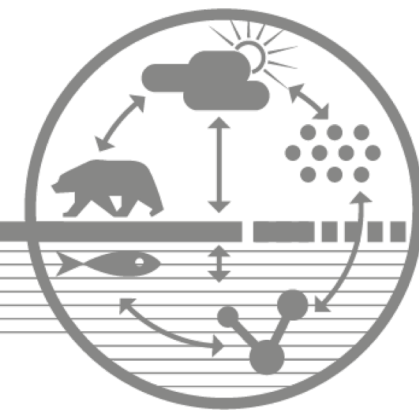


# MOSAiC

International  
Arctic Drift  
Expedition



## DataManagement in MOSAiC Overview Safety Briefing Leg 1 - Tromsø

Antonia Immerz, Johannes Käßbohrer, Peter Gerchow, Franziska Nehring

**FIELAX**

15.09.2019



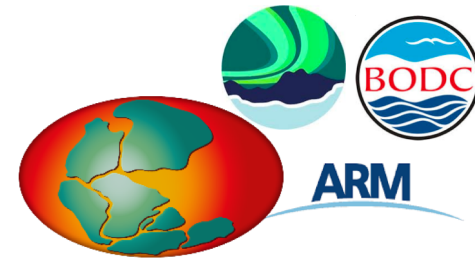
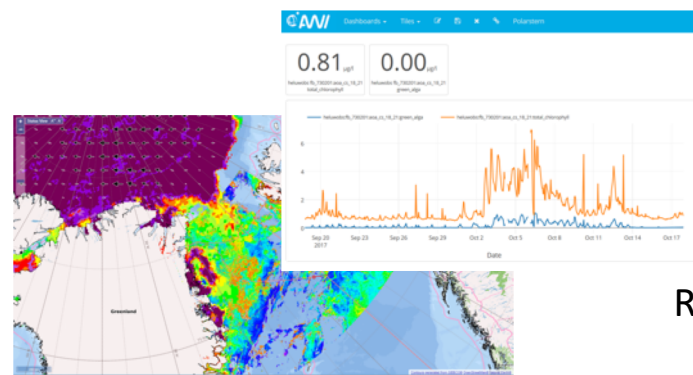
ALFRED-WEGENER-INSTITUT  
HELMHOLTZ-ZENTRUM FÜR POLAR-  
UND MEERESFORSCHUNG

# Data Flow in MOSAiC



ActionLog Events

Activity - Device Operator	Start	Device	Action	Latitude	Longitude
PS4_4-1 ADCP	12.10.2016 11:49:24	Acoustic Doppl...	station start	51° 03,088' N	001° 23,
PS4_1-3 BLN	11.10.2016 14:17:22	BALLON	in the water	46° 07,339' N	010° 15,
PS4_1-1 BOAT	11.10.2016 14:13:31	Boat	MyAction	46° 07,251' N	010° 15,

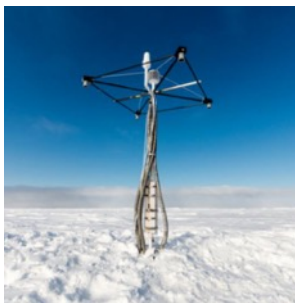
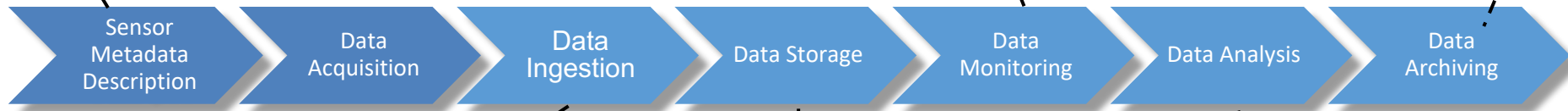


Raw and primary data archiving at AWI and primarily PANGAEA. Majority of data transfers after each leg

**SENSORWeb** for management of device metadata

**DSHIP-ActionLog** for Device-Operation ID management

**DSHIP-Mapviewer and Dashboard**



Data transfer via satellite, local LAN, radio LAN as stream and/or in delayed mode

MOSAic Central Storage and workspace



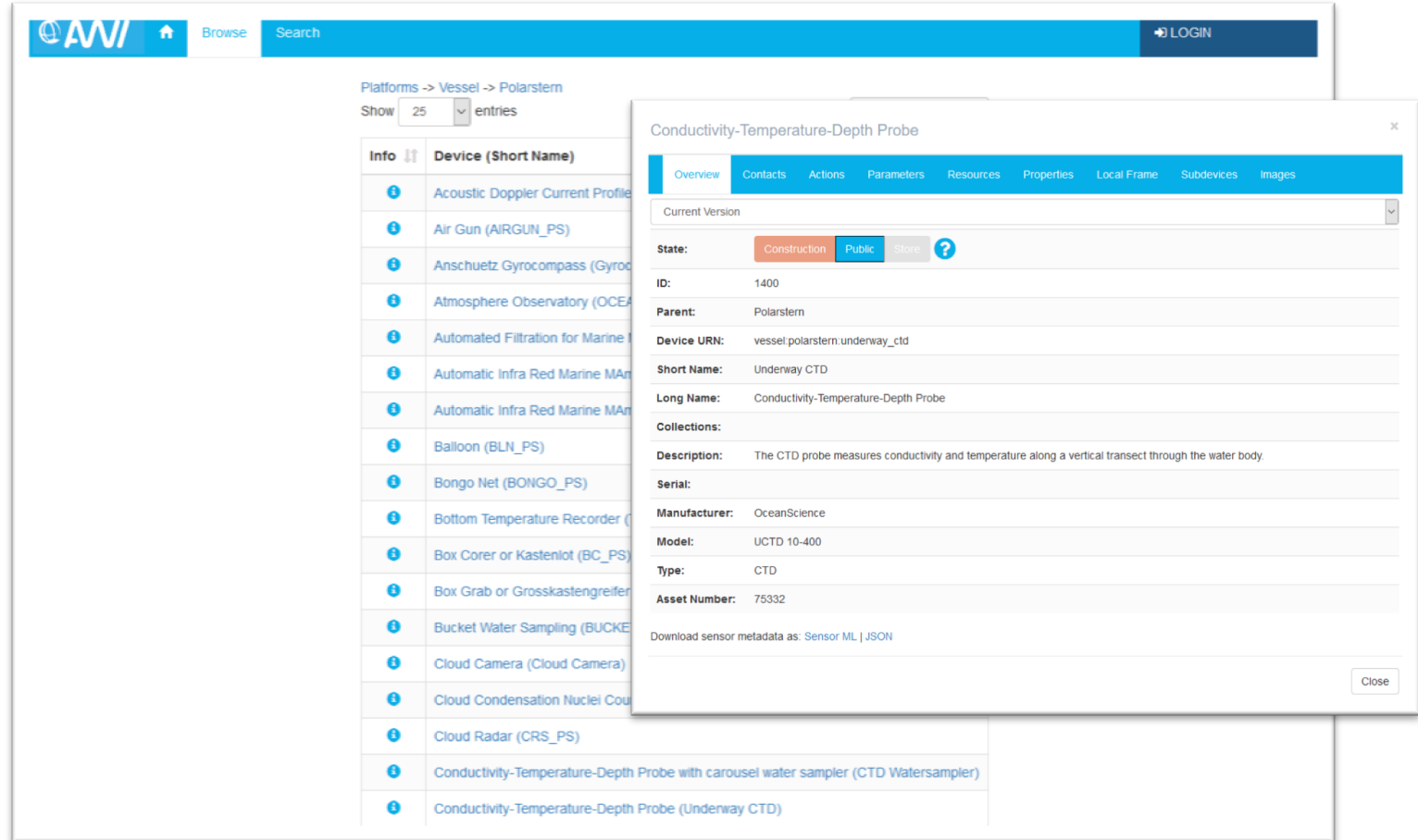
Using workspace and **Marketplace (VMs)** e.g. with **Jupyter Notebook** (R or Python) or Bash-Script or or ...?

**Sensor metadata description (SENSORWeb) is the basis for all parts!!!**



- ✓ Describe your sensor only once with SENSORWeb
- ✓ Then sensor data can be ingested, stored, monitored, analysed and archived

# SENSOR

The screenshot shows the SENSORWeb interface. At the top, there is a navigation bar with 'AWI', 'Browse', 'Search', and 'LOGIN'. Below this, the breadcrumb path is 'Platforms -> Vessel -> Polarstern'. A 'Show 25 entries' dropdown is visible. A table lists various sensors, including 'Acoustic Doppler Current Profile', 'Air Gun (AIRGUN\_PS)', 'Anschutz Gyrocompass (Gyro)', 'Atmosphere Observatory (OCEA)', 'Automated Filtration for Marine', 'Automatic Infra Red Marine MA', 'Automatic Infra Red Marine MA', 'Balloon (BLN\_PS)', 'Bongo Net (BONGO\_PS)', 'Bottom Temperature Recorder', 'Box Corer or Kastenlot (BC\_PS)', 'Box Grab or Grosskastengreifer', 'Bucket Water Sampling (BUCKE)', 'Cloud Camera (Cloud Camera)', 'Cloud Condensation Nuclei Cou', 'Cloud Radar (CRS\_PS)', 'Conductivity-Temperature-Depth Probe with carousel water sampler (CTD Watersampler)', and 'Conductivity-Temperature-Depth Probe (Underway CTD)'. A modal window is open for the 'Conductivity-Temperature-Depth Probe', showing details such as 'Current Version', 'State' (Construction, Public, Store), 'ID: 1400', 'Parent: Polarstern', 'Device URN: vessel.polarstern.underway\_ctd', 'Short Name: Underway CTD', 'Long Name: Conductivity-Temperature-Depth Probe', 'Description: The CTD probe measures conductivity and temperature along a vertical transect through the water body.', 'Manufacturer: OceanScience', 'Model: UCTD 10-400', 'Type: CTD', and 'Asset Number: 75332'. There is also a 'Download sensor metadata as: Sensor ML | JSON' option and a 'Close' button.

Sensor Metadata Description

Data Acquisition

Data Ingestion

Data Storage

Data Monitoring

Data Analytics

Data Archiving

# What is SENSORWeb?

- SENSORWeb does not manage measurement data
- SENSORWeb manages metadata of
  - Research platforms
  - Sensors
  - Sampling Devices

SENSOR

Sensor  
Metadata  
Description

Data  
Acquisition

Data  
Ingestion

Data  
Storage

Data  
Monitoring

Data  
Analytics

Data  
Archiving

**HELMHOLTZ**

# SENSORWeb

- Sensor Information System - Create and manage meta data of devices and sensors

[https://sensor.awi.de/?urn=vessel:polarstern:ctd\\_watersampler](https://sensor.awi.de/?urn=vessel:polarstern:ctd_watersampler)

Parent Item-Type: Vessel  
 Parent Item: RV Polarstern  
 Sub Item: CTD Watersampler

**Subdevices**

- Altimeter
- Lowered Acoustic Doppler Current Profiler
- SBE32 water sampler
- SBE3plus temperature sensor
- SBE4 conductivity sensor
- SBE43 oxygen sensor
- Transmissiometer

**Parameters**

- conductivity
- temperature
- altimeter
- transmission
- oxygen
- pressure
- fluorescence

**Overview**

- Long and short names
- Manufacturer
- Model-Nr.



**Properties**

- used for quality checks: e.g. Water temperature min/max values

**Contact**

- Owner: AWI
- Editor: Peter Gerchow
- Engineer in Charge: Marius Hirsekorn
- Principal Investigator: ...
- Data Scientist: ...
- Data Provider: ...

**Resources**

- factsheets
- calibration certificates
- manuals

**Actions**

- Deployment
- Recovery



# SENSOR

Overview

Contacts

Actions

Parameters

Resources

Properties

Local Frame

Subdevices

Images

Ingest

2018-06-04 02:00:00 Mount Mounted to heluw1

SENSOR (2014). Sensor metadata for SST\_CTD\_183 of Station AWIPEV Underwater Observatory Svalbard Alfred Wegener Institute for Polar and Marine Research. <https://hdl.handle.net/10013/sensor.82f77b6c-a35d-40ff-ba8d-65442cfb49e7#subItemID=1285&subItemEventID=3389>

PIDs + Citation for all actions of type: calibration, commissioned, deployment, mount

<https://hdl.handle.net/10013/sensor.82f77b6c-a35d-40ff-ba8d-65442cfb49e7#subItemID=1285&subItemEventID=3389>

State: public

ID: 1285

Parent: Svalbard Underwater Node 2

Device URN: station:svluwobs:svluw2:ctd\_183

Short Name: CTD\_183

Long Name: SST\_CTD\_183

Collections: undefined

Description: High quality, high accuracy multi parameter probe for oceanographic and limnology parameters.

