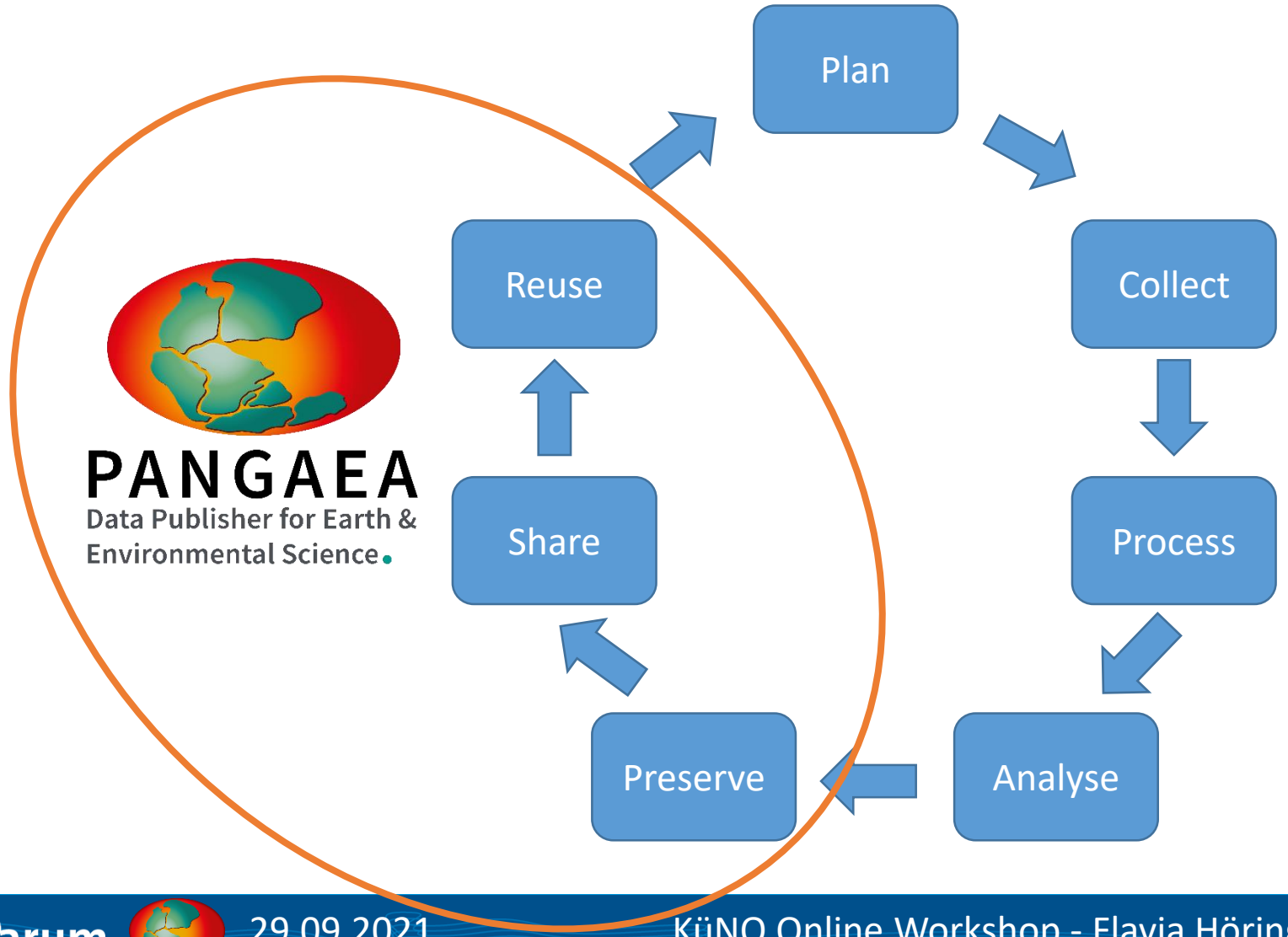
Practical guide for FAIR and Open data publishing in PANGAEA

KüNO Online Workshop ‘Data sharing in marine research’, 29 Sep 2021

Dr. Flavia Höring – Data manager at DAM/PANGAEA

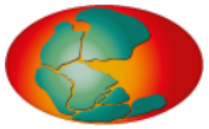
Research data life cycle



Step 1: Prepare the data

- Preferred format for data tables is **TAB-delimited text files** (UTF-8 encoding) or Excel-format
- **Position(s) (latitude/longitude in decimal degree)** must be provided for every sample, observation and measurement carried out anywhere on earth
- **Date/Time** must be provided in the ISO-format (e.g. 1954-04-07T13:34:11) as coordinated universal time (UTC)
- Parameters are always accompanied by a **unit**
- **Event/station ID** as first column
- Explain **abbreviations**
- Read guidelines at: **https://wiki.pangaea.de/wiki/Data_submission**

Step 1: Prepare the data



PANGAEA.

