Open Science – more than Open Access

Kirsten Elger
GFZ German Research Centre for Geosciences, Library and Information Services
FID GEO

GFZ Helmholtz Centre Potsdam

GFZ Data Services
Geosciences Data Publisher

FID GEO

HELMHOLTZ

Challenges for Researchers

OPEN ACCESS

HELP!!

ORCID Connecting Research and Researchers

RORX

doi

Crossref Funder Registry

IGSN

ODC open data charter

XML

JSON-LD

DFG Deutsche Forschungsgemeinschaft

Handling of Research Data

FAIR Principles

Findable

Accessible

Interoperable

Reusable

https://www.alamy.de/stockfoto-wissenschaftlerin-mit-lupe-163648035.html

Open Access – 2003 to 2022

Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003): *„Open access contributions include original scientific research results,* ***raw data and metadata****, source materials, digital representations of pictorial and graphical materials and scholarly multimedia materials."*

OPEN ACCESS

Plan S

Making full & immediate Open Access a reality

Open data – an international request

2013

G8 UK
UNITED KINGDOM 2013

G8 OPEN DATA CHARTER

H2020 Programme

Guidelines on

FAIR Data Management in Horizon 2020

DFG Deutsche Forschungsgemeinschaft

Guidelines on handling of research data

2015

ODC open data charter

DFG promotes Open Access papers, open data, open source software

How re-usable are data supplements?

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 2014

"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, https://doi.org/10.1029/2015EO022207) and www.copdess.org

Coalition on Publishing Data in the Earth and Space Sciences

2015: **Data Publications with DOI are citable in research articles**
(COPDESS Statement of Commitment)

STATEMENT OF COMMITMENT

- 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/

Publisher/Journal requirements for Open Science

SPRINGER NATURE

Reporting standards and availability of data, materials, code and protocols

An inherent principle of publication is that others should be able to replicate and build upon the authors' published claims. A condition of publication in a Nature Portfolio journal is that **authors are required to make materials, data, code, and associated protocols promptly available to readers without undue qualifications**. Any restrictions on the availability of materials or information must be disclosed to the editors at the time of submission. Any **restrictions must** also **be disclosed** in the submitted manuscript.

AGU ADVANCING EARTH AND SPACE SCIENCE

AGU requires that the **underlying data** needed to understand, evaluate, and build upon the reported research **be available at the time of peer review and publication**. Additionally, authors should make available **software** that has a significant impact on the research. This entails:

1. Depositing the data and software in a **community accepted, trusted repository**, as appropriate, and **preferably with a DOI**
2. Including an Availability Statement as a separate paragraph in the Open Research section explaining to the reader where and how to access the data and software
3. And including **citation(s)** to the deposited data and software, in the Reference Section.

How do I cite a dataset?

Contents lists available at ScienceDirect

Tectonophysics

journal homepage: www.elsevier.com/locate/tecto

Properties of granular analogue model materials: A community wide survey

M. Klinkmüller [a], G. Schreurs [a,1], M. Rosenau [b], H. Kemnitz [b]

[a] Institute of Geological Sciences, University of Bern, Baltzerstrasse 1 +3, CH-3012 Bern, Switzerland
[b] Helmholtz-Zentrum Potsdam, GFZ Deutsches GeoForschungsZentrum, Telegrafenberg, D-14473 Potsdam, Germany

Link to paper

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).

1. Citation in the text

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.

2. Full reference with DOI in the References

3. Data access via DOI

GFZ Helmholtz Centre Potsdam — GFZ German Research Centre for Geosciences

Impressum

Dataset

GeoMod2008 materials benchmark: The sieve dataset

Released

Cite as:

Copy citation to clipboard

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

Related Work

Supplement to

Klinkmüller, M., Schreurs, G., Rosenau, M., & Kemnitz, H. (2016). Properties of granular analogue model materials: A community wide survey. Tectonophysics. doi:10.1016/j.tecto.2016.01.017

Find More Research Data

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

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; http://www.gfz-potsdam.de/en/section/lithosphere-dynamics/infrastructure/geodynamics/tectonic-modeling-lab/