Serial: 183

Manufacturer: Sea and Sun Technology

Model: CTD 90

Type: CTD

Overview Contacts Actions Parameters Resources Properties Local Frame Subdevices Images Ingest

Current Version

Show 25 entries

Search:

ID	Name	E-Mail	Role	Organization
70	Cornelia Roder	cornelia.roder@awi.de	Editor	Alfred-Wegener-Institute

Showing 1 to 1 of 1 entries

Previous 1 Next

Inherited Contacts

Show 25 entries

Search:

ID	Name	Role	Organization	Inherited from
73	Alexandra Kraberg	Editor	Alfred-Wegener-Institute	Helgoland Underwater Observatory

Overview Contacts Actions Parameters Resources Properties Local Frame Subdevices Images

Current Version

Show 25 entries

Search:

ID	Short Name	Name	Sensor Output Type	Units
861		Conductivity	conductivity	mS/cm
862		Salinity	salinity	PSU

# Item State

pCO2 Monitoring System General Oceanics

Overview Contacts Actions Parameters Resources

Current Version

Reassign

State: Construction Public Store ?

ID: 1398

Parent: Polarstern

Device URN: vessel:polarstern:pco2\_go\_ps

shortName\* pCO2\_GO\_PS

longName\* pCO2 Monitoring System General Oceanics

## Construction:

- Seen only by “editor” of this device under “My Devices”
- Not ready for publication

## Public:

- Seen by everybody (no Login)
- Ready for publication
- Public devices should not be deleted. (Measured data would loose metadata)

## Store:

- Devices that are not in use
- Devices at the store

# Further Features

## Facetted Search

SENSOR

AMI [Browse](#) [Search](#) [Device Store](#) [My Devices](#) [Create Item](#)

Item type: [MicroCAT](#) (171)

Parameters: conductivity (12), depth (9), oxygen (9), temperature (9), water temperature (3). See more...

Action type: Deployment (150), Recovery (62), Calibration (1), Mount (1), Unmount (1)

Action: NABOS/2309-1 (7), NABOS/2409-1 (7), NABOS/2409-2 (7), NABOS/3008-1 (7), HE451-2/2-1 (6). See more...

Contact: Vernaleken, Jutta (150), von Appen, Wilken-Jon (150), Lochthofen, Normen (21), Hattermann, Tore (12), Scholz, Daniel (11)

Collections: FRAM (2)

Search... Selected facets: [MicroCAT](#) ✕

Sort by relevance | Sort [alphanumerically](#)

Info	Long Name	Short Name	URN	Item State	Tools
<a href="#">i</a>	MC1	MC1_37-12917	mooring:fsw1_300234061031800:mc1_37-12917	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>
<a href="#">i</a>	MC3	MC3_37-12715	mooring:fsw1_300234061031800:mc3_37-12715	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>
<a href="#">i</a>	MC5	MC5_37-12717	mooring:fsw1_300234061031800:mc5_37-12717	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>
<a href="#">i</a>	SBE-37 SM	SBE-37-SM_1606	mooring:f4-16:sbe-37-sm_1606	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>
<a href="#">i</a>	SBE37-SMP-ODO_13			public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>
<a href="#">i</a>	SBE37-SMP-ODO_13			public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>
<a href="#">i</a>	SBE-37 SM	0:mc1_37-12917	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>	<b>Clone</b>
<a href="#">i</a>	SBE-37 SM	0:mc3_37-12715	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>	<b>Reassign</b>
<a href="#">i</a>	SBE-37 SMP	0:mc5_37-12717	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>	<b>Add Subitem</b>
<a href="#">i</a>	SBE-37 SM		public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>	
<a href="#">i</a>	SBE-37 SMP		public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>	
<a href="#">i</a>	SBE-37 SMP	SBE-37-SMP_10935	mooring:f5-16:sbe-37-smp_10935	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>
<a href="#">i</a>	SBE-37 SMP	SBE-37-SMP_12502	mooring:ak5-1:sbe-37-smp_12502	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>
<a href="#">i</a>	SBE-37 SMP	SBE-37-SMP_12492	mooring:ak5-1:sbe-37-smp_12492	public	<a href="#">📄</a> <a href="#">🗑️</a> <a href="#">👤</a> <a href="#">+</a> <a href="#">↑</a>

Showing 1 to 15 of 171 entries

« 1 2 3 4 5 6 7 8 9 »



# Platformtypes in SENSOR



- Aircraft
- Buoy
- Laboratory
- Mooring
- **Pack Ice**
- Satellite
- Small Boat
- Station
- TowedSystem
- Vehicle
- **Vessel**
- Model



# Device URNs



- URN (Uniform ResourceName)
  - Unique name of an item
    - Example: vessel:ps:adcp
  - Composed of short names
  - The path to your data on the MOSAiC Central Storage (MCS) is based on the URN
    - Example: .../vessel/ps/adcp
  - It is human readable in contrast to a numeric ID
- Short name
  - catchy abbreviations of your item name
    - Polarstern-> PS
    - AcousticDoppler CurrentProfiler-> ADCP
  - can't be edited by a user, only admins can change the short name



# Structure of an Item: Contact Roles



- Special function of roles:
  - **Editor**: can edit items, has write access respective device directory on MOSAiC Central Storage (MCS)
  - **Owner**: defines the institute owning the item
  - **dship connector** -> import sensors into DSHIP
  - **Data Provider** -> write access to raw data directory on MCS
  
- Other roles
  - Data Scientist
  - Engineer in Charge
  - Principal Investigator



# Collections



- MOSAiC-Aircraft
- MOSAiC-ATMOS
- MOSAiC-BGC
- MOSAiC-ECO
- MOSAiC-ICE
- MOSAiC-Modelling
- MOSAiC-OCEAN
- MOSAiC-RemoteSensing

# Action Types in SENSOR

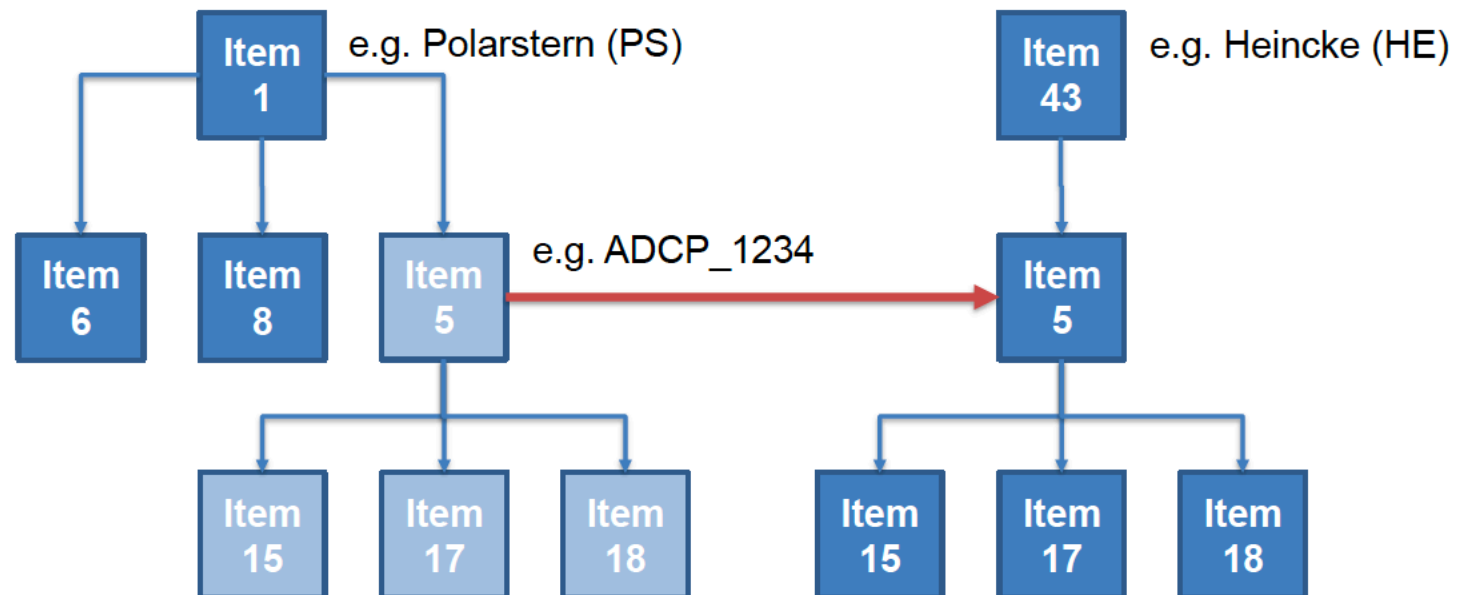


- **Calibration** (create version)
- **Comissioned** (create version)
- Configuration
- Decomissioned
- Deployment (create version)
- Information
- Maintenance
- Mission
- **Mount** (create version)
- Partial failure
- Recovery
- Total failure



# Reassignment

- Items can be assigned to a different parent
  - Changes URN of device
  - Best practice: create a new version of device



Device URN change from vessel:**ps**:adcp\_1234 to vessel:**he**:adcp\_1234

# Linking PANGAEA to SENSOR



- Configuration of device at measurement time linked directly to SENSORWeb

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

**Wulff, Thorben; Bauerfeind, Eduard; von Appen, Sascha (2018):** Vertical profiles of physical and chemical parameters in the vicinity of an ice tongue in the Fram Strait. <https://doi.org/10.1594/PANGAEA.887579>

**Abstract:** AWI's autonomous underwater vehicle "PAUL" covered two 10 km transects across the meltwater front. The meltwater front was associated to a large ice tongue. The resolution profile of the following parameters: Temperature, Conductivity, Salinity, Depth, and Pressure. The dataset contains the data of the vertical ascends only. Due to the nature of the parameter has an individual depth stamp.

**Related to:** **Wulff, Thorben; Bauerfeind, Eduard; von Appen, Wilken-Jon (2016):** Vertical profiles of physical and chemical parameters in the vicinity of an ice tongue in the Fram Strait. <https://doi.org/10.1016/j.dsr.2016.07.001>

**Project(s):** [Physical Oceanography @ AWI \(AWI\\_PhyOce\)](#)

**Coverage:** Median Latitude: 78.753080 \* Median Longitude: 5.144880 \* South-bound Latitude: 78.714727 \* West-bound Longitude: 5.100582 \* North-bound Latitude: 78.794343 \* East-bound Longitude: 5.185734  
Date/Time Start: 2013-07-02T20:45:38 \* Date/Time End: 2013-07-03T01:35:26  
Minimum DEPTH, water: 1.22 m \* Maximum DEPTH, water: 52.62 m

**Event(s):** **MSM29\_440-5** \* Latitude Start: 78.714170 \* Longitude Start: 5.160830 \* Latitude End: 78.715330 \* Longitude End: 5.158000 \* Date/Time Start: 2013-07-02T19:58:00 \* Date/Time End: 2013-07-03T02:58:00 \* Elevation Start: -2332.3 m \* Elevation End: -2332.0 m \* SENSOR AWI: <https://hdl.handle.net/10013/sensor.664525cf-45b9-4969-bb88-91a1c5e97a5b> \* Location: North Greenland Sea \* Campaign: MSM29 (HAUSGARTEN 2013) \* Basis: Maria S. Merian \* Device: Autonomous underwater vehicle (AUV)

**SENSOR.awi.de**

AWI AUV Polar Autonomous Underwater Laboratory

Overview | Contacts | Actions | Parameters | Resources | Properties | Local Frame | Subdevices | Images

2013-07-02 19:58:00 Deployment MSM29\_440-5

SENSOR (2013). Platform metadata for Vehicle AWI AUV Polar Autonomous Underwater Laboratory. Configuration from 2013-07-02 21:58:00. Alfred Wegener Institute for Polar and Marine Research. <https://hdl.handle.net/10013/sensor.664525cf-45b9-4969-bb88-91a1c5e97a5b>

State: public

ID: 458

Parent:

Device URN: vehicle:awi\_paul

Short Name: AWI-PAUL

Long Name: AWI AUV Polar Autonomous Underwater Laboratory

Collections:

Description: The Bluefin-21 is a highly modular autonomous underwater vehicle able to carry multiple sensors and payloads at once. It boasts a high energy capacity that enables extended operations even at the greatest depths. The Bluefin-21 has immense capability but is also flexible enough to operate from various ships of opportunity worldwide.

