

# PANGAEA.

Community Workshops



## Find & retrieve data

08 & 09 May 2025



# AWI

ALFRED-WEGENER-INSTITUT  
HELMHOLTZ-ZENTRUM FÜR POLAR-  
UND MEERESFORSCHUNG



University  
of Bremen



# The workshop team



**Dorothee  
Kottmeier**

Terminology Manager  
& Data Steward  
PANGAEA / HMC



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DAM Project Manager &  
Data Editor



**Dana Ransby**

Data Manager & Data  
Editor



# The workshop team



**Uwe Schindler**

Technical infrastructure,  
metadata, search



**Kathrin  
Riemann-Campe**  
DAM Data Editor



**Lars Möller**  
Science & Service  
Coordinator

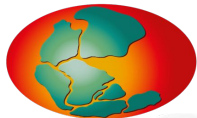


# Outline Day 1



May 08	Intro & Find data
10:30 am	Welcome & ...
10:35 am	Brief introduction to PANGAEA
10:45 am	PANGAEA search challenge
11:30 am	<b>Break</b> (10 min)
11:40 am	Search challenge - presentation & discussion
12:00 pm	"Advanced search" presentation
12:20 am	<b>Questions &amp; Answers</b> (10 min)





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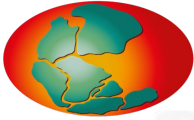




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# PANGAEA in a nutshell



# PANGAEA in a nutshell

- Information system for long-term archival and publication of scientific data
- Established  $\pm$  30 years ago
- Hosted by:



- Accredited:



WMO Information System



**PANGAEA.**  
Data Publisher for Earth & Environmental Science

SEARCH

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**Welcome to PANGAEA® Data Publisher**

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Search for measurement type, author name, project, taxa,...

**CHEMISTRY**  
(73533)

**LITHOSPHERE**  
(50297)

**BIOLOGICAL CLASSIFICATION**  
(34336)

**ATMOSPHERE**  
(31773)

**PALEONTOLOGY**  
(25880)

**Latest News**

2024-04-02  
**REGISTRATION - COMMUNITY AND RETRIEVAL**

**PANGAEA.**  
Community Workshop

deNBI

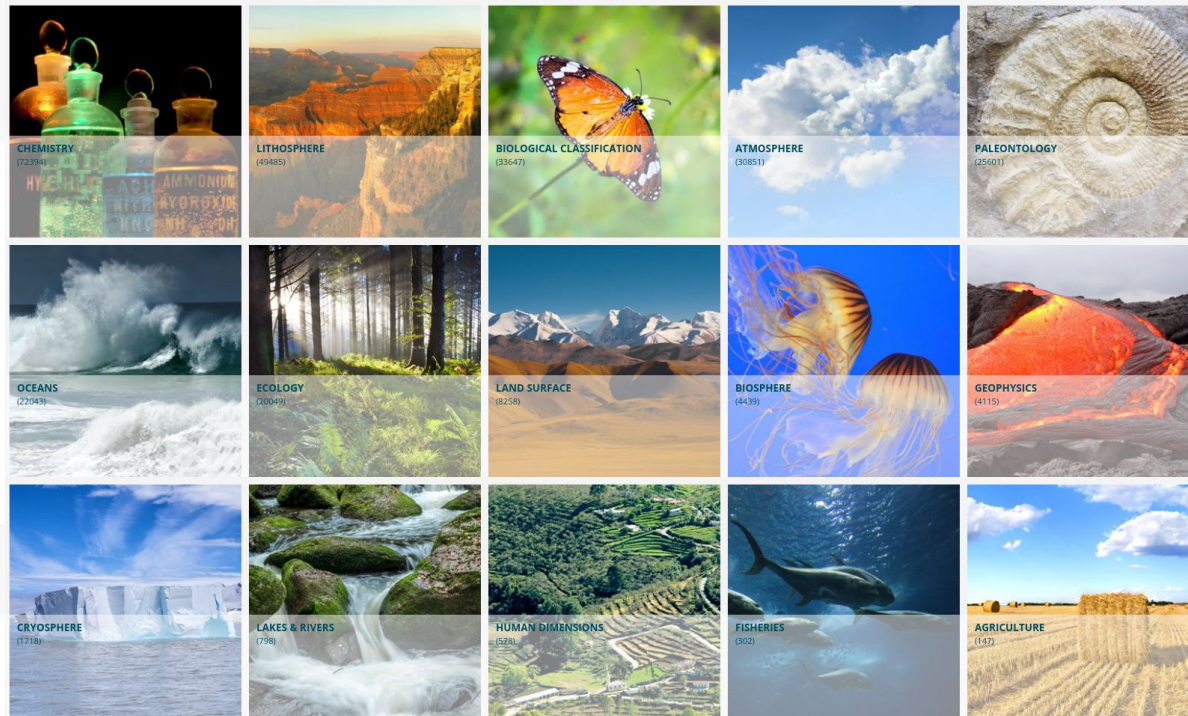
PANGAEA data use and analysis notebooks. You can find the latest version of the PANGAEA data use and analysis notebooks on 03 May 2024, at 12:00 (UTC+2). For more information, see this post.

2024-01-24  
**PANGAEA C**



# PANGAEA in a nutshell

- multidisciplinary data

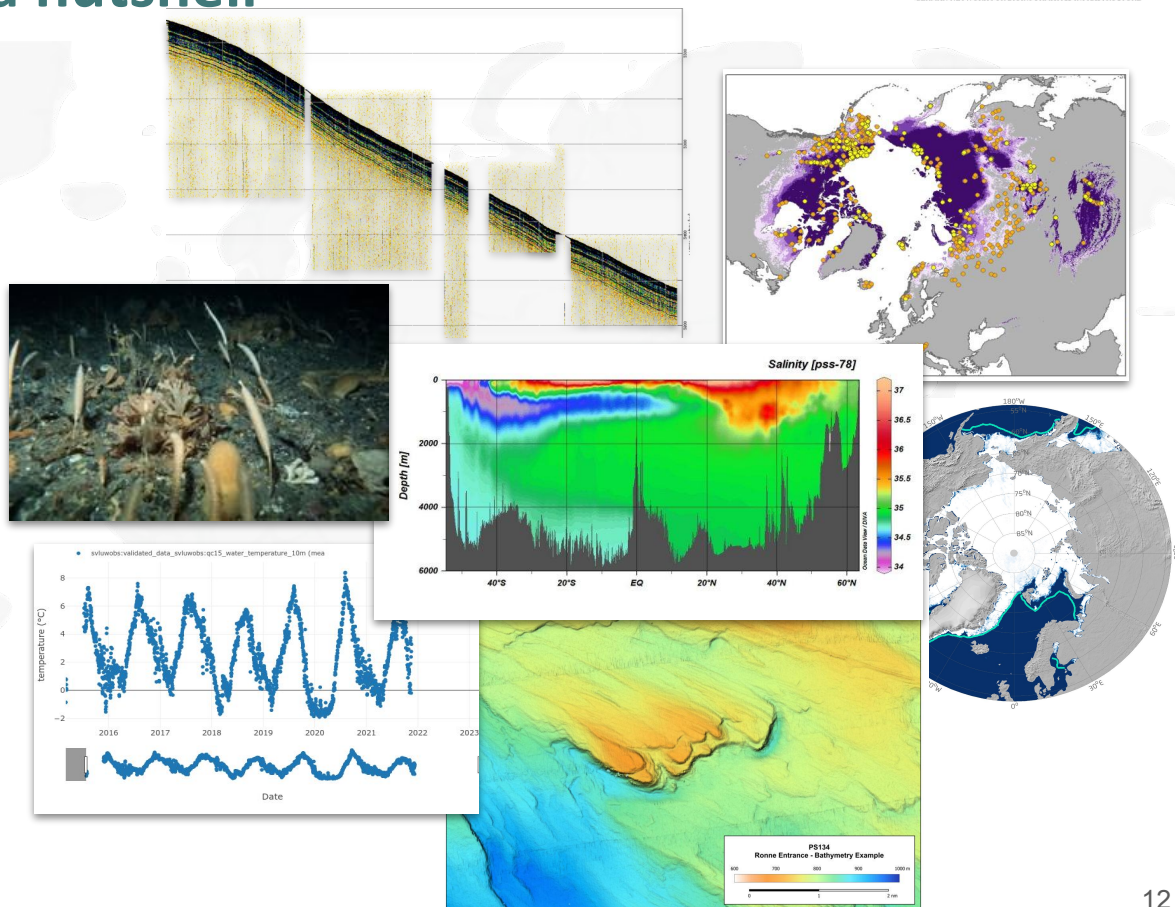






# PANGAEA in a nutshell

- multidisciplinary data
- heterogeneous data types

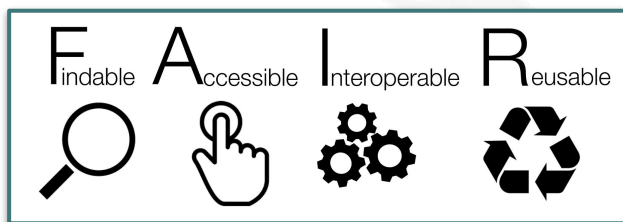
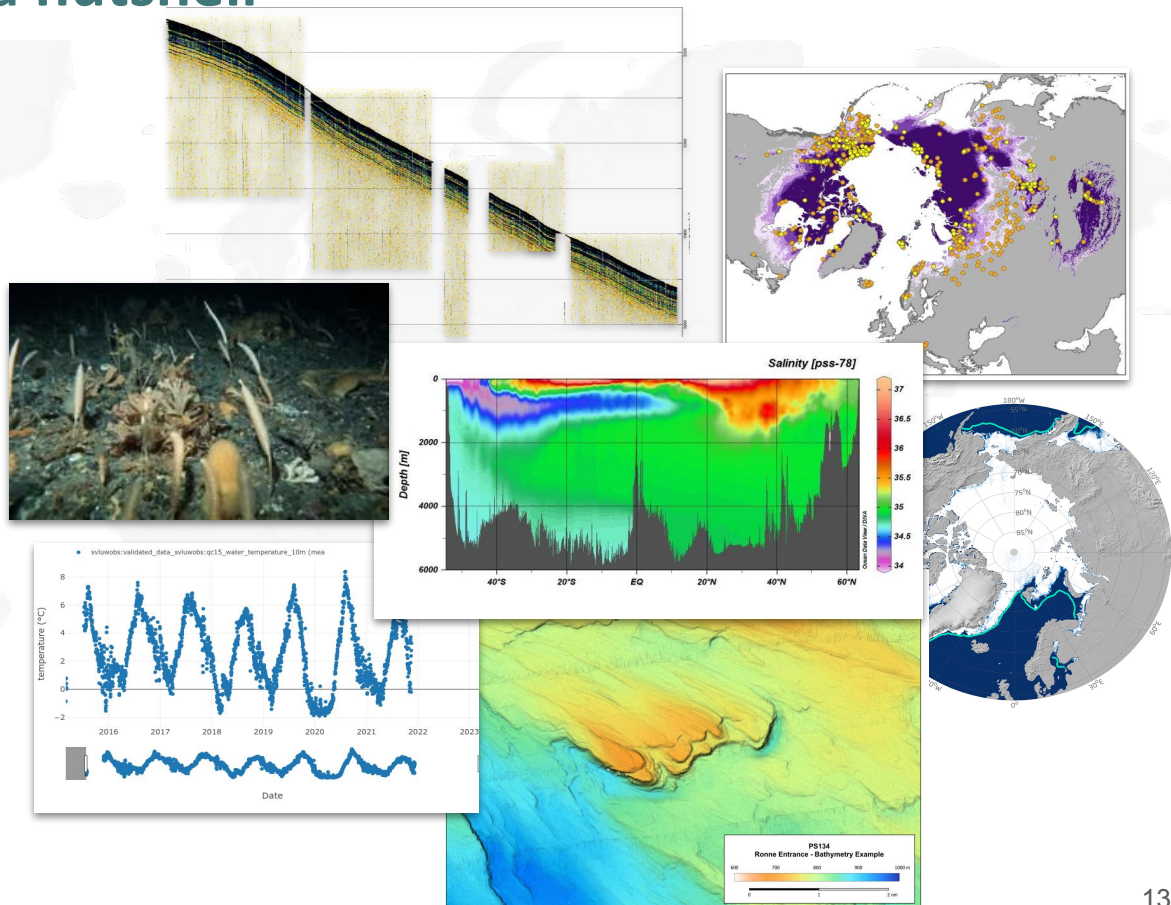






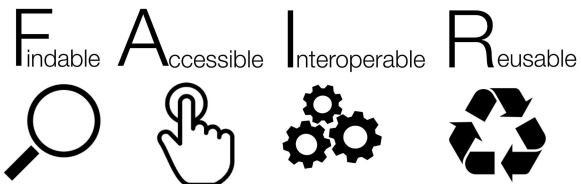
# PANGAEA in a nutshell

- multidisciplinary data
- heterogeneous data types
- quality controlled via manual review & curation