Data Publisher for Earth & Environmental Science

SEARCH SUBMIT HELP ABOUT CONTACT

Expeditions

This page contains an overview of selected ships and projects hosted at PANGAEA.

Event information at:
https://pangaea.de/expeditions/

Cruise inventory and cruise data of german research vessels

Below you can find links to campaign lists of large and medium-sized German research vessels. The lists contain current and past campaign schedules, information on the chief scientist, links to station lists, cruise reports, and links to cruise data if available in PANGAEA. Some lists contain additional information such as research area, start and end harbour or cruise tracks. A link to the respective cruise summary report of the German Oceanographic Datacentre is also given.

Large Research Vessels

- Polarstern (DBLK, 1982)
- Sonne (DBBE, 2014)
- Meteor (DBBH, 1986)

Medium-sized Research Vessels

- Alkor (DBND, 1990)
- Elisabeth Mann Borgese (DBKR)
- Heincke (DBCK, 1990)
- Maria S. Merian (DBBT, 2005)

Aircrafts

- POLAR 5
- POLAR 6

Decommissioned Research Vessels

- Meteor (1964-1985)
- Meteor (1924-1939)
- Poseidon (DBKV, 1976)
- Sonne (DFCG, 1969-2014)
- Valdivia (C6QT2, 1961-1999)

Please also visit the Data Portal German Marine Research for detailed expedition/cruise information.

Step 1: Prepare the data

Abbreviation not explained!

Unit is missing!

Depth	Age	SS%	SS
0.01	1.518	86.351	30.337
0.03	2.448	80.966	30.037
0.05	3.369	80.832	29.628
0.07	4.283	80.908	30.290
0.09	5.24	83.068	31.866
0.11	6.269	80.819	29.770
0.13	7.441	80.905	30.873
0.15	8.16	79.570	28.772
0.17	8.901	78.748	29.243
0.19	9.764	82.442	30.896
0.21	10.63	80.586	30.040
0.23	11.426	83.245	30.853
0.25	12.506	81.855	30.112
0.27	13.49	83.264	30.556
0.29	14.538	81.176	28.842
0.31	15.715	80.703	29.623

Date/Time is missing!

Station	Longitude (°E)	Latitude (°N)	Temperature (°C)	Salinity
A04	124	35	24.212	30.775
C01	121.35	34.97	24.108	29.668
C02	122	35	24.288	30.558
C03	122.52	34.999	24.21	30.254
C05	123.5	35	24.816	30.32
D01	122.61	31.908	22.673	29.36
D05	124.27	32.439	26.434	28.289
F02	123	31	24.18	31.934
F03	123.5	31.076	25.471	32.133
F04	123.95	31	26.822	31.645
F05	124.39	31.088	27.146	30.294
F07	125.27	31.136	27.962	29.61
F08	125.498	31.35	27.363	29.761
F10	126.11	31.748	27.383	29.951

Step 1: Prepare the data

EB1_1_data_FH.txt

```
Date/Time	Latitude	Longitude	Gear ID	Depth Water [m]	Press [dbar]	Cur vel U [cm/s]	Cur vel V [cm/s]
2016-04-04T10:00:00	49	-12.62	3	1380.1	1396.6	-8.91	16.21
2016-04-04T11:00:00	49	-12.62	2	1063.9	1075.8	-4.3	11.71
2016-04-04T11:00:00	49	-12.62	3	1380.4	1396.9	-5.9	16.44
2016-04-04T12:00:00	49	-12.62	1	211.3	213.3	-7.96	-1.49
2016-04-04T12:00:00	49	-12.62	1	227.3	229.4	-9.67	-2.92
2016-04-04T12:00:00	49	-12.62	1	243.3	245.6	-7.5	-2.23
2016-04-04T12:00:00	49	-12.62	1	259.4	261.7	-8.6	-0.07
2016-04-04T12:00:00	49	-12.62	1	275.4	277.9	-6.79	-2.92
2016-04-04T12:00:00	49	-12.62	1	291.4	294.1	-6.37	-1.72
2016-04-04T12:00:00	49	-12.62	1	307.4	310.2	-8.93	-1.94
2016-04-04T12:00:00	49	-12.62	1	323.4	326.4	-5.89	1.58
2016-04-04T12:00:00	49	-12.62	1	339.4	342.6	-5.74	1.69
2016-04-04T12:00:00	49	-12.62	1	355.4	358.7	-5.84	0.91
2016-04-04T12:00:00	49	-12.62	1	371.4	374.9	-3.87	3.72
2016-04-04T12:00:00	49	-12.62	1	387.4	391.1	-4.2	5.31
2016-04-04T12:00:00	49	-12.62	1	403.4	407.2	0.29	1.3
2016-04-04T12:00:00	49	-12.62	1	419.4	423.4	-3.46	2.82
2016-04-04T12:00:00	49	-12.62	1	435.4	439.6	-3.41	4.79
2016-04-04T12:00:00	49	-12.62	1	451.4	455.8	-4.25	7.09
```