Keywords

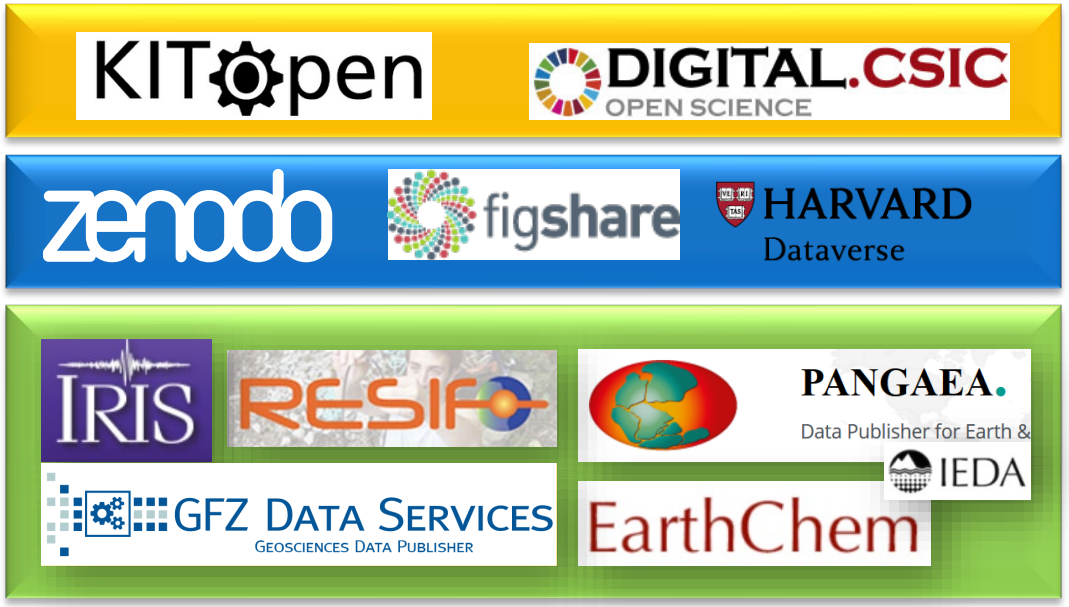
analogue materials, granular materials, bulk solids, analog models, sandbox, benchmark, Geomod, EPOS, experiment, properties of materials, geological process, materials science

GCMD Science Keywords

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

Research Data Repositories

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



"***Domain 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." Hanson et al.(2015) Eos, 96, https://doi.org/10.1029/2015EO022207

Find your repository in:

re3data.org

Registry of Research Data Repositories

FAIR Principles - Guiding Principles for Findable, Accessible, Interoperable and Re-usable Data

Findable – Data Discovery	Accessible	Interoperable	Reusable
Metadata for data discovey in public domain	Data is accessible by humans and machines	Open formats	Data rights and licences
Metadata catalogues of data repositories	Standard protocols	Machine executable metadata standards	Full record on data provenance
Metadata harvesting by data portals	Authorisation	Consistent vocabulary/ ontology	Rich metadata enabling to link data with other sources
Persistent Identifier		Documented workflows	
Data citation			

simplified

*Wilkinson et al., 2016 https://doi.org/10.1038/sdata.2016.18

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Metadata harvesting by data portals	Authorisation	Consistent **vocabulary/ ontology**	**Rich metadata** enabling to link data with other sources
Persistent Identifier		Documented workflows	
Data citation			