Serial: Paul

Manufacturer: Bluefin Robotics

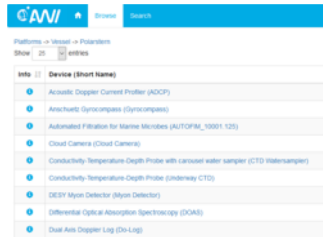
Model: Bluefin-21

Type: Vehicle

Asset Number: 44055

Close

# Data Flow in MOSAic

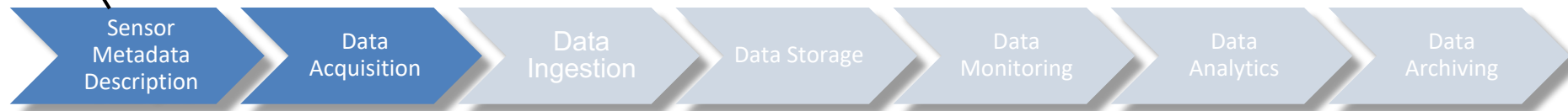


≡ ActionLog Events

Activity - Device Operator	Start	Device	Action	Latitude	Longitude
PS4_4-1 ADCP	12.10.2016 11:49:24	Acoustic Doppl...	station start	51° 03,088' N	001° 23'
	12.10.2016 11:49:01	Acoustic Doppl...	station start	51° 03,157' N	001° 23'
PS4_1-3 BLN	11.10.2016 14:17:22	BALLON	in the water	46° 07,339' N	010° 15'
PS4_1-1 BOAT	11.10.2016 14:13:31	Boat	MyAction	46° 07,251' N	010° 15'

**SENSORWeb** for management of device metadata

**DSHIP-ActionLog** for Device-Operation ID management



**Sensor metadata description (SENSORWeb) is the basis for all parts!!!**





# DSHIP



✓ *Monitoring real-time data from ship sensors*



DSHIP Finland Snow School 1 || 16° 25,809' N 155° 38,542' W || 2019-03-10 15:07:36 UTC wgrum

Logging Bridge +

<b>Position</b> 16° 25,809' N 155° 38,542' W		<b>Temperature</b> Air temperature 26,4 °C	
<b>Course</b> 299 °		<b>Water temperature</b> 16,43 °C	
<b>Speed / Depth</b> Speed 5,1 kn depth 0 m		<b>Direction-Thrust</b> Heading 232 ° Course 299 ° Ship Speed 5,1 kn Wind direction 200 ° Wind speed 3,3 m/s	
		<b>Wind</b> Winddirection true 200 ° Windspeed true 3,3 m/s	

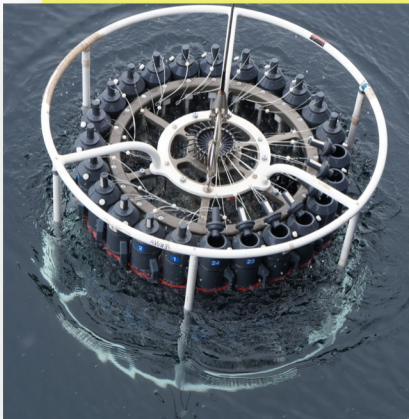
admin ONLINE SYS ACQ TERR 2019-03-10 15:07:36 UTC

- ✓ Logs „Science Activities“ and “Device Operations“ during cruise
- ✓ Logging can be easily done in Webbrowser or using the IceFloeNavi-App

# DSHIP-ActionLog

! Devices are imported from SENSORWeb where

- Item state: public
- Contact/role:
  - polarstern dship/ dship connector



The screenshot displays the 'Log Events' interface. A table lists various events with columns for Device Operation, Timestamp, Device, and Action. An 'Edit event' dialog box is open, showing fields for Science activity (PS120\_28), Device operation (PS120\_28-2 CTD Watersampler), Device (Conductivity-Temperature-Depth Probe with carousel wa...), Label (CTD Watersampler), Positioning system, Comment (Verantwortlich: A. Immerz), Event Action (information), and Timestamp (28.06.2019 12:04:30). Buttons for 'Cancel' and 'Apply' are visible at the bottom of the dialog.

Sensor Metadata Description

Data Acquisition

Data Ingestion

Data Storage

Data Monitoring

Data Analytics

Data Archiving

# Structure

- Expedition (per Leg)
  - Science Activity (weekly)
    - Device Operation

Device Operation ID:

<Campaign/Expedition-Leg>\_

<Science Activity>-

<No. of Device Operation within Science Activity>

Display in ActionLog:

<Campaign/Expedition-Leg>\_<Science Activity>-<Number of Device Operation within Science Activity> <Shortname>  
 (e.g. PS120\_28-2 CTD Watersampler“)

≡ ActionLog Events

Activity - Device Operation	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Speed (kn)	Course	Latitude (deg)	Longitude (deg)	Wind Dir	Wind Velocity	Transp
PS120_28-2 CTD Watersampler	28.06.2019 12:...	Conductivity-T...	information	54° 04,977' N	007° 58,006' E	21.3	1.0	285.0	54.082946	7.966764	295.0	4.8	
PS120_27-1 GC_PS	28.06.2019 12:...	Gravity Corer, ...	station end	54° 05,044' N	007° 57,271' E	22.4	9.3	257.9	54.084065	7.954517	330.0	5.2	
	28.06.2019 12:...	Gravity Corer, ...	on deck	54° 05,015' N	007° 58,072' E	21.2	0.0	36.8	54.083582	7.967863	314.0	4.1	
	28.06.2019 12:...	Gravity Corer, ...	information	54° 05,009' N	007° 58,069' E	20.9	0.2	233.5	54.083486	7.967815	310.0	5.2	
	28.06.2019 12:...	Gravity Corer, ...	hoisting	54° 05,011' N	007° 58,078' E	21.2	0.1	305.1	54.083523	7.967969	321.0	3.2	
	28.06.2019 12:...	Gravity Corer, ...	max depth/on ...	54° 05,011' N	007° 58,076' E	20.8	0.3	110.0	54.083511	7.967926	309.0	4.4	
	28.06.2019 12:...	Gravity Corer, ...	in the water	54° 05,010' N	007° 58,073' E	21.0	0.4	94.5	54.083504	7.967879	309.0	4.4	
	28.06.2019 11:...	Gravity Corer, ...	station start	54° 04,345' N	007° 58,260' E	20.7	7.3	45.8	54.072423	7.971005	318.0	6.7	
PS120_28-1 CTD Watersampler	28.06.2019 11:...	Conductivity-T...	information	54° 03,956' N	007° 57,546' E	22.2	13.7	48.6	54.065936	7.959104	317.0	7.6	
PS120_27-2 topAWI	28.06.2019 11:...	Towed Ocean ...	information	54° 03,575' N	007° 57,025' E	23.2	13.9	30.2	54.059586	7.950411	316.0	7.9	

# Extract from DHIP Archive (dms.awi.de)



	A	B	C	D	E	F	G	H	I	J
1	<b>Campaign</b>	<b>Station - Device Operation</b>	<b>Device Types</b>	<b>Device Types Code</b>	<b>Device</b>	<b>Device Code</b>	<b>Date/Time (Start)</b>	<b>Action (Start)</b>	<b>Latitude (deg) (Start)</b>	<b>Longitude (deg) (Start)</b>
2	PS118	PS118_0_Underway-10	Thermosalinograph	TSG	Thermosalinograph Keel	TSG_KEEL	20.02.19 08:54	profile start	-57.897.329	-61.533.381 0
3	PS118	PS118_0_Underway-13	Magnetometer	MAG	Magnetometer	MAG	20.02.19 09:03	profile start	-57.908.644	-61.514.114 3
4	PS118	PS118_5-3	Video,Multi Corer	VIDEO,MUC	Video Multi Corer	TVMUC	04.03.19 18:32	station start	-64.983.699	-57.751.797 4
5	PS118	PS118_5-4	Multi Corer,Video	MUC,VIDEO	Video Multi Corer	TVMUC	04.03.19 20:26	station start	-64.981.029	-57.746.836 0
6	PS118	PS118_6-5	Plankton Net	PLA	Epibenthossledge	EBS	05.03.19 16:58	station start	-64.973.826	-57.786.732 0
7	PS118	PS118_6-6	Plankton Net	PLA	Epibenthossledge	EBS	05.03.19 19:07	station start	-64.970.863	-57.798.089 0
8	PS118	PS118_6-7	Bottom Net	BN	Agassiz Trawl	AGT	05.03.19 21:31	station start	-64.964.397	-57.836.353 0
9	PS118	PS118_6-8	Remotely Operated Vehicle	ROV	Remotely Operated Vehicle	ROV	06.03.19 00:54	station start	-64.953.392	-57.795.686 0
10	PS118	PS118_9-4	Plankton Net	PLA	Epibenthossledge	EBS	12.03.19 14:24	station start	-64.017.813	-55.918.205 4
11	PS118	PS118_9-5	Plankton Net	PLA	Epibenthossledge	EBS	12.03.19 15:50	station start	-64.019.655	-55.901.400 4
12	PS118	PS118_9-6	Bottom Net	BN	Agassiz Trawl	AGT	12.03.19 17:43	station start	-64.023.801	-55.918.680 4

Extract of Device Operation ID in ActionLog:

<Campaign/Expedition-Leg>\_<Science Activity>-<Number of Device Operation within Science Activity>  
 (e.g. PS120\_28-2“)



# Data Flow in MOSAiC

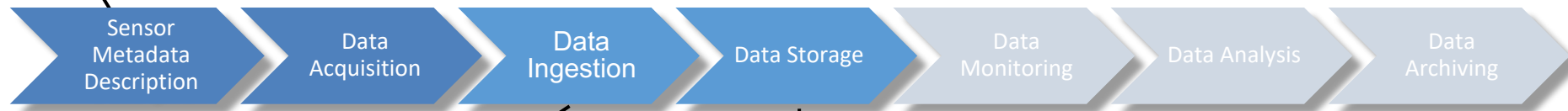
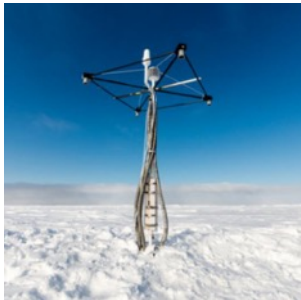


≡ ActionLog Events

Activity - Device Operator	Start	Device	Action	Latitude	Longitude
PS4_4-1 ADCP	12.10.2016 11:49:24	Acoustic Doppl...	station start	51° 03,088' N	001° 23'
	12.10.2016 11:49:01	Acoustic Doppl...	station start	51° 03,157' N	001° 23'
PS4_1-3 BLN	11.10.2016 14:17:22	BALLON	in the water	46° 07,339' N	010° 15'
PS4_1-1 BOAT	11.10.2016 14:13:31	Boat	MyAction	46° 07,251' N	010° 15'

**SENSORWeb** for management of device metadata

**DSHIP-ActionLog** for Device-Operation ID management



Data transfer via satellite, local LAN, radio LAN as stream and/or in delayed mode

MOSAic Central Storage and workspace



**Sensor metadata description (SENSORWeb) is the basis for all parts!!!**



# MOSAiC Central Storage (MCS)



- Central Storage for raw data and data products on board Polarstern
- Naming convention of device area is derived from SENSORWeb
- Data transferred to MCS at AWI for common access by MOSAiC consortium members after every leg



Device Area (Raw Data)



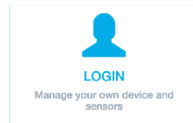
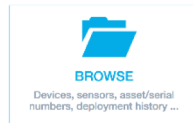
Workspace Area

## platforms

vessel  
polarstern  
    ctd\_watersampler  
        SBE3plus temperature sensor  
        exdata  
            DSHIP-DEVICEOPERATION-ID  
            SensorFile.xxx  
FerryBox  
    exdata  
        DSHIP-DEVICEOPERATION-ID  
        SensorFile.xxx  
vehicle  
    BEAST  
        ECO-Triplet Fluorometer  
    ...

## SENSOR INFORMATION SYSTEM

Create and manage platform, device and sensor related information



## Tasks

Coring  
    Site 1  
        Quicklooks  
        Processed Data  
        Combined Datasets  
    Site 2  
        DN  
        ...  
SnowPits  
    Site 1  
    Site 2  
    DN  
ROV

## Team-Folders

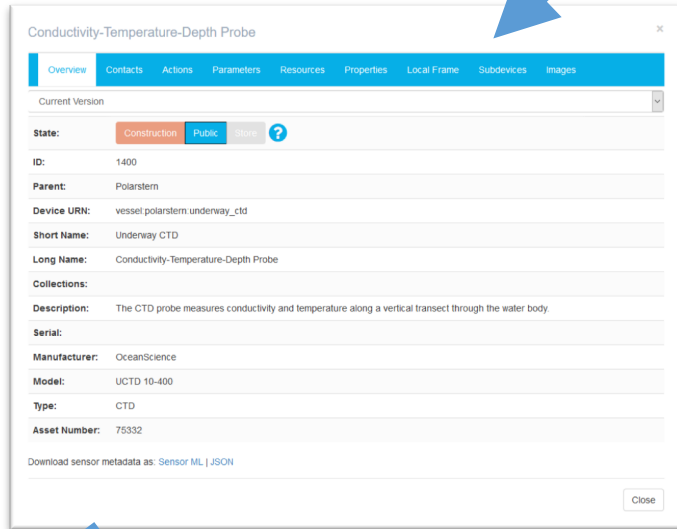
OCEAN  
ICE  
ATMOS  
...



