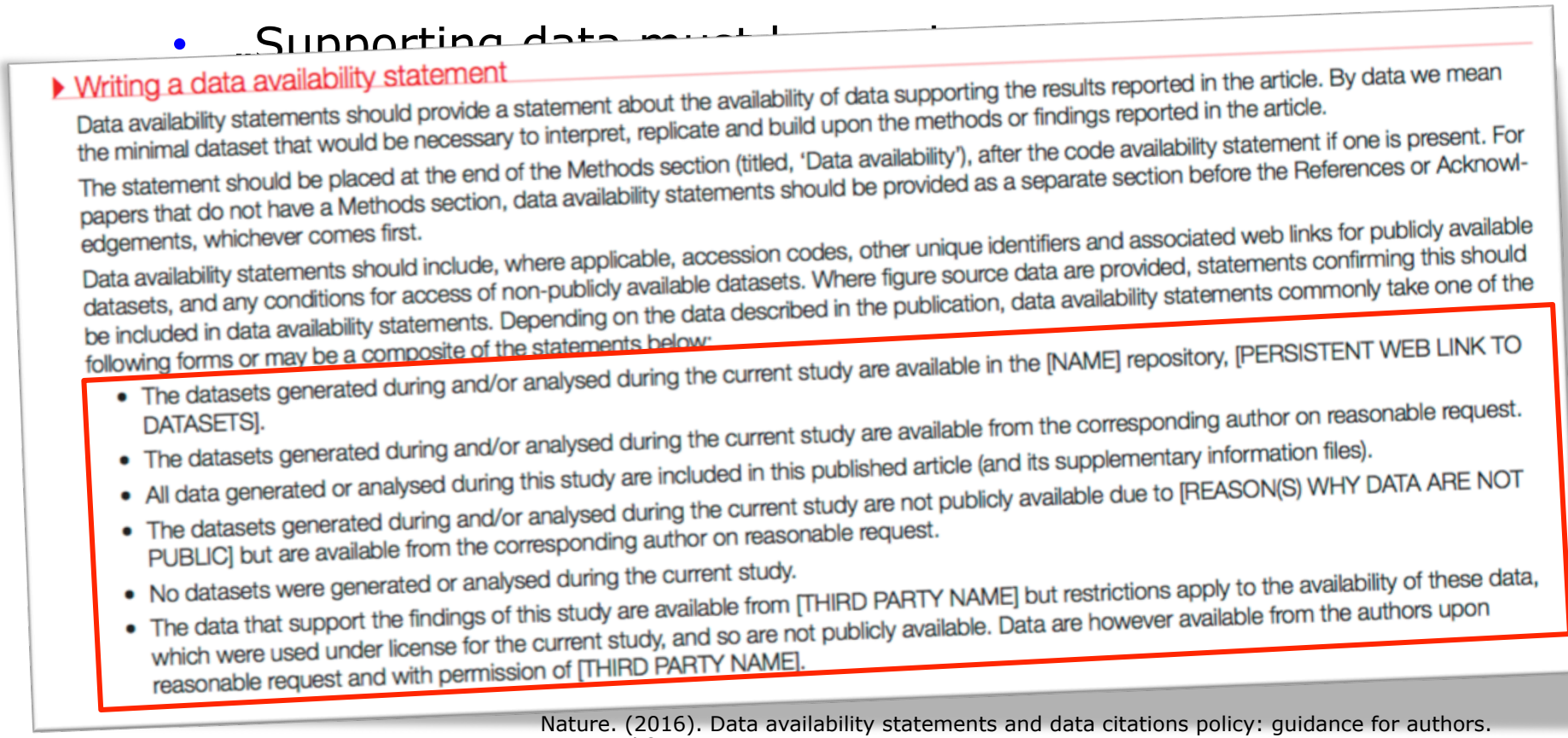

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- All data generated or analysed during this study are included in this published article (and its supplementary information files).
- The datasets generated during and/or analysed during the current study are not publicly available due to [REASON(S) WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.
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Nature. (2016). Data availability statements and data citations policy: guidance for authors. Retrieved from http://www.nature.com/authors/policies/data/data-availability-statements-data-citations.pdf

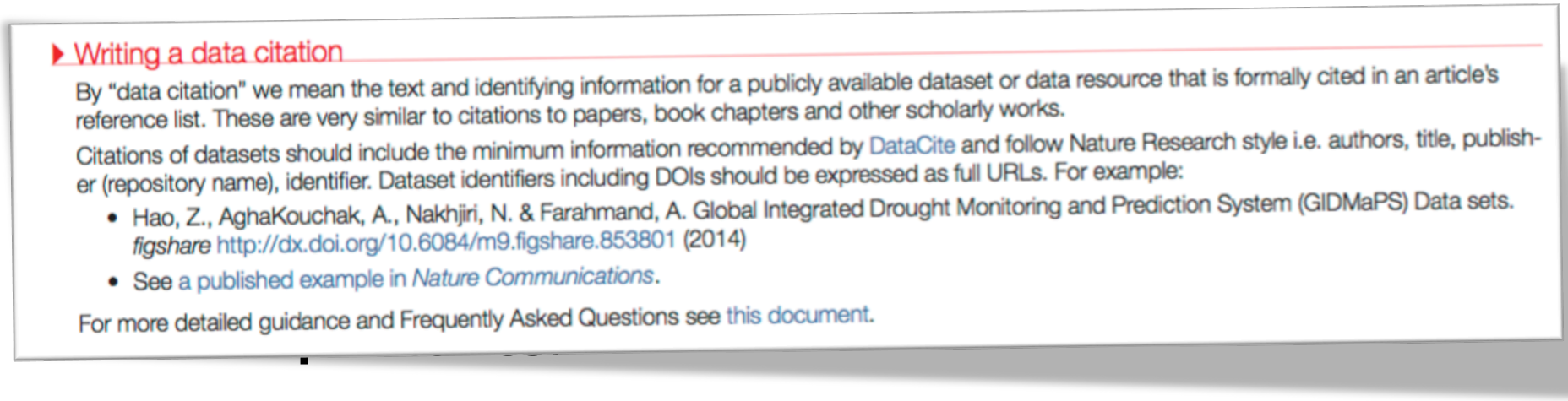
POLICIES VON JOURNALEN

Published examples

Statement type	Example statement text	Published example(s)
Data generated during the study available in a public repository (mandated deposition, DOIs not provided)	*[Data type e.g. "Sequence"] data that support the findings of this study have been deposited in [repository name e.g. "GenBank"] with the [primary] accession codes [list accession codes e.g. "KP253039" or "KP253039 (http://www.ncbi.nlm.nih.gov/nuccore/KP253039)"]*	*Nature Communications* *Nature Communications*
Data available in a public (institutional, general or subject specific) repository that issues datasets with DOIs (non-mandated deposition)	*The [data type] data that support the findings of this study are available in [repository name e.g "figshare"] with the identifier(s) [data DOI(s) e.g. "doi:10.6084/m9.figshare.1499292_D8"] [Reference number]*	*Nature Communications* *Nature Physics*
Data available in a public (institutional, general or subject specific) repository that does not issue datasets with DOIs (non-mandated deposition)	*The [data type e.g. "Snow pack depth"] data that support the findings of this study are available in/from [repository/resource name e.g. "GlobSnow"], [hyperlink to dataset(s)/data source e.g. "http://www.globsnow.info/"].*	*Nature Geoscience*
Data available on request from the authors	*The data that support the findings of this study are available from the corresponding author upon reasonable request.*	*Nature Communications* *Nature Neuroscience*
Authors can confirm that all relevant data are included in the paper and/or its supplementary information files	*The authors declare that [the/all other] data supporting the findings of this study are available within the paper [and its supplementary information files].*	*Nature Communications*
Data are available on request due to privacy or other restrictions	*The data that support the findings of this study are available on request from the corresponding author [author initials]. The data are not publicly available due to [state restrictions e.g. "them containing information that could compromise research participant privacy/consent"].*	*Nature Communications*
Standard statement where figure source data are provided (must be used in combination with another statement)	*Source data for figure(s) [number(s)] are provided with the paper.*	*Nature Cell Biology*

POLICIES VON JOURNALEN

- Nature, 2016
  - „Supporting data must be made available to editors and peer-reviewers at the time of submission for the



Writing a data citation

By "data citation" we mean the text and identifying information for a publicly available dataset or data resource that is formally cited in an article's reference list. These are very similar to citations to papers, book chapters and other scholarly works.

Citations of datasets should include the minimum information recommended by DataCite and follow Nature Research style i.e. authors, title, publisher (repository name), identifier. Dataset identifiers including DOIs should be expressed as full URLs. For example:

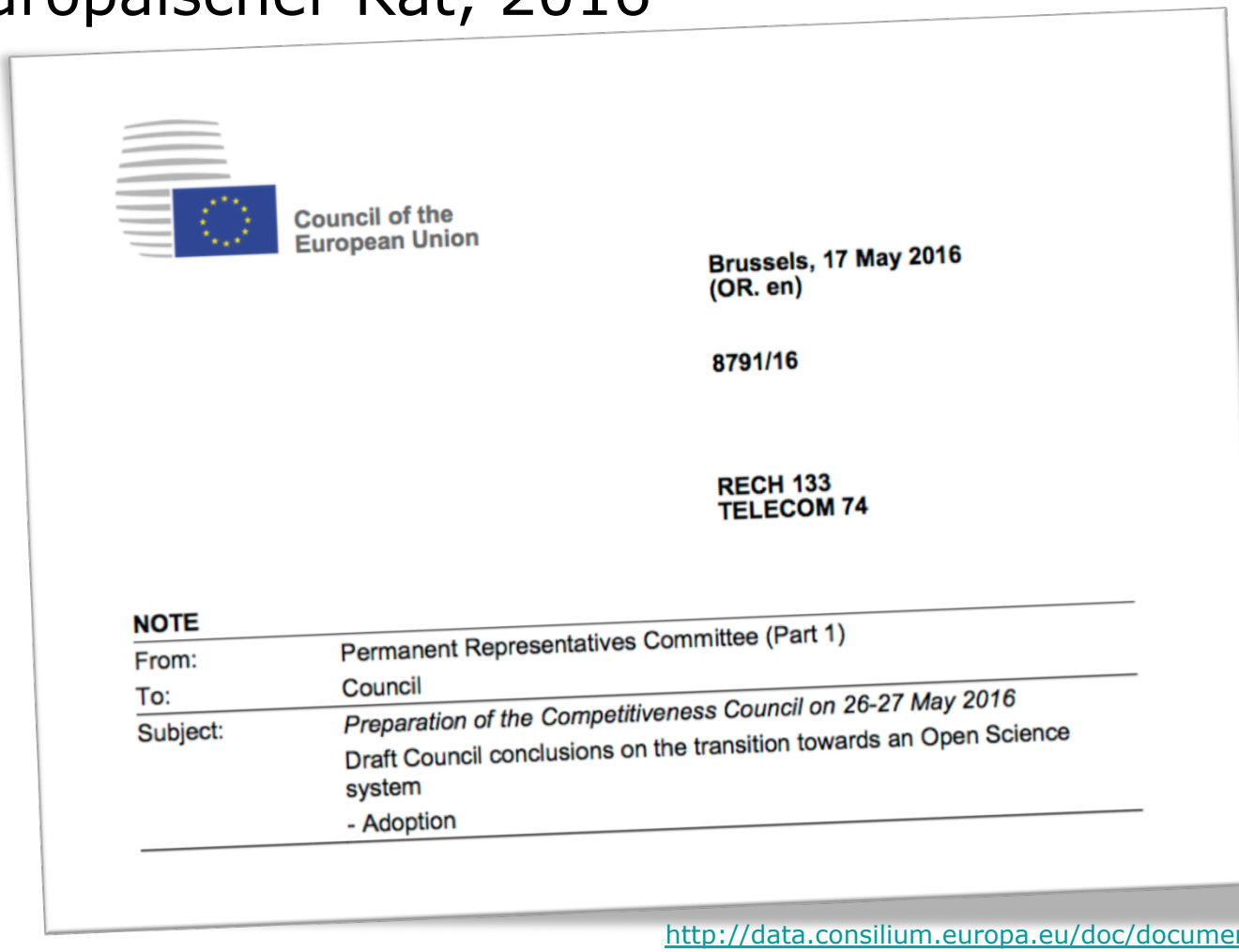
- Hao, Z., AghaKouchak, A., Nakhjiri, N. & Farahmand, A. Global Integrated Drought Monitoring and Prediction System (GIDMaPS) Data sets. *figshare* http://dx.doi.org/10.6084/m9.figshare.853801 (2014)
- See a published example in *Nature Communications*.

For more detailed guidance and Frequently Asked Questions see this document.

Nature. (2016). Data availability statements and data citations policy: guidance for authors. Retrieved from http://www.nature.com/authors/policies/data/data-availability-statements-data-citations.pdf

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Europäischer Rat, 2016



Council of the European Union

Brussels, 17 May 2016
(OR. en)

8791/16

RECH 133
TELECOM 74

NOTE

From:	Permanent Representatives Committee (Part 1)
To:	Council
Subject:	*Preparation of the Competitiveness Council on 26-27 May 2016* Draft Council conclusions on the transition towards an Open Science system - Adoption

http://data.consilium.europa.eu/doc/document/ST-8791-2016-INIT/en/pdf

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Europäischer Rat, 2016

Optimal reuse of research data

14. UNDERLINES that research data originating from publicly funded research projects could be considered as a public good, and ENCOURAGES the Member States, the Commission and stakeholders to set optimal reuse of research data as the point of departure, whilst recognising the needs for different access regimes because of Intellectual Property Rights, personal data protection and confidentiality, security concerns, as well as global economic competitiveness and other legitimate interests. Therefore, the underlying principle for the optimal reuse of research data should be: "as open as possible, as closed as necessary".

http://data.consilium.europa.eu/doc/document/ST-8791-2016-INIT/en/pdf

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Europäische Kommission, 2016

15. WELCOMES the intention of the Commission to make research data produced by the Horizon 2020 programme open by default[17], whilst recognising the right of opting out on grounds based on Intellectual Property Rights, personal data protection and confidentiality, security concerns, and other legitimate interests; CALLS on the Commission to promote data stewardship – including training activities and awareness-raising – and to implement Data Management Plans as an integral part of the research process and to continue to make the costs incurred for both data management and preparation of research data eligible for funding in Horizon 2020; ENCOURAGES Member States and stakeholders to set up strategies accordingly and to implement the use of Data Management Plans as a standard scientific practice in their national research programmes.

http://data.consilium.europa.eu/doc/document/ST-8791-2016-INIT/en/pdf

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Europäische Kommission, 2016

16. EMPHASISES that the opportunities for the optimal reuse of research data can only be realised if data are consistent with the FAIR principles (findable, accessible, interoperable and re-usable) within a secure and trustworthy environment; RECALLS the importance of storage, long term preservation and curation of research data, taking into consideration the capacity of the research group or organisation, as well as ensuring the existence of metadata based on international standards; ENCOURAGES Member States, the Commission and stakeholders to follow the FAIR principles in research programmes and funding mechanisms.

http://data.consilium.europa.eu/doc/document/ST-8791-2016-INIT/en/pdf

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Europäische Kommission, 2016

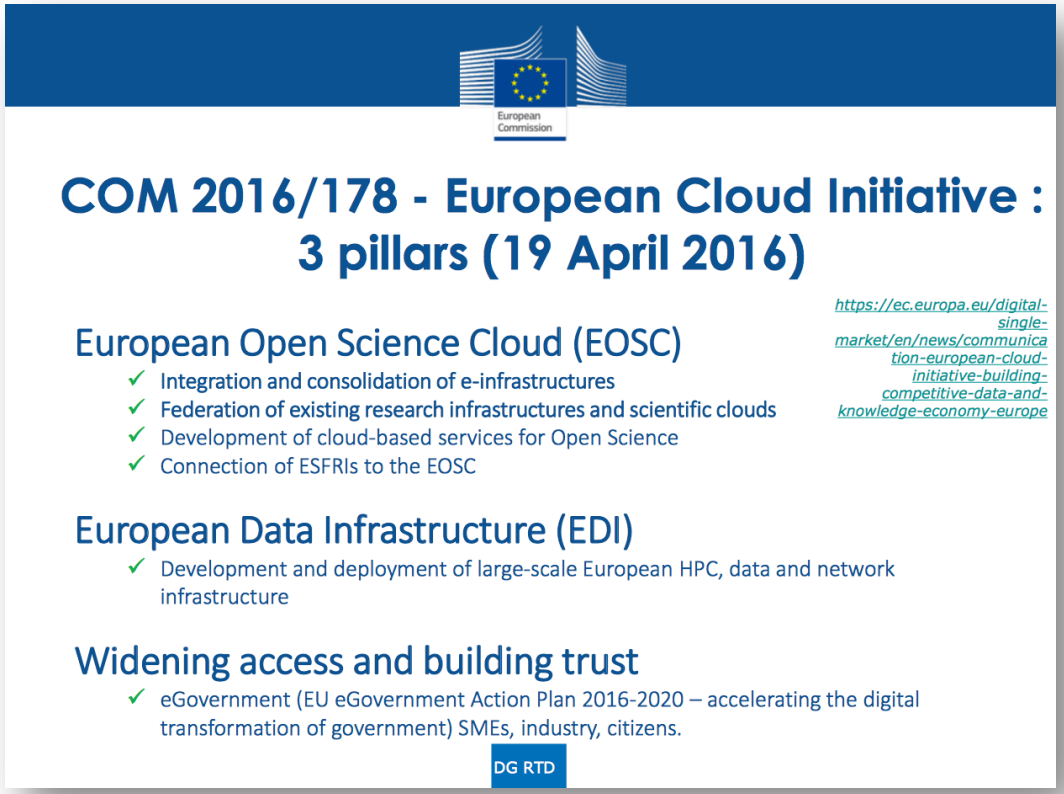
Open Science Policy Platform and European Open Science Agenda

4. NOTES the establishment of the Open Science Policy Platform[12] by the Commission, which aims at supporting the further development of the European Open Science policy and promoting the uptake by stakeholders of best practices, including issues such as adapting reward and evaluation systems, alternative models for open access publishing and management of research data (including archiving), altmetrics, guiding principles for optimal reuse of research data, development and use of standards, and other aspects of open science such as fostering research integrity and developing citizen science; CALLS on the Commission to inform the Member States and stakeholders on a regular basis on the ongoing developments and outputs of the Open Science Policy Platform at least twice a year.

http://data.consilium.europa.eu/doc/document/ST-8791-2016-INIT/en/pdf

WISSENSCHAFTSPOLITISCHE DISKUSSION

- European Open Science Cloud (EOSC)



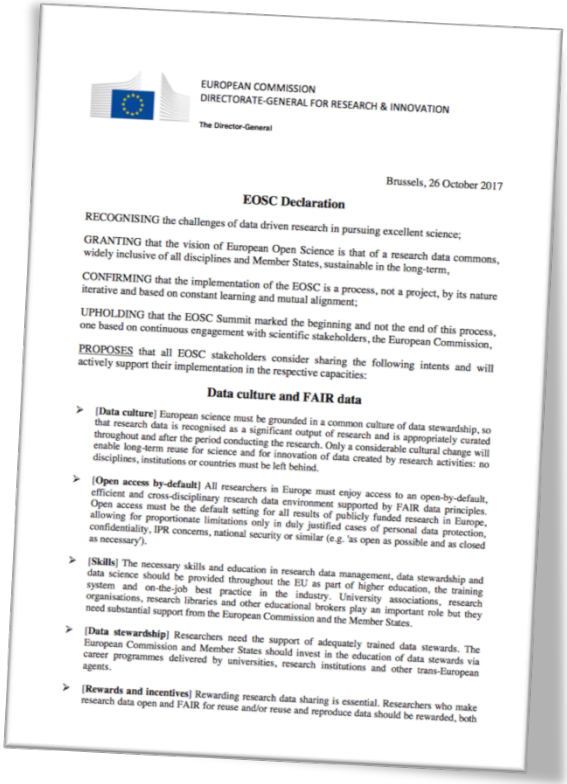
„Mit der Europäischen Cloud für offene Wissenschaft soll Europa die weltweite Führung bei den wissenschaftlichen Dateninfrastrukturen übernehmen, damit europäische Wissenschaftler das Potenzial der datengesteuerten Wissenschaft voll ausschöpfen können.“

Burgelman (2017): https://www.open-science-conference.eu/wp-content/uploads/2016/02/Burgelman_2017-Science-2-Berlin-March-2017.pdf

WISSENSCHAFTSPOLITISCHE DISKUSSION

- European Open Science Cloud (EOSC)

European Commisison (2017):
https://ec.europa.eu/research/openscience/pdf/realising_the_european_open_science_cloud_2016.pdf



EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR RESEARCH & INNOVATION
The Director-General

Brussels, 26 October 2017

EOSC Declaration

RECOGNISING the challenges of data driven research in pursuing excellent science;

GRANTING that the vision of European Open Science is that of a research data commons, widely inclusive of all disciplines and Member States, sustainable in the long-term,

CONFIRMING that the implementation of the EOSC is a process, not a project, by its nature iterative and based on constant learning and mutual alignment;

UPHOLDING that the EOSC Summit marked the beginning and not the end of this process, one based on continuous engagement with scientific stakeholders, the European Commission,

PROPOSES that all EOSC stakeholders consider sharing the following intents and will actively support their implementation in the respective capacities:

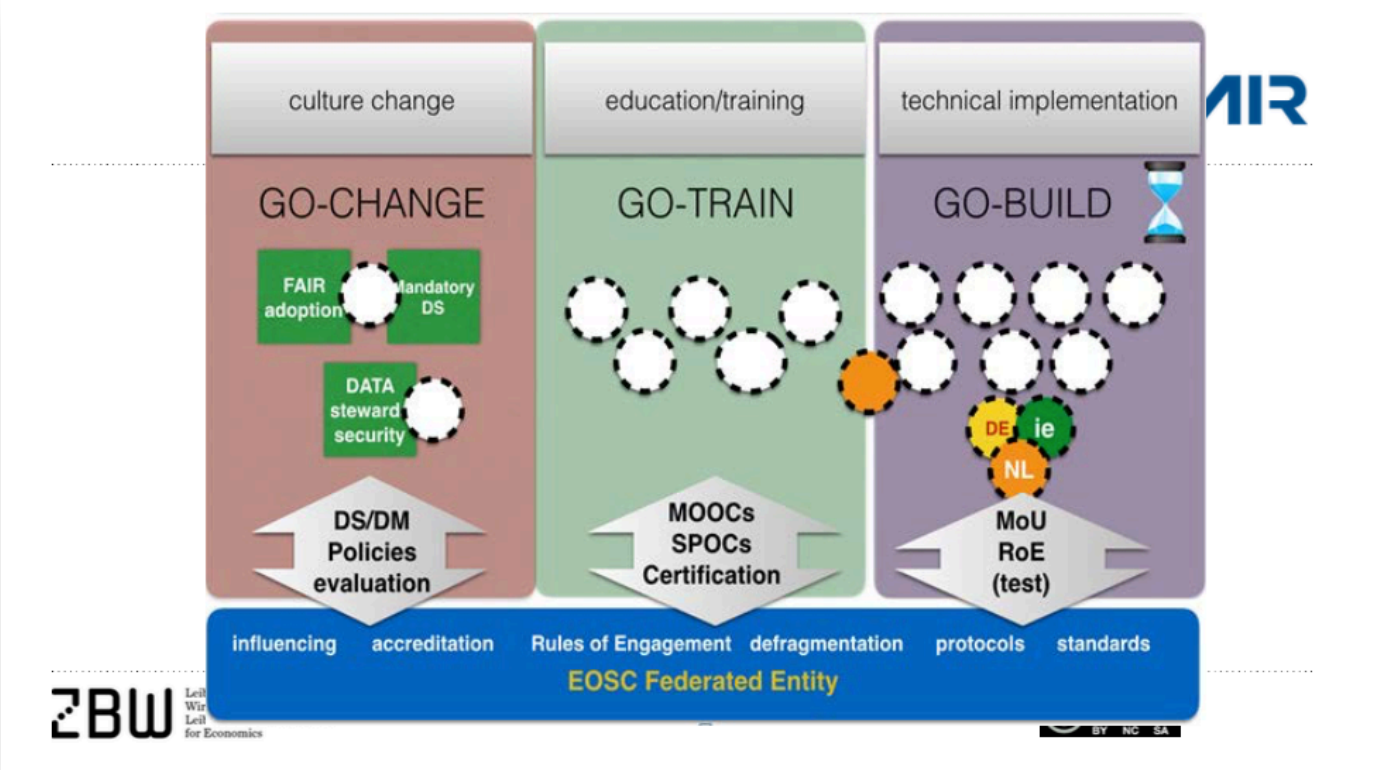
Data culture and FAIR data

- **[Data culture]** European science must be grounded in a common culture of data stewardship, so that research data is recognised as a significant output of research and is appropriately curated throughout and after the period conducting the research. Only a considerable cultural change will enable long-term reuse for science and for innovation of data created by research activities: no disciplines, institutions or countries must be left behind.
- **[Open access by-default]** All researchers in Europe must enjoy access to an open-by-default, efficient and cross-disciplinary research data environment supported by FAIR data principles. Open access must be the default setting for all results of publicly funded research in Europe, allowing for proportionate limitations only in duly justified cases of personal data protection, confidentiality, IPR concerns, national security or similar (e.g. 'as open as possible and as closed as necessary').
- **[Skills]** The necessary skills and education in research data management, data stewardship and data science should be provided throughout the EU as part of higher education, the training system and on-the-job best practice in the industry. University associations, research organisations, research libraries and other educational brokers play an important role but they need substantial support from the European Commission and the Member States.
- **[Data stewardship]** Researchers need the support of adequately trained data stewards. The European Commission and Member States should invest in the education of data stewards via career programmes delivered by universities, research institutions and other trans-European agents.
- **[Rewards and incentives]** Rewarding research data sharing is essential. Researchers who make research data open and FAIR for reuse and/or reuse and reproduce data should be rewarded, both

EC (2017):
https://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud

WISSENSCHAFTSPOLITISCHE DISKUSSION

- GO-FAIR INITATIVE



„GO CHANGE aims to instigate cultural change to make the FAIR principles a working standard in science and to reform reward systems to incorporate open science activities."

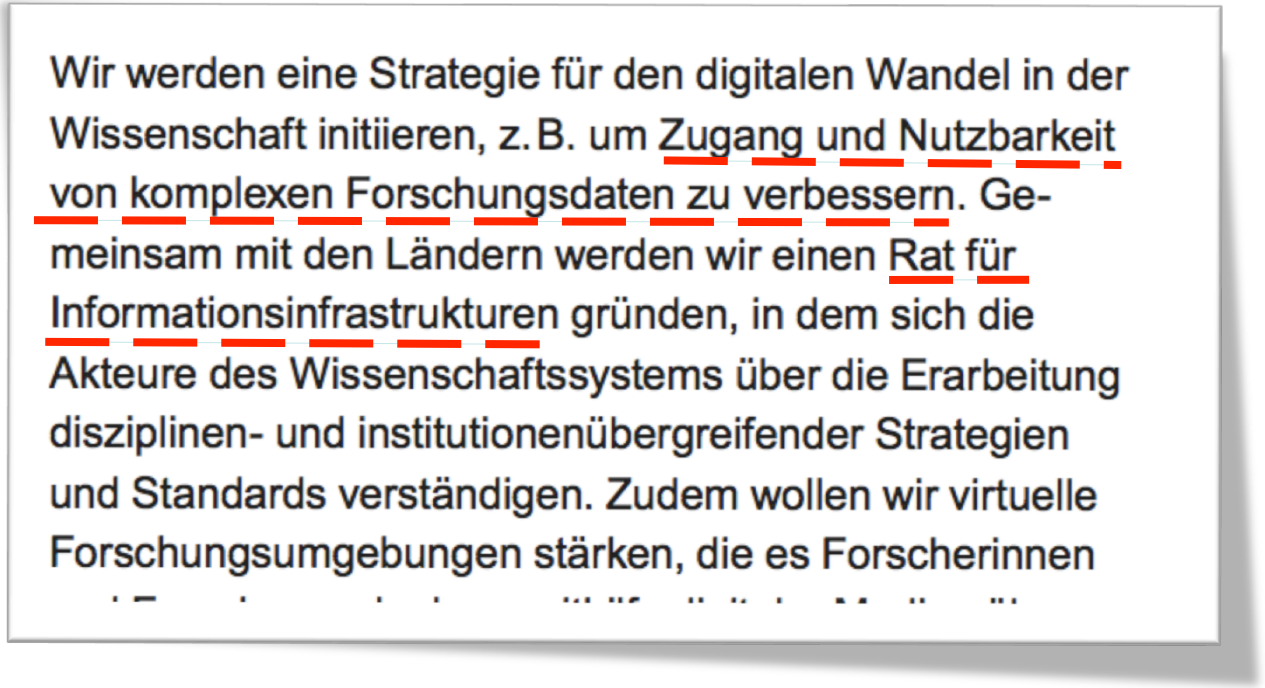
„GO TRAIN is about locating, creating, maintaining, and sustaining the required data expertise in Europe through training and education. The aim is to have core certified data experts and to have at least one certified institute in each Member State and for each discipline to support implementation of data stewardship."

„GO BUILD deals with the need for interoperable and federated data infrastructures. In addition, it is about the harmonisation of standards, protocols, and services, which enable all researchers to deposit, access, and analyse scientific data across disciplines."

DTL (2017): https://www.dtls.nl/fair-data/go-fair/

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Wissenschaftspolitisch: Deutschland

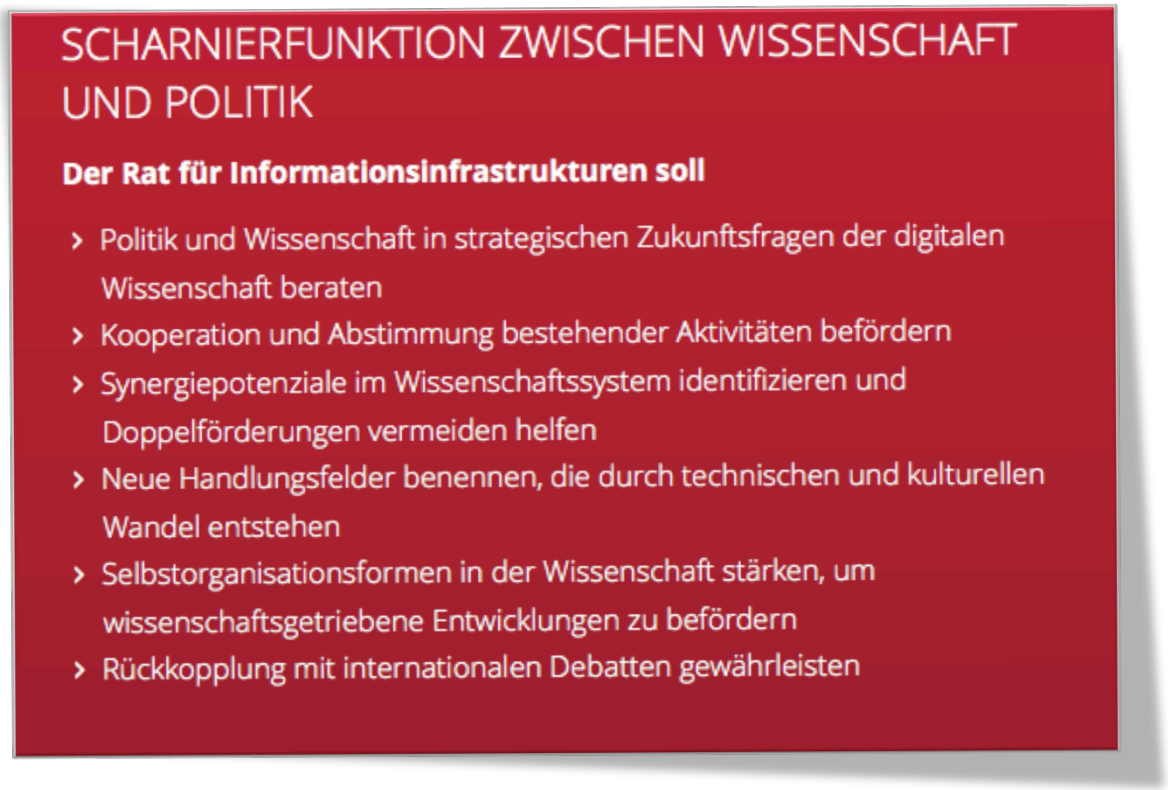


Wir werden eine Strategie für den digitalen Wandel in der Wissenschaft initiieren, z. B. um Zugang und Nutzbarkeit von komplexen Forschungsdaten zu verbessern. Gemeinsam mit den Ländern werden wir einen Rat für Informationsinfrastrukturen gründen, in dem sich die Akteure des Wissenschaftssystems über die Erarbeitung disziplinen- und institutionenübergreifender Strategien und Standards verständigen. Zudem wollen wir virtuelle Forschungsumgebungen stärken, die es Forscherinnen

Deutschlands Zukunft gestalten. Koalitionsvertrag zwischen CDU, CSU und SPD. 18. Legislaturperiode. Retrieved from https://www.cdu.de/sites/default/files/media/dokumente/koalitionsvertrag.pdf

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Wissenschaftspolitisch: Deutschland



Rat für Informationsinfrastrukturen (RfII). http://www.rfii.de

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Wissenschaftspolitisch: Deutschland
  - Herausforderungen:
    - Umgang mit digitalen Forschungsdaten **überwiegend schwach koordiniert**
    - **Fehlende Grundversorgung** der Forschenden mit niederschwelligen Services
    - **Effizienzprobleme** aufgrund Kleinteiligkeit und befristeter Finanzierung
    - **Kompetenzverluste** aufgrund hoher Personalfluktuation
    - Einschränkung der Leistungsbereiche durch **fehlende strategische Aufstellung**
    - **Nachteile** im internationalen Wettbewerb bei **Qualitätssicherung**, Klärung von **Rechtsfragen**, **Datenschutz** und **Datensicherheit**

Rat für Informationsinfrastruktur (RfII). (2016). Leistung aus Vielfalt. Retrieved from http://www.rfii.de/?wpdmdl=1998

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Wissenschaftspolitisch: Deutschland
  - RFII-Empfehlungen:
    - System **nachhaltiger Informationsinfrastrukturen**: verlässliche Arbeitsbedingungen, qualitätsvolle Grundversorgung, dynamische Weiterentwicklung
    - Etablierung einer **Nationalen Forschungsdateninfrastruktur (NFDI)** als arbeitsteiliges und verteiltes Netzwerk
    - **Nachhaltige Projektförderung** von Forschungsdateninfrastrukturen
    - **Datenverantwortung** bei Forschenden im Sinne guter wissenschaftlicher Praxis verankern
    - **Personalentwicklung** auf allen Ebenen des Wissenschaftssystems
    - Entwicklung im **internationalen Kontext**

Rat für Informationsinfrastruktur (RfII). (2016). Leistung aus Vielfalt. Retrieved from http://www.rfii.de/?wpdmdl=1998

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Positionierungen: Helmholtz-Gemeinschaft

HELMHOLTZ GEMEINSCHAFT

Die Ressource Information besser nutzbar machen!

Positionspapier zum Umgang mit Forschungsdaten in der Helmholtz-Gemeinschaft

Die MISSION der Helmholtz-Gemeinschaft

Wir leisten Beiträge zur Lösung großer und drängender Fragen von Gesellschaft, Wissenschaft und Wirtschaft durch strategisch-programmatisch ausgerichtete Spitzenforschung in den Bereichen Energie, Erde und Umwelt, Gesundheit, Schlüsseltechnologien, Struktur der Materie, Verkehr und Weltraum.

Wir erforschen Systeme hoher Komplexität unter Einsatz von Großgeräten und wissenschaftlichen Infrastrukturen gemeinsam mit nationalen und internationalen Partnern.

Wir tragen bei zur Gestaltung unserer Zukunft durch Verbindung von Forschung und Technologieentwicklung mit innovativen Anwendungs- und Vorsorgeperspektiven.

Forschungsdaten sind Grundlage für Forschungsprozesse und vielfach auch für ökonomische und gesellschaftliche Innovation[1]. Der Umgang mit Forschungsdaten ändert sich aufgrund des digitalen Wandels und der Open-Science-Bewegung grundlegend. Insbesondere die starke Zunahme des Umfangs digital vorliegender Daten – einschließlich Forschungsdaten – und die ständig steigende Geschwindigkeit, in der diese gewonnen werden, eröffnen der Wissenschaft und der Wirtschaft neue Potenziale. Deren Nutzung setzt umfangreiche Investitionen in Fachpersonal, Forschung und Infrastrukturen zum Management und zur Analyse der Daten sowie einen als Open Science bezeichneten Wandel der wissenschaftlichen Kulturen und korrespondierender Geschäftsmodelle des Publizierens von Texten, Daten und Software voraus. Forschungsdatenrelevante Infrastrukturen der Helmholtz-Gemeinschaft dienen schon heute als bedeutende nationale und internationale Knoten.

Die Helmholtz-Gemeinschaft gehörte bereits im Jahr 2003 zur Gruppe der Erstunterzeichner der *Berliner Erklärung über den offenen Zugang zu wissenschaftlichem Wissen*[2]. Einen offenen Zugang zu Forschungsdaten zu gewährleisten, gehört inzwischen zur Kernstrategie der Industriestaaten[3] und der Europäischen Union. Diese Politik wird auch von der Bundesregierung als entscheidendes Instrument zur erfolgreichen Positionierung im globalen wissenschaftlichen Wettbewerb gesehen. Der Aufbau einer nationalen Forschungsdateninfrastruktur als Komponente global verteilten

1 Science Europe Roadmap, Dezember 2013. http://www.scienceeurope.org/uploads/PublicDocumentsAndSpeeches/ScienceEurope_Roadmap.pdf

2 http://openaccess.mpg.de/68053/Berliner_Erklaerung_dt_Version_07-2006.pdf

3 G7 Science and Technology Ministers' Meeting: Tsukuba Communiqué, 17. Mai 2016. http://www8.cao.go.jp/cstp/english/others/20160517communique.pdf

zen ihrer Forschungsbereiche zu stärken und besser zum Tragen zu bringen. Im Sinne ihrer Mission wird die Helmholtz-Gemeinschaft durch Stärkung ihrer „digitalen Wissenschaft" das Potenzial der gewonnenen Informationen und Erkenntnisse deutlich steigern. Dazu wird sie

- fokussierte Forschung im informationstechnischen Bereich und den Aufbau und Betrieb entsprechender Informationsinfrastrukturen für die Wissenschaftler und Wissenschaftlerinnen an ihren Zentren, für ihre Kooperationspartner und für die Nutzer und Nutzerinnen der von ihr betriebenen Forschungsinfrastrukturen vorantreiben,
- Forschungsdaten aus den Zentren in geeigneten Dateninfrastrukturen bewahren und zur Nachnutzung durch Wissenschaft und Gesellschaft offen und kostenfrei zugänglich machen,
- sich an nationalen und internationalen Initiativen für die Koordinierung des Aufbaus der benötigten Infrastrukturen aktiv beteiligen sowie
- wissenschaftliche sowie nicht-wissenschaftliche Mitarbeiter und Mitarbeiterinnen durch Aus- und Weiterbildung in die Lage versetzen, die geschaffenen Möglichkeiten zu nutzen.

Die Zentren sind sich einig, dass sie auf diesem Weg im Sinn der Empfehlungen des *Rates für Informationsinfrastrukturen für Bund und Länder*

- die Finanzierungsmechanismen für Dateninfrastrukturen weiter verstetigen,
- ihre verteilte Dateninfrastrukturen noch besser Helmholtz-intern, national und international koordinieren und vernetzen,
- eine neue Datenkultur weiter fördern und
- ihre Personalressourcen ausbauen werden.

Helmholtz-Gemeinschaft (2016): Die Ressource Information besser nutzbar machen. Retrieved from: https://www.helmholtz.de/os-positionspapier/

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Wissenschaftspolitisch: USA

b) Ensure that all extramural researchers receiving Federal grants and contracts for scientific research and intramural researchers develop data management plans, as appropriate, describing how they will provide for long-term preservation of, and access to, scientific data in digital formats resulting from federally funded research, or explaining why long-term preservation and access cannot be justified;

c) Allow the inclusion of appropriate costs for data management and access in proposals for Federal funding for scientific research;

d) Ensure appropriate evaluation of the merits of submitted data management plans;

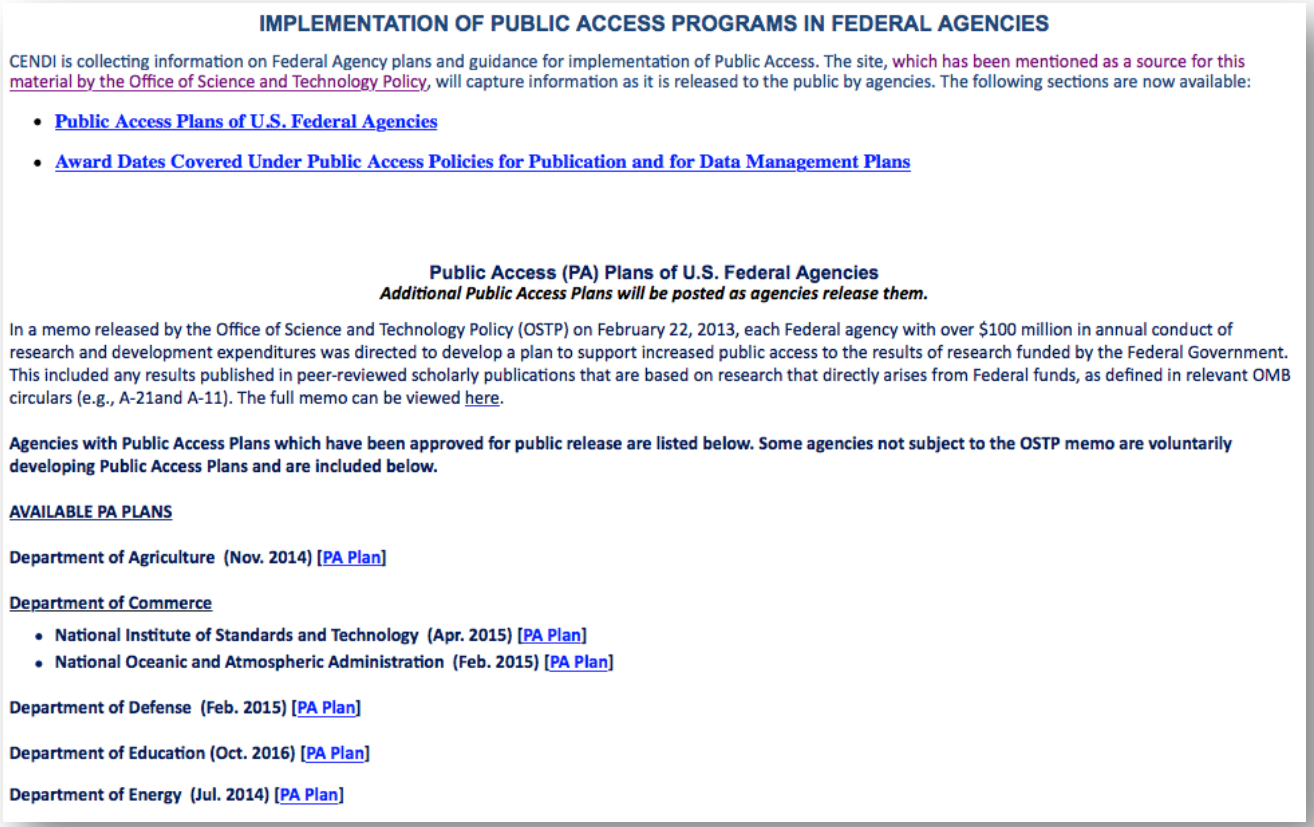
e) Include mechanisms to ensure that intramural and extramural researchers comply with data management plans and policies;

f) Promote the deposit of data in publicly accessible databases, where appropriate and available;

Office of Science and Technology Policy. (2013). Increasing Access to the Results of Federally Funded Scientific Research. Retrieved from http://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf

WISSENSCHAFTSPOLITISCHE DISKUSSION

- Wissenschaftspolitisch: USA
  - Übersicht der „Public Access Plans“



IMPLEMENTATION OF PUBLIC ACCESS PROGRAMS IN FEDERAL AGENCIES

CENDI is collecting information on Federal Agency plans and guidance for implementation of Public Access. The site, which has been mentioned as a source for this material by the Office of Science and Technology Policy, will capture information as it is released to the public by agencies. The following sections are now available:

- Public Access Plans of U.S. Federal Agencies
- Award Dates Covered Under Public Access Policies for Publication and for Data Management Plans

Public Access (PA) Plans of U.S. Federal Agencies

Additional Public Access Plans will be posted as agencies release them.