simplified

*Wilkinson et al., 2016 https://doi.org/10.1038/sdata.2016.18

GFZ Data Services: Research Data Repository

Profile

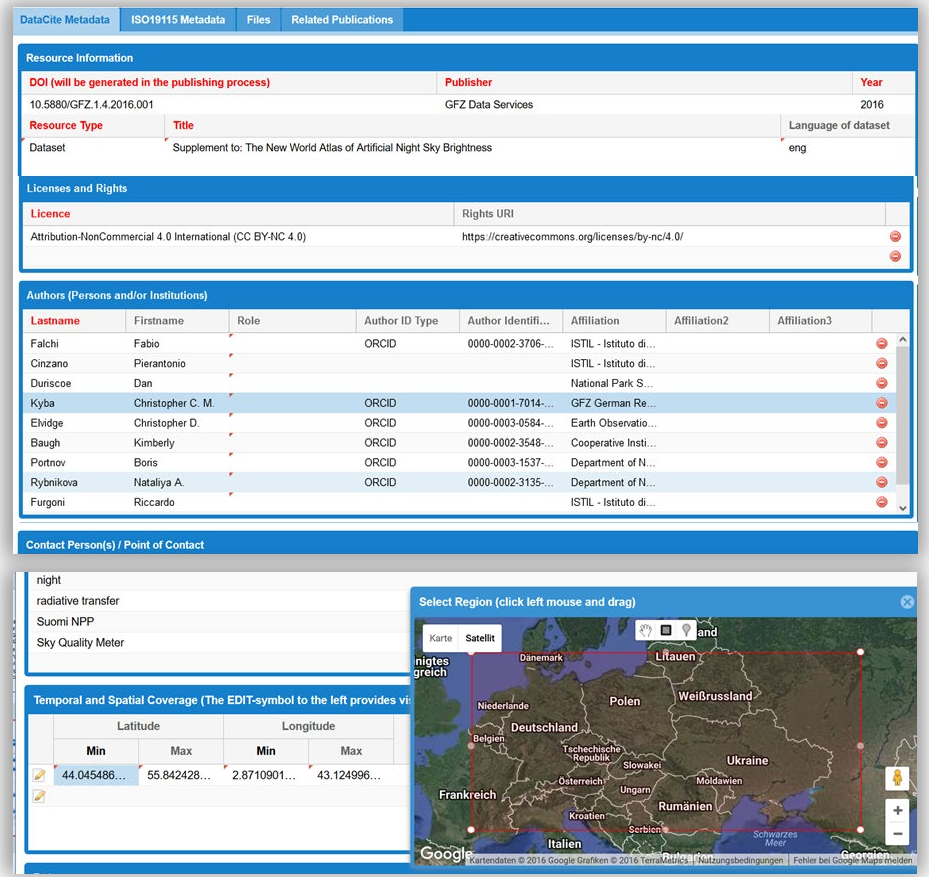
- Domain repository for the Geosciences since 2006
- DOIs for Data and software
- Data: real-time data streams, tables, maps, model data, …
- **Data curation by domain scientists**
- Partner of: FIDGEO

https://dataservices.gfz-potsdam.de

FAIR data

- International metadata standards (human & machine readable)
- Controlled vocabularies for „rich“ metadata
- PIDs ORCID Connecting Research and Researchers, IGSN, Crossref Funder Registry, doi, ROR in prep
- Open Licences for data and software
- OAI-PMH interface
- schema.org → Google Dataset Search

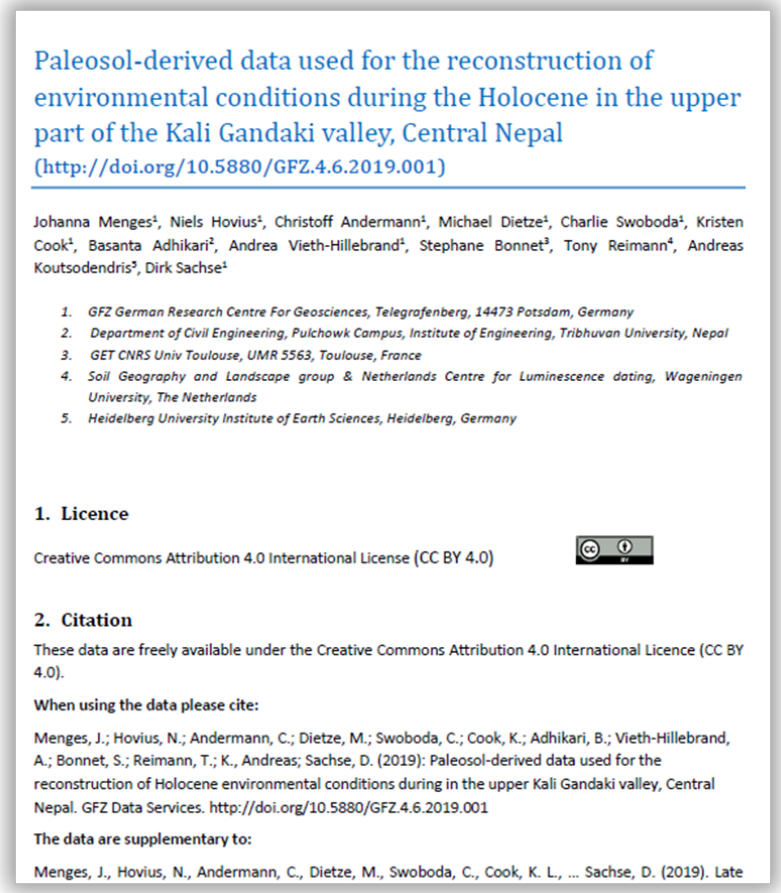
Metadata Tools of GFZ Data Services



XML Translator

Online Metadata Editor

Data Description Templates



Paleosol-derived data used for the reconstruction of environmental conditions during the Holocene in the upper part of the Kali Gandaki valley, Central Nepal (http://doi.org/10.5880/GFZ.4.6.2019.001)