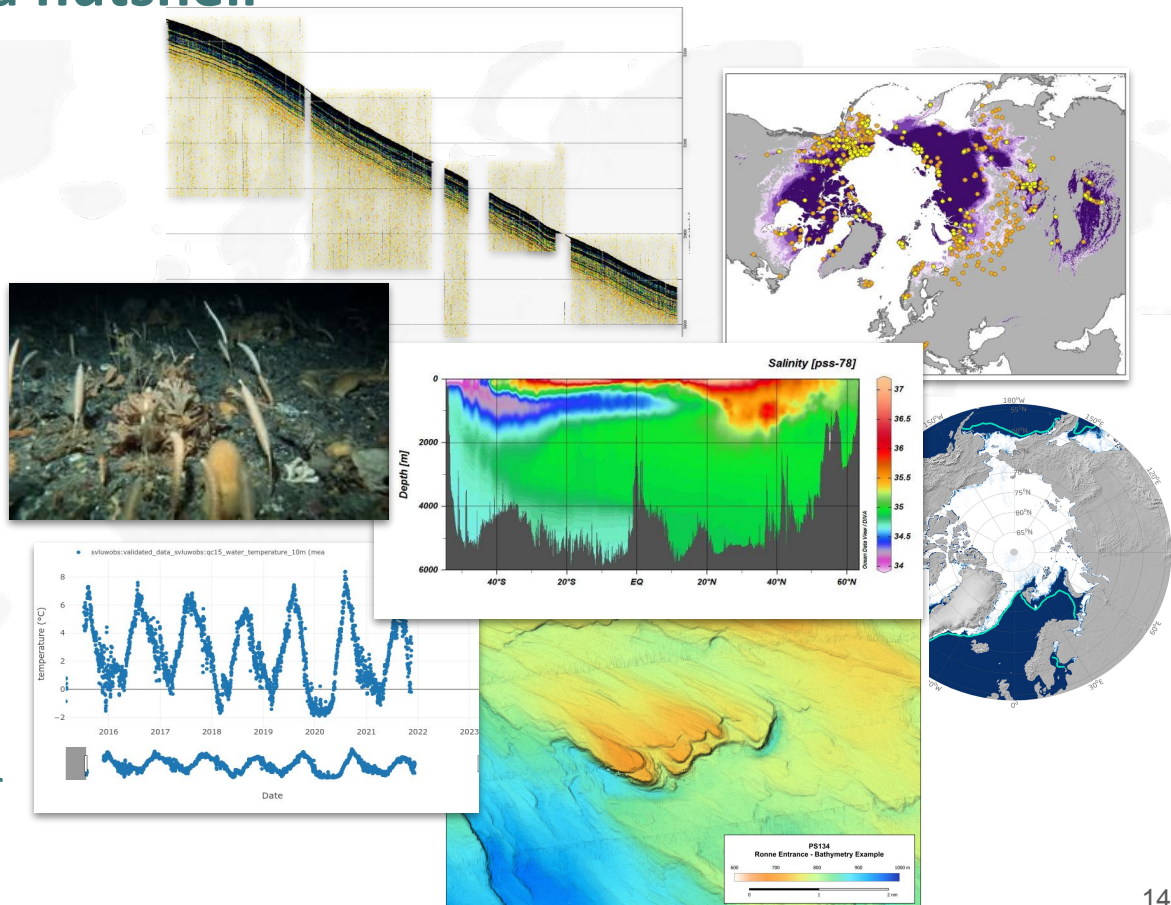




# PANGAEA in a nutshell



- > 435,000 datasets
- > 33 billion measurements
- > 890 projects
- ~ 10,000 new datasets / year

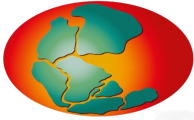




# Who is behind PANGAEA?

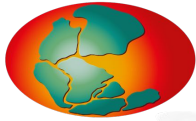
- Team consists of ...
  - Data editors
  - Scientific project & data managers
  - Software developers
  - Management & Coordination
- ...and associated partners