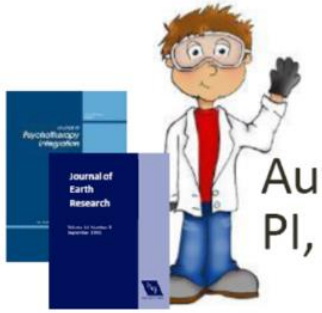
Normal text file | length : 19 560 956 | lines : 348 768 | Ln : 1 | Col : 1 | Pos : 1 | Windows (CR LF) | UTF-8 | INS

Step 2: Prepare the metadata

What?

Parameter [unit]

Who?



Author(s),
PI, Article

Where?

Latitude/Longitude

Depth in ice/water/
sediment; Altitude...

When?

Date,
Age...

How?

Method

Credits: Janine Felden (AWI)

Step 2: Prepare the metadata

- **Titles and abstracts** for each dataset (≠ paper, see https://wiki.pangaea.de/wiki/Abstract)
- (Preliminary) paper citation & other **references**
- **Projects/awards**
- A separate metadata table can be added (e.g. multiple abstracts, parameter information)

Step 2: Prepare the metadata

Example for metadata file

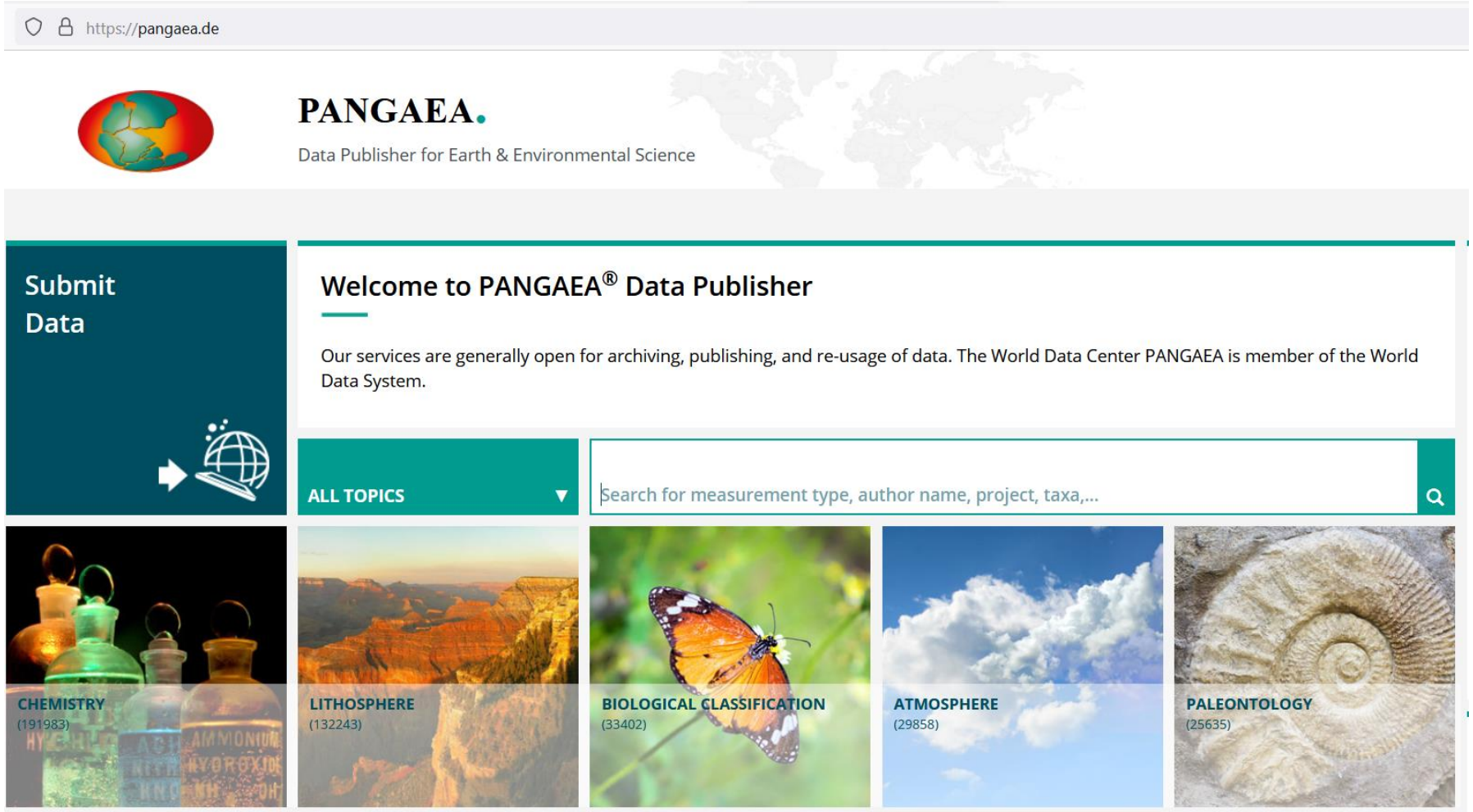
```
Title: Elemental composition of sediment core EPS_123
In Supplement to: Hagen, Thomas; Müller, Lydia; Potter, Dan. A Climate study of the Late Holocene. Submitted to P
Authors:  Hagen, Thomas; Müller, Lydia; Potter, Dan
Core name: EPS_123
Latitude: -20.56660
Longitude: -12.318733
Sampling Date: March, 20th 2018
Elevation: -512.0 m
Location:  South Atlantic Ocean
Device: Gravity corer

Properties:
Depth, sediment/rock: [m]
Age: [ka BP]
In-Potassium/Aluminium ratio: [] *METHOD/DEVICE: X-ray fluorescence (XRF)
```

