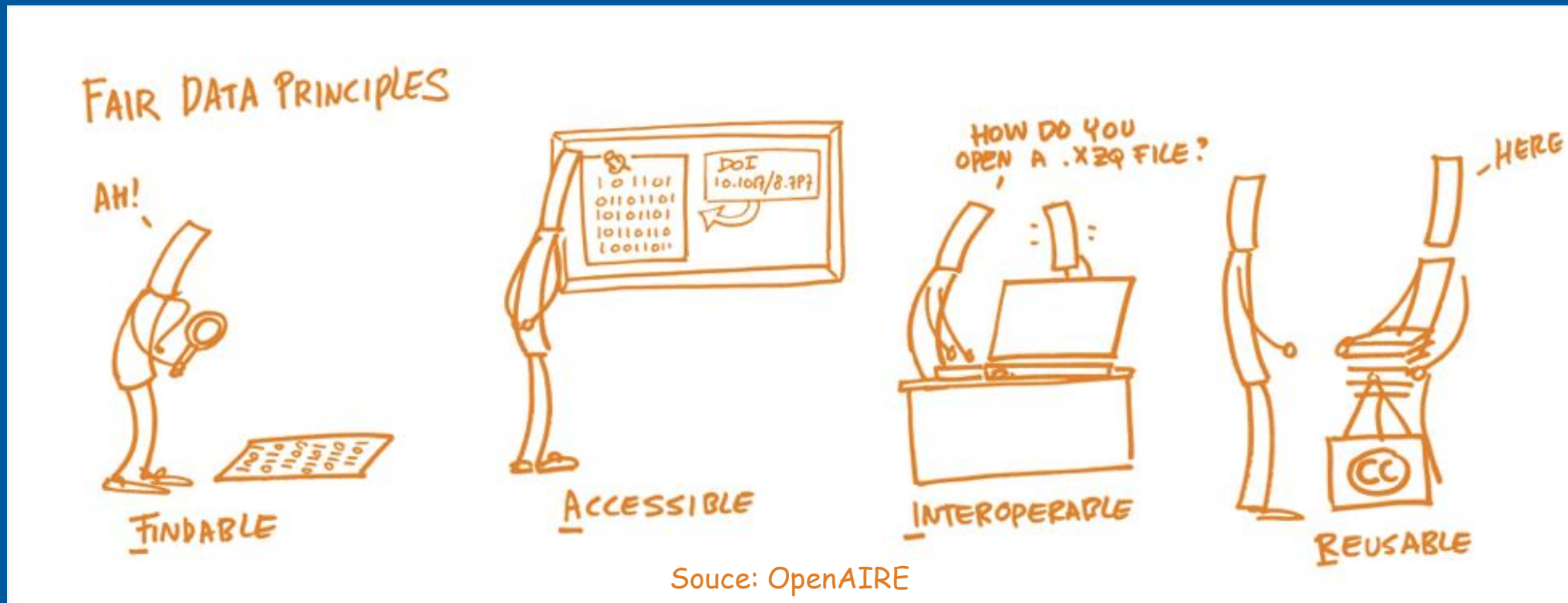


# Die Rolle von Fachrepositorien und Datenjournals bei der Umsetzung der FAIR Prinzipien



Kirsten Elger, Boris Radosavljevic, Damian Ulbricht



# Outline

- Introduction – open data and repositories
- COPDESS and Enabling FAIR Data
- Data Publications: technical background and best practices
- Data documentation: Practical tools and documents (by GFZ Data Services), reports, data journals
- Scholix: Increasing the transparency of research products

# Open data – an international request



→ following the **FAIR Principles** for Research Data Management

## FAIR Principles

Findable



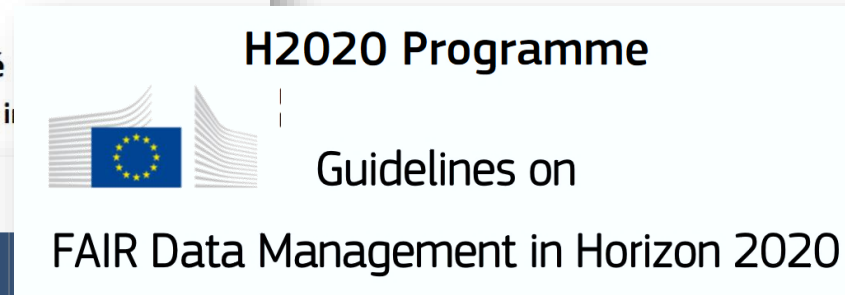
Accessible



Interoperable



Reusable



## Tsukuba Communiqué

G7 Science and Technology Ministers' Meeting in



Jobs ▾ Immigration ▾ Travel ▾ Business ▾ Benefits ▾

Home → Open Government → About Open Government → G8 Open Data Charter – Canada's Action Plan

## G8 Open Data Charter – Canada's Action Plan



# Data Publications – best practice for FAIR sharing data

**Publication of datasets as individual publications (with assigned persistent Identifier; DOI) through data repositories**

- **Findable:** integration of standardised machine readable metadata in external data portals (e.g. DataCite, B2Find, Google Dataset Search)
- **Accessible:** via DOI, persistent data storage and access guaranteed by the publisher (= data repository)
- **Documented:** with metadata for discovery and reuse
- **Citable:** DOI-referenced datasets are citable just as journal articles (→ credit for researcher and institution)

# Research Data Repositories

- permanent archives and access points to research data
- open access
- persistent identifier (ideally DOI)
- institutional, general, **domain**



***“Domain repositories:*** These repositories provide quality and standards [for their domain], enriching and organizing data from multiple sources to facilitate new discoveries. They are in many ways the best stewards of the data but are not currently well connected with most publishers, and many data are thus not finding their proper home.”

- **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

**2466** registered repositories  
(25 Feb 2020)

Version 3.0

re3data.org  
REGISTRY OF RESEARCH DATA REPOSITORIES

## Metadata Schema for the Description of Research Data Repositories

Version 3.0

December 2015

doi: <http://doi.org/10.2312/re3.008>

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

Centre for Geosciences, Library and Information Services (LIS),  
Library and Information Science (BLIS),

41 Properties on

- General information
- Responsibilities
- Policies
- Legal aspects
- Technical standards
- Quality standards

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



simple search box

Nordicana d

Search

Toogle short help

filters

- Filter
- Subjects
- Content Types
- Countries
- Data access
- Database access
- Data licenses
- Data upload
- Data upload restrictions
- Enhanced publication
- Institution responsibility type
- Institution type
- Keywords
- Metadata standards
- PID systems
- Provider types
- Quality management
- Repository languages
- Repository types
- Versioning

← Previous 1 Next →

icons

Sort by

Found 1 result(s)

**Nordicana D**  
Nordicana D collection



Subject(s) Geosciences (including Geography) Natural Sciences

Content type(s) Raw data Structured graphics Images Scientific and statistical data formats  
Plain text