# The keys to PANGAEA data





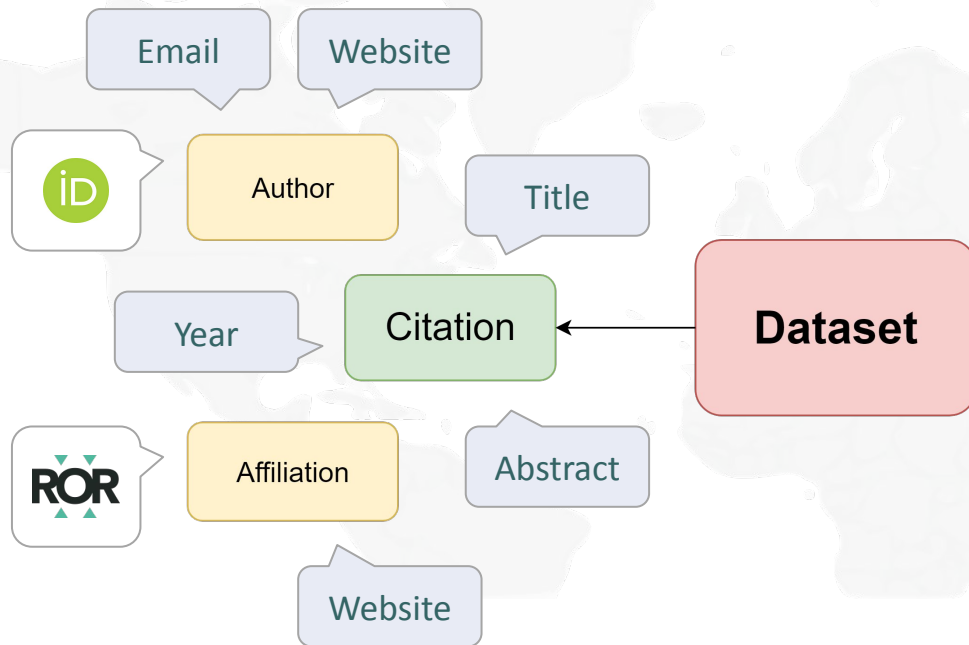
# Data model



**Dataset**



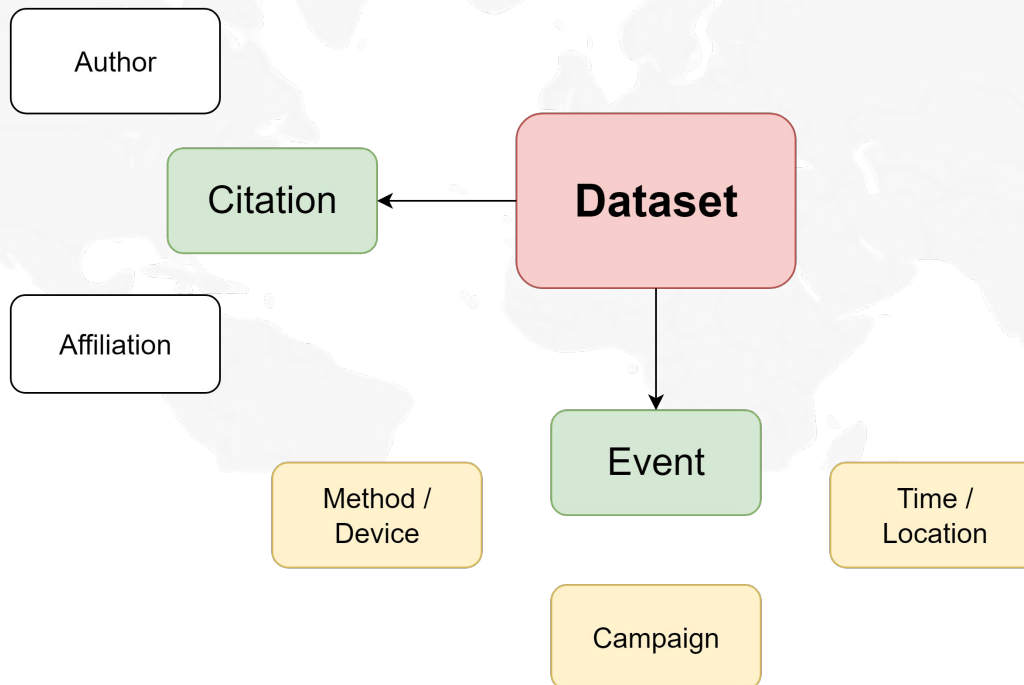
# Data model





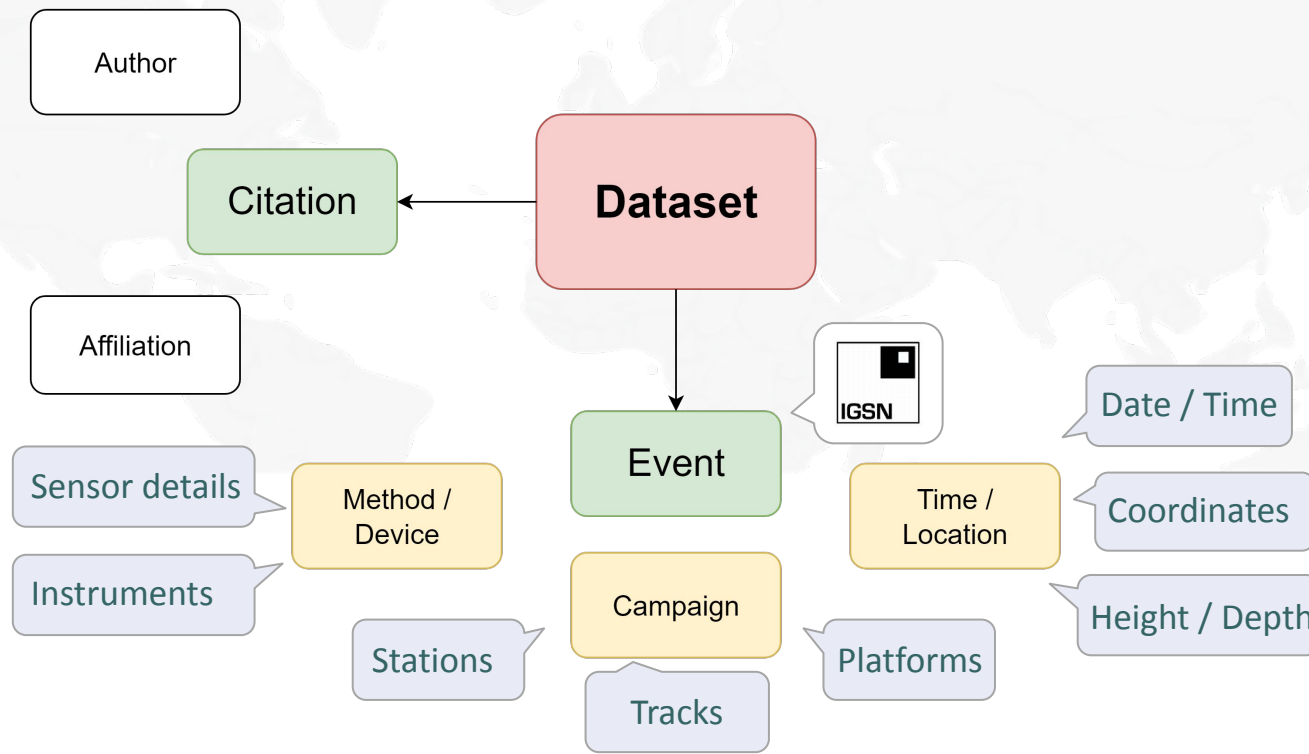


# Data model



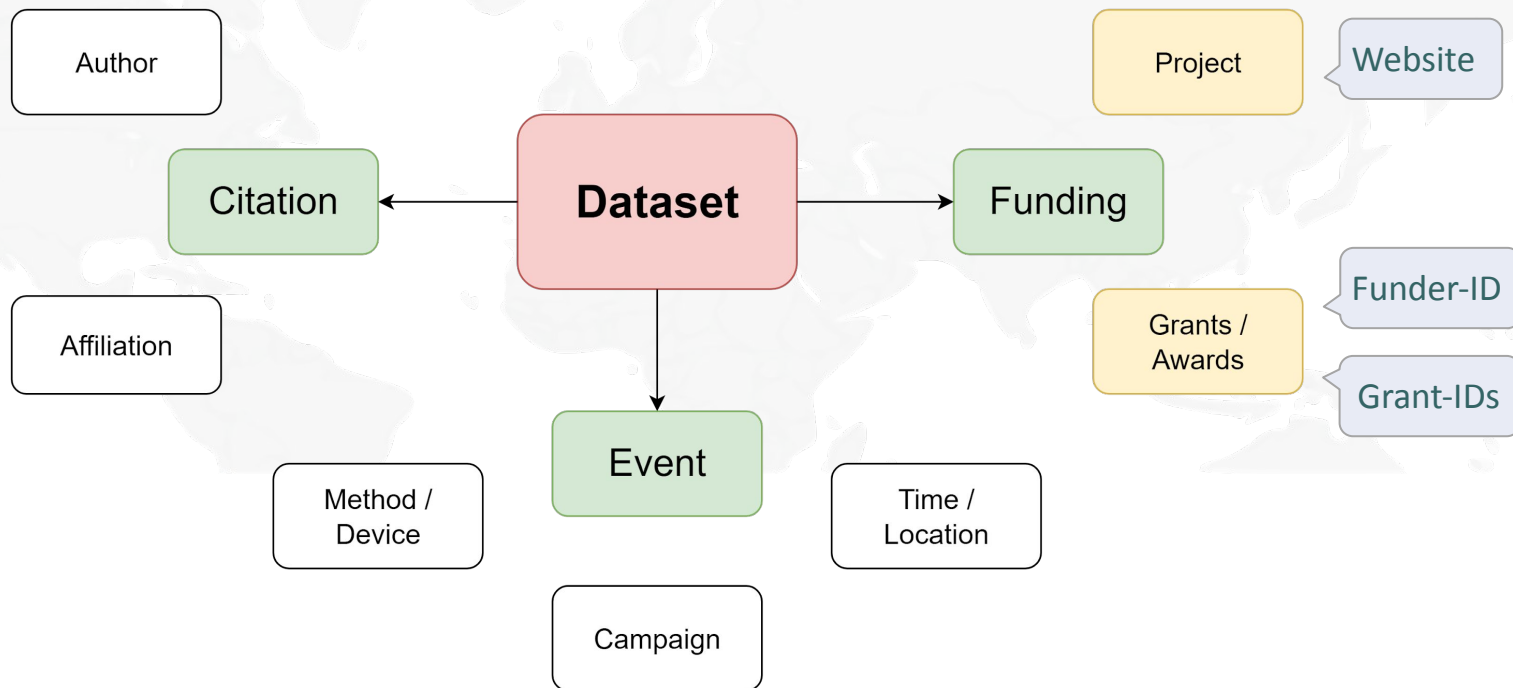


# Data model



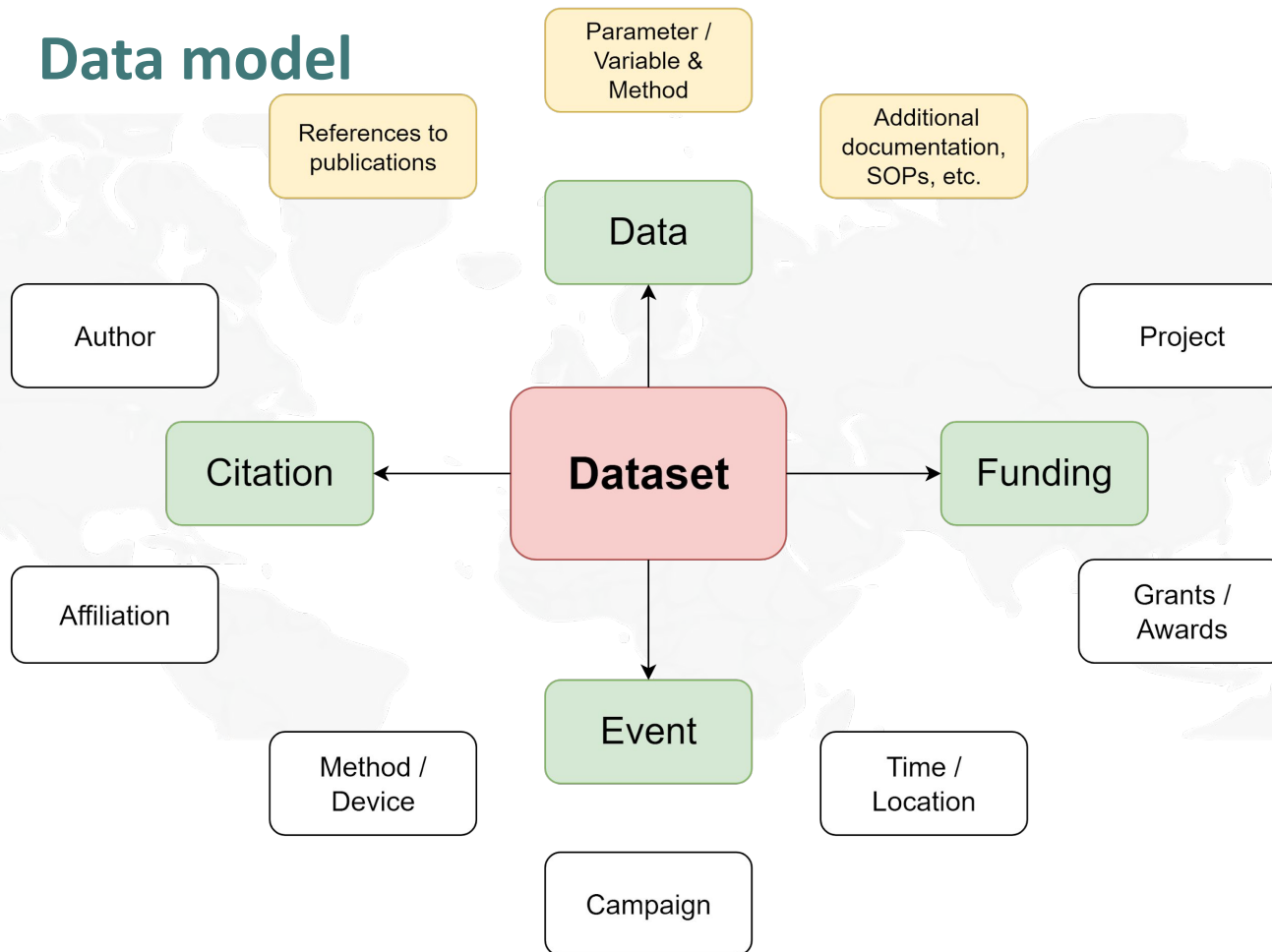


# Data model



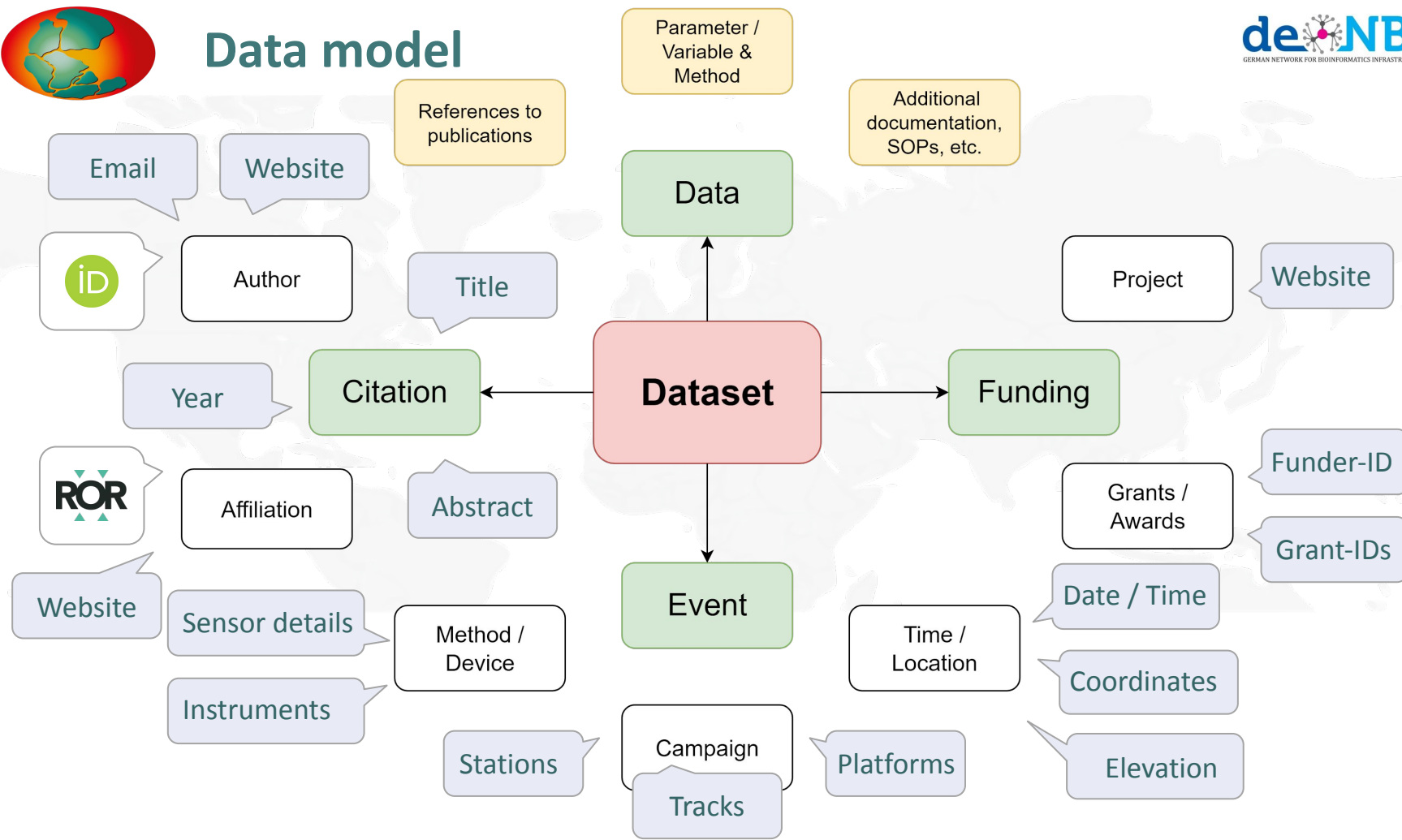


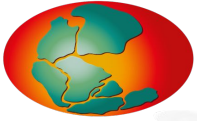
# Data model





# Data model





# Landing pages Basics





# Dataset landing pages

Citation

Collection  
reference

Abstract

References

**PANGAEA.**  
Data Publisher for Earth & Environmental Science

Lars Möller

SEARCH SUBMIT HELP ABOUT CONTACT

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*Citation:*

**Hoppmann, Mario; Kuznetsov, Ivan; Fang, Ying-Chih; Rabe, Benjamin (2022):** Processed seawater temperature, conductivity and salinity obtained at different depths by CTD buoy 2019O1 as part of the MOSAIC Distributed Network. *PANGAEA*,  <https://doi.org/10.1594/PANGAEA.940271>,

*In:* Hoppmann, M et al. (2022): Processed data of CTD buoys 2019O1 to 2019O8 as part of the MOSAIC Distributed Network. *PANGAEA*,  <https://doi.org/10.1594/PANGAEA.940320>

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*Abstract:*

CTD buoy 2019O1 was deployed in the MOSAIC Distributed Network in the Northern Laptev Sea in early October 2019 as part of a set of eight identical ice-tethered buoy systems, each consisting of 5 Seabird SBE37IMP Microcat CTDs mounted along an inductive modem tether at depths of 10, 20, 50, 75 and 100m. The CTDs were recording oceanographic data internally at 2-minute intervals. The surface unit of the buoy prompted the instruments for an additional measurement every 10 minutes, which was then transmitted to a base station via Iridium along with GPS position and time, as well as surface temperature. After 305 days of drift through the Central Arctic Ocean, 2019O1 was recovered in August 2020, and the internally recorded data from the CTDs were secured. The 10-minute buoy data and 2-minute CTD data were co-processed and merged into a combined product. A buoy flag indicates whether a measurement was taken by the buoy (1) or was recorded by the CTD itself (0). The data were quality controlled by means of outlier detection using global limits, moving average filters and manual inspection. The dataset was carefully checked for inconsistencies, especially in the salinity. Where appropriate, parameters were modified to enhance the quality. A (slightly modified) quality flagging scheme was applied according to the Ocean Data Standards Volume 3 (UNESCO 2013), where 1 = Good, 2 = Good (Modified), 3 = Questionable, 4 = Bad, 9 = no data. Finally, the data were validated against independent measurements. Details are available in the data paper indicated below.

*Keyword(s):* Arctic Ocean ; buoy ; eddy ; mesoscale ; mesoscale eddy ; MOSAIC\_PO ; oceanographic time series ; oceanography ; Transpolar Drift 

*Related to:*

**Hoppmann, Mario; Kuznetsov, Ivan; Fang, Ying-Chih; Rabe, Benjamin (2022):** Mesoscale observations of temperature and salinity in the Arctic Transpolar Drift: a high-resolution dataset from the MOSAIC Distributed Network. *Earth System Science Data*, **14**, 4901–4921,  <https://doi.org/10.5194/essd-14-4901-2022> 

**Kruppen, Thomas; Sokolov, Vladimir (2020):** The Expedition AF122/1 : Setting up the MOSAIC Distributed Network in October 2019 with Research Vessel AKADEMIK FEDOROV. *Berichte zur Polar- und Meeresforschung = Reports on Polar and Marine Research*, **744**, 119 pp.  <https://doi.org/10.2317/BzPM.0744.2020> 

Map Satellite



Keyboard shortcuts | Map Data | 5000 km | Terms of Use



# Dataset landing pages

Alternative  
version

Additional  
documentation

Funding  
information

Geospatial &  
temporal  
reference

Sampling  
(event)  
information

Related to:	<b>Hoppmann, Mario; Kuznetsov, Ivan; Fang, Ying-Chih; Rabe, Benjamin (2022):</b> Mesoscale observations of temperature and salinity in the Arctic Transpolar Drift: a high-resolution dataset from the MOSAIC Distributed Network. <i>Earth System Science Data</i> , <b>14</b> , 4901–4921, <a href="https://doi.org/10.5194/essd-14-4901-2022">https://doi.org/10.5194/essd-14-4901-2022</a>
Other version:	<b>Krumpen, Thomas; Sokolov, Vladimir (2020):</b> The Expedition AF122/1 : Setting up the MOSAIC Distributed Network in October 2019 with Research Vessel AKADEMIK FEDOROV. <i>Berichte zur Polar- und Meeresforschung = Reports on Polar and Marine Research</i> , <b>744</b> , 119 pp. <a href="https://doi.org/10.2312/BzPM_0744_2020">https://doi.org/10.2312/BzPM_0744_2020</a>
Further details:	<b>Hoppmann, Mario; Kuznetsov, Ivan; Fang, Ying-Chih; Rabe, Benjamin (2021):</b> Raw seawater temperature, conductivity and salinity obtained at different depths by CTD buoy 201901 as part of the MOSAIC Distributed Network. <i>PANGAEA</i> , <a href="https://doi.org/10.1594/PANGAEA.933934">https://doi.org/10.1594/PANGAEA.933934</a>
Project(s):	<b>Intergovernmental Oceanographic Commission (2013):</b> Ocean Data Standards Volume 3. Recommendation for a Quality Flag Scheme for the Exchange of Oceanographic and Marine Meteorological Data. Version 1. <i>Paris, France, UNESCO-IOC. Intergovernmental Oceanographic Commission Manuals and Guides, Volume 54 (3)</i> , 5 pp & Annexes, <a href="https://doi.org/10.25607/OBP-6">https://doi.org/10.25607/OBP-6</a>
Funding:	<b>FRontiers in Arctic marine Monitoring (FRAM)</b> <b>Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC)</b> <b>Multidisciplinary Ice-based Distributed Observatory (MIDO)</b>
Coverage:	<b>Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Bremerhaven (AWI)</b> , grant/award no. <b>AFMOSAIC-1_00</b> : Multidisciplinary drifting Observatory for the Study of Arctic Climate <b>Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Bremerhaven (AWI)</b> , grant/award no. <b>AWI_PS122_00</b> : Multidisciplinary drifting Observatory for the Study of Arctic Climate / MOSAIC <i>Median Latitude: 84.835747 * Median Longitude: 57.368446 * South-bound Latitude: 78.593337 * West-bound Longitude: -2.166119 * North-bound Latitude: 88.357508 * East-bound Longitude: 133.481303</i> <i>Date/Time Start: 2019-10-05T05:11:40 * Date/Time End: 2020-08-05T09:59:40</i> <i>Minimum DEPTH, water: -99.40 m * Maximum DEPTH, water: -7.51 m</i>
Event(s):	<b>AF-MOSAIC-1_106</b> (PS122/1_1-148, 201901)  * <i>Latitude Start: 84.917822 * Longitude Start: 131.279197 * Latitude End: 78.590000 * Longitude End: -1.540000 * Date/Time Start: 2019-10-05T04:40:00 * Date/Time End: 2020-08-05T10:00:00 * Sensor URI: <a href="https://sensor.awi.de">sensor.awi.de</a> * Location: Arctic Ocean * Campaign: AF-MOSAIC-1 (MOSAIC20192020, AF122/1)  * <i>Basis: Akademik Fedorov</i>  * <i>Method/Device: Ocean CTD buoy (OCTDB)</i>  * <i>Comment: Station M1_Measurement: Snow and ice temperature profile_Comment: ice thickness 1.8 m and snow depth 0.15 m_Old Labels: M1_SIT_1_AWI_20191005, PS122/1_1-148</i> <b>PS122/4_43-165</b> (201901)  * <i>Latitude: 78.645231 * Longitude: -1.353982 * Date/Time: 2020-08-05T08:00:00 * Sensor URI: <a href="https://sensor.awi.de">sensor.awi.de</a> * Location: Arctic Ocean</i>  * <i>Campaign: PS122/4 (MOSAIC20192020)</i>  * <i>Basis: Polarstern</i>  * <i>Method/Device: Ocean CTD buoy (OCTDB)</i> </i>
Comment:	<ul style="list-style-type: none"><li>• GearID 1: SBE37IMP, SN 21089</li><li>• GearID 2: SBE37IMP, SN 21090</li><li>• GearID 3: SBE37IMP, SN 21091</li></ul>