Step 3: Data submission

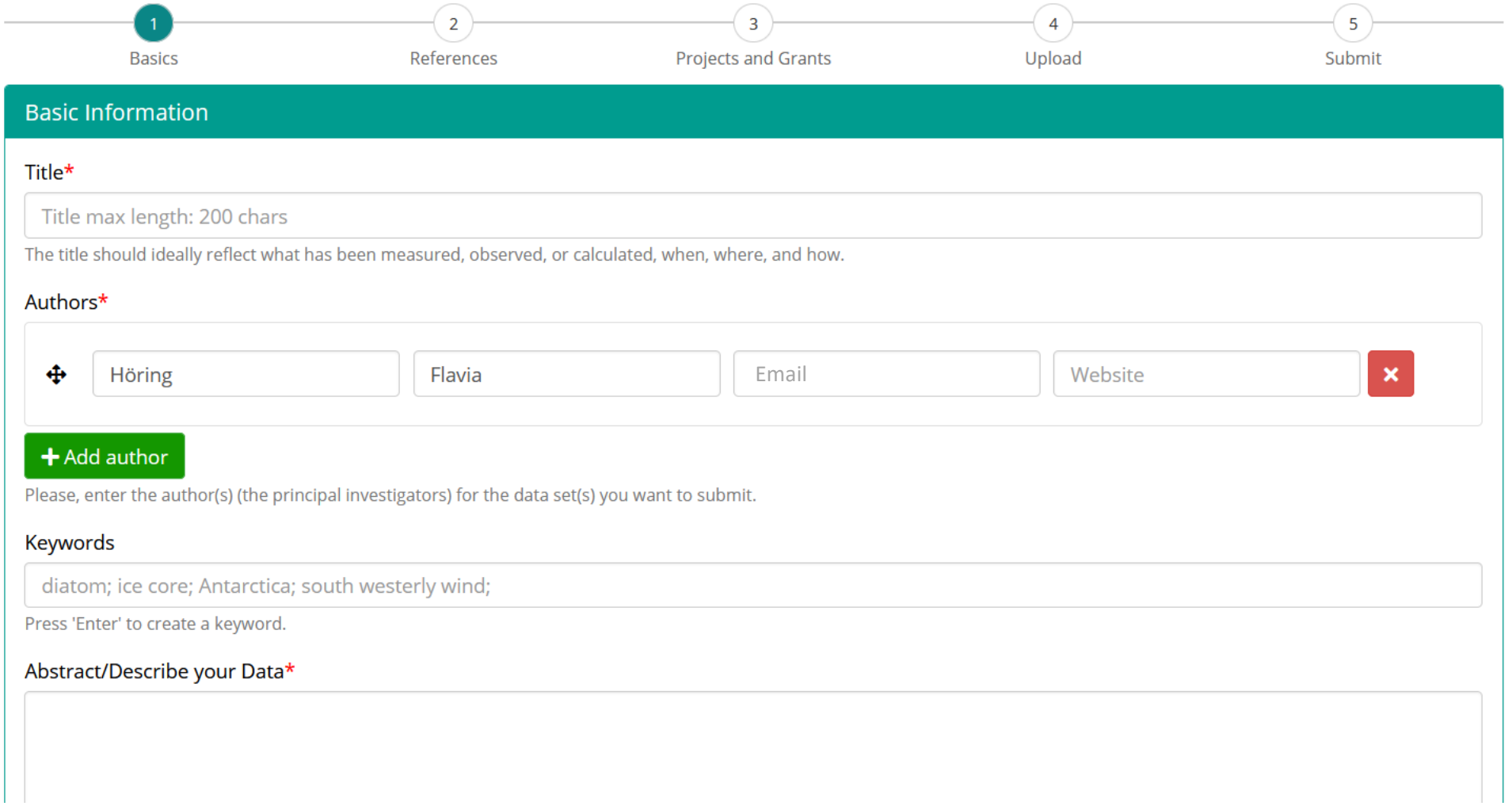
- Data prepared ✓
- Metadata prepared ✓
- Ready for submission ☺

Please submit your data as early as possible!