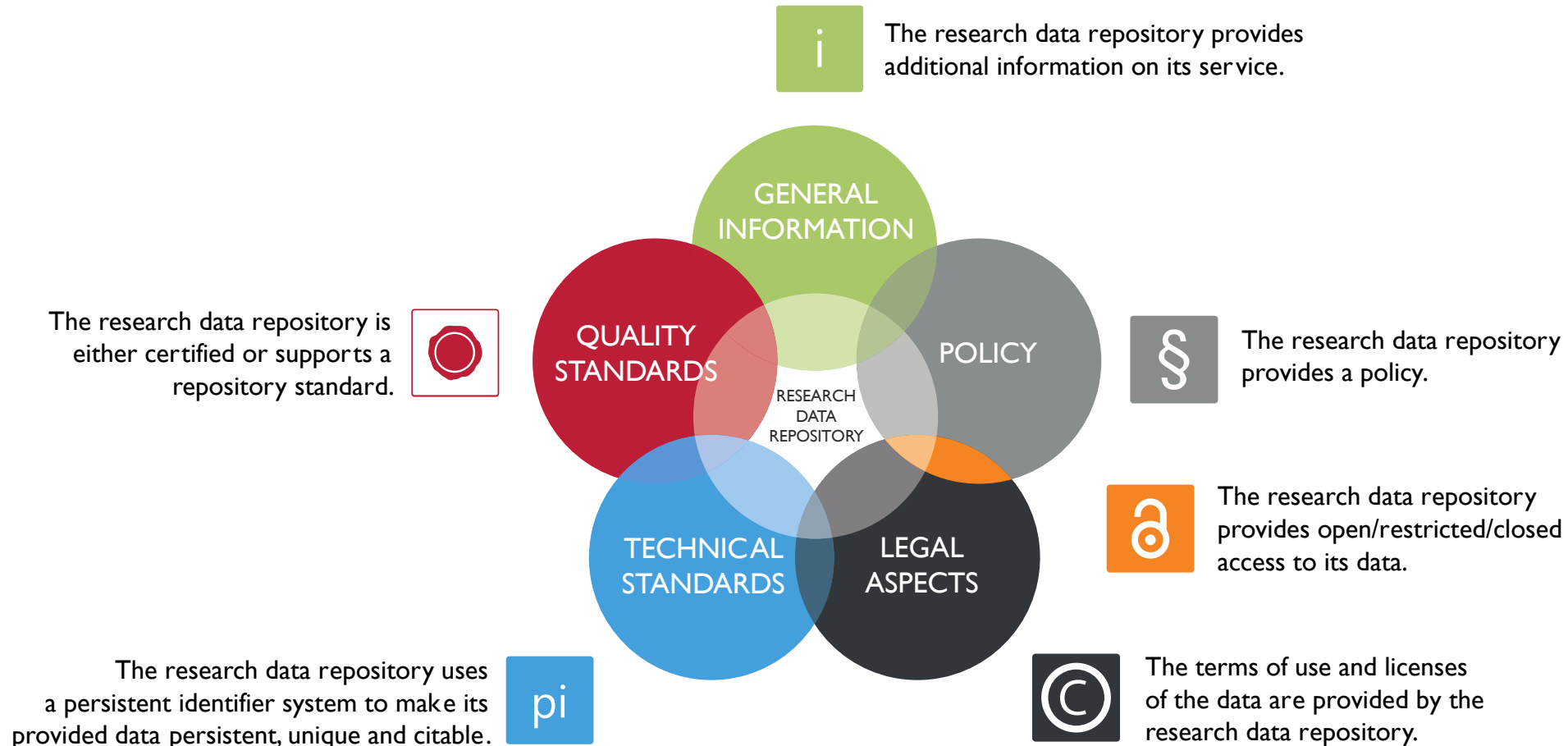
Country Canada

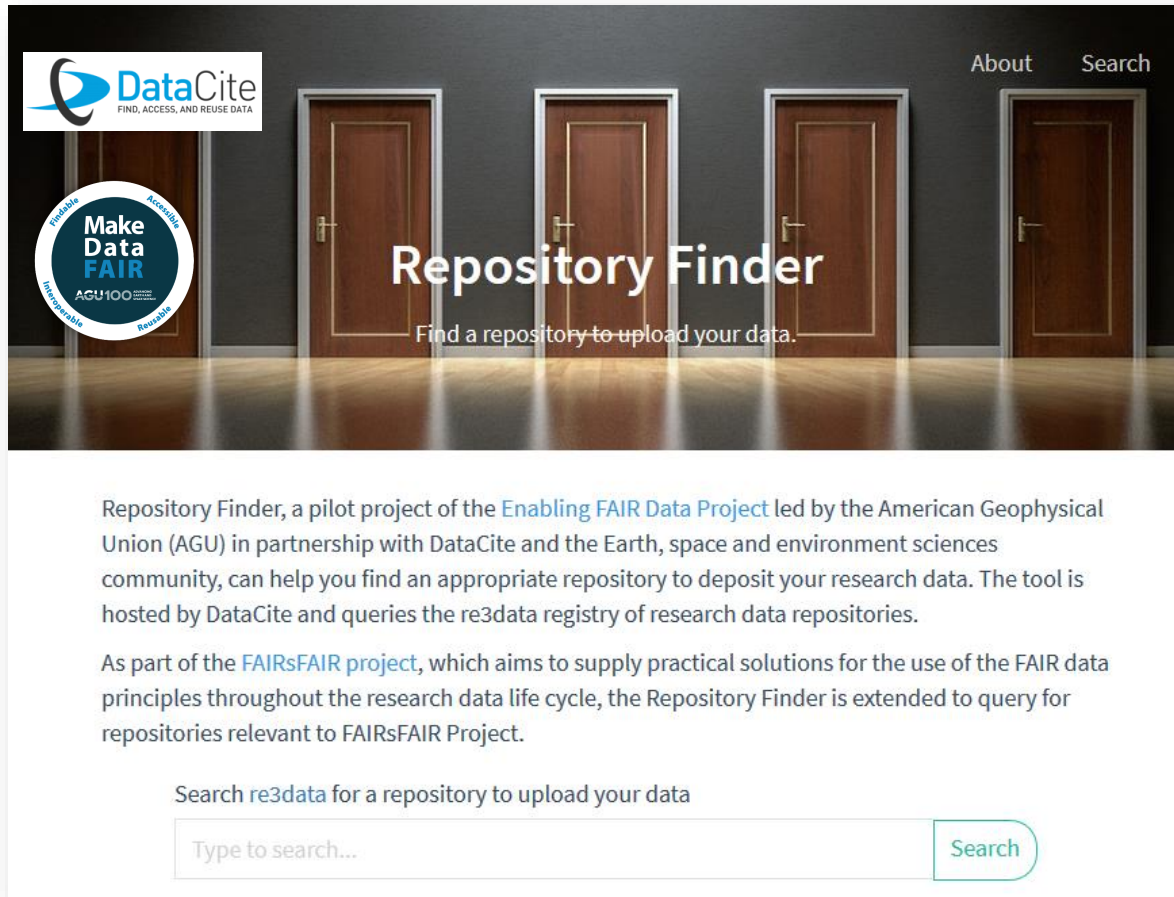
Nordicana series D is a formatted, online data report series archived at CEN. It is produced only in electronic form and is freely and openly accessible to CEN researchers and to other users. Each issue is published in French and in English, and is indexed via an assigned digital object identifier (DOI). An issue may be updated, for example with new data, as a new version number, but will retain the same DOI. Each issue contains data sets and extensive metadata that explain the origin of the data, the format of the data, the history of updates via different version numbers, and the format that should be adopted to cite the data.



# Icons

facilitating the selection  
process of appropriate  
research data repositories





Repository Finder  
Find a repository to upload your data.

Repository Finder, a pilot project of the [Enabling FAIR Data Project](#) led by the American Geophysical Union (AGU) in partnership with DataCite and the Earth, space and environment sciences community, can help you find an appropriate repository to deposit your research data. The tool is hosted by DataCite and queries the re3data registry of research data repositories.

As part of the [FAIRsFAIR project](#), which aims to supply practical solutions for the use of the FAIR data principles throughout the research data life cycle, the Repository Finder is extended to query for repositories relevant to FAIRsFAIR Project.

Search re3data for a repository to upload your data

Type to search... Search

## New **DFG** Project:

### re3data COREF

Community Driven Open Reference  
for Research Data Repositories

- 2020-2022



- To connect re3data as the reference for research data repositories with other services and infrastructures

# Break – Questions?

Next: COPDESS and Enabling FAIR Data



COPDESS

**Coalition for Publishing Data in  
the Earth and Space Sciences**

## **COPDESS Statement of Commitment 2015**

**Statement of Commitment from Earth and Space Science Publishers  
and Data Facilities**



COPDESS @ AGU 2015

“Scholarly publication is a key high-value entry point in making data available, open, discoverable, and usable. Most publishers have statements related to the inclusion or release of data as part of publication, recognizing that inclusion of the full data enhances the value and is part of the integrity of the research. Unfortunately, the vast majority of data submitted along with publications are in formats and forms of storage that makes discovery and reuse difficult or impossible.”

Hanson et al. (2015, doi:10.1029/2015EO022207) and [www.copdess.org](http://www.copdess.org)



# Coalition on Publishing Data in the Earth and Space Sciences

Data Publications are citable in research articles (COPDESS Statement of Commitment)



## STATEMENT OF COMMITMENT

(January 2015)

- data should be stored in appropriate domain repositories.
- citations of data sets should be included within reference lists.
- include in research papers concise data availability statements.
- links to data sets in publications and corresponding links to journals in data facilities

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

# After COPDESS: new Journal Policies



## Data policy

Copernicus Publications recommends depositing data that correspond to journal articles in reliable (public) data repositories, assigning digital object identifiers, and properly citing data sets as individual contributions. Please find your appropriate data repository in the registry for research data repositories [re3data.org](https://re3data.org). A data citation in a publication should resemble a bibliographic citation and be located in the publication's reference list. To foster the proper citation of data, Copernicus Publications requires all authors to provide a statement on the availability of underlying data as the last paragraph of each article (see section [data availability](#)). In addition, Copernicus Publications provides with [Earth System Science Data \(ESSD\)](#) a journal dedicated to the publication of data papers including peer review on data sets. Authors might consider submitting a data paper to ESSD in addition to their research paper in Copernicus Publications.



Best practice following the [Joint Declaration of Data Citation Principles](#) initiated by FORCE 11:

## COPDESS

In addition to promoting these data citation principles, Copernicus Publications is a signatory of the Coalition on Publishing Data in the Earth and Space Sciences (COPDESS) [commitment statement](#).



The Enabling FAIR Data project has brought together a broad spectrum of Earth, space, and environmental science leaders to ensure that data are findable, accessible, interoperable, and reusable.

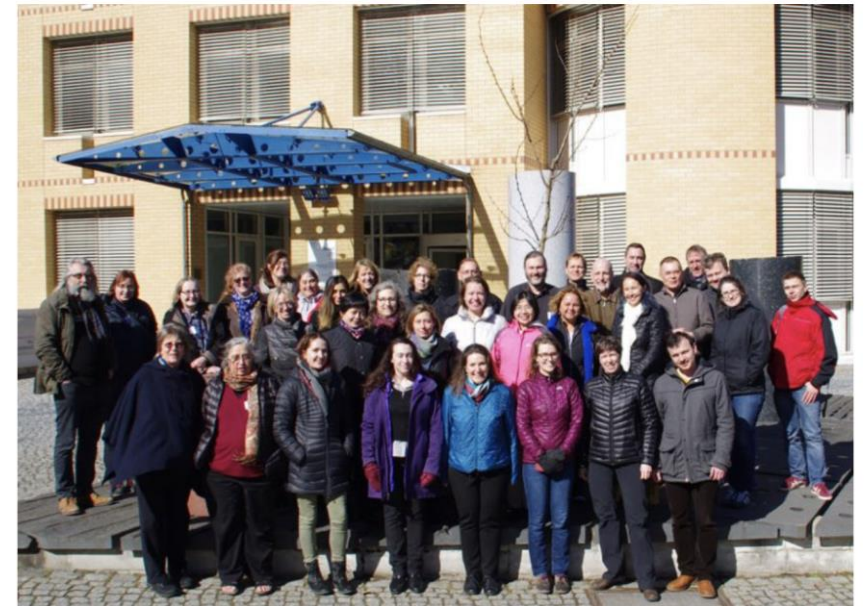


### From the Enabling FAIR Data Commitment Statement:

- Direct all core research outputs (data, software, samples and sample metadata) to trusted repositories.
  - Supplements will no longer be primary “archive” for data.
  - Data are cited via persistent identifier
- Adopt a shared set of author instructions (common set of expectations for authors in the ESES).
- Provide common expectations for publication peer review when evaluating science and determining if the data, metadata, and software are adequate.

### Advancing FAIR Data in Earth, Space, and Environmental Science

The Enabling FAIR Data project has brought together a broad spectrum of Earth, space, and environmental science leaders to ensure that data are findable, accessible, interoperable, and reusable.



# How to cite a dataset?

## Properties of granular analogue model materials: A community wide survey

M. Klinkmüller<sup>a</sup>, G. Schreurs<sup>a,1</sup>, M. Rosenau<sup>b</sup>, H. Kemnitz<sup>b</sup>

<sup>a</sup> Institute of Geological Sciences, University of Bern, Baltzerstrasse 1 +3, CH-3012 Bern, Switzerland

<sup>b</sup> Helmholtz-Zentrum Potsdam, GFZ Deutsches GeoForschungsZentrum, Telegrafenberg, D-14473 Potsdam, Germany

sented as grain size distribution curves, in which particle grain size is plotted against cumulative weight percentage (Fig. 2).

The original sieve data have been published open access and are available in Klinkmüller et al. (2016b).