Johanna Menges[1], Niels Hovius[1], Christoff Andermann[1], Michael Dietze[1], Charlie Swoboda[1], Kristen Cook[1], Basanta Adhikari[2], Andrea Vieth-Hillebrand[1], Stephane Bonnet[3], Tony Reimann[4], Andreas Koutsodendris[5], Dirk Sachse[1]

1. *GFZ German Research Centre For Geosciences, Telegrafenberg, 14473 Potsdam, Germany*
2. *Department of Civil Engineering, Pulchowk Campus, Institute of Engineering, Tribhuvan University, Nepal*
3. *GET CNRS Univ Toulouse, UMR 5563, Toulouse, France*
4. *Soil Geography and Landscape group & Netherlands Centre for Luminescence dating, Wageningen University, The Netherlands*
5. *Heidelberg University Institute of Earth Sciences, Heidelberg, Germany*

1. Licence

Creative Commons Attribution 4.0 International License (CC BY 4.0)

2. Citation

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

When using the data please cite:

Menges, J.; Hovius, N.; Andermann, C.; Dietze, M.; Swoboda, C.; Cook, K.; Adhikari, B.; Vieth-Hillebrand, A.; Bonnet, S.; Reimann, T.; K., Andreas; Sachse, D. (2019): Paleosol-derived data used for the reconstruction of Holocene environmental conditions during in the upper Kali Gandaki valley, Central Nepal. GFZ Data Services. http://doi.org/10.5880/GFZ.4.6.2019.001

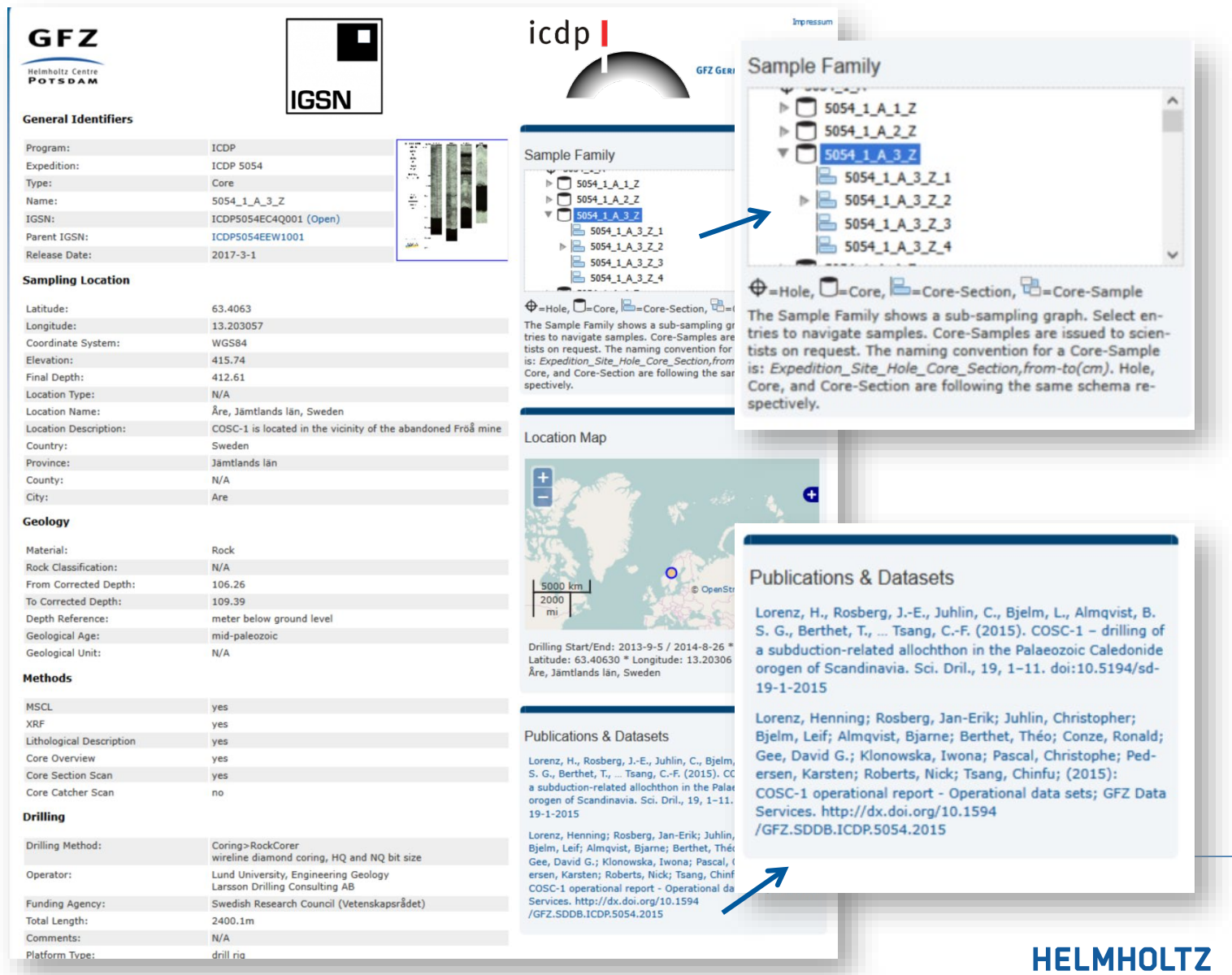
The data are supplementary to:

Menges, J., Hovius, N., Andermann, C., Dietze, M., Swoboda, C., Cook, K. L., ... Sachse, D. (2019). Late

Uniform layout

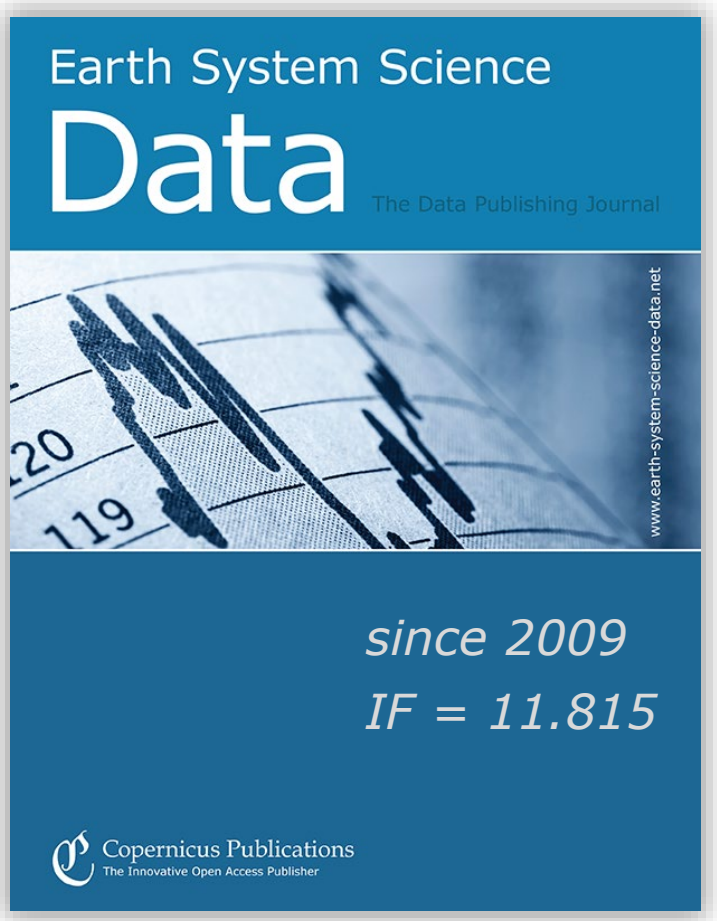
IGSN – International Generic Sample Number

- Globally unique persistent identifier (PID) for physical samples and materials
- Closing the last gap for the full provenance of research results
- IGSNs link to the online sample description
  (link, QR Code)
  https://igsn.org/ICDP5054EX2Z501
- For individual and hierarchical samples (e.g. drilling projects)
- IGSN are citable in papers and data publications



Copernicus Publications
The Innovative Open Access Publisher

Data Journals - example ESSD



"An ESSD 'product' consists of a detailed description published in ESSD, linked to a dataset archived by a reliable data repository."