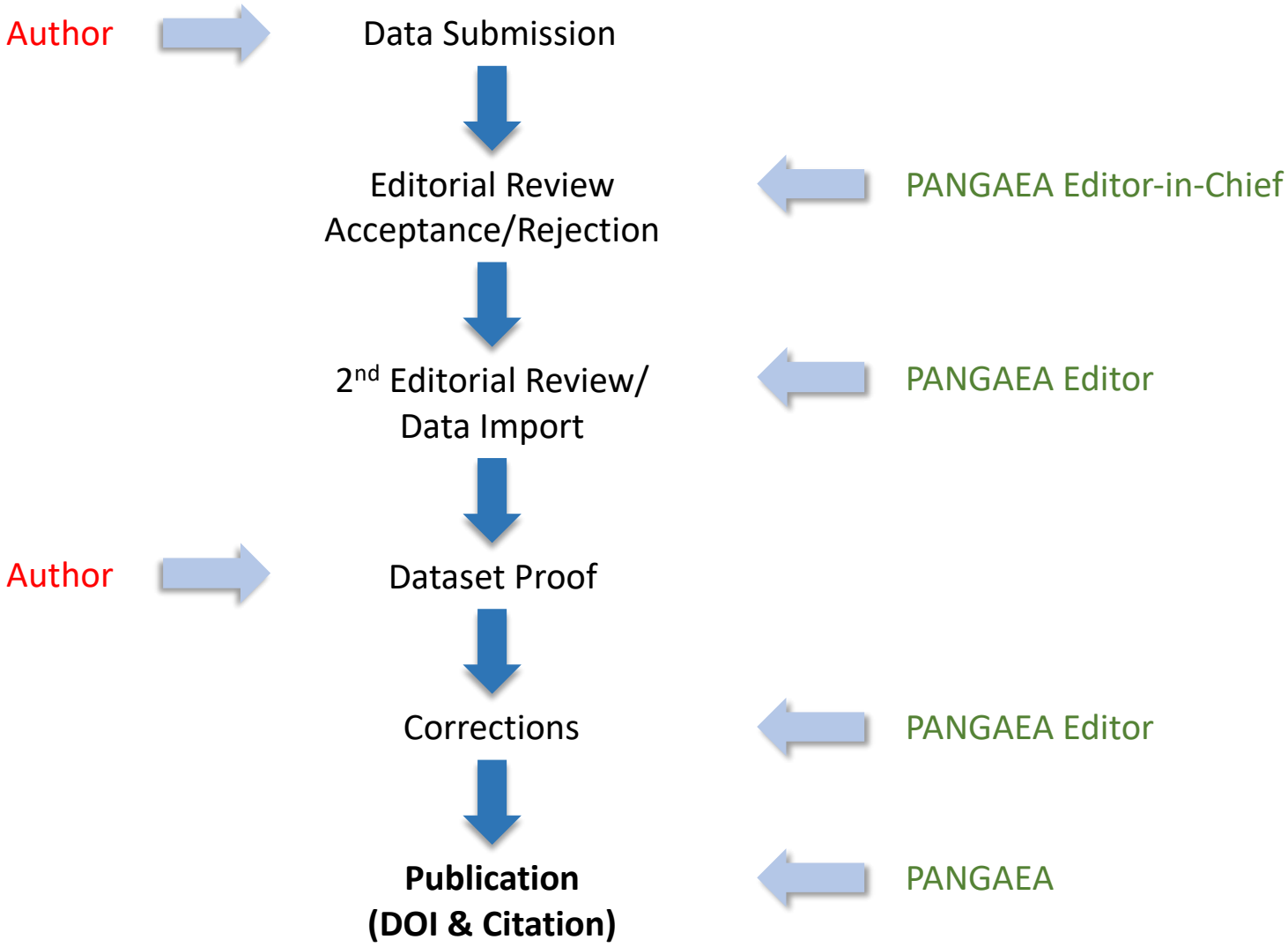
Step 3: Data submission



Step 3: Data submission



Step 4: Data curation



Credits: PANGAEA Team

Jira Ticket system

PANGAEA Data Archiving & Publication / PDI-28417

Data submission 2021-05-18T13:14:03Z (Franziska Nehring)

Edit | Add comment | Assign | More | Change Resolution | Reopen Issue | Export

Details

Type:	Data Submission	Status:	RESOLVED (View Workflow)
Priority:	Major	Resolution:	Done
Labels:	None		
Author(s):	Nehring, Franziska ,		
Title:	Physical oceanography during HEINCKE cruise HE575		
License:	CC-BY: Creative Commons Attribution 4.0 International		
DOI:	https://doi.pangaea.de/10.1594/PANGAEA.934145		

Description

Edit Metadata

To edit any metadata information (e.g abstract, authors...) of your data submission, please use the above button. You can also use it to upload more or updated file versions.