Devices has to be created in SENSOR (only once)

Log every device operation

SENSOR.fs-polarstern.de



Conductivity-Temperature-Depth Probe

Overview | Contacts | Actions | Parameters | Resources | Properties | Local Frame | Subdevices | Images

Current Version

State: Construction Public

ID: 1400

Parent: Polarstern

Device URN: vessel.polarstern.underway\_ctd

Short Name: Underway CTD

Long Name: Conductivity-Temperature-Depth Probe

Collections:

Description: The CTD probe measures conductivity and temperature along a vertical transect through the water body.

Serial:

Manufacturer: OceanScience

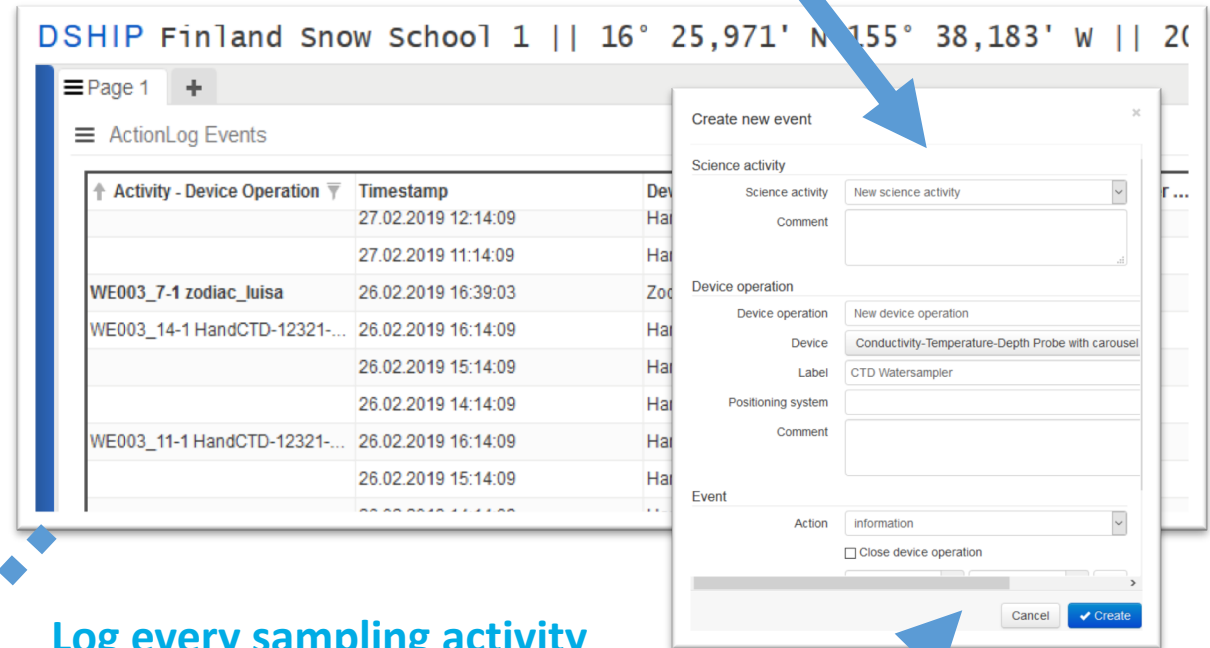
Model: UCTD 10-400

Type: CTD

Asset Number: 75332

Download sensor metadata as: Sensor ML | JSON

DSHIP-ActionLog



DSHIP Finland Snow School 1 || 16° 25,971' N 155° 38,183' W || 20

Page 1

ActionLog Events

Activity - Device Operation	Timestamp	Dev
	27.02.2019 12:14:09	Ha
	27.02.2019 11:14:09	Ha
WE003_7-1 zodiac_luisa	26.02.2019 16:39:03	Zod
WE003_14-1 HandCTD-12321-...	26.02.2019 16:14:09	Ha
	26.02.2019 15:14:09	Ha
	26.02.2019 14:14:09	Ha
WE003_11-1 HandCTD-12321-...	26.02.2019 16:14:09	Ha
	26.02.2019 15:14:09	Ha

Create new event

Science activity

Science activity: New science activity

Comment:

Device operation

Device operation: New device operation

Device: Conductivity-Temperature-Depth Probe with carousel

Label: CTD Watersampler

Positioning system:

Comment:

Event

Action: information

Close device operation

Cancel Create

background  
Synching  
(device & device operation)

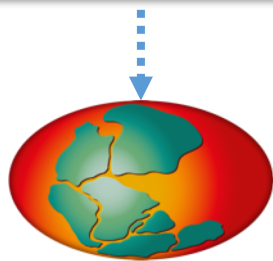
Background creating directories  
(device & device operation)

Log every sampling activity

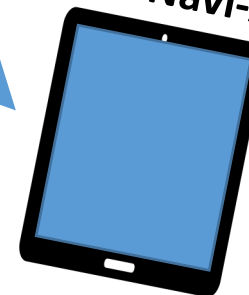
manually  
Synching  
(device & device operation)

Storage MCS

vessel/polarstern/ctd\_watersampler/SBE3plus\_temperature\_sensor/exdata/DEVICEOPERATION\_ID/



IceFloeNavi-App



Data Flow in more detail

- Directory structure on MCS resembles structure of devices in SENSORWeb
  - Directories automatically created for devices in SENSORWeb with state 'public' and contact ,polarstern dship' with role ,dship connector'!
- Every device directory has subdirectory ,exdata' (stands for „expedition data“)
- Device Operation in DSHIP automatically triggers creation of subdirectory with according name in all (sub) device directories selected for operation (within ,exdata').
- Device Operation is to written to device in SENSORWeb (Tab Actions)
- (Raw)data and sampling log sheets are to be uploaded in the respective directories of the Device Operation ID



platforms

Datei Start Freigeben Ansicht

Netzwerk > mcs > platforms

- vehicle
- vessel
  - polarstern
    - adcp
    - aimmms\_0001
    - aimmms\_0002
    - airgun\_ps
    - autofim\_10001\_125
    - bc\_ps
    - bln\_ps
    - bongo\_ps
    - bow\_sonic\_3d
    - bucket\_ps
    - canberra-awi-det\_2
    - ccnc\_ps
    - cloud\_camera
    - crds\_ghg\_ship\_bow
    - crs\_ps
    - ctd\_watersampler
      - altimeter
        - exdata
          - PS120\_28-1
          - PS120\_28-2
        - exdata
          - PS120\_28-1
          - PS120\_28-2
      - ladcp
      - sbe3plus

# Demo of Meta Data Flow



Overview Contacts **Actions** Parameters Resources Properties Local Frame Subdevices Images Ingest

Current Version

Show 25 entries Search:

ID ↑↓	Type ↑↓	Label ↑↓	Date ↓↑	Lat/Long/elevation ↑↓	Tools ↑↓
4630	Information	PS120_28-2	2019-06-28T12:51:52+02:00	54.408908° / -7.934236 / 21.3	<a href="#">i</a>
4603	Recovery	PS120_25-15	2019-06-24T17:51:52+02:00	44.482408° / -10.965533° / 4941 m	<a href="#">i</a>

≡ ActionLog Events

↑ Activity - Device Operation ▼	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Speed (kn)	Course
<b>PS120_28-2 CTD Watersampler</b>	28.06.2019 12:...	Conductivity-T...	information	54° 04,977' N	007° 58,006' E	21.3	1.0	285.0
PS120_27-1 GC_PS	28.06.2019 12:...	Gravity Corer, ...	station end	54° 05,044' N	007° 57,271' E	22.4	9.3	257.9
	28.06.2019 12:...	Gravity Corer, ...	on deck	54° 05,015' N	007° 58,072' E	21.2	0.0	36.8
	28.06.2019 12:...	Gravity Corer, ...	information	54° 05,009' N	007° 58,069' E	20.9	0.2	233.5
	28.06.2019 12:...	Gravity Corer, ...	hoisting	54° 05,011' N	007° 58,078' E	21.2	0.1	305.1
	28.06.2019 12:...	Gravity Corer, ...	max depth/on ...	54° 05,011' N	007° 58,076' E	20.8	0.3	110.0
	28.06.2019 12:...	Gravity Corer, ...	in the water	54° 05,010' N	007° 58,073' E	21.0	0.4	94.5
	28.06.2019 11:...	Gravity Corer, ...	station start	54° 04,345' N	007° 58,260' E	20.7	7.3	45.8
<b>PS120_28-1 CTD Watersampler</b>	28.06.2019 11:...	Conductivity-T...	information	54° 03,956' N	007° 57,546' E	22.2	13.7	48.6
<b>PS120_27-2 topAWI</b>	28.06.2019 11:...	Towed Ocean...	information	54° 03,575' N	007° 57,025' E	23.2	13.9	30.2

# IceFloeNaviApp to DSHIP



- Log scientific events on the ice
- Available Sensors are imported from DSHIP (SENSOR) (contact Data Supporters)
- Actions from IceFloeNaviApps imported into DSHIP daily by Data Supporters
  - Default: one individual log entry on the ice resembles one Device Operation in DSHIP
  - Actions can be grouped into one Device Operation

☰ ActionLog Events

↑ Activity - Device Operation ▾	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Speed (kn)	Course
PS120_28-2 CTD Watersampler	28.06.2019 12:...	Conductivity-T...	information	54° 04,977' N	007° 58,006' E	21.3	1.0	
PS120_27-1 GC_PS	28.06.2019 12:...	Gravity Corer, ...	station end	54° 05,044' N	007° 57,271' E	22.4	9.3	
	28.06.2019 12:...	Gravity Corer, ...	on deck	54° 05,015' N	007° 58,072' E	21.2	0.0	
	28.06.2019 12:...	Gravity Corer, ...	information	54° 05,009' N	007° 58,069' E	20.9	0.2	
	28.06.2019 12:...	Gravity Corer, ...	hoisting	54° 05,011' N	007° 58,078' E	21.2	0.1	
	28.06.2019 12:...	Gravity Corer, ...	max depth/on ...	54° 05,011' N	007° 58,076' E	20.8	0.3	
	28.06.2019 12:...	Gravity Corer, ...	in the water	54° 05,010' N	007° 58,073' E	21.0	0.4	
	28.06.2019 11:...	Gravity Corer, ...	station start	54° 04,345' N	007° 58,260' E	20.7	7.3	
PS120_28-1 CTD Watersampler	28.06.2019 11:...	Conductivity-T...	information	54° 03,956' N	007° 57,546' E	22.2	13.	
PS120_27-2 topAWI	28.06.2019 11:...	Towed Ocean...	information	54° 03,575' N	007° 57,025' E	23.2	13.	



# DSHIP



- One account for every teams
- Create Science Activity: Cruise Leader?
- Create Device Operation: PIs/Scientists
  - Include/Exclude Subdevices
  - Add Actions
  - Change Devices Operations (Date, Time, Subdevices)

# Synchronisation Details



- SENSOR AWI to SENSOR Polarstern (autom. every 10 min)
- SENSOR Polarstern to SENSOR AWI (directly)
  
- (Re-)Import device from SENSOR Polarstern to DSHIP
  - Once a day by Data Supporters, additional imports upon request
  - Re-Import Sensors after creating new version in SENSORWeb (e.g. subdevice exchange, recalibration, ...)
- Write DSHIP actions to SENSOR AWI/Polarstern (autom. every 5 min)
- Import Actions from IceFloeNavi App to DSHIP
  - Once a day by Data Supporters, additional imports upon request
- **You can edit devices on Polarstern in SENSOR but it is not very convenient due to the limited bandwidth!**



# SENSOR Best Practices and Workflows



- See Best Practices in MOSAiC Handbook for first orientation
- Will be further documented during the cruise
- Ask Data Supporters, Data Contact Persons and Chief Editors
  
- Special Cases
  - Reassign/Add new subdevices to SENSOR
    - New Version in SENSOR
    - Reimport in DSHIP necessary
  - Recalibrate devices
    - New Version in SENSOR
    - Reimport in DSHIP necessary
  - Run Labinstruments onboard
    - Use 'Add Action' -> Event Relations
  - ....