In a memo released by the Office of Science and Technology Policy (OSTP) on February 22, 2013, each Federal agency with over $100 million in annual conduct of research and development expenditures was directed to develop a plan to support increased public access to the results of research funded by the Federal Government. This included any results published in peer-reviewed scholarly publications that are based on research that directly arises from Federal funds, as defined in relevant OMB circulars (e.g., A-21and A-11). The full memo can be viewed here.

Agencies with Public Access Plans which have been approved for public release are listed below. Some agencies not subject to the OSTP memo are voluntarily developing Public Access Plans and are included below.

AVAILABLE PA PLANS

Department of Agriculture (Nov. 2014) [PA Plan]

Department of Commerce

- **National Institute of Standards and Technology (Apr. 2015) [PA Plan]**
- **National Oceanic and Atmospheric Administration (Feb. 2015) [PA Plan]**

Department of Defense (Feb. 2015) [PA Plan]

Department of Education (Oct. 2016) [PA Plan]

Department of Energy (Jul. 2014) [PA Plan]

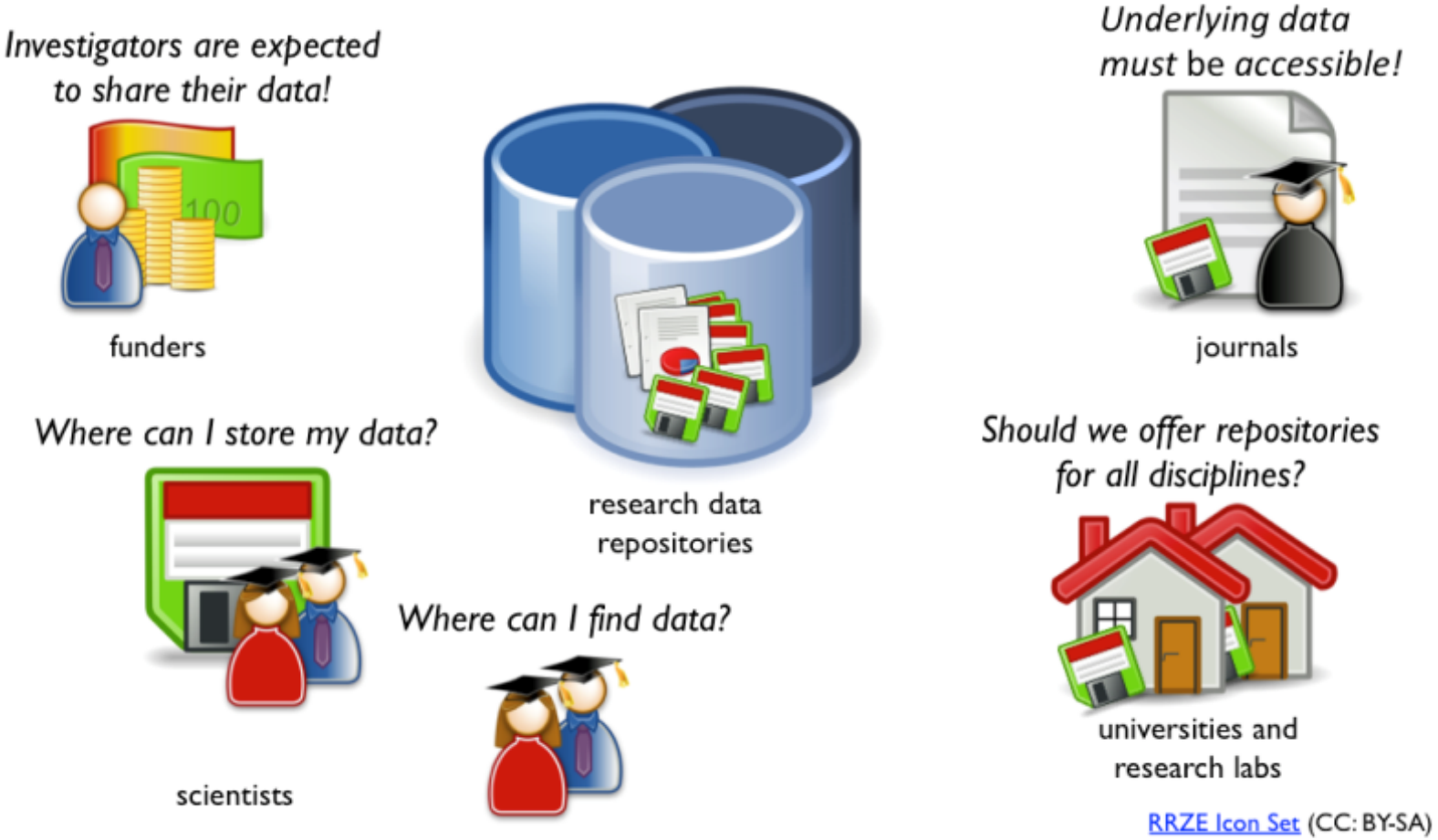
https://www.nasa.gov/sites/default/files/atoms/files/206985_2015_nasa_plan-for-web.pdf

AGENDA

- Digitale Wissenschaft
- Policies
- **Forschungsdaten-Repositorien**

RAHMENBEDINGUNGEN

The Research Data Repositories Landscape



Grafik: re3data

RAHMENBEDINGUNGEN

- Welche Konsequenzen ergeben sich aus den genannten Policies für Betreiber von Forschungsdaten-Repositorien?

RAHMENBEDINGUNGEN

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- Mögliches Vorgehen:

  1. Bestandsaufnahme der Policies auf Basis der Nutzergruppe

RAHMENBEDINGUNGEN

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  3. Umsetzung der Anforderung in Kooperation mit anderen relevanten Akteuren (z. B. disziplinären Daten-Repositorien)

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  4. Reflexion mit Hilfe von Nutzerstudien und Monitoring

RAHMENBEDINGUNGEN

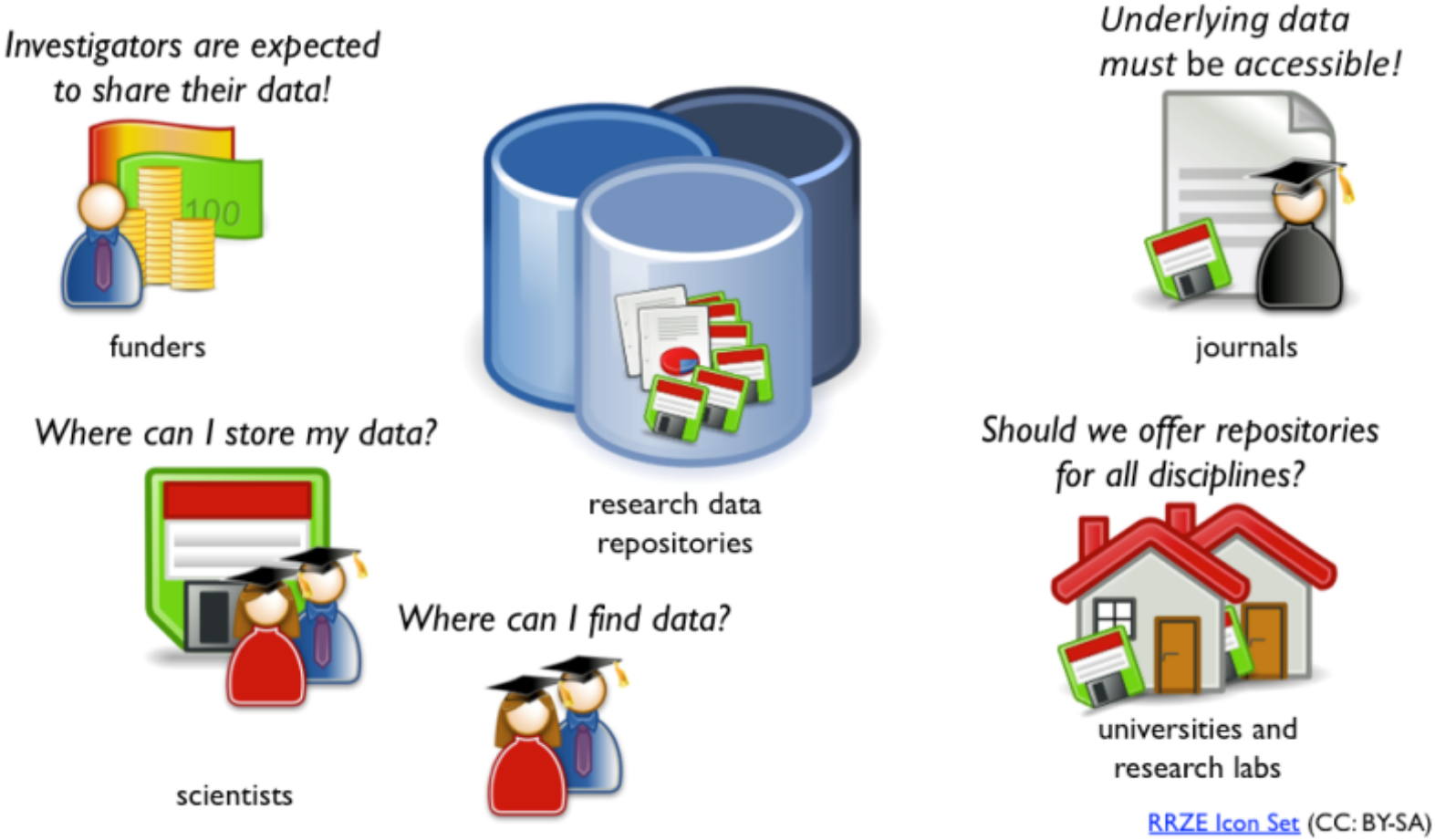
- Benötigt werden Informationsinfrastrukturen, die die dauerhafte Zugänglichkeit der Forschungsdaten sicherstellen.
- Die Anforderungen an diese Infrastrukturen können je nach Disziplin (und Forschungsdaten) variieren.

- Europäische Kommission (2009):
  - „The landscape of data repositories across Europe is **fairly heterogeneous**, but there is a solid basis to develop a coherent strategy to overcome the fragmentation and enable research communities to better manage, use, share and preserve data."

European Commission. (2009). ICT infrastructures for e-science. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. COM(2009) 108 final. Retrieved from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0108:FIN:EN:PDF

RAHMENBEDINGUNGEN

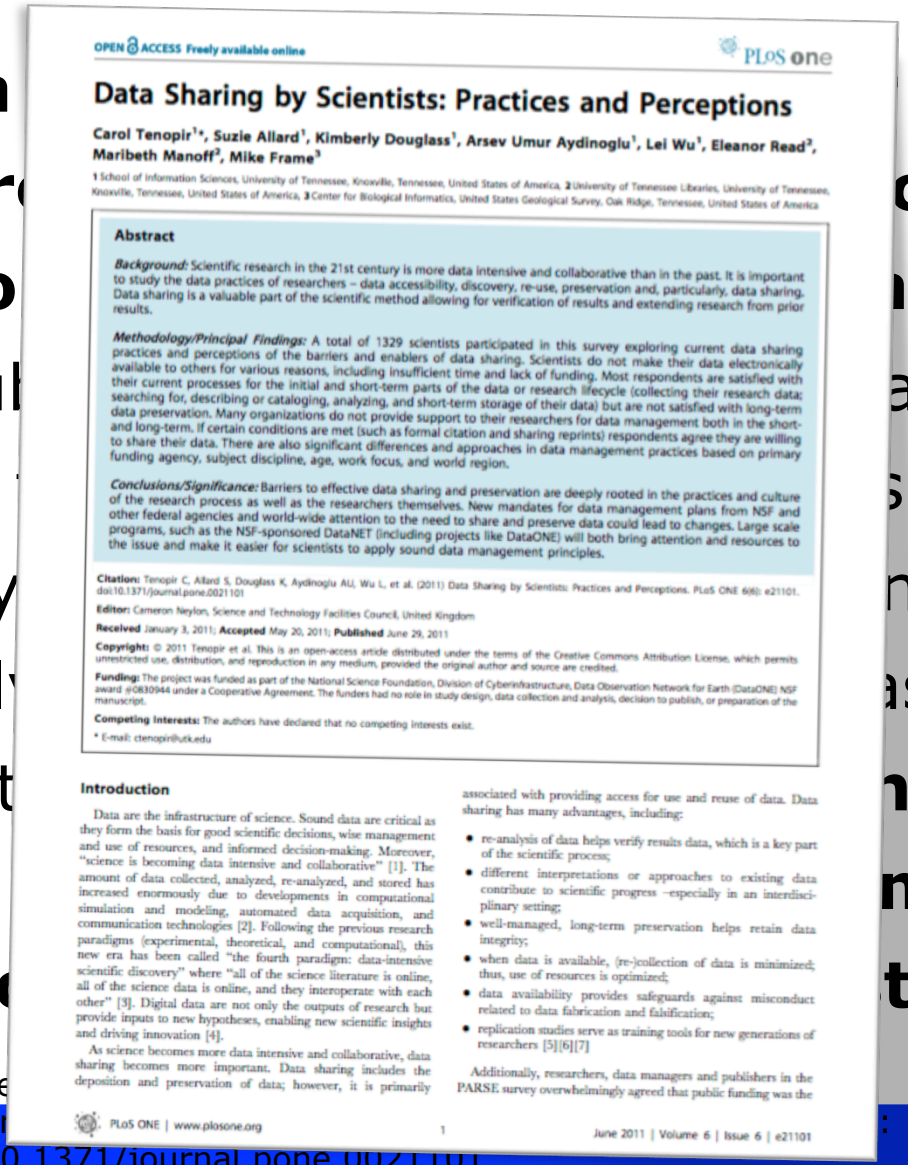
The Research Data Repositories Landscape



Grafik: re3data

RAHMENBEDINGUNGEN

- **„Building a … data sharing, pr… challenge, but is in so… nging a culture**. Sul… actually show that we are … s. Researchers report many… not available electronicall… asons were insufficient t… **hese are difficult to … make it quick and easy t… t may help.“**



OPEN ACCESS Freely available online

PLoS one

Data Sharing by Scientists: Practices and Perceptions

Carol Tenopir[1]*, Suzie Allard[1], Kimberly Douglass[1], Arsev Umur Aydinoglu[1], Lei Wu[1], Eleanor Read[2], Maribeth Manoff[2], Mike Frame[3]

1 School of Information Sciences, University of Tennessee, Knoxville, Tennessee, United States of America, 2 University of Tennessee Libraries, University of Tennessee, Knoxville, Tennessee, United States of America, 3 Center for Biological Informatics, United States Geological Survey, Oak Ridge, Tennessee, United States of America

Abstract

Background: Scientific research in the 21st century is more data intensive and collaborative than in the past. It is important to study the data practices of researchers – data accessibility, discovery, re-use, preservation and, particularly, data sharing. Data sharing is a valuable part of the scientific method allowing for verification of results and extending research from prior results.

Methodology/Principal Findings: A total of 1329 scientists participated in this survey exploring current data sharing practices and perceptions of the barriers and enablers of data sharing. Scientists do not make their data electronically available to others for various reasons, including insufficient time and lack of funding. Most respondents are satisfied with their current processes for the initial and short-term parts of the data or research lifecycle (collecting their research data; searching for, describing or cataloging, analyzing, and short-term storage of their data) but are not satisfied with long-term data preservation. Many organizations do not provide support to their researchers for data management both in the short- and long-term. If certain conditions are met (such as formal citation and sharing reprints) respondents agree they are willing to share their data. There are also significant differences and approaches in data management practices based on primary funding agency, subject discipline, age, work focus, and world region.

Conclusions/Significance: Barriers to effective data sharing and preservation are deeply rooted in the practices and culture of the research process as well as the researchers themselves. New mandates for data management plans from NSF and other federal agencies and world-wide attention to the need to share and preserve data could lead to changes. Large scale programs, such as the NSF-sponsored DataNET (including projects like DataONE) will both bring attention and resources to the issue and make it easier for scientists to apply sound data management principles.

Citation: Tenopir C, Allard S, Douglass K, Aydinoglu AU, Wu L, et al. (2011) Data Sharing by Scientists: Practices and Perceptions. PLoS ONE 6(6): e21101. doi:10.1371/journal.pone.0021101

Editor: Cameron Neylon, Science and Technology Facilities Council, United Kingdom

Received January 3, 2011; **Accepted** May 20, 2011; **Published** June 29, 2011

Funding: The project was funded as part of the National Science Foundation, Division of Cyberinfrastructure, Data Observation Network for Earth (DataONE) NSF award #OB30944 under a Cooperative Agreement. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing Interests: The authors have declared that no competing interests exist.

* E-mail: ctenopir@utk.edu

Introduction

Data are the infrastructure of science. Sound data are critical as they form the basis for good scientific decisions, wise management and use of resources, and informed decision-making. Moreover, "science is becoming data intensive and collaborative" [1]. The amount of data collected, analyzed, re-analyzed, and stored has increased enormously due to developments in computational simulation and modeling, automated data acquisition, and communication technologies [2]. Following the previous research paradigms (experimental, theoretical, and computational), this new era has been called "the fourth paradigm: data-intensive scientific discovery" where "all of the science literature is online, all of the science data is online, and they interoperate with each other" [3]. Digital data are not only the outputs of research but provide inputs to new hypotheses, enabling new scientific insights and driving innovation [4].

As science becomes more data intensive and collaborative, data sharing becomes more important. Data sharing includes the deposition and preservation of data; however, it is primarily associated with providing access for use and reuse of data. Data sharing has many advantages, including:

- re-analysis of data helps verify results data, which is a key part of the scientific process;
- different interpretations or approaches to existing data contribute to scientific progress –especially in an interdisciplinary setting;
- well-managed, long-term preservation helps retain data integrity;
- when data is available, (re-)collection of data is minimized; thus, use of resources is optimized;
- data availability provides safeguards against misconduct related to data fabrication and falsification;
- replication studies serve as training tools for new generations of researchers [5][6][7]

Additionally, researchers, data managers and publishers in the PARSE survey overwhelmingly agreed that public funding was the

Te… Pr… 10.1371/journal.pone.0021101

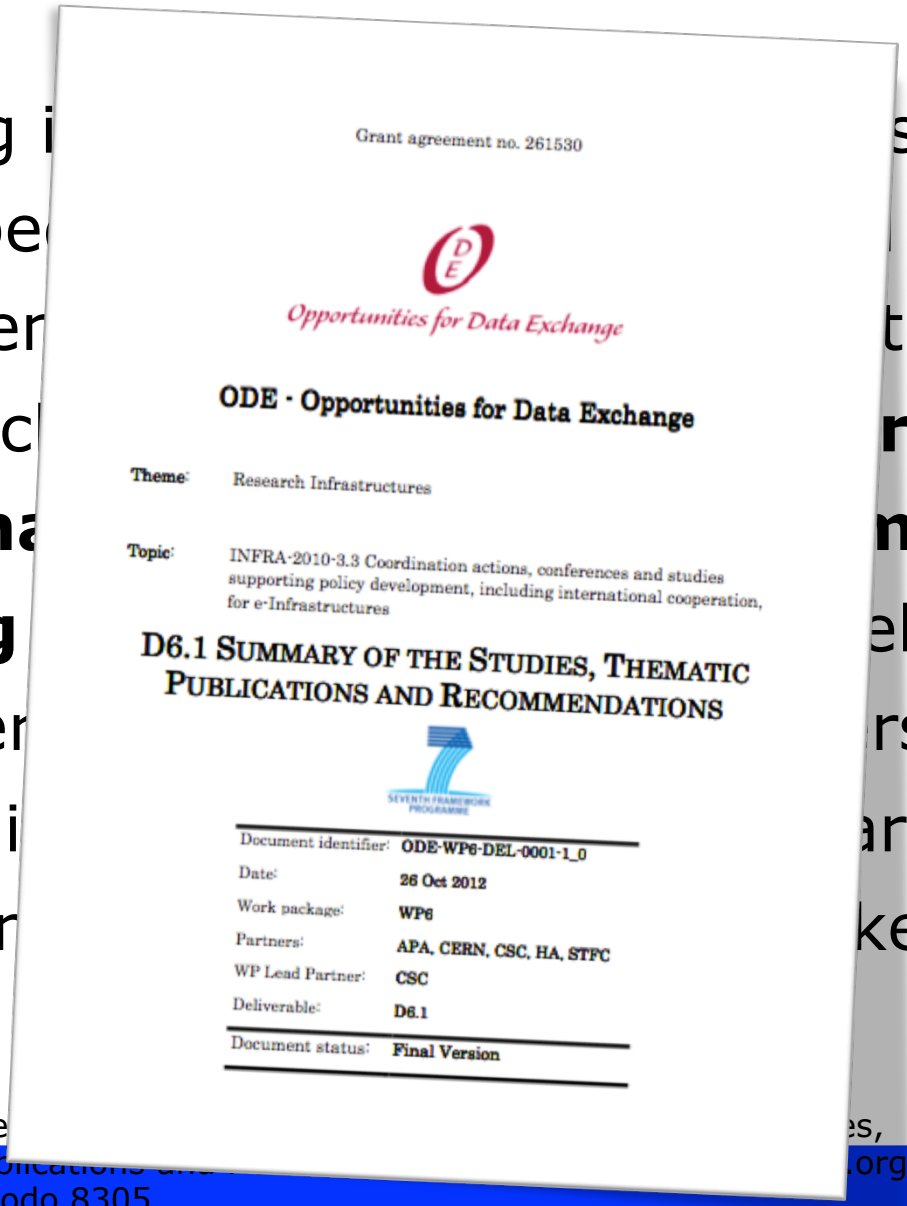
RAHMENBEDINGUNGEN

- „**Building a sound infrastructure for data sharing, preservation, and use is a challenge, but is in some ways easier than changing a culture**. Subject discipline differences actually show that we are faced with multiple cultures. Researchers report many reasons why their data is not available electronically to others. The leading reasons were insufficient time and lack of funding. **These are difficult to solve, but systems that make it quick and easy to share data without cost may help.**"

Tenopir, C. et al. (2011). Data Sharing by Scientists: Practices and Perceptions. PLoS ONE, 6(6), e21101. doi: 10.1371/journal.pone.0021101

RAHMENBEDINGUNGEN

- „A key finding i sharing have to be develope to the academic incer the research assessment sc **rriers to share data ha nplifying data sharing** eholders, from publisher rs have to be involved in thi archers' hesitation to r ke them available.



Grant agreement no. 261530

Opportunities for Data Exchange

ODE - Opportunities for Data Exchange

Theme: Research Infrastructures

Topic: INFRA-2010-3.3 Coordination actions, conferences and studies supporting policy development, including international cooperation, for e-Infrastructures

D6.1 SUMMARY OF THE STUDIES, THEMATIC PUBLICATIONS AND RECOMMENDATIONS

Document identifier:	ODE-WP6-DEL-0001-1_0
Date:	26 Oct 2012
Work package:	WP6
Partners:	APA, CERN, CSC, HA, STFC
WP Lead Partner:	CSC
Deliverable:	D6.1
Document status:	Final Version

Dallmeier-Tie es,
Thematic Publications .org/
5281/zenodo.8305

RAHMENBEDINGUNGEN

- „A key finding is that incentives for data sharing have to be developed. These have to be linked to the academic incentive system as well as to the research assessment schemes. **The technical barriers to share data have to be reduced by simplifying data sharing workflows.** Several stakeholders, from publishers or data centres to funders have to be involved in this process to address researchers' hesitation to manage their data and make them available.

Dallmeier-Tiessen, S.; et al. (2012): D6.1 Summary of the Studies, Thematic Publications and Recommendations. Retrieved from doi.org/10.5281/zenodo.8305

TYPOLOGIE

- Disziplinäre Forschungsdaten-Repositorien
- Institutionelle Forschungsdaten-Repositorien
- Projektspezifische Forschungsdaten-Repositorien
- Multidisziplinäre Forschungsdaten-Repositorien
- Portale, die verteile Datensammlungen zugänglich machen

Pampel, H., Goebelbecker, H.-J., & Vierkant, P. (2012). re3data.org: Aufbau eines Verzeichnisses von Forschungsdaten-Repositorien. Ein Werkstattbericht. In B. Mittermaier (Ed.), Vernetztes Wissen – Daten, Menschen, Systeme. WissKom 2012 (pp. 61–73). Jülich: Verlag des Forschungszentrums Jülich. Retrieved from http://hdl.handle.net/2128/4699

TYPOLOGIE

- Disziplinäre Forschungsdaten-Repositorien
  - Beispiele:
    - PANGAEA – Data Publisher for Earth & Environmental Science, http://www.pangaea.de
    - Gene Expression Omnibus (GEO), http://www.ncbi.nlm.nih.gov/geo
    - GESIS – Datenarchiv für Sozialwissenschaften, http://www.gesis.org/unser-angebot/recherchieren/datenbestandskatalog/

TYPOLOGIE

- PANGAEA

Betreiber:	Alfred-Wegener-Institut (AWI) und MARUM – Zentrum für Marine Umweltwissenschaften der Universität Bremen
Disziplin:	Erd- und Umweltwissenschaften
Mission:	„The information system PANGAEA is operated as an Open Access library aimed at archiving, publishing and distributing georeferenced data from earth system research. The system guarantees long-term availability of its content through a commitment of the operating institutions.“
Zugangs-bedingungen:	CC-BY
Finanzierung:	Betreiber und Drittmittelförderung (u. a. Datenmanagement)
Zitations-vorschlag:	Beispiel: http://doi.pangaea.de/10.1594/PANGAEA.738246

Citation:

Holbourn, Ann; Kuhnt, Wolfgang; Schulz, Michael; Erlenkeuser, Helmut (2005): Geochemistry and stable isotope record of benthic foraminifera of Miocene sediments. doi:10.1594/PANGAEA.738246,
Supplement to: Holbourn, A et al. (2005): Impacts of orbital forcing and atmospheric carbon dioxide on Miocene ice-sheet expansion. *Nature*, **438**, 483-487, doi:10.1038/nature04123

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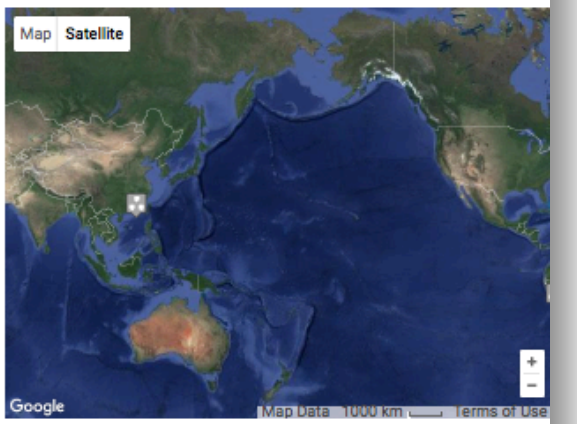

Abstract:

The processes causing the middle Miocene global cooling, which marked the Earth's final transition into an 'icehouse' climate about 13.9 million years ago (Myr ago) (Flower and Kennett, 1993, doi:10.1029/93PA02196; 1995 doi:10.1029/95PA02022; Miller et al., 1991, doi:10.1029/90JB0201; Zachos et al., 2001, doi:10.1126/science.1059412), remain enigmatic. Tectonically driven circulation changes (Kennett, 1977, doi:10.1029/JC082i027p03843); Woodruff and Savin, 1991, doi:10.1029/91PA02561) and variations in atmospheric carbon dioxide levels (Raymo and Ruddimann, 1992, doi:10.1038/359117a0; Vincent and Berger, 1985) have been suggested as driving mechanisms, but the lack of adequately preserved sedimentary successions has made rigorous testing of these hypotheses difficult. Here we present high-resolution climate proxy records, covering the period from 14.7 to 12.7 million years ago, from two complete sediment cores from the northwest and southeast subtropical Pacific Ocean. Using new chronologies through the correlation to the latest orbital model (Laskar et al., 2004, doi:10.1051/0004-6361:20041335), we find relatively constant, low summer insolation over Antarctica coincident with declining atmospheric carbon dioxide levels at the time of Antarctic ice-sheet expansion and global cooling, suggesting a causal link. We surmise that the thermal isolation of Antarctica played a role in providing sustained long-term climatic boundary conditions propitious for ice-sheet formation. Our data document that Antarctic glaciation was rapid, taking place within two obliquity cycles, and coincided with a striking transition from obliquity to eccentricity as the drivers of climatic change.

Project(s):

Institute for Geosciences, Christian Albrechts University, Kiel (GIK/IfG)
Center for Marine Environmental Sciences (MARUM)
Ocean Drilling Program (ODP)

Coverage:

Median Latitude: -0.808281 * *Median Longitude:* -148.099083 * *South-bound Latitude:* -16.007017 * *West-bound Longitude:* 116.272917 * *North-bound Latitude:* 19.456700 * *East-bound Longitude:* -76.378083
Date/Time Start: 1999-03-21T00:00:00 * *Date/Time End:* 2002-04-26T00:00:00

Event(s):

184-1146 * *Latitude:* 19.456700 * *Longitude:* 116.272917 * *Date/Time Start:* 1999-03-21T00:00:00 * *Date/Time End:* 1999-03-29T00:00:00 * *Elevation:* -2091.5 m * *Penetration:* 1455.6 m * *Recovery:* 1451.7 m * *Location:* South China Sea * *Campaign:* Leg184 * *Basis:* Joides Resolution * *Device:* Composite Core (COMPCORE) * *Comment:* 153 cores; 1450.6 m cored; 5 m drilled; 100.1% recovery

202-1237 * *Latitude:* -16.007017 * *Longitude:* -76.378083 * *Date/Time:* 2002-04-26T00:00:00 * *Elevation:* -3212.3 m * *Penetration:* 896.2 m * *Recovery:* 771 m * *Location:* South Pacific Ocean * *Campaign:* Leg202 * *Basis:* Joides Resolution * *Device:* Composite Core (COMPCORE) * *Comment:* 79 cores; 744.7 m cored; 151.5 m drilled; 103.5 % recovery

License:

Size:

7 datasets

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PANGAEA.
Data Publisher for Earth & Environmental Science

Citation: **Holbourn, Ann; Kuhnt, Wolfgang; Schulz, Michael; Erlenkeuser, Helmut (200**
benthic foraminifera of Miocene sediments. doi:10.1594/PANGAEA.738246,
Supplement to: Holbourn, A et al. (2005): Impacts of orbital forcing and atm
expansion. *Nature*, **438**, 483-487, doi:10.1038/nature04123

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Abstract: The processes causing the middle Miocene global cooling, which marked the Earth
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Woodruff and Savin, 1991, doi:10.1029/91PA02561) and variations in atmospheric
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Project(s): **Institute for Geosciences, Christian Albrechts University, Kiel** (GIK/IfG)
Center for Marine Environmental Sciences (MARUM)
Ocean Drilling Program (ODP)

Coverage: *Median Latitude:* -0.808281 * *Median Longitude:* -148.099083 * *South-bound Latitude*
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Event(s): **184-1146** * *Latitude:* 19.456700 * *Longitude:* 116.272917 * *Date/Time Start:* 1999
China Sea * *Campaign:* Leg184 * *Basis:* Joides Resolution * *Device:* Con
202-1237 * *Latitude:* -16.007017 * *Longitude:* -76.378083 * *Date/Time:* 2002-04-2
Joides Resolution * *Device:* Composite Core (COMPCORE) * *Comment:* 79

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Size: 7 datasets

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Letter

Nature **438**, 483-487 (24 November 2005) | doi:10.1038/nature04123; Received 21 February 2005; Accepted 4 August 2005

Impacts of orbital forcing and atmospheric carbon dioxide on Miocene ice-sheet expansion

Ann Holbourn[1], Wolfgang Kuhnt[1], Michael Schulz[2] & Helmut Erlenkeuser[3]

1. Institute of Geosciences, Christian-Albrechts-University, D-24118 Kiel, Germany
2. Department of Geosciences and Research Center Ocean Margins, University of Bremen, Postfach 330 440, D-28334 Bremen, Germany
3. Leibniz Laboratory for Radiometric Dating and Stable Isotope Research, Christian-Albrechts-University, D-24118 Kiel, Germany

Correspondence to: Ann Holbourn[1] Correspondence and requests for materials should be addressed to A.E.H. (Email: ah@gpi.uni-kiel.de). Data sets are archived at WDC-MARE (http://www.pangaea.de).

Top

The processes causing the middle Miocene global cooling, which marked the Earth's final transition into an 'icehouse' climate about 13.9 million years ago (Myr ago)[1, 2, 3, 4] remain enigmatic. Tectonically

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TYPOLOGIE

- Gene Expression Omnibus

Betreiber:	National Center for Biotechnology Information (NCBI) der U.S. National Library of Medicine
Disziplin:	Biomedizin
Mission:	„a public functional genomics data repository supporting MIAME-compliant data submissions. Array- and sequence-based data are accepted. Tools are provided to help users query and download experiments and curated gene expression profiles.“
Zugangs-bedingungen:	„Therefore, NCBI itself places no restrictions on the use or distribution of the data contained therein. Nor do we accept data when the submitter has requested restrictions on reuse or redistribution.“
Finanzierung:	Betreiber
Zitations-vorschlag:	Beispiel: http://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE33331

TYPOLOGIE

- Gene Expression Omnibus

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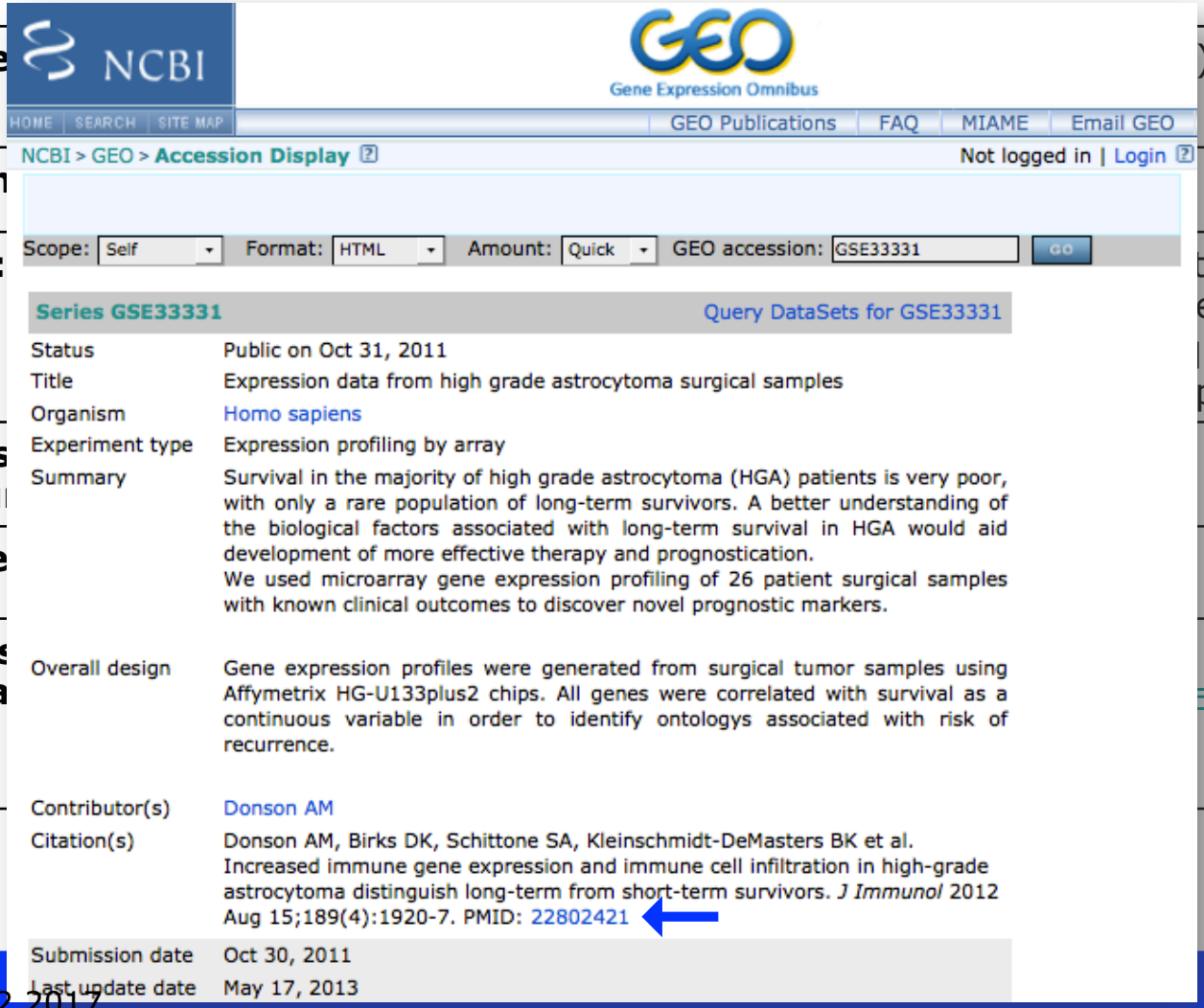
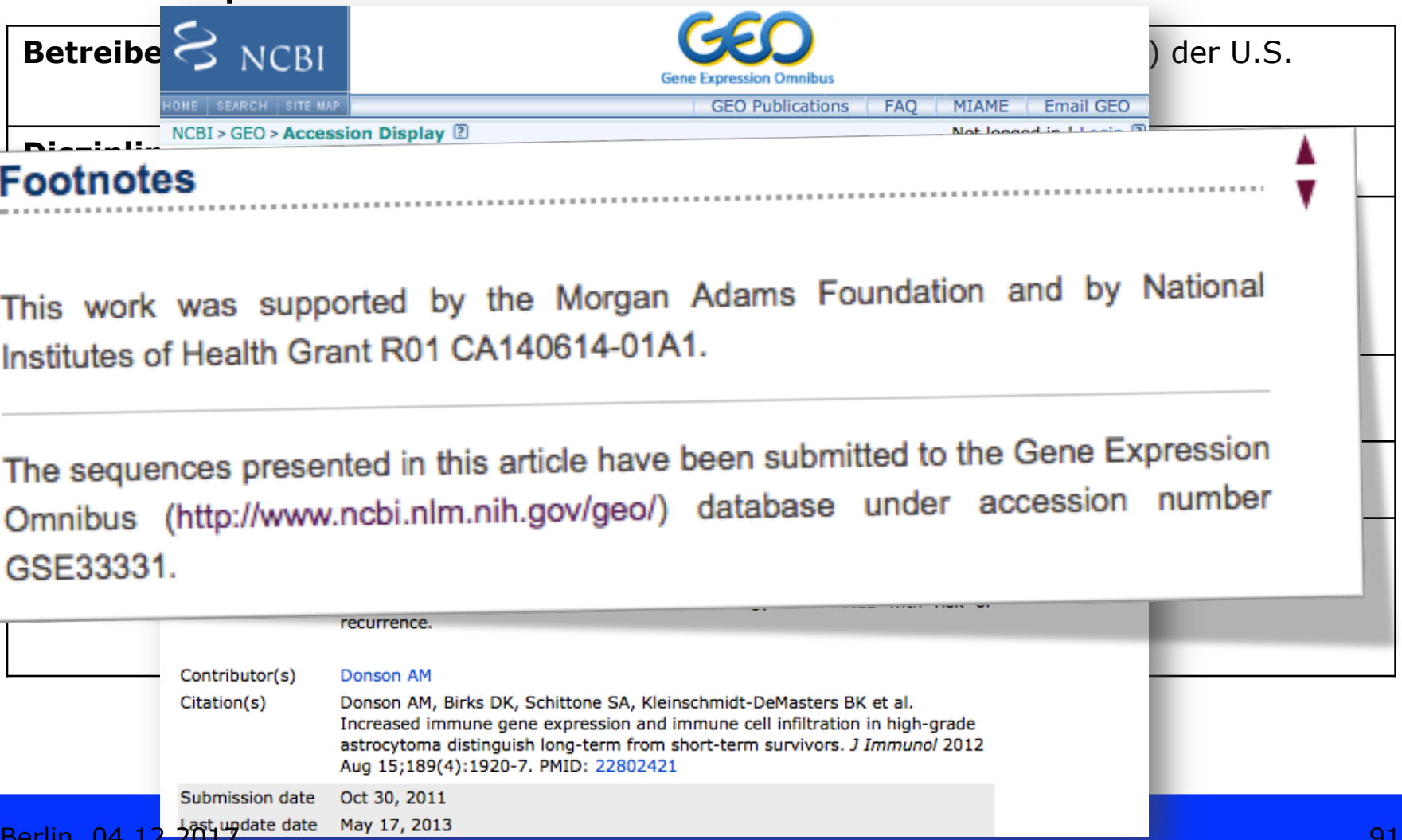