- Open Access, public peer review
- Data are included in the review (no barriers!)
- Quality assessment of the data described
- No interpretation of the data!

Persistent Identifier (PID)

for paper, data, software

https://doi.org/10.5880/fidgeo.2021.049 (Data)

PID for physical samples, cross references to samples underlying measurements

https://igsn.org/GFFJH00AD (Rock sample)

uniquely identifying persons

https://orcid.org/0000-0001-5140-8602 (Kirsten Elger)

List of funders with DOIs

http://doi.org/10.13039/501100001659 (DFG)

New PID for Institutions

https://ror.org/04z8jg394 (GFZ)

→ PIDs ARE RESOLVABLE AND MACHINE-ACTIONABLE

PIDs and the provenance of research outcome

data

code

papers

sample

Sample description

Data publication

PIDs connect everything → FAIR

Table S3. Sierra Nevada analyses of plant samples

sample ID	IGSN	brief sample description	Element concentrations (µg/g) Al	Fe	Mn	Mg	Ca
fresh f							
MW1							
MW2							
MW3							
MW4							
mean f							
(2SE,							

Table SN1. Sierra Nevada analyses of soil, saprolite, rock, bedload sediment a

sample ID		IGSN	sample type	XRF lab	depth (cm)	Major element oxides (wt%) (SiO_2	TiO_2	Al_2O_3	Fe_2O_3
P301 regolith depth profile									
SN01	*	GFFB1002T	bulk soil	GFZ	7	36.2	0.55	11.4	3.88
SN02	*	GFFB1002U	bulk soil	GFZ	20	49.3	0.71	14.9	4.84
SN02e	*	GFFB1002U	exchangeable soil	-	20	n.a.	<lod	0.00	0.00
SN02r	*	GFFB1002U	residuum soil	-	20	n.a.	0.84	14.3	5.68
SN03	*	GFFB1002V	bulk soil	GFZ	30	57.5	0.88	17.6	6.44
SN04	*	GFFB1002R	bulk soil	GFZ	39	56.6	0.93	17.7	6.85
SN04e	*	GFFB1002R	exchangeable soil	-	39	n.a.	<lod	0.00	0.00
SN04r	*	GFFB1002R	residuum soil	-	39	n.a.	0.91	15.3	6.95

Scientific Drilling
The open-access ICDP and IODP journal

Global Biogeochemical Cycles

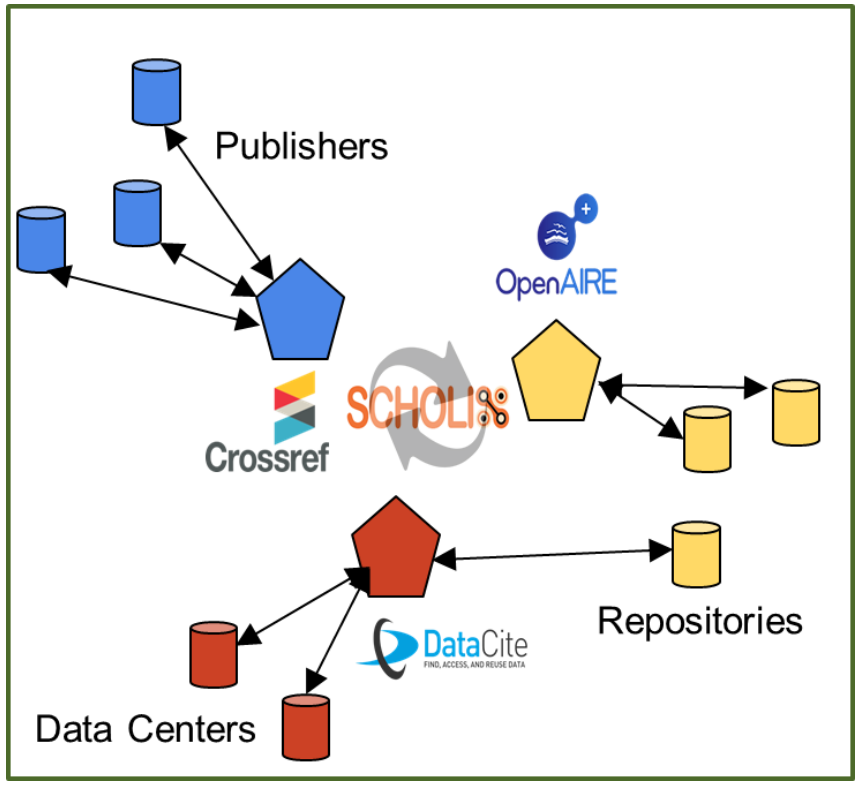
Research Article | Open Access

Mineral Nutrients Sourced in Deep Regolith Sustain Long-Term Nutrition of Mountainous Temperate Forest Ecosystems