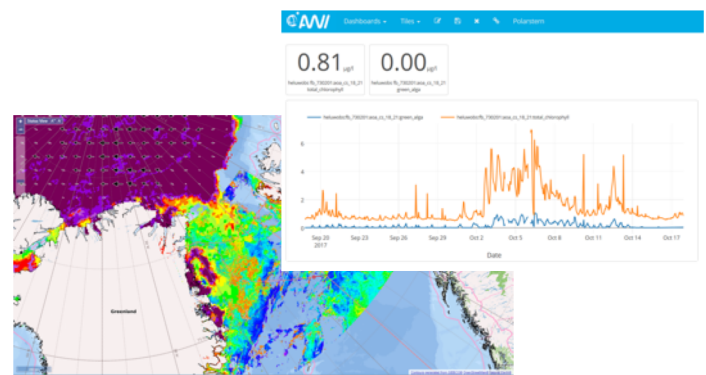


# Data Flow in MOSAiC



ActionLog Events

Activity - Device Operator	Start	Device	Action	Latitude	Longitude
PS4_4-1 ADCP	12.10.2016 11:49:24	Acoustic Doppl...	station start	51° 03,088' N	001° 23'
PS4_1-3 BLN	11.10.2016 14:17:22	BALLON	in the water	46° 07,339' N	010° 15'
PS4_1-1 BOAT	11.10.2016 14:13:31	Boat	MyAction	46° 07,251' N	010° 15'



**SENSORWeb** for management of device metadata

**DSHIP-ActionLog** for Device-Operation ID management

**DSHIP-Mapviewer and Dashboard**



Data transfer via satellite, local LAN, radio LAN as stream and/or in delayed mode

MOSAic Central Storage and workspace



**Sensor metadata description (SENSORWeb) is the basis for all parts!!!**

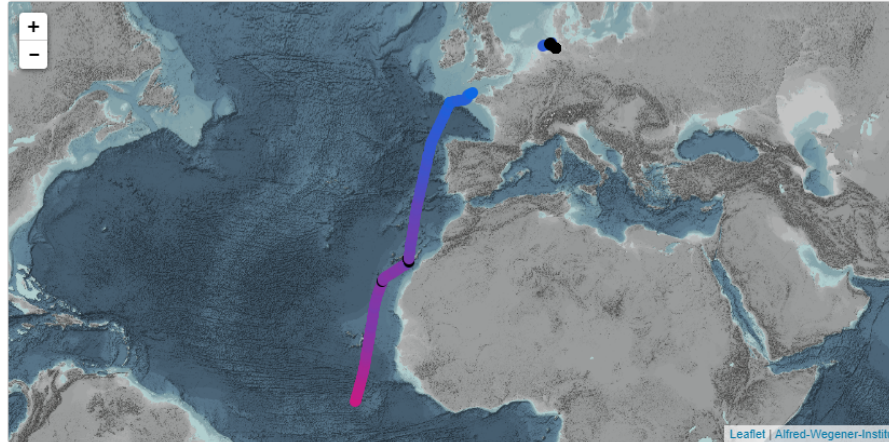


# Dashboard

Monitoring of near real-time and delayed-mode data

- 2D graph
- Heatmap
- Map widgets color-coded parameters
- and more tools...

Temperature and related observations from R.V. Polarstern



## Near-real time data from RV Polarstern

Related links

- <https://www.awi.de/>
- <https://data.awi.de>
- <https://sensor.awi.de/?urn=vessel:polarstern>

Questions? Email to [o2a-support \(at\) awi.de](mailto:o2a-support@awi.de)

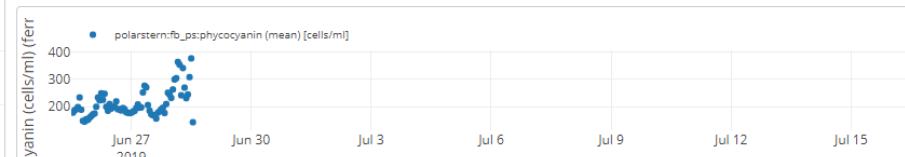
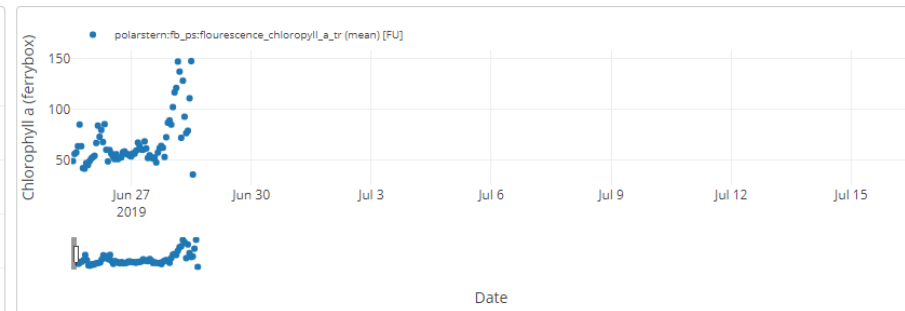
Tips

- Click on horizontal (or vertical) axis to focus on a given value - range; double-click for reset
- Select/unselect parameter in the legend
- Statistics and download functionality available

Air temperature (device [weather station](#)) and water temperature (device [thermosalinograph](#) and [ferrybox](#))



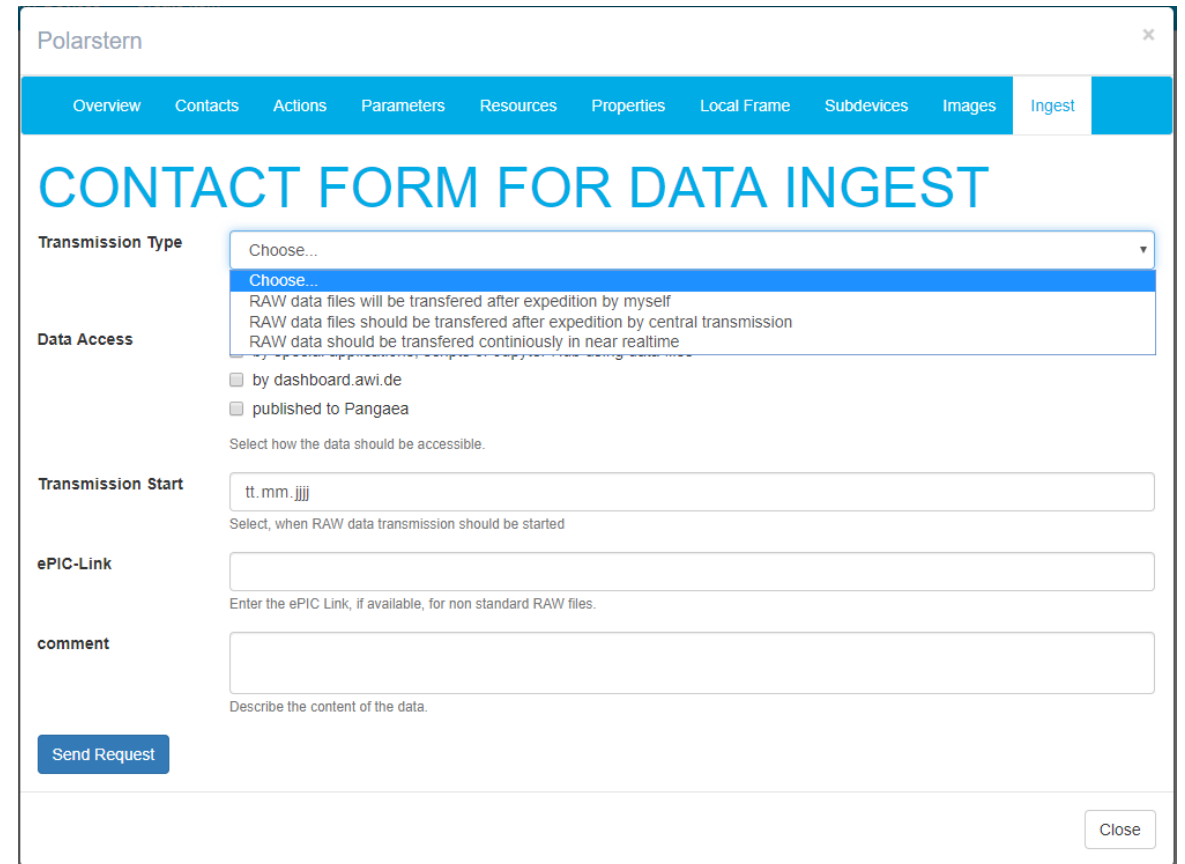
Chlorophyll a, Phycocyanin and Oxygen (device [ferrybox](#))



- Contact Data Supporters for Help

- **Transmission Methods**

- E-Mail
- sftp
- ftp
- smb (Windows-Share)
- rsync (only Download)



Polarstern

Overview Contacts Actions Parameters Resources Properties Local Frame Subdevices Images Ingest

## CONTACT FORM FOR DATA INGEST

Transmission Type: Choose...  
Choose...  
RAW data files will be transfered after expedition by myself  
RAW data files should be transfered after expedition by central transmission  
RAW data should be transfered continuously in near realtime

Data Access:  
 by dashboard.awi.de  
 published to Pangaea  
Select how the data should be accessible.

Transmission Start: tt.mm.jjjj  
Select, when RAW data transmission should be started

ePIC-Link: Enter the ePIC Link, if available, for non standard RAW files.

comment: Describe the content of the data.

Send Request

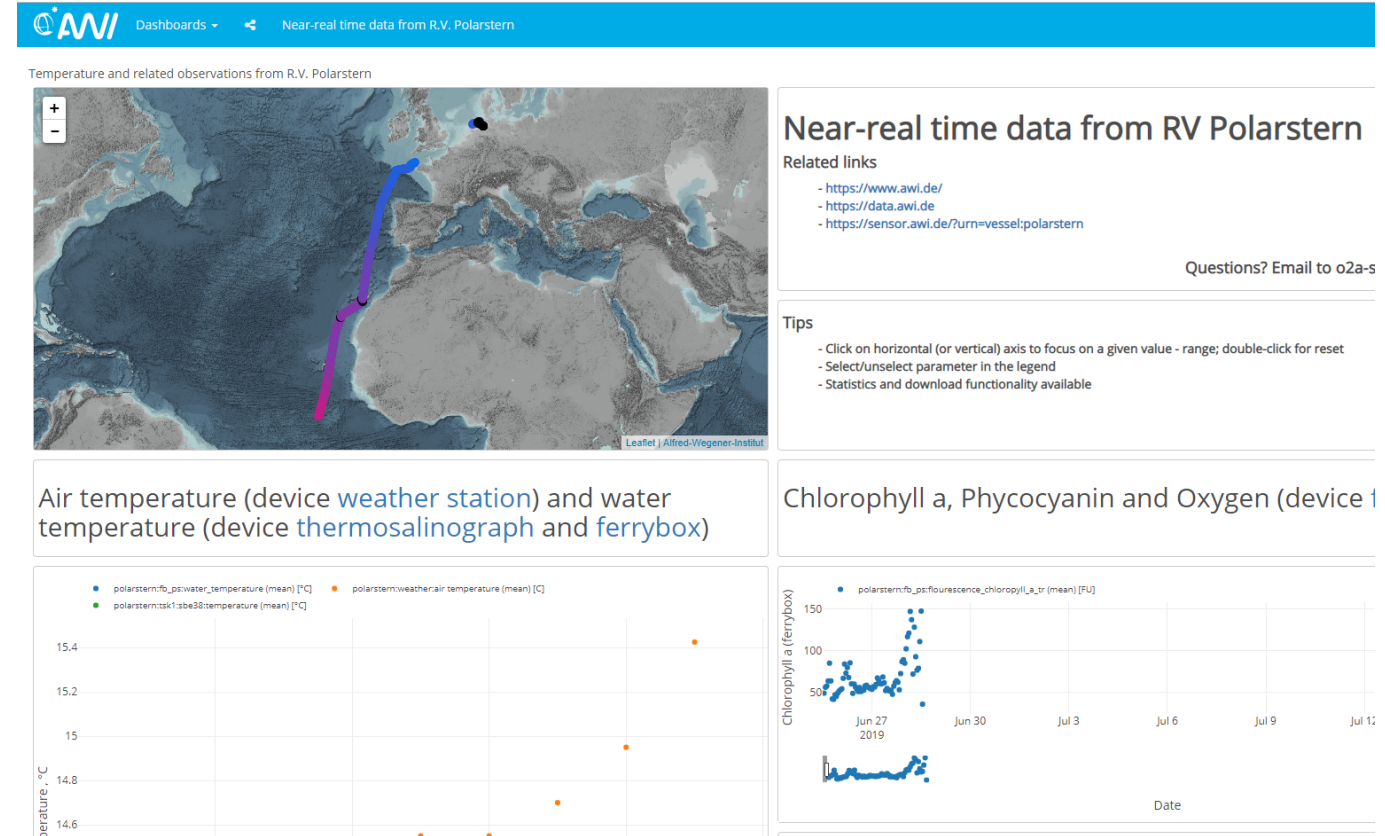
Close

Choose transmission type “...continuously in near real-time”



# Provide Data in Ingest Database

- Contact Data Supporters For Help
- Convert data into CSV Format for import into database
  - To access data via defined interface
  - For display in DASHBOARD



datetime	vessel:polarstern:tsk1:salinity [psu]	vessel:polarstern:tsk1:sbe38:temperature [°C]
2019-02-28 15:50:00.000	34.1234	2.443
2019-02-28 15:50:01.000	34.1345	2.564
2019-02-28 15:50:02.000	34.1456	2.544

# MOSAiC Central Storage (MCS) - Workspace



- Central Storage for raw data and data products on board Polarstern
- Naming convention of device area is derived from SensorWeb
- Data transferred to in Bremerhaven for common access by MOSAIC consortium members



## platforms

vessel  
polarstern  
    ctd\_watersampler  
        SBE3plus temperature sensor  
        exdata  
            DSHIP-DEVICEOPERATION-ID  
            SensorFile.xxx  
FerryBox  
    exdata  
        DSHIP-DEVICEOPERATION-ID  
        SensorFile.xxx  
vehicle  
    BEAST  
    ECO-Triplet Fluorometer  
    ...