TYPOLOGIE

- Gene Expression Omnibus



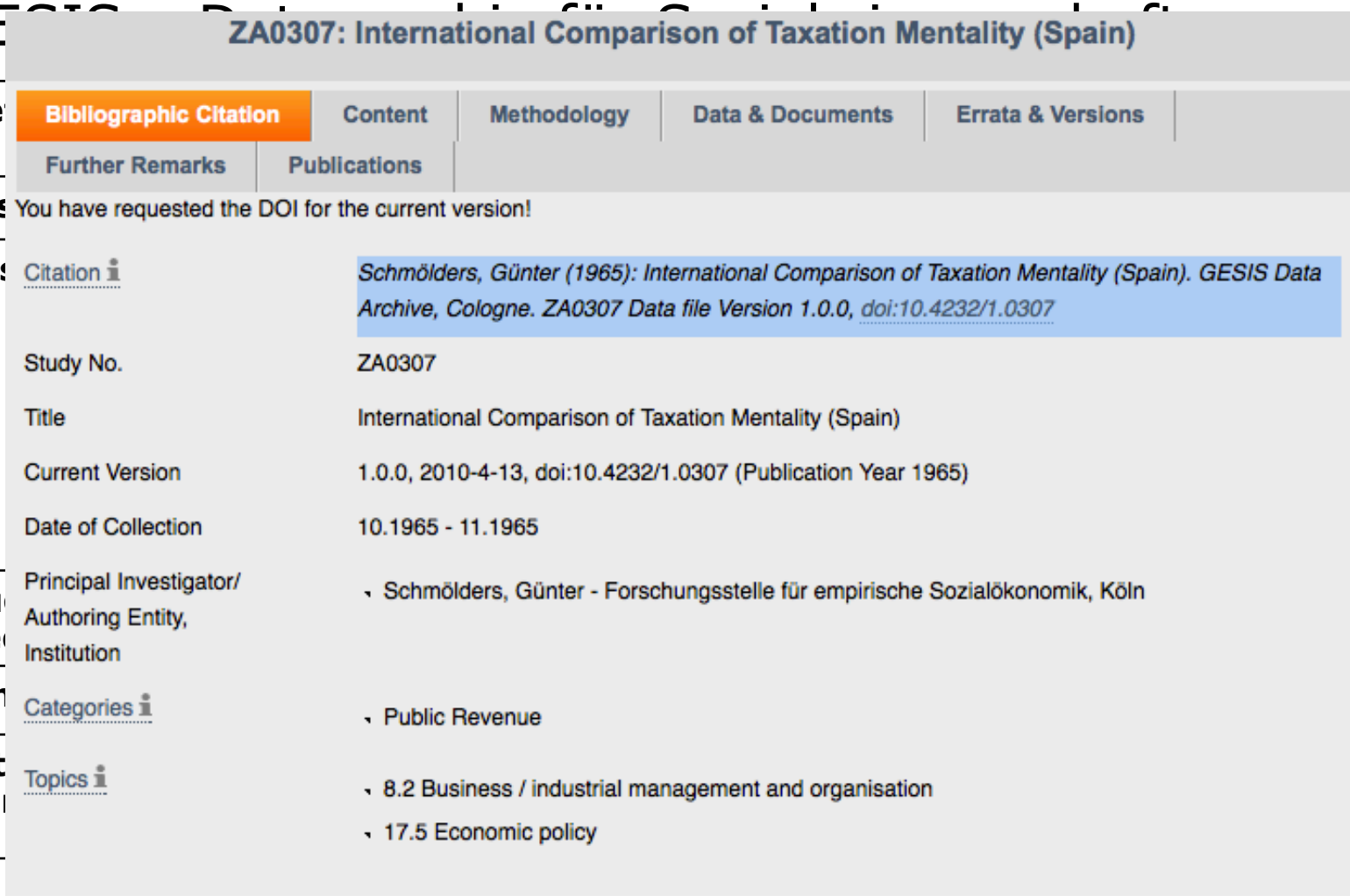
TYPOLOGIE

- GESIS – Datenarchiv für Sozialwissenschaften

Betreiber:	GESIS - Leibniz-Institut für Sozialwissenschaften, Datenarchiv für Sozialwissenschaften
Disziplin:	Sozialwissenschaften
Mission:	„Die Abteilung „Datenarchiv für Sozialwissenschaften" bietet in erster Linie Datenservice zu nationalen und international-vergleichende Umfragen zu soziologischen und politikwissenschaftlichen Fragestellungen. Die Studien werden gemäß klar definierten methodisch-technischen Anforderungen akquiriert und sodann bedarfsorientiert gemäß international anerkannten Standards aufbereitet, archiviert und der wissenschaftlich interessierten Öffentlichkeit zugänglich gemacht."
Zugangs-bedingungen:	Diverse Zugangskategorien (0, A, B, C)
Finanzierung:	Betreiber und Drittmittelförderung (u. a. Datenmanagement)
Zitations-vorschlag:	Beispiel: http://dx.doi.org/doi:10.4232/1.0307

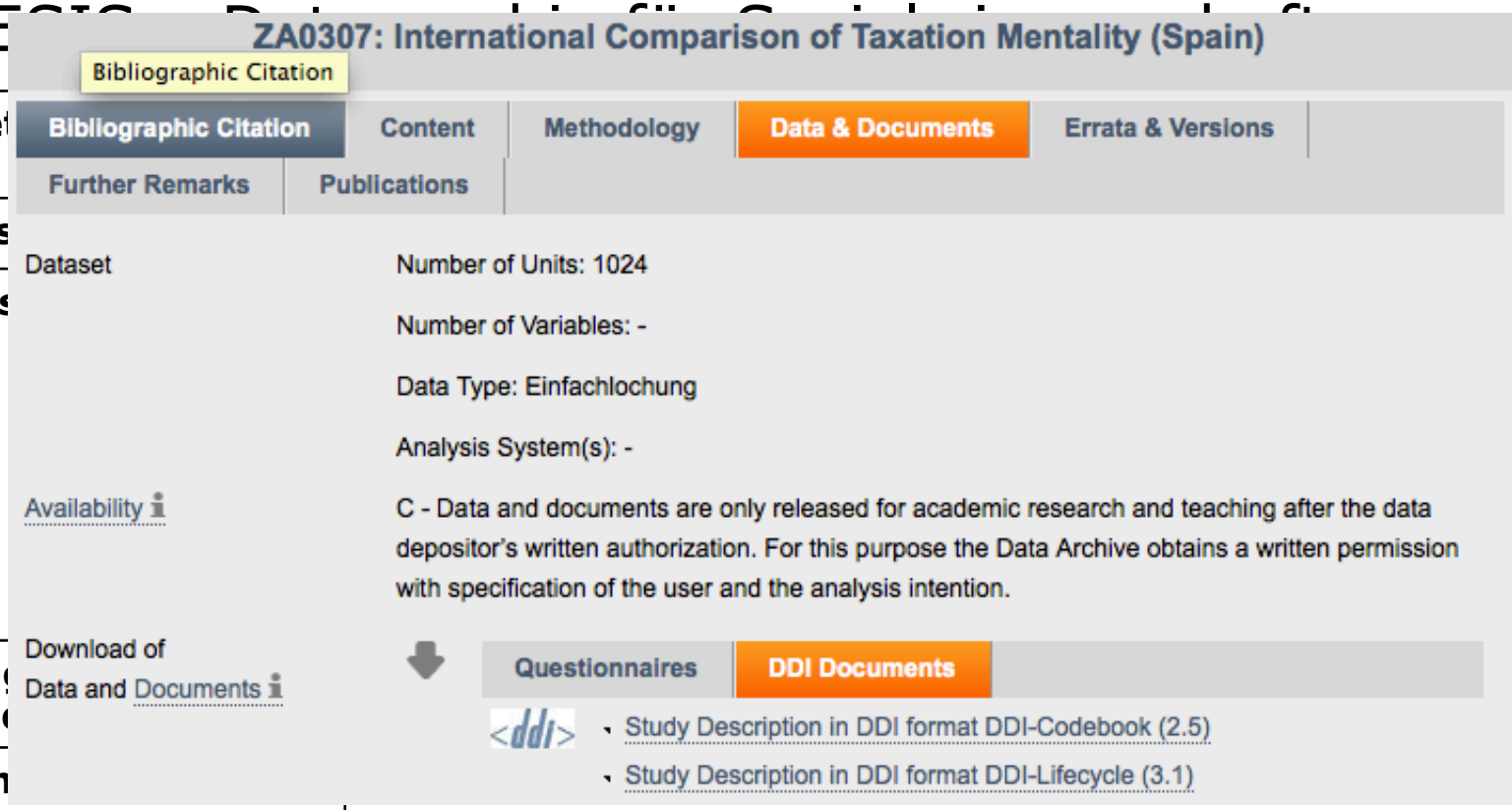
TYPOLOGIE

- GE



TYPOLOGIE

- GE



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Zitations-vorschlag:	Beispiel: http://dx.doi.org/doi:10.4232/1.0307

TYPOLOGIE

- GESIS – Datenarchiv für Sozialwissenschaften

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Mis	akquiriert und sodann bedarfsorientiert gemäß international anerkannten Standards aufbereitet, archiviert und der wissenschaftlich interessierten Öffentlichkeit zugänglich gemacht.“
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Finanzierung:	Betreiber
Zitations-vorschlag:	Beispiel: http://dx.doi.org/doi:10.4232/1.0307

TYPOLOGIE

- Institutionelle Forschungsdaten-Repositorien
  - Beispiele:
    - Purdue University Research Repository (PURR), https://purr.purdue.edu
    - Open Data LMU, http://data.ub.uni-muenchen.de
    - MADATA – Mannheim Research Data Repository, http://madata.bib.uni-mannheim.de

TYPOLOGIE

- Purdue University Research Repository (PURR)

Betreiber:	„PURR is a collaboration among the Purdue Libraries, the Office of the Vice President for Research, and Information Technology at Purdue (ITaP).“
Disziplin:	Multidisziplinär (Fächer der Universität)
Mission:	„The Purdue University Research Repository (PURR) provides an online, collaborative working space and data-sharing platform to support the data management needs of Purdue researchers and their collaborators.“
Zugangs-bedingungen:	CC0
Finanzierung:	Betreiber
Zitations-vorschlag:	Beispiel: http://dx.doi.org/10.4231/D39P2W550

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Graph of Flickr Photo-Sharing Social Network Crawled in May 2006

By David F Gleich

Purdue University

Crawl of the Flickr photo-sharing social network from May 2006 returning a graph with 820,878 nodes and 9,837,214 edges. Dataset is distributed as a SMAT file with README file with code to read file in Python and MATLAB.

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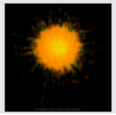

Abstract

Flickr is a popular online-community for sharing photos, with millions of users. This graph is representative of its social network, in which the node set V represents users, and the edge set E is such that (u, v) is in E if and only if a user u has added user v as his/her contact. We start with a crawl extracted from Flickr in May 2006. This crawl began with a single user and continued until the total personalized PageRank on the set of uncrawled nodes was less than 0.0001. The result of the crawl was a graph with 820,878 nodes and 9,837,214 edges.

Cite this work

Researchers should cite this work as follows:

David F Gleich (2012). **Graph of Flickr Photo-Sharing Social Network Crawled in May 2006**. Purdue University Research Repository. doi:10.4231/D39P2W550

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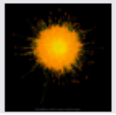

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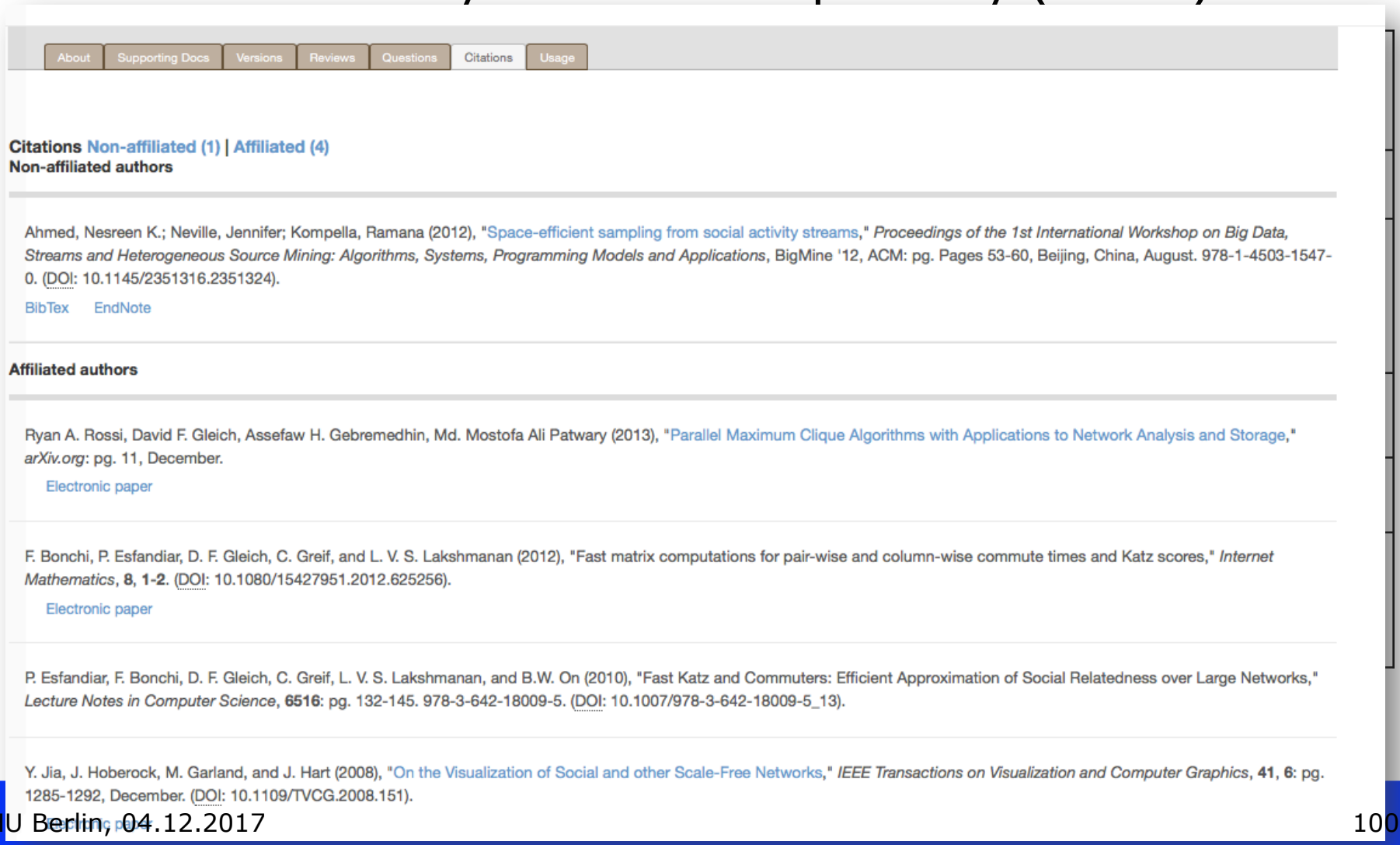
BibTex EndNote

TYPOLOGIE

- Purdue University Research Repository (PURR)



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Citations Non-affiliated (1) | Affiliated (4)

Non-affiliated authors

Ahmed, Nesreen K.; Neville, Jennifer; Kompella, Ramana (2012), "Space-efficient sampling from social activity streams," *Proceedings of the 1st International Workshop on Big Data, Streams and Heterogeneous Source Mining: Algorithms, Systems, Programming Models and Applications*, BigMine '12, ACM: pg. Pages 53-60, Beijing, China, August. 978-1-4503-1547-0. (DOI: 10.1145/2351316.2351324).

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Affiliated authors

Ryan A. Rossi, David F. Gleich, Assefaw H. Gebremedhin, Md. Mostofa Ali Patwary (2013), "Parallel Maximum Clique Algorithms with Applications to Network Analysis and Storage," *arXiv.org*: pg. 11, December.

Electronic paper

F. Bonchi, P. Esfandiar, D. F. Gleich, C. Greif, and L. V. S. Lakshmanan (2012), "Fast matrix computations for pair-wise and column-wise commute times and Katz scores," *Internet Mathematics*, **8**, **1-2**. (DOI: 10.1080/15427951.2012.625256).

Electronic paper

P. Esfandiar, F. Bonchi, D. F. Gleich, C. Greif, L. V. S. Lakshmanan, and B.W. On (2010), "Fast Katz and Commuters: Efficient Approximation of Social Relatedness over Large Networks," *Lecture Notes in Computer Science*, **6516**: pg. 132-145. 978-3-642-18009-5. (DOI: 10.1007/978-3-642-18009-5_13).

Y. Jia, J. Hoberock, M. Garland, and J. Hart (2008), "On the Visualization of Social and other Scale-Free Networks," *IEEE Transactions on Visualization and Computer Graphics*, **41**, **6**: pg. 1285-1292, December. (DOI: 10.1109/TVCG.2008.151).

TYPOLOGIE

- Open Data LMU

Betreiber:	Universitätsbibliothek der Ludwig-Maximilians-Universität München
Disziplin:	Multidisziplinär (Fächer der Universität)
Mission:	„Die Universitätsbibliothek stellt mit Open Data LMU eine Plattform für die Veröffentlichung von Forschungsdaten bereit. Wissenschaftler/innen aller Fakultäten der LMU sowie von Institutionen, die mit der LMU kooperieren, sind eingeladen, ihre Forschungsdaten auf dieser Plattform abzulegen, um sie [...] der Allgemeinheit zur Verfügung zu stellen.“
Zugangs-bedingungen:	-
Finanzierung:	Betreiber
Zitations-vorschlag:	Beispiel: http://dx.doi.org/10.5282/ubm/data.55

- Op

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DOI: http://dx.doi.org/10.5282/ubm/data.55

Beschreibung

Molecular phylogenetics resulted in a plethora of controversial hypotheses about the early diversification of non-bilaterian animals. To date, increasing the amount of DNA sequence data analyzed has been insufficient to resolve these relationships unequivocally. To unravel the causes for the patterns of extreme inconsistencies at the base of the metazoan tree of life, we constructed a novel supermatrix containing 122 genes, enriched with new non-bilaterian taxa. Comparative analyses of two non-overlapping multi-gene partitions of this dataset revealed conflicting phylogenetic signals. We show that gene sampling correlates with levels of saturation and Long Branch Attraction artifacts in the two partitions. Additional systematic errors are derived from significant variation in amino acid substitution patterns among metazoan lineages that violate the stationary assumption of models frequently used to reconstruct phylogenies. By modifying gene sampling and taxonomic composition of the outgroup, we were able to construct three different yet well-supported phylogenies. These results show that the accuracy of phylogenetic inference may be improved substantially by selecting genes that evolve slowly across metazoan lineages and applying more realistic substitution models. Additional non sequence-based markers are also necessary to assess the validity of phylogenetic reconstructions.

TYPOLOGIE

Keywords

Animal Evolution, non-bilateria, phylogeny, phylogenomics, gene selection

Quelle

Moloecular Phylogenetics and Evolution

Dokumententyp:	Daten
Name der Kontaktperson:	Wörheide, Gert
E-Mail der Kontaktperson:	woerheide at lmu.de
URL der Kontaktperson:	http://www.palmuc.de
Fakultät:	Fakultät für Geowissenschaften
Dewey Dezimalklassifikation:	500 Naturwissenschaften und Mathematik > 560 Paläontologie 500 Naturwissenschaften und Mathematik > 590 Tiere (Zoologie)
ID-Code:	55
Hochgeladen von:	Prof. Dr. Gert Wörheide
Hochgeladen am:	29. Jan. 2013 23:09
Letzte Änderungen:	24. Jun. 2014 09:47

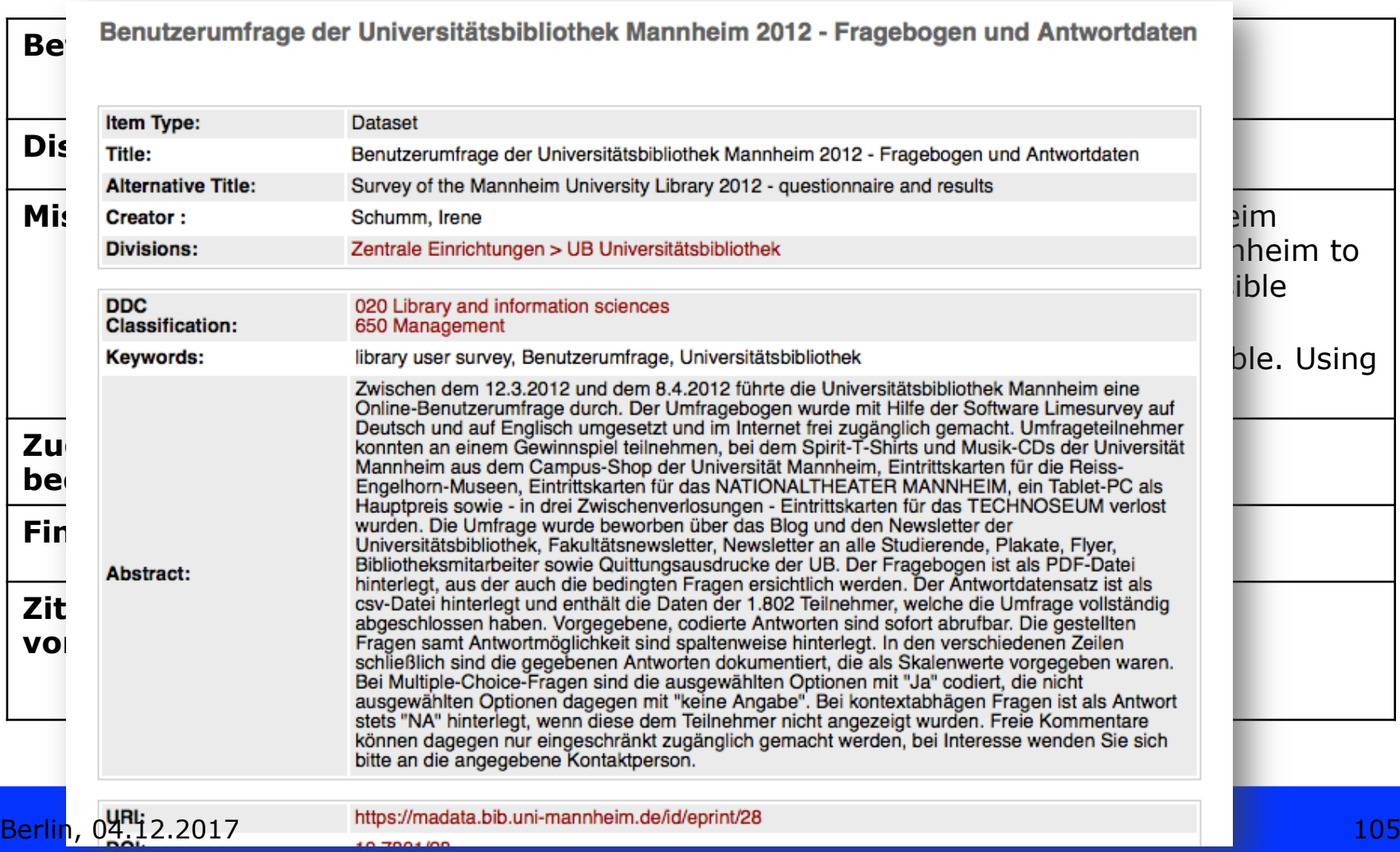
TYPOLOGIE

- MADATA – Mannheim Research Data Repository

Betreiber:	Universitätsbibliothek Mannheim
Disziplin:	Multidisziplinär (Fächer der Universität)
Mission:	„The Research Data Repository of the University of Mannheim invites all researchers and faculty of the University of Mannheim to archive their research data here in order to make it accessible through the Internet. All archived data sets receive DOIs (Digital Object Identifier) to make them accessible and citable. Using this repository is free of charge.“
Zugangs-bedingungen:	u. a. Creative-Commons-Lizenzen (Empfehlung: CC0)
Finanzierung:	Betreiber
Zitations-vorschlag:	Beispiel: http://dx.doi.org/10.7801/28

TYPOLOGIE

- MADATA – Mannheim Research Data Repository



Benutzerumfrage der Universitätsbibliothek Mannheim 2012 - Fragebogen und Antwortdaten

Item Type:	Dataset
Title:	Benutzerumfrage der Universitätsbibliothek Mannheim 2012 - Fragebogen und Antwortdaten
Alternative Title:	Survey of the Mannheim University Library 2012 - questionnaire and results
Creator :	Schumm, Irene
Divisions:	Zentrale Einrichtungen > UB Universitätsbibliothek
DDC Classification:	020 Library and information sciences 650 Management
Keywords:	library user survey, Benutzerumfrage, Universitätsbibliothek
Abstract:	Zwischen dem 12.3.2012 und dem 8.4.2012 führte die Universitätsbibliothek Mannheim eine Online-Benutzerumfrage durch. Der Umfragebogen wurde mit Hilfe der Software Limesurvey auf Deutsch und auf Englisch umgesetzt und im Internet frei zugänglich gemacht. Umfrageteilnehmer konnten an einem Gewinnspiel teilnehmen, bei dem Spirit-T-Shirts und Musik-CDs der Universität Mannheim aus dem Campus-Shop der Universität Mannheim, Eintrittskarten für die Reiss-Engelhorn-Museen, Eintrittskarten für das NATIONALTHEATER MANNHEIM, ein Tablet-PC als Hauptpreis sowie - in drei Zwischenverlosungen - Eintrittskarten für das TECHNOSEUM verlost wurden. Die Umfrage wurde beworben über das Blog und den Newsletter der Universitätsbibliothek, Fakultätsnewsletter, Newsletter an alle Studierende, Plakate, Flyer, Bibliotheksmitarbeiter sowie Quittungsausdrucke der UB. Der Fragebogen ist als PDF-Datei hinterlegt, aus der auch die bedingten Fragen ersichtlich werden. Der Antwortdatensatz ist als csv-Datei hinterlegt und enthält die Daten der 1.802 Teilnehmer, welche die Umfrage vollständig abgeschlossen haben. Vorgegebene, codierte Antworten sind sofort abrufbar. Die gestellten Fragen samt Antwortmöglichkeit sind spaltenweise hinterlegt. In den verschiedenen Zeilen schließlich sind die gegebenen Antworten dokumentiert, die als Skalenwerte vorgegeben waren. Bei Multiple-Choice-Fragen sind die ausgewählten Optionen mit "Ja" codiert, die nicht ausgewählten Optionen dagegen mit "keine Angabe". Bei kontextabhägen Fragen ist als Antwort stets "NA" hinterlegt, wenn diese dem Teilnehmer nicht angezeigt wurden. Freie Kommentare können dagegen nur eingeschränkt zugänglich gemacht werden, bei Interesse wenden Sie sich bitte an die angegebene Kontaktperson.
URI:	https://madata.bib.uni-mannheim.de/id/eprint/28

TYPOLOGIE

- Projektspezifische Forschungsdaten-Repositorien
  - Beispiele:
    - The Bern Digital Pantheon Project, http://www.digitalpantheon.ch/repository

TYPOLOGIE

- Projektspezifische Forschungsdaten-Repositorien
  - Beispiele:
    - The ~~Bern~~ Digital Pantheon Project, http://repository.edition-topoi.org/collection/BDPP/

Overview

Metadata

Search

Abstract
Description
Further information
Research Group Phase 1
Research Group Phase 2
Conditions for Use

cite Download JSON

Institutions
Universtität Bern (Phase I),
Humboldt-Univesität zu Berlin
(Phase II)

Description

The collection 'Digital Pantheon' is based on research data of the Bern Digital Pantheon project. This project - directed by Gerd Graßhoff, Michael Heinzelmann and Markus Wäfler of the University of Bern - created a digital 3d scan of the Pantheon in Rome using a laser scanner in several scanning campaigns in the years 2005 to 2008. On the basis of these data, the registered papers were published and the website www.digitalpantheon.ch established. Since 2010, this website is no longer being maintained.

The collection 'Digital Pantheon' is further processing the research data. It provides long-term archiving of the data, which has been further analysed within the framework of the Excellence Cluster TOPOI, and makes it available to interested researchers and the public.

Further information

G. Graßhoff, M. Heinzelmann, M. Wäfler (Hrsg.), Das Pantheon in Rom, Pantheon 1: Publikation eines internationalen Kolloquiums vom 9.-12.11.2006 an der Universität Bern, Bern Studies in the History and Philosophy of Science, Bern, 2009

TYPOLOGIE

- The Bern Digital Pantheon Project

Betreiber:	Humboldt Universität zu Berlin, Lehrstuhl für Wissenschaftsgeschichte der Antike, Exzellenzcluster 264 TOPOI
Disziplin:	Archäologie, Architektur und Kunstgeschichte
Mission:	„The Pantheon in Rome is a hallmark in ancient architecture. A comprehensive architectural survey has been undertaken by the Bern Digital Pantheon project under the direction of Gerd Graßhoff, Michael Heinzelmann and Markus Wäfler of Bern University from 2005-2008. With support of the Excellence Cluster Topoi, Gerd Graßhoff has recomputed the digital model and prepared its data for long-time preservation and publication in this collection.“
Zugangs-bedingungen:	CC BY-NC-SA 3.0 DE
Finanzierung:	Betreiber und Drittmittelförderung
Zitations-vorschlag:	Beispiel: http://doi.org/10.17171/1-4-33

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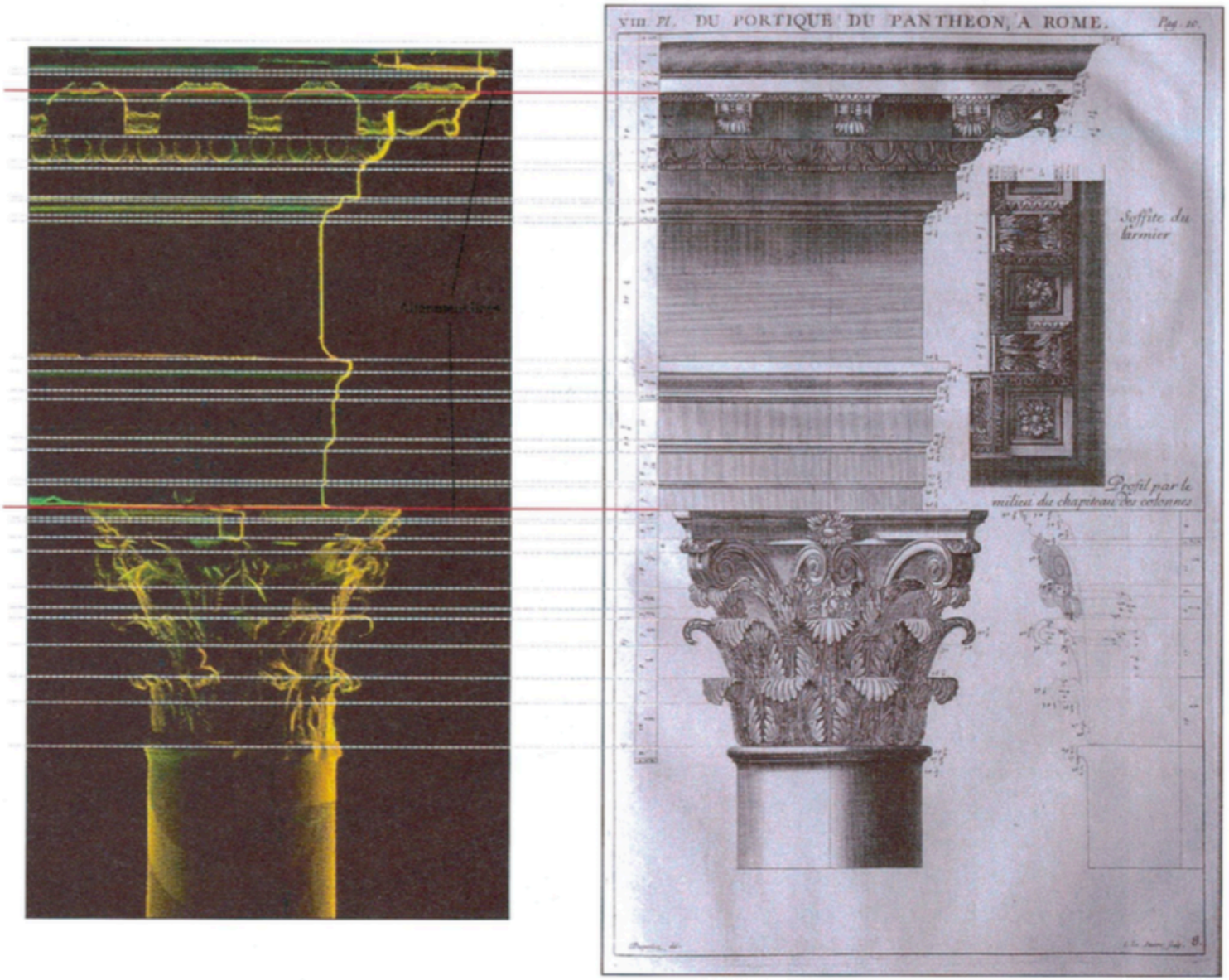


Abb. 2: Vergleich der digitalen Profile mit den Zeichnungen von Desgodetz

http://doi.org/10.5169/seals-521499

TYPOLOGIE

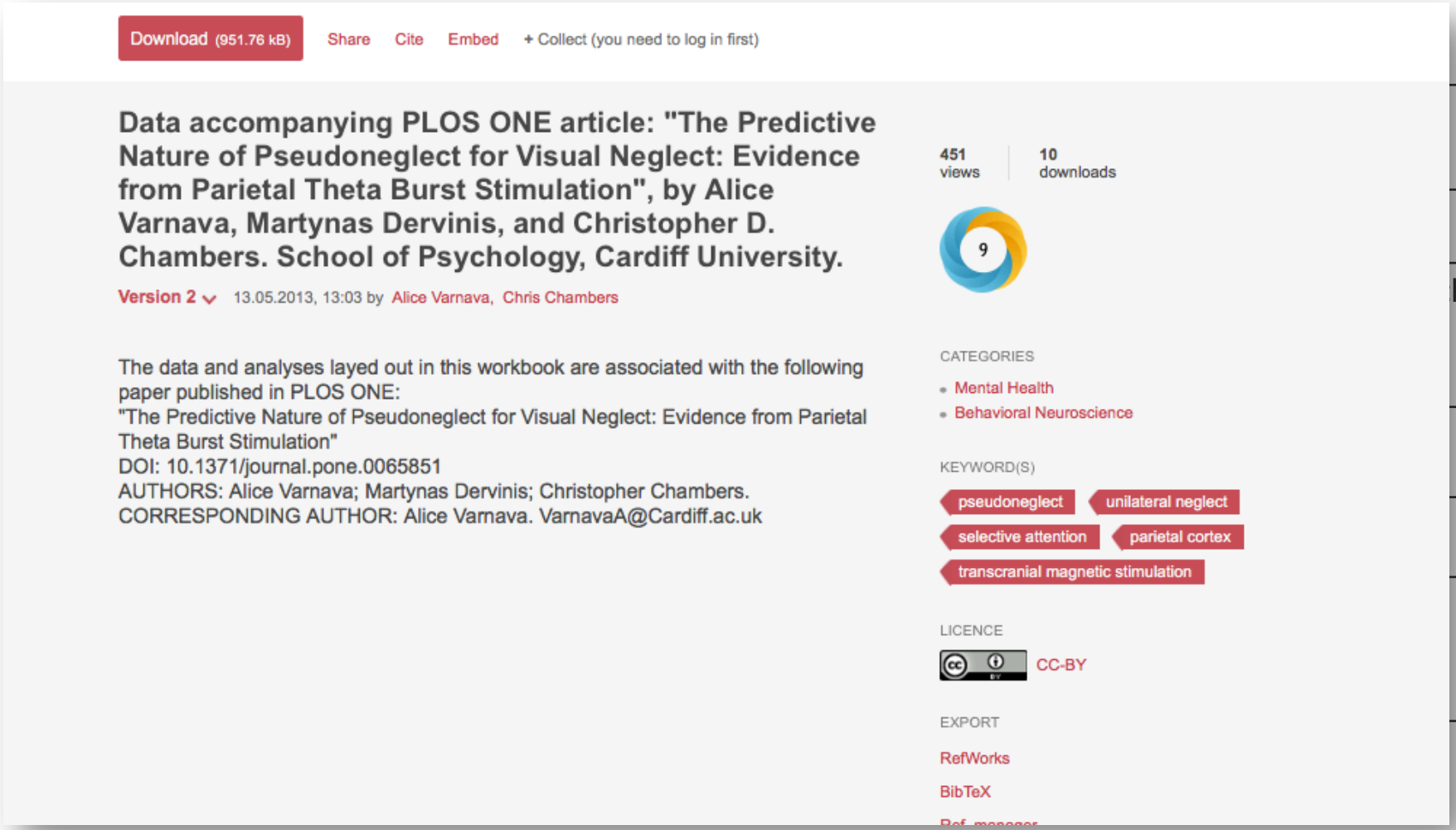
- Multidisziplinäre (Forschungsdaten-)Repositorien
  - Beispiele:
    - Figshare, http://figshare.com
    - ZENODO, https://zenodo.org

TYPOLOGIE

- Figshare

Betreiber:	Figshare LLP
Disziplin:	Multidisziplinär
Mission:	„figshare is a repository where users can make all of their research outputs available in a citable, sharable and discoverable manner.“
Zugangs-bedingungen:	CC-BY (figures, media, posters, papers, filesets) und CC0 (datasets)
Finanzierung:	Digital Science (Holtzbrinck Publishing Group)
Zitations-vorschlag:	Beispiel: http://dx.doi.org/10.6084/m9.figshare.701525

TYPOLOGIE



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Data accompanying PLOS ONE article: "The Predictive Nature of Pseudoneglect for Visual Neglect: Evidence from Parietal Theta Burst Stimulation", by Alice Varnava, Martynas Dervinis, and Christopher D. Chambers. School of Psychology, Cardiff University.

Version 2 13.05.2013, 13:03 by Alice Varnava, Chris Chambers

The data and analyses layed out in this workbook are associated with the following paper published in PLOS ONE:
"The Predictive Nature of Pseudoneglect for Visual Neglect: Evidence from Parietal Theta Burst Stimulation"
DOI: 10.1371/journal.pone.0065851
AUTHORS: Alice Varnava; Martynas Dervinis; Christopher Chambers.
CORRESPONDING AUTHOR: Alice Varnava. VarnavaA@Cardiff.ac.uk

451 views | 10 downloads

9

CATEGORIES
- Mental Health
- Behavioral Neuroscience

KEYWORD(S)
pseudoneglect | unilateral neglect | selective attention | parietal cortex | transcranial magnetic stimulation

LICENCE
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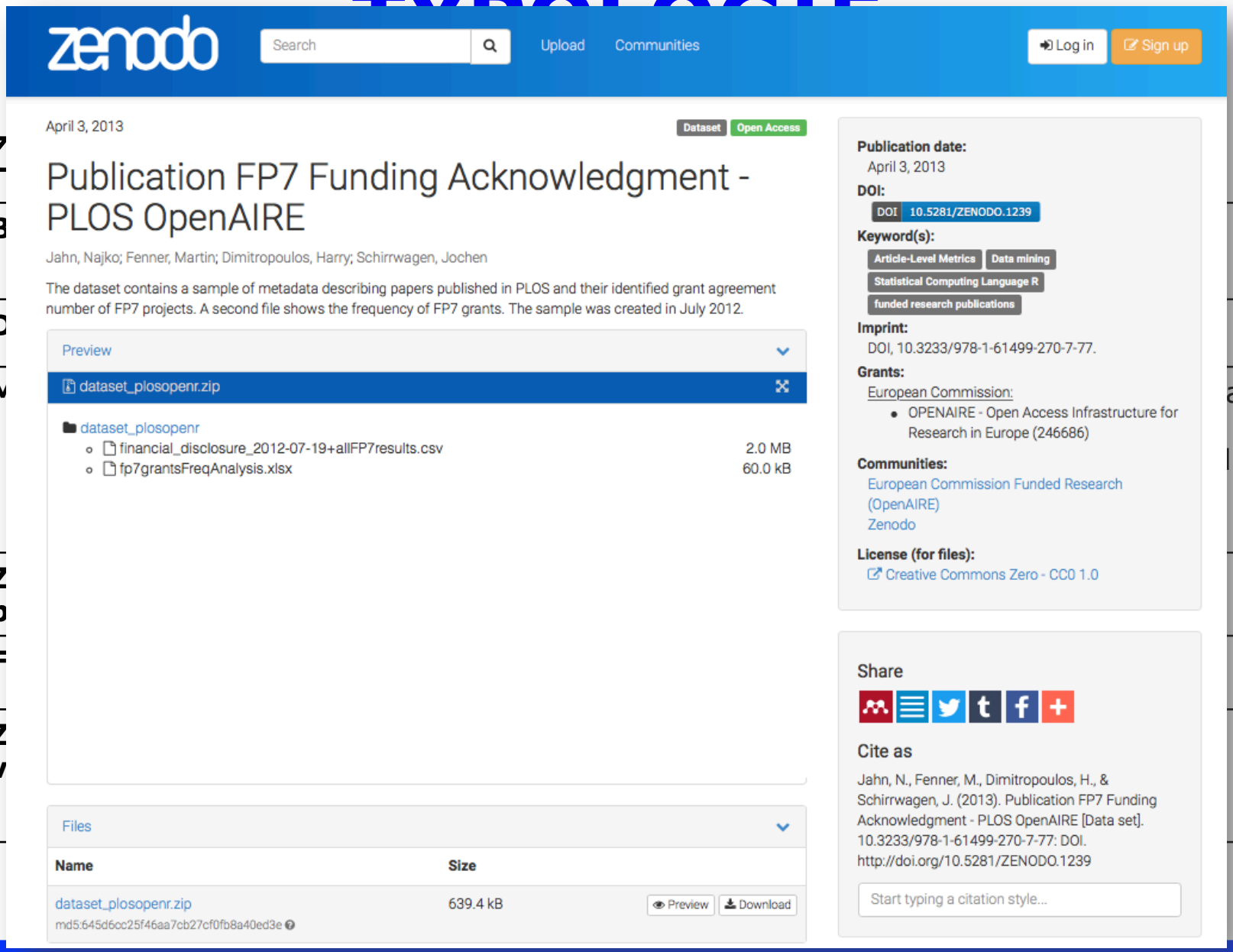
TYPOLOGIE

- ZENODO

Betreiber:	CERN – European Organization for Nuclear Research
Disziplin:	Multidisziplinär
Mission:	„ZENODO builds and operate a simple and innovative service that enables researchers, scientists, EU projects and institutions to share and showcase multidisciplinary research results (data and publications) that are not part of the existing institutional or subject-based repositories of the research communities.“
Zugangs-bedingungen:	Diverse Lizenzen
Finanzierung:	Betreiber, Drittmittelförderung (OpenAIREplus), Spenden
Zitations-vorschlag:	Beispiel: http://dx.doi.org/10.5281/ZENODO.1239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Dataset
Open Access
Publication FP7 Funding Acknowledgment - PLOS OpenAIRE
Jahn, Najko; Fenner, Martin; Dimitropoulos, Harry; Schirrwagen, Jochen
The dataset contains a sample of metadata describing papers published in PLOS and their identified grant agreement number of FP7 projects. A second file shows the frequency of FP7 grants. The sample was created in July 2012.
Preview
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financial_disclosure_2012-07-19+allFP7results.csv 2.0 MB
fp7grantsFreqAnalysis.xlsx 60.0 kB
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Publication date:
April 3, 2013
DOI:
DOI 10.5281/ZENODO.1239
Keyword(s):
Article-Level Metrics
Data mining
Statistical Computing Language R
funded research publications
Imprint:
DOI, 10.3233/978-1-61499-270-7-77.
Grants:
European Commission:
OPENAIRE - Open Access Infrastructure for Research in Europe (246686)
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European Commission Funded Research (OpenAIRE)
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Jahn, N., Fenner, M., Dimitropoulos, H., & Schirrwagen, J. (2013). Publication FP7 Funding Acknowledgment - PLOS OpenAIRE [Data set]. 10.3233/978-1-61499-270-7-77: DOI. http://doi.org/10.5281/ZENODO.1239
Start typing a citation style...

