

HGF Alliance: Remote Sensing and Earth System Dynamics

Data Publication

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Why are we speaking about research data?

Research data is fundamental for scientific research

There are increasing expectations by the scientific community as well as by funding agencies and the public to make publicly funded research results and data free and open accessible without any constraints.

What many researchers fear

- too much work with no benefit
- data publications were deleted from reference lists by journal editors
- they mis-interpret or mis-use my data
- someone will publish my data before me

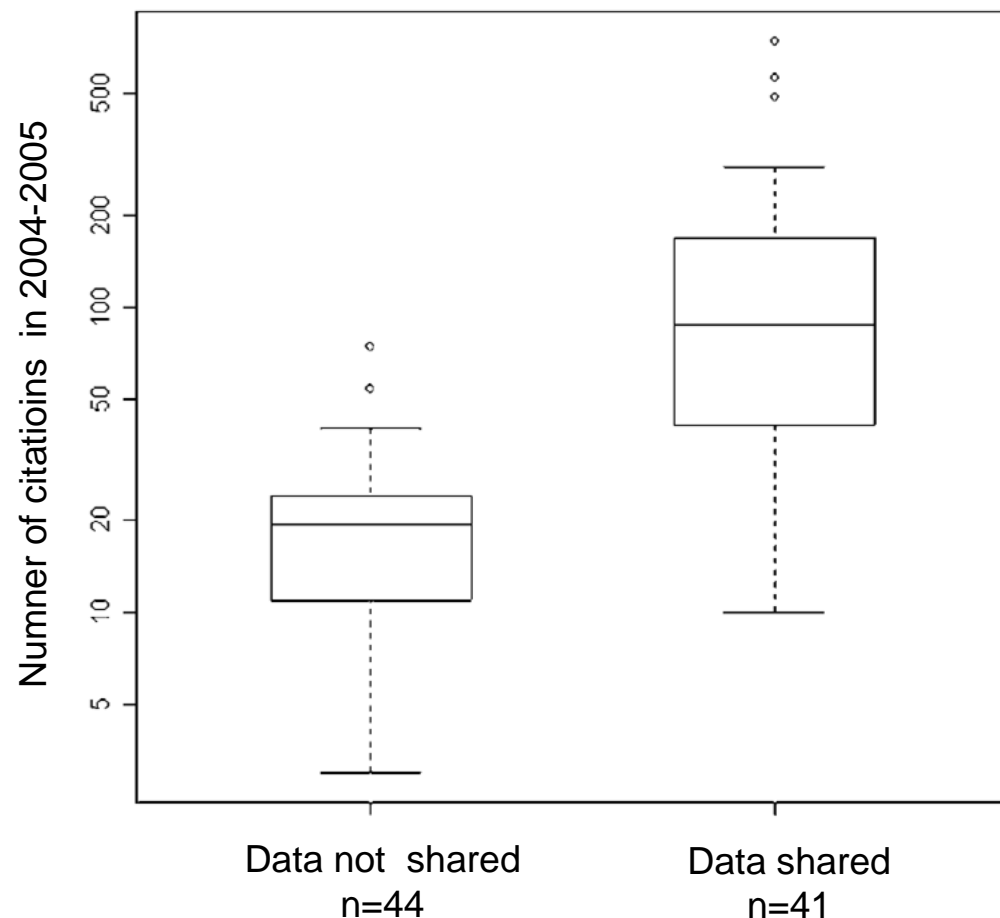
Sharing Detailed Research Data Is Associated with Increased Citation Rate

Heather A. Piwowar*, Roger S. Day, Douglas B. Fridsma

Department of Biomedical Informatics, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania, United States of America

*“We examined the citation history of 85 cancer microarray clinical trial publications with respect to the availability of their data. The **48% of trials with publicly available microarray data received 85% of the aggregate citations. Publicly available data was significantly** ($p = 0.006$) **associated with a 69% increase in citations, independently of journal impact factor, date of publication, and author country of origin using linear regression.**”*

[doi:10.1371/journal.pone.0000308](https://doi.org/10.1371/journal.pone.0000308)