## SENSOR INFORMATION SYSTEM

Create and manage platform, device and sensor related information

 <b>BROWSE</b> Devices, sensors, asset/serial numbers, deployment history ...	 <b>TUTORIAL</b> Create metadata, use the device store re-assign sensors	 <b>LOGIN</b> Manage your own device and sensors
--	---	---

## Tasks

Coring  
    Site 1  
        **Quicklooks**  
        Processed Data  
        Combined Datasets  
    Site 2  
        DN  
        ...  
SnowPits  
    Site 1  
    Site 2  
    DN  
ROV

## Team-Folders

OCEAN  
ICE  
ATMOS  
...



# Quicklooks

- Share quicklooks (plots, CSV files, etc.) of data for a device operation for scientists on board

## Quicklooks

Find quicklooks from your expedition.

Task	Event	Date
aircraft_operations	PS122-123	2019-01-01
some deep	PS122-99_depth_matters	2019-01-01
some other	PS122-1-ij	2019-03-01

### Platforms and devices

[vessel:polarstern:bln\\_ps](#)  
[vessel:polarstern:crs\\_ps](#)

### Files



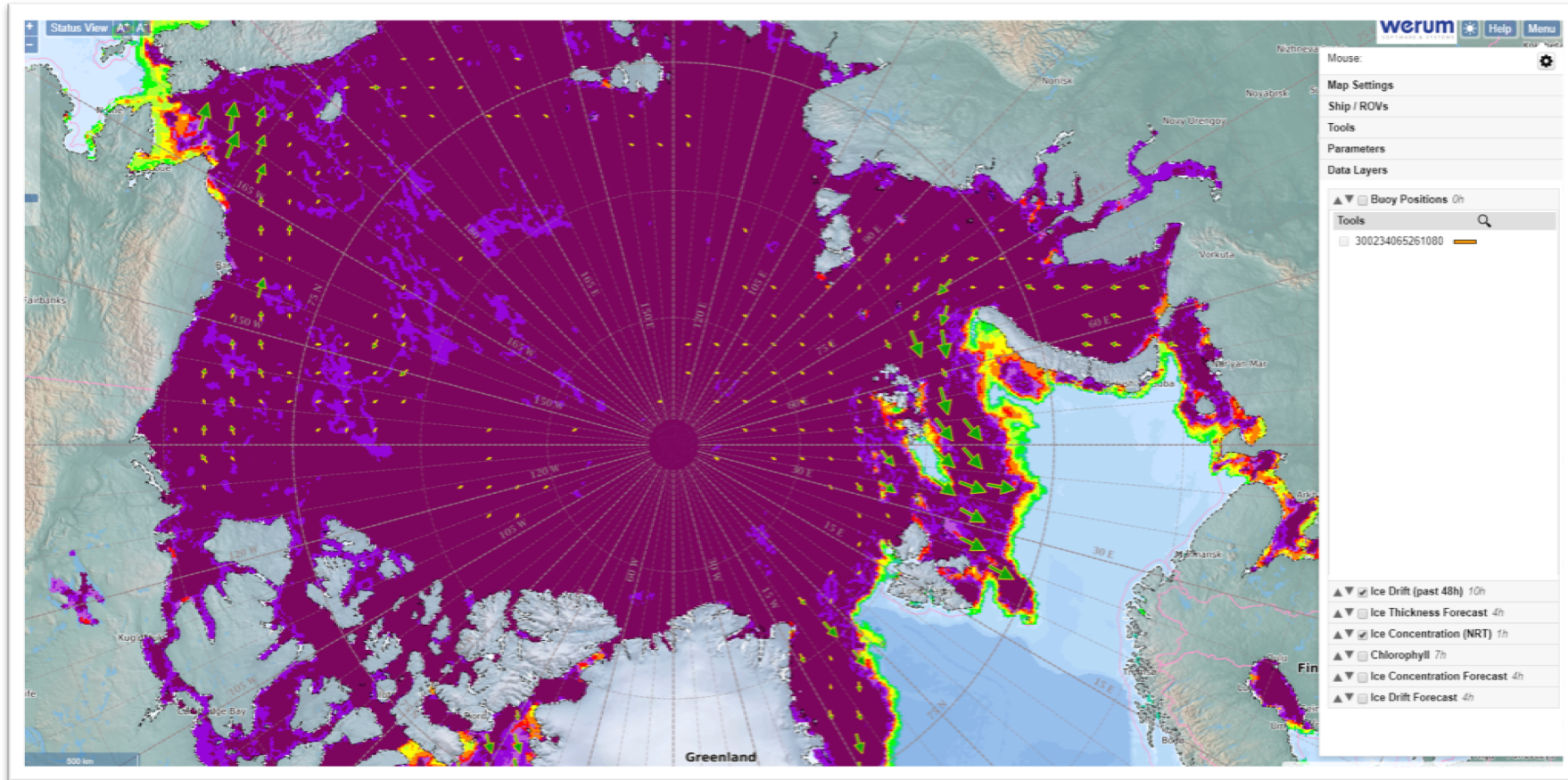
[very interesting file.xlsx](#)

## Provide a quicklook

- Create a quicklooks directory in your tasks storage.
- Create a directory with the event date and name in the quicklooks directory.  
Best practice: yyyy-MM-dd\_event. For example: 2019-12-24\_Christmas.
- Place your files in the event directory. Images (e.g., jpg, png, gif) get a preview.
- If you like to link your instrument (platform, device), create a metadata.txt file in the event directory.  
Best practice: write sensor codes line by line. For example: vessel:polarstern.

- ✓ *A browser based mapping and viewing system available on board*
- ✓ *Decision support on board*

# MAPVIEWER



Sensor  
Metadata  
Description

Data  
Acquisition

Data  
Ingestion

Data  
Storage

Data  
Monitoring

Data  
Analytics

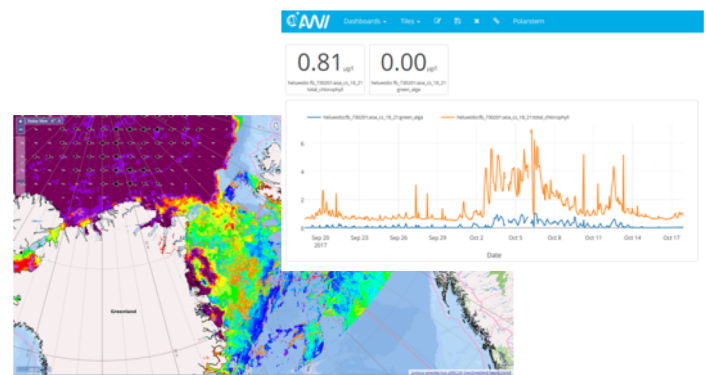
Data  
Archiving

# Data Flow in MOSAiC



ActionLog Events

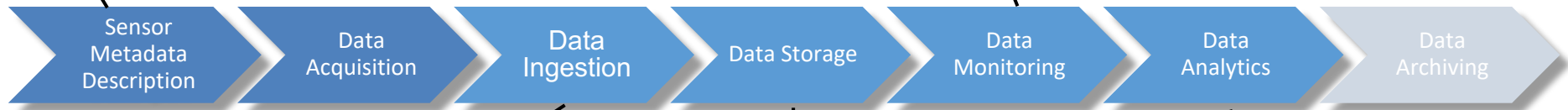
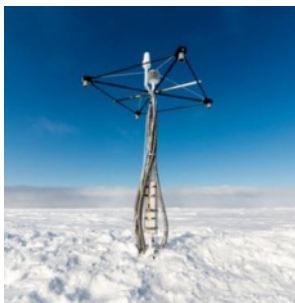
Activity - Device Operator	Start	Device	Action	Latitude	Longitude
PS4_4-1 ADCP	12.10.2016 11:49:24	Acoustic Doppl...	station start	51° 03,088' N	001° 23'
PS4_1-3 BLN	11.10.2016 14:17:22	BALLON	in the water	46° 07,339' N	010° 15'
PS4_1-1 BOAT	11.10.2016 14:13:31	Boat	MyAction	46° 07,251' N	010° 15'



**SENSORWeb** for management of device metadata

**DSHIP-ActionLog** for Device-Operation ID management

**DSHIP-Mapviewer and Dashboard**



Data transfer via satellite, local LAN, radio LAN as stream and/or in delayed mode

MOSAic Central Storage and workspace

Using workspace and **Marketplace (VMs)** e.g. with **Jupyter Notebook** (R or Python) or Bash-Script or or ...?



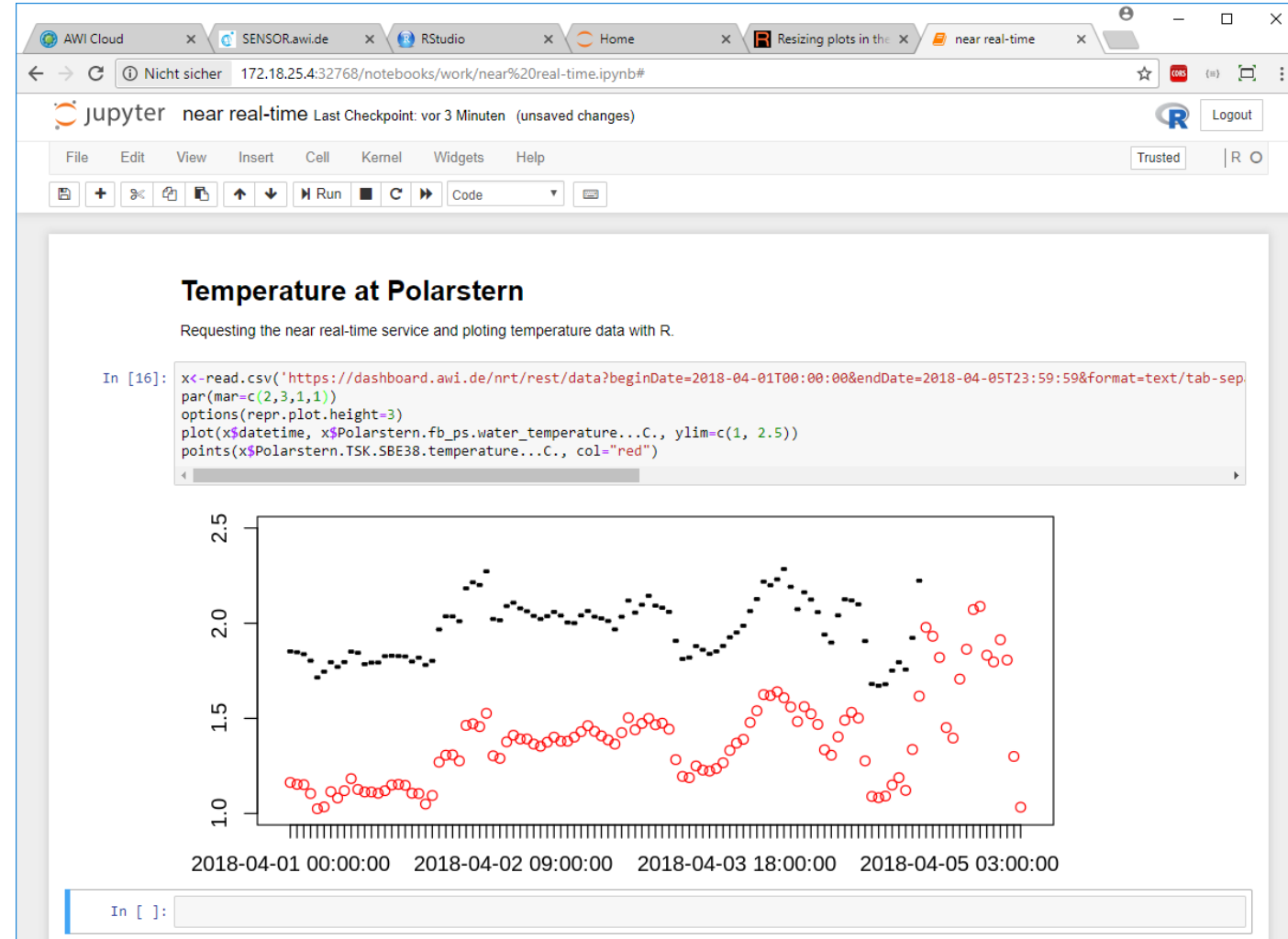
**Sensor metadata description (SENSORWeb) is the basis for all parts!!!**



# Workspace - Solutions



- Virtual Machines with e.g.
  - Jupyter Notebook,
  - R
  - your tools..?