TYPOLOGIE

- Portale, die verteile Datensammlungen zugänglich machen
  - Beispiel:
    - Council of European Social Science Data Archives (CESSDA), http://cessda.net/CESSDA-Services/Resources/Data-Catalogue

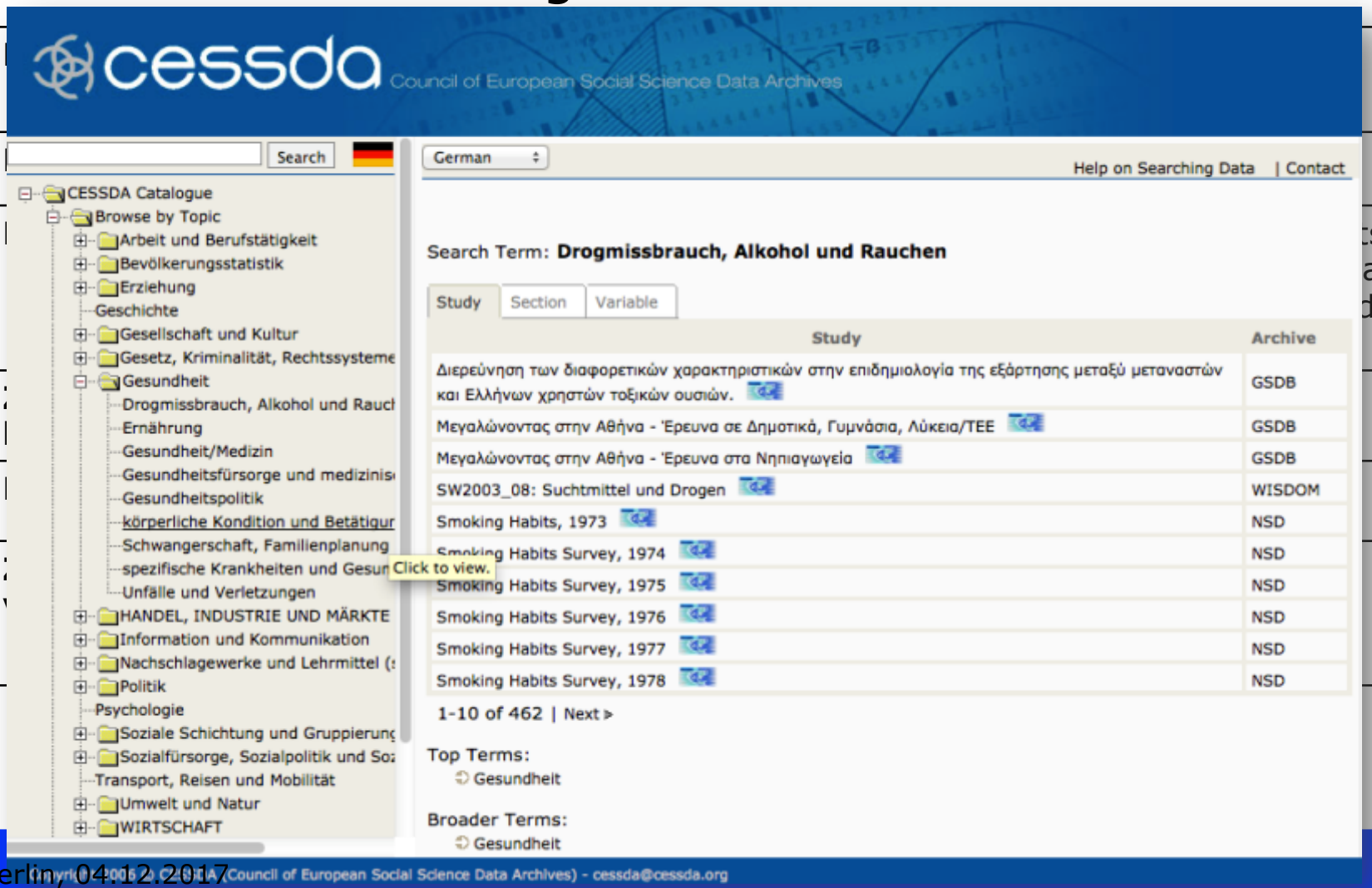
TYPOLOGIE

- CESSDA Data Catalogue

Betreiber:	CESSDA (Council of European Social Science Data Archives), 15 CESSDA Data Publishers (u.a. DANS, WISDOM, GESIS)
Disziplin:	Sozialwissenschaften
Mission:	„The CESSDA Data Catalogue represents a virtual common catalogue for the collective data holdings of the various CESSDA member archives. In OAIS1 (Reference Model for an Open Archival Information System) terminology, CESSDA is a "federation", adding together the collected data holdings of its members.“ [...] „The data catalogue also makes use of DDI (Data Documentation Initiative) metadata standard [...]“
Zugangs-bedingungen:	-
Finanzierung:	-
Zitations-vorschlag:	-

TYPOLOGIE

- CESSDA Data Catalogue



TYPOLOGIE

- Frage: Auf welchem der vorgestellten Repositorien-Typen würden Sie Ihre Forschungsdaten zugänglich machen?
  - Disziplinäre Forschungsdaten-Repositorien
  - Institutionelle Forschungsdaten-Repositorien
  - Projektspezifische Forschungsdaten-Repositorien
  - Multidisziplinäre Forschungsdaten-Repositorien
  - Portale, die verteile Datensammlungen zugänglich machen

DEFINITION

- Spannungsfeld: Anspruch – Wirklichkeit

  - „Research Data Infrastructures can be defined as **managed networked environments for digital research data consisting of services and tools that support**: (i) the **whole research cycle**, (ii) the movement of research data **across scientific disciplines**, (iii) the creation of **open linked data spaces** by connecting data sets from diverse disciplines, (iv) the management of **scientific workflows**, (v) the **interoperation between** research **data** and **literature** and (vi) an integrated Science **Policy** Framework.“

GRDI2020. (2012). GRDI2020 Final Roadmap Report. Global Research Data Infrastructures: The Big Data Challenges. Retrieved from http://www.grdi2020.eu/Repository/FileScaricati/e2b03611-e58f-4242-946a-5b21f17d2947.pdf

DEFINITION

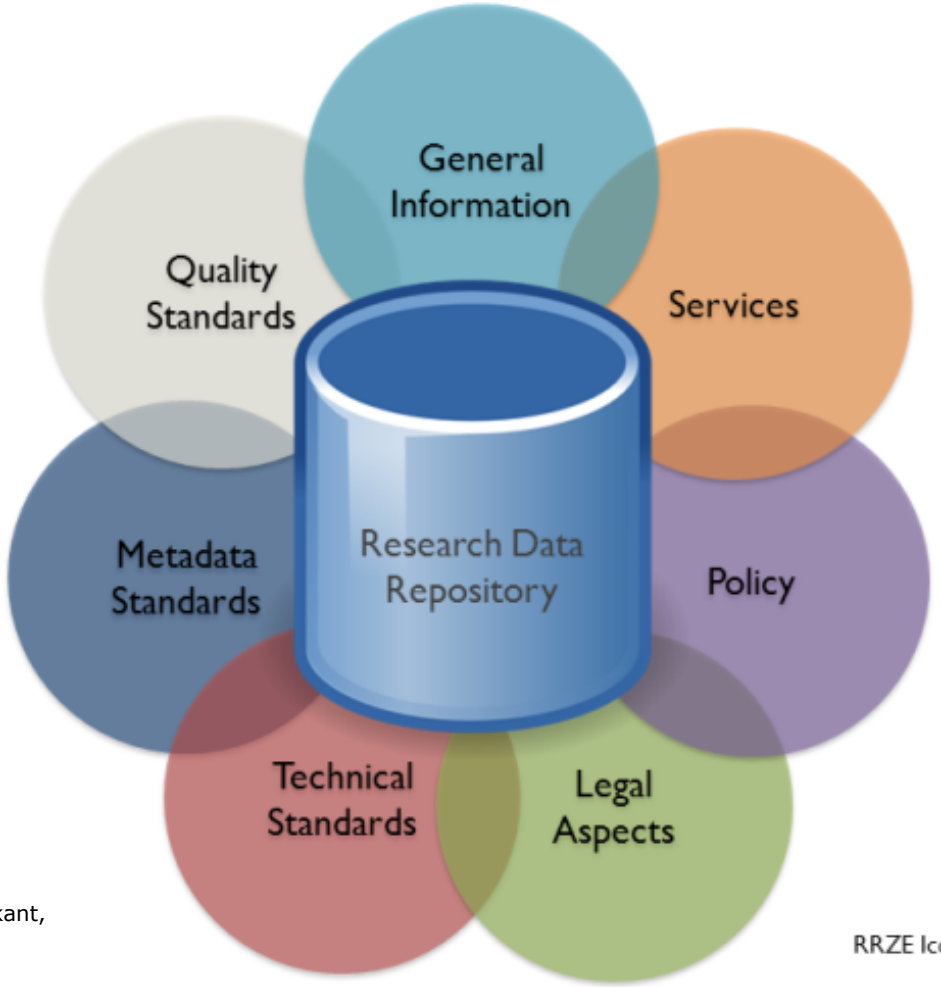
- Zentrale Herausforderungen:
  - „The three main challenges in developing an **ecosystem of data repositories** are (1) **gaps** in the present data infrastructure and (2) **connectivity issues** (between the workflow of researchers and the institutional data infrastructure and between institutional and national data infrastructures) and (3) **long-term financial basis**."

Van der Graaf, M., & Waaijers, L. (2011). A Surfboard for Riding the Wave. Towards a four country action programme on research data. Retrieved from http://www.knowledge-exchange.info/Admin/Public/DWSDownload.aspx?File=/Files/Filer/downloads/Primary+Research+Data/Surfboard+for+Riding+the+Wave/KE_Surfboard_Riding_the_Wave_Screen.pdf

DEFINITION

- **Digitale Forschungsdaten-Repositorien sind Informationsinfrastrukturen, die digitale Forschungsdaten möglichst dauerhaft - anhand den Anforderungen der jeweiligen Nutzergruppe – speichern und organisieren um die Auffindbarkeit und Zugänglichkeit der Daten zu sichern.**
- Forschungsdaten-Repositorien werden durch disziplinäre Anforderungen geprägt (z.B. Form und Format der Daten).
- Die Funktionalitäten und Dienstleistungen der Forschungsdaten-Repositorien variieren stark.
- Zu unterscheiden sind Small-Data- und Big-Data-Ansätze.
- Der Prozess der Standardisierung steht erst am Anfang.
- Die Schaffung einer vernetzten Forschungsdaten-Infrastruktur ist eine Herausforderung für das weltweite Wissenschaftssystem.
- Viele Fragen rund um den Betrieb sind ungelöst.

ASPEKTE



RRZE Icon Set (CC: BY-SA)

Pampel, H., Goebelbecker, H.-J., & Vierkant, P. (2012). re3data.org: Aufbau eines Verzeichnisses von Forschungsdaten-Repositorien. Ein Werkstattbericht. In B. Mittermaier (Ed.), Vernetztes Wissen – Daten, Menschen, Systeme. WissKom 2012 (pp. 61–73). Jülich: Verlag des Forschungszentrums Jülich. Retrieved from http://hdl.handle.net/2128/4699

SERVICES

- Daten-Upload
  - Unterstützung bei der Metadaten-Vergabe
    - Import- und Export der Metadaten
    - Thesauri, Klassifikationen und Schlagwörter
  - Vergabe von persistenten Identifikatoren
    - z. B.: Akzessionsnummern
  - Verknüpfungen mit persistenten Identifikatoren
    - z. B.: ORCID, FundRef, CrossRef, DataCite
  - Verknüpfungen mit Verzeichnisdiensten
    - z. B.: Lightweight Directory Access Protocol (LDAP)
  - Unterstützung von Authentifikations- und Autorisierungsdiensten

SERVICES

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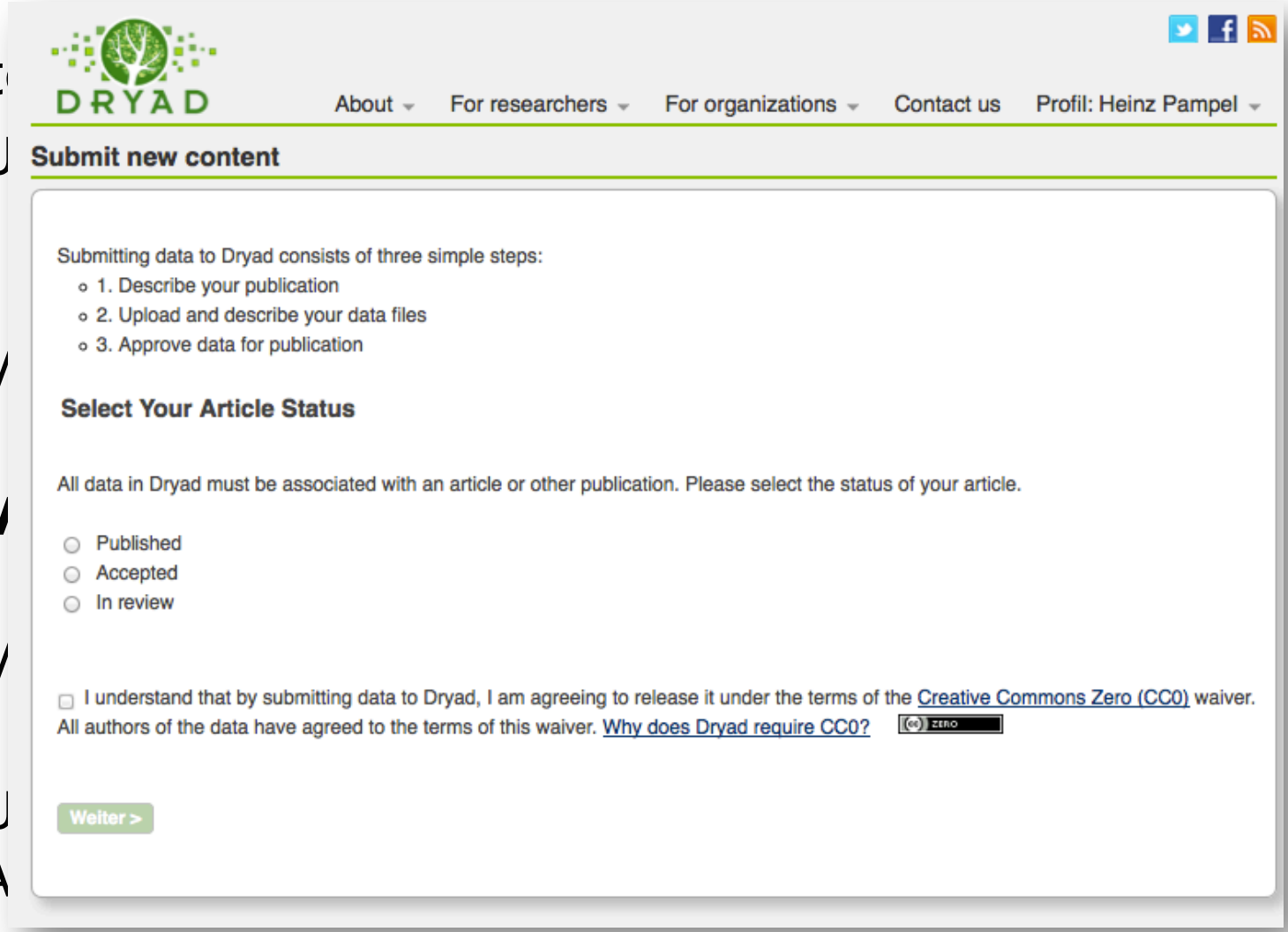

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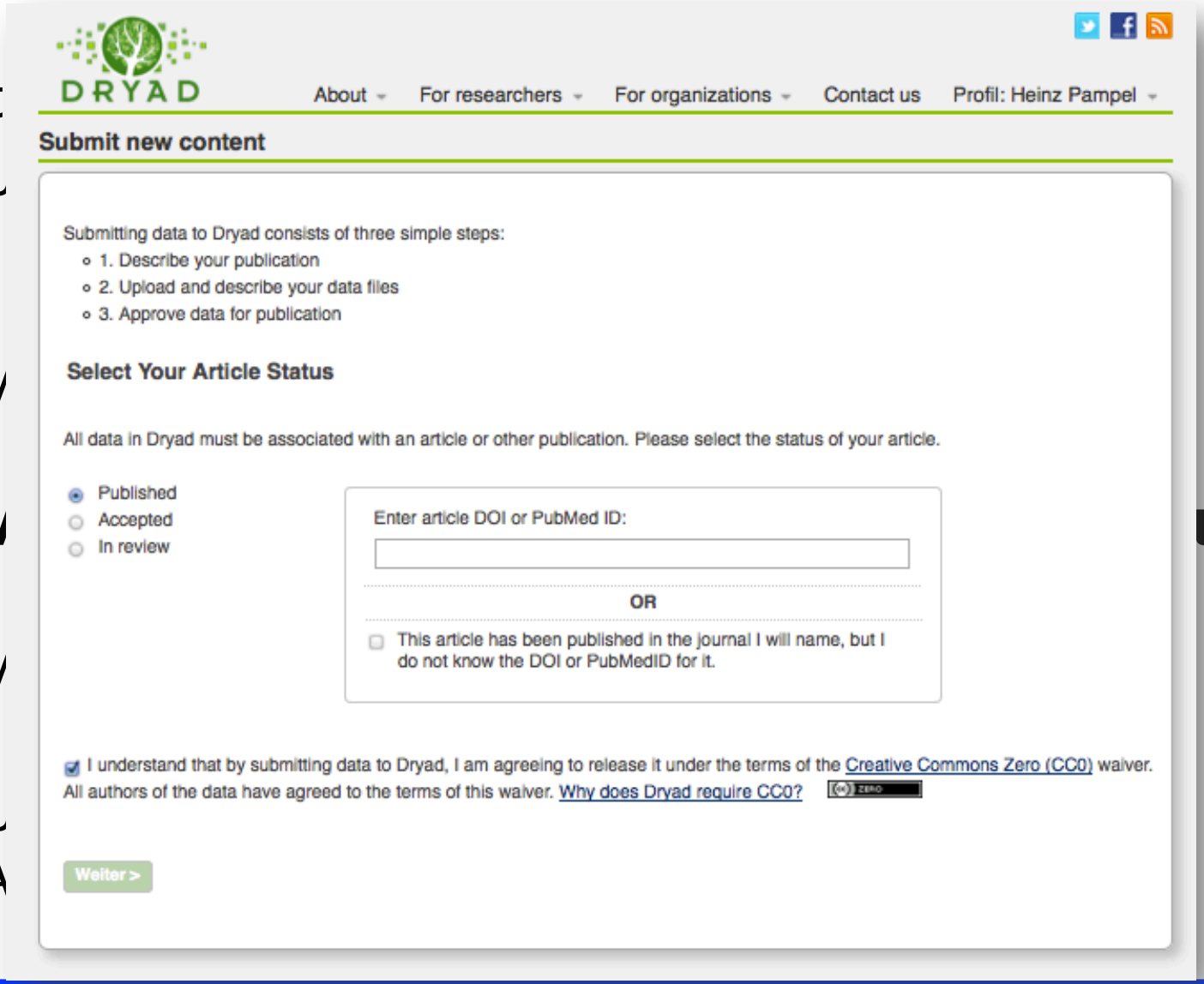

SERVICES

- Daten-Download
  - Import- und Export der Metadaten
  - Zitationsvorschläge
- Referenz zu Text-Publikationen
- Kommentierungs- und Bewertungsfunktionen
- Metriken
- Social-Media-Funktionen
- Nachweis in Suchdiensten (z.B. Google Scholar)
- **Kooperationen mit Zeitschriften und Verlagen**
  - Cross-Referenzierung: Artikel und Forschungsdaten

SERVICES

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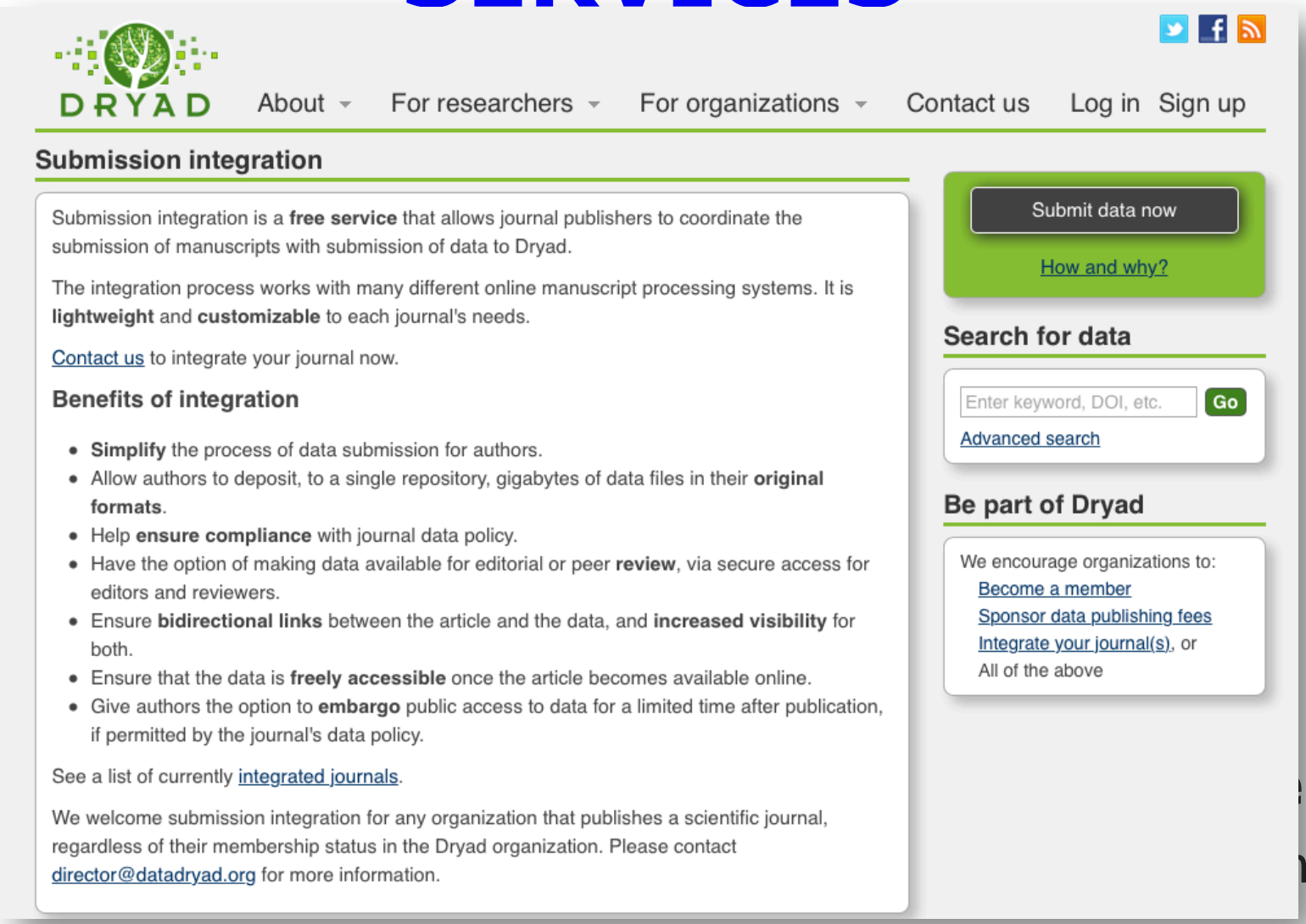


SERVICES

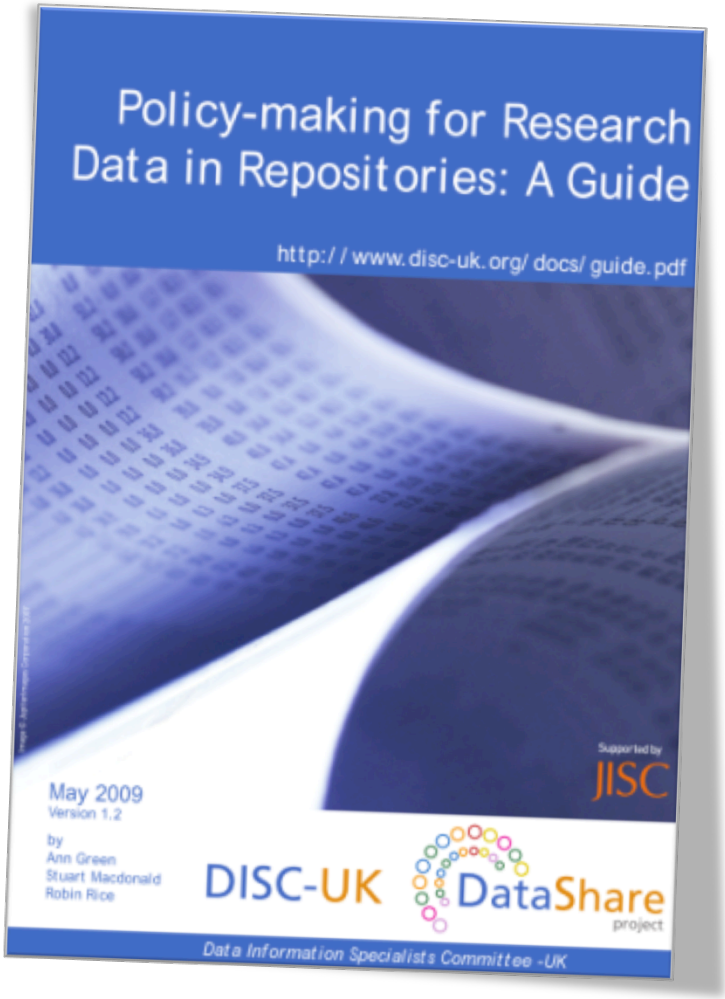
- Versionsverwaltung
- Alerting-Dienste
- Kooperationen mit Förderorganisationen
- ...

POLICIES

- Leit- und Richtlinien zum Betrieb eines Repositoriums
- Aussagen zu rechtlichen, finanziellen, technischen und organisatorischen Funktionalitäten eines Repositoriums
- Dokumentation der Rechte und Pflichten
  - des Daten-ProduzentInnen
  - des Repositorien-BetreiberInnen
  - der Daten-NutzerInnen
- Sicherung der Transparenz
- Zusammenspiel mit weiteren Policies (z. B. von Förderorganisation und Zeitschriften)

POLICIES

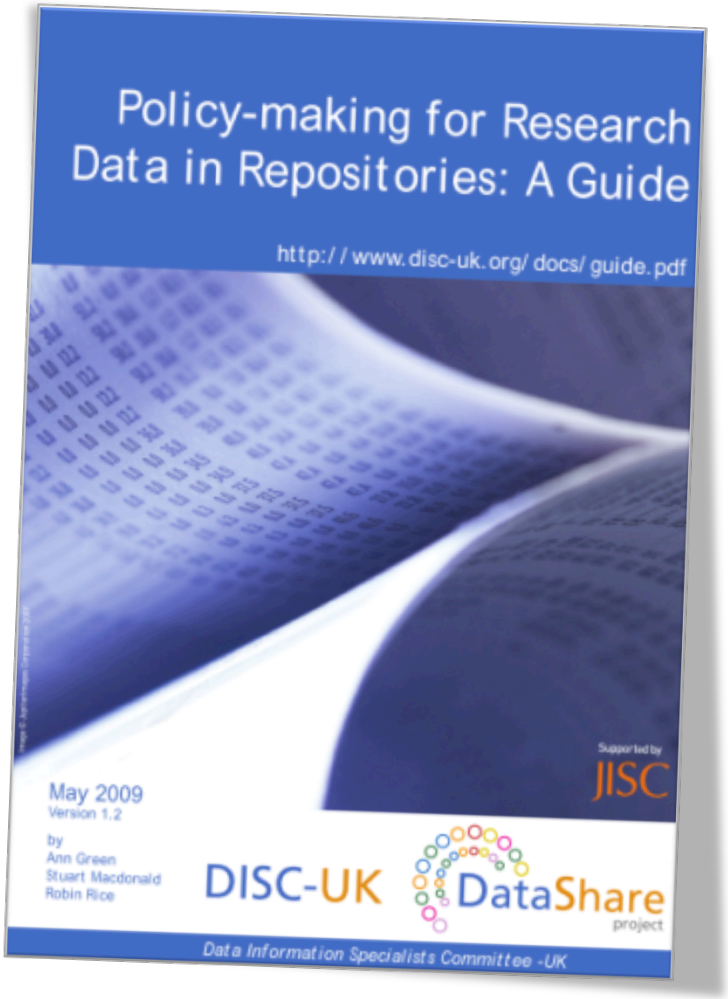
- Content Coverage
  - Scope: subjects and languages
  - Kinds of research data
  - Status of the research data
  - Versions
  - Data file formats
  - Volume and size limitations



Green, A., Macdonald, S., & Rice, R. (n.d.). Policy-making for Research Data in Repositories: A Guide Data Share. Version 1.2. Retrieved from www.disc-uk.org/docs/guide.pdf

POLICIES

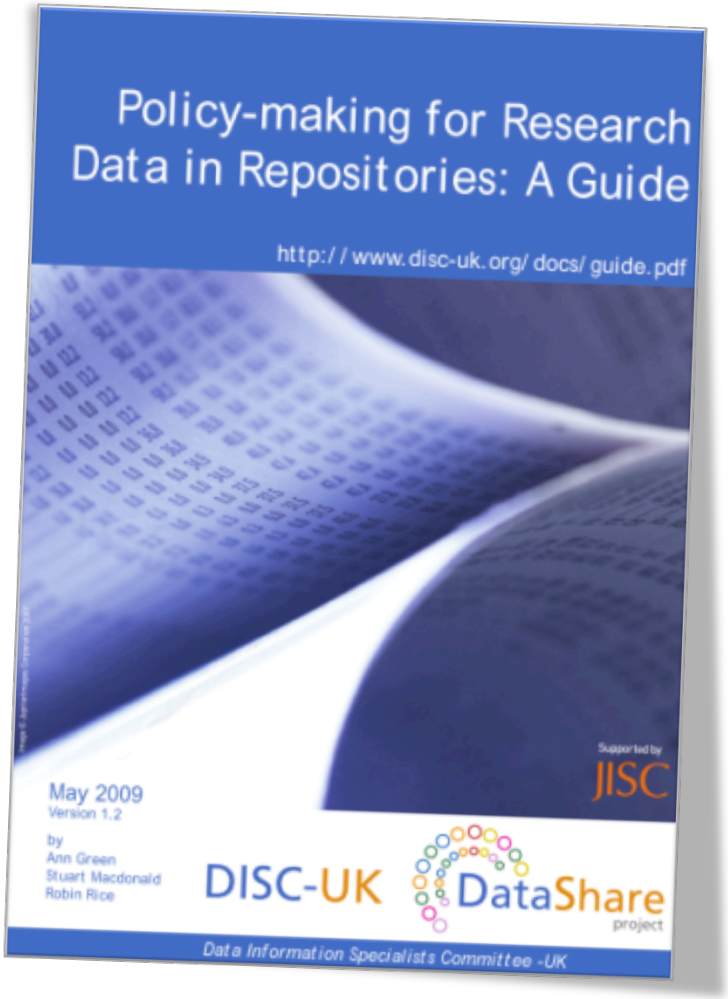
- Metadata
  - Access to metadata
  - Reuse of metadata
  - Metadata types and sources
  - Metadata schemas
- Submission of Data (Ingest)
  - Eligible depositors
  - Moderation by repository
  - Data quality requirements
  - Confidentiality and disclosure
  - Embargo status
  - Rights and ownership



Green, A., Macdonald, S., & Rice, R. (n.d.). Policy-making for Research Data in Repositories: A Guide Data Share. Version 1.2. Retrieved from www.disc-uk.org/docs/guide.pdf

POLICIES

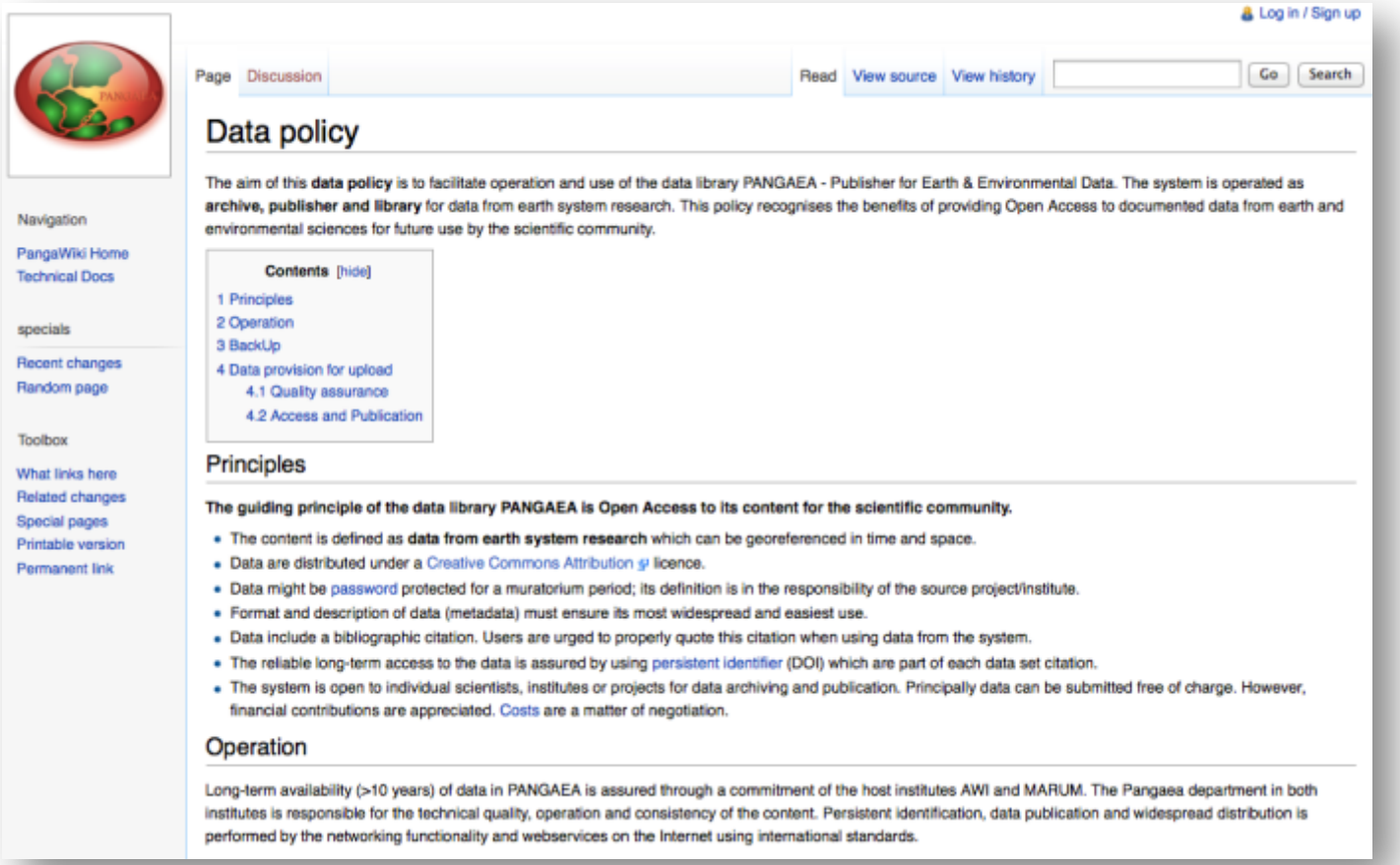
- Access and Reuse of Data
  - Access to data objects
  - Use and reuse of data objects
  - Tracking users and use statistics
- Preservation of Data
  - Retention period
  - Functional preservation
  - File preservationd
  - Fixity and authenticity



Green, A., Macdonald, S., & Rice, R. (n.d.). Policy-making for Research Data in Repositories: A Guide Data Share. Version 1.2. Retrieved from https://www.coar-repositories.org/files/guide.pdf

POLICIES

- Beispiel: PANGAEA



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Data policy

The aim of this **data policy** is to facilitate operation and use of the data library PANGAEA - Publisher for Earth & Environmental Data. The system is operated as **archive, publisher and library** for data from earth system research. This policy recognises the benefits of providing Open Access to documented data from earth and environmental sciences for future use by the scientific community.

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1 Principles
2 Operation
3 BackUp
4 Data provision for upload
4.1 Quality assurance
4.2 Access and Publication

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Principles

The guiding principle of the data library PANGAEA is Open Access to its content for the scientific community.

- The content is defined as **data from earth system research** which can be georeferenced in time and space.
- Data are distributed under a Creative Commons Attribution licence.
- Data might be password protected for a muratorium period; its definition is in the responsibility of the source project/institute.
- Format and description of data (metadata) must ensure its most widespread and easiest use.
- Data include a bibliographic citation. Users are urged to properly quote this citation when using data from the system.
- The reliable long-term access to the data is assured by using persistent identifier (DOI) which are part of each data set citation.
- The system is open to individual scientists, institutes or projects for data archiving and publication. Principally data can be submitted free of charge. However, financial contributions are appreciated. Costs are a matter of negotiation.

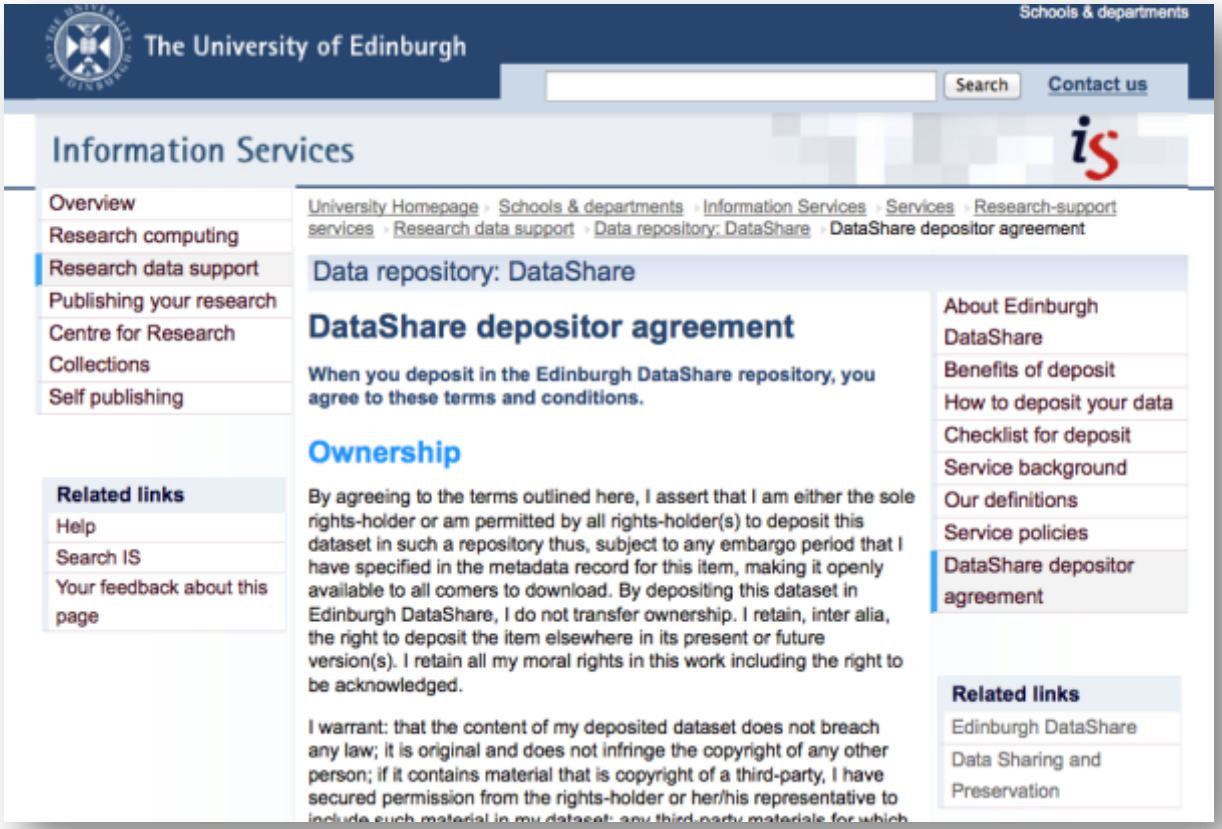
Operation

Long-term availability (>10 years) of data in PANGAEA is assured through a commitment of the host institutes AWI and MARUM. The Pangaea department in both institutes is responsible for the technical quality, operation and consistency of the content. Persistent identification, data publication and widespread distribution is performed by the networking functionality and webservices on the Internet using international standards.

http://wiki.pangaea.de/wiki/Data_policy

POLICIES

- Beispiel: DataShare (University of Edinburg)



DataShare. (2013) DataShare depositor agreement. Retrieved from http://www.ed.ac.uk/schools-departments/information-services/services/research-support/data-library/data-repository/depositor-agreement

RECHTLICHES

- Rechtliche Situation variiert nach nationaler Gesetzgebung
- Deutsches Urheberrecht (UrhR)
  - „Daten“ sind mehrheitlich nicht schutzwürdig
  - UrhR greift in Abhängigkeit der Schöpfungshöhe
  - Jedoch:
    - Datenschutz, Persönlichkeitsrechte, etc. sind zu beachten!
    - „Sui-generis Datenbankenrecht” (SGDR): Beruht auf der europäischen Datenbankrichtlinie 96/9/EG und schützt die Investition des Datenbankherstellers
  - Creative-Commons-Lizenzen:
    - Ab Version 4.0: lizenzieren Datenbankenrechte mit

RECHTLICHES

LEGEND:

Access categories

The provision of data and documents is regulated by the following access categories. They are indicated in the respective study description in the Data Catalogue.