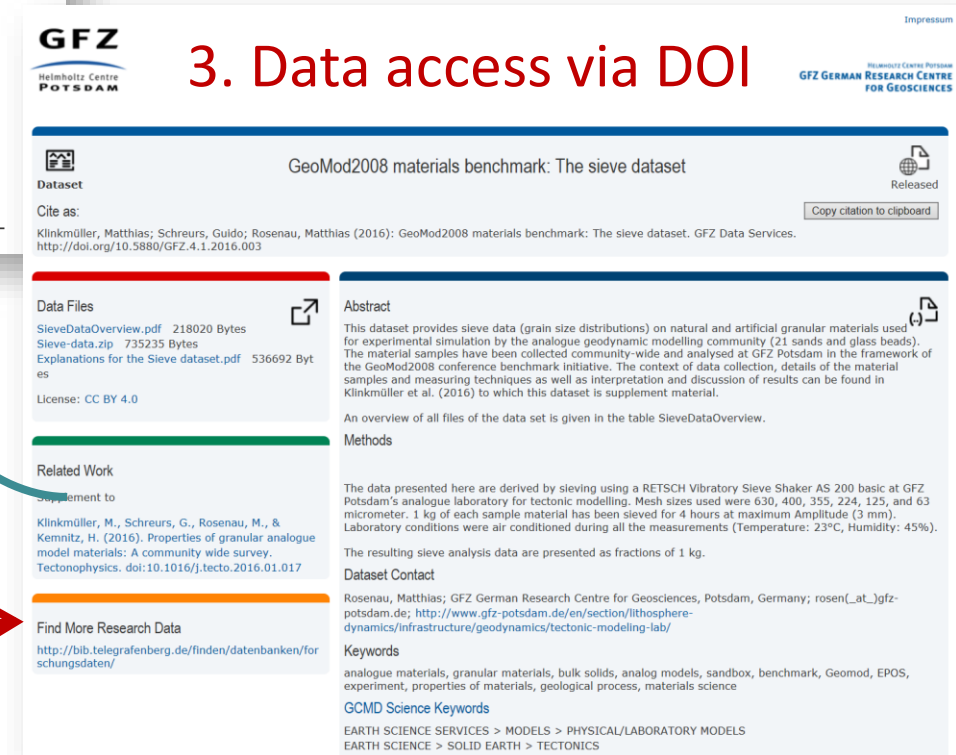
## References

- Heilbronner, R., Keulen, N., 2006. Grain size and grain shape analysis of fault rocks. *Tectonophysics* 427, 199–216.
- Hubbert, M.K., 1951. Mechanical basis for certain familiar geologic structures. *Geol. Soc. Am. Bull.* 62, 1259–1273.
- Klinkmüller, M., Schreurs, G., Rosenau, M., 2016a. GeoMod2008 materials benchmark: The ring shear test data set. GFZ Data Services. <http://dx.doi.org/10.5880/GFZ.4.1.2016.002>.
- Klinkmüller, M., Schreurs, G., Rosenau, M., 2016b. GeoMod2008 materials benchmark: The sieve data set. GFZ Data Services. <http://dx.doi.org/10.5880/GFZ.4.1.2016.003>.
- Klinkmüller, M., Kemnitz, H., Schreurs, G., Rosenau, M., 2016c. GeoMod2008 materials benchmark: The SEM image data set. GFZ Data Services. <http://dx.doi.org/10.5880/GFZ.4.1.2016.004>.

Link to paper

1. Citation in the text

3. Data access via DOI



**GFZ**  
Helmholtz Centre  
POTSDAM

GeoMod2008 materials benchmark: The sieve dataset

Released

Copy citation to clipboard

Cite as:  
Klinkmüller, Matthias; Schreurs, Guido; Rosenau, Matthias (2016): GeoMod2008 materials benchmark: The sieve dataset. GFZ Data Services.  
<http://doi.org/10.5880/GFZ.4.1.2016.003>

**Data Files**

SieveDataOverview.pdf 218020 Bytes  
Sieve-data.zip 735235 Bytes  
Explanations for the Sieve dataset.pdf 536692 Bytes  
License: CC BY 4.0

**Abstract**

This dataset provides sieve data (grain size distributions) on natural and artificial granular materials used for experimental simulation by the analogue geodynamic modelling community (21 sands and glass beads). The material samples have been collected community-wide and analysed at GFZ Potsdam in the framework of the GeoMod2008 conference benchmark initiative. The context of data collection, details of the material samples and measuring techniques as well as interpretation and discussion of results can be found in Klinkmüller et al. (2016) to which this dataset is supplement material.

An overview of all files of the data set is given in the table SieveDataOverview.

**Methods**

The data presented here are derived by sieving using a RETSCH Vibratory Sieve Shaker AS 200 basic at GFZ Potsdam's analogue laboratory for tectonic modelling. Mesh sizes used were 630, 400, 355, 224, 125, and 63 micrometer. 1 kg of each sample material has been sieved for 4 hours at maximum Amplitude (3 mm). Laboratory conditions were air conditioned during all the measurements (Temperature: 23°C, Humidity: 45%).

The resulting sieve analysis data are presented as fractions of 1 kg.

**Dataset Contact**

Rosenau, Matthias; GFZ German Research Centre for Geosciences, Potsdam, Germany; [rosen\(at\)\\_gfz-potsdam.de](mailto:rosen(at)_gfz-potsdam.de); <http://www.gfz-potsdam.de/en/section/lithosphere-dynamics/infrastructure/geodynamics/tectonic-modelling-lab/>

**Keywords**

analogue materials, granular materials, bulk solids, analog models, sandbox, benchmark, Geomod, EPOS, experiment, properties of materials, geological process, materials science

**GCMD Science Keywords**

EARTH SCIENCE SERVICES > MODELS > PHYSICAL/LABORATORY MODELS  
EARTH SCIENCE > SOLID EARTH > TECTONICS

2. Full reference with DOI in the References

# Break – Questions?

**Next:** Data Publications: technical background and best practices

# Data Publications - components

- Data
- Metadata

# Types of Metadata

Descriptive metadata	For finding or understanding a resource
Administrative metadata <ul style="list-style-type: none"><li>- Technical metadata</li><li>- Preservation metadata</li><li>- Rights metadata</li></ul>	<ul style="list-style-type: none"><li>- For decoding and rendering files</li><li>- Long-term management of files</li><li>- Intellectual property rights attached to content</li></ul>
Structural metadata	Relationships of parts of resources to one another
Markup languages	Integrates metadata and flags for other structural or semantic features within content

Descriptive Metadata: Contextual metadata  
Metadata for data discovery



# Contextual Metadata

highly variable  
between the  
disciplines but key  
information for  
data reuse

## README

Datei Bearbeiten Format Ansicht ?

AVERTISSEMENT / WARNING

Même si des efforts sont déployés pour

Although efforts are made to ensure th

AUTEUR(S) / AUTHOR(S)

Centre d'études nordiques

RÉSUMÉ / SUMMARY

Les données de ce numéro de Nordica

The datasets in this issue of Nordica

CITATION DES DONNÉES / DATA CITATI

CEN 2014. Données environnemental

CEN 2014. Environmental data from

SITE(S)

Nom / Name

Ellesmere Parks Canada (ELLEPAR) 83.09396

DESCRIPTION

SITE: Ellesmere Parks Canada (ELLEPAR)  
Profondeurs des / températures de sol (m) / Ground temperature depth range (m): 0.20

MESURE(S) / MEASUREMENT(S)

TYPE: Température moyenne du sol (Degré celsius (°C)) / Average ground temperature (Degree Celsius (°C))

## Definition of data labels

Metadata of the Data Tables

Sites

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	NAME	Text	site name or locality	text string of max. 40 characters	#
4	PLATFORM	Text	platform identifier, C=Chikyu, J=Joides, M=Mission Specific, R=Drill Rig	text string of max. 1 character	#
5	LATITUDE_DEG	Integer	decimal degrees of site latitude (latitude of hole 'A')	integer value between 0 and 90	deg.
6	LATITUDE_MIN	Double	decimal minutes of site latitude (latitude of hole 'A')	real value	min.
7	LATITUDE_DIR	Text	direction latitude	text string of max. 1 character	#
8	LONGITUDE_DEG	Integer	decimal degrees of site longitude (longitude of hole 'A')	integer value between 0 and 180	deg.
9	LONGITUDE_MIN	Double	decimal minutes of site longitude	real value	min.
10	LONGITUDE_DIR	Text	direction site longitude	text string of max. 1 character	m
11	DATE_START	Date	date of site start	date in UTC	dd-mmm-yyyy
12	DATE_END	Date	date of site end	date in UTC	dd-mmm-yyyy

## Data Articles/ Reports





# Metadata for data discovery: example DOI Landing Page

title  
citation

download  
data files

related  
work

**GFZ**  
Helmholtz Centre  
POTSDAM

Impressum

HELMHOLTZ CENTRE POTSDAM  
GFZ GERMAN RESEARCH CENTRE  
FOR GEOSCIENCES

Dataset: COSC-1 operational report - Operational data sets

Released

Cite as:  
Lorenz, Henning; Rosberg, Jan-Erik; Juhlin, Christopher; Bjelm, Leif; Almqvist, Bjarne; Berthet, Théo; Conze, Ronald; Gee, David G.; Klonowska, Iwona; Pascal, Christophe; Pedersen, Karsten; Roberts, Nick; Tsang, Chinfu (2015): COSC-1 operational report - Operational data sets. GFZ German Research Centre for Geosciences. <http://dx.doi.org/10.1594/GFZ.SDDB.ICDP.5054.2015>

Data Files

This dataset contains files with restricted (R) access. You may download or apply for access at the following contacts:

- Lorenz, Henning  
Uppsala University, Department of Earth Sciences, Geophysics  
henning.lorenz@geo.uu.se
- COSC Consortium  
<http://cosc.icdp-online.org>

Supporting Information: Lorenz, H.; Rosberg, J. E.; et al. (2015): COSC-1 operational report Explanatory remarks on the operational data sets. Deutsches GeoForschungsZentrum GFZ doi:10.2312/ICDP.2015.001

(R) All Data  
Sites 2427 Bytes  
Holes 15133 Bytes  
Core Runs 85575 Bytes  
Core Sections 300426 Bytes  
Core Boxes 59763 Bytes  
Core Overviews 61279327 Bytes  
(R) Lithological Descriptions  
(R) Sample Request  
(R) Core Samples taken  
Mud Samples taken 20781 Bytes  
(R) Multi Sensor Core Logging  
(R) XRF logging  
Borehole Measurement Campaigns 4966 Bytes  
Borehole Measurement Runs 12358 Bytes  
(R) Borehole Measurement Files  
(R) Composite Borehole Log Plots  
Drilling Time Breakdown per Day 11110 Bytes  
Drilling Time Breakdown of Tasks 102353 Bytes  
Drilling Technical Parameter 35538 Bytes  
Used Drill Bits 2981 Bytes

License: CC BY 4.0  
End of moratorium: /2017-03-01

Abstract

The Collisional Orogeny in the Scandinavian Caledonides (COSC) scientific drilling project focuses on mountain building processes in a major mid-Paleozoic orogen in western Scandinavia and its comparison with modern analogues. The transport and emplacement of subduction-related highgrade continent-ocean transition (COT) complexes onto the Baltoscandian platform and their influence on the underlying allochthons and basement will be studied in a section provided by two fully cored 2.5 km deep drill holes. This operational report concerns the first drill hole, COSC-1 (ICDP 5054-1-A), drilled from early May to late August 2014.

COSC-1 is located in the vicinity of the abandoned Fröå mine, close to the town of Åre in Jämtland, Sweden and was planned to sample a thick section of the Sveve Nappe and to penetrate its basal thrust zone into the underlying lower grade metamorphosed allochthon. Despite substantial technical problems, the drill hole reached 2502.8 m driller's depth and nearly 100 % core recovery was achieved. Surprising was the homogeneity of the Sveve Nappe rocks, the unexpected thickness of its basal thrust zone (> 500 m) and that the drill hole, therefore, did not penetrate the bottom of the thrust zone. However, lower grade metasedimentary rocks were encountered in the lowermost part of the drill hole together with tens of metres thick mylonites that are, unexpectedly, rich in large garnets.