Recent international steps towards open access of scientific research data

- **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.“*
- **German Alliance of Science Organisations (2010): Principles for the Handling of Research Data:** *„Quality-assured research data are a cornerstone of scientific knowledge and [...] can often serve as the basis for further research. [...]. Preserving research data over the long term and making them available therefore does not only serve the verification of prior results, but also, to a large extent, the obtaining of future ones. It is a strategic task to which science and the humanities, politics as well as other parts of society, must contribute“*
- **G8 Science Ministers Statement (June 2013):** *„to the largest extent and with the fewest constraints possible, publicly funded scientific research data should be open [...] while acknowledging the legitimate concerns of private partners.“*
- Followed by the **EU Implementation of the Open Data Charter** and national initiatives like, e.g., the **„Digital Agenda“** of the Federal Government of Germany,

Principles for the Handling of Research Data

German Alliance of Science Organisations

DFG

HRK



MAX-PLANCK-GESELLSCHAFT

WR
WISSENSCHAFTSRAT

DAAD

Partners

- Alexander von Humboldt Foundation
- Deutsche Forschungsgemeinschaft (DFG, German Research Foundation)
- Fraunhofer-Gesellschaft
- German Academic Exchange Service (DAAD)
- German Academy of Sciences Leopoldina
- German Rectors' Conference (Hochschulrektorenkonferenz - HRK)
- Helmholtz Association
- Leibniz Association
- Max Planck Society
- Wissenschaftsrat (German Council of Science and Humanities)



Alexander von Humboldt
Stiftung / Foundation

Leibniz
Leibniz-Gemeinschaft



Leopoldina
Nationale Akademie
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Helmholtz Open Science Policy

- ***Open science, the unrestricted access to scientific publications and cultural heritage, is an ongoing and future trend in the scientific landscape worldwide. Research publications and other digital objects such as research data and scientific software will thus be publicly available on the internet.***
- *The Helmholtz Association was one of the initial signatories of the „Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities“ in 2003. This commitment towards open access was then formally approved by its Assembly of Members (assembly of the directors of the Helmholtz Centres): „**Publications from the Helmholtz Association shall in future, without exception, be available free of charge, as far as no conflicting agreement with publishers or others exists.**“ (Resolution of the Assembly of Members, 27 September 2004).*
- *An Open Access Policy of the Helmholtz Association is ensuring that publications originating from funded projects will be made freely available to the public on the internet.*

2013

....there is no way out:
we will have to share our data

but... with acknowledgement

Statement of Commitment, Jan 2015

Coalition on Publishing Data in the Earth and Space Sciences

*This statement of commitment signals important progress and a continuing commitment by publishers and data facilities **to enable open data in the Earth and space sciences.***

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.

Signed by: American Astronomical Society, American Geophysical Union, American Meteorological Society, Biological and Chemical Oceanography Data Management Office, Woods Hole, Oceanographic Institution (BCODMO), Center for Open Science, CLIVAR and Carbon Hydrographic Data Office (CCHDO), Community Inventory of EarthCube Resources for Geosciences Interoperability, (CINERGI), Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI), Continental Scientific Drilling Coordination Office (CSDCO), Copernicus Publications, Council of Data Facilities, Elsevier, European Geosciences Union, Geological Data Center of Scripps Institution of Oceanography, Geological Society London, ICSU World Data System, Incorporated Research Institutions for Seismology (IRIS), Integrated Earth Data Applications (IEDA), John Wiley and Sons, Magnetism Information Consortium (MagIC), Mineralogical Society of America, Neotoma Paleoecology Database, National Snow and Ice Data Center, Nature Publishing Group, OpenTopography, Paleontological Society, Proceedings of the National Academy of Sciences, Rolling Deck to Repository (R2R), Science, Springer, UNAVCO

Statement of Commitment, Jan 2015

Coalition on Publishing Data in the Earth and Space Sciences

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.

Key commitment of publishers and unions:

- *To promulgate **metadata information and domain standards**, including in the online directory, to help **simplify and standardize deposition and reuse**.*
- *To promote referencing of data sets using the **Joint Declaration of Data Citation Principles**, in which **citations of data sets should be included within reference lists***
- *To **include in research papers** concise **statements indicating where data reside and clarifying availability**.*
- *To promote and implement **links to data sets in publications and corresponding links to journals in data facilities via persistent identifiers**. Data sets should ideally be referenced using registered DOI's.*

Data publications – persistent and citable

Data publication with assigned DOI

➤ **citable**

DOI have emerged as the leading system for text and data publication (COPDESS 2015).

➤ **persistent**

long-term data access guaranteed (by the publisher) despite servers being changed or switched off or people change affiliations and email addresses.