Access categories in the usage regulations

Category 0	Data and documents are released for everybody.
Category A	Data and documents are released for academic research and teaching.
Category B	Data and documents are released for academic research and teaching, if the results won't be published. If any publications or any further work on the results is planned, permission must be obtained by the Data Archive.
Category C	Data and documents are only released for academic research and teaching after the data depositor's written authorization. For this purpose the Data Archive obtains a written permission with specification of the user and the analysis intention.

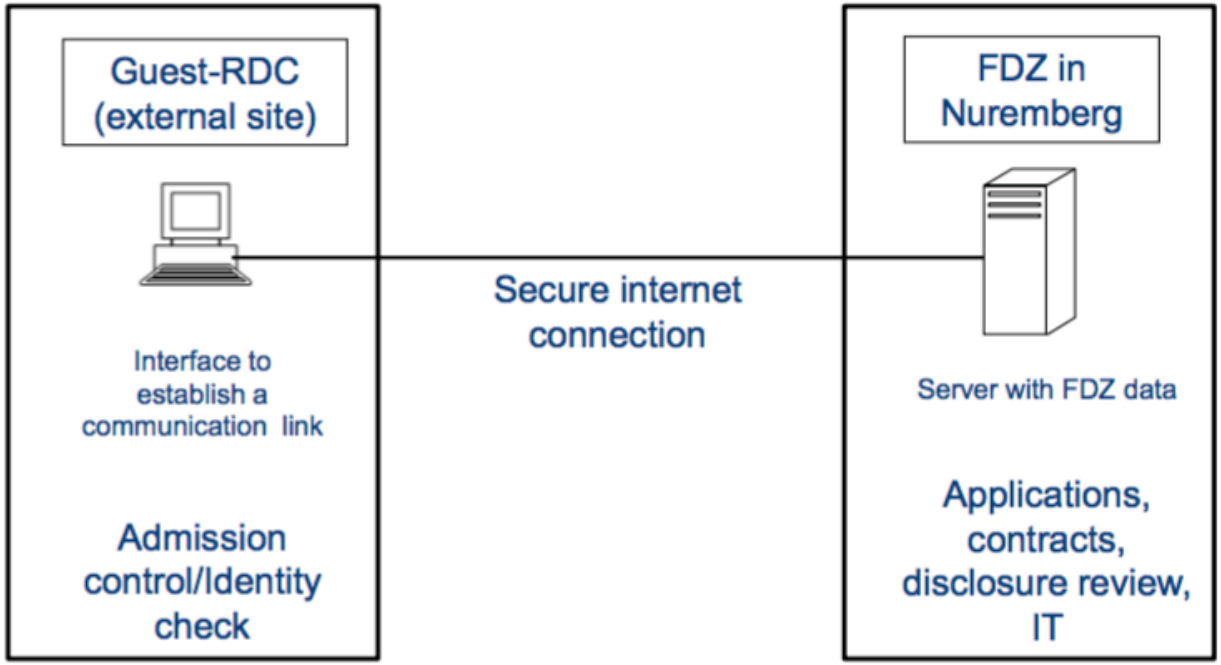
Zugangskategorien des GESIS – Datenarchiv für Sozialwissenschaften

RECHTLICHES

http://economics.harvard.edu/german-administrative-data-project

RECHTLICHES

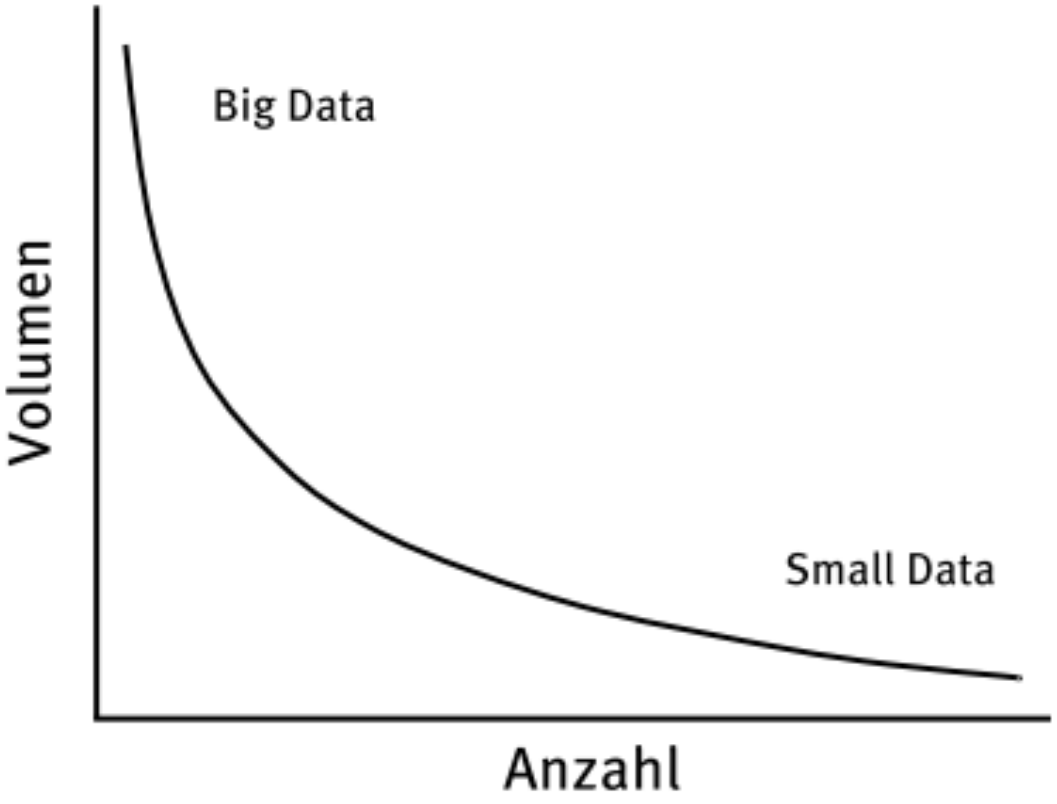
4. Data Access – On-site Access



http://economics.harvard.edu/files/economics/files/140211_rdc_bu-mit.pdf

TECHNOLOGIE

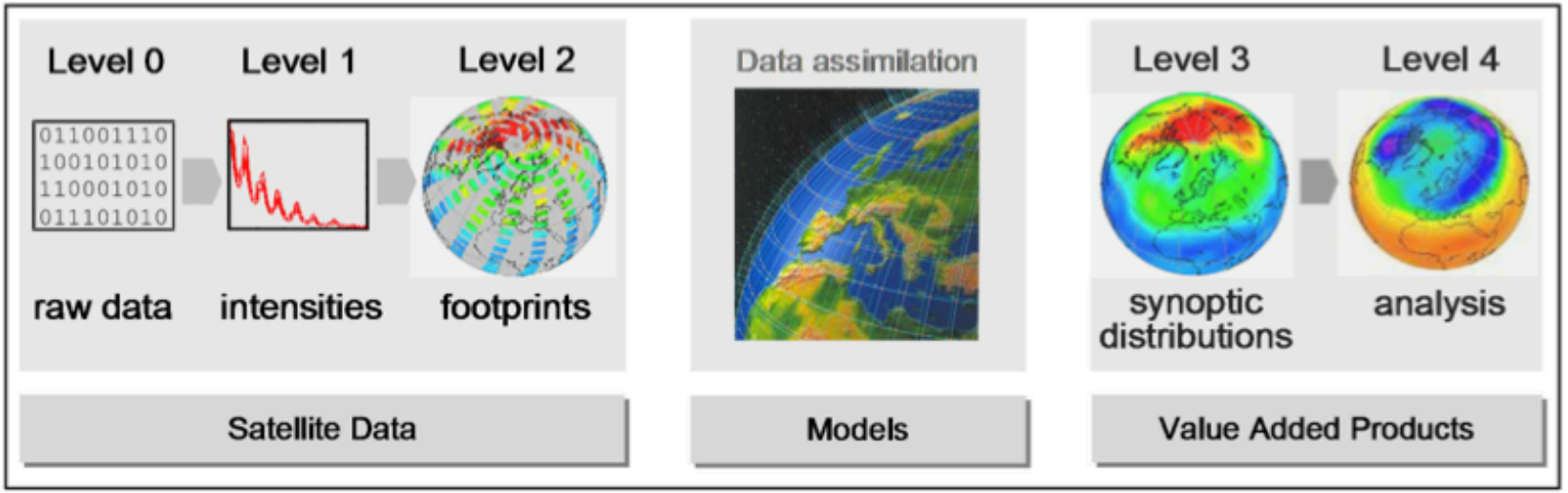
- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen



Klump, J., & Bertelmann, R. (2013). D 8 Forschungsdaten. In R. Kuhlen, W. Semar, & D. Strauch (Eds.), Grundlagen der praktischen Information und Dokumentation. Berlin: De Gruyter Saur. doi:10.1515/9783110258264.575

TECHNOLOGIE

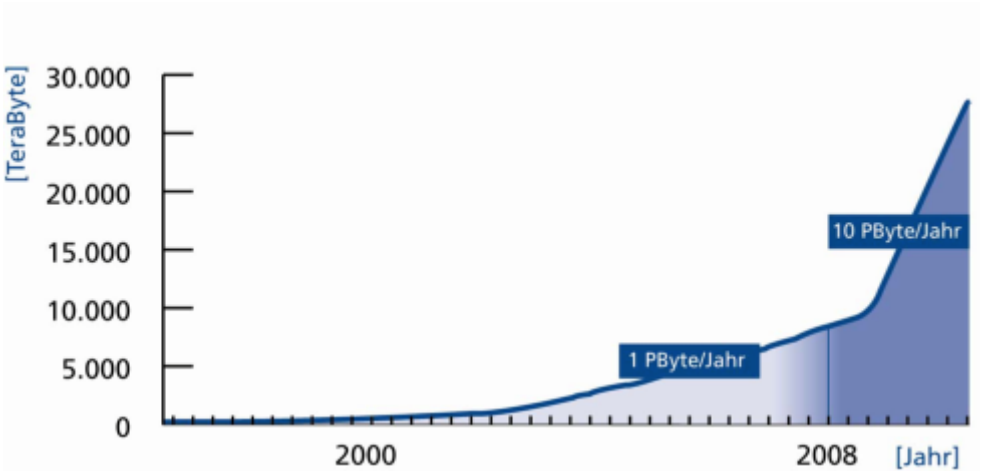
- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen
- Big-Data-Beispiel: World Data Center for Remote Sensing of the Atmosphere (WDC-RSAT)

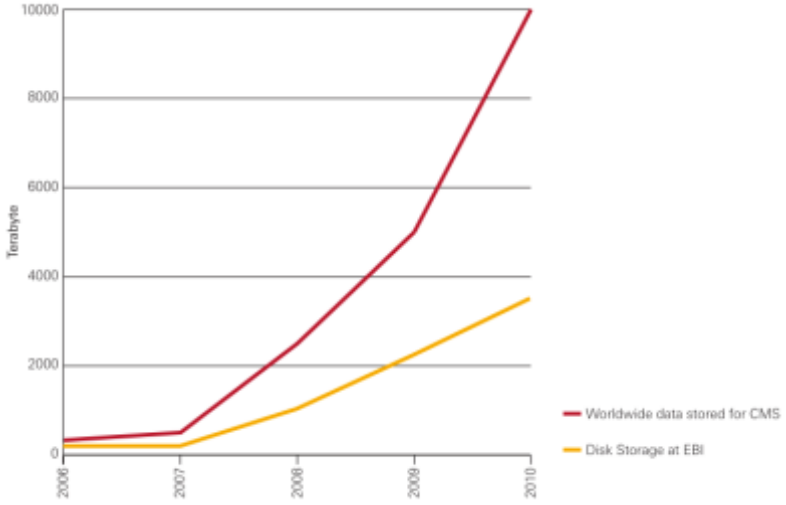


Michael, B. (2013). ICSU/WMO World Data Center for Remote Sensing of the Atmosphere (WDC-RSAT). GAW 2013 Symposium. Genf. Retrieved from http://www.wmo.int/pages/prog/arep/gaw/documents/GAW-2013-poster-Bittner-WDC-RSAT.pdf

TECHNOLOGIE

- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen
- Big-Data-Beispiel: DKRZ sowie EBI und CMS





Luthardt, H. (2011). Langzeitarchivierung am DKRZ. Workshop Archivierung sozial- und wirtschaftswissenschaftlicher Datenbestände. Frankfurt am Main. Retrieved from http://files.dnb.de/nestor/praesentationen/Gesamt/luthardt.pdf

The Royal Society. (2012). Science as an open enterprise. The Royal Society Science Policy Centre report 02/12. Retrieved from http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/projects/sape/2012-06-20-SAOE.pdf

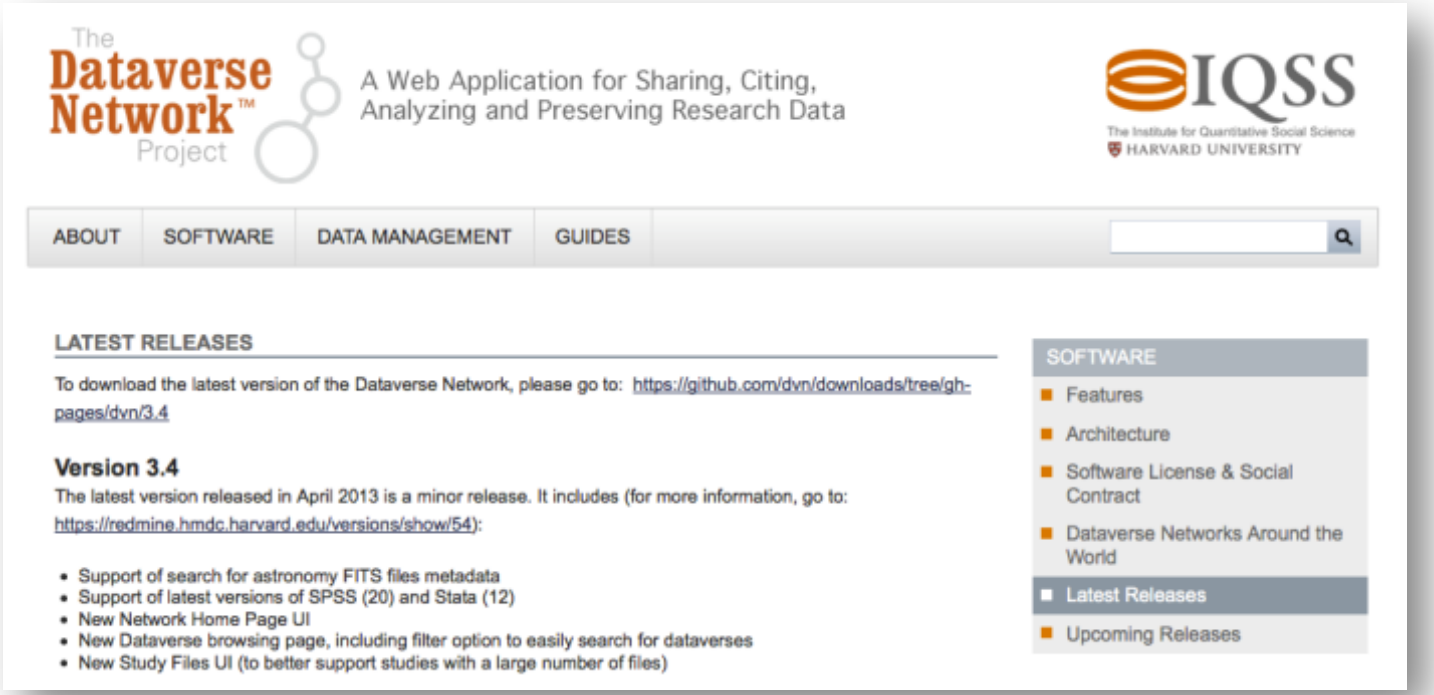
TECHNOLOGIE

- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen
- Big-Data

Luthardt, H. (2011). Langz Datenbestände. Frankfurt am Main. Retrieved from tt

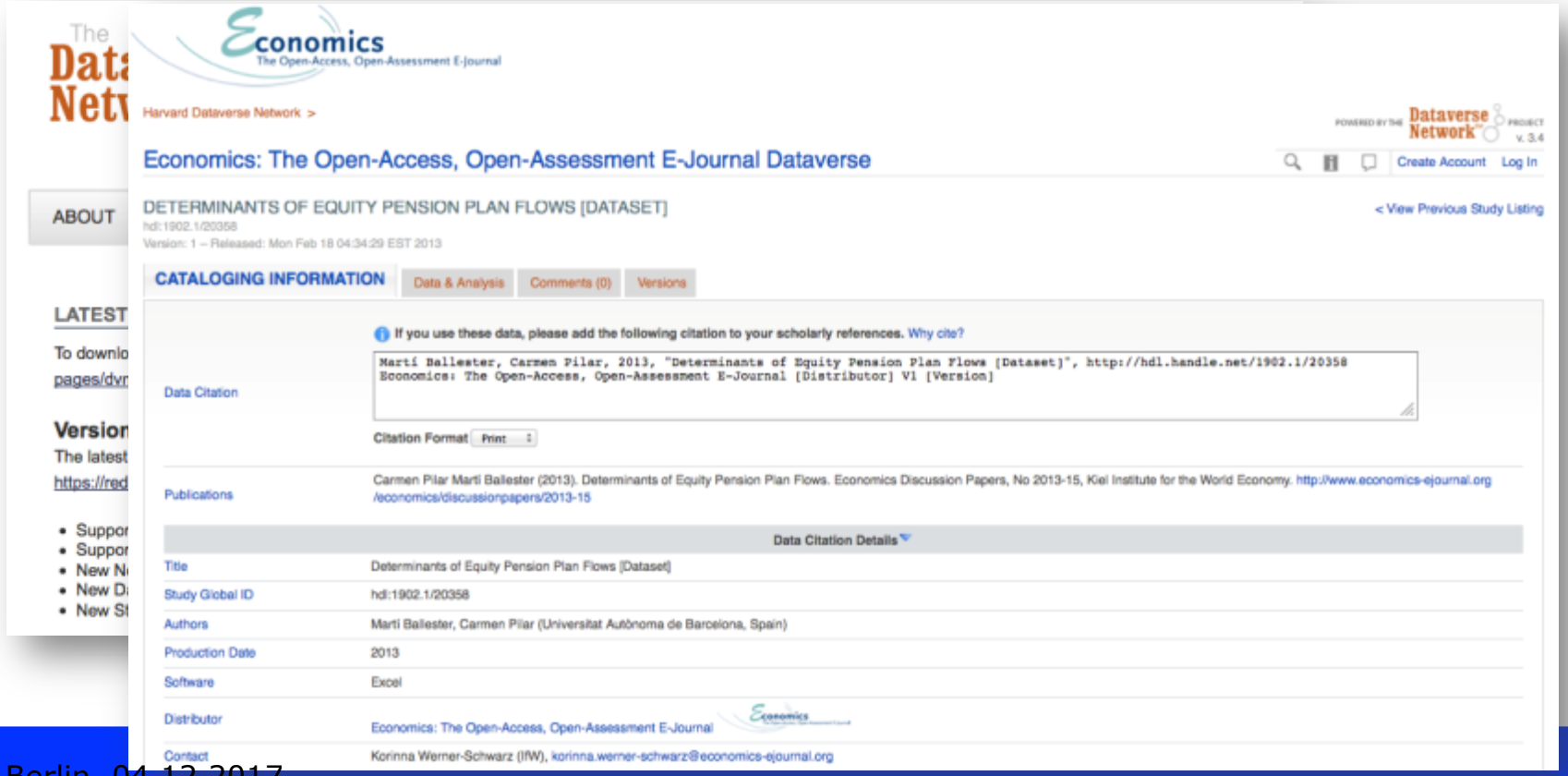
TECHNOLOGIE

- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen
- Small-Data-Beispiel: Dataverse



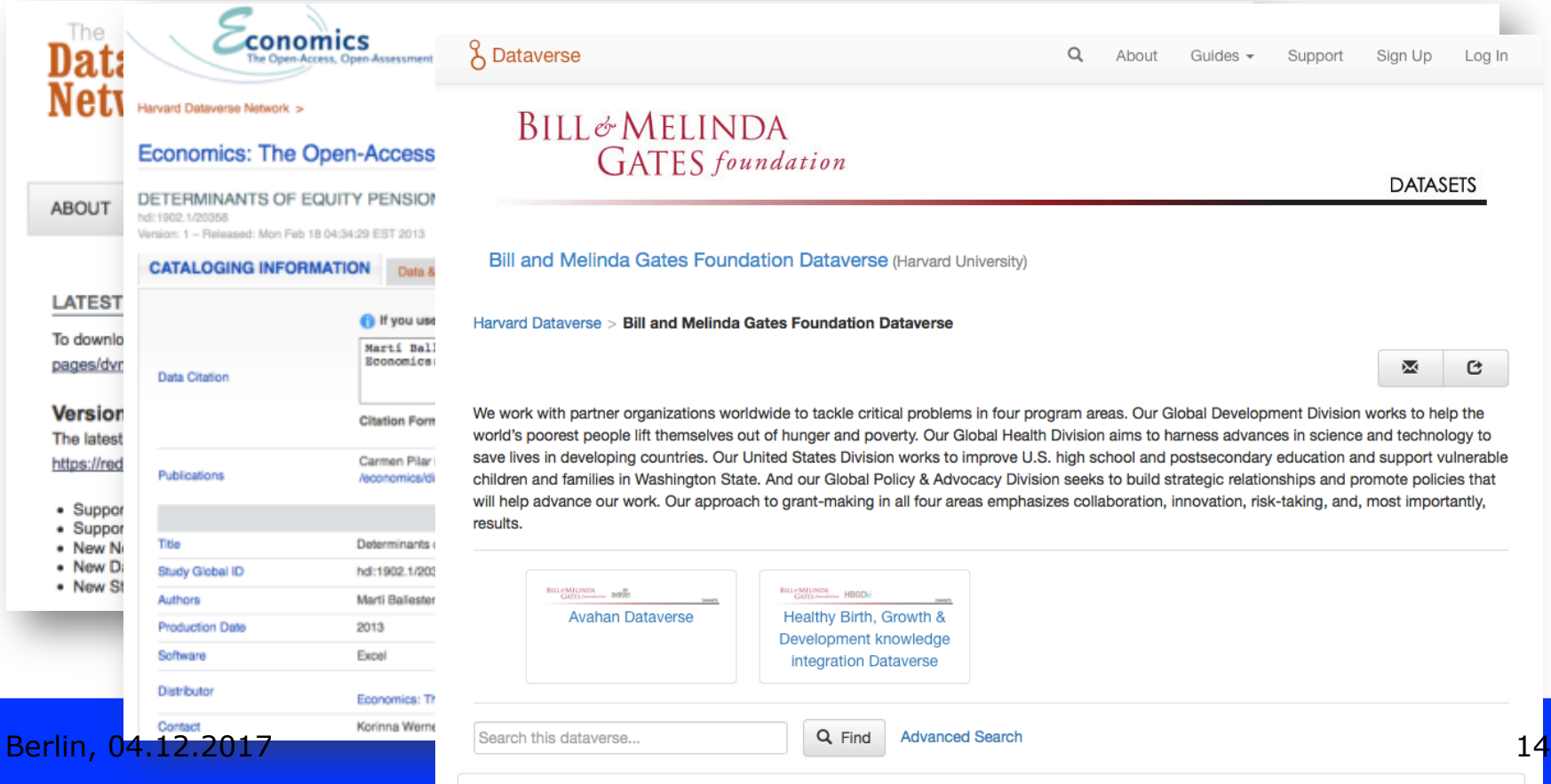
TECHNOLOGIE

- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen
- Small-Data-Beispiel: Dataverse



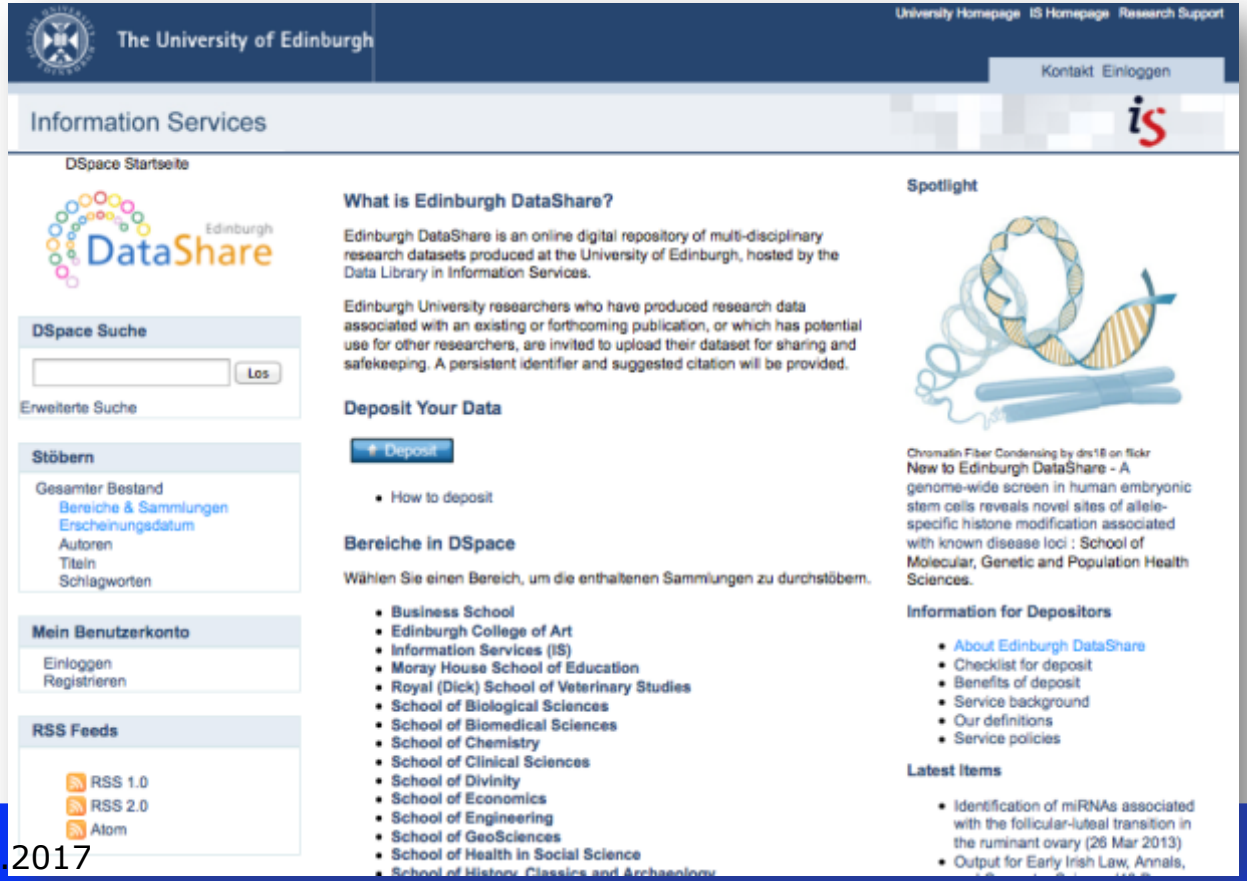
TECHNOLOGIE

- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen
- Small-Data-Beispiel: Dataverse



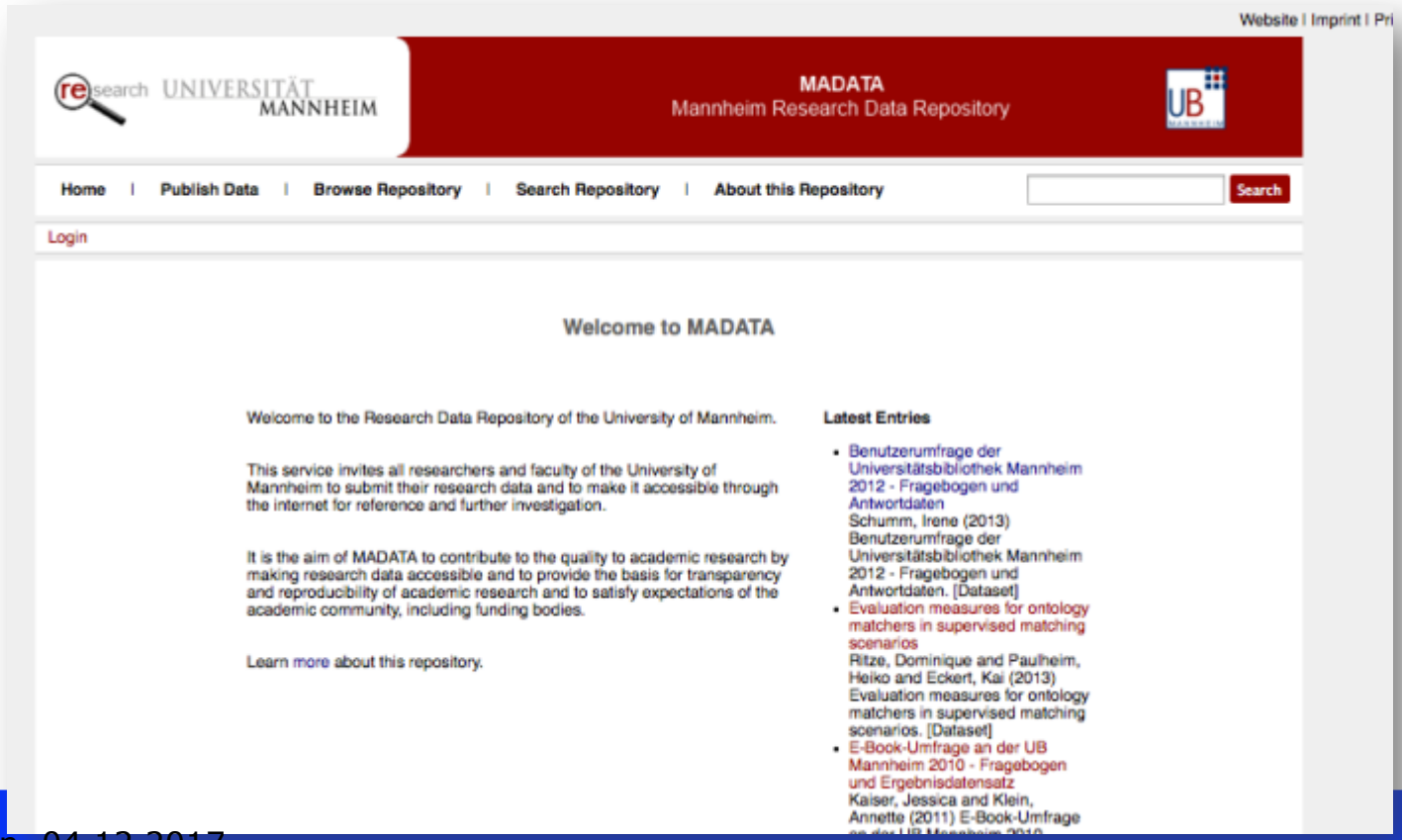
TECHNOLOGIE

- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen
- Small-Data-Beispiel: DSpace



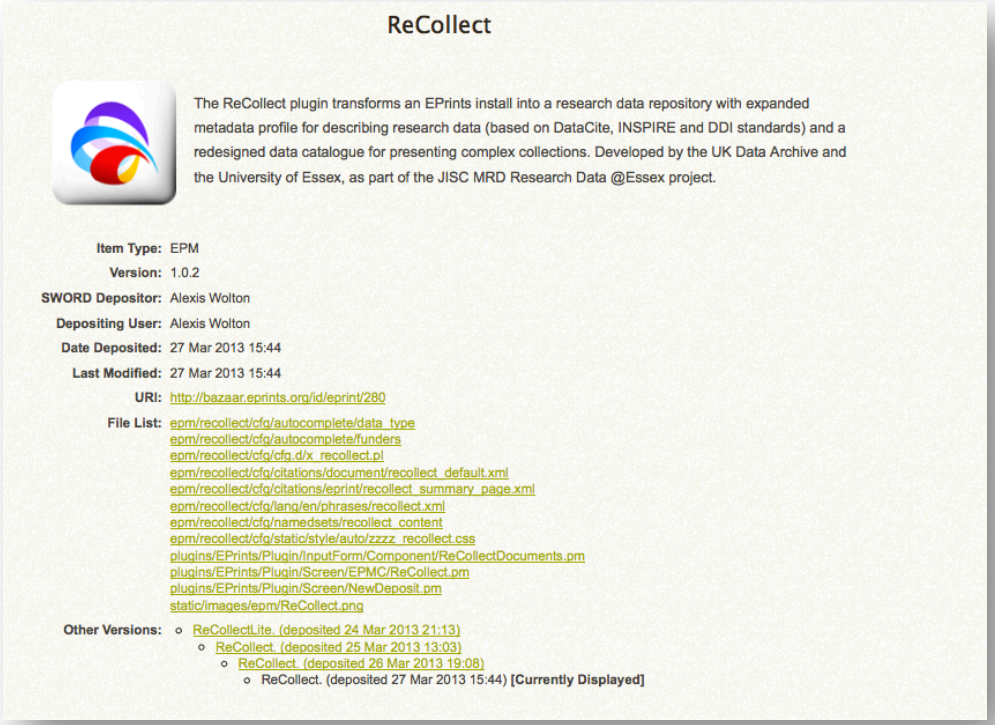
TECHNOLOGIE

- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen
- Small-Data-Beispiel: EPrints



TECHNOLOGIE

- Unterscheidung zwischen Small-Data und Big-Data-Ansätzen
- Small-Data-Beispiel: EPrints



ReCollect

The ReCollect plugin transforms an EPrints install into a research data repository with expanded metadata profile for describing research data (based on DataCite, INSPIRE and DDI standards) and a redesigned data catalogue for presenting complex collections. Developed by the UK Data Archive and the University of Essex, as part of the JISC MRD Research Data @Essex project.

Item Type: EPM
Version: 1.0.2
SWORD Depositor: Alexis Wolton
Depositing User: Alexis Wolton
Date Deposited: 27 Mar 2013 15:44
Last Modified: 27 Mar 2013 15:44
URI: http://bazaar.eprints.org/id/eprint/280
File List:
epm/recollect/cfg/autocomplete/data_type
epm/recollect/cfg/autocomplete/funders
epm/recollect/cfg/cfg.d/x_recollect.pl
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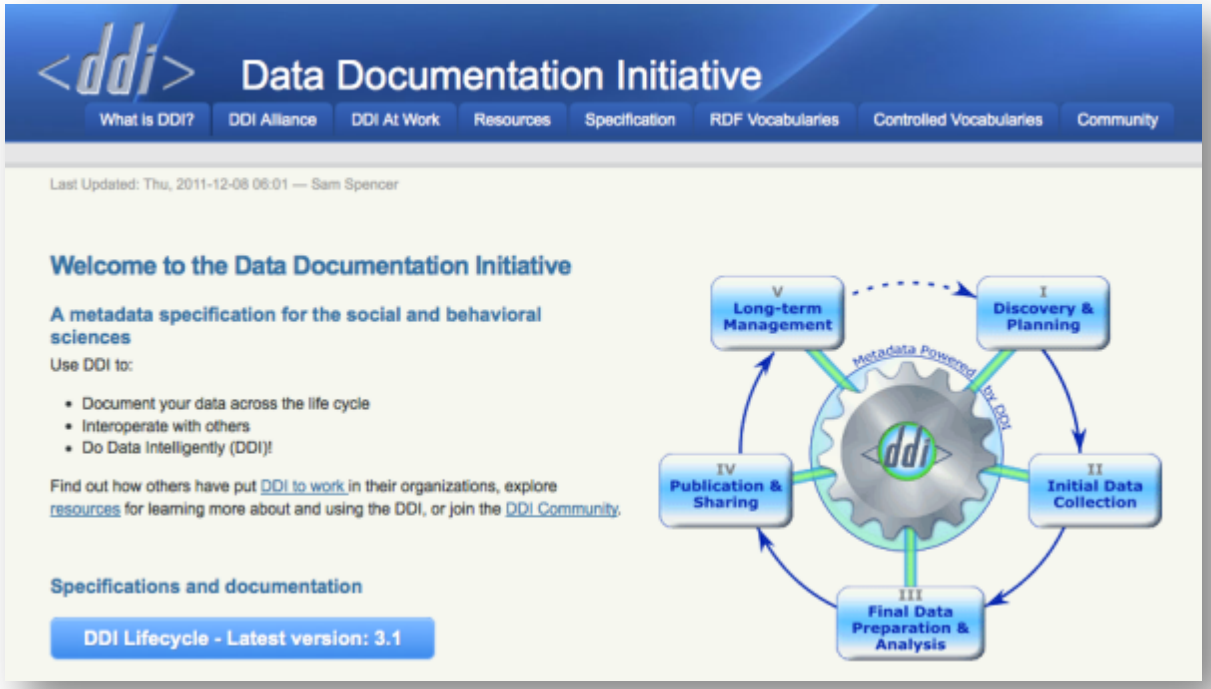
epm/recollect/cfg/namedsets/recollect_content
epm/recollect/cfg/static/style/auto/zzzz_recollect.css
plugins/EPrints/Plugin/InputForm/Component/ReCollectDocuments.pm
plugins/EPrints/Plugin/Screen/EPMC/ReCollect.pm
plugins/EPrints/Plugin/Screen/NewDeposit.pm
static/images/epm/ReCollect.png
Other Versions:
- ReCollectLite. (deposited 24 Mar 2013 21:13)
  - ReCollect. (deposited 25 Mar 2013 13:03)
    - ReCollect. (deposited 26 Mar 2013 19:08)
      - ReCollect. (deposited 27 Mar 2013 15:44) **[Currently Displayed]**

http://bazaar.eprints.org/280/

METADATEN

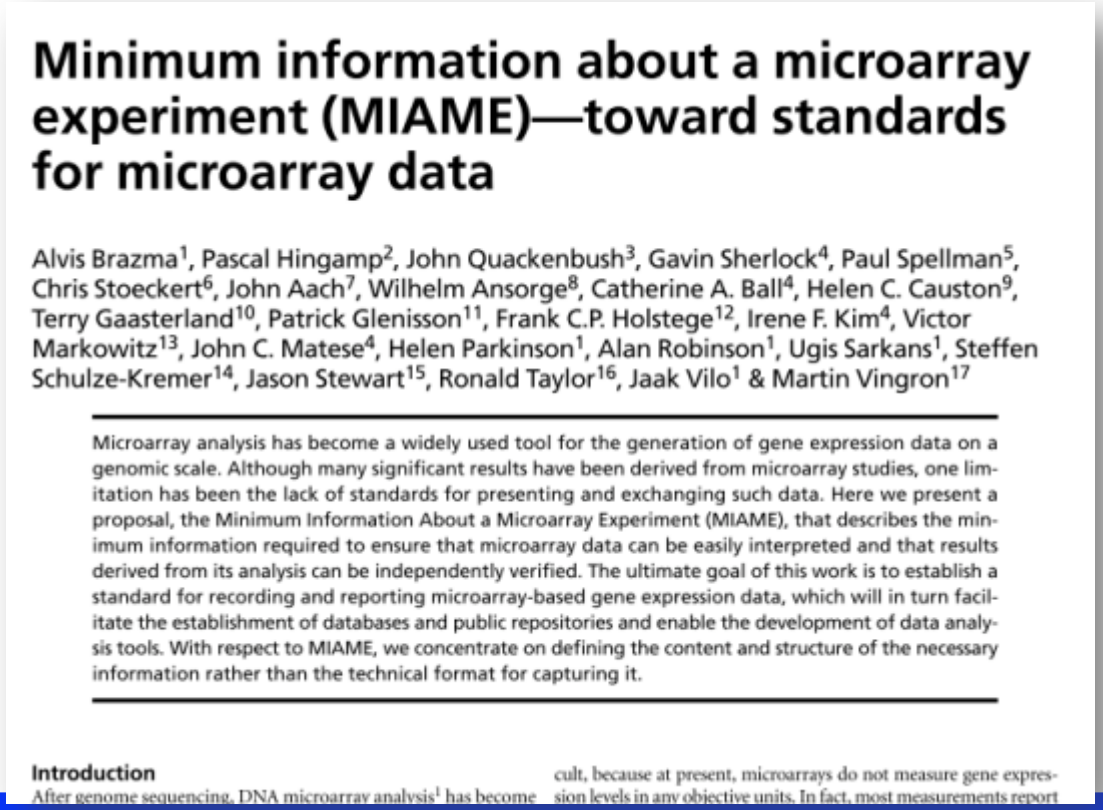
- Diverse disziplinäre Standards
- Beispiel: Data Documentation Initiative (DDI)
  - Sozial- und Wirtschaftswissenschaften



http://www.ddialliance.org

METADATEN

- Diverse disziplinäre Standards
- Beispiel: MIAME
  - Molekularbiologie



Minimum information about a microarray experiment (MIAME)—toward standards for microarray data

Alvis Brazma[1], Pascal Hingamp[2], John Quackenbush[3], Gavin Sherlock[4], Paul Spellman[5], Chris Stoeckert[6], John Aach[7], Wilhelm Ansorge[8], Catherine A. Ball[4], Helen C. Causton[9], Terry Gaasterland[10], Patrick Glenisson[11], Frank C.P. Holstege[12], Irene F. Kim[4], Victor Markowitz[13], John C. Matese[4], Helen Parkinson[1], Alan Robinson[1], Ugis Sarkans[1], Steffen Schulze-Kremer[14], Jason Stewart[15], Ronald Taylor[16], Jaak Vilo[1] & Martin Vingron[17]

Microarray analysis has become a widely used tool for the generation of gene expression data on a genomic scale. Although many significant results have been derived from microarray studies, one limitation has been the lack of standards for presenting and exchanging such data. Here we present a proposal, the Minimum Information About a Microarray Experiment (MIAME), that describes the minimum information required to ensure that microarray data can be easily interpreted and that results derived from its analysis can be independently verified. The ultimate goal of this work is to establish a standard for recording and reporting microarray-based gene expression data, which will in turn facilitate the establishment of databases and public repositories and enable the development of data analysis tools. With respect to MIAME, we concentrate on defining the content and structure of the necessary information rather than the technical format for capturing it.