# Marketplace Catalog







AWIcloud + https://cloud.awi.de/vcac/org/awi/#csp.cs.ui.catalog.list

**AWI** ALFRED-WEGENER-INSTITUT HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG **AWIcloud** spinkern@dmawi.de

[Katalog](#) [Bereitstellungen](#) [Design](#) [Posteingang](#) [Administration](#) [Infrastruktur](#)

Katalog 4 Elemente ▼

Q Katalogelemente nach Name oder Beschreibung suchen | Sortieren: Name (aufsteigend) ▼ ↻

 <b>CentOS 7 Server</b> CentOS 7.x Server Business-Gruppe <code>bg_users</code> Dienst <code>Virtual Machines</code> <b>ANFORDERN</b>	 <b>Jupyterhub</b> Jupyterhub including interpreters for anaconda-python2.7 and anaconda- Business-Gruppe <code>bg_users</code> Dienst <code>Applications</code> <b>ANFORDERN</b>	 <b>RStudio</b> RStudio Server Business-Gruppe <code>bg_users</code> Dienst <code>Applications</code> <b>ANFORDERN</b>	 <b>Ubuntu Server 18.04</b> Ubuntu 18.04 Server mit Storage (Isilon) Anbindung Business-Gruppe <code>bg_users</code> Dienst <code>Virtual Machines</code> <b>ANFORDERN</b>
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# Ordering an individual compute instance



AWIcloud

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

AWIcloud

spinkern@dmawi.de

Katalog Bereitstellungen Design Posteingang Administration Infrastruktur

Jupyterhub Business-Gruppe bg\_users

Jupyterhub

- UbuntuServer1804BaseB...
- vSphere-Maschine\_\_v...**
  - App\_Sudo\_1
  - App\_Upgrade\_1
  - App\_Jupyterhub\_...

vSphere-Maschine (vCenter): vSphere-Maschine\_\_vCenter\_\_1

Allgemein Speicher

Instanzen:

Beschreibung:

\* Size:

Very Small	CPU: 1	Memory (MB): 2048	Storage (GB): 50
Small	CPU: 2	Memory (MB): 4096	Storage (GB): 50
Medium	CPU: 4	Memory (MB): 8192	Storage (GB): 50
Large	CPU: 8	Memory (MB): 16384	Storage (GB): 50
<b>Very Large</b>	<b>CPU: 16</b>	<b>Memory (MB): 32768</b>	<b>Storage (GB): 50</b>

CPU: 16, Memory (MB): 32768, Storage (GB): 50



# Example: Jupyter Notebook Server



The screenshot shows the Jupyter Notebook web interface. At the top, there's a browser window with the URL `172.18.27.17/user/spinkern/tree/jupyternotebook`. The Jupyter logo is on the left, and 'Logout' and 'Control Panel' buttons are on the right. Below the navigation tabs (Files, Running, IPython Clusters, Conda), there's a message 'Select items to perform actions on them.' and buttons for 'Upload', 'New', and a refresh icon. The main area displays a file tree for the 'jupyternotebook' directory. A 'New' dropdown menu is open, showing options under 'Notebook:' (Python 3, Python [conda env:Anaconda-Python2.7], Python [conda env:Anaconda-Python3.7], R) and 'Other:' (Text File, Folder, Terminal). Three blue arrows point from text annotations to the file list and the 'New' menu.

**Pre-installed environments**

**Access to persistent storage**

Item	Last Modified
..	
avgtemperature	
bioOracle2	
dask-worker-space	
dws	
dws-master	
framDemo	vor 13 Tagen
gitTest	vor 14 Tagen
hadoop	vor 5 Tagen
isilon	vor 2 Monaten
keras	vor 3 Monaten

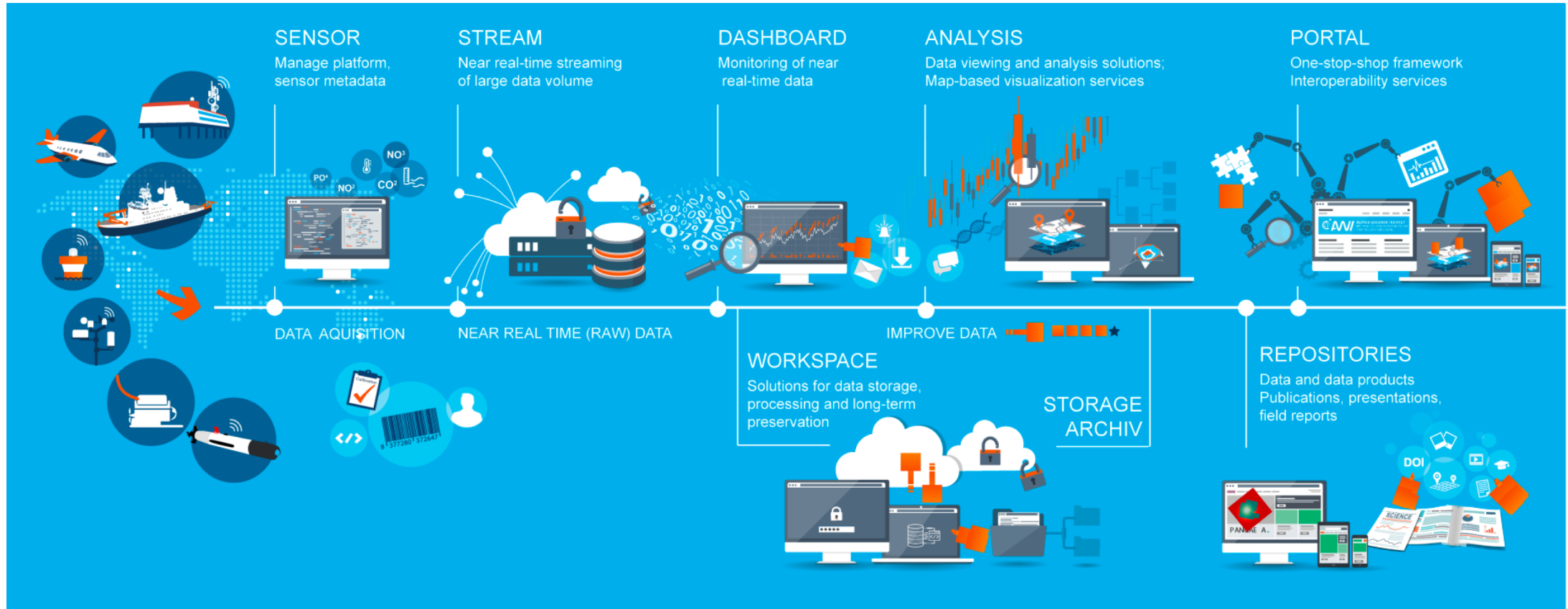
# Advantages of Virtual Machines (VMs)



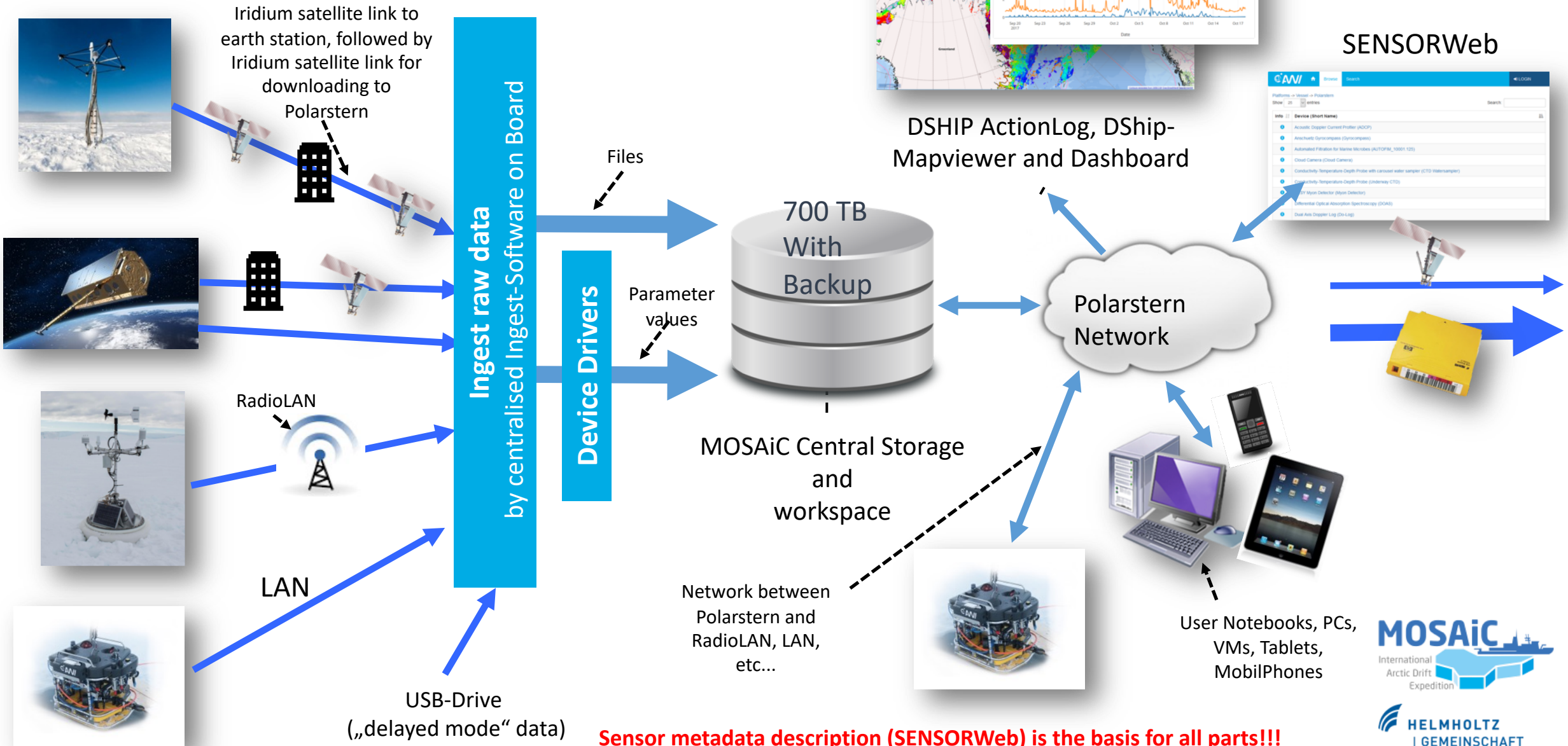
- No configuration of laptop needed to access storage, databases etc. on board
- VMs accessible through network
  - work on machine via any laptop/PC on ship with network access
- No need to carry laptop around
  - Access same state of machine anywhere
- Accessible to many
  - Share virtual machine with colleagues
- VMs run on server
  - skripts may run overnight while you shut down your laptop



# O2A Framework

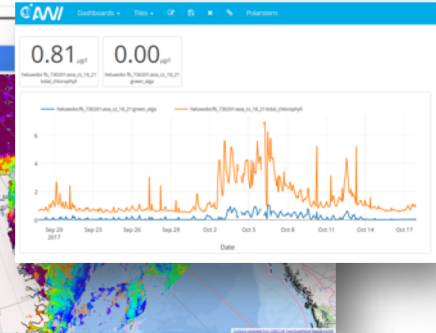


# Overview Architecture



ActionLog Events

Activity - Device Operator	Start	Device	Action	Latitude
PS4_4-1 ADCP	12.10.2016 11:49:24	Acoustic Doppl...	station start	51° 03.088' N
PS4_1-3 BLN	12.10.2016 11:49:01	Acoustic Doppl...	station start	51° 03.088' N
PS4_1-1 BOAT	11.10.2016 14:13:31	Boat	MyAc...	