➤ **with metadata and data description**

essential for data re-use and discovery, a comprehensive data description should be made a condition for assigning a DOI to a dataset.

What do I need for a data publication

1. Research data (ideally file-based)
2. Metadata for data discovery (authors, title, abstract, location, etc.)
3. Structural/ technical metadata for data re-use (data format, processing steps, used instruments or sensors, etc.)

→ **Digital object identifier (DOI)**

Example for metadata for data discovery



GFZ
Helmholtz Centre
POTSDAM

DOI- „LANDING PAGE“

Imprimatur

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, Lelf; 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 Svea 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 drillers depth and nearly 100 % core recovery was achieved. Surprising was the homogeneity of the Svea 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, geoscientificInformation, 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 > METAMORPHIC ROCK FORMATION

More Metadata

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

title
citation

description/
abstract

keywords

spatial/
temporal
coverage

download
data files
(for data
publilation)

related work

Structural Metadata

Metadata of the Data Tables

Sites

	Column Name	Data Type	Description	Validation Text
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=Joide, 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
6	LATITUDE_MIN	Double	decimal minutes of site latitude (latitude of hole 'A')	real value
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
9	LONGITUDE_MIN	Double	decimal minutes of site longitude	real value
10	LONGITUDE_DIR	Text	direction site longitude	text string of max. 1 character
11	DATE_START	Date	date of site start	date in YYYY-MM-DD
12	DATE_END	Date	date of site end	date in YYYY-MM-DD

ICDP – data labels

ESA DUE Permafrost



SAR Freeze/Thaw v2 product guide



Vienna University of Technology
Institute of Photogrammetry and Remote Sensing

GAMMA REMOTE SENSING

UNIVERSITY OF Waterloo



Gamma Remote Sensing

Contents

- 1 Product overview
- 2 Improvements relative version 1
- 3 Product specification
- 4 Known issues
 - 4.1 Limited ENVISAT ASAR GM data coverage
 - 4.2 Influence of sub-pixel water bodies
 - 4.3 Map artifacts
- 5 Data access and contact information
- 6 References

2012 January

Formats for data publication

1. Data supplement to scientific articles
 - data description in the scientific article
2. Article in a Data Journal
 - data description is a peer-review article
3. Data publication with adjoint data report
 - data description in a data report

1. Widely known: data supplements to scientific articles

The screenshot shows a web interface for a data supplement. A yellow circle highlights the 'Dataset' icon in the top left. A red circle highlights the 'Data Files' section, which lists three files: 'Swierczynski_2013_CP_microXRF.txt' (2 97219 Bytes), 'Swierczynski_2013_CP_detrital layers.txt' (24 89 Bytes), and 'Swierczynski_2013_CP.xls' (446219 Bytes). A red arrow points from the text 'Links to datasets' to the file list. A green circle highlights the 'Related Work' section, which contains a link to the original article: 'http://dx.doi.org/10.5194/cp-9-1601-2013'. A green arrow points from the text 'Link to original article with data description' to this link. The page also includes a title 'Supplement to: Late Neolithic Mondsee Culture in Austria: Living on lakes and living with flood risk?', a 'Released' status, a citation, an abstract (stating no abstract is available), keywords, more metadata with links to view or download data in various formats, a location map, and a section to find more research data.

Dataset

Supplement to: Late Neolithic Mondsee Culture in Austria: Living on lakes and living with flood risk?

Released

Cite as:
Swierczynski, Tina; Lauterbach, Stefan; Dulski, Peter; Brauer, Achim (2013): Supplement to: Late Neolithic Mondsee Culture in Austria: Living on lakes and living with flood risk?. Deutsches GeoForschungsZentrum GFZ. <http://dx.doi.org/10.5880/GFZ.5.2.2012.002>

Data Files

- Swierczynski_2013_CP_microXRF.txt 2 97219 Bytes
- Swierczynski_2013_CP_detrital layers.txt 24 89 Bytes
- Swierczynski_2013_CP.xls 446219 Bytes

License: cc-by

Abstract
There is no abstract available.

Keywords
Terrestrial Hydrosphere, Hydrology, Geoscientific Information, Floods
EARTH SCIENCE > Terrestrial Hydrosphere > Hydrology

More Metadata
datacite: [view inline](#) / [download xml](#)
dif: [view inline](#) / [download xml](#)
escidoc: [view inline](#) / [download xml](#)

Related Work
Supplement to
<http://dx.doi.org/10.5194/cp-9-1601-2013>

Find More Research Data
<http://bib.telegrafenberg.de/finden/datenbanken/forschungsdaten/>

Location
Latitude: 47.816667 Longitude: 13.4

Links to datasets

Link to original article with data description

Data Supplements -2

- required by many journals → but only open access if the journal is an open access journal
- problem: data supplements have been lost after a journal changed its publisher

We recommend...