The drill core was documented on-site and XRF scanned off site. During various stages of the drilling, the borehole was documented by comprehensive downhole logging. This operational report provides an overview over the COSC-1 operations from drilling preparations to the sampling party and describes the available datasets and sample material.

Keywords

SOLID EARTH, ROCKS/MINERALS/CRYSTALS, geoscientific information, caledonides, COSC, deep hydrosphere, dynamics, europe, heat flow, himalaya, ICDP-2011/03, microbiology, norway, orogen, scandes, scandinavia, seismic, sweden, earth science

GCMD Science Keywords

EARTH SCIENCE > SOLID EARTH > ROCKS/MINERALS/CRYSTALS > METAMORPHIC ROCKS > ROCK FORMATION

More Metadata

iso19115: [view inline](#) / [download xml](#)  
datacite: [view inline](#) / [download xml](#)  
dif: [view inline](#) / [download xml](#)  
esidoc: [view inline](#) / [download xml](#)

Location

Latitude: 63.4063 Longitude: 13.203057

Related Work

IsReferencedBy

Lorenz, H.; Rosberg, J. E.; et al. (2015): Operational report about phase 1 of the collisional orogeny in the scandinavian caledonides scientific drilling project (COSC-1). Deutsches GeoForschungsZentrum GFZ doi:10.2312/ICDP.2015.002

Supplement to

Lorenz, H.; Rosberg, J.-E.; et al. (2015): COSC-1 - drilling of a subduction-related allochthon in the Palaeozoic Caledonide orogen of Scandinavia. Scientific Drilling doi:10.5194/sd-19-1-2015

References

Kalaallit Nunaat

© OpenStreetMap Contributors

description/  
abstract

Keywords

More Metadata

iso19115: [view inline](#) / [download xml](#)  
datacite: [view inline](#) / [download xml](#)  
dif: [view inline](#) / [download xml](#)  
esidoc: [view inline](#) / [download xml](#)

spatial  
coverage

Essential for data  
discovery, DOI  
registration, etc:  
international  
standards across all  
disciplines

XML metadata following  
international standards  
(DataCite, ISO19115)


# Machine-readable metadata standards

```
iso19115: close inline view / download xml
o MD_Metadata (xsi:schemaLocation=http://www.isotc211.org/2005/gmd http://www.isotc211.org/2005/gmd/gmd.xsd)
  ■ fileIdentifier
    ■ CharacterString: doi:10.5880/igets.po.l1.001
  ■ language
    ■ LanguageCode (codeList=http://www.loc.gov/standards/iso639-2/ codeListValue=eng): eng
  ■ characterSet
    ■ MD_CharacterSetCode (codeList=http://www.isotc211.org/2005/resources/codeList.xml#MD_CharacterSetCode codeListValue=utf8):
  ■ hierarchyLevel
    ■ MD_ScopeCode (codeList=http://www.isotc211.org/2005/resources/Codelist/gmx-Codelists.xml#MD_ScopeCode codeListValue=):
  ■ hierarchyLevelName
    ■ CharacterString:
  ■ contact
    ■ CI_ResponsibleParty
      ■ organisationName
        ■ CharacterString: GFZ German Research Center for Geosciences
      ■ contactInfo
        ■ CI_Contact
          ■ address
            ■ CI_Address
              ■ electronicMailAddress
                ■ CharacterString:
            ■ onlineResource
              ■ CI_OnlineResource
                ■ linkage
                  ■ URL: http://www.gfz-potsdam.de/
                ■ function
                  ■ CI_OnlineFunctionCode (codeList=http://www.isotc211.org/2005/resources/Codelist/gmx-Codelists.xml#CI_OnlineFunctionCode codeListValue=):
          ■ role
            ■ CI_RoleCode (codeList=http://www.isotc211.org/2005/resources/Codelist/gmx-Codelists.xml#CI_RoleCode codeListValue=pointOfContact): pointOfContact
    ■ dateStamp
      ■ Date: 2017-01-06
    ■ referenceSystemInfo
      ■ MD_ReferenceSystem
        ■ referenceSystemIdentifier
          ■ RS_Identifier
            ■ code
              ■ CharacterString: urn:ogc:def:crs:EPSG:4326
    ■ identificationInfo
      ■ MD_DataIdentification
        ■ citation
```

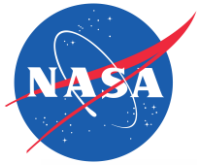


- XML metadata in DataCite, ISO19115 standards
- Exchange via OAI-PMH interface

**schema.org**

- Machine-readable websites
- JSON LD
-  Dataset Search

# Controlled Vocabularies in the Metadata Editor



**NASA Global Change Master Directory (GCMD) Keywords**

*Example: EARTH SCIENCE > SOLID EARTH > TECTONICS > VOLCANIC ACTIVITY > ERUPTION DYNAMICS*

Thesaurus

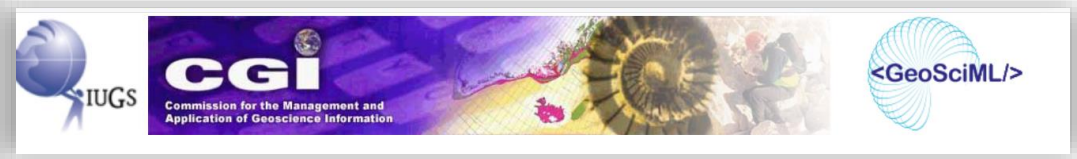
Filter on keyword: tecto

- NASA GCMD Science Keywords
  - EARTH SCIENCE
    - OCEANS
      - MARINE GEOPHYSICS
      - PLATE TECTONICS
    - SOLID EARTH
      - GEOMORPHIC LANDFORMS
      - TECTONICS
        - VOLCANIC ACTIVITY
          - ERUPTION DYNAMICS**
            - LAVA COMPOSITION/TEXTURE
            - MAGMA COMPOSITION/TEXTURE
            - PYROCLASTICS COMPOSITION/TEXTURE
            - ASH/DUST COMPOSITION
            - VOLCANIC GASES
            - LAVA SPEED/FLOW
            - MAGMA SPEED/FLOW
            - PYROCLASTIC PARTICAL SIZE DISTRIBUTION



**INSPIRE ISO 19115 Keywords**

**RDF-Version**



**GeoSciML: Geoscience Vocabularies for Linked Data**

# Persistent Identifier in data publications



for data, software,  
cross-references to  
related work



**Crossref**  
Funder Registry

List of funders  
with DOIs

**ORCID**

Connecting Research  
and Researchers

uniquely identifying  
persons



PID for physical samples,  
cross references to  
samples underlying  
measurements

**ROR** 

New PID for  
Institutions

and others...



# Linking papers, data, samples, ...

## DataCite related Identifier

IsCitedBy	indicates that B
Cites	indicates that A
IsSupplement	indicates that A
IsSupplement	indicates that A
IsContinuedBy	
Continues	
HasMetadata	
IsMetadataFrom	
IsNewVersion	
IsPreviousVersion	
IsPartOf	
HasPart	
IsReferencedIn	
References	
IsDocumentedIn	
Documents	
IsCompiledBy	
Compiles	
IsVariantForm	
IsOriginalForm	
IsIdenticalTo	

Sample

Data Report

**Data Description**

Lorenz, H.; Rosberg, J. E.; Juhlin, C.; Bjelm, L.; Almqvist, B.; Berthet, T.; Conze, Ronald; Gee, D.; Klonowska, I.; Pascal, C.; Pedersen, K.; Roberts, N.; Tsang, C. F.; (2015): COSC-1 operational report Explanatory remarks on the operational data sets; Deutsches GeoForschungsZentrum GFZ. <https://doi.org/10.2312/ICDP.2015.001>

**References**

Lorenz, H., Rosberg, J.E., Juhlin, C., Bjelm, L., Almqvist, B.S.G., Berthet, T., Conze, R., Gee, D.G., Klonowska, I., Pascal, C., Pedersen, K., Roberts, N.M.W. and Tsang, C.F. (2015): COSC-1 – Drilling of a subduction-related Allochthon in the Paleozoic Caledonide Orogen of Scandinavia. Scientific Drilling, doi: 10.5194/sd-19-1-2015

Lorenz, H., Rosberg, J.E., Juhlin, C., Bjelm, L., Almqvist, B.S.G., Berthet, T., Conze, R., Gee, D.G., Klonowska, I., Pascal, C., Pedersen, K., Roberts, N.M.W. and Tsang, C.F. (2015): COSC-1 operational report – Operational data sets. GFZ German Research Centre for Geosciences, doi: [10.1594/GFZ.SDDB.ICDP.5054.2015](https://doi.org/10.1594/GFZ.SDDB.ICDP.5054.2015)

**Publications & Datasets**

Lorenz, H., Rosberg, J.-E., Juhlin, C., Bjelm, L., Almqvist, B. S. G., Berthet, T., ... Tsang, C.-F. (2015). COSC-1 – drilling of a subduction-related allochthon in the Palaeozoic Caledonide orogen of Scandinavia. *Sci. Dril.*, 19, 1–11. doi:10.5194/sd-19-1-2015

Lorenz, Henning; Rosberg, Jan-Erik; Juhlin, Christopher; Bjelm, Leif; Almqvist, Bjarne; Berthet, Théo; Conze, Ronald; Gee, David G.; Klonowska, Iwona; Pascal, Christophe; Pedersen, Karsten; Roberts, Nick; Tsang, Chinfu; (2015): COSC-1 operational report - Operational data sets; GFZ Data Services. <http://dx.doi.org/10.1594/GFZ.SDDB.ICDP.5054.2015>

**Related Work**

Referenced by

Lorenz, H.; Rosberg, J. E.; Juhlin, C.; Bjelm, L.; Almqvist, B.; Berthet, T.; Conze, Ronald; Gee, D.; Klonowska, I.; Pascal, C.; Pedersen, K.; Roberts, N.; Tsang, C. F.; (2015): Operational report about phase 1 of the collisional orogeny in the Scandinavian caledonides scientific drilling project (COSC-1); Deutsches GeoForschungsZentrum GFZ. <https://doi.org/10.2312/ICDP.2015.002>

**Supplement to**

Lorenz, H., Rosberg, J.-E., Juhlin, C., Bjelm, L., Almqvist, B. S. G., Berthet, T., ... Tsang, C.-F. (2015). COSC-1 – drilling of a subduction-related allochthon in the Palaeozoic Caledonide orogen of Scandinavia. *Sci. Dril.*, 19, 1–11. doi:10.5194/sd-19-1-2015

**References**

IGSN:ICDP5054EHW1001 (5054\_1\_A)

IGSN:ICDP5054EHX1001 (5054\_1\_B)

IGSN:ICDP5054EH02001 (5054\_1\_C)

Data

Scientific Paper

Lorenz, H., Rosberg, J.-E., Juhlin, C., Bjelm, L., Almqvist, B. S. G., Berthet, T., Conze, R., Gee, D. G., Klonowska, I., Pascal, C., Pedersen, K., Roberts, N. M. W., and Tsang, C.-F.: COSC-1 operational report – Scientific data sets, GFZ German Research Center for Geosciences, doi:10.1594/GFZ.SDDB.ICDP.5054.2015, 2015b.