D. Uhlig, W. Amelung, F. von Blanckenburg

First published: 19 August 2020 | https://doi.org/10.1029/2019GB006513 | Citations: 2

Scholix: linking data with papers



Credit: Wouter Haak, Elsevier

SCHOLIX

"interoperability framework for exchanging information about the links between scholarly literature and data"

Scholexplorer
The Data Literature Interlinking Service

The classical approach (before Scholix)

GFZ DATA SERVICES
GEOSCIENCES DATA PUBLISHER

Audiovisual

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

Released

Cite as:

Copy citation to clipboard

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

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

…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 [a, b], Nina Kukowski [b, 1], Lothar Ratschbacher [a]

Show more

https://doi.org/10.1016/j.epsl.2010.12.002

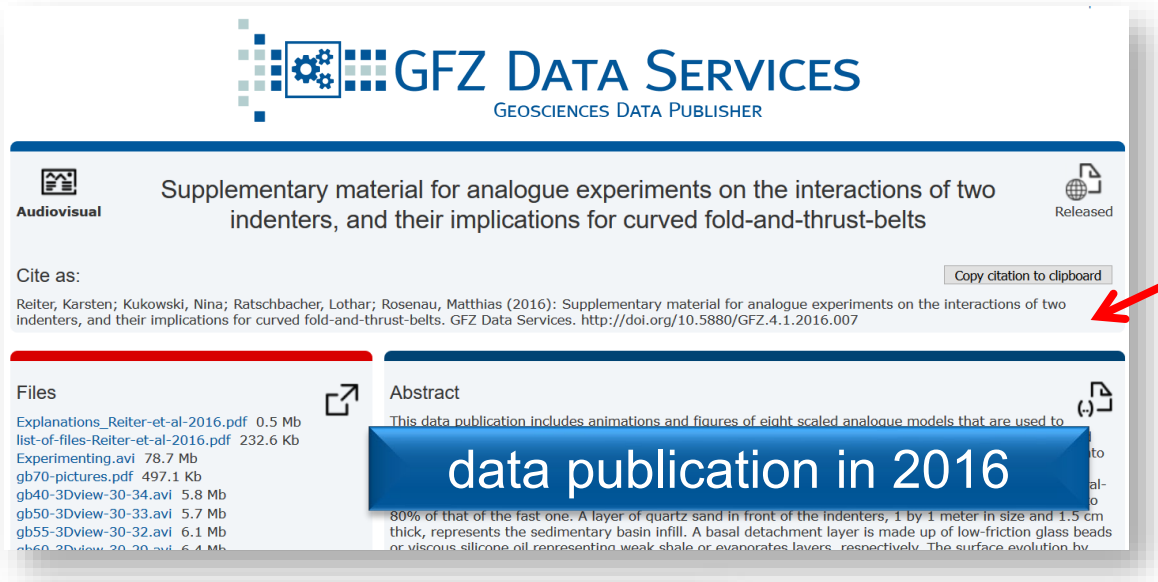
Get rights and content

Abstract

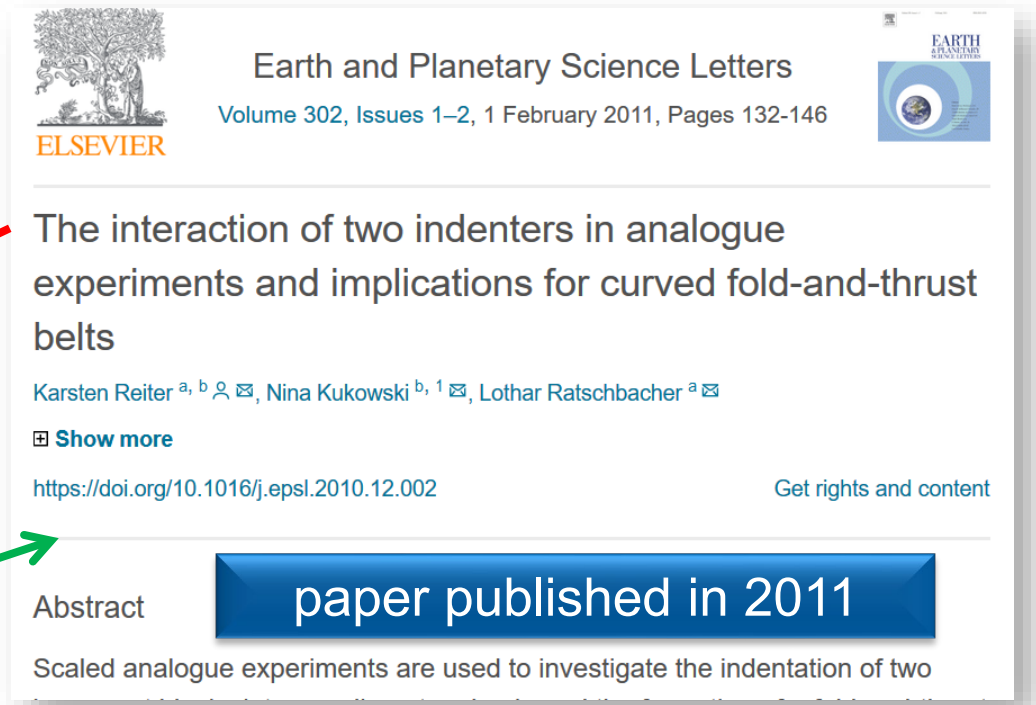
Scaled analogue experiments are used to investigate the indentation of two

Data: http://doi.org/10.5880/GFZ.4.1.2016.007, Paper: https://doi.org/10.1016/j.epsl.2010.12.002

The classical approach (before Scholix)



Link to paper in the metadata of the data publication



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

Data: http://doi.org/10.5880/GFZ.4.1.2016.007, Paper: https://doi.org/10.1016/j.epsl.2010.12.002

New possibilities for cross-linking data and papers

GFZ DATA SERVICES
GEOSCIENCES DATA PUBLISHER

Audiovisual

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

Released

Cite as:

Copy citation to clipboard

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

Abstract

data publication in 2016

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