- to publish **data supplements in open access data repositories**
- **synchronous to the publication** of the scientific article with cross-references between the article and the dataset

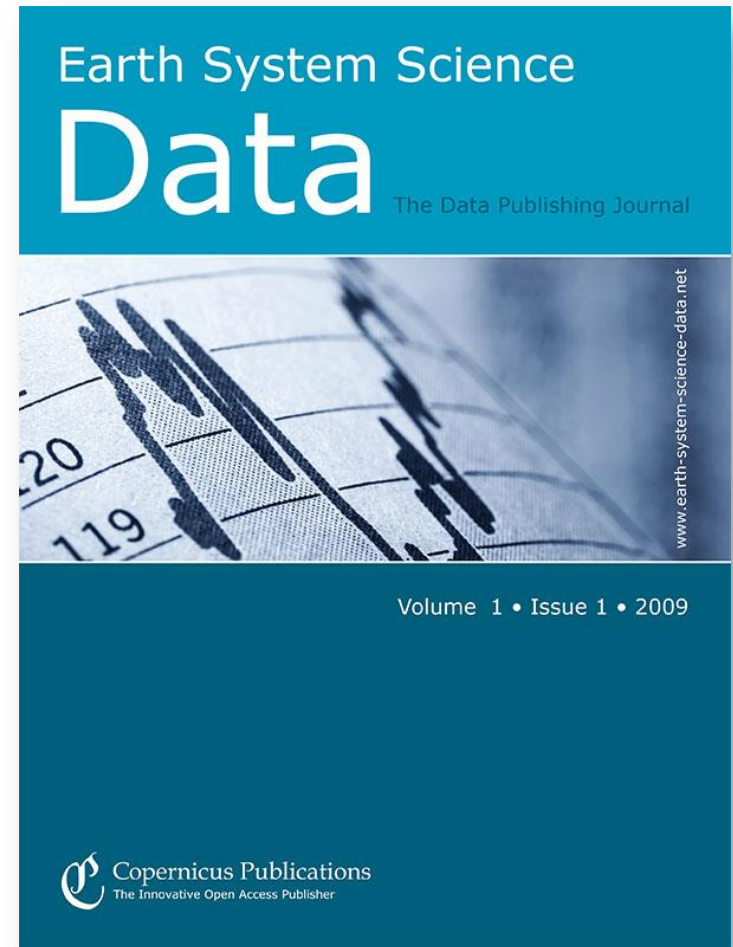
2. New development: Data Journals

Peer-review articles with the description of datasets, data collections, data portals, etc.



Data Journals: Example ESSD

- Copernicus Open Access Journal for the publication of datasets and data collections
- Peer-review of articles and adjoined datasets
- **No scientific interpretation** of the data
- Data storage in appropriate domain repositories (and not in ESSD)
- **Indexed in the Web of Science since March 2015 (as first data journal)**