Majka, J., Rosén, A., Janák, M., Frotzheim, N., Klonowska, I., Mancek, M., Sasinková, V., and Yoshida, K.: Microdiamond dis-

29 May 2015

**COSC-1 – drilling of a subduction-related allochthon in the Palaeozoic Caledonide orogen of Scandinavia**

H. Lorenz<sup>1</sup>, J.-E. Rosberg<sup>2</sup>, C. Juhlin<sup>1</sup>, L. Bjelm<sup>2</sup>, B. S. G. Almqvist<sup>1</sup>, T. Berthet<sup>1</sup>, R. Conze<sup>3</sup>, D. G. Gee<sup>1</sup>, I. Klonowska<sup>1</sup>, C. Pascal<sup>4</sup>, K. Pedersen<sup>5</sup>, N. M. W. Roberts<sup>6</sup>, and C.-F. Tsang<sup>1,7</sup>

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# Break – Questions?

**Next:** Data documentation: Practical tools and guidelines, data reports, data journals



# Outline

- Practical tools and documents (by GFZ Data Services)
  - GFZ Metadata Editor
  - Data description template
  - Machine-readable data tables



# Standardised Metadata Workflow

Metadata Dataset Publication About/Help

DataCite Metadata

Resource Information

DOI (will be generated in the publishing process) Year  
10.5880/GFZ.4.1.2019.005 2019

Resource Type	Title	Version	Language of dataset
Dataset	Supplement to "Synchronization of great subduction megathrust earthquakes: Insights from scale model analysis"		eng

Licenses and Rights

Licence  
CC BY 4.0

Authors (Persons and/or Institutions)

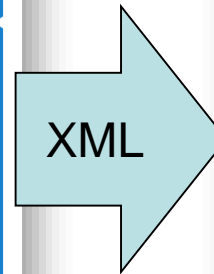
Lastname	Firstname	Role	Author ID Type	Author Identifier (ID)	Affiliation
Rosenau	Matthias		ORCID	0000-0003-1134-5381	GFZ German Research Centre for G...
Horenko	Illia				Università della Svizzera Italiana, L...
Corbi	Fabio		ORCID	0000-0003-2662-3065	Roma Tre University, Rome, Italy
Rudolf	Michael		ORCID	0000-0002-5077-5221	GFZ German Research Centre for G...
Kornhuber	Ralf				Freie University Berlin, Berlin, Germ...
Oncken	Onno		ORCID	0000-0002-2894-480X	GFZ German Research Centre for G...

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Author (Lastname, Firstname)	Position	Email	Website	Affiliation
Rosenau, Matthias	Lab Manager	rosen@gfz-potsdam.de	http://www.gfz-potsdam.de/en/section/litho...	GFZ German Research Centre for Geoscie...

Contributors (Persons and/or Institutions)

Lastname	Firstname	Role	Contributor ID ...	Contributor Identifier (ID)	Affiliation
HelTec - Helmholtz Laboratory for T...		HostingInstitution			GFZ German Research Centre for G...



GFZ Data Services

Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust-belts

Cite as:  
Reiter, Karsten; Kukowski, Nina; Ratschbacher, Lothar; Rosenau, Matthias (2016): Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust-belts. GFZ Data Services. <http://doi.org/10.5880/GFZ.4.1.2016.007>

Files

- Explanations\_Reiter-et-al-2016.pdf 0.5 Mb
- list-of-files-Reiter-et-al-2016.pdf 232.6 Kb
- Experimenting.avi 78.7 Mb
- gb70-pictures.pdf 497.1 Kb
- gb40-3Dview-30-34.avi 5.8 Mb
- gb50-3Dview-30-33.avi 5.7 Mb
- gb55-3Dview-30-32.avi 6.1 Mb
- gb60-3Dview-30-29.avi 6.4 Mb
- gb70-3Dview-30-30.avi 6.0 Mb
- gb80-3Dview-30-31.avi 5.9 Mb
- si60-3Dview-30-38.avi 5.7 Mb

Abstract

This data publication includes animations and figures of eight scaled analogue models that are used to investigate the evolution of a curved mountain belt akin to the Pamir and Hindu Kush orogenic system and adjacent Tadjik basin. Crustal deformation is simulated by means of indentation of two basement blocks into a sedimentary sequence and the formation of a curved fold-and-thrust belt. The experimental set-up has two adjacent rigid indenters representing the basement blocks moving in parallel with a velocity difference (Figure 1). The slow indenter moves with a relative velocity ranging from 40 to 80% of that of the fast one. A layer of quartz sand in front of the indenters, 1 by 1 meter in size and 1.5 cm thick, represents the sedimentary basin infill. A basal detachment layer is made up of low-friction glass beads or viscous silicone oil representing weak shale or evaporates layers, respectively. The surface evolution by means of topography and strain distribution is derived from 3-D particle image velocimetry (PIV). This allows visualizing and analysing the development of the model surface during the complete model run at high spatio-temporal resolution. All details about the model set-up, modelling results and interpretation can be found in Reiter et al. (2011).

Dataset Description

Supplement to  
Reiter, K., Kukowski, N., & Ratschbacher, L. (2011). The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts. *Earth and Planetary Science Letters*, 302(1-2), 132-146. doi:10.1016/j.epsl.2010.12.002

Keywords

two indenter tectonics, particle image velocimetry, fold-and-thrust belts, Tadjik basin, Pamir, 4D analogue experiments, mountain building, continental collision, sandbox model, digital elevation model, analogue model, EPDS, multi-scale laboratories, analogue models of geologic processes, analogue modelling results, Microsphere > Glassy, Particle Image Velocimetry (PIV), Sand > Quartz Sand, Sandbox > Sandbox (cm scale), Sectioning, Silicon, Time lapse camera, crustal setting > upper continental crustal setting, detachment fault, mountain, oblique slip fault, reverse fault, tectonic and structural features, tectonic process > continental collision, tectonically defined setting > collisional setting, tectonically defined setting > foreland setting, thrust fault, wrench fault

GCMD Science Keywords

EARTH SCIENCE > SOLID EARTH > GEOMORPHIC LANDFORMS/PROCESSES > TECTONIC PROCESSES  
EARTH SCIENCE > SOLID EARTH > TECTONICS > PLATE TECTONICS > FAULT MOVEMENT

More Metadata

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

Location

Click/hover over markers or bounding boxes to see related details. Click/hover over details to see related marker or bounding box.

Find More Research Data

<http://bib.telegrafenberg.de/finden/datenbanken/forschungsdaten/>

# GFZ Metadata Editor (Java Script „translator“)

**Input:**  
by scientists

## „Special“ Features:

- Interactive map
- ORCID and Fundref
- Controlled vocabularies
- Multiple affiliations for authors

The screenshot displays the GFZ Metadata Editor interface with the following sections:

- DataCite Metadata** (selected tab)
- Resource Information**:
  - DOI (will be generated in the publishing process): 10.5880/GFZ.1.4.2016.001
  - Publisher: GFZ Data Services
  - Year: 2016
  - Resource Type: Dataset
  - Title: Supplement to: The New World Atlas of Artificial Night Sky Brightness
  - Language of dataset: eng
- Licenses and Rights**:
  - Licence: Please contact the authors for a licence agreement
- Authors (Persons and/or Institutions)**:

Author (Lastname, Firstname)	Role	Author ID Type	Author Identifier (ID)	Affiliation
Cinzano, Pierantonio				ISTIL - Istituto di Scienza e Tecnologia ...
Duriscoe, Dan				National Park Service, U.S. Departmen...
Kyba, Christopher C. M.				GFZ German Research Centre for Geo...
Elvidge, Christopher D.				Earth Observation Group, NOAA Natio...
Baugh, Kimberly				Cooperative Institute for Research in th...
Portnov, Boris				Department of Natural Resources & En...
Rybnikova, Nataliya A.				Department of Natural Resources & En...
Furgoni, Riccardo				ISTIL - Istituto di Scienza e Tecnologia ...
- Contact Person(s) / Point of Contact**:
  - night
  - radiative transfer
  - Suomi NPP
  - Sky Quality Meter
- Temporal and Spatial Coverage**:

Latitude		Longitude	
Min	Max	Min	Max
44.045486...	55.842428...	2.8710901...	43.124996...
- Interactive Map**: A map showing a selected region in Europe with a red bounding box. The map includes labels for countries like Deutschland, Polen, and Rumänien.

**Output:**

Standardised XML files (Datacite, ISO 19115, NASA GCMD DIF, Dublin Core)



GFZ Data Services Metadata Catalogue

EPOS, B2FIND, ENVRIplus, etc.

# Description Template

- Many users are unaware of what a data publication represents and what to include in description
- Increase the quality of metadata
- Reduces curation workload
- Uniform format aids comprehension

# Data Description Template



## Descriptive Title of Dataset

Author-1<sup>1</sup>, Author-2<sup>2</sup> ...

- *Affiliation1, City, Country*
- *Affiliation2, City, Country*

### •1. Licence

Creative Commons Attribution 4.0 International License (CC BY 4.0)

### 2. Citation

**When using the data please cite:**

Will be added by GFZ Data Services

**The data are supplementary material to:**

## Please add citation and DOI of the key paper/s

- **3. Data Description**
  - **Sampling method**
  - **Analytical procedure**
  - **Data processing**
- **4. File description**
  - **File inventory**
  - **File naming convention**
  - **Description of data tables**
- **5. References**

#### **Sampling method**

How was sample obtained? Is the sample assigned with e.g. International Geo Sample Numbers?

How were the samples prepared for analysis?

#### **Analytical procedure:**

Instrument information, platform, calibration, standards used, number of aliquots, sample quantities,

#### **Data processing**

Describe how the analytical data was treated to obtain the dataset you would like to publish. What transformations, statistical methods did you apply?

# 3. Data Description

- Summary of the data description
- „Abstract“ on the DOI Landing Page
  - Internal part of metadata
  - transferred to other portals as machine-readable XML
  - essential for data discovery
- Understandable for the broader scientific community
- Scientific purpose for data collection (and project) and summary of technical data description



# Example Description: Before

Stimulation data for each of the analyzed EGS projects.

The are provided in tabular form (CSV). The file names indate the project.

Definition of columns in the data tables (also in the header of the data):

- V = Cumulative injected volume ( $\text{m}^3$ ) - Ehyd = Applied hydraulic energy (J) - MaxM0 = Maximum observed seismic moment (Nm) - CumM0 = Cumulative seismic moment (Nm)
- IE = Injection efficiency (-)

# Example Description: After (= with the template)

The here provided data are part of a broader analysis of past and present stimulation projects, revealing that the temporal evolution and growth of maximum observed moment magnitudes may be linked directly to the injected fluid volume and hydraulic energy. Analyzed projects include the most prominent European Enhanced Geothermal System (EGS) projects in Basel, Switzerland (BAS) and Soultz-sous-Forêts (STZ), France. In Soultz, three different stimulations over the course of 10 years were performed in different wells and different depths. Therefore, we differentiate between the injections in 1993 (STZ93), 2000 (STZ00), and in 2003 (STZ03). We also included the deepest EGS Project to date (St1), located in Helsinki, Finland. Furthermore, we included the fluid-injection experiment from the German super deep scientific drilling hole (KTB), two Australian EGS projects, located at Paralana (Para) and the 2003 Cooper Basin (CBN) injection, as well as the EGS project near Pohang, South Korea. Finally, we also considered a single well injection period at the Berlín geothermal field (BGF), El Salvador, representing the only hydrothermal site considered here.