ELSEVIER

Earth and Planetary Science Letters

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Abstract

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Scaled analogue experiments are used to investigate the indentation of two

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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

SCHOLIX

Link to data on the paper landing page

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

GFZ Helmholtz-Zentrum Potsdam

Data: http://doi.org/10.5880/GFZ.4.1.2016.007,
Paper: https://doi.org/10.1016/j.epsl.2010.12.002

Deutsche Forschungsgemeinschaft
German Research Foundation

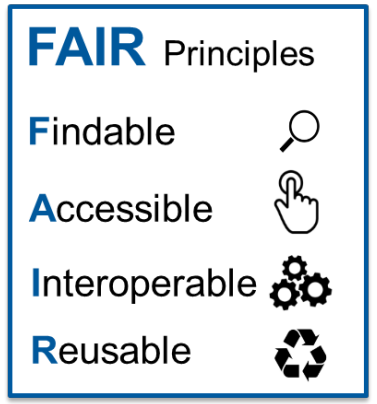
Information for Researchers No. 61 | 1 September 2022

Package of Measures to Support a Shift in the Culture of Research Assessment

DFG changes proposal forms and introduces mandatory CV template / The aim is to support a shift in the culture of research assessment / Improvement of equal opportunity practices

In addition to a maximum of ten publications in the more common publication formats, the CV can therefore now list up to ten further sets of research outcomes and findings that have been publicised in a variety of other ways, including **articles on preprint servers, data sets or software packages**, for example.

The role of data repositories for Open Science



Data repositories support researchers to make their data FAIR…..

happy…and ready for future developments

NFDI4Earth

EPOS
EUROPEANPLATEOBSERVINGSYSTEM

ENVRI community

#Geoportal.de
suchen. finden. verbinden.

B2FIND

AuScope

<HMC> | HELMHOLTZ METADATA COLLABORATION

EarthCube

Thank you for your attention

Contact: Kirsten Elger: kelger@gfz-potsdam.de