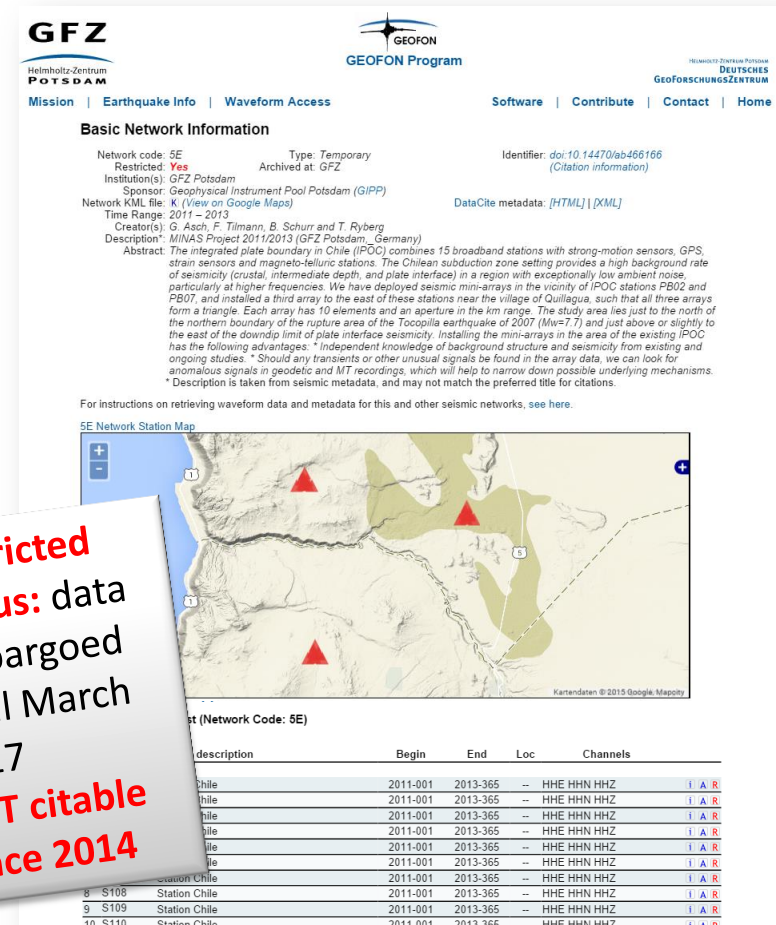
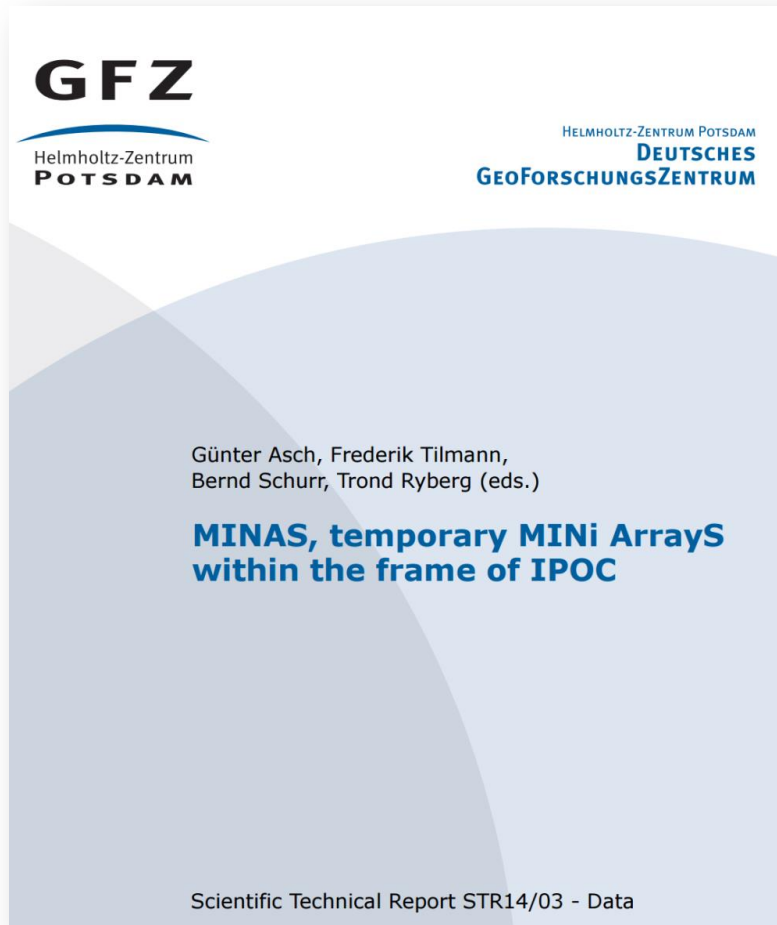
3. Data Reports – GFZ examples

Institutional Report Series have long traditions, as important sources of information. Today: online accessible and citable with DOI...

- Flexible format – „enhanced data description“
- More than a README but less than a data article
- Project-specific design if required
- One data report could serve for several datasets



Example: data publication with data report



DOI 1 for Report

DOI 2 for Data

→ Data report for enhanced data description

Data publication for EDA

PANGAEA data publication: Stettner et al. (2015) Retreat of top cliff of Kurungnakh Island, Lena Delta, Siberia, Russia, 2010-2014, with links to shapefiles, doi:10.1594/PANGAEA.846164



PANGAEA®
Data Publisher for Earth & Environmental Science

Not logged in (log in or sign up)

Always quote citation when using data!