Attachments

Drop files to attach, or browse.

HE575.zip	41 kB	2021-05-18 13:18
Campaign_inp.txt	0.0 kB	
Data.txt	100 kB	
Event_inp.txt	0.6 kB	
HE575.txt	118 kB	
Meta_inp.txt	0.3 kB	
Download Zip		
metadata.json	1 kB	2021-05-18 13:18

People

Assignee:	Flavia Höring
Reporter:	Franziska Nehring
Contributors / Reviewers:	Gerd Rohardt, Sandra Tippenhauer
Watchers:	1 Start watching this issue

Dates

Created:	2021-05-18 13:18
Updated:	2021-08-17 07:34
Resolved:	2021-08-12 15:15

Jira Ticket system

Event_inp.txt - Editor

Datei Bearbeiten Format Ansicht Hilfe

Campaign	LabelEvent	Gear	DatetimeEvent	LatitudeEvent	LongitudeEvent	ElevationEvent
HE575/1	HE575_1-1	CTD	2021-04-19T07:59	53.8430	8.1009	-7.0
HE575/1	HE575_2-1	CTD	2021-04-19T11:24	53.9016	7.9388	-15.0
HE575/1	HE575_4-1	CTD	2021-04-24T09:55	53.9358	7.9525	-16.0
HE575/1	HE575_6-1	CTD	2021-04-24T11:20	54.0566	7.9419	-34.0
HE575/1	HE575_7-1	CTD	2021-04-24T13:11	53.9159	7.9458	-3.0
HE575/1	HE575_8-1	CTD	2021-04-25T10:07	53.9358	7.9521	-17.0
HE575/1	HE575_10-1	CTD	2021-04-25T11:27	54.0570	7.9394	-34.0
HE575/1	HE575_12-1	CTD	2021-04-25T13:25	53.9544	7.9041	-25.0

Edit Metadata

To edit any metadata informatio
can also use it to upload more c

Attachments

HE575.zip
Campaign_inp.txt
Data.txt
Event_inp.txt
HE575.txt
Meta_inp.txt
Download Zip

metadata.json

Data.txt - Editor

Datei Bearbeiten Format Ansicht Hilfe

Event label	Depth, water [m]		Pressure, water [dbar]	Temperature, water [deg C]	
HE575_1-1	1.4	1.4	7.5927	29.1306	27.8261
HE575_1-1	1.6	1.6	7.5904	29.1319	27.8292
HE575_1-1	1.8	1.8	7.5880	29.1328	27.8321
HE575_1-1	2.0	2.0	7.5882	29.1332	27.8322
HE575_1-1	2.2	2.2	7.5893	29.1333	27.8314
HE575_1-1	2.4	2.4	7.5834	29.1327	27.8354
HE575_1-1	2.6	2.6	7.5801	29.1316	27.8367
HE575_1-1	2.8	2.8	7.5769	29.1312	27.8388
HE575_1-1	3.0	3.0	7.5754	29.1308	27.8395

Jira Ticket system

PANGAEA Data Archiving & Publication / PDI-28417

Data submission 2021-05-18T13:14:03Z (Franzisk

Edit | Add comment | Assign | More | Change Resolution | Reopen

Details

Type:	Data Submission	Status:	
Priority:	Major	Resolution:	
Labels:	None		
Author(s):	Nehring, Franziska ,		
Title:	Physical oceanography during HEINCKE cruise HE575		
License:	CC-BY: Creative Commons Attribution 4.0 International		
DOI:	https://doi.pangaea.de/10.1594/PANGAEA.934145		

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can also use it to upload more or updated file versions.

Attachments

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Meta_inp.txt	0.3 kB
Download Zip	
metadata.json	1 kB

https://issues.pangaea.de/secure/attachment/160457/metadata.json

JSON | Rohdaten | Kopfzeilen

Speichern | Kopieren | Alle einklappen | Alle ausklappen | JSON durchsuchen


```
Version:            "1.0"
customfield_10820:  "checked"
Summary:            "Data submission 2021-05-18T13:14:03Z (Franziska Nehring)"
Abstract:           "Conductivity-temperature-depth profiles were measured using a Seabird SBE 911plus CTD during RV Heincke cruise
                    HE575 between 18.04.2021 and 01.05.2021. Additional sensors included a WET Labs C-Star transmissometer and a WET
                    Labs ECO-AFL fluorometer. Data were connected to the station book of the specific cruise as available in the DSHIP
                    database. Processing of the data including removal of obvious outliers followed the procedures described in CTD
                    Processing Logbook of RV Heincke (hdl: 10013/epic.47427). A detailed report on the CTD data of HE575 is available
                    at https://hdl.handle.net/10013/epic.c7d9939e-4d7d-4fa2-80ad-a0627a766195."
Keywords:
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    id:             "0"
  1:
    name:           "HE575"
    id:             "0"
  2:
    name:           "Heincke"
    id:             "0"
License:
  title:            "CC-BY: Creative Commons Attribution 4.0 International"
  id:               "todo"
References:
  0:
    title:          "Rohardt, G. (2021). CTD Processing Report of RV Heincke HE575. https://hdl.handle.net/10013/epic.c7d9939e-
                    4d7d-4fa2-80ad-a0627a766195.."
Staffs:
  0:
    name_last:      "Nehring"
    name_first:     "Franziska "
    email:
    website:        ""
Title:              "Physical oceanography during HEINCKE cruise HE575"
```