SEARCH

Platform: all vessel in Polarstern

Show: 25 entries

Info: Device (Short Name)

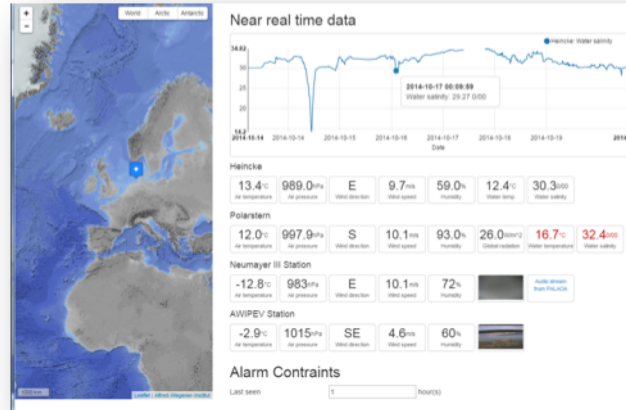
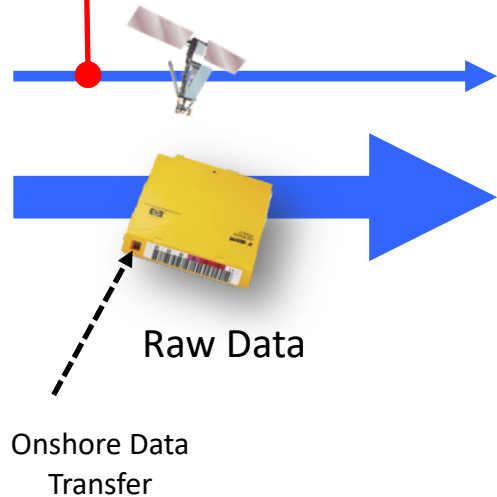
- Acoustic Doppler Current Profiler (ADCP)
- Autonomous Oceanographic System (Autonomous)
- Automated Filtration for Marine Microbes (AUTOFM\_1001\_125)
- Cloud Camera (Cloud Camera)
- Conductivity-Temperature-Depth Probe with carousel water sampler (CTD Watersampler)
- Conductivity-Temperature-Depth Probe (underway CTD)
- CTD Nipon Detector (Nipon Detector)
- Fluorescence Optical Absorption Spectroscopy (FOAS)
- Dual Axis Doppler Log (Da-Log)



# Raw Data at AWI



Currently only 3 x 200MB/day



Land-MOSAic Central Storage



# Satellite Communication



Version	Volume	Transfer Rates	Remarks
IRIDIUM	Max. 2x100 MB/day	2x128 kbps	Max. 2x 5GB/month Used by buoys
IRIDIUM Certus	Max. 3x200 MB/day	3x700 kbps	1 backup Max.3-4x 10GB/month  Testing phase
Nano Satellites		Store & Forward!!	Early testing phase

## Email Quotas:

Suggested limitations	Iridium
Cruise leader	1 MByte
Group leader	100 kByte
German Weather Service	1 MByte
Helicopter crew	100 kByte
Captain	1 MByte
Ship's management	100 kByte
Scientific participants	50 kByte

**No internet access available for user pcs and personal laptops!**

# Collaboration Tools



- MOSAiC Logbook
- Public server for personal data available on Polarstern
- RocketChat for communication on board
  
- **NOT: MS Teams!, google docs, etc.**

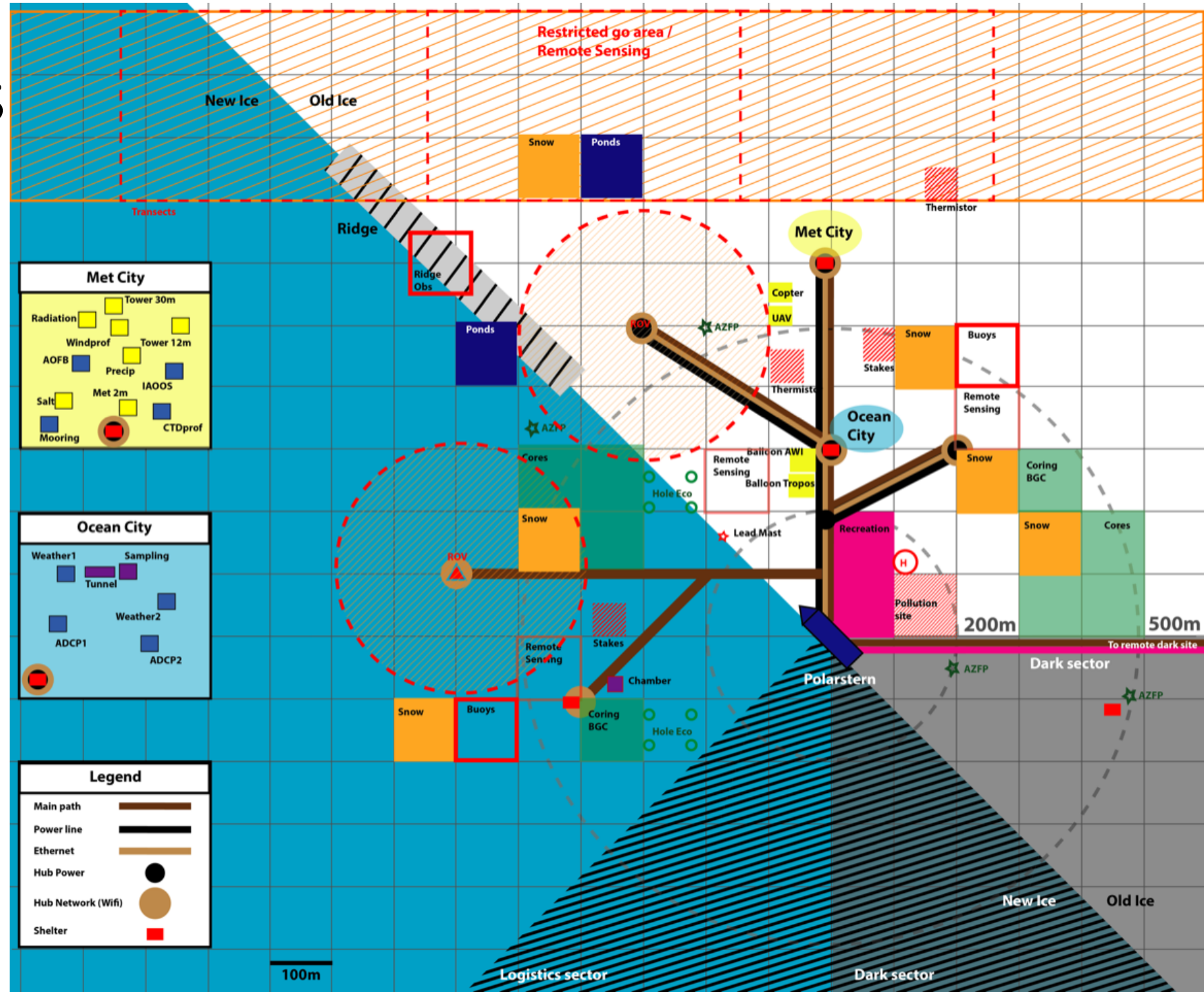
# Network Access

## Cabled LAN (glas fibre)

- at power lines
- 1Gbit/s

## Radio LAN (Estimated transfer rates (not yet tested in polar regions))

- 50-200 Mbit/s near Polarstern
- 3Mbit/s in 20km distance
- Needs mobile power supply







# MOSAiC Services

Documentation of all components is found in the MOSAIC Handbook.  
If you have any questions, please contact the data supporters.

- User Accounts
  - To obtain your user account with which you can access the services please contact the communications officer on board.
- Storage
  - [mcs.fs-polarstern.de](http://mcs.fs-polarstern.de)
- (Meta)-Data Management Tools
  - SENSORWeb:
    - <http://sensor.fs-polarstern.de/>
  - Dashboard:
    - <http://dashboard.fs-polarstern.de/>
- Virtual Workspace Environment and Software Repository
  - Marketplace:
    - <http://marketplace.fs-polarstern.de/vcac>
  - Repository:
    - <https://reposrv1.fs-polarstern.de/>
- Communication
  - RocketChat:
    - <http://rocket.fs-polarstern.de/>
- Quicklooks
  - <http://frame-rem1.fs-polarstern.de/quicklooks>



# SENSOR Chief Editors

- Collect list of devices to be entered in SENSOR for your team
- Act as a multiplier for SENSOR in team.
  - spread knowledge on updates of SENSOR in team.
  - Filter questions which can already be answered by you for your team
    - Best practices
    - Best configuration of instruments
    - Where to get documentation
  - Spread knowledge
    - on best practices in SENSOR specific for team
    - How SENSOR, DSHIP and MCS relate
  - Act as first contact for questions on SENSOR for team.
- Monitor devices in SENSOR for your team to ensure best practices are followed
  - Item state, mandatory Contacts/Roles, correct configuration



# Data Contact Person on Board

- Act as a multiplier for knowledge
  - on best practices in SENSOR specific for team
  - on SENSOR, DSHIP, MCS on Board
  - how SENSOR, DSHIP and MCS relate
- First contact for questions regarding SENSOR
  - Know Best practices
  - Help reassigning, editing (and entering new) devices
  - Know where to get documentation
- Keep an eye on data for your team.
  - Is raw data being stored in MCS appropriately and in time?

# Data Contact Persons and Chief Editors

- Data Contact Persons Leg 1

- ATMOS: Byron Blomquist
- BGC: Dorothea Bauch
- ECO: Allison Fong
- ICE: Julia Regnery
- OCEAN: Mario Hoppmann

- Chief Editors

- ATMOS: Peter von der Gathen, Byron Blomquist, Giri Prakash
- BGC: Dorothea Bauch
- ECO: Allison Fong, Clara Hoppe
- ICE: Julia Regnery, Amy MacFarlane
- OCEAN: Julia Regnery, Sandra Tippenhauer

# Data Supporters

- Help with DSHIP, SENSOR, data access and storage on MCS
- Assist with accessing virtual solutions
- Keep an eye on data flow
  - Is raw data being stored in MCS appropriately and in time?
- Help with technical network problems on the ice
- Transfer data from MCS to AWI after each leg

# Data Supporters Leg 1

- Leg 1a

Franziska Nehring  
Peter Gerchow



- Leg 1 a and b

- Antonia Immerz
- Johannes Käßbohrer



- Find us in the Bathymetry Room 😊



# Ready to start?

- Register all scientific devices in SENSOR
  - Contact Chief Editor of your team to start
- SENSOR Checklist
  - Add mandatory contacts/roles
    - DSHIP Connector
    - Owner
    - Editor (and Data Provider)
- Ready?
  - Set Item State to „Public“
  - Create Initial Version of type “Comissioned“
- Software to bring to Polarstern for your personal laptops and cellphones
  - RocketChat App
  - Remote Desktop Client to access [Virtual Machines](#):
    - X2Go, or if desired: NX (NoMachine)
    - Microsoft RDP for Windows 10

# MOSAiC User Account

- To obtain your user account with which you can access the services please contact the communications officer on board.
- MOSAiC-User-Account created for you using your email address in [EIS.awi.de](mailto:EIS.awi.de) (prerequisite: sign data policy)
- With this user you can afterwards also access the MCS and MOSAiC Infrastructure at the AWI (see [mosaic-data.org](http://mosaic-data.org))



# Links and Further Documentation

- MOSAIC Handbook: <https://spaces.awi.de/display/EFPW/PS122+--+MOSAiC+--+Information>

- [sensor.fs-polarstern.de](https://sensor.fs-polarstern.de)
- [dashboard.fs-polarstern.de](https://dashboard.fs-polarstern.de)
- [sensor.fs-polarstern.de/quicklooks](https://sensor.fs-polarstern.de/quicklooks)
- ....

- O2A-Wiki: <https://spaces.awi.de/display/DM/MOSAiC>

- Access MCS at AWI: [mosaic-data.org](https://mosaic-data.org)



The screenshot shows the AWI Spaces web interface. The top navigation bar includes the AWI logo, a 'Spaces' dropdown menu, and a 'Create' button. The main content area is titled 'Polarstern - Wiki' and features a 'PAGE TREE' on the left side. The page tree lists various categories under 'PS122 - MOSAIC - Information', including 'Definitions & Abbreviations', 'Expedition Planning', 'Polarstern', 'Infrastructure Setup', 'Organizational Matters', 'Safety on the ice', 'Communication on the ice', 'Health Management', 'Environmental Aspects', 'Mobility & Travel on ice', and 'Navigation on the ice & tracki...'. Under 'MOSAIC Data Management', there is a sub-section for 'MOSAIC Central Storage' which includes 'Quicklooks', 'SENSOR', 'INGEST', 'DASHBOARD', 'DSHIP', 'Mapviewer Realtime Visualis...', and 'Virtual Environment'. The main content area on the right is titled 'MOSAIC Central Storage' and contains text explaining the MCS structure, including the 'Platforms area' and 'Workspace area'. A diagram at the bottom right illustrates the 'Device Area (Raw Data)' structure, showing a hierarchy of folders: 'platforms' (containing 'vessel', 'polarstern', 'ctd\_watersampler', 'exdata', 'SensorFile.xxx', and 'FerryBox') and 'Tasks' (containing 'Coring', 'Site 1', 'Qu', 'Pro', 'Co', 'Datasets', and 'Site 2').

**MOSAIC Central Storage**  
Created by Antonia Immerz, last modified by Sebastian Immoor on Aug 06, 2019

The MCS is divided into two areas, the platforms area and the workspace area. B mounting the areas as shares or using an ftp-client. For detailed information have

**Platforms area**  
(Raw) data and sample log sheets of a device are stored in the MCS in a directory. Operation IDs in DSHIP. Raw data obtained during each device operation will be u

The platforms area is readable by all participants.

Only users entered as 'Editors' or 'Data Providers' of the specific device in SENS

**Workspace area**  
All participants have read access to the workspace area.

- The workspace area has a tasks directory in which scientists on board can participants to upload and modify data.
  - Quicklooks: Data in folders named "Quicklooks" can be displayed in
- Further there is a Team-Folder in which all scientific teams have a director

**platforms**  
vessel  
polarstern  
ctd\_watersampler  
SBE3plus temperature sensor  
exdata  
DSHIP-DEVICEOPERATION-ID  
SensorFile.xxx  
FerryBox

**Tasks**  
Coring  
Site 1  
Qu  
Pro  
Co  
Datasets  
Site 2  
D