# Dataset landing pages

Variables  
measured

documented  
changes

Usage rights  
information

Parameter(s):

#	Name	Short Name	Unit	Principal Investigator	Method/Device	Comment
1	<a href="#">DATE/TIME Q</a>	Date/Time		<a href="#">Hoppmann, Mario Q</a>		<a href="#">Geocode</a>
2	<a href="#">LATITUDE Q</a>	Latitude		<a href="#">Hoppmann, Mario Q</a>		<a href="#">Geocode</a>
3	<a href="#">LONGITUDE Q</a>	Longitude		<a href="#">Hoppmann, Mario Q</a>		<a href="#">Geocode</a>
4	<a href="#">Drift velocity Q</a>	Drift vel	m/s	<a href="#">Hoppmann, Mario Q</a>		
5	<a href="#">Submerged Q</a>	Submerged		<a href="#">Hoppmann, Mario Q</a>		Boolean (logical)
6	<a href="#">Temperature, air Q</a>	TTT	°C	<a href="#">Hoppmann, Mario Q</a>		Surface
7	<a href="#">Gear Identification number Q</a>	Gear ID		<a href="#">Hoppmann, Mario Q</a>	<a href="#">see description in data-set comment Q</a>	
8	<a href="#">Conductivity Q</a>	Cond	mS/cm	<a href="#">Hoppmann, Mario Q</a>	<a href="#">CTD, SEA-BIRD SBE 37-IMP MicroCAT Q</a>	
9	<a href="#">Temperature, water Q</a>	Temp	°C	<a href="#">Hoppmann, Mario Q</a>	<a href="#">CTD, SEA-BIRD SBE 37-IMP MicroCAT Q</a>	
10	<a href="#">Pressure, water Q</a>	Press	dbar	<a href="#">Hoppmann, Mario Q</a>	<a href="#">CTD, SEA-BIRD SBE 37-IMP MicroCAT Q</a>	
11	<a href="#">DEPTH, water Q</a>	Depth water	m	<a href="#">Hoppmann, Mario Q</a>	<a href="#">calculated from pressure and latitude Q</a>	<a href="#">Geocode</a>
12	<a href="#">Salinity Q</a>	Sal		<a href="#">Hoppmann, Mario Q</a>	<a href="#">PSS-78, salinity scale Q</a>	
13	<a href="#">Quality flag, conductivity Q</a>	QF conduct		<a href="#">Hoppmann, Mario Q</a>	<a href="#">Quality Flag Scheme for the Exchange of Oceanographic and Marine Meteorological Data Q</a>	
14	<a href="#">Quality flag, water temperature Q</a>	QF water temp		<a href="#">Hoppmann, Mario Q</a>	<a href="#">Quality Flag Scheme for the Exchange of Oceanographic and Marine Meteorological Data Q</a>	
15	<a href="#">Quality flag, water pressure Q</a>	QF water press		<a href="#">Hoppmann, Mario Q</a>	<a href="#">Quality Flag Scheme for the Exchange of Oceanographic and Marine Meteorological Data Q</a>	
16	<a href="#">Quality flag, water depth Q</a>	QF water depth		<a href="#">Hoppmann, Mario Q</a>	<a href="#">Quality Flag Scheme for the Exchange of Oceanographic and Marine Meteorological Data Q</a>	
17	<a href="#">Quality flag, salinity Q</a>	QF sal		<a href="#">Hoppmann, Mario Q</a>	<a href="#">Quality Flag Scheme for the Exchange of Oceanographic and Marine Meteorological Data Q</a>	
18	<a href="#">Flag, buoy Q</a>	Flag buoy		<a href="#">Hoppmann, Mario Q</a>	<a href="#">see comment Q</a>	Indicator for buoy-transmitted (1) or internally-recorded (0) CTD data

Change history:

2022-10-13T13:17:57 – Quality flags corrected

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# Dataset landing pages

Change history:

2022-10-13T13:17:57 – Quality flags corrected

License:

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Status:

Curation Level: Enhanced curation (CurationLevelC)  \* Processing Level: PANGAEA data processing level 2 (ProcLevel2) 

Size:

16220887 data points

## Download Data

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

 View dataset as HTML (shows only first 2000 rows)

## Datasets with similar metadata

Hoppmann, M; Kuznetsov, I; Fang, Y-C et al. (2021): Raw seawater temperature, conductivity and salinity obtained at different depths by CTD buoy 2019O5 as part of the MOSAIC Distributed Network.  <https://doi.org/10.1594/PANGAEA.933937>

Hoppmann, M; Kuznetsov, I; Fang, Y-C et al. (2021): Raw seawater temperature, conductivity and salinity obtained at different depths by CTD buoy 2019O4 as part of the MOSAIC Distributed Network.  <https://doi.org/10.1594/PANGAEA.933933>

Hoppmann, M; Kuznetsov, I; Fang, Y-C et al. (2021): Raw seawater temperature, conductivity and salinity obtained at different depths by CTD buoy 2019O6 as part of the MOSAIC Distributed Network.  <https://doi.org/10.1594/PANGAEA.933941>

## Users interested in this dataset were also interested in

Angelopoulos, M; Abrahamsson, K; Bauch, D et al. (2022): Physical properties of sea ice cores from site MCS\_FYI measured on legs 1 to 3 of the MOSAIC expedition.  <https://doi.org/10.1594/PANGAEA.943817>

Angelopoulos, M; Abrahamsson, K; Bauch, D et al. (2022): Physical properties of sea ice cores from site MCS-SYI measured on legs 1 to 3 of the MOSAIC expedition.  <https://doi.org/10.1594/PANGAEA.943818>

Angelopoulos, M; Damm, E; Simões Pereira, P et al. (2022): Physical properties of sea ice cores from site BGC3 measured on legs 1 to 3 of the MOSAIC expedition.  <https://doi.org/10.1594/PANGAEA.943813>

Direct  
download

Data preview





# Dataset landing pages

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Status:

Curation Level: Enhanced curation (CurationLevelC) \* Processing Level: PANGAEA data processing level 2 (ProcLevel2)

Size:

16220887 data points

17	Quality flag, salinity	oeptn		Meteorological Data
	QF sal		Hoppmann, Mario	Quality Flag Scheme for the Exchange of Oceanographic and Marine Meteorological Data
18	Flag, buoy	Flag buoy	Hoppmann, Mario	see comment
				Indicator for buoy-transmitted (1) or internally-recorded (0) CTD data

2022-10-13T13:17:57 – Quality flags corrected

## Data

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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Date/Time	Latitude	Longitude	Drift vel [m/s]	Submerged	TTT [°C]	Gear ID	Cond [mS/cm]	Temp [°C]	Press [dbar]	Depth water [m]	Sal	QF conduct	QF water temp	QF water pres
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2019-10-05T05:11:40	84.918326	131.268406	0.08			2						9		9
2019-10-05T05:11:40	84.918326	131.268406	0.08			3	-0.001	-1.811	50.21	-49.66		4		1
2019-10-05T05:11:40	84.918326	131.268406	0.08			4	25.034	-1.690	75.45	-74.63	31.40	3		1
2019-10-05T05:11:40	84.918326	131.268406	0.08			5	26.700	-0.935	100.42	-99.32	32.85	3		1
2019-10-05T05:13:40	84.918404	131.267947	0.08			1						9		9
2019-10-05T05:13:40	84.918404	131.267947	0.08			2						9		9
2019-10-05T05:13:40	84.918404	131.267947	0.08			3	-0.001	-1.808	50.21	-49.66		4		1
2019-10-05T05:13:40	84.918404	131.267947	0.08			4	25.192	-1.682	75.45	-74.63	31.61	3		1
2019-10-05T05:13:40	84.918404	131.267947	0.08			5	26.650	-0.925	100.42	-99.32	32.77	3		1
2019-10-05T05:15:40	84.918481	131.267488	0.08			1						9		9
2019-10-05T05:15:40	84.918481	131.267488	0.08			2						9		9
2019-10-05T05:15:40	84.918481	131.267488	0.08			3	-0.001	-1.806	50.21	-49.66		4		1
2019-10-05T05:15:40	84.918481	131.267488	0.08			4	25.361	-1.685	75.45	-74.63	31.85	3		1
2019-10-05T05:15:40	84.918481	131.267488	0.08			5	26.587	-0.925	100.43	-99.33	32.68	3		1
2019-10-05T05:17:40	84.918559	131.267029	0.08			1						9		9
2019-10-05T05:17:40	84.918559	131.267029	0.08			2						9		9
2019-10-05T05:17:40	84.918559	131.267029	0.08			3	-0.001	-1.804	50.21	-49.66		4		1
2019-10-05T05:17:40	84.918559	131.267029	0.08			4	25.500	-1.680	75.45	-74.63	32.03	3		1
2019-10-05T05:17:40	84.918559	131.267029	0.08			5	26.517	-0.934	100.42	-99.32	32.60	3		1
2019-10-05T05:19:00	84.918650	131.266494	0.08	0	-4.35	1	19.254	-1.790	9.80	-9.69	23.68	4		1
2019-10-05T05:19:00	84.918650	131.266494	0.08	0	-4.35	2	19.355	-1.800	19.80	-19.59	23.81	4		1
2019-10-05T05:19:00	84.918650	131.266494	0.08	0	-4.35	3	0.001	-1.802	50.21	-49.66	0.00	4		1