Introduction

After genome sequencing, DNA microarray analysis[1] has become cult, because at present, microarrays do not measure gene expression levels in any objective units. In fact, most measurements report

Brazma, A., Hingamp, P., Quackenbush, J., Sherlock, G., Spellman, P., Stoeckert, C., Aach, J., et al. (2001). Minimum information about a microarray experiment (MIAME) - toward standards for microarray data. Nature Genetics, 29(4), 365–371. Retrieved from http://dx.doi.org/10.1038/ng1201-365

METADATEN

- Diverse disziplinäre Standards
- Beispiel: ISO 19115
  - Erd- und Umweltwissenschaften

26	purpose	summary of the intentions with which the resource(s) was developed	Zweck	Zusammenfassung, für welchen Zweck oder mit welcher Absicht die Ressource erstellt wurde	0..1	Freitext
27	credit	recognition of those who contributed to the resource(s)	Beteiligte	Nennung von Beteiligten, die zur Ressource beigetragen haben	0..*	Freitext
28	status	status of the resource(s)	Bearbeitungsstatus	Bearbeitungsstatus der Ressource	0..*	MD_ProgressCode <<CodeList>> (B.5.23)
29	pointOfContact	identification of, and means of communication with, person(s) and organization(s) associated with the resource(s)	Kontakt	Kontaktinformation zu Person(en) und Organisation(en), welche im Bezug zur Ressource stehen	0..*	CI_ResponsibleParty <<DataType>> (B.3.2)
30	*Role name:* resourceMaintenance	provides information about the frequency of resource updates, and the scope of those updates	Pflege der Ressource	Information über die Häufigkeit und den Umfang der Aktualisierung der Ressource	0..*	MD_MaintenanceInformation (B.2.5)
31	*Role name:* graphicOverview	provides a graphic that illustrates the resource(s) (should include a legend for the graphic)	Grafische Darstellung	Grafik, die die Ressource darstellt (möglichst einschließlich Legende)	0..*	MD_BrowseGraphic (B.2.2.2)
32	*Role name:* resourceFormat	provides a description of the format of the resource(s)	Format der Ressource	Formatbeschreibung der Ressource	0..*	MD_Format (B.2.10.4)
33	Role name: descriptiveKeywords	provides category keywords, their type, and reference source	Schlüsselwörter	Schlüsselwörter, ihr Typ und Quellenangabe	0..*	MD_Keywords (B.2.2.3)
34	*Role name:* resourceSpecificUsage	provides basic information about specific application(s) for which the resource(s) has/have been or is being used by different users	Nutzungsinformation	grundlegende Information über spezifische Anwendungen, für die die Ressource von Nutzern verwendet wurde oder wird	0..*	MD_Usage (B.2.2.6)
35	*Role name:* resourceConstraints	provides information about constraints which apply to the resource(s)	Ressourceneinschränkungen	Einschränkungen bezüglich der Ressource	0..*	MD_Constraints (B.2.3)
35.1	*Role name:* aggregationInfo	provides aggregate dataset information	Beziehungsinformation	Angaben über Beziehungen zu anderen Datenbeständen	0..*	MD_AggregateInformation (B.2.2.7)
36	MD_DataIdentification	information required to identify a dataset	Basisinformation zum Datenbestand	Basisinformation zur eindeutigen Beschreibung des Datenbestands	vererbt vom übergeordneten Objekt	Zeile 37-46 und 24-35.1

Koordinierungsstelle GDI-DE. (2008). Deutsche Übersetzung der Metadatenfelder des ISO 19115 Geographic information – Metadata. Retrieved from http://www.gdi-de.org/download/AK/ISO19115_GermanTranslation_GDIDE.pdf

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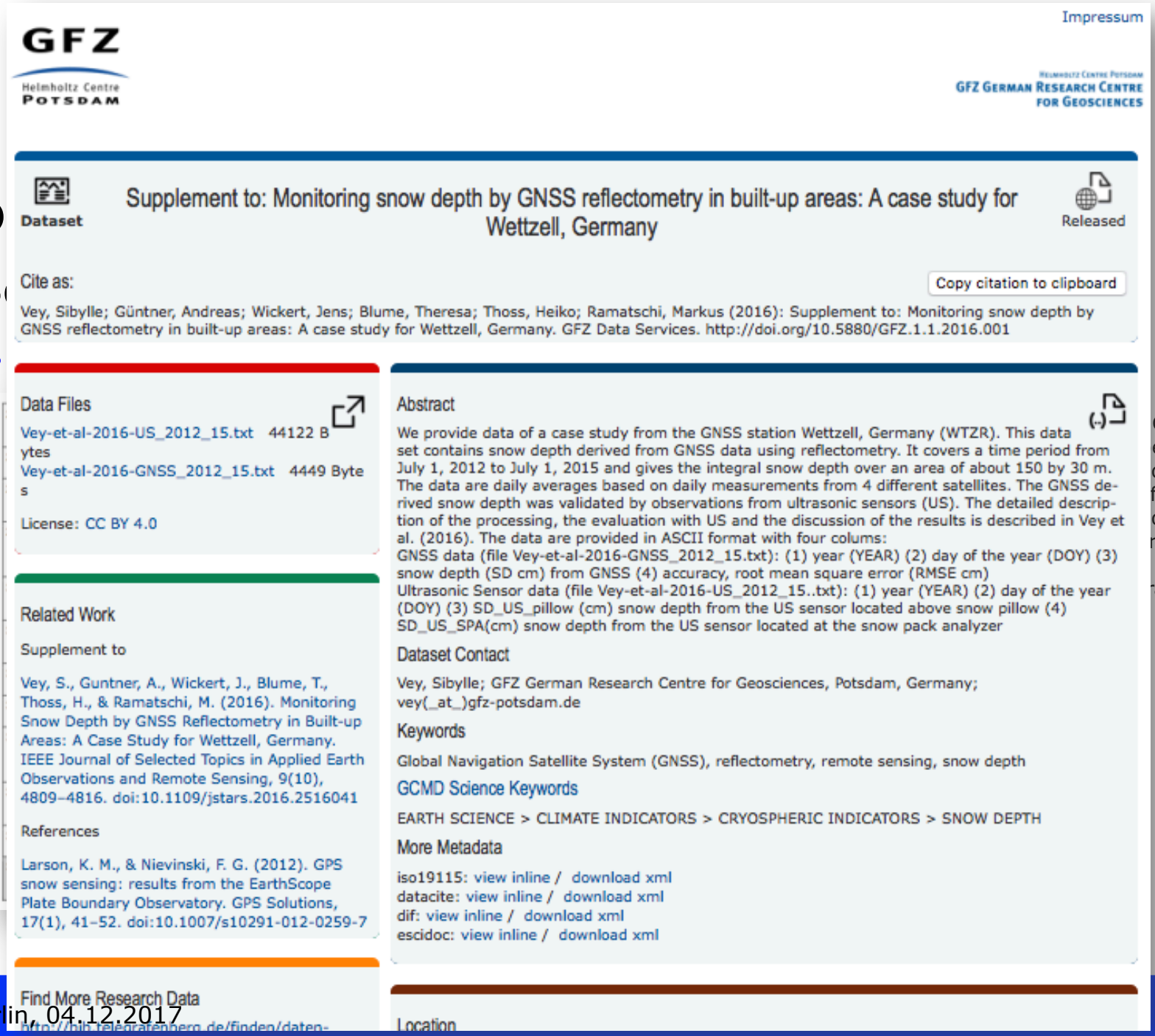


GFZ
Helmholtz Centre Potsdam

Impressum

Helmholtz Centre Potsdam
GFZ German Research Centre for Geosciences

Dataset

Supplement to: Monitoring snow depth by GNSS reflectometry in built-up areas: A case study for Wettzell, Germany

Released

Cite as:

Copy citation to clipboard

Vey, Sibylle; Güntner, Andreas; Wickert, Jens; Blume, Theresa; Thoss, Heiko; Ramatschi, Markus (2016): Supplement to: Monitoring snow depth by GNSS reflectometry in built-up areas: A case study for Wettzell, Germany. GFZ Data Services. http://doi.org/10.5880/GFZ.1.1.2016.001

Data Files

Vey-et-al-2016-US_2012_15.txt 44122 Bytes
Vey-et-al-2016-GNSS_2012_15.txt 4449 Bytes

License: CC BY 4.0

Related Work

Supplement to

Vey, S., Guntner, A., Wickert, J., Blume, T., Thoss, H., & Ramatschi, M. (2016). Monitoring Snow Depth by GNSS Reflectometry in Built-up Areas: A Case Study for Wettzell, Germany. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 9(10), 4809–4816. doi:10.1109/jstars.2016.2516041

References

Larson, K. M., & Nievinski, F. G. (2012). GPS snow sensing: results from the EarthScope Plate Boundary Observatory. GPS Solutions, 17(1), 41–52. doi:10.1007/s10291-012-0259-7

Find More Research Data

http://lib.telegrafenberg.de/finden/daten-

Abstract

We provide data of a case study from the GNSS station Wettzell, Germany (WTZR). This data set contains snow depth derived from GNSS data using reflectometry. It covers a time period from July 1, 2012 to July 1, 2015 and gives the integral snow depth over an area of about 150 by 30 m. The data are daily averages based on daily measurements from 4 different satellites. The GNSS derived snow depth was validated by observations from ultrasonic sensors (US). The detailed description of the processing, the evaluation with US and the discussion of the results is described in Vey et al. (2016). The data are provided in ASCII format with four colums:
GNSS data (file Vey-et-al-2016-GNSS_2012_15.txt): (1) year (YEAR) (2) day of the year (DOY) (3) snow depth (SD cm) from GNSS (4) accuracy, root mean square error (RMSE cm)
Ultrasonic Sensor data (file Vey-et-al-2016-US_2012_15..txt): (1) year (YEAR) (2) day of the year (DOY) (3) SD_US_pillow (cm) snow depth from the US sensor located above snow pillow (4) SD_US_SPA(cm) snow depth from the US sensor located at the snow pack analyzer

Dataset Contact

Vey, Sibylle; GFZ German Research Centre for Geosciences, Potsdam, Germany; vey(_at_)gfz-potsdam.de

Keywords

Global Navigation Satellite System (GNSS), reflectometry, remote sensing, snow depth

GCMD Science Keywords

EARTH SCIENCE > CLIMATE INDICATORS > CRYOSPHERIC INDICATORS > SNOW DEPTH

More Metadata

iso19115: view inline / download xml
datacite: view inline / download xml
dif: view inline / download xml
escidoc: view inline / download xml

Location

QUALITÄTSSTANDARDS

- CoreTrustSeal (2016): Core Trustworthy Data Repositories Requirements. Retrieved from http://www.coretrustseal.org/wp-content/uploads/2017/01/Core_Trustworthy_Data_Repositories_Requirements_01_00.pdf
- DINI. (2016): DINI-Zertifikat für Open-Access-Repositorien und -Publikationsdienste 2016. DINI Schriften 3-de. Version 5.0. Retrieved from http://nbn-resolving.de/urn:nbn:de:kobv:11-100239432
- Data Seal of Approval. (2016). Data Seal of Approval. Guidelines version 2017-2019 November 10, 2016 Retrieved from https://assessment.datasealofapproval.org/guidelines_54/pdf/
- DIN. (2012). Kriterien für vertrauenswürdige digitale Langzeitarchive. DIN 31644:2012-04. Retrieved from http://www.beuth.de/de/norm/din-31644/147058907
- ESF & EUROHORCs. (2011). Basic Requirements for Research Infrastructures in Europe. Retrieved from http://www.dfg.de/download/pdf/foerderung/programme/wgi/basic_requirements_research_infrastructures.pdf
- ICSU World Data System (WDS). (2011). Certification of WDS Members. Retrieved from http://icsu-wds.org/images/files/WDS_Certification_Summary_11_June_2012.pdf
- ISO. (2012). Space data and information transfer systems - Audit and certification of trustworthy digital repositories. ISO 16363:2012. Retrieved from http://www.iso.org/iso/catalogue_detail.htm?csnumber=56510

QUALITÄTSSTANDARDS

- CoreTrustSeal (2016): Core Trustworthy Data Repositories Requirements. Retrieved from http://www.coretrustseal.org/wp-content/uploads/2017/01/Core_Trustworthy_Data_Repositories_Requirements_01_00.pdf
- DINI. (2016): DINI-Zertifikat für Open-Access-Repositorien und -Publikationsdienste 2016. DINI Schriften 3-de. Version 5.0. Retrieved from http://nbn-resolving.de/urn:nbn:de:kobv:11-100239432
- **Data Seal of Approval. (2016). Data Seal of Approval. Guidelines version 2017-2019 November 10, 2016 Retrieved from https://assessment.datasealofapproval.org/guidelines_54/pdf/**
- DIN. (2012). Kriterien für vertrauenswürdige digitale Langzeitarchive. DIN 31644:2012-04. Retrieved from http://www.beuth.de/de/norm/din-31644/147058907
- ESF & EUROHORCs. (2011). Basic Requirements for Research Infrastructures in Europe. Retrieved from http://www.dfg.de/download/pdf/foerderung/programme/wgi/basic_requirements_research_infrastructures.pdf
- ICSU World Data System (WDS). (2011). Certification of WDS Members. Retrieved from http://icsu-wds.org/images/files/WDS_Certification_Summary_11_June_2012.pdf
- ISO. (2012). Space data and information transfer systems - Audit and certification of trustworthy digital repositories. ISO 16363:2012. Retrieved from http://www.iso.org/iso/catalogue_detail.htm?csnumber=56510

3. Continuity of access

Required statement of compliance:

0. N/A: Not Applicable.

Applicant manual

The repository has a continuity plan to ensure ongoing access to and preservation of its holdings.

Guidance:

This Requirement covers the measures in place to ensure access to, and availability of, data holdings, both currently and in the future. Reviewers are seeking evidence that preparations are in place to address the risks inherent in changing circumstances.

For this Requirement, please describe:

- The level of responsibility undertaken for data holdings, including any guaranteed preservation periods.
- The medium-term (three- to five-year) and long-term (> five years) plans in place to ensure the continued availability and accessibility of the data. In particular, both the response to rapid changes of circumstance and long-term planning should be described, indicating options for relocation or transition of the activity to another body or return of the data holdings to their owners (i.e., data producers). For example, what will happen in the case of cessation of funding, which could be through an unexpected withdrawal of funding, a planned ending of funding for a time-limited project repository, or a shift of host institution interests?

Evidence for this Requirement should relate more to governance than to the technical information that is needed in R10 (Preservation plan) and R14 (Data reuse), and should cover the situation in which R1 (Mission/Scope) changes. This Requirement contrasts with R15 (Technical infrastructure) and R16 (Security) in that it covers full business continuity of the preservation and access functions.

QUALITÄTSSTANDARDS

- CoreTrustSeal (2016): Core Trustworthy Data Repositories Requirements. Retrieved from http://www.coretrustseal.org/wp-content/uploads/2017/01/

The framework will consist of a sequence of three levels, in increasing trustworthiness:

- **BASIC CERTIFICATION** is granted to repositories which obtain DSA certification;
- **EXTENDED CERTIFICATION** is granted to Basic Certification repositories which in addition perform a structured, externally reviewed and publicly available self-audit based on ISO 16363 or DIN 31644;
- **FORMAL CERTIFICATION** is granted to repositories which in addition to Basic Certification obtain full external audit and certification based on ISO 16363 or equivalent DIN 31644.

Granting of these certificates will allow repositories to show one of three symbols (to be agreed) on their web pages and other documentation, in addition to any other DSA, DIN or ISO certification marks.

- ISO. (2012). Space data and information transfer systems – Audit and certification of trustworthy digital repositories. ISO 16363:2012. Retrieved from http://www.iso.org/iso/catalogue_detail.htm?csnumber=56510

QUALITÄTSSTANDARDS

- CoreTrustSeal (2016): Core Trustworthy Data Repositories Requirements. Retrieved from http://www.coretrustseal.org/wp-content/uploads/2017/01/Core_Trustworthy_Data_Repositories_Requirements_01_00.pdf
- DINI. (2016): DINI-Zertifikat für Open-Access-Repositorien und -Publikationsdienste 2016. DINI Schriften 3-de. Version 5.0. Retrieved from http://nbn-resolving.de/urn:nbn:de:kobv:11-100239432

The Core Trustworthy Data Repository Requirements were developed by the DSA–WDS Partnership Working Group on Repository Audit and Certification, a Working Group (WG) of the Research Data Alliance[1]. The goal of the effort was to create a set of harmonized common requirements for certification of repositories at the core level, drawing from criteria already put in place by the Data Seal of Approval (DSA) and the ICSU World Data System (ICSU-WDS). An additional goal of the project was to develop common procedures to be implemented by both DSA and ICSU-WDS. Ultimately, the DSA and ICSU-WDS plan to collaborate on a global framework for repository certification that moves from the core to the extended (nestor-Seal DIN 31644), to the formal (ISO 16363) level.

http://www.dfg.de/download/pdf/foerderung/programme/wgi/basic_requirements_research_infrastructures.pdf

- ICSU World Data System (WDS). (2011). Certification of WDS Members. Retrieved from http://icsu-wds.org/images/files/WDS_Certification_Summary_11_June_2012.pdf
- ISO. (2012). Space data and information transfer systems - Audit and certification of trustworthy digital repositories. ISO 16363:2012. Retrieved from http://www.iso.org/iso/catalogue_detail.htm?csnumber=56510

FINANZIERUNGS- UND GESCHÄFTSMODELLE

- Häufig Anschubfinanzierung durch Drittmittel
- Herausforderung: Betriebskosten (und Investitionen)
- Beispiel: GESIS
  - ca. 3,8 Mio. Euro jährliche Betriebskosten
  - Gesamtkapazität: ca. 6.100 Studien
  - Neuzugänge: ca. 120 Studien pro Jahr
  - ca. 20.000 Nutzungsvorgänge (Bestellung/Download) pro Jahr
  - Personalkosten (inkl. Verwaltung und IT): 2.700 k€ pro Jahr
  - Sachausgaben 1.000 k€ pro Jahr
  - EDV-Investitionen 100 k€ pro Jahr

Kommission Zukunft der Informationsinfrastruktur. (2011). Gesamtkonzept für die Informationsinfrastruktur in Deutschland. Retrieved from http://www.allianz-initiative.de/fileadmin/user_upload/KII_Gesamtkonzept.pdf

FINANZIERUNGS- UND GESCHÄFTSMODELLE

- Häufig Anschubfinanzierung durch Drittmittel
- Herausforderung: Betriebskosten (und Investitionen)
- Beispiel: Deutsches Fernerkundungsdatenzentrum
  - ca. 3,8 Mio. Euro jährliche Betriebskosten
  - Gesamtkapazität 2,7 Petabyte
  - Datenzuwachs: 300 Gigabyte/Tag
  - Prozessierte Produkte pro Monat: 100.000
  - Betriebsbereithaltung 690k€ pro Jahr
  - Systembetrieb 660 k€ Kosten pro Jahr
  - Softwareentwicklung 700 k€ pro Jahr
  - Datenzugang 420 k€ pro Jahr
  - Anwenderbetreuung 400 k€ pro Jahr
  - Anlagenerneuerung alle sechs Jahre 3.500 k€

Kommission Zukunft der Informationsinfrastruktur. (2011). Gesamtkonzept für die Informationsinfrastruktur in Deutschland. Retrieved from http://www.allianz-initiative.de/fileadmin/user_upload/KII_Gesamtkonzept.pdf

FINANZIERUNGS- UND GESCHÄFTSMODELLE

- Sicherung der dauerhaften Finanzierung

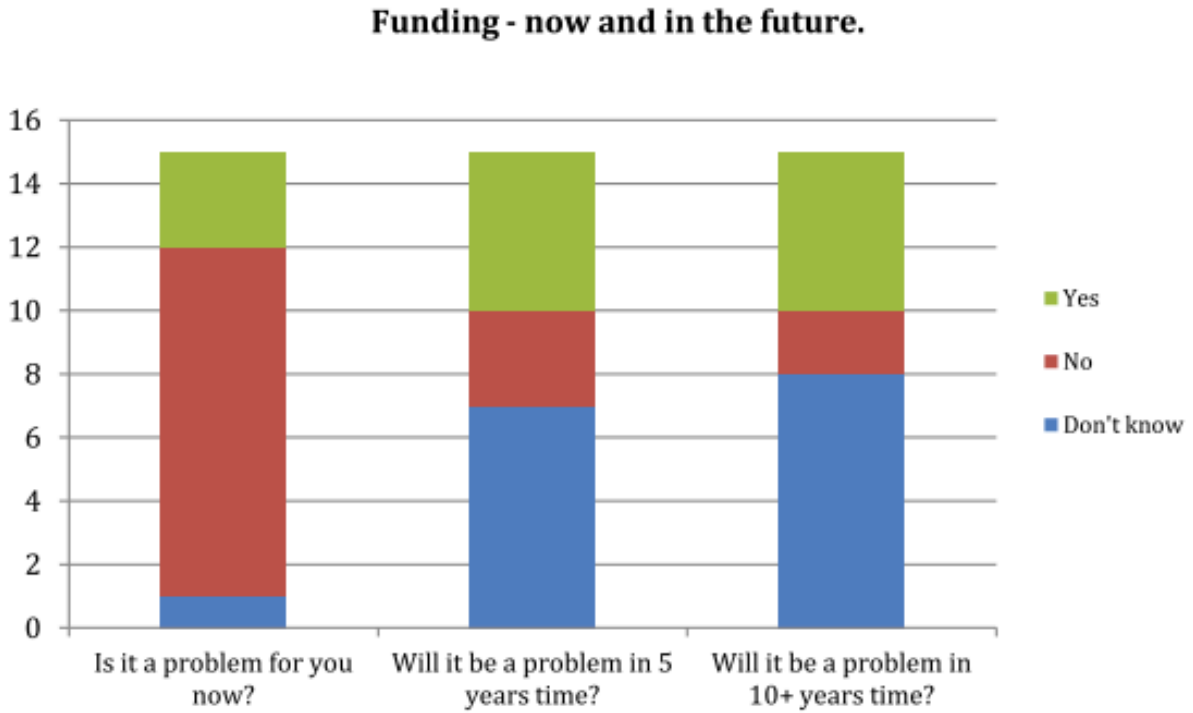
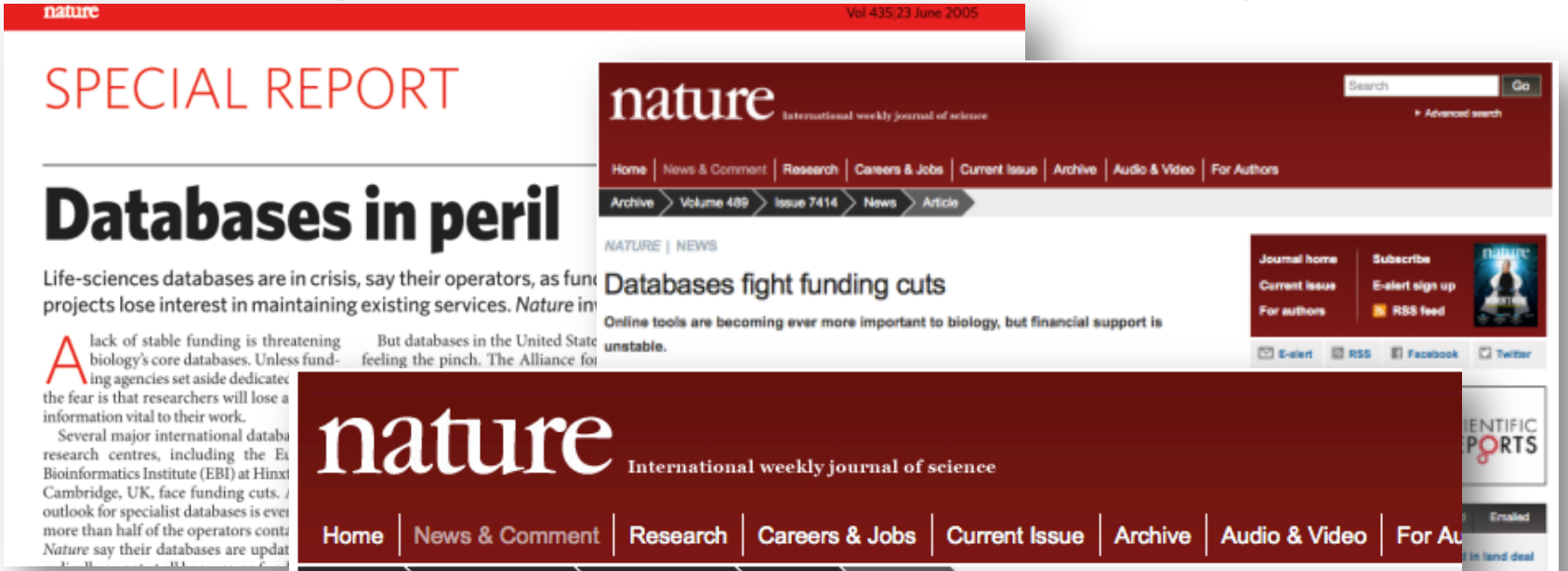


Figure 3 Funding of the repositories - now and in the future, n = 15

Pfeiffenberger, H., Pampel, H., Schäfer, A., Guidetti, V., Bruch, C., Tzitzikas, Y., Pröll, S., et al. (2012). Report and Strategy on Annotation, Reputation and Data Quality. Retrieved from http://nbn-resolving.de/urn:nbn:de:101-20140516191

FINANZIERUNGS- UND GESCHÄFTSMODELLE

- Sicherung der dauerhaften Finanzierung



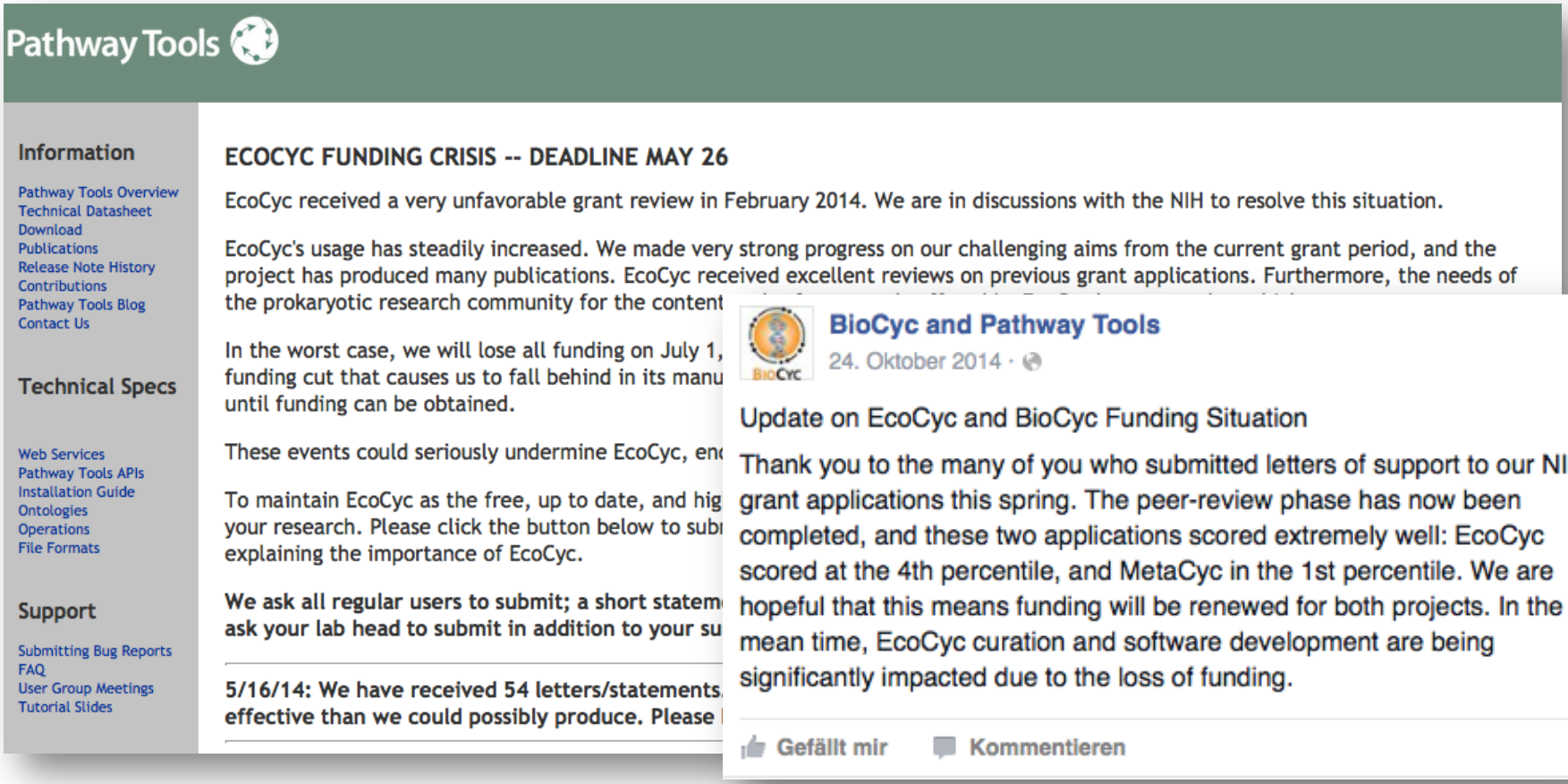
Merali, Z., & Giles, J. (2005). Databases in peril. Nature, 435(7045), 1010–1. doi:10.1038/4351010a

Baker, M. (2012). Databases fight funding cuts. Nature, 489(7414), 19–19. doi: 10.1038/489019a

Baker, M. (2014). Repositories share key research tools. Nature, 505(7483), 272. doi: 10.1038/505272a

FINANZIERUNGS- UND GESCHÄFTSMODELLE

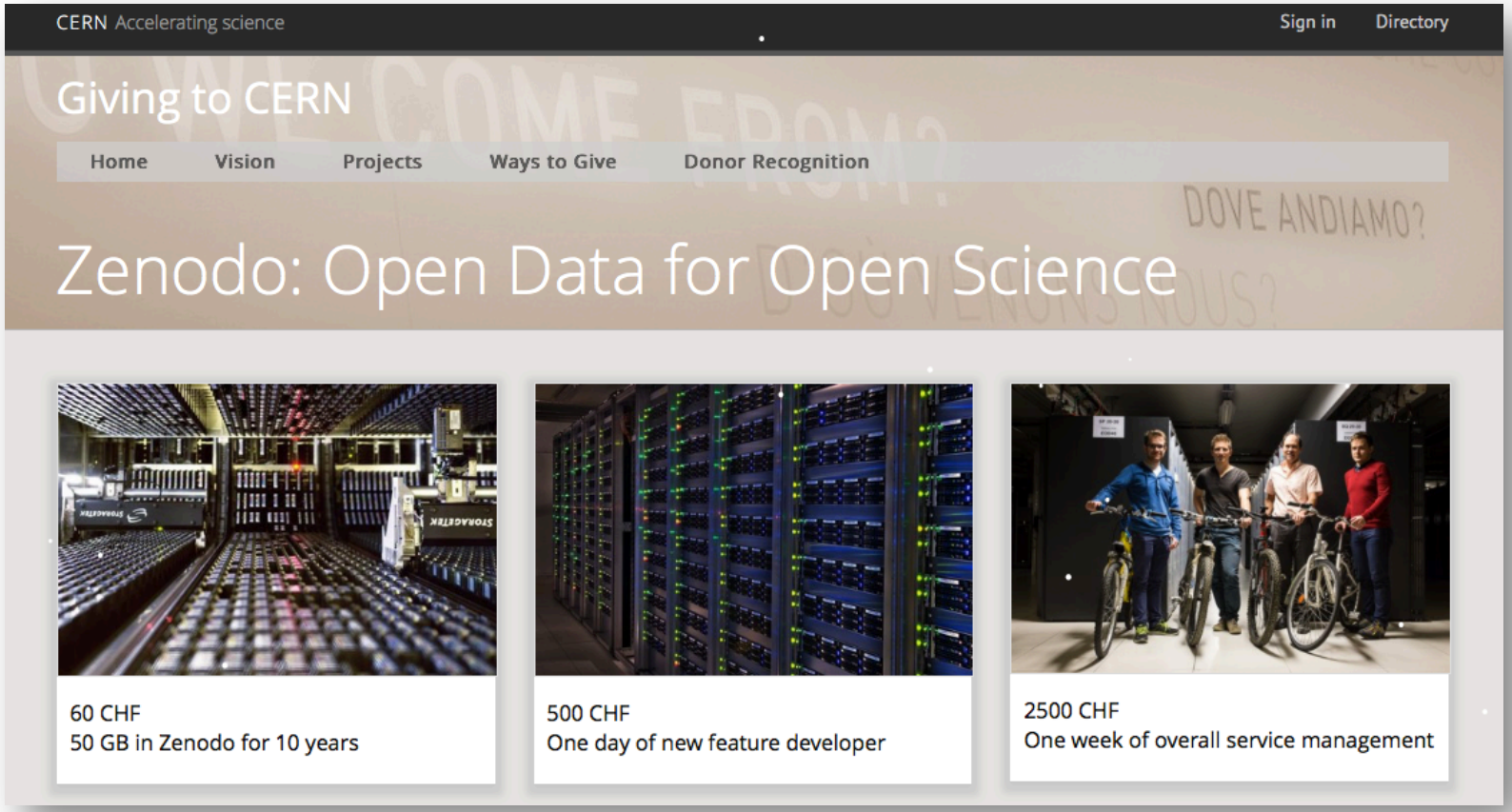
- Sicherung der dauerhaften Finanzierung



http://brg.ai.sri.com/ptools/ecocyc-letters-of-support.shtml

FINANZIERUNGS- UND GESCHÄFTSMODELLE

- Sicherung der dauerhaften Finanzierung



https://giving.web.cern.ch/civicrm/contribute/transact?reset=1&id=20

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Keeping Research Data Safe Factsheet

Cost issues in digital preservation of research data

This factsheet illustrates for institutions, researchers, and funders some of the key findings and recommendations from the JISC-funded Keeping Research Data Safe (KRDS1) and Keeping Research Data Safe 2 (KRDS2) projects. Further information on the research and findings can be found in the final reports and on the KRDS website.

What Costs Most?

Acquisition and ingest costs most. The costs of archival storage and preservation activities are consistently a very small proportion of the overall costs and significantly lower than the costs of acquisition/ingest or access activities for all our case studies. Note we believe early preservation action during ingest or pre-ingest produces lower costs over the lifecycle as a whole. (KRDS1, p.25; KRDS2, pp.31-52)

Activity Costs for the Archaeology Data Service

Outreach/ Acquisition/ Ingest	Archival Storage and Preservation	Access
c. 55%	c. 15%	c. 31%

Recommendation to Funders

From our research, it is likely that the largest potential cost efficiencies will come from future tool development supporting automation of ingest and access activities for curation and preservation. (KRDS2, p.83)

Impact of Fixed Costs

- The costs of long-term data curation/preservation are dominated by fixed costs that do not vary with the size of the collections;
- Staff are the major cost component overall and there is a minimum base-level of staff cover, skills and equipment required for any service;
- Activities characterised by significant fixed costs can reduce the per-unit cost of long-term preservation by leveraging economies of scale.

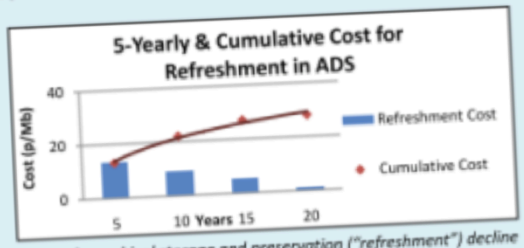
(KRDS2, pp.32-34, 79-80)

Recommendation to Institutions

Repositories should take advantage of economies of scale, using multi-institutional collaboration and outsourcing as appropriate. Once core capacity is in place additional content can be added at increasing levels of efficiency and lower cost. (KRDS1, pp.77-78)

Declining Costs over Time

We found a trend of relatively high preservation costs in the early years reducing substantially over time for data collections. An example is the preservation costs projected for the Archaeology Data Service (ADS) based on their experience of the first 10 years of operating the data service. (KRDS1, pp.4-6)



Costs for archival storage and preservation ("refreshment") decline to a minimal level over 20 years

Recommendation to Funders and Institutions

The implications of these factors and projection for sustainability of data archives e.g. via archive charges to project budgets, are notable and worthy of more extensive study and testing. (KRDS1, pp.5-6)

Beagrie, C. (2011). Keeping Research Data Safe Factsheet. Cost issues in digital preservation of research data. Retrieved from http://www.beagrie.com/KRDS_Factsheet_0711.pdf

FINANZIERUNG - UND NACHHALTIGKEIT

- Sicherung

cyc-letters-of-support.shtml

Keeping Research Data Safe Factsheet

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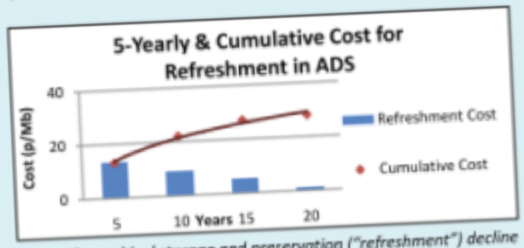

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FINANZIERUNGS- UND GESCHÄFTSMODELLE

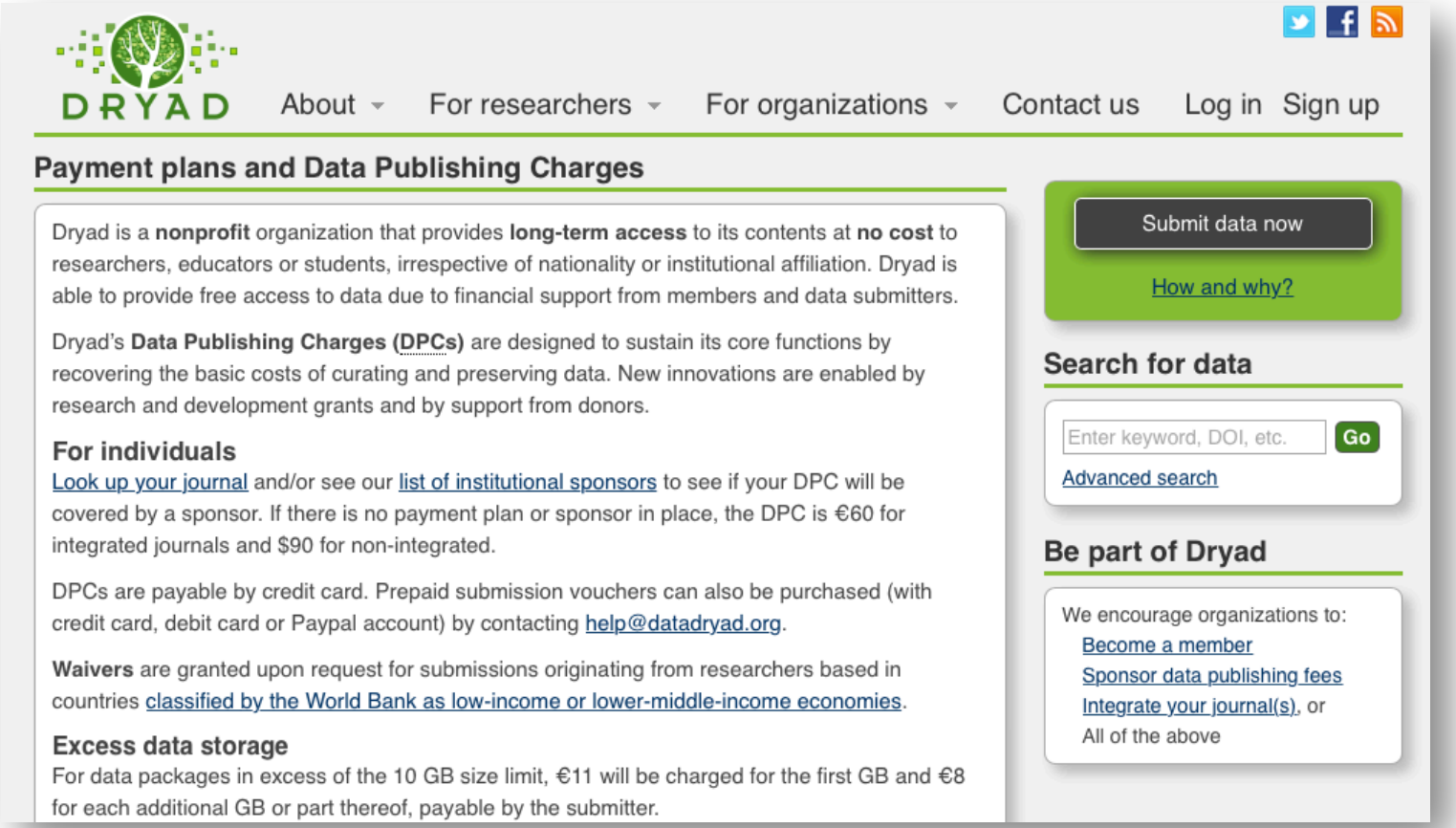
- Sicherung der dauerhaften Finanzierung

> Unabhängig davon ist festzuhalten, dass der dauerhafte Betrieb von Forschungsdatenzentren als Teil der Forschungskosten etabliert werden muss und grob geschätzt einen dauerhaft zu finanzierenden Anteil von 5 % bis 10 % für den Bereich der „Datenpflege" an den Gesamtkosten für Forschung vorzusehen ist. Um international kompetitiv zu bleiben bedeutet dies, dass auch in Deutschland mittelfristig etwa 5 % bis 10 % der Forschungskosten zusätzlich für nachhaltige „Datenbereitstellung" aufgebracht werden müssen.