Data Description

Show Map Google Earth RIS BioRx

Citation:

Stettner, Samuel; Bartsch, Annett; Widhalm, Barbara; Heim, Birgit; Günther, Frank; Morgenstern, Anne; Roth, Achim; Chetverova, Antonina; Fedorova, Irina (2015): Retreat of top cliff of Kurungnakh Island, Lena Delta, Siberia, Russia, 2010-2014, with links to shapefiles. *Alfred Wegener Institute - Research Unit Potsdam*, doi:10.1594/PANGAEA.846164

Abstract:

Thawing-induced cliff top retreat in permafrost landscapes is mainly due to thermo-erosion. Ground-ice-rich permafrost landscapes are specifically vulnerable to thermo-erosion and may show high degradation rates.

Within the HGF Alliance Remote Sensing and the FP7 PAGE21 permafrost programs we investigated how SAR and optical remote sensing can contribute to the monitoring of erosion rates of ice-rich cliffs in Arctic Siberia (Lena Delta, Russia).

We produced two different vector products:

i) Intra-annual cliff top retreat based on TerraSAR-X (TSX) satellite data (2012-2014):

High-temporal resolution time series of TSX satellite data allow the inter-annual and intra-annual monitoring of the upper cliff-line retreat also under bad weather conditions and continuous cloud coverage. This published SAR product contains the retreating upper cliff lines of a 1.5 km long part of eroding ice-rich coast of Kurungnakh Island in the central Lena Delta. The upper cliff line was mapped using a thresholding approach for images acquired in the years 2012, 2013 and 2014 for the months June (2013, 2014), July (2013, 2014), August (2012, 2013, 2014) and September (2013, 2014). The cliff top retreat vector product is called 'upper_cliff_TerraSAR-X'. While the 2014 cliff lines show a clear retreat of 2 to 3 m/month, the cliff top lines for 2012 and 2013 are



The long-term cliff top retreat derived from optical satellite data are 35 m cliff retreat within 4 years. The higher-temporal resolution SAR data equivalently show long-term rates of 18 m within 2 years and nearly now degradation activities in winter but maximum erosion rates in summer months. The intra-seasonal cliff top retreat lines from 2014 show a rate of 2 to 3 m per month.

Related to:

Stettner, Samuel; Bartsch, Annett; Widhalm, Barbara; Heim, Birgit; Günther, Frank; Morgenstern, Anne (2015): Product Guide: TerraSAR-X derived Cliff Top Retreat. *Helmholtz Alliance: Remote Sensing and Earth System Dynamics*, 6 pp, [hdi:10013/epic.45520.d001](https://doi.org/10.1013/epic.45520.d001)

Coverage:

Latitude: 72.328150 * Longitude: 126.284335

Data

Download dataset as tab-delimited text (use the following character encoding: UTF-8: Unicode (PANGAEA default))

1	2	3	4
Date/Time	Date/time end	Content	URL title
2010-08-05	2014-08-19	4-year cliff top retreat based on optical satellite data (2010-2014)	Link
2012-06-01	2014-09-30	Intra-annual cliff top retreat based on TerraSAR-X (TSX) satellite data (2012-2014)	Link

Link to product guide

Link to datasets

PANGAEA data publication: Product Guide to Stettner et al. (2015) doi:10.1594/PANGAEA.846164

Product Guide: TerraSAR-X derived Cliff Top Retreat



**Helmholtz Alliance:
Remote Sensing and Earth System Dynamics**



- 6 pages
- Introduction and product overview
- Data and Methods
- Processing of Optical Image Data
- Processing of SAR Data
- Results and References

Intra- and Inter-annual Monitoring of Cliff Top Retreat, Lena
Siberia (2010-2014)

Thawing-induced cliff top retreat in permafrost landscapes is mainly due to thermo-erosion and ice-rich permafrost landscapes are specifically vulnerable to thermo-erosion and the F77-PAC degradation rates. Within the HGF Alliance Remote Sensing and the F77-PAC programs we investigated how SAR and optical remote sensing can contribute to the erosion rates of ice-rich cliffs in the Lena Delta in Arctic Siberia (Russia) (Fig. 1, Fig. 2).