# Dataset landing pages

```
51 <meta name="DC.relation" content="Hoppmann, Mario; Kuznetsov, Ivan; Fang, Ying-Chih; Rabe, Benjamin (2022): Mesoscale observations of temperature and salin:  
52 <meta name="DC.relation" content="Krumpfen, Thomas; Sokolov, Vladimir (2020): The Expedition AF122/1 : Setting up the MOSAiC Distributed Network in October :  
53 <meta name="DC.relation" content="Hoppmann, Mario; Kuznetsov, Ivan; Fang, Ying-Chih; Rabe, Benjamin (2021): Raw seawater temperature, conductivity and salin  
54 <meta name="DC.relation" content="Intergovernmental Oceanographic Commission (2013): Ocean Data Standards Volume 3. Recommendation for a Quality Flag Schem  
55 <!--END: Dublin Core description-->  
56 <script type="text/javascript" src="//dlbxb8uas1mnw7.cloudfront.net/assets/embed.js"></script>  
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# PANGAEA data search challenge



# Challenge: Biological data

## Break out room 1

How do environmental and anthropogenic change affect the biodiversity in Antarctica?





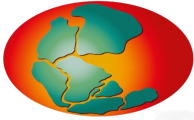
# Challenge: Biogeochemical data

## Break out room 2

How can corals be used as geochemical archives of human impact, particularly through marine heat waves, acidification, pollution or eutrophication?



Credit: Hagainativ  
via Wikimedia



# Challenge: Oceanography data

Break out room 3

In which geographical regions can you find marine litter?  
Do they change for different types of litter?



Credit: Mudasir Zainuddin  
via [Wikimedia](#)



# Challenge: Climate data

## Break out room 4

What was the variability of atmospheric carbon dioxide levels during the last 1 Mio. years, and how does it compare to levels before industrialisation and today?



Image Credit : Dennis  
Bromage / Barcroft



# Search challenge wrap-up & discussion

Please present your groups findings & experiences

- a. What were the outcomes of your challenges briefly
- b. What went well concerning the data search?
- c. What were your (groups) challenges with searching?
- d. Focus on key points / findings / issues / takeaways
- e. Anything you missed? What could have helped?





# Advanced search

Kathrin Riemann-Campe



# Start with keyword(s)

- start with any keyword in search panel



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Data Publisher for Earth & Environmental Science

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Data



TOPICS

MAP

CHEMISTRY

(74580)



OCEANS

(22667)



LITHOSPHERE

(51320)



ECOLOGY

(22539)



ALL TOPICS

MOSA

MOSAiC

Oreochromis mosambica

MOSAiC team ECO

Mosar, Jon

MOSAiC20192020\_Drift\_Winter

MOSAiC\_Arctic\_ice\_drift\_deformation

Mosaik

Mosaik\_L1

Mosaik\_L4

Mosaik\_RiP2

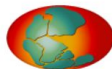
Mosaik\_T1

Mosaik\_T4

(8938)

(4796)

(4371)



## ALL TOPICS

MOSAIC

SEARCH SUBMIT HELP ABOUT CONTACT

Filter by...

6705 datasets found on search for »MOSAiC«

[SHOW MAP](#) [GOOGLE EARTH](#) [DATA WAREHOUSE](#)

< 1 2 3 4 5 6 7 8 9 10 >

## Dataset Author

Nicolaus, Marcel (2650)  
Katlén, Christian (2583)  
Anhaus, Philipp (2482)  
Schiller, Martin (2434)  
Rohde, Jan (2218)  
Regnery, Julia (2217)  
Lange, Benjamin Allen (2208)  
Arndt, Stefanie (2203)  
[more...](#)

## Dataset Publication Year

- ☐ unpublished (470)
- ☐ 2025 (260)
- ☐ 2024 (1545)
- ☐ 2023 (2315)
- ☐ 2022 (1367)
- ☐ 2021 (495)
- ☐ 2020 (87)
- ☐ 2019 (27)

[more](#)

## Topic

- Ecology (2533)
- Environmental Sciences (2521)
- Atmosphere (1293)
- Meteorology & Atmospheric Sciences (1213)
- Multidisciplinary Sciences (652)
- Chemistry (257)
- Land Surface (245)
- Remote Sensing (229)

1. **Stephens, M (2022):** Beryllium-7 concentrations in snow, ice, seawater, and aerosols during the MOSAiC expedition

**Abstract:** Atmospheric transport and deposition of aerosols is an important delivery mechanism of natural and contaminant trace elements (TEs) to the Arctic, but direct measurements of TE fluxes are difficult and unreliable. The naturally occurring isotope Beryllium-7 (Be-7) can be used as a tracer of aerosol deposition and to provide reliable seasonal TE flux estimates. Be-7 is a cosmic ray produced isotope (half life 53.3 days) that is deposited upon the ocean surface primarily by precipitation. The standing crop (inventory) of Be-7 in the surface ocean (including snow and ice) affords a way to determine the deposition flux of this isotope. At steady state, the input flux of Be-7 is balanced by the decay rate of the Be-7 inventory integrated over the water column, sea ice and snow. [...]

Size: 4 datasets

 <https://doi.org/10.1594/PANGAEA.945414> – Score: 35.37

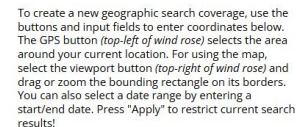
2. **Moser, M; Voigt, C; Hahn, V (2022):** DLR in-situ cloud measurements during MOSAiC-ACA Arctic airborne campaign


**Abstract:** During MOSAiC-ACA field campaign in late summer 2020 the Basler BT-67 research aircraft Polar 5 based in Spitzbergen (78.24 N, 15.49 E) was equipped with an advanced in-situ cloud payload by the DLR including a combination of the Cloud Droplet Probe, Cloud Imaging Probe and Precipitation Imaging Probe. The data sets provides data from all DLR particle measurement instruments including micropysical cloud properties like particle size distribution, total particle number concentration, effective diameter, median volume diameter and an estimated cloud/liquid/ice water content. In combination the dataset includes all particle sizes from 2.8 - 6400.0µm in diameter. In addition to the particle measurement systems the Nevzorov probe provides bulk measurements of the liquid and total water content. These cloud measurements were mainly conducted in low and midlevel clouds in the Fram Strait over sea ice and the open ocean. [...]

Size: 40 data points

<https://doi.org/10.1594/PANGAEA.940557> - Score: 29.7

3. **Heinemann, G (2022):** Regional climate model simulations (CCLM 15km) of near-surface variables for the MOSAiC winter period



Start date:  

End date:  



# Search via facet filter



PANGAEA.

ALL TOPICS

MOSAiC



SEARCH SUBMIT HELP

Filter by...

Rex, Markus ✕

## Dataset Author

Hoppmann, Mario (19)  
Bliss, Angela (16)  
Granskog, Mats A (16)  
Haas, Christian (16)  
Hutchings, Jennifer K (16)  
Kanzow, Torsten (16)  
Krishfield, Richard A (16)  
Lei, Ruibo (16)  
[more...](#)

## Dataset Publication Year

☐ 2023 (3)  
☒ 2021 (118)  
☐ 2020 (5)

## Project

☒ MOSAiC (118)

## Basis

Polarstern (104)  
Akademik Fedorov (12)  
Akademik Tryshnikov (4)

118 datasets found on search for »MOSAiC« with facet filters

< 1 2 3 4 5 6 7 8 9 10 >

### 1. Rex, M (2021): Master tracks in different resolutions of helicopter flights during POLARST PS122/1

**Abstract:** GPS data acquired on board helicopters operating from R.V. Polarstern during the MOSAiC Expedition to receive a validated master track which can be used as reference of further expedition data. Proo provided as a master track with 1 sec resolution and a generalized track with a reduced set of the n positions of the master track. Depending on availability different data source were used. Please ref report of each individual flight for further information.

**Size:** 10 datasets

<https://doi.org/10.1594/PANGAEA.927443> – Score: 19.44

### 2. Rex, M (2021): Master tracks in different resolutions of helicopter flights during POLARST PS122/5

**Abstract:** GPS data acquired on board helicopters operating from R.V. Polarstern during the MOSAiC Expedition to receive a validated master track which can be used as reference of further expedition data. Proo provided as a master track with 1 sec resolution and a generalized track with a reduced set of the n positions of the master track. Depending on availability different data source were used. Please ref report of each individual flight for further information.

**Size:** 13 datasets

<https://doi.org/10.1594/PANGAEA.929204> – Score: 18.41

### 3. Nicolaus, M; Riemann-Campe, K; Bliss, A et al. (2021): Drift trajectories of the main site Distributed Network of MOSAiC 2019/2020



# Use specific keywords

- use specific keywords, wildcards (\*), exclusions (-), etc.
- Help: [PANGAEA Wiki](#)



## PANGAEA.

ALL TOPICS ▼

project:mosaic author:m\*ller -author:meyer



44 datasets found on search for »project:mosaic author:...«

< 1 2 3 4 5 >

1. **Cornils, A; Niehoff, B; Knüppel, N et al.:** Zooplankton abundance and biovolume from Multinet and WP2 net samples during the MOSAiC expedition (PS122) in the Arctic Ocean

*Abstract:* Depth-stratified mesozooplankton samples were collected in the Arctic Ocean from 2019 to 2020 multinet midi (Hydrobios, 150 µm mesh, opening 0.25 m<sup>2</sup>) and with a WP2 net (150 µm, 0.38 m<sup>2</sup>) during the MOSAiC expedition with PV Polarstern (PS122). In approximately weekly intervals, we conducted vertical tows at mostly five depth intervals 0 – 50 m, 50 – 200 m, 200 – 500 m, 500 – 1000 m and 1000 – 2000 m. The volume of filtered water was recorded with a digital flowmeter. All net samples were preserved in a 4% formaldehyde seawater solution buffered with Borax onboard. The samples were analyzed with a stereo microscope and with the imaging system ZooScan.

### DATA SEARCH

- PANGAEA Search (also explained in [one of our videos](#) 🔗)
- PANGAEA XML schema







# Where to find the PANGAEA Wiki ?



## PANGAEA.

ALL TOPICS

project:mosaic author:m\*ller-author:meyer

SEARCH SUBMIT **HELP** ABOUT CONTACT

Filter by...

44 datasets found on search for »project:mosaic author:...«

SHOW MAP GOOGLE EARTH DATA WAREHOUSE

### Dataset Author

Lonardi, Michael (19)  
Pilz, Christian (19)  
Siebert, Holger (19)  
Wehner, Birgit (19)  
Granskog, Mats A (15)  
Müller, Oliver (15)  
Gardner, Jessie (13)  
Hoppe, Clara Jule Marie (11)  
[more...](#)

### Dataset Publication Year

☐ unpublished (1)  
☐ 2024 (4)  
☐ 2023 (16)  
☐ 2022 (23)

### Topic

Cryosphere (8)  
Chemistry (7)  
Organic Chemistry (7)  
Animalia (3)  
Biological Classification (3)  
Chordata (3)  
Ecology (3)  
Environmental Sciences (3)  
[more...](#)

### Project

☐ MOSAiC (44)  
☐ AC3 (21)  
[more...](#)

< 1 2 3 4 5 >

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**Size:** 1 datasets  
<https://doi.pangaea.de/10.1594/PANGAEA.980504> – Score: 13.01

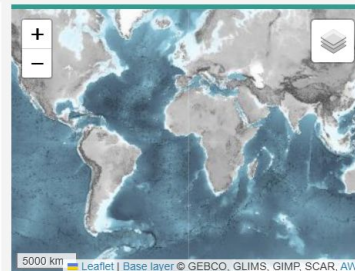
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**Size:** 25249 data points  
<https://doi.org/10.1594/PANGAEA.966213> – Score: 11.97

3. **Torres-Valdés, S; Rember, R; Heitmann, L et al. (2024):** Dissolved nutrients data from the PS122 MOSAiC Expedition carried out at the AWI Nutrient Facility

**Abstract:** Samples for the analysis of dissolved nutrients were collected during the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC) from the water column, sea ice cores and from



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Start date:    
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# Show results on map



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project:mosaic author:m\*ller -author:meyer

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Siebert, Holger (19)  
Wehner, Birgit (19)  
Granskog, Mats A (15)  
Müller, Oliver (15)  
Gardner, Jessie (13)  
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☐ 2024 (4)  
☐ 2023 (16)  
☐ 2022 (23)

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☐ AC3 (21)

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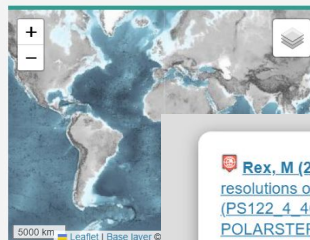
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### 3. Torres-Valdés, S; Rember, R; Heitmann, L et al. (2024): Dissolved nutrients data from the PS122 MOSAIC Expedition carried out at the AWI Nutrient Facility

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N

W

Clear

S

Start date: YYYY-MM-DD

End date: YYYY-MM-DD

**Rex, M (2021): Master tracks in different resolutions of helicopter flight PS122/4\_46-39 (PS122\_4\_46\_39\_2020070703) during POLARSTERN cruise PS122/4**

**Size:** 330 data points

<https://doi.org/10.1594/PANGAEA.927513>



# Apply bounding box on map



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ALL TOPICS

project:mosaic author:m\*ller -author:meyer



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DATA WAREHOUSE

### Dataset Author

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Pilz, Christian (19)  
Siebert, Holger (19)  
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Granskog, Mats A (15)  
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### Dataset Publication Year

☐ unpublished (1)  
☐ 2024 (4)  
☐ 2023 (16)  
☐ 2022 (23)

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☐ MOSAIC (44)  
☐ AC3 (21)

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**Size:** 1 datasets

<https://doi.pangaea.de/10.1594/PANGAEA.980504> - Score: 13.01

#### 2. Torres-Valdés, S; Rember, R; Heitmann, L et al. (2024): Dissolved nutrients data from the PS122 MOSAIC Expedition carried out onboard Polarstern during Legs 1 to 3

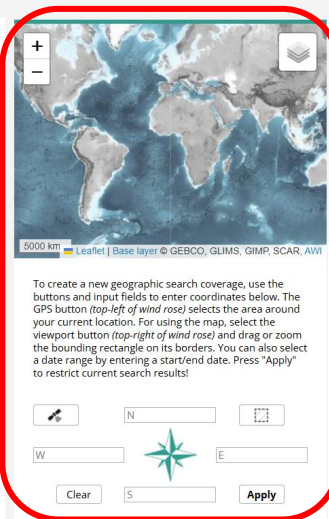
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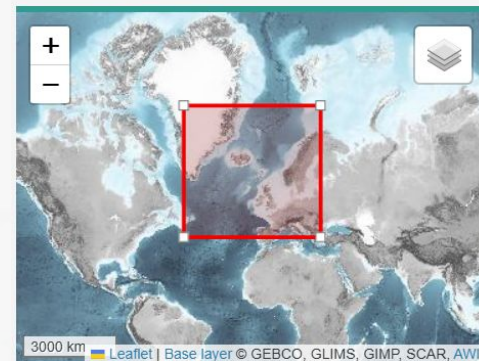
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N   
W  E   
 S

Start date: YYYY-MM-DD   
End date: YYYY-MM-DD



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75   
-50  25   
 40



# Select time range of data acquisition



PANGAEA.