For each project the cumulative volume injected is provided along with the applied hydraulic energy, maximum observed seismic moment, cumulative seismic moment, and injection efficiency as tab separated ASCII files with the .csv extension. All stimulation files are combined into a single .zip archive. More details on processing steps and references herein can be found in the accompanying data description.

## 4. File inventory

Explanation of folder structure, file list and file contents included in data publication of mechanical data from rotary shear experiments on material derived from the Alpine Fault during the Deep Fault Drilling Project (phases 1A and 1B).

The zip-file contains folders for each individual experiment (33 in total), listed in **Table 1** in the Appendix of this document. In addition, Table 1 is provided in the Data Files section of the DOI Landing Page (Table 1-Niemeijer-2017.pdf).

Each folder contains 5 different files and a subfolder (and each filename follows the same naming convention: the letter u, followed by a 3-digit number, indicating the experiment number):

- **datasheet.pdf**: Logsheet indicating the conditions of the material, sample material used and notes on the progress of the experiment, including times at which boundary conditions were changed.
- **u101AF\_300**: Original data-file, a tab-separated text file with 12 columns. Note that the column headers and units in this file are NOT the correct headers, rearrangement and proper naming of the columns occurs within the XLOOK script.
- **u101AF\_300l**: A “look” file, built from the original file using “asc2look” (see link below) of the data processing software “XLOOK”, a program developed by Chris Marone which is available on github (<https://github.com/PennStateRockandSedimentMechanics/xlook>).

Example for a file inventory from Niemeijer et al. (<http://doi.org/10.5880/icdp.5052.002>)

# 4. File inventory/ list of files

This data set is freely available under a Creative Commons Attribution 4.0 International (CC-BY 4.0) Licence.

It is part of the following data publication and should be cited as:

Rosenau, Matthias; Pohlenz, Andre; Kemnitz, Helga; Warsitzka, Michael (2018): Ring-shear test data of quartz sand G23 used for analogue experiments in the Helmholtz Laboratory for Tectonic Modelling (HelTec) at the GFZ German Research Centre for Geosciences in Potsdam. GFZ Data Services. <http://doi.org/10.5880/GFZ.4.1.2019.004>

ZIP folder	Folder size	File name	File format	Content
		2019-004_Rosenau-et-al_List_of_files	.pdf	List of files
		2019-004_Rosenau-et-al_Description-of-data	.pdf	Description of data and methods
Scripts	978 kb	RSTanalysis	.py	Python script for analysing and plotting friction and time series data (Mohr plot, histograms, shear curves)
		VSTanalysis	.py	Python script for analysing and plotting VST data
Data files	2932 kb	421-01_GFZ_quartzsandG23_vst	.pdf	Visualization of the VST data
		421-01_GFZ_quartzsandG23_vst	.txt	Table of the VST data: time, shear velocity, normal force, shear force
		426-01_GFZ_quartzsandG23_dynamic	.txt	Pairs of normal stress and corresponding shear strength for dynamic friction
		426-01_GFZ_quartzsandG23_hist	.pdf	Histograms of friction coefficients and cohesions
		426-01_GFZ_quartzsandG23_lineregr	.pdf	Mohr plot of friction data
		426-01_GFZ_quartzsandG23_peak	.txt	Pairs of normal stress and corresponding shear strength for peak friction
		426-01_GFZ_quartzsandG23_reactivation	.txt	Pairs of normal stress and corresponding shear strength for reactivation friction
		426-01_GFZ_quartzsandG23_ts	.pdf	Visualization of time series data (shear curves): Shear stress vs. shear displacement for 18 measurements
		426-01_GFZ_quartzsandG23_ts	.txt	Table of time series data for 18 measurements of shear stress (Pa, columns 2-19) at given normal stresses (Pa, first cell in each column) vs. time (column 1)

# Definition of data tables

## Description of data tables

You should include a table explaining the column headers in case of tabular data:



Column header	unit	Description
SampleID		Sample Identifier
Lat	DD,dddd	Latitude in WGS84 in decimal degrees
Long	DD,dddd	Longitude in WGS84 in decimal degrees
MeasurementXY	xy	Value of XY in units xy





# 5. References

## 4. References

References for dataset and those cited above. If the data follows a standard format defined in the community, please cite the standard. Does this data incorporate other authors' datasets? Citations should contain a DOI (or URL for reports or websites). The DOI numbers shall be provided with a code facilitating to directly link to the cited paper (see Figure 3)

## 8. References

Corbi, F., F. Funiciello, S. Brizzi, S. Lallemand, and M. Rosenau (2017), Control of asperities size and spacing on seismic behavior of subduction megathrusts, *Geophys. Res. Lett.*, 44, 8227–8235, <https://doi.org/10.1002/2017GL074182>

**GFZ Data Services**

**Dataset** Ring-shear test data of quartz sand G23 used for analogue experiments in the Helmholtz Laboratory for Tectonic Modelling (HelTec) at the GFZ German Research Centre for Geosciences in Potsdam.

**Cite as:**  
Rosenau, Matthias | Pohlenz, Andre | Kennitz, Helga | Waratzka, Michael (2019): Ring-shear test data of quartz sand G23 used for analogue experiments in the Helmholtz Laboratory for Tectonic Modelling (HelTec) at the GFZ German Research Centre for Geosciences in Potsdam. GFZ Data Services. <https://doi.org/10.5880/GFZ.4.1.2019.004>

**Files**  
Download data (ftp)  
Data description  
List of files  
License  
CC BY 4.0

**Dataset Description**  
Supplement to  
<http://doi.org/DOI/Of/Gz/et.al.when.available>

**Related Work**  
Cites  
Contardo, X. J., Kulowski, N., & Cembrano, J. M. (2011). Material transfer and its influence on the formation of slope basins along the South Central Chilean convergent margin: Insights from scaled sandbox experiments. *Tectonophysics*, 513(1-4), 20-36. doi:10.1016/j.tecto.2011.09.016  
Kernmann, T., Kiebach, F., Rosenau, M., Raschke, U., Pignorie, A., Mittelbach, K., & Eise, D. (2007). Coupled effects of impact and orogeny: Is the marine Lockne crater, Sweden, pristine? *Meteoritics & Planetary Science*, 42(11), 1995-2012. doi:10.1111/j.1945-5100.2007.tb00556.x  
Köster, M., Schreurs, G., Rosenau, M., & Kennitz, H. (2016). Properties of granular analogue materials: A community wide survey. *Tectonophysics*, 684, 23-38. doi:10.1016/j.tecto.2016.01.017  
Reber, K., Kulowski, N., & Ratschbacher, L. (2011). The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts. *Earth and Planetary Science Letters*, 302(1-2), 132-146. doi:10.1016/j.epsl.2010.12.002  
Ritter, M. C., Leever, K., Rosenau, M., & Oncken, O. (2016). Scaling the sandbox-Mechanic al (ds) similarities of granular materials and brittle rock. *Journal of Geophysical Research: Solid Earth*, 121(9), 6863-6879. doi:10.1002/2016b012915

Figure 3: example of a reference with executable DOI link leading to the referred publication (example from Rosenau et al., <http://doi.org/10.5880/GFZ.4.1.2019.005>).



# Machine Readable Tables

**Table S1a** Chemical composition of soil, saprolite and rock samples at CON and MIT (for colour coding see table caption)

sample ID	IGSN <sup>†</sup>	brief sample description	mean depth (m)	XRF analyses: Raw data (major oxides)								
				SiO <sub>2</sub> (wt%)	TiO <sub>2</sub> (wt%)	Al <sub>2</sub> O <sub>3</sub> (wt%)	Fe <sub>2</sub> O <sub>3</sub> (wt%)	MnO (wt%)	MgO (wt%)	CaO (wt%)	Na <sub>2</sub> O (wt%)	
<i>CON regolith - bedrock depth profile</i>												
CON 14	<a href="#">GFDUH00LT</a>	soil, Ah horizon	0.2	57	0.86	15	6.4	0.12	2.0	0.19	0.87	
CON 13	<a href="#">GFDUH00LU</a>	soil, Ah/Bw horizon	0.4	60	0.89	16	6.3	0.13	1.9	0.19	0.93	
CON 12	<a href="#">GFDUH00LV</a>	soil, Bw1 horizon	0.6	51	0.79	14	5.5	0.12	1.6	0.16	0.87	
CON 11	<a href="#">GFDUH00LW</a>	soil, Bw1 horizon	0.8	58	0.93	18	7.4	0.15	2.1	0.20	1.0	
CON 10	<a href="#">GFDUH00LX</a>	soil, Bw1 horizon	1.0	59	0.94	18	7.3	0.13	2.2	0.24	1.0	
CON 9	<a href="#">GFDUH00LY</a>	soil, Bw1 horizon	1.2	62	0.94	17	6.9	0.08	2.3	0.28	1.1	

# Machine readable data tables

## Motivation:

- Easy access and data manipulation by machines (via scripts)
- Information can be easily read by a computer
  
- Especially for long data tables
- standardised tables
- Precondition for machine-learning, AI....