We produced two different vector products:

We produced two different vector products:

- i) **Intra-annual cliff top retreat** based on TerraSAR-X (TSX) satellite data (2012-2014):
 High-temporal resolution time series of TSX satellite data allow the conditions and monitoring of the upper cliff-line retreat also under bad weather conditions and low coverage. This published SAR cliff retreat analysis in the central Laja Delta. The upper cliff-erosion is the coast of Kurungnagh Island in the years 2012, 2013 and 2014. The erosion is the coast of islands acquired in the years 2012, 2013 and 2014 and September 2015. Using a thresholding approach for images acquired in the years 2012, 2013, 2014 and September 2015, a cliff-erosion vector product is called "upper_cliff_TerraSAR-X".
- ii) **4-year cliff top retreat** based on optical satellite data (2010-2014):
 The 4-year cliff-top retreat is based on the high-spatial resolution optical satellite data (2010-2014). The 4-year cliff-top retreat is based on the high-spatial resolution optical satellite data (2010-2014).

Long-term cliff top retreat could be assessed with 2 high-spatial resolution o (GeoEye-1, 2010-08-05 and Worldview-1, 2014-08-19). The cliff-retreat ve 'upper cliff optical'.

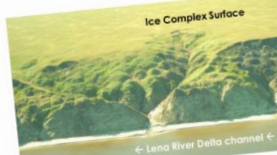


Figure 1: Eroding cliff at Kurungnakh Island at the southern end of the island. The undisturbed ice complex surface to the actively eroding cliff is referred to as the 'ice plateau'.

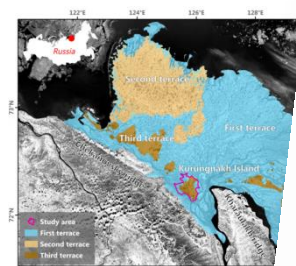


Figure 1: Geomorphological overview of the Lena Delta and location of the study area. The geomorphological units can be differentiated in the Lena Delta (Grigoriev, 1993). The delta with heights from 1–12 m above sea level (m.a.s.l.) and has formed since the Miocene with heights ranging from 11–30 m was formed during the Late Pleistocene to Early ranges from 30–60 m elevation and is the oldest part of the delta area. Its upper layer represent erosional remnants of a Late Pleistocene sedimentary accumulation plane and ice-rich sediments derived from the Chukanovaly Ridge and the Kharauskal Ridge et al. 2011). Underneath these so called Ice Complex deposits are fluvial sands. The Ice strand is usually in the range of 30–50 cm depth during summer. Geomorphological units in the Lena Delta are data published in PANGAEA (Morgner Landst ETM# 2000).

Data and Methods

Software used:

- Next ESA SAR Toolbox (NEST) 5.1 for pre-processing of SAR
- ENVI + IDL for scale conversion of backscatter intensities
- ArcGIS 10.3 for raster analysis and mapping of the cliff top
- PCI Ortho Engine 2014 for orthorectification of optical sat

Data source

- TSX data were made available through DLR EOS Land Overview on image acquisitions see Fig. 3

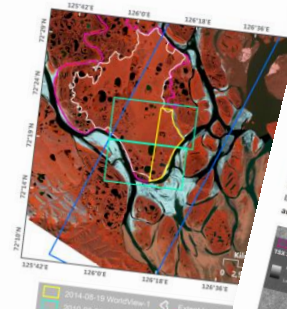


Figure 2: Study area and image frames of datasets used. The TSX acquisition 2010-08-04, RGB composite S21 (copyright

Processing of Optical Image Data

Orthorectification of the WorldView-1 and GeoEye-1 acquisitions was done using the module OrthoEngine of PCI Geomatica 2014, in total 7 ground control points were set with an overall GCP RMS of 0.33 meters using the ratio collected during the LENA2013 expedition in summer 2013 with kinematic-GPS mode. The two cliff top lines from the optical image

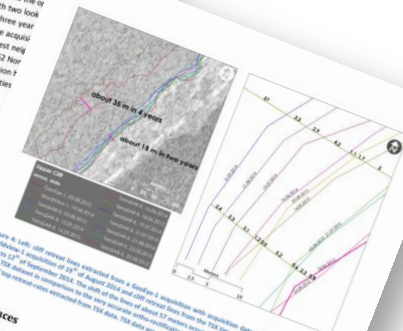
4 Results

The overall cliff top retreat-rate extracted from TSK of about 15° of the optical satellite images of about 35 m in 4 years (when look time series) (Figure 4). The intra-seasonal cliff top retreat lines: month. The lines from 2012 and 2013 are not always chronologically differing image quality. However, cliff top lines from the end of lines from the beginning of the next summer season, reflecting