ALL TOPICS

project:mosaic author:m\*ller -author:meyer

SEARCH SUBMIT HELP ABOUT CONTACT

Filter by...

44 datasets found on search for »project:mosaic author:...«

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☐ 2024 (4)  
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☐ 2022 (23)

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Environmental Sciences (3)  
more...

## Project

☐ MOSAIC (44)  
☐ AC3 (21)

### 1. Cornils, A; Niehoff, B; Knüppel, N et al.: Zooplankton abundance and biovolume from Multinet and WP2 net samples during the MOSAIC expedition (PS122) in the Arctic Ocean

**Abstract:** Depth-stratified mesozooplankton samples were collected in the Arctic Ocean from 2019 to 2020 multinet midi (Hydrobios, 150 µm mesh, opening 0.25 m<sup>2</sup>) and with a WP2 net (150 µm, 0.38 m<sup>2</sup>) during the MOSAIC expedition with PV Polarstern (PS122). In approximately weekly intervals, we conducted vertical tows at mostly five depth intervals 0 – 50 m, 50 – 200 m, 200 – 500 m, 500 – 1000 m and 1000 – 2000 m. The volume of filtered water was recorded with a digital flowmeter. All net samples were preserved in a 4% formaldehyde seawater solution buffered with Borax onboard. The samples were analyzed with a stereo microscope and with the imaging system ZooScan.

**Size:** 1 datasets  
<https://doi.pangaea.de/10.1594/PANGAEA.980504> - Score: 13.01

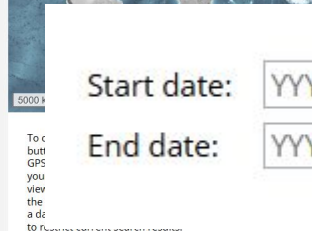
### 2. Torres-Valdés, S; Rember, R; Heitmann, L et al. (2024): Dissolved nutrients data from the PS122 MOSAIC Expedition carried out onboard Polarstern during Legs 1 to 3

**Abstract:** Samples for the analysis of dissolved nutrients were collected during the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC) from the water column, sea ice cores and from special events/locations (e.g., leads, melt ponds, brine, incubation experiments). Samples for dissolved inorganic nutrients (NO<sub>3</sub> + NO<sub>2</sub>, NO<sub>2</sub>, PO<sub>4</sub>, Si(OH)<sub>4</sub>, NH<sub>4</sub>) were analysed onboard during PS122 legs 1 to 3, with duplicate samples collected from CTD casts for later analysis of total dissolved nitrogen (TDN) and total dissolved phosphorus (TDP). From leg 4, all samples collected were stored frozen at -20°C for later analysis. Analyses of stored samples were carried out at the AWI Nutrient Facility between January and March 2021. Nutrient analyses onboard and on land were carried out using a Seal Analytical AA3 continuous flow autoanalyser, controlled by the AACE software version 7.09. [...]

**Size:** 25249 data points  
<https://doi.org/10.1594/PANGAEA.966213> - Score: 11.97

### 3. Torres-Valdés, S; Rember, R; Heitmann, L et al. (2024): Dissolved nutrients data from the PS122 MOSAIC Expedition carried out at the AWI Nutrient Facility

**Abstract:** Samples for the analysis of dissolved nutrients were collected during the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC) from the water column, sea ice cores and from



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End date:

YYYY-MM-DD



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End date: YYYY-MM-DD



Apply





# Select and download via Data Warehouse



PANGAEA.

ALL TOPICS

mosaic "snow height"

SEARCH SUBMIT HELP ABOUT CONTACT

Kathrin Riemann-Campe

log in needed

Filter by...

125 datasets found on search for »mosaic "snow height"«

SHOW MAP

GOOGLE EARTH

DATA WAREHOUSE

## Dataset Author

Nicolaus, Marcel (105)  
Hoppmann, Mario (102)  
Katlein, Christian (73)  
Tao, Ran (73)  
Belter, Hans Jakob (50)  
Rohde, Jan (49)  
Anhaus, Philipp (27)  
Salganik, Evgenii (16)  
more...

## Dataset Publication Year

☐ 2025 (2)  
☐ 2024 (68)  
☐ 2023 (19)  
☐ 2022 (9)  
☐ 2021 (15)  
☐ 2020 (12)

## Topic

Chemistry (5)  
Organic Chemistry (5)  
Cryosphere (3)  
Inorganic Chemistry (3)  
Geosciences, Multidisciplinary (1)  
Lithosphere (1)

## Project

☐ MOSAiC (121)  
☐ AWI\_Sealce (93)  
☐ meereisportal.de (93)  
☐ MIDO (14)

1. Nicolaus, M; Hoppmann, M; Regnery, J (2021): Snow height on sea ice, meteorological conditions and drift of sea ice from autonomous measurements from buoy 2020S106, deployed during MOSAiC 2019/20

**Abstract:** Snow height was measured by the Snow Buoy 2020S106, an autonomous platform, installed on drifting sea ice in the Arctic Ocean during MOSAiC (Leg 5) 2019/20. The resulting time series describes the evolution of snow height as a function of place and time between 26 August 2020 and 26 June 2021 in sample intervals of 1 hour. The Snow Buoy consists of four independent acoustic range finder measurements relative to snow height, geographic position and temperature were measured. It was deployed into the sea ice. Thus, these measurements represent the original snow-ice interface. The snow pack around the buoy was measured.

**Size:** 116672 data points  
<https://doi.org/10.1594/PANGAEA.937174>

2. Nicolaus, M; Hoppmann, M; Regnery, J (2021): Snow height on sea ice, meteorological conditions and drift of sea ice from autonomous measurements from buoy 2020S106, deployed during MOSAiC 2019/20

**Abstract:** Snow height was measured by the Snow Buoy 2020S106, an autonomous platform, installed on drifting sea ice in the Arctic Ocean during MOSAiC (Leg 5) 2019/20. The resulting time series describes the evolution of snow height as a function of place and time between 26 August 2020 and 26 June 2021 in sample intervals of 1 hour. The Snow Buoy consists of four independent acoustic range finder measurements relative to snow height, geographic position and temperature were measured. It was deployed into the sea ice. Thus, these measurements represent the original snow-ice interface. The snow pack around the buoy was measured.

**Size:** 110176 data points  
<https://doi.org/10.1594/PANGAEA.937173> - Download - Score: 35.66

## Available Parameters and Geocodes

Page 1 of 165 < prev 1 2 3 4 5 6 next >

Score	Parameter/Geocode	
	DATE/TIME	+
	LATITUDE	+
	LONGITUDE	+
	EVENT LABEL	+
	ELEVATION [m a.s.l.]	+
	DEPTH, ice/snow [m]	+
	DEPTH, water [m]	+
100.0%	Snow height [m]	+
23.1%	Quality flag, snow height	+
17.7%	Quality flag, position	+
15.0%	Temperature, technical [°C]	+

## Configuration

Page 1 of 1 < prev 1 next >

Parameter/Geocode	Method	
DATE/TIME	no average	↓ ↑
LATITUDE		↓ ↑
LONGITUDE		↓ ↑
Snow height [m]	<any>	↓ ↑
	<any>	
	Buoy, radiation station	
	Snow buoy	
	SnowMicroPen	
	Tape measure	



## Outline Day 2



May 09	Download and access data
10:30 am	Intro PANGAEA programmable interfaces
10:50 am	<b>Questions I</b>
10:55 am	Introducing pangaeear
11:05 am	Introducing pangaeapy
11:20am	<b>Questions II</b>
11:25 am	<b>Break</b> (10 min)
11:35 am	Pangaeapy practical
12:20 am	<b>Questions III &amp; Outro</b> (10 min)



## Outline Day 2



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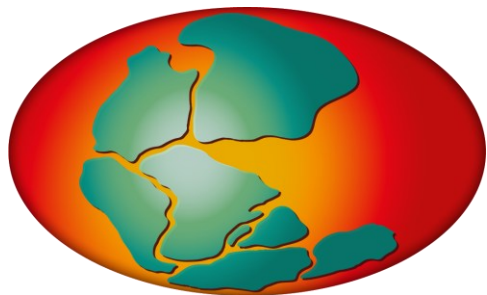




## Outline Day 2



<b>May 09</b>	<b>Download and access data</b>
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10:50 am	<b>Questions I</b>
10:55 am	Introducing pangaeear
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11:20am	<b>Questions II</b>
11:25 am	<b>Break</b> (10 min)
11:35 am	Pangaeapy practical
12:20 am	<b>Questions III &amp; Outro</b> (10 min)



PANGAEA Community Workshop 2025

# **Intro: PANGAEA**

## programmable interfaces

Uwe Schindler

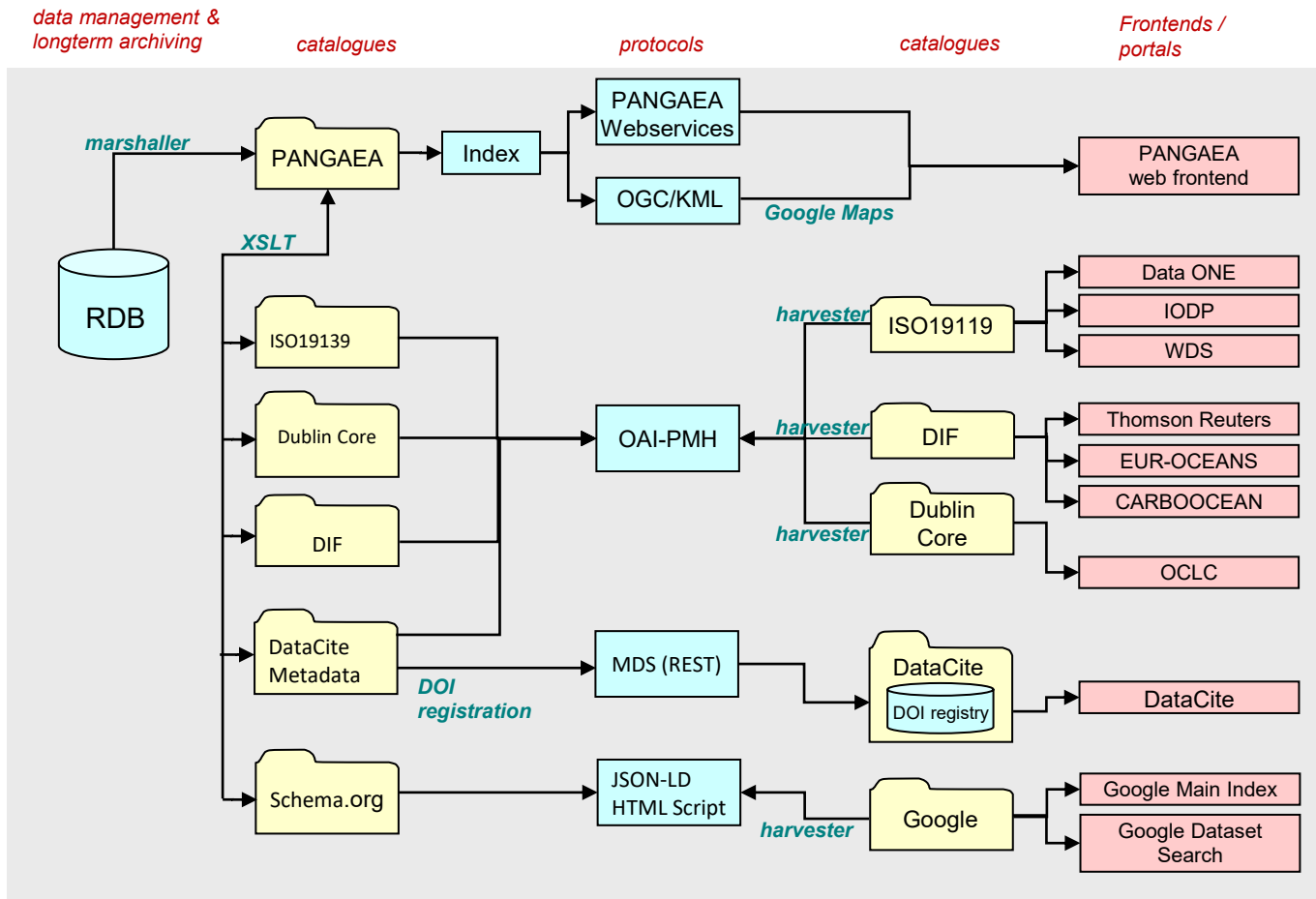
*PANGAEA (MARUM, University of Bremen)*

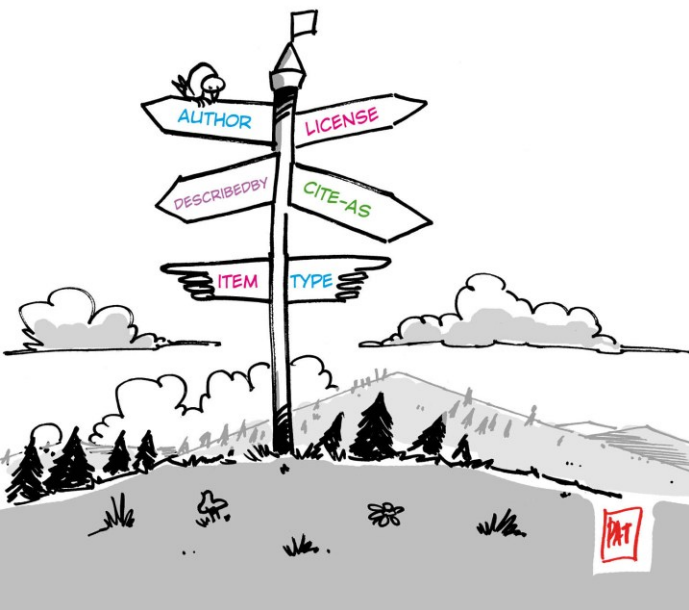
Overview



# PANGAEA Metadata Dissemination

# PANGAEA Metadata Services





Data and Metadata APIs:  
Programmatic download!

# DOI Link Discovery & Content Negotiation



# API to access metadata and data?

**There's no PANGAEA API for that!**

# API to access metadata and data?

**There's no PANGAEA API for that!**



*It's all included in PANGAEA's  
DOI / dataset landing pages!*



\*) and many other data centers have the same available thanks to FAIR

\*\*) and also your paper publisher may serve metadata like that

# Background

I have a DOI name, **FAIR** / machine usage? =>

**HTTP Content Negotiation**

Download link discovery? =>

<https://signposting.org/>

# Background

## Newest Work

Content Negotiation by Profile  
W3C Working Draft 26 November 2019

<https://www.w3.org/TR/dx-prof-conneg/>



Download link discovery: =>

<https://signposting.org/>

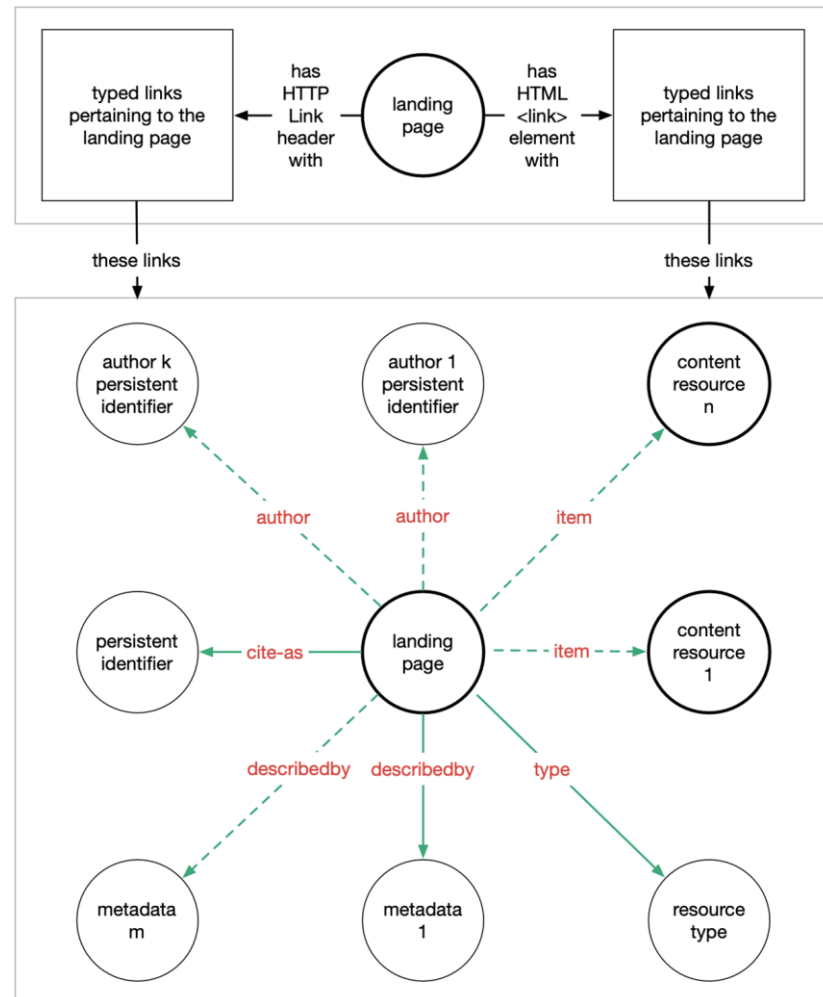




# Link discovery

HTTP (HEAD) request to  
landing page of DOI:

Web server tells all  
“alternate  
representations” of a  
resource!



\$ > curl -LI https://doi.org/10.1594/PANGAEA.841672

HTTP/2 302

date: Thu, 02 May 2024 14:19:46 GMT

[...]

location: https://doi.pangaea.de/10.1594/PANGAEA.841672

[...]

HTTP/2 200

server: nginx/1.25.5

date: Thu, 02 May 2024 14:19:47 GMT

content-type: text/html; charset=utf-8

content-length: 389246

x-powered-by: Jetty(12.0.8)

vary: Origin, Cookie, Authorization, Accept

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Capron, E et al. (2015): Last Interglacial synthesis of high-latitude temperature: temperature anomalies and associated errors for 4 time slices [dataset]. PANGAEA, <https://doi.org/10.1594/PANGAEA.841672>

Uwe Schindler

PANGAEA.

Data Publisher for Earth & Environmental Science

SEARCH

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ABOUT

CONTACT

Capron, Emilie; Govin, Aline; Stone, Emma J; Masson-Delmotte, Valerie; Mulitza, Stefan; Otto-Bliesner, Bette L; Rasmussen, Tine Lander; Sime, Louise C; Waelbroeck, Claire; Wolff, Eric William (2015): Last Interglacial synthesis of high-latitude temperature: temperature anomalies and associated errors for 4 time slices [dataset]. PANGAEA, <https://doi.org/10.1594/PANGAEA.841672>, <https://doi.org/10.1016/j.quascirev.2014.08.018>

Supplement to: Capron, E et al. (2014): Temporal and spatial structure of multi-millennial temperature changes at high latitudes during the Last Interglacial. Quaternary Science Reviews, 103, 116-133, <https://doi.org/10.1016/j.quascirev.2014.08.018>

Always quote citation above when using data! You can download the citation in several formats below.

RIS Citation

BrisTeX Citation

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1432

151

80

Abstract:

The Last Interglacial (LIG, 129-116 thousand of years BP, ka) represents a test bed for climate model feedbacks in warmer-than-present high latitude regions. However, mainly because aligning different palaeoclimatic archives and from different parts of the world is not trivial, a spatio-temporal picture of LIG temperature changes is difficult to obtain. Here, we have selected 47 polar ice core and sub-polar marine sediment records and developed a strategy to align them onto the recent AICC2012 ice core chronology. We provide the first compilation of high-latitude temperature changes across the LIG.

Elements

Console

Sources

Network

Performance

Memory

Application

Security

Preserve log

Disable cache

No throttling

Filter

Invert

Hide data URLs

Hide extension URLs

All

Fetch/XHR

Doc

CSS

JS

Font

Img

Media

Manifest

WS

Wasm

Other

Blocked response cookies

Blocked requests

3rd-party requests

10000 ms

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Headers

Preview

Response

Initiator

Timing

Cookies

PANGAEA.841672

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jquery.appear.min.js

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twitter-icon.png

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memvYaGs126MiZpBA-Uv...

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General

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Request Method: GET

Status Code: 200 OK

Remote Address: 134.1.2.171:443

Referrer Policy: strict-origin-when-cross-origin

Response Headers

Alt-Svc: h3=":443"; ma=2592000

Cache-Control: private

Content-Encoding: gzip

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Date: Thu, 02 May 2024 15:03:49 GMT


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36 requests

59.1 kB transferred

Capron, E et al. (2015): Last Interglacial

Uwe Schindler



# PANGAEA

Data Publisher for Earth & Environmental Science

Filter

Fetch/XHRDocCSSJSFontImgMediaManifestWSWasmOther

Preserve log

Disable cache

No throttling

Blocked response cookies

Blocked requests

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Show Map

Google Earth

1432

151

80

Abstract:

The Last Interglacial (LIG, 129-116 thousand of years BP, ka) represents a test bed for climate model feedbacks in warmer-than-present high latitude regions. However, mainly because aligning different palaeoclimatic archives and from different parts of the world is not trivial, a spatio-temporal picture of LIG temperature changes is difficult to obtain. Here, we have selected 47 polar ice core and sub-polar marine sediment records and developed a strategy to align them onto the recent AICC2012 ice core chronology. We provide the first compilation of high latitude temperature changes across the LIG

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36 requests

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# Data Download

- Use one of the provided “**link**” relations to download!
- Query the DOI directly with *YOUR* most liked content type: **Content Negotiation**





# Download tab data file!