# Things to keep in mind

- No combined cells
- No free lines or rows
- No metadata in the data table (definition of table heads in separate metadata spreadsheet)
- Separate data types in separate tables

# Machine Readable Tables

# These data are freely available under the Creative Commons Attribution 4.0 International Licence (CC BY 4.0)

# when using the data please cite as:

# Uhlig, D. and von Blanckenburg, F. (2019): Geochemical and isotope data on rock weathering, and nutrient balances during fast forest floor turnover in montane, temperate forest ecosystems. GFZ Data Services. <http://doi.org/10.5880/GFZ.3.3.2019.004>

# The data are supplementary material to: Uhlig, D. and von Blanckenburg, F. (2019). How slow rock weathering balances nutrient loss during fast forest floor turnover in montane, temperate forest ecosystems. *Frontiers in Earth Sciences*. <http://doi.org/10.3389/feart.2019.00159>

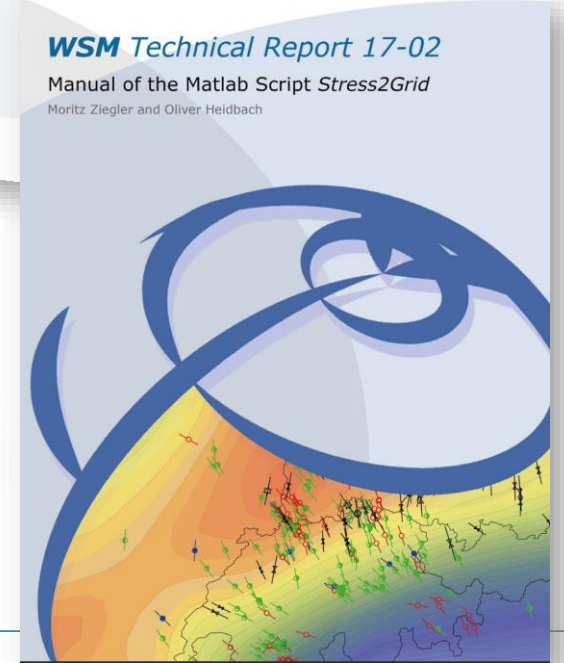
sample ID	IGSN	brief sample description	mean depth (m)	SiO2 (wt%)	TiO2 (wt%)	Al2O3 (wt%)	Fe2O3 (wt%)	MnO (wt%)	MgO (wt%)	CaO (wt%)	Na2O (wt%)
CON 14	GFDUH00LT	soil, Ah horizon 0.2	57	0.86	15	6.4	0.12	2.0	0.19	0.87	
CON 13	GFDUH00LU	soil, Ah/Bw horizon	0.4	60	0.89	16	6.3	0.13	1.9	0.19	0.93
CON 12	GFDUH00LV	soil, Bw1 horizon 0.6	51	0.79	14	5.5	0.12	1.6	0.16	0.87	
CON 11	GFDUH00LW	soil, Bw1 horizon 0.8	58	0.93	18	7.4	0.15	2.1	0.20	1.0	

# GFZ Data Reports/ Technical Reports

First Data Report published in 2011:  
persistently online accessible and citable  
with DOI

GFZ Data Reports/ Technical Reports:

- Flexible format for: “enhanced” data or software description, field guides
- standardised templates for each discipline/ project (ICDP, EnMAP)
- internal review by domain experts
- Project-specific design if required



# Data Journals



Peer-reviewed articles with the description of datasets, data collections, data infrastructures, etc.



# Earth System Science Data



- First data journal, launched in 2008
- „international, interdisciplinary journal for the publication of articles on original research data”
- **No interpretation of the data!**
- In 2020:
  - more than 500 peer-reviewed descriptions of easily- and freely-accessible data products from
  - more than 4000 data providers
  - archiving their products at more than 100 data centres
  - IF = 10.951

# Break – Questions?

**Next:** Scholix: Increasing the transparency of research products

# Linking papers, data, samples, ...

## DataCite related Identifier

IsCitedBy	indicates that B (discovery).
Cites	indicates that A (discovery).
IsSupplementTo	indicates that A (discovery).
IsSupplementTo	indicates that A (discovery).
IsContinuedBy	
Continues	
HasMetadata	
IsMetadataFrom	
IsNewVersionOf	
IsPreviousVersionOf	
IsPartOf	
HasPart	
IsReferencedIn	
References	
IsDocumentedIn	
Documents	
IsCompiledBy	
Compiles	
IsVariantFormOf	
IsOriginalFormOf	
IsIdenticalTo	

**Data Description**

Lorenz, H.; Rosberg, J. E.; Juhlin, C.; Bjelm, L.; Almquist, B.; Berthet, T.; Conze, Ronald; Gee, D.; Klonowska, I.; Pascal, C.; Pedersen, K.; Roberts, N.; Tsang, C. F.; (2015): COSC-1 operational report Explanatory remarks on the operational data sets; Deutsches GeoForschungsZentrum GFZ. <https://doi.org/10.2312/ICDP.2015.001>

**Related Work**

Referenced by

Lorenz, H.; Rosberg, J. E.; Juhlin, C.; Bjelm, L.; Almquist, B.; Berthet, T.; Conze, Ronald; Gee, D.; Klonowska, I.; Pascal, C.; Pedersen, K.; Roberts, N.; Tsang, C. F.; (2015): Operational report about phase 1 of the collisional orogeny in the scandinavian caledonides scientific drilling project (COSC-1); Deutsches GeoForschungsZentrum GFZ. <https://doi.org/10.2312/ICDP.2015.002>

**Supplement to**

Lorenz, H., Rosberg, J.-E., Juhlin, C., Bjelm, L., Almquist, B. S. G., Berthet, T., ... Tsang, C.-F. (2015). COSC-1 – drilling of a subduction-related allochthon in the Palaeozoic Caledonide orogen of Scandinavia. *Sci. Dril.*, 19, 1–11. doi:10.5194/sd-19-1-2015

**References**

IGSN:ICDP5054EHW1001 (5054\_1\_A)  
 IGSN:ICDP5054EHX1001 (5054\_1\_B)  
 IGSN:ICDP5054EH02001 (5054\_1\_C)

**COSC-1 operational report - Operational data sets**

**Abstract**

The Collisional Orogeny in the Scandinavian Caledonides (COSC) scientific drilling project focuses on mesozoic building processes in a major mid-Palaeozoic orogen in western Scandinavia and its comparison with modern analogues. The transport and emplacement of subduction-related high-grade continent-ocean transition (COT) complexes onto the Baltoscandian platform and their influence on the underlying allochthons and basement will be studied in a section provided by two fully cored 2.5 km deep drill holes. This operational report concerns the first drill hole, COSC-1 (ICDP 5054-1-A), drilled from early May to late August 2014.

**Keywords**

caldonides, COSC, deep hydrosphere, dynamics, europe, heat flow, himalaya, ICDP-2011/03, microbiology, norway, orogen, scandies, scandinavia, seismic, sweden, earth science

**Location**

Click/over on markers or bounding boxes to see related details. Click/over over details to see related marker or bounding box.

**Data**

**Data Report**

**ICDP Data Set Report**

10.2312/ICDP.2015.001

**COSC-1 operational report**  
 Explanatory remarks on the operational data sets

H. Lorenz, J.E. Rosberg, C. Juhlin, L. Bjelm, B.S.G. Almquist, T. Berthet, R. Conze, D. Gee, I. Klonowska, C. Pascal, K. Pedersen, N.M.W. Roberts, N.M.W. and Tsang, C.F. (2015): COSC-1 – drilling of a subduction-related allochthon in the Palaeozoic Caledonide orogen of Scandinavia. *Scientific Drilling*, doi: 10.5194/sd-19-1-2015

**References**

Lorenz, H., Rosberg, J.E., Juhlin, C., Bjelm, L., Almquist, B.S.G., Berthet, T., Conze, R., Gee, D.G., Klonowska, I., Pascal, C., Pedersen, K., Roberts, N.M.W. and Tsang, C.F. (2015): COSC-1 – Drilling of a subduction-related Allochthon in the Palaeozoic Caledonide orogen of Scandinavia. *Scientific Drilling*, doi: 10.5194/sd-19-1-2015

Lorenz, H., Rosberg, J.E., Juhlin, C., Bjelm, L., Almquist, B.S.G., Berthet, T., Conze, R., Gee, D.G., Klonowska, I., Pascal, C., Pedersen, K., Roberts, N.M.W. and Tsang, C.F. (2015): COSC-1 operational report – Operational data sets. *GFZ German Research Centre for Geosciences*, doi: [10.1594/GFZ.SDDB.ICDP.5054.2015](https://doi.org/10.1594/GFZ.SDDB.ICDP.5054.2015)

**Sample**

**IGSN**

**General Identifiers**

Program: ICDP  
 Expedition: ICDP 5054  
 Type: Core  
 Name: 5054\_1\_A\_1\_2  
 IGSN: ICDP5054EHW1001 (Open)  
 Parent IGSN: ICDP5054EH01001  
 Release Date: 2017-3-1

**Sample Family**

- 5054\_1\_A\_1\_1
- 5054\_1\_A\_1\_2
- 5054\_1\_A\_1\_3
- 5054\_1\_A\_1\_4
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- 5054\_1\_A\_1\_100

**Sampling Location**

Latitude: 63.4063  
 Longitude: 13.202057  
 Coordinate System: WGS84  
 Elevation: 415.74  
 Elevation: 412.61  
 Location Type: N/A  
 Location Name: Åre, Jämtlands län, Sweden  
 Location Description: COSC-1 is located in the vicinity of the abandoned Fröjd mine.  
 Country: Sweden  
 Province: Jämtlands län  
 Country: N/A  
 City: Åre  
 Geology: N/A  
 Material: Rock

**Publications & Datasets**

Lorenz, H., Rosberg, J.-E., Juhlin, C., Bjelm, L., Almquist, B. S. G., Berthet, T., ... Tsang, C.-F. (2015). COSC-1 – drilling of a subduction-related allochthon in the Palaeozoic Caledonide orogen of Scandinavia. *Sci. Dril.*, 19, 1–11. doi:10.5194/sd-19-1-2015

Lorenz, Henning; Rosberg, Jan-Erik; Juhlin, Christopher; Bjelm, Leif; Almquist, Bjørn; Berthet, Théo; Conze, Ronald; Gee, David G.; Klonowska, Iwona; Pascal, Christophe; Pedersen, Karsten; Roberts, Nick; Tsang, Chinfu; (2015): COSC-1 operational report - Operational data sets; GFZ Data Services. <http://dx.doi.org/10.1594/GFZ.SDDB.ICDP.5054.2015>

## Scientific Paper

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Science report

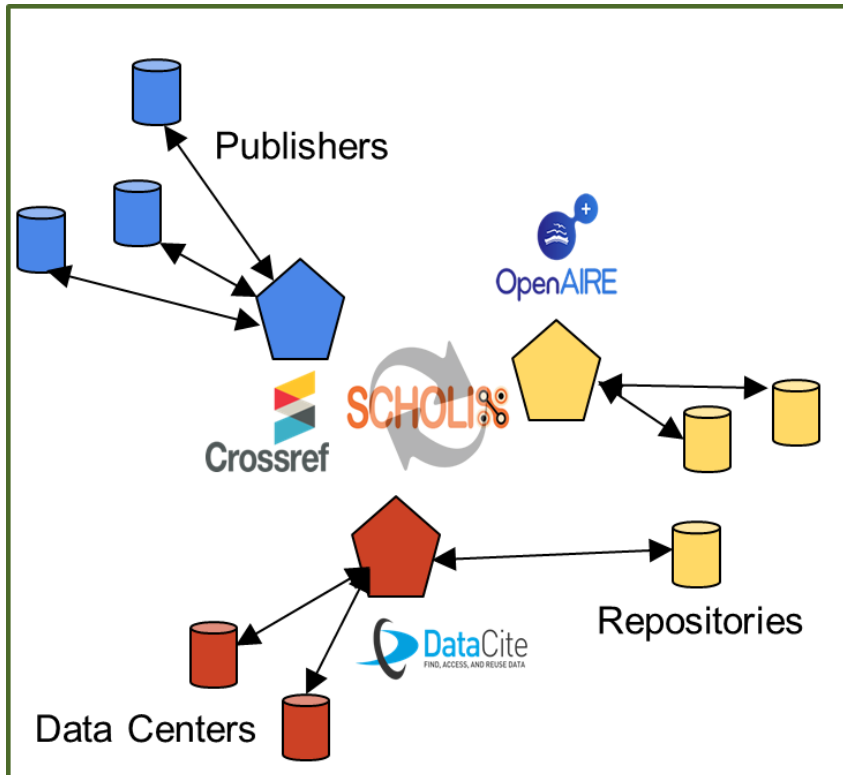
**COSC-1 – drilling of a subduction-related allochthon in the Palaeozoic Caledonide orogen of Scandinavia**