Kommission Zukunft der Informationsinfrastruktur. (2011). Gesamtkonzept für die Informationsinfrastruktur in Deutschland. Retrieved from http://www.allianz-initiative.de/fileadmin/user_upload/KII_Gesamtkonzept.pdf

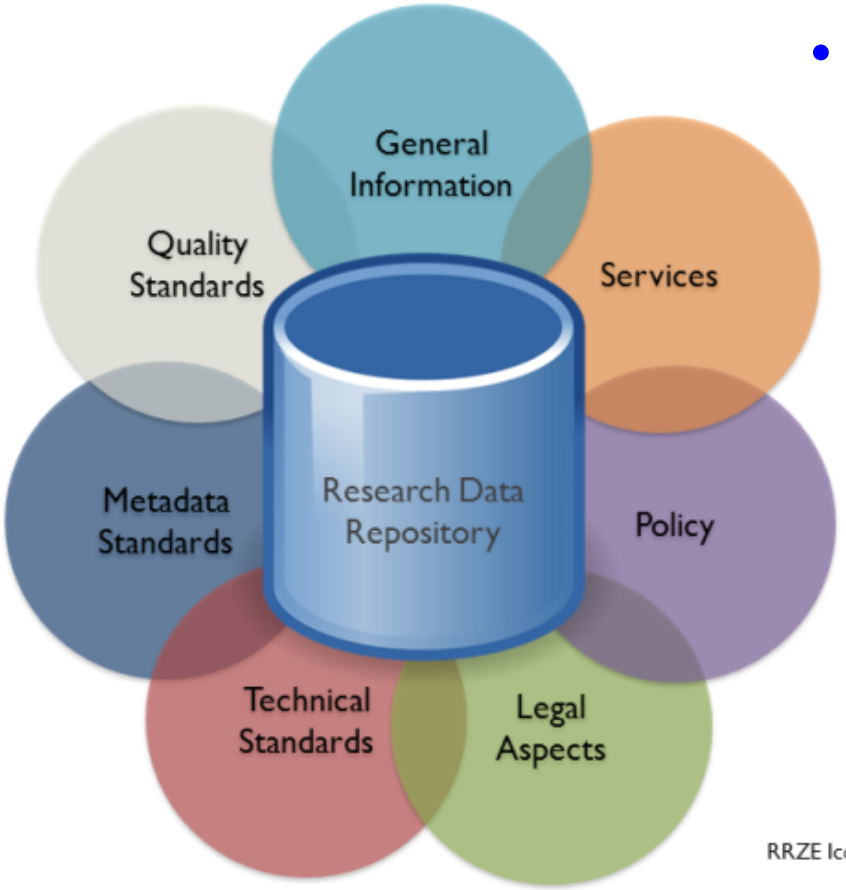
FINANZIERUNGS- UND GESCHÄFTSMODELLE

- Sicherung der dauerhaften Finanzierung



http://datadryad.org/pages/payment

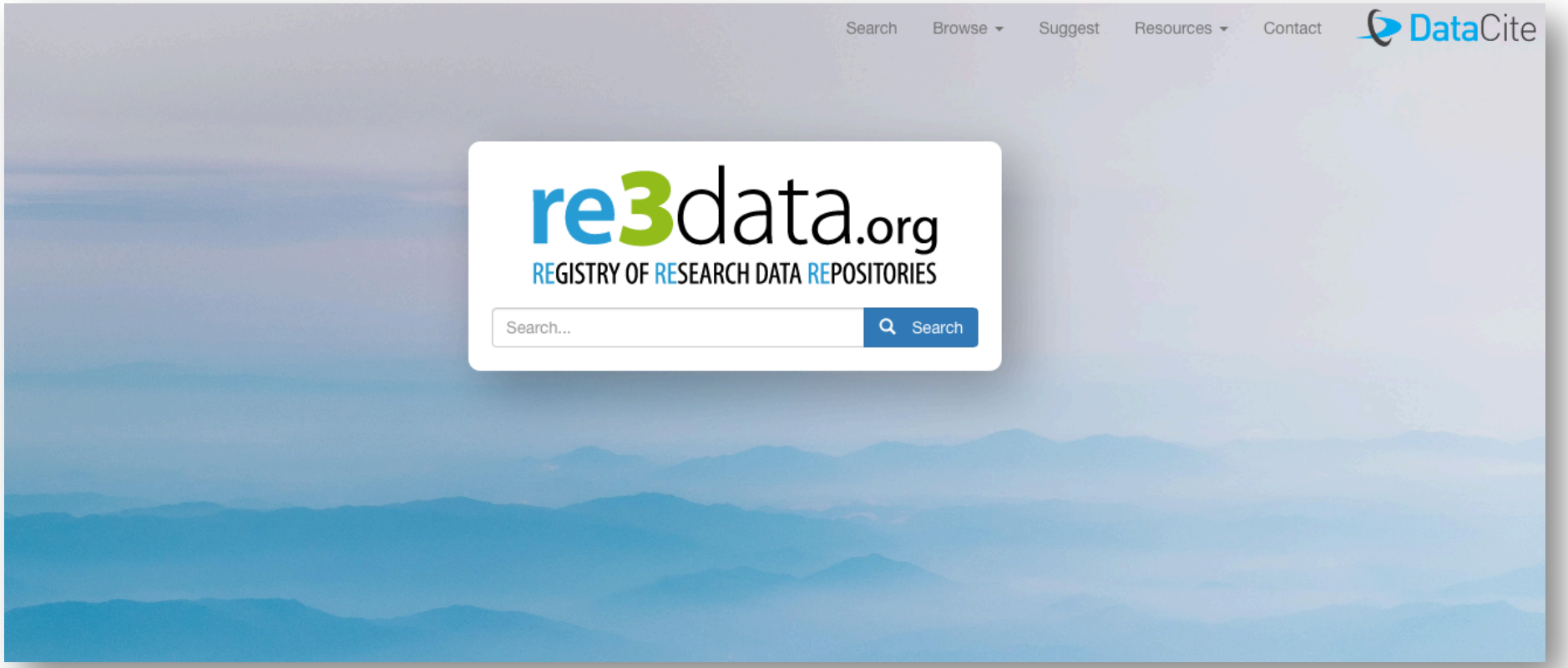
ASPEKTE



RRZE Icon Set (CC: BY-SA)

- Frage:
  - Welche Finanzierungs- und Geschäftsmodelle scheinen Ihnen für ein Forschungsdaten-Repositorium geeignet?

re3data



http://re3data.org

Mission

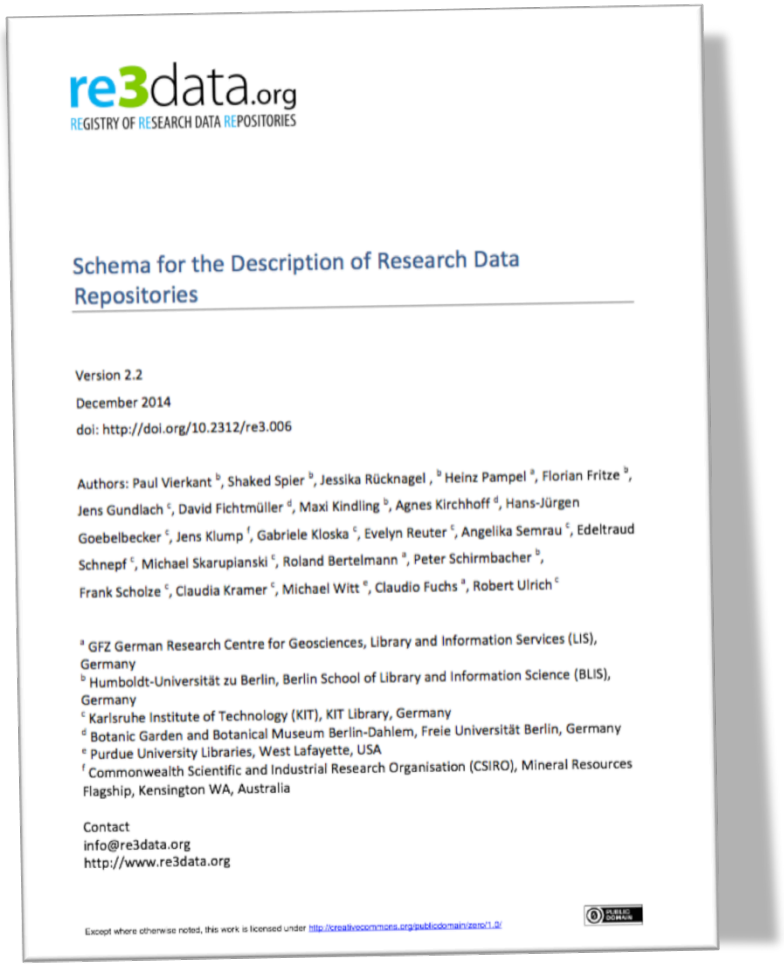
- global registry of research data repositories
- covers all academic disciplines
- presents repositories and portals for the permanent storage and access of research data sets to researchers, funding bodies, publishers and scholarly institutions
- promotes a culture of sharing, increased access and better visibility of research data

Registration Policy

- To be registered in re3data.org a research data repository must
  - be run by a legal entity, such as a sustainable institution (e.g. library, university);
  - clarify access conditions to the data and repository as well as the terms of use;
  - have focus on research data.

Metadata Schema

- 41 Properties on
  - General information
  - Responsibilities
  - Policies
  - Legal aspects
  - Technical standards
  - Quality standards



re3data.org
REGISTRY OF RESEARCH DATA REPOSITORIES

Schema for the Description of Research Data Repositories

Version 2.2

December 2014

doi: http://doi.org/10.2312/re3.006

Authors: Paul Vierkant [b], Shaked Spier [b], Jessika Rücknagel , [b] Heinz Pampel [a], Florian Fritze [b], Jens Gundlach [c], David Fichtmüller [d], Maxi Kindling [b], Agnes Kirchhoff [d], Hans-Jürgen Goebelbecker [c], Jens Klump [f], Gabriele Kloska [c], Evelyn Reuter [c], Angelika Semrau [c], Edeltraud Schnepf [c], Michael Skarupianski [c], Roland Bertelmann [a], Peter Schirmbacher [b], Frank Scholze [c], Claudia Kramer [c], Michael Witt [e], Claudio Fuchs [a], Robert Ulrich [c]

[a] GFZ German Research Centre for Geosciences, Library and Information Services (LIS), Germany
[b] Humboldt-Universität zu Berlin, Berlin School of Library and Information Science (BLIS), Germany
[c] Karlsruhe Institute of Technology (KIT), KIT Library, Germany
[d] Botanic Garden and Botanical Museum Berlin-Dahlem, Freie Universität Berlin, Germany
[e] Purdue University Libraries, West Lafayette, USA
[f] Commonwealth Scientific and Industrial Research Organisation (CSIRO), Mineral Resources Flagship, Kensington WA, Australia

Contact
info@re3data.org
http://www.re3data.org

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Vierkant, P., et al. (2015). Schema for the Description of Research Data Repositories. Version 3.0. http://doi.org/10.2312/re3.008

Icons

The research data repository provides additional information on its service.

The research data repository is either certified or supports a repository standard.

The research data repository provides a policy.

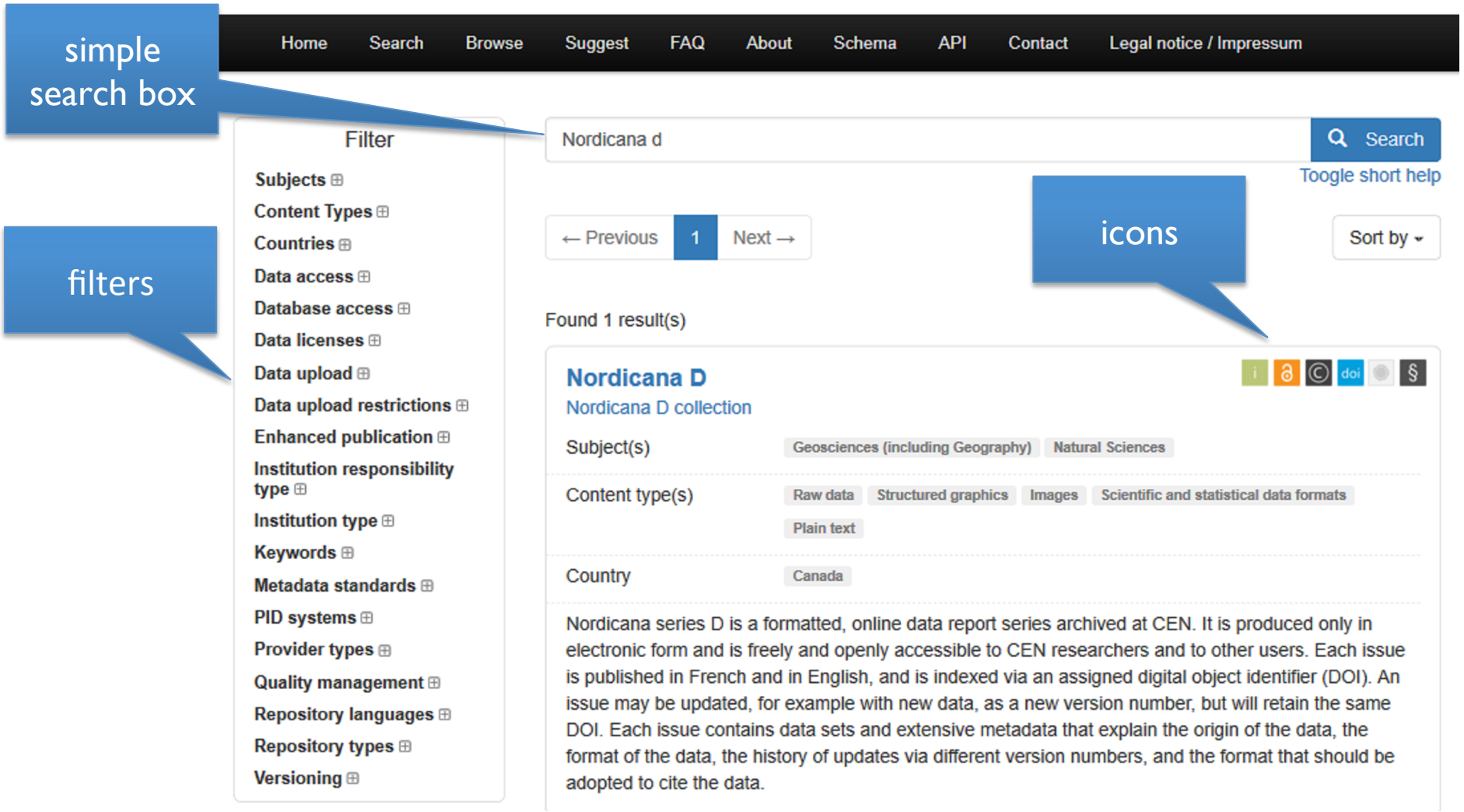
The research data repository provides open/restricted/closed access to its data.

The research data repository uses a persistent identifier system to make its provided data persistent, unique and citable.

The terms of use and licenses of the data are provided by the research data repository.

DEMO

re3data.org
REGISTRY OF RESEARCH DATA REPOSITORIES



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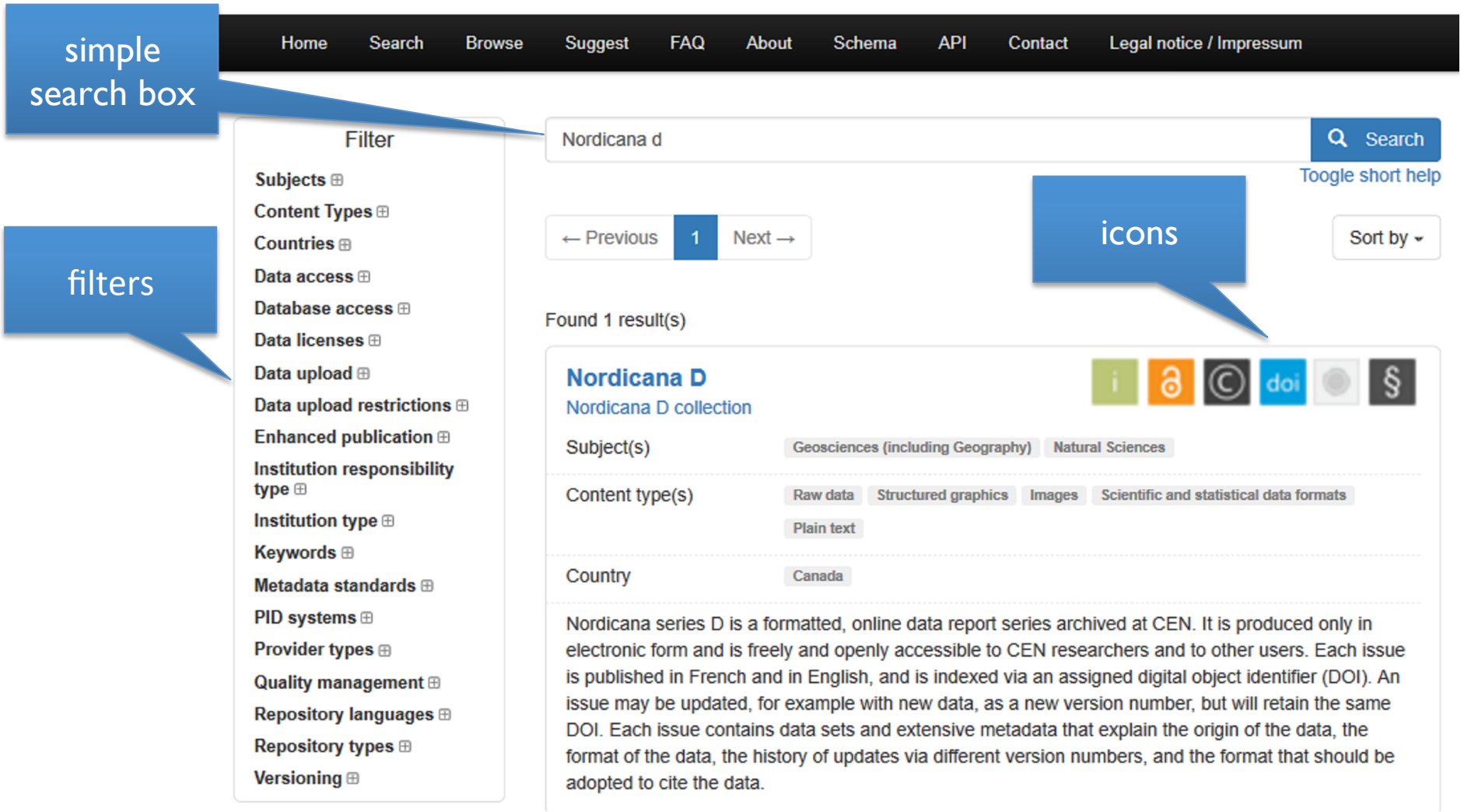

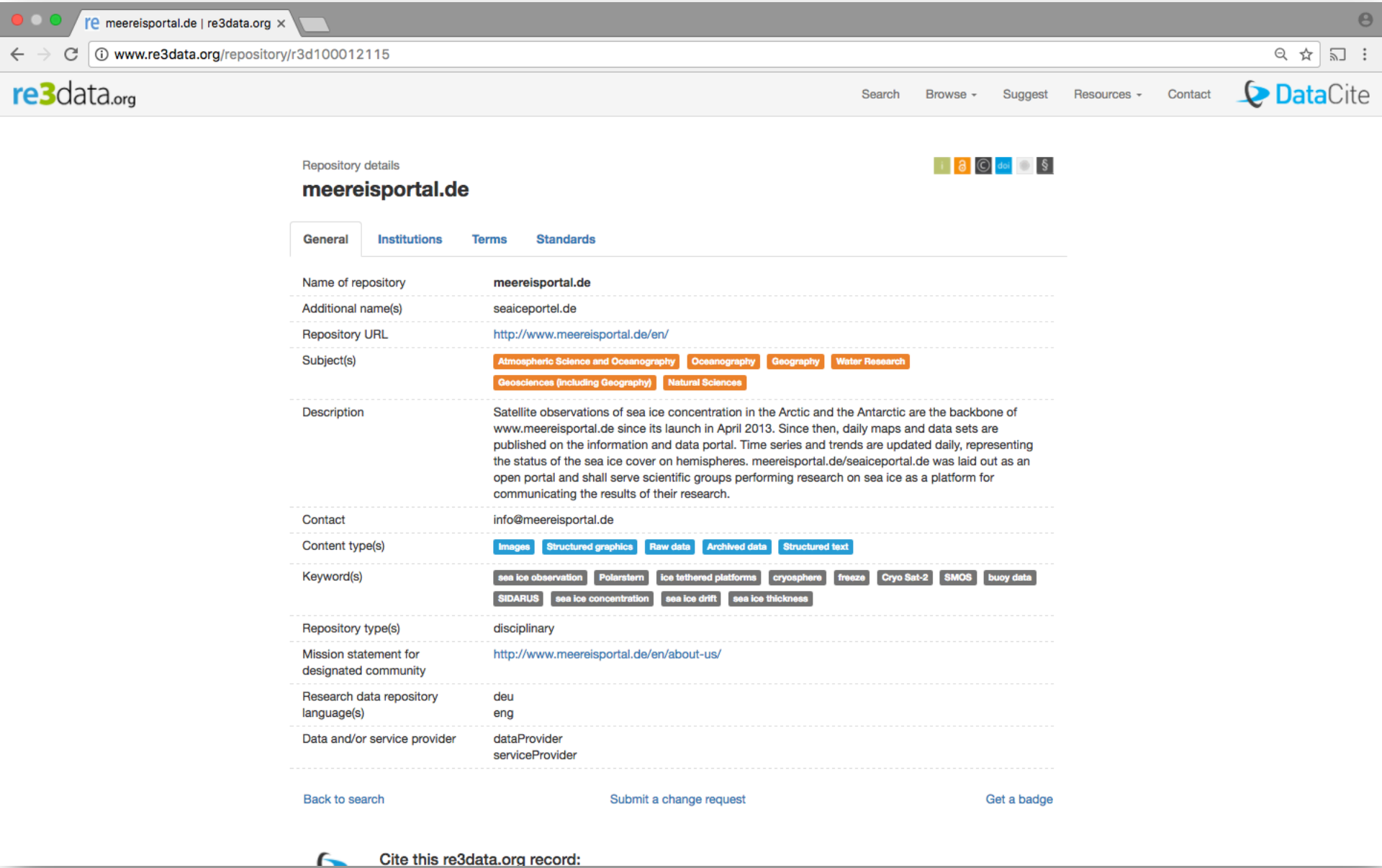
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Terms
Standards
Name of repository
meereisportal.de
Additional name(s)
seaiceportel.de
Repository URL
http://www.meereisportal.de/en/
Subject(s)
Atmospheric Science and Oceanography
Oceanography
Geography
Water Research
Geosciences (including Geography)
Natural Sciences
Description
Satellite observations of sea ice concentration in the Arctic and the Antarctic are the backbone of www.meereisportal.de since its launch in April 2013. Since then, daily maps and data sets are published on the information and data portal. Time series and trends are updated daily, representing the status of the sea ice cover on hemispheres. meereisportal.de/seaiceportal.de was laid out as an open portal and shall serve scientific groups performing research on sea ice as a platform for communicating the results of their research.
Contact
info@meereisportal.de
Content type(s)
Images
Structured graphics
Raw data
Archived data
Structured text
Keyword(s)
sea ice observation
Polarstern
ice tethered platforms
cryosphere
freeze
Cryo Sat-2
SMOS
buoy data
SIDARUS
sea ice concentration
sea ice drift
sea ice thickness
Repository type(s)
disciplinary
Mission statement for designated community
http://www.meereisportal.de/en/about-us/
Research data repository language(s)
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Data and/or service provider
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serviceProvider
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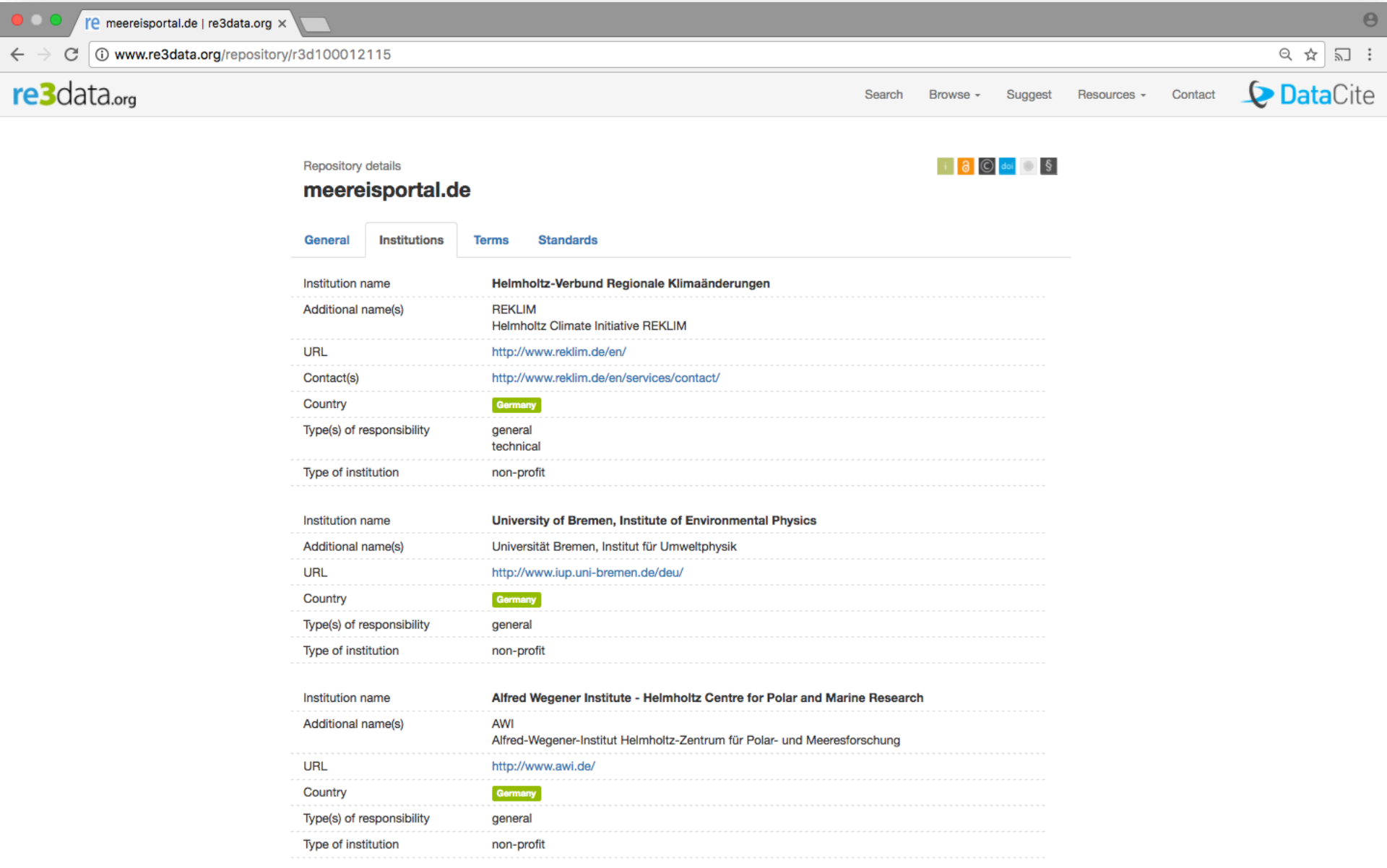
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Additional name(s)
REKLIM
Helmholtz Climate Initiative REKLIM
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Alfred Wegener Institute - Helmholtz Centre for Polar and Marine Research
Additional name(s)
AWI
Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung
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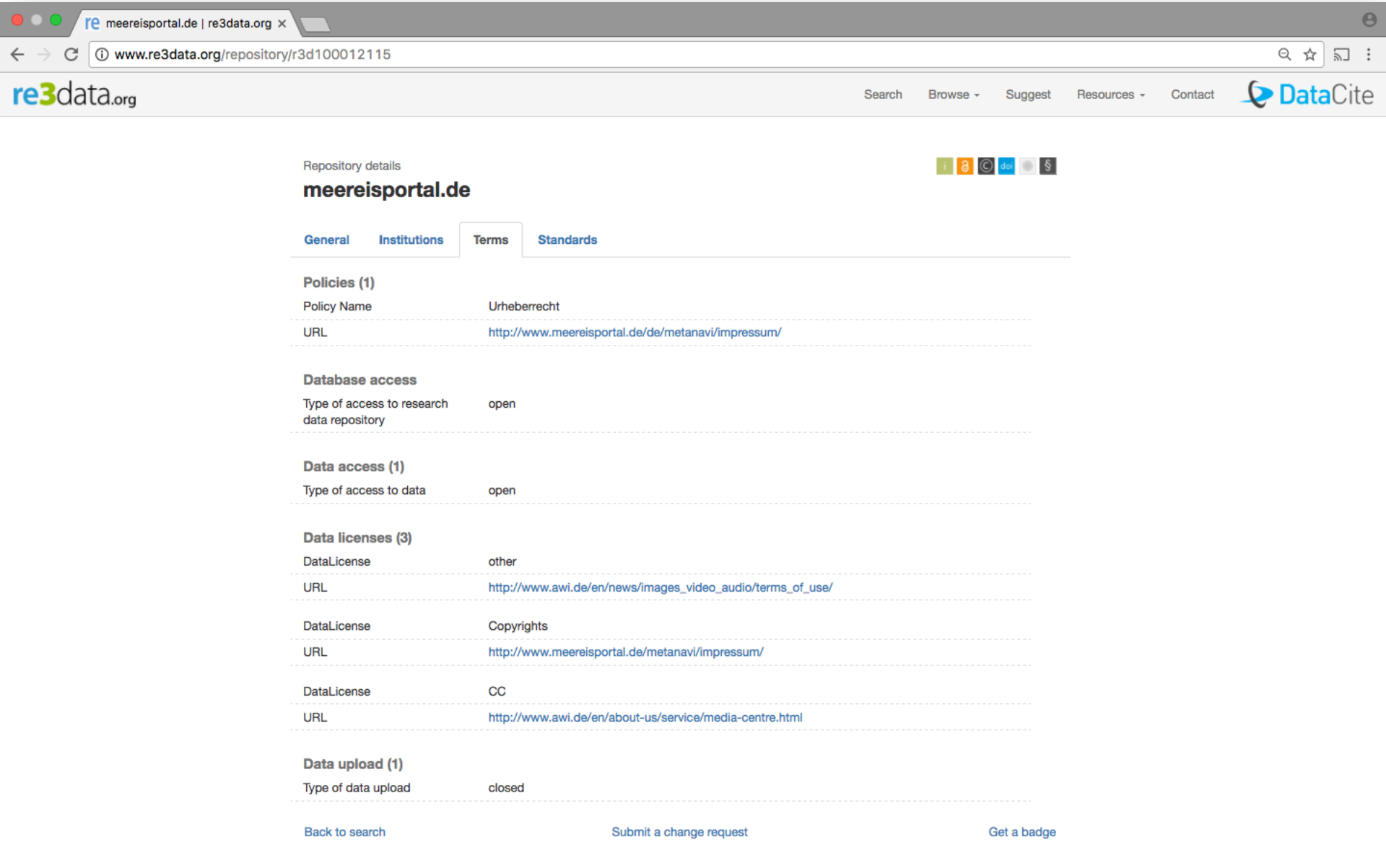
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Policies (1)
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Database access
Type of access to research data repository
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Data access (1)
Type of access to data
open
Data licenses (3)
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Data upload (1)
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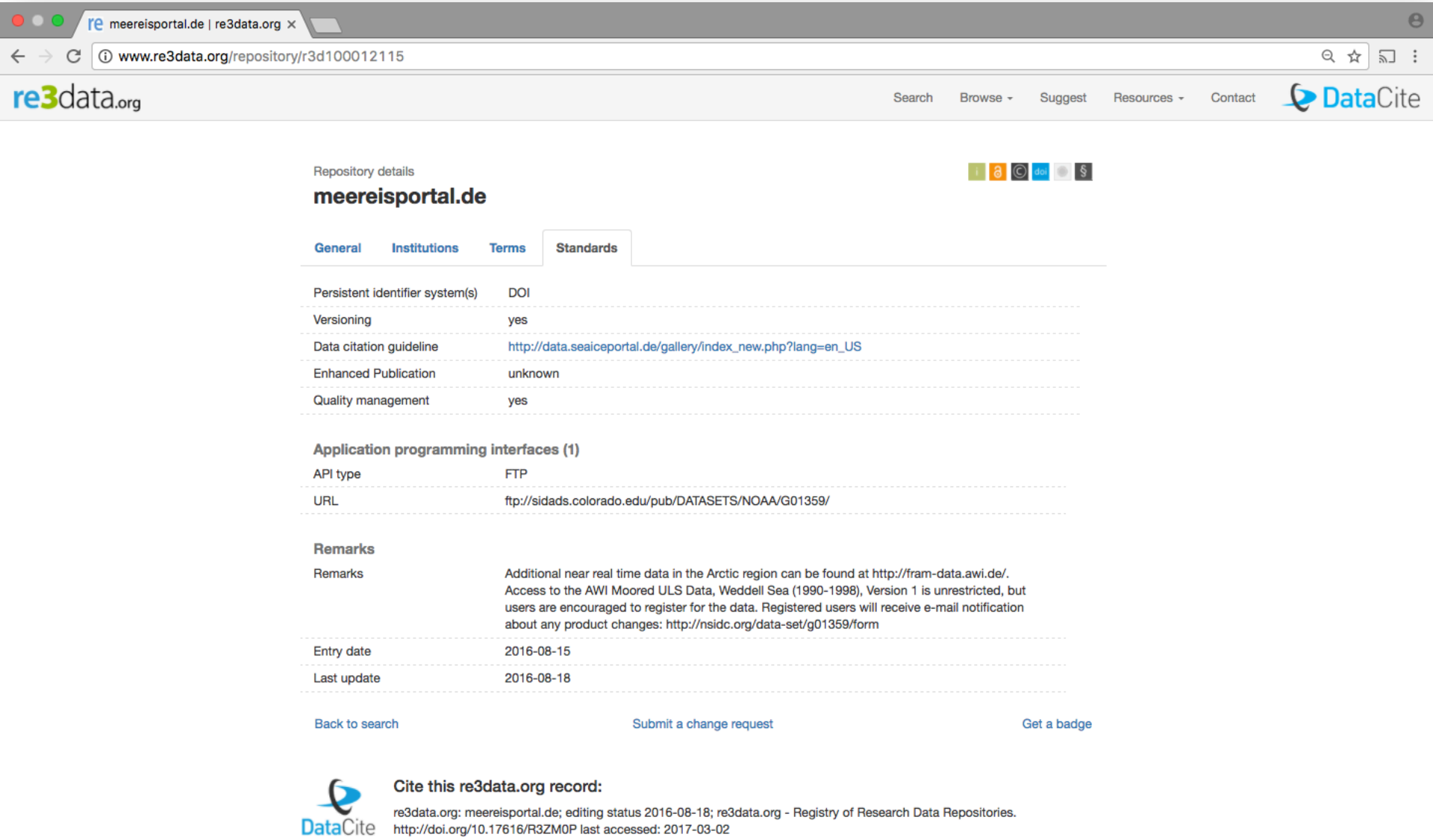
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Persistent identifier system(s) DOI
Versioning yes
Data citation guideline http://data.seaiceportal.de/gallery/index_new.php?lang=en_US
Enhanced Publication unknown
Quality management yes
Application programming interfaces (1)
API type FTP
URL ftp://sidads.colorado.edu/pub/DATASETS/NOAA/G01359/
Remarks
Remarks Additional near real time data in the Arctic region can be found at http://fram-data.awi.de/. Access to the AWI Moored ULS Data, Weddell Sea (1990-1998), Version 1 is unrestricted, but users are encouraged to register for the data. Registered users will receive e-mail notification about any product changes: http://nsidc.org/data-set/g01359/form
Entry date 2016-08-15
Last update 2016-08-18
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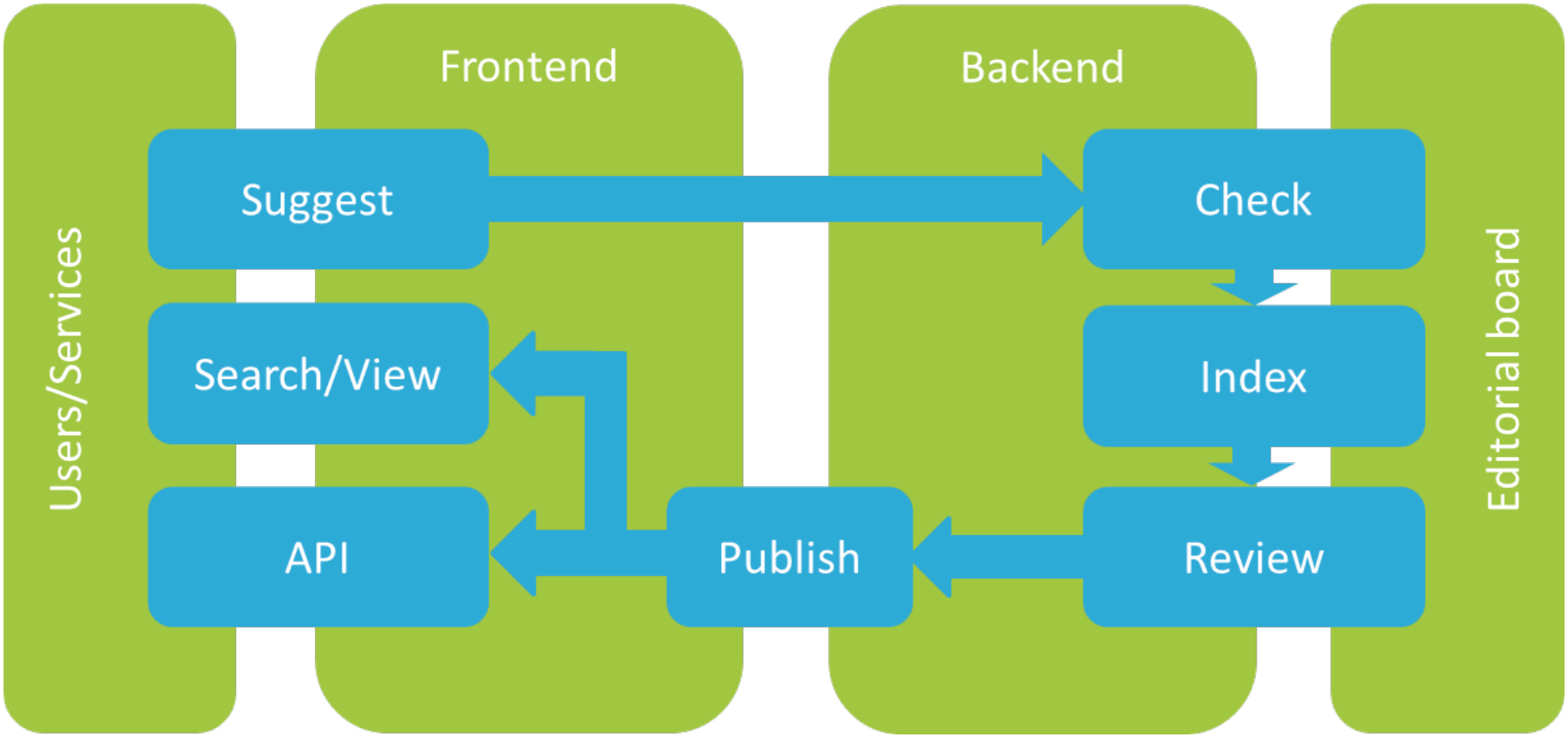
re3data.org: meereisportal.de; editing status 2016-08-18; re3data.org - Registry of Research Data Repositories. http://doi.org/10.17616/R3ZM0P last accessed: 2017-03-02

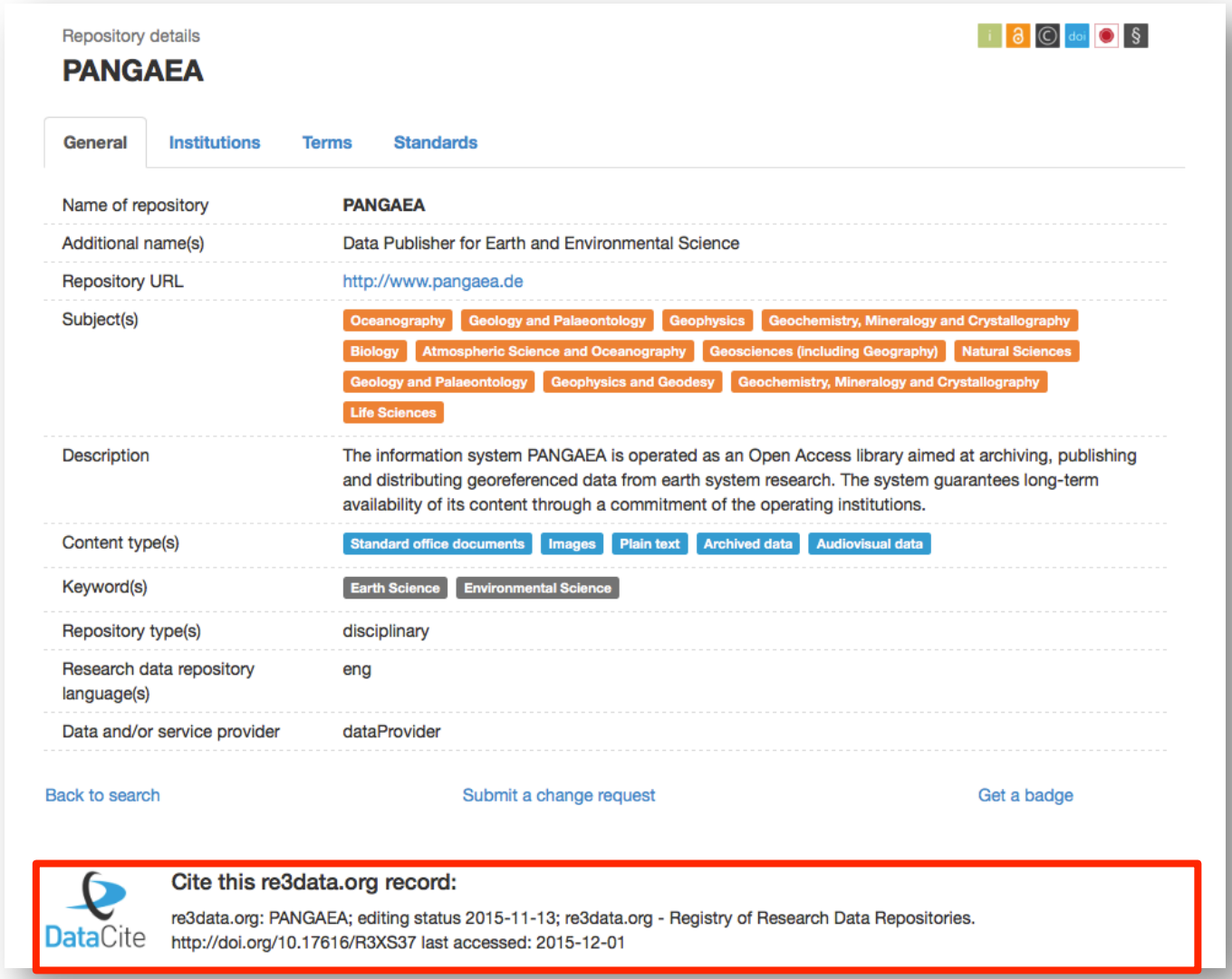
Workflow


Users/Services
Frontend
Backend
Editorial board
Suggest
Search/View
API
Publish
Check
Index
Review

Sustainability

- 2012-2015 DFG project (partners: GFZ, Humboldt University Berlin, Karlsruhe Institute of Technology KIT)
- From 2016 on:
  - merge with DataBib (new partner: Purdue University)
  - official service of DataCite
  - re3data.org working group within DataCite
  - technical maintenance and development financed and managed by DataCite
  - International Editorial Board
  - Cooperation with RDA, DINI, OpenAIRE, BioSharing