```
$ > curl -OJLf 'https://doi.pangaea.de/10.1594/PANGAEA.841672?format=textfile'
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           %             %             Dload  Upload   Total   Spent    Left   Speed
100 43533    0 43533    0     0   110k      0  --:--:-- --:--:-- --:--:--   110k
curl: Saved to filename 'Capron_2014.tab'

$ >
```



# Download tab data file!

```
$ > curl -OJLf -H'Accept: text/tab-separated-values'
https://doi.org/10.1594/PANGAEA.841672
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           %             %             Dload  Upload  Total  Spent    Left     Speed
100   187    100   187     0     0    573      0  --:--:-- --:--:-- --:--:--    573
100   111     0   111     0     0    119      0  --:--:-- --:--:-- --:--:--    119
100 43533     0 43533     0     0 33130      0  --:--:-- 0:00:01 --:--:--  166k
curl: Saved to filename 'Capron_2014.tab'
```

```
$ >
```



# Download tab data file!

```
$ > curl -OJLf -H'Accept: application/x-download' https://doi.org/10.1594/PANGAEA.841672
% Total      % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total      Spent    Left     Speed
100   187    100   187    0    0    573      0  --:--:-- --:--:-- --:--:--    573
100   111     0   111    0    0   119      0  --:--:-- --:--:-- --:--:--    119
100 43533     0 43533    0    0 33130      0  --:--:-- 0:00:01 --:--:--  166k
curl: Saved to filename 'Capron_2014.tab'
```

```
$ >
```



# Let's get metadata in ISO 19139 / 19115 format!

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$ > curl -L -H'Accept: application/vnd.iso19139.metadata+xml' https://doi.org/10.1594/PANGAEA.841672
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  xmlns:gml="http://www.opengis.net/gml" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.isotc211.org/2005/gmd">
  <fileIdentifier>
  <gco:CharacterString>de.pangaea.dataset841672</gco:CharacterString>
  </fileIdentifier>
  <language>
  <LanguageCode codeList="http://www.isotc211.org/2005/resources/Codelist/ML_gmxCodelists.xml#LanguageCode" codeListValue="eng">eng</LanguageCode>
  </language>
  <hierarchyLevel>
  <MD_ScopeCode codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
    codeListValue="dataset">dataset</MD_ScopeCode>
  </hierarchyLevel>
  <contact>
  <CI_ResponsibleParty>
  <organisationName>
  <gco:CharacterString>PANGAEA</gco:CharacterString>
  </organisationName>
  <contactInfo>
  <CI_Contact>
```

How about access restricted datasets?

# Bearer Tokens

Following “cookie monster” illustrations by Till Born (*predic8: Microservices, APIs & Integration*):

<https://www.predic8.de/bearer-token-autorisierung-api-security.htm>







GET /kekse





GET /kekse  
401 Bearer Realm





GET /kekse  
401 Bearer Realm



POST /ausgabe user/pwd







GET /kekse  
401 Bearer Realm



POST /ausgabe user/pwd  
200 ● Token







GET /kekse



401 Bearer Realm

GET /kekse

Authorization: Bearer ● Token

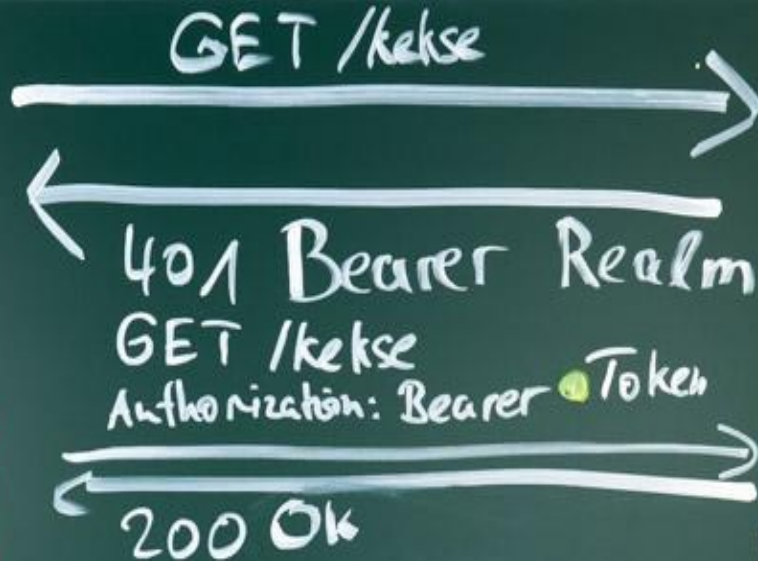


POST /ausgabe user/pwd




200 ● Token





Log in – Data Publisher for Earth | X

← → ↺ 🏠 🌐 pangaea.de/user/login.php?referer=https%3A... ☆ 4° 🌐 ⚡ 📁 📄 🖨 👤 ⋮



PANGAEA.

Data Publisher for Earth & Environmental Science

SEARCH SUBMIT HELP ABOUT CONTACT

PANGAEA Log in


Login is only required for access to data under moratorium or for submitting new data sets.

*Most of the data are freely available and can be used under the terms of the license mentioned on the data set description. A few password protected data sets are under moratorium from ongoing projects. The description of each data set is always visible and includes the principle investigator (PI) who may be asked for access.*

**You can [sign up](#) for a user account at PANGAEA [here](#).** This account can be used to access more advanced services (like our data warehouse), access your own data under moratorium, or submit data using the issue tracker.

Log in with ORCID iD

Your account must already be connected to an **ORCID ID** for this to work. **ORCID** provides a persistent digital identifier that distinguishes you from other researchers. If your account is not yet connected, please use the [username/password log in](#) below and connect the accounts from the profile page after logging in.

 Log in with ORCID iD

Log in with username and password

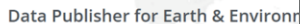
User Name / E-mail:

Password:

Lost password?

Log in





Login is only required for access to data under mor

Most of the data are freely available and can be used under the CC-BY license. A few password protected data sets are under the CC-BY-NC license. The data set is always visible and includes the principle investigator's name.

You can [sign up](#) for a user account at PANGAEA [here](#) to use our services (like our data warehouse), access your own data, and more.

## Log in with ORCID iD

Your account must already be connected to an **ORCID** identifier that distinguishes you from other researchers. [username/password log in](#) below and connect the account.



Log in with username and password

User Name / E-mail: uschindler

Password: .....

Lost password?

Log in



**PANGAEA.**

Data Publisher for Earth &amp; Environmental Science

[SEARCH](#) [SUBMIT](#) [HELP](#) [ABOUT](#) [CONTACT](#)

User Profile: Uwe Schindler (*uschindler*)

On this page you have access to your PANGAEA user profile. You are logged in as **uschindler** with the following options:

- **Change password**
- **Edit user profile** (*full name, e-mail, institution, phone*)
- Review our terms of use
- Review our privacy policy
- **Log out** and return to PANGAEA home page
- **Log out from all devices** (please activate this option if you think that your account was compromised, somebody got one of your API bearer token, or you lost a device that was used to access PANGAEA)

Your account is connected to the following **ORCID** ID:



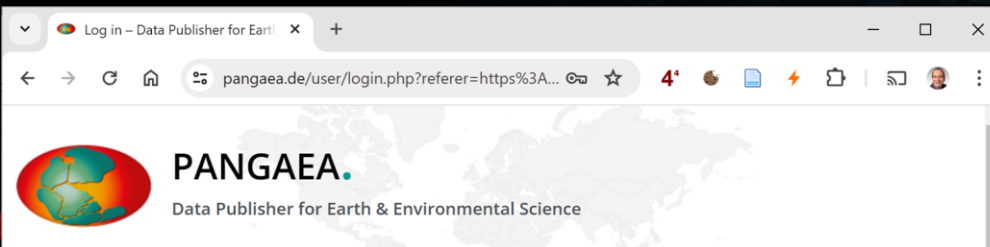
## Your temporary login token

PANGAEA allows to download protected datasets and access APIs using a *bearer token*. Your current login session is using the following token: `u7f14y421yan3azebox73uskqm5m3kqypbhitpyro4rfijgtbpfboyqz4kkn1v4`

The token can be passed as "**Authorization: Bearer** `u7f14y4y42l3an3azebox73usqkm5m3kqypbhhtpyro4rfijgtbpfyqz4kknlv4`" header with HTTP requests to PANGAEA's APIs. For example, it can be used to download a protected dataset with **curl**:

```
$ curl -OJLf -H'Authorization: Bearer u7fl4y4y42lyan3azebox73uskqm5m3kqypbhitpyro4rfijgtpbfoyqz4kknlv4' -H'Accept:
```

Please read our [Interoperability / Services](#) page and our [Wiki](#) for more information about PANGAEA's APIs.



## Your temporary login token

PANGAEA allows to download protected datasets and access APIs using a *bearer token*. Your current login session is using the following token: `u7f14y4y421yan3azebox73uskqm5m3kqypbhitpyro4rfijgtpbfoyqz4kknlv4`

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```

Please read our [Interoperability / Services](#) page and our [Wiki](#) for more information about PANGAEA's APIs.

### Log in with username and password

User Name / E-mail:

Password:

[Lost password?](#)

[Log in](#)





How about finding out what datasets exist in the system?

# PANGAEA Search

# Caution!

- There is *(at moment)* **no official and documented** API of PANGAEA Search
- Official **Search REST API** will come **in near future**

Currently, clients “**pangaeapy**” and “**pangaeear**” have support for using an internal, undocumented API

# Alternatives

DataCite Search API:

<https://support.datacite.org/docs/api>

- Searches larger inventory
- Returns DOI from any datacenter
- Summary metadata is returned
- Data access with.....

# Alternatives

DataCite Search API:

<https://support.datacite.org/docs/api>

- Searches larger inventory
- Returns DOI from any datacenter
- Summary metadata is returned
- Data access with..... **Content Negotiation!**



Feedback?