Processing of SAR Data

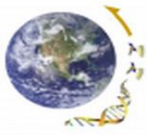
The TSX data were delivered in Level 1 B. For preprocessing of the TSX data the *er* NEST from ESA was used. To improve image quality, multi-looking with two look every image of the time series. The eroding coast is observed over a three year are no successive DEMs available that reflect the terrain for each of the acquisition of an ellipsoid correction was performed with a geolocation grid and nearest full spatial resolution of 2.5 m in the UTM Map projection WGS 1984. The comparison of the processed TSX images: Horizontal and vertical interpretation of the ortho-rectified optical satellite images: Horizontal and vertical interpretation.

A thresholding of the scaled backscatter images (> 46 scaled backscatter) lines were digitized in 1:2000 scale. A lateral shift with disturbed surface (see Fig. 1) compared to the cliff top lines derived from the TSS-derived cliff top lateral shift is due to the only optical-based correction of the TSS dataset accurate ortho-rectification of the optical satellite images. Finally, the backscatter intensities

[illegible]

References

- Articles**
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<http://dx.doi.org/10.1016/j.quaint.2010.04.004>



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Data Products



Biosphere:

- Forest
- ...



Hydrosphere:

- Soil moisture
- Ocean currents



Geosphere:

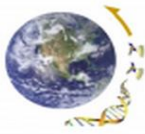
- Earthquakes
- Volcanoes
- Landslides
- Urban subsidence



Cryosphere:

- Land ice
- Sea ice
- Permafrost
- Snow

Proposed cross-reference of data publications on the HGF EDA Website



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Cryosphere > Permafrost (upper part)

Permafrost is perennial frozen ground for at least two consecutive years. It is acknowledged by the World Meteorological Organisation (WMO) and the United Nations Framework Convention on Climate Change (UNFCCC) as Essential Climate Variable (ECV) and is being monitored for decades, e.g., within the Global Terrestrial Network for Permafrost (GTN-P)...



Remote sensing can monitor these indicators and identify hotspots of surface change. Consequently, it can advise on extension of in-situ monitoring networks and places in-situ measurements into a wider spatial context and supports modelling of subsurface conditions.

Radar remote sensing operates through cloud cover and during polar night allowing high-temporal monitoring of **disturbance**, of the **frozen or non-frozen state** of the ground, of **frost-heave and ground subsidence**, of **waterbodies** and **lake and river ice**, as well as the dynamics of **surface soil moisture** and **vegetation**.



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Cryosphere > Permafrost (lower part)

Available products

Disturbance:

Permafrost landscape instability and geohazards express themselves as landslides and (thermo-) erosion (**disturbance**) that can be monitored by satellite remote sensing.

- **Top-cliff erosion:** change detection of the top-cliff erosion line along coastal cliffs in the Lena River delta based on TerraSAR-X data from 2013-2014 ([Link to PANGAEA Stettner et al. 2015](#))
- *Next product when it is available*

Subsidence:

Seasonal ground subsidence occurs every summer due to the melting of ice in the upper ground. The magnitude of subsidence can be used to derive the ice content in the upper ground that seasonally thaws in summer (active layer).

- *Next product when it is available*

More product groups to come: **ground frozen/ non-frozen state, surface moisture, lake dynamics, lake ice (as applicable)**



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Cryosphere Work Packages

[Internal EDA Teamsite](#)

WP C7: Sea ice classification and thickness retrieval

Responsible: Prof. Dr. Lars Kaleschke (Universität Hamburg)

WP C8: Freeze/ thaw, soil moisture, and terrain disturbances in permafrost regions

Responsible: Dr. Birgit Heim (AWI)

Data products: *Disturbance: permafrost cliff erosion* [doi: 10.1594/PANGAEA.846164](https://doi.org/10.1594/PANGAEA.846164)

WP C9: Permafrost thaw-season subsidence

Responsible: Dr. Julia Boike, Prof. Dr. Wolfgang Hubberten (AWI)



conclusions

- Free and open access to scientific results and research data is required by the scientific community, funding agencies, and the public
- Data publications can be included in reference lists
- Best and safest way: data publication with DOI in appropriate (theme specific) open access data repositories (e.g. permafrost products in PANGAEA, Geosphere Products at GFZ, sea ice in WDS Climate at DKRZ...)
- Cross-reference at the HGF-EDA website
- Next steps, timeline