Jira Ticket system - communication

Dear Franziska,
Please proofread your data and metadata at https://doi.pangaea.de/10.1594/PANGAEA.934145 .
Best regards,
Flavia

Virtual conversation

Dear Flavia,
Thank you for the archiving. Everything looks okay. You can publish the data now.
Best regards,
Franziska

Step 5: FAIR data publishing in PANGAEA

Citation: **Bijma, Jelle; Rohardt, Gerd (2021):** Physical oceanography during HEINCKE cruise HE575. *Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Bremerhaven, PANGAEA,* https://doi.org/10.1594/PANGAEA.934145

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

RIS Citation | BibTeX Citation | Copy Citation | Facebook | Twitter | Show Map | Google Earth

Full citation with DOI!

M E T A D A T A

Abstract: Conductivity-temperature-depth profiles were measured using a Seabird SBE 911plus CTD during RV Heincke cruise HE575 between 18.04.2021 and 01.05.2021. Additional sensors included a WET Labs C-Star transmissometer and a WET Labs ECO-AFL fluorometer. Data were connected to the station book of the specific cruise as available in the DSHIP database. Processing of the data including removal of obvious outliers followed the procedures described in CTD Processing Logbook of RV Heincke (hdl:10013/epic.47427). A detailed report on the CTD data of HE575 is available at https://hdl.handle.net/10013/epic.c7d9939e-4d7d-4fa2-80ad-a0627a766195.

Keyword(s): CTD; HE575; Heincke

Further details: **Müller-Michaelis, Antje; Rohardt, Gerd (2016):** CTD Processing Logbook of RV Heincke. hdl:10013/epic.47427.d001

Rohardt, Gerd (2021): CTD Processing Report of RV Heincke HE575. hdl:10013/epic.c7d9939e-4d7d-4fa2-80ad-a0627a766195

Project(s): **Physical Oceanography @ AWI** (AWI_PhyOce)

Coverage: *Median Latitude:* 53.950018 * *Median Longitude:* 7.959461 * *South-bound Latitude:* 53.843040 * *West-bound Longitude:* 7.904090 * *North-bound Latitude:* 54.057020 * *East-bound Longitude:* 8.100930

Date/Time Start: 2021-04-19T07:59:47 * *Date/Time End:* 2021-04-25T13:25:54

Minimum DEPTH, water: 1.4 m * *Maximum DEPTH, water:* 35.1 m

Step 5: FAIR data publishing in PANGAEA

METADATA

Project(s): **Physical Oceanography @ AWI** (AWI_PhyOce)

Coverage: *Median Latitude:* 53.950018 * *Median Longitude:* 7.959461 * *South-bound Latitude:* 53.843040 * *West-bound Longitude:* 7.904090 * *North-bound Latitude:* 54.057020 * *East-bound Longitude:* 8.100930

Date/Time Start: 2021-04-19T07:59:47 * *Date/Time End:* 2021-04-25T13:25:54

Minimum DEPTH, water: 1.4 m * *Maximum DEPTH, water:* 35.1 m

Event(s): **HE575_10-1** * *Latitude:* 54.057020 * *Longitude:* 7.939440 * *Date/Time:* 2021-04-25T11:27:24 * *Elevation:* -34.1 m * *Location:* North Sea * *Campaign:* HE575 * *Basis:* Heincke * *Method/Device:* CTD/Rosette (CTD-RO)

HE575_1-1 * *Latitude:* 53.843040 * *Longitude:* 8.100930 * *Date/Time:* 2021-04-19T07:59:47 * *Elevation:* -7.4 m * *Location:* North Sea * *Campaign:* HE575 * *Basis:* Heincke * *Method/Device:* CTD/Rosette (CTD-RO)

HE575_12-1 * *Latitude:* 53.954420 * *Longitude:* 7.904090 * *Date/Time:* 2021-04-25T13:25:54 * *Elevation:* -25.4 m * *Location:* North Sea * *Campaign:* HE575 * *Basis:* Heincke * *Method/Device:* CTD/Rosette (CTD-RO)

Show more...