# Thank You!





# pangaeear: open source package

- R package **developed and maintained by rOpenSci**
- Data retrieval interface for PANGAEA
- Download and documentation on GitHub and CRAN:
  - <https://github.com/ropensci/pangaeear>
  - <https://CRAN.R-project.org/package=pangaeear>



© 2016 The R Foundation,  
[CC-BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)

Scott Chamberlain, Kara Woo, Andrew MacDonald, Naupaka Zimmerman and Gavin Simpson (2021).  
pangaeear: Client for the 'Pangaea' Database. R package version 1.1.0.  
<https://CRAN.R-project.org/package=pangaeear>



# Why pangaeear?

- ✓ Direct data queries and retrieval via R
- ✓ Enables automated workflows and data mining
- ✓ Reproducible workflow and record of data retrieval
- ✓ Easier bulk download of data
- ✓ Metadata search and analysis



Credit: Gregor  
Cesnar



# Getting started

Install *pangaeear* in your environment

```
install.packages('pangaeear')
```

Import packages

```
library(pangaeear)
```





# Two essential commands

| Function               | Description  |
|------------------------|--|
| <code>pg_search</code> | Search the Pangaea database<br>(arguments: e.g. count, offset) |
| <code>pg_data</code>   | Download data from Pangaea                                     |

... and others ...



# pg\_search

This mirrors the query via the [PANGAEA website](https://pangaea.de/)

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Workshop\_scripts.R

```
1 # install.packages('pangaeR')
2 # install.packages('dplyr')
3 library(pangaeR) # see package details at https://github.com/ropensci/pangaeR
4 library(dplyr) # set of tools for data manipulation, see details at https://dplyr.tidyverse.org/
5
6 #===== 1. SEARCH (by PROJECT) =====
7 # Documentation of PANGAEA search: https://wiki.pangaea.de/wiki/PANGAEA_search
8 # Website: https://www.pangaea.de/?q=project:label:PAGES_C-PEAT
9 # search with pg_search: maximum = 500 records (set with count, continue with offset)
10 PAGES <- pg_search("project:label:PAGES_C-PEAT", count = 1000)
11 PAGES1 <- pg_search("project:label:PAGES_C-PEAT", count = 500)
12 PAGES2 <- pg_search("project:label:PAGES_C-PEAT", count = 500, offset = 500)
13
14 PAGES_all <- rbind(PAGES1, PAGES2)
15
16
```

Environment History Connections Tutorial

R Global Environment

Data

| PAGES  | 500 obs. of 6 variables |  |
|--------|-------------------------|--|
| PAGES1 | 500 obs. of 6 variables |  |
| PAGES2 | 375 obs. of 6 variables |  |

Files Plots Packages Help Viewer Presentation

R: Search the PANGAEA database Find in Topic

pg\_search (pangaeR) R Documentation

## Search the PANGAEA database

### Description

Search the PANGAEA database

### Usage

```
pg_search(
  query,
  count = 10,
  offset = 0,
  topic = NULL,
  bbox = NULL,
```





# pg\_data

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Workshop\_scripts.R x

```
21 #===== 2. GET DATA =====
22 # download single dataset (randomly selected from the search result above)
23 # pg_data returns list, data table -> data frame
24 Joey_core12 <- pg_data(doi="10.1594/PANGAEA.890405")
25 Joey_core12 <- Joey_core12[[1]][["data"]]
26
27 # create a folder for download
28 getwd()
29 dir.create(path="R/Files")
30 folderpath <- "R/Files/"
31
32 # write table as txt file
33 # paste function: concatenate vectors by converting them into character (list
34 write.table(Joey_core12, file=paste0(folderpath,"Joey_core12.txt"), row.names=
35
36
```

25:1 2. GET DATA R Script

Console Terminal Background Jobs

R 4.3.0 · ~

```
[workspace loaded from ~/.RData]

> library(pangaeear)
Registered S3 method overwritten by 'httr':
  method from
  print.cache_info hoardr
> #===== 2. GET DATA =====
> # download single dataset (randomly selected from the search result above)
> # pg_data returns list, data table -> data frame
> Joey_core12 <- pg_data(doi="10.1594/PANGAEA.890405")
Downloading 1 datasets from 10.1594/PANGAEA.890405
Processing 1 files
> |
```

Environment History Connections Tutorial

R Global Environment 160 MiB

Data

Joey\_core12 List of 1

\$ :List of 7

|                           |                                |
|---------------------------|--------------------------------|
| ..\$ parent_doi:          | chr "10.1594/PANGAEA.89...     |
| ..\$ doi:                 | chr "10.1594/PANGAEA.89...     |
| ..\$ citation:            | chr "Camill, Philip (20...     |
| ..\$ url:                 | chr "https://doi.org/10...     |
| ..\$ path:                | chr "C:\\Users\\FLAVIA~...     |
| ..\$ metadata:            | :List of 9                     |
| .. ..\$ citation:         | chr "Camill, Ph...             |
| .. ..\$ related_to:       | chr "Camill, Ph...             |
| .. ..\$ further_details:  | chr "Camill, Ph...             |
| .. ..\$ projects:         | chr "Past Globa...             |
| .. ..\$ coverage:         | chr "LATITUDE: ...             |
| .. ..\$ events:           | :List of 8                     |
| .. .. ..\$ Joey_core12:   | chr NA                         |
| .. .. ..\$ LATITUDE:      | chr "55.470000"                |
| .. .. ..\$ LONGITUDE:     | chr "-98.15000...              |
| .. .. ..\$ ELEVATION:     | chr "214.0 m"                  |
| .. .. ..\$ Recovery:      | chr "155 cm"                   |
| .. .. ..\$ LOCATION:      | chr "Canada"                   |
| .. .. ..\$ METHOD/DEVICE: | chr "Peat core...              |
| .. .. ..\$ COMMENT:       | chr "Coring ye...              |
| .. .. ..\$ parameters:    | :List of 6                     |
| .. .. .. ..\$:            | chr [1:3] "DEPTH, sediment/... |
| .. .. .. ..\$:            | chr [1:4] "AGE [ka BP] (Aae... |

Files Plots Packages Help Viewer Presentation



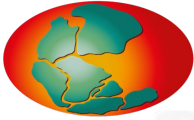
# Example R-scripts

<https://github.com/pangaea-data-publisher/community-workshop-material>

- Search datasets (by Project or by unique semantic URI from WoRMS database)

```
# Search for species 'Arenicola marina' using its unique semantic URI, see WoRMS database https://www.marinespecies.org/aphia.php?p=taxdetails&id=129868  
res2 <- pg_search(query = 'urn:lsid:marinespecies.org:taxname:129868', count = 100)
```

- Filter search results and get multiple datasets
- Download multiple binary files (e.g., images, netCDF format, etc.)



# Introduction to pangaeapy



# pangaeapy: open source package

1. Developed and maintained by PANGAEA staff

2. But anyone can contribute, see

<https://pypi.org/project/pangaeapy/>

3. Report issues on [GitHub](#)

Robert Huber, Egor Gordeev, Markus Stocker, Aarthi Balamurugan, & Uwe Schindler (2020). pangaeapy - a Python module to access and analyse PANGAEA data. Zenodo. <http://doi.org/10.5281/zenodo.4013940>.

## pangaeapy 1.0.22

✓ Latest version

Released: Feb 11, 2025

`pip install pangaeapy`

This module allows to download and analyse metadata as well as data from tabular PANGAEA (<https://www.pangaea.de>) datasets. Usage: `import pangaeapy.pandataset as pd ds= pd.PanDataSet(787140) print(ds.title) print(ds.data.head())` Please visit the github project page to see more documentation and some examples: <https://github.com/pangaea-data-publisher/pangaeapy>

### Navigation

- Project description
- Release history
- Download files

### Project description

DOI: [10.5281/zenodo.4013941](https://doi.org/10.5281/zenodo.4013941)

**pangaeapy - a Python module to access and analyse PANGAEA data**

### Background



PANGAEA (<https://www.pangaea.de>) is one of the world's largest archives of this kind offering essential data services such as data curation, long-term data archiving and data publication. PANGAEA hosts about 400,000 datasets comprising around 17.5 billion individual measurements (Aug. 2020) and observations which have been collected during more than 240 international research projects. The system is open to any project, institution or individual scientist using, archiving or publishing research data.

Since the programming languages Python and R have become increasingly important for scientific data analysis in recent years, we have developed 'pangaeapy' a new, custom Python module that considerably simplifies typical data science tasks.

### Verified details

These details have been *verified by PyPI*

### Maintainers

-  nselke
-  pangaea

### Unverified details

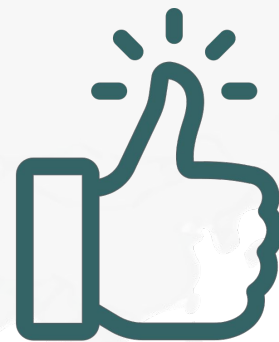
These details have *not* been verified by PyPI

### Project links



# Why pangaeapy?

- ✓ Direct data queries and retrieval via Python
- ✓ Easier bulk download of data
- ✓ **Metadata search and analysis**
- ✓ Enables automated workflows and data mining
- ✓ Reproducible workflow and record of data retrieval



Credit: Gregor  
Cesnar



# Getting started

Install *pangaeapy* in your environment

```
pip install pangaeapy
```

Import packages

```
import pangaeapy as pan
```

or

```
from pangaeapy.panquery import PanQuery
```

```
from pangaeapy.pandataset import PanDataSet
```







# Two essential commands

| Function                                 | Attributes         |
|--|--------------------|
| <code>pan.PanQuery('search term')</code> | totalcount, result |

Example: `query = pan.PanQuery("Triticum")`  
`query.result`

|   | URI                        | score     | html  |
|---|----------------------------|-----------|---|
| 0 | doi:10.1594/PANGAEA.896784 | 20.516336 | <li><div class="citation"><a href="https://doi... |
| 1 | doi:10.1594/PANGAEA.886727 | 18.917538 | <li><div class="citation"><a href="https://doi... |
| 2 | doi:10.1594/PANGAEA.925261 | 18.777039 | <li><div class="citation"><a href="https://doi... |
| 3 | doi:10.1594/PANGAEA.886725 | 18.592678 | <li><div class="citation"><a href="https://doi... |



# Two essential commands

| Function                                  | Attributes   |
|---|--|
| <code>pan.PanDataSet('PANGAEA ID')</code> | data, id, uri, doi, title, abstract, year, authors, citation, parameters, events, min-/maxtimeextent, children, etc. |

Example: `ds = PanDataSet("doi:10.1594/PANGAEA.923033")`  
`ds.data`

|   | Event        | ID       | Project     | Access no gen     | Access no gen_2 | Campaign       | Date/Time           |
|---|--------------|----------|-------------|-------------------|-----------------|----------------|---------------------|
| 0 | HUD16/19_010 | WB-00001 | PRJNA613976 | insdc:SRR11365522 | NaN             | Hudson2016-019 | 2016-07-20 16:30:12 |
| 1 | HUD16/19_010 | WB-00005 | PRJNA613976 | insdc:SRR11365520 | NaN             | Hudson2016-019 | 2016-07-20 16:30:12 |
| 2 | HUD16/19_010 | WB-00007 | PRJNA613976 | insdc:SRR11365519 | NaN             | Hudson2016-019 | 2016-07-20 16:30:12 |



# For our practice today



1. We'll work in  
JupyterNotebook via Colab

2. Go to PANGAEA's community  
workshop [GitHub repository](#)

3. Navigate to  
Python/PANGAEApY\_practical

4. Scroll down and click on  
"Open in Colab"



PANGAEA.  
Community Workshops

## PANGAEApY practical

### How to search and download data from PANGAEA

By: Kathrin Riemann-Campe Last updated: 2025-05-07

This notebook will guide you how to retrieve diverse earth- and environmental data and its metadata from the [PANGAEA data repository](#) using Python. It uses the [PangaePy package](#), to facilitate the data download.

Run this notebook in:

- [GoogleColab:](#)  [Open in Colab](#)



Find solutions to quizzes in this [notebook](#)

Additional examples related to PANGAEApY\_practical

- detailed examples on metadata extraction in [pangaeapy\\_detailed\\_metadata\\_search](#)
- example to extract project-specific information in [PANGAEA\\_access\\_metadata\\_per\\_project](#)



# Working in Jupyter notebooks

NOTE: You cannot save files but download/sync to GoogleDrive

CO pangaeapy\_practical.ipynb

File Edit View Insert Runtime Tools Help

Q Commands + Code + Text Copy to Drive

Table of contents

- pangaeapy practical
  - Content of this notebook
  - Import libraries
  - PANGAEAPy documentation
  - Query for data in PANGAEA
    - General info on query
    - 2.1 Basic queries
      - Query PANGAEA with combinations of keywords
      - Optional query terms
      - Uncertain spelling
      - Specific author
      - Within geographical coordinates a.k.a bounding box
    - 2.3 Queries exceeding 500 results
    - 2.2 How to query PANGAEA without result limitations
    - 2.3 Quiz
      - 2.3.1 How many datasets contain "geological investigations"?
      - 2.3.2 How many datasets contain "geological investigations" in the title only?
      - 2.3.3 How many datasets measured "Temperature, water" using a CTD/Rosette?
  - Get metadata
    - 3.1 Get metadata of individual dataset
  - Example dataset from PANGAEA <https://doi.pangaea.de/10.1594/PANGAEA.923033>

## Content of linked GitHub Jupyter Notebook

## PANGAEA.

Community Workshops

▼ pangaeapy practical

**How to search and download data from PANGAEA**

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Run this notebook in: [GoogleColab](#): [Open in Colab](#)

Content of this notebook

1. Import libraries
2. Query for data in PANGAEA
3. Get metadata
4. Download datasets
5. Download binary files

▼ 1. Import libraries

```
[ ] ## general libraries
import os
import pandas as pd
import numpy as np
import requests
from urllib.request import urlopen, urretrieve
```

## Code and Markdown

## Run code by clicking play button or with Shift + Enter



# PANGAEAPy practical

Kathrin Riemann-Campe

please go to community workshop page on github

[https://github.com/pangaea-data-publisher/community-workshop-material/tree/master/Python/PANGAEAPy\\_practical](https://github.com/pangaea-data-publisher/community-workshop-material/tree/master/Python/PANGAEAPy_practical)



# Thank you!

## Interested in the next event?

Enroll to our training mailing list  
(<https://lists.pangaea.de/listinfo/training>)

or scan the QR-code to the right...