Features: profile page



Repository details

PANGAEA

General | Institutions | Terms | Standards

Name of repository	**PANGAEA**
Additional name(s)	Data Publisher for Earth and Environmental Science
Repository URL	http://www.pangaea.de
Subject(s)	Oceanography; Geology and Palaeontology; Geophysics; Geochemistry, Mineralogy and Crystallography; Biology; Atmospheric Science and Oceanography; Geosciences (including Geography); Natural Sciences; Geology and Palaeontology; Geophysics and Geodesy; Geochemistry, Mineralogy and Crystallography; Life Sciences
Description	The information system PANGAEA is operated as an Open Access library aimed at archiving, publishing and distributing georeferenced data from earth system research. The system guarantees long-term availability of its content through a commitment of the operating institutions.
Content type(s)	Standard office documents; Images; Plain text; Archived data; Audiovisual data
Keyword(s)	Earth Science; Environmental Science
Repository type(s)	disciplinary
Research data repository language(s)	eng
Data and/or service provider	dataProvider

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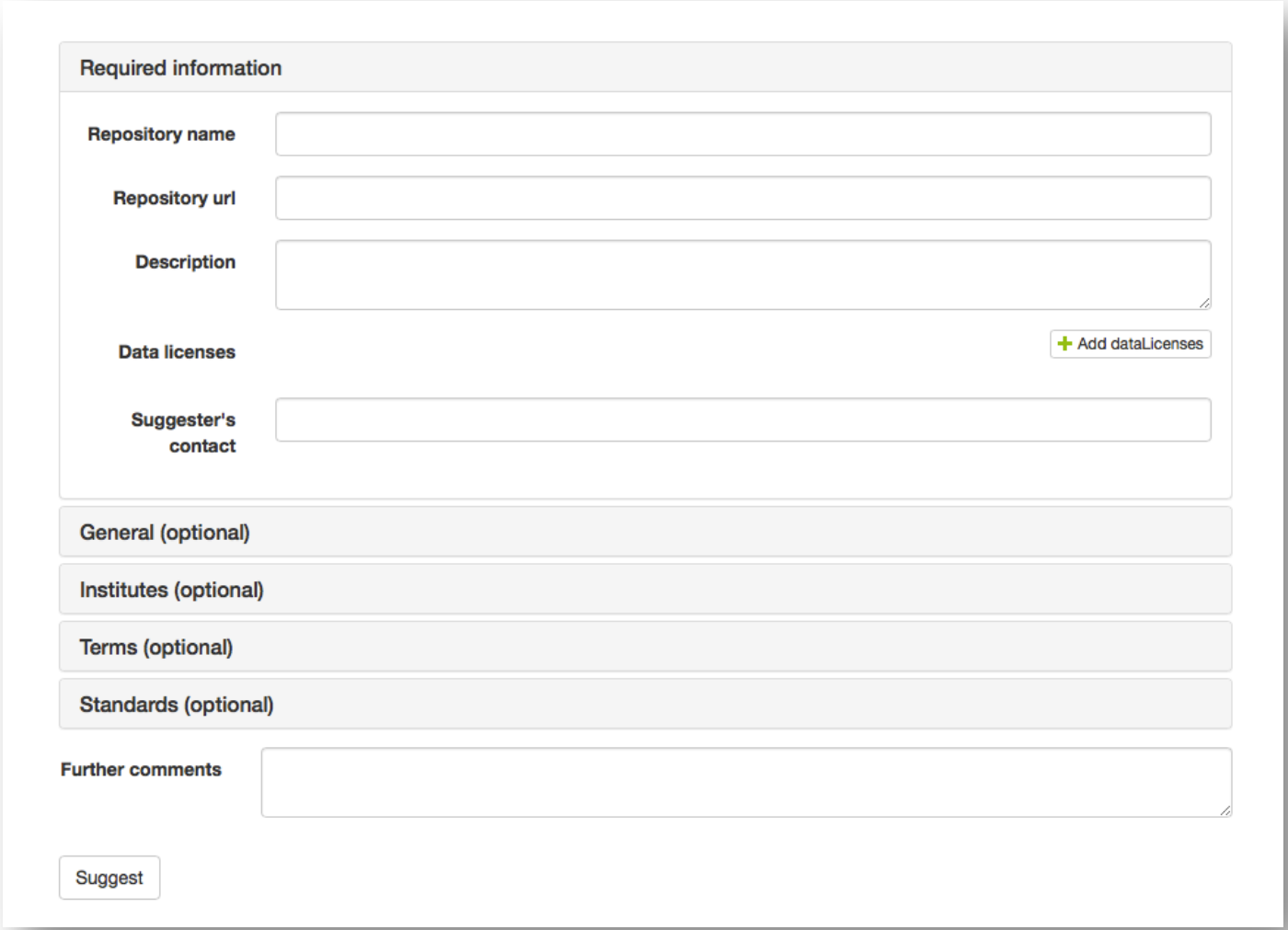

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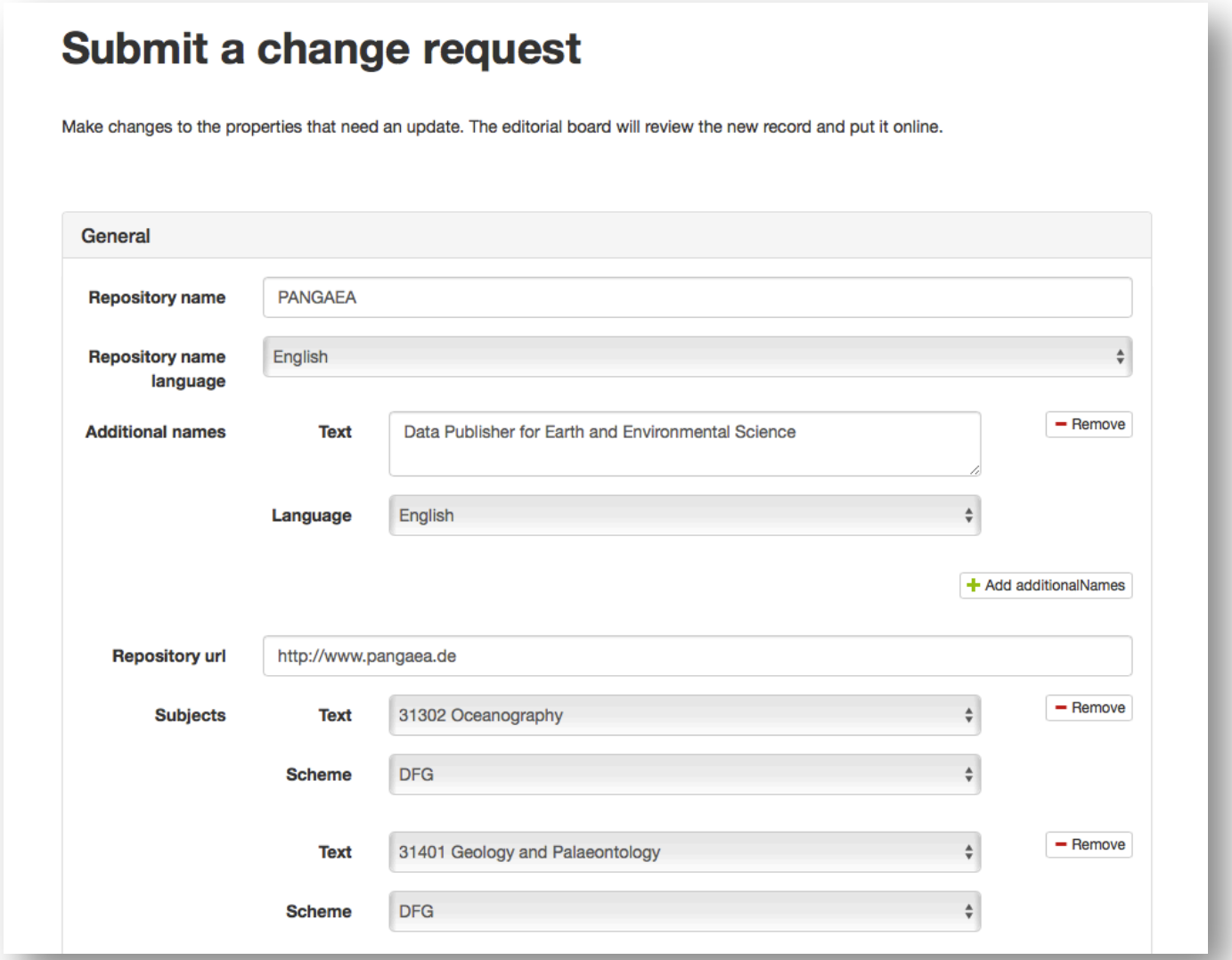

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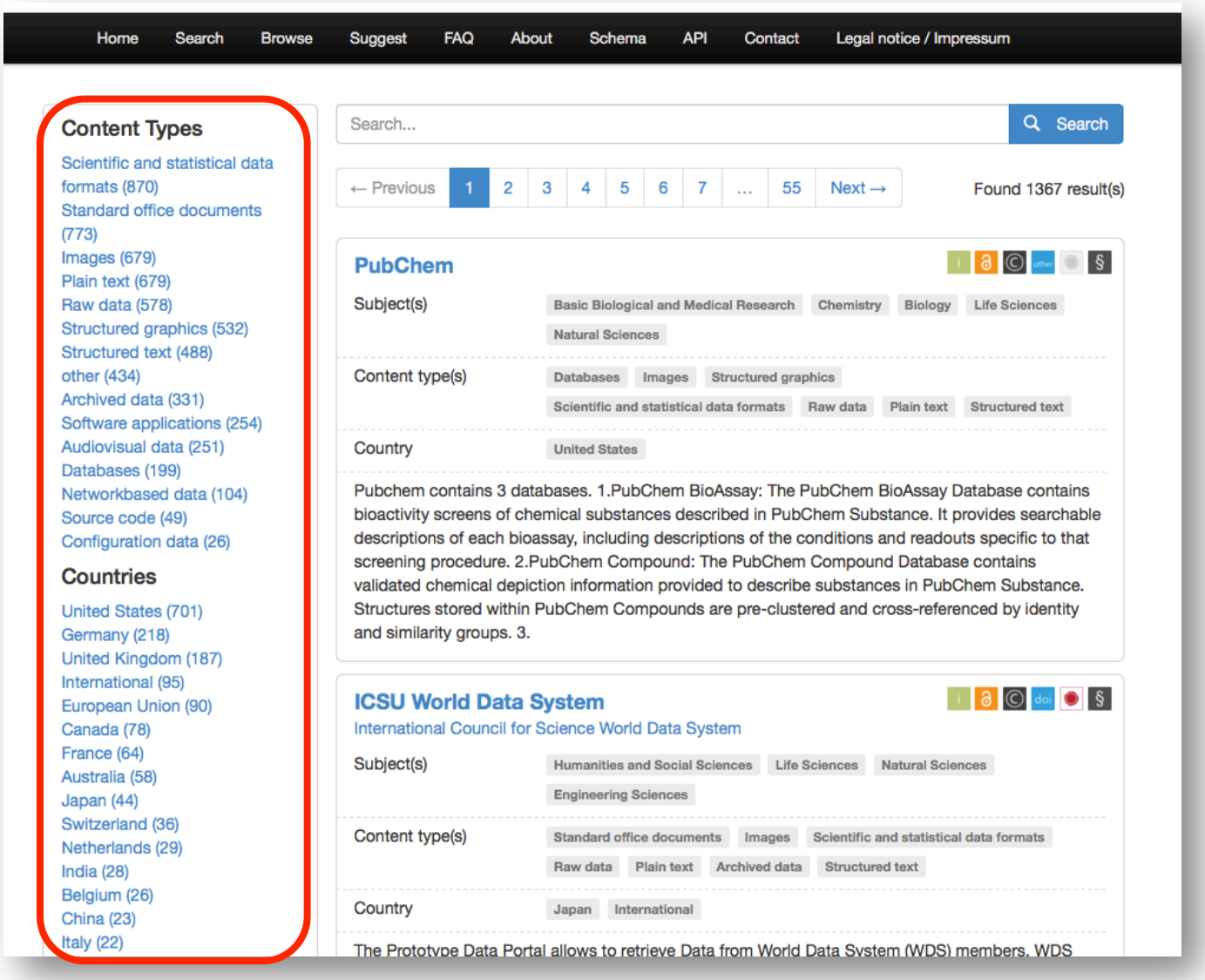

Features: browsing

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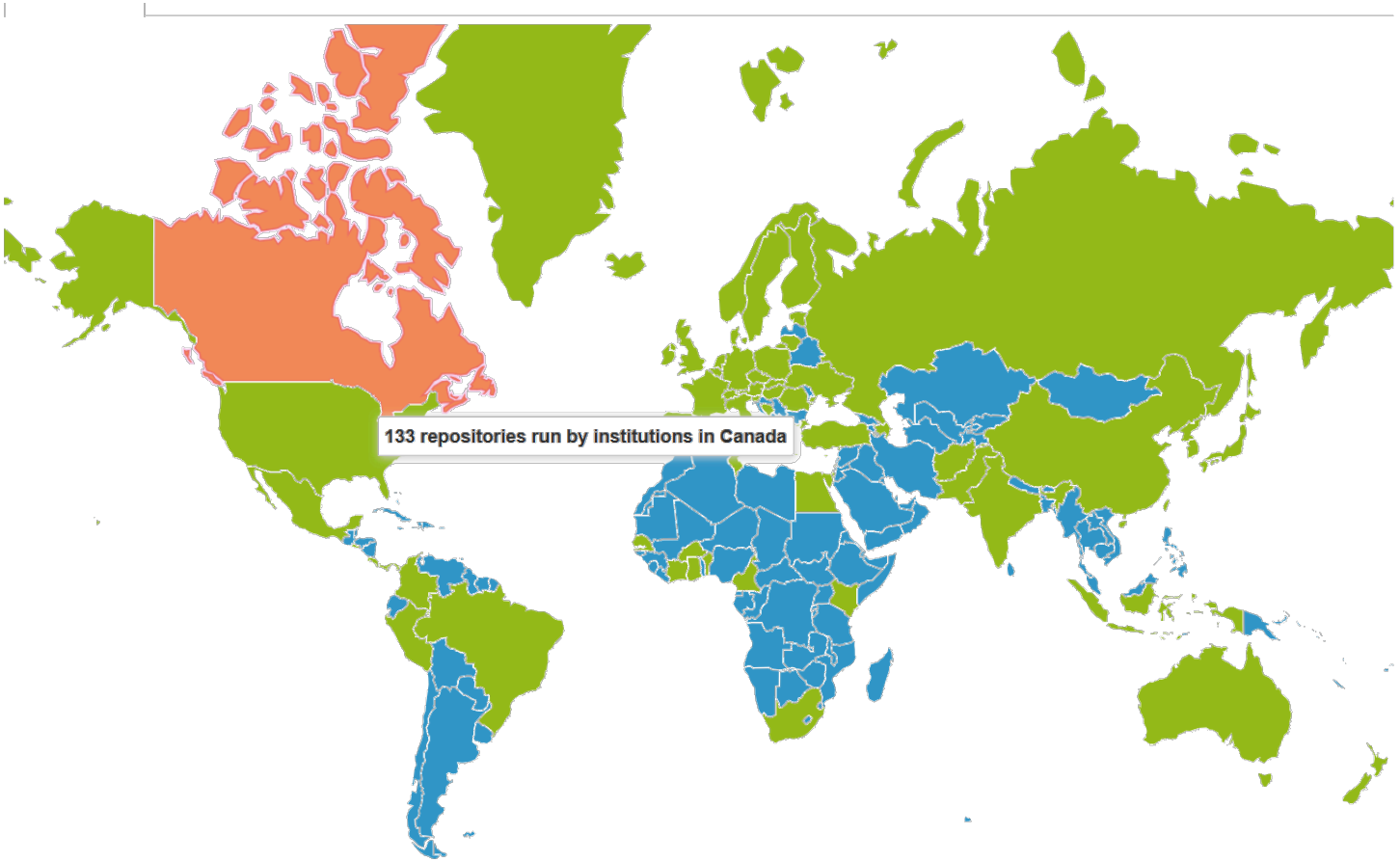
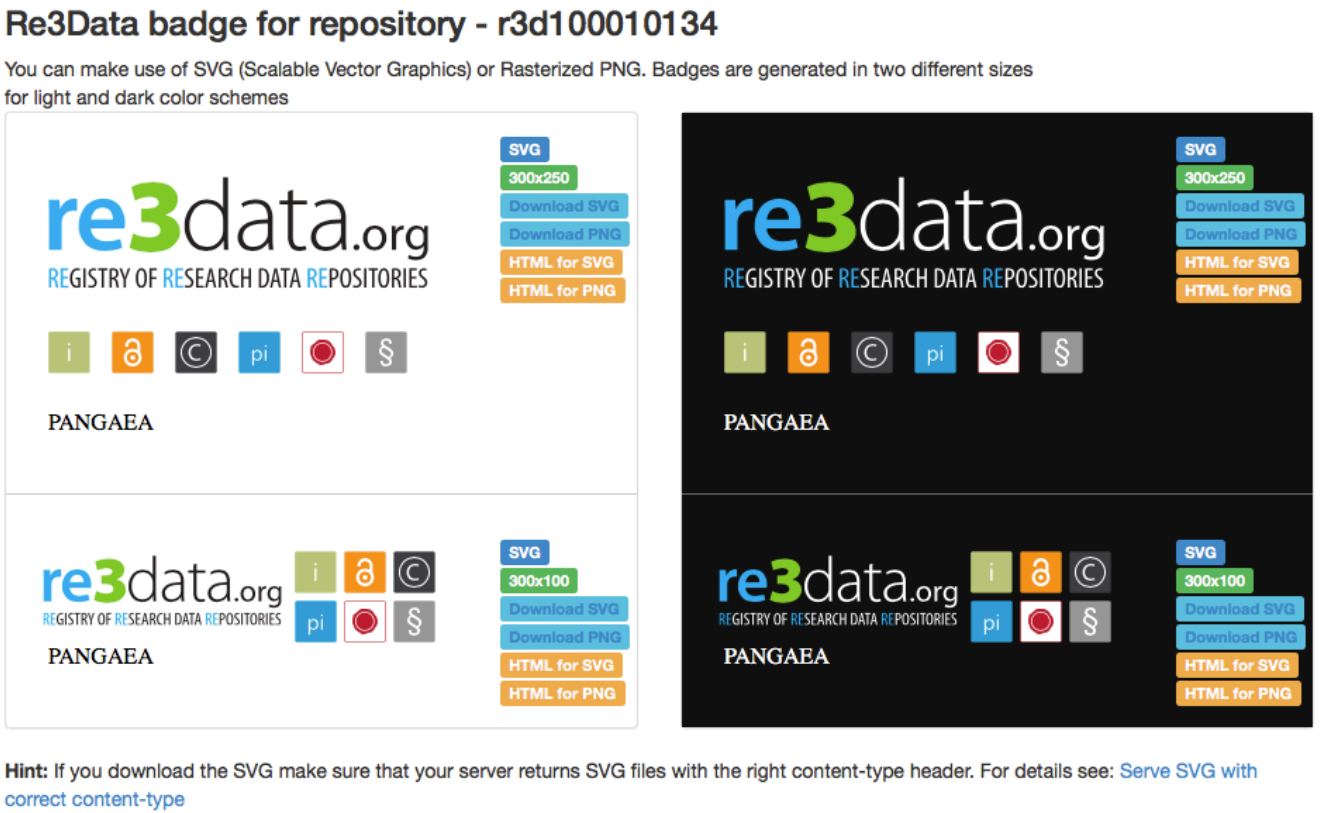


Features: badges



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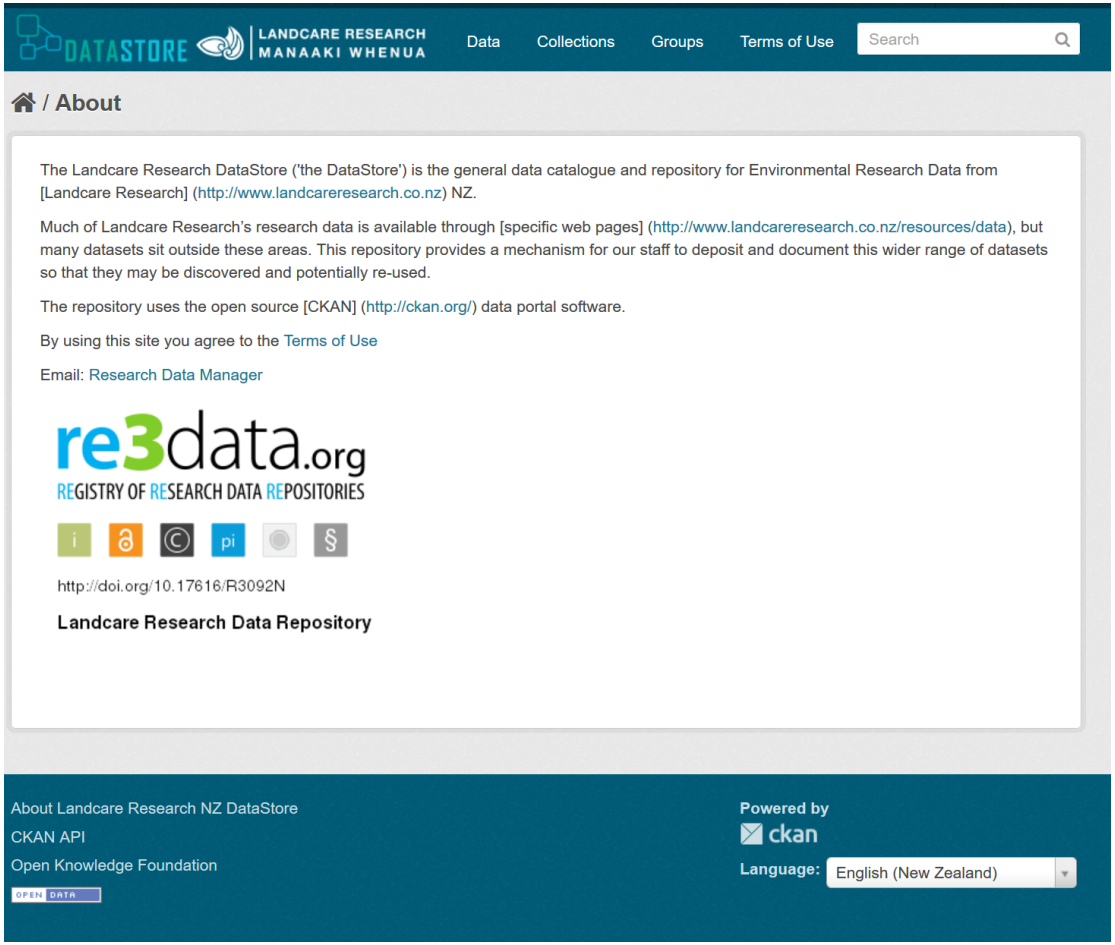

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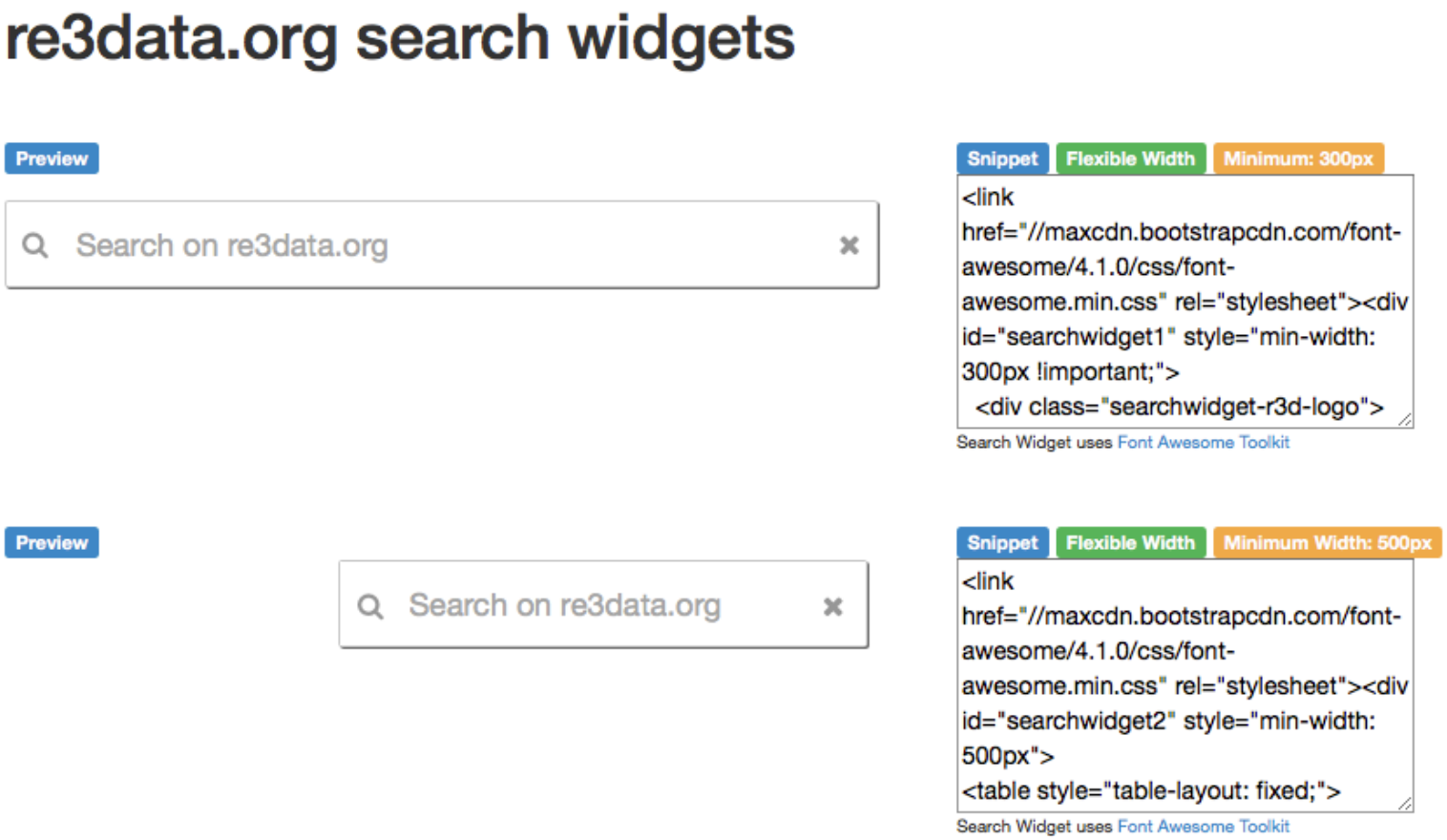

FORSCHUNGSDATEN.ORG

http://www.forschungsdaten.org

RDA PLENARY 11

http://https://www.rd-alliance.org/plenaries/rda-eleventh-plenary-meeting-berlin-germany

VIELEN DANK FÜR IHRE AUFMERKSAMKEIT!

Heinz Pampel
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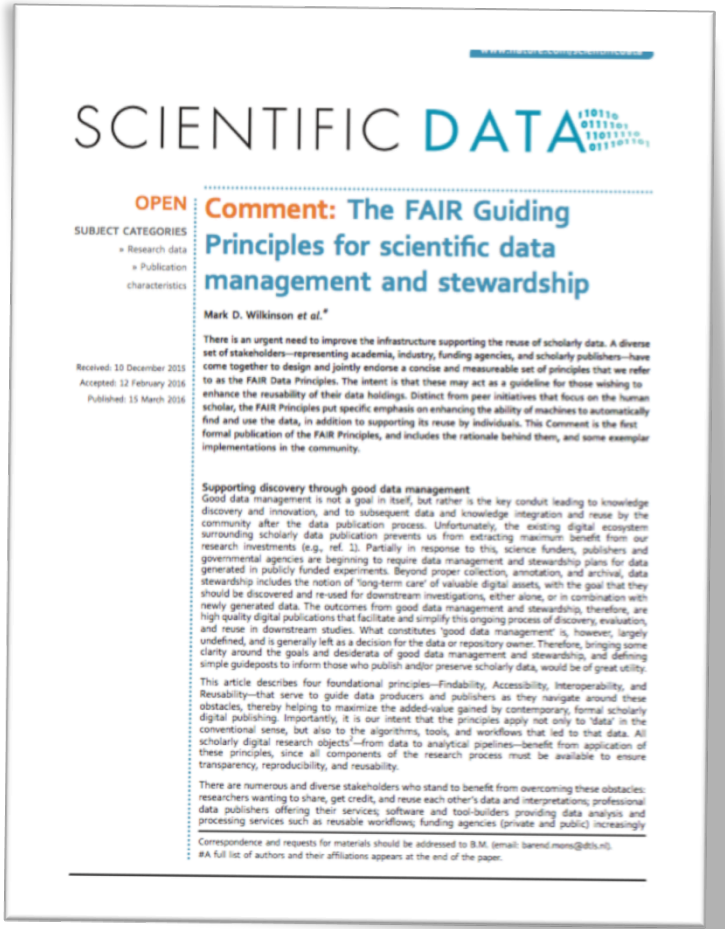
BACK UP

RAHMENBEDINGUNGEN

- Welche Konsequenzen haben die FAIR-Prinzipien auf den Betrieb von Forschungsdaten-Repositorien?

FAIR-PRINZIPIEN

- Die FAIR-Prinzipien stehen für:
  - **F**indable
  - **A**ccessible
  - **I**nteroperable
  - **R**eusable



SCIENTIFIC DATA

OPEN

SUBJECT CATEGORIES
» Research data
» Publication characteristics

Received: 10 December 2015
Accepted: 12 February 2016
Published: 15 March 2016

Comment: The FAIR Guiding Principles for scientific data management and stewardship

Mark D. Wilkinson *et al.**

There is an urgent need to improve the infrastructure supporting the reuse of scholarly data. A diverse set of stakeholders—representing academia, industry, funding agencies, and scholarly publishers—have come together to design and jointly endorse a concise and measureable set of principles that we refer to as the FAIR Data Principles. The intent is that these may act as a guideline for those wishing to enhance the reusability of their data holdings. Distinct from peer initiatives that focus on the human scholar, the FAIR Principles put specific emphasis on enhancing the ability of machines to automatically find and use the data, in addition to supporting its reuse by individuals. This Comment is the first formal publication of the FAIR Principles, and includes the rationale behind them, and some exemplar implementations in the community.

Supporting discovery through good data management

Good data management is not a goal in itself, but rather is the key conduit leading to knowledge discovery and innovation, and to subsequent data and knowledge integration and reuse by the community after the data publication process. Unfortunately, the existing digital ecosystem surrounding scholarly data publication prevents us from extracting maximum benefit from our research investments (e.g., ref. 1). Partially in response to this, science funders, publishers and governmental agencies are beginning to require data management and stewardship plans for data generated in publicly funded experiments. Beyond proper collection, annotation, and archival, data stewardship includes the notion of 'long-term care' of valuable digital assets, with the goal that they should be discovered and re-used for downstream investigations, either alone, or in combination with newly generated data. The outcomes from good data management and stewardship, therefore, are high quality digital publications that facilitate and simplify this ongoing process of discovery, evaluation, and reuse in downstream studies. What constitutes 'good data management' is, however, largely undefined, and is generally left as a decision for the data or repository owner. Therefore, bringing some clarity around the goals and desiderata of good data management and stewardship, and defining simple guideposts to inform those who publish and/or preserve scholarly data, would be of great utility.

This article describes four foundational principles—Findability, Accessibility, Interoperability, and Reusability—that serve to guide data producers and publishers as they navigate around these obstacles, thereby helping to maximize the added-value gained by contemporary, formal scholarly digital publishing. Importantly, it is our intent that the principles apply not only to 'data' in the conventional sense, but also to the algorithms, tools, and workflows that led to that data. All scholarly digital research objects[1]—from data to analytical pipelines—benefit from application of these principles, since all components of the research process must be available to ensure transparency, reproducibility, and reusability.

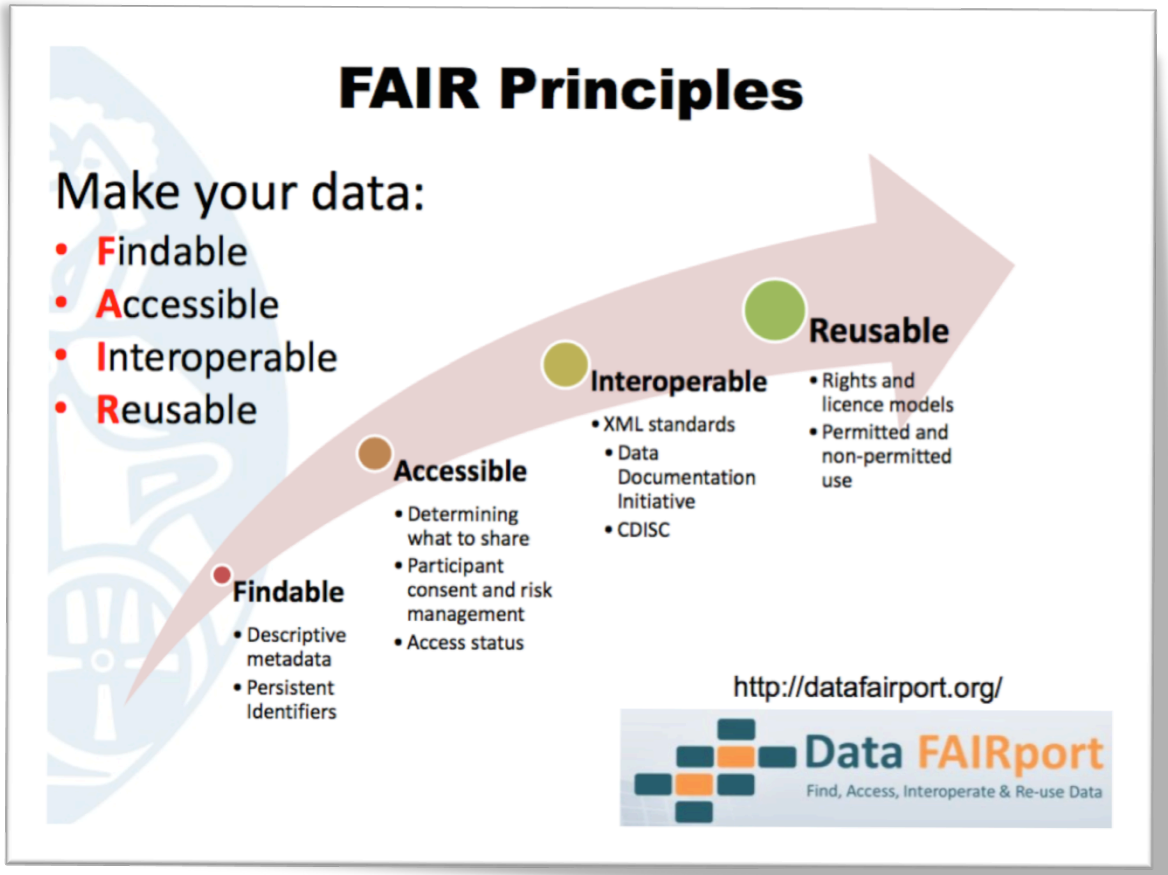
There are numerous and diverse stakeholders who stand to benefit from overcoming these obstacles: researchers wanting to share, get credit, and reuse each other's data and interpretations; professional data publishers offering their services; software and tool-builders providing data analysis and processing services such as reusable workflows; funding agencies (private and public) increasingly

Correspondence and requests for materials should be addressed to B.M. (email: barend.mons@dtls.nl).
*A full list of authors and their affiliations appears at the end of the paper.

http://doi.org/10.1038/sdata.2016.18

FAIR-PRINZIPIEN

- Die FAIR-Prinzipien stehen für:
  - **F**indable
  - **A**ccessible
  - **I**nteroperable
  - **R**eusable



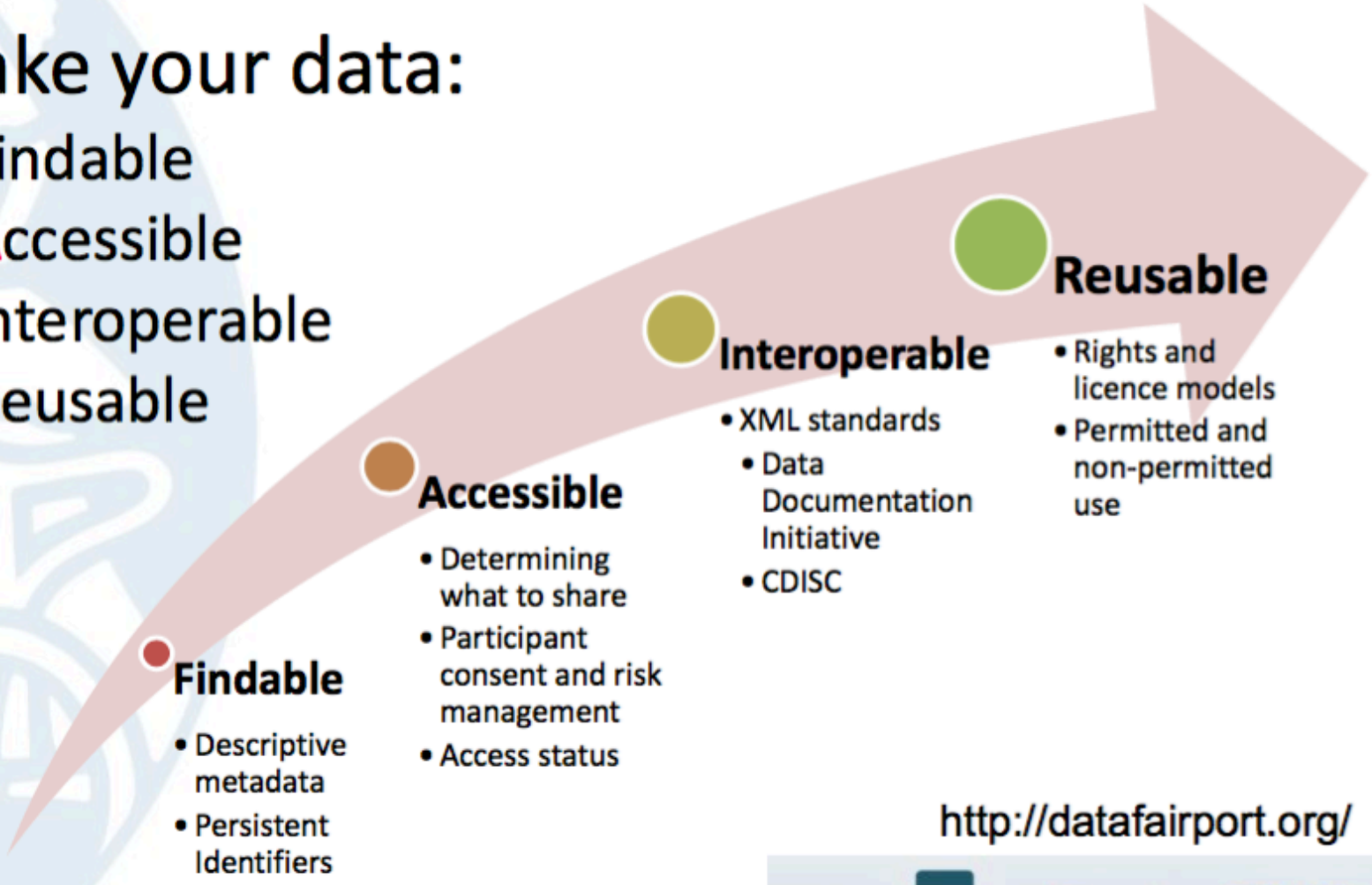
http://doi.org/10.1038/sdata.2016.18

Folie: https://de.slideshare.net/lshtm/preparing-data-for-sharing-the-fair-principles

FAIR Principles

Make your data:

- **F**indable
- **A**ccessible
- **I**nteroperable
- **R**eusable



http://datafairport.org/

Data FAIRport

Find, Access, Interoperate & Re-use Data

Folie: https://de.slideshare.net/lshtm/preparing-data-for-sharing-the-fair-principles

FAIR-PRINZIPIEN

To be Findable	To be Accessible	To be Interoperable	To be Reusable

http://doi.org/10.1038/sdata.2016.18

FAIR-PRINZIPIEN

To be Findable	To be Accessible	To be Interoperable	To be Reusable
F1. (meta)data are assigned a globally unique and persistent identifier			
F2. data are described with rich metadata (defined by R1 below)			
F3. metadata clearly and explicitly include the identifier of the data it describes			
F4. (meta)data are registered or indexed in a searchable resource			

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FAIR-PRINZIPIEN

To be Findable	To be Accessible	To be Interoperable	To be Reusable
F1. (meta)data are assigned a globally unique and persistent identifier	A1. (meta)data are retrievable by their identifier using a standardized communications protocol		
F2. data are described with rich metadata (defined by R1 below)	A1.1 the protocol is open, free, and universally implementable		
F3. metadata clearly and explicitly include the identifier of the data it describes	A1.2 the protocol allows for an authentication and authorization procedure, where necessary		
F4. (meta)data are registered or indexed in a searchable resource	A2. metadata are accessible, even when the data are no longer available		

http://doi.org/10.1038/sdata.2016.18

FAIR-PRINZIPIEN

To be Findable	To be Accessible	To be Interoperable	To be Reusable
F1. (meta)data are assigned a globally unique and persistent identifier	A1. (meta)data are retrievable by their identifier using a standardized communications protocol	I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.	
F2. data are described with rich metadata (defined by R1 below)	A1.1 the protocol is open, free, and universally implementable	I2. (meta)data use vocabularies that follow FAIR principles	
F3. metadata clearly and explicitly include the identifier of the data it describes	A1.2 the protocol allows for an authentication and authorization procedure, where necessary	I3. (meta)data include qualified references to other (meta)data	
F4. (meta)data are registered or indexed in a searchable resource	A2. metadata are accessible, even when the data are no longer available		

http://doi.org/10.1038/sdata.2016.18

FAIR-PRINZIPIEN

To be Findable	To be Accessible	To be Interoperable	To be Reusable
F1. (meta)data are assigned a globally unique and persistent identifier	A1. (meta)data are retrievable by their identifier using a standardized communications protocol	I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.	R1. meta(data) are richly described with a plurality of accurate and relevant attributes
F2. data are described with rich metadata (defined by R1 below)	A1.1 the protocol is open, free, and universally implementable	I2. (meta)data use vocabularies that follow FAIR principles	R1.1. (meta)data are released with a clear and accessible data usage license
F3. metadata clearly and explicitly include the identifier of the data it describes	A1.2 the protocol allows for an authentication and authorization procedure, where necessary	I3. (meta)data include qualified references to other (meta)data	R1.2. (meta)data are associated with detailed provenance
F4. (meta)data are registered or indexed in a searchable resource	A2. metadata are accessible, even when the data are no longer available		R1.3. (meta)data meet domain-relevant community standards

http://doi.org/10.1038/sdata.2016.18