Parameter(s):

#	Name	Short Name	Unit	Principal Investigator	Method/Device	Comment
1	Event label	Event		Rohardt, Gerd		
2	Date/Time of event	Date/Time		Rohardt, Gerd		
3	Latitude of event	Latitude		Rohardt, Gerd		
4	Longitude of event	Longitude		Rohardt, Gerd		
5	Elevation of event	Elevation	m	Rohardt, Gerd		
6	DEPTH, water	Depth water	m	Rohardt, Gerd	CTD, SEA-BIRD SBE 911plus, SN 1015	Geocode
7	Pressure, water	Press	dbar	Rohardt, Gerd	CTD, SEA-BIRD SBE 911plus, SN 1015	
8	Temperature, water	Temp	°C	Rohardt, Gerd	CTD, SEA-BIRD SBE 911plus, SN 1015	ITS-90
9	Conductivity	Cond	mS/cm	Rohardt, Gerd	CTD, SEA-BIRD SBE 911plus, SN 1015	
10	Salinity	Sal		Rohardt, Gerd	CTD, SEA-BIRD SBE 911plus, SN 1015	PSU
11	Temperature, water, potential	Tpot	°C	Rohardt, Gerd	Calculated	ITS-90
12	Density, sigma-theta (0)	Sigma-theta	kg/m^3	Rohardt, Gerd	Calculated	
13	Oxygen	O2	µmol/l	Rohardt, Gerd	CTD, SEA-BIRD SBE 911plus, SN 1015	not calibrated
14	Oxygen saturation	O2 sat	%	Rohardt, Gerd	CTD, SEA-BIRD SBE 911plus, SN 1015	not calibrated
15	Attenuation, optical beam transmission	Attenuation	arbitrary units	Rohardt, Gerd	CTD, SEA-BIRD SBE 911plus, SN 1015	
16	Fluorometer	Fluorometer	arbitrary units	Rohardt, Gerd	CTD, SEA-BIRD SBE 911plus, SN 1015	
17	Number of observations	NOBS	#	Rohardt, Gerd		

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Open Access Licence

Size: 8943 data points

Step 5: FAIR data publishing in PANGAEA

DATA

Size: 8943 data points

Data

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

1 Event	2 Date/Time	3 Latitude	4 Longitude	5 Elevation [m]	6 Depth water [m]	7 Press [dbar]	8 Temp [°C]	9 Cond [mS/cm]	10 Sal	11 Tpot [°C]	12 Sigma-theta [kg/m³]	13 O2 [µmol/l]	14 O2 sat [%]	15 Attenuation [arbitrary u
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	1.4	1.4	7.5927	29.1306	27.8261	7.5926	21.6994	322.774	103.46	2
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	1.6	1.6	7.5904	29.1319	27.8292	7.5903	21.7021	322.664	103.42	2
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	1.8	1.8	7.5880	29.1328	27.8321	7.5878	21.7046	322.645	103.41	2
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	2.0	2.0	7.5882	29.1332	27.8322	7.5880	21.7047	322.848	103.47	2
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	2.2	2.2	7.5893	29.1333	27.8314	7.5891	21.7039	322.755	103.45	2
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	2.4	2.4	7.5834	29.1327	27.8354	7.5832	21.7078	322.911	103.48	2
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	2.6	2.6	7.5801	29.1316	27.8367	7.5799	21.7093	323.036	103.52	2
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	2.8	2.8	7.5769	29.1312	27.8388	7.5767	21.7114	323.025	103.51	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	3.0	3.0	7.5754	29.1308	27.8395	7.5751	21.7121	322.811	103.44	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	3.2	3.2	7.5793	29.1316	27.8371	7.5790	21.7098	322.716	103.41	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	3.4	3.4	7.5716	29.1323	27.8439	7.5713	21.7161	322.911	103.46	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	3.6	3.6	7.5701	29.1318	27.8446	7.5698	21.7168	322.789	103.42	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	3.8	3.8	7.5686	29.1333	27.8472	7.5683	21.7191	322.668	103.38	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	4.0	4.0	7.5581	29.1375	27.8600	7.5578	21.7304	322.599	103.34	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	4.2	4.2	7.5564	29.1295	27.8529	7.5560	21.7251	322.620	103.34	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	4.4	4.4	7.5516	29.1419	27.8697	7.5512	21.7389	322.595	103.33	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	4.6	4.6	7.5494	29.1428	27.8723	7.5490	21.7412	322.389	103.26	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	4.8	4.8	7.5477	29.1428	27.8736	7.5473	21.7424	322.171	103.19	1
HE575_1-1	2021-04-19T07:59	53.8430	8.1009	-7	5.0	5.0	7.5471	29.1428	27.8740	7.5467	21.7428	322.055	103.15	1

Benefits of data publishing

- Citation – appropriate attribution and credit
- Reusability – Data sharing and collaboration
- Reproducibility of findings
- Increasing the efficiency of research

Questions?