H. Lorenz<sup>1</sup>, J.-E. Rosberg<sup>2</sup>, C. Juhlin<sup>1</sup>, L. Bjelm<sup>2</sup>, B. S. G. Almquist<sup>1</sup>, T. Berthet<sup>1</sup>, R. Conze<sup>3</sup>, D. G. Gee<sup>1</sup>, I. Klonowska<sup>1</sup>, C. Pascal<sup>4</sup>, K. Pedersen<sup>5</sup>, N. M. W. Roberts<sup>6</sup>, and C.-F. Tsang<sup>1,7</sup>

<sup>1</sup>Department of Earth Sciences, Uppsala University, Villavägen 16, 752 36 Uppsala, Sweden  
<sup>2</sup>Engineering Geology, Lund University, John Ericssons väg 1, 221 00 Lund, Sweden  
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<sup>4</sup>Institute of Geology, Mineralogy and Geophysics, Ruhr-University Bochum, Universitätsstraße 150, 44780 Bochum, Germany  
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<sup>6</sup>NERC Isotope Geosciences Laboratory, British Geological Survey, Nottingham, NG12 5GG, UK  
<sup>7</sup>Lawrence Berkeley National Laboratory, Earth Sciences Division, 1 Cyclotron Road, MS74R316C, Berkeley, CA 94720, USA

Lorenz, H., Rosberg, J.-E., Juhlin, C., Bjelm, L., Almquist, B. S. G., Berthet, T., Conze, R., Gee, D. G., Klonowska, I., Pascal, C., Pedersen, K., Roberts, N. M. W., and Tsang, C.-F.: COSC-1 operational report – Scientific data sets, GFZ German Research Center for Geosciences, doi:10.1594/GFZ.SDDB.ICDP.5054.2015, 2015b.

Majka, J., Rosén, A., Janák, M., Frotzheim, N., Klonowska, I., Mancek, M., Sasinková, V., and Yoshida, K.: Microdiamond dis-



Credit: Wouter Haak, Elsevier

## SCHOLIX

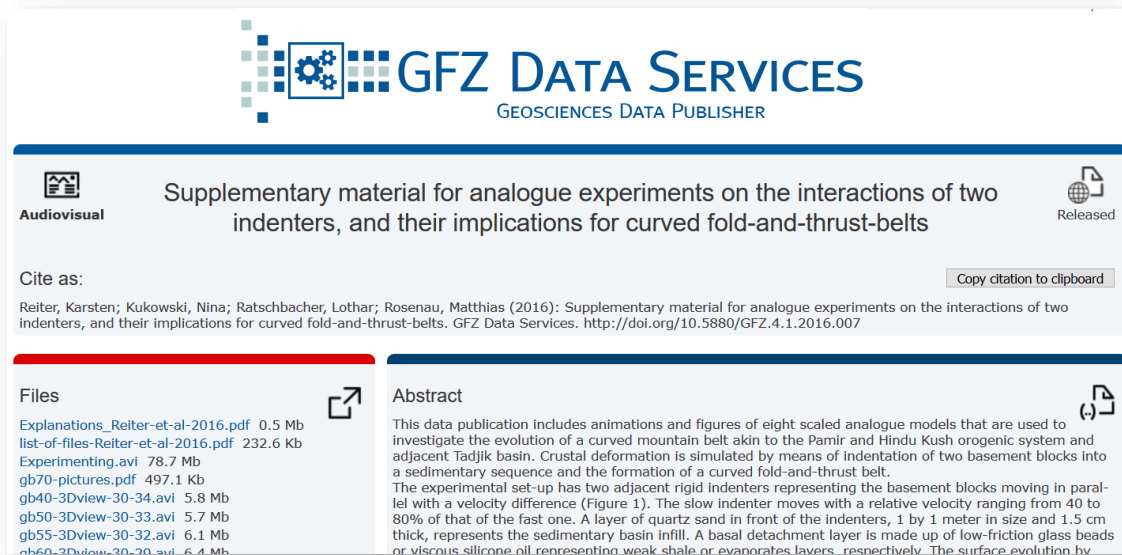
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# The classical approach (before Scholix)



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Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts

Cite as:  
Reiter, Karsten; Kukowski, Nina; Ratschbacher, Lothar; Rosenau, Matthias (2016): Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust-belts. GFZ Data Services. <http://doi.org/10.5880/GFZ.4.1.2016.007>

**Files**

- Explanations\_Reiter-et-al-2016.pdf 0.5 Mb
- list-of-files-Reiter-et-al-2016.pdf 232.6 Kb
- Experimenting.avi 78.7 Mb
- gb70-pictures.pdf 497.1 Kb
- gb40-3Dview-30-34.avi 5.8 Mb
- gb50-3Dview-30-33.avi 5.7 Mb
- gb55-3Dview-30-32.avi 6.1 Mb
- gb60-3Dview-30-30.avi 6.4 Mb

**Abstract**

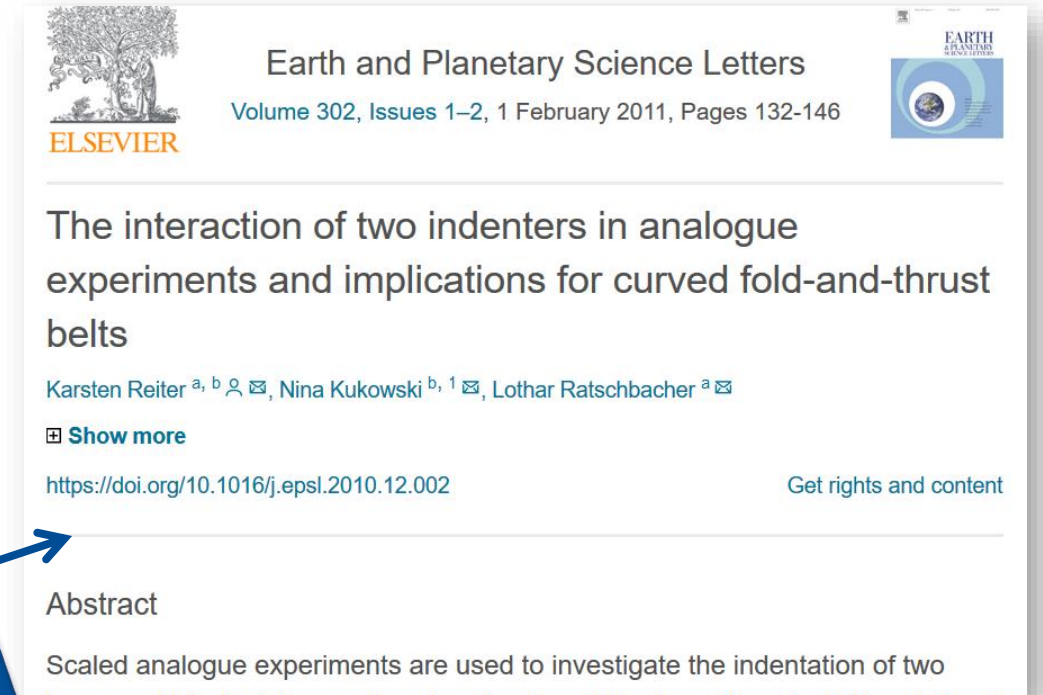
This data publication includes animations and figures of eight scaled analogue models that are used to investigate the evolution of a curved mountain belt akin to the Pamir and Hindu Kush orogenic system and adjacent Tadjik basin. Crustal deformation is simulated by means of indentation of two basement blocks into a sedimentary sequence and the formation of a curved fold-and-thrust belt. The experimental set-up has two adjacent rigid indenters representing the basement blocks moving in parallel with a velocity difference (Figure 1). The slow indenter moves with a relative velocity ranging from 40 to 80% of that of the fast one. A layer of quartz sand in front of the indenters, 1 by 1 meter in size and 1.5 cm thick, represents the sedimentary basin infill. A basal detachment layer is made up of low-friction glass beads or viscous silicone oil representing weak shale or evaporates layers, respectively. The surface evolution by

**Dataset Description**

Supplement to

Reiter, K., Kukowski, N., & Ratschbacher, L. (2011). The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts. *Earth and Planetary Science Letters*, 302(1-2), 132–146.  
[doi:10.1016/j.epsl.2010.12.002](https://doi.org/10.1016/j.epsl.2010.12.002)

...supplement to an article from 2011



**ELSEVIER**

Earth and Planetary Science Letters  
Volume 302, Issues 1–2, 1 February 2011, Pages 132–146

**The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts**

Karsten Reiter <sup>a, b</sup>, Nina Kukowski <sup>b, 1</sup>, Lothar Ratschbacher <sup>a</sup>

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<https://doi.org/10.1016/j.epsl.2010.12.002> [Get rights and content](#)

**Abstract**

Scaled analogue experiments are used to investigate the indentation of two



# The classical approach (before Scholix)

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Abstract  
This data publication includes animations and figures of eight scaled analogue models that are used to

**data publication in 2016**

**Dataset Description**

Supplement to

Reiter, K., Kukowski, N., & Ratschbacher, L. (2011). The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts. Earth and Planetary Science Letters, 302(1-2), 132–146. doi:10.1016/j.epsl.2010.12.002

Link to paper in the metadata of the data publication

Earth and Planetary Science Letters  
Volume 302, Issues 1–2, 1 February 2011, Pages 132–146

**ELSEVIER**

The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts

Karsten Reiter <sup>a, b</sup>, Nina Kukowski <sup>b, 1</sup>, Lothar Ratschbacher <sup>a</sup>

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Abstract

**paper published in 2011**

Scaled analogue experiments are used to investigate the indentation of two



Is **not** possible to add the citation of the dataset to the paper 5 years after publishing

# New possibilities for cross-linking data and papers

**GFZ DATA SERVICES**  
GEOSCIENCES DATA PUBLISHER

Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts

Cite as:  
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Files

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- gb55-3Dview-30-32.avi 6.1 Mb
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Abstract

This data publication includes animations and figures of eight scaled analogue models that are used to ...

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SCHOLIX

Link to data on the paper landing page

**ELSEVIER** Earth and Planetary Science Letters  
Volume 302, Issues 1–2, 1 February 2011, Pages 132–146

## The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts

Karsten Reiter <sup>a, b</sup>, Nina Kukowski <sup>b, 1</sup>, Lothar Ratschbacher <sup>a</sup>

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Abstract

paper published in 2011

Scaled analogue experiments are used to investigate the indentation of two

Research data for this article

new

GFZ Data Services  
Geosciences data  
Data associated with the article:  
Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts

**GFZ**  
Helmholtz Centre  
POTSDAM