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

O2A – Observations to Archive

Data Flow Framework

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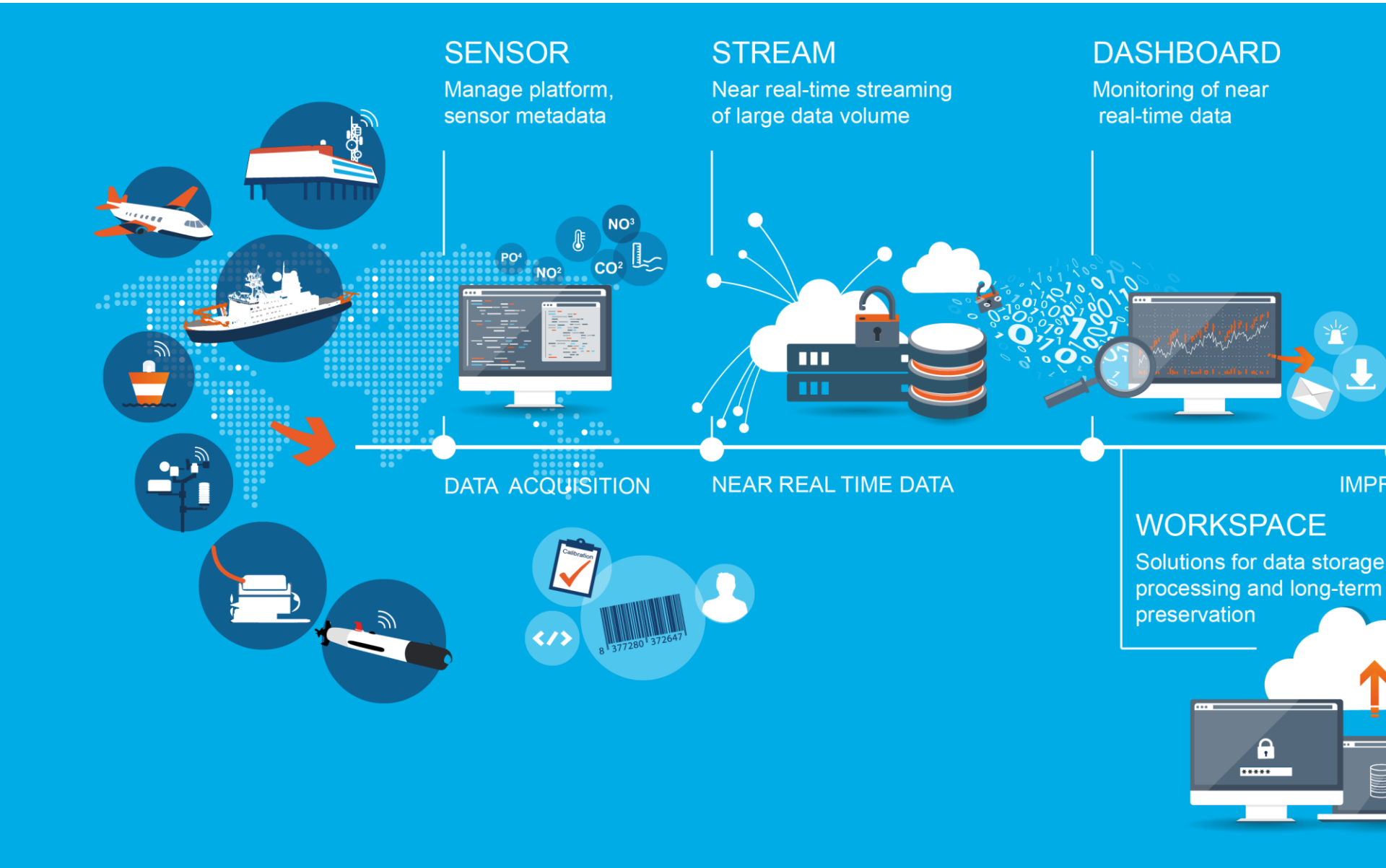
Roland Koppe

HELMHOLTZ GEMEINSCHAFT

Data Flow Framework



Data Flow Framework

DASHBOARD

Monitoring of near real-time data

ANALYSIS

Data viewing and analysis solutions;
Map-based visualization services

PORTAL

One-stop-shop framework
Interoperability services

IMPROVE DATA

WORKSPACE

Solutions for data storage, processing and long-term preservation

STORAGE ARCHIVE

REPOSITORIES

Data and data products
Publications, presentations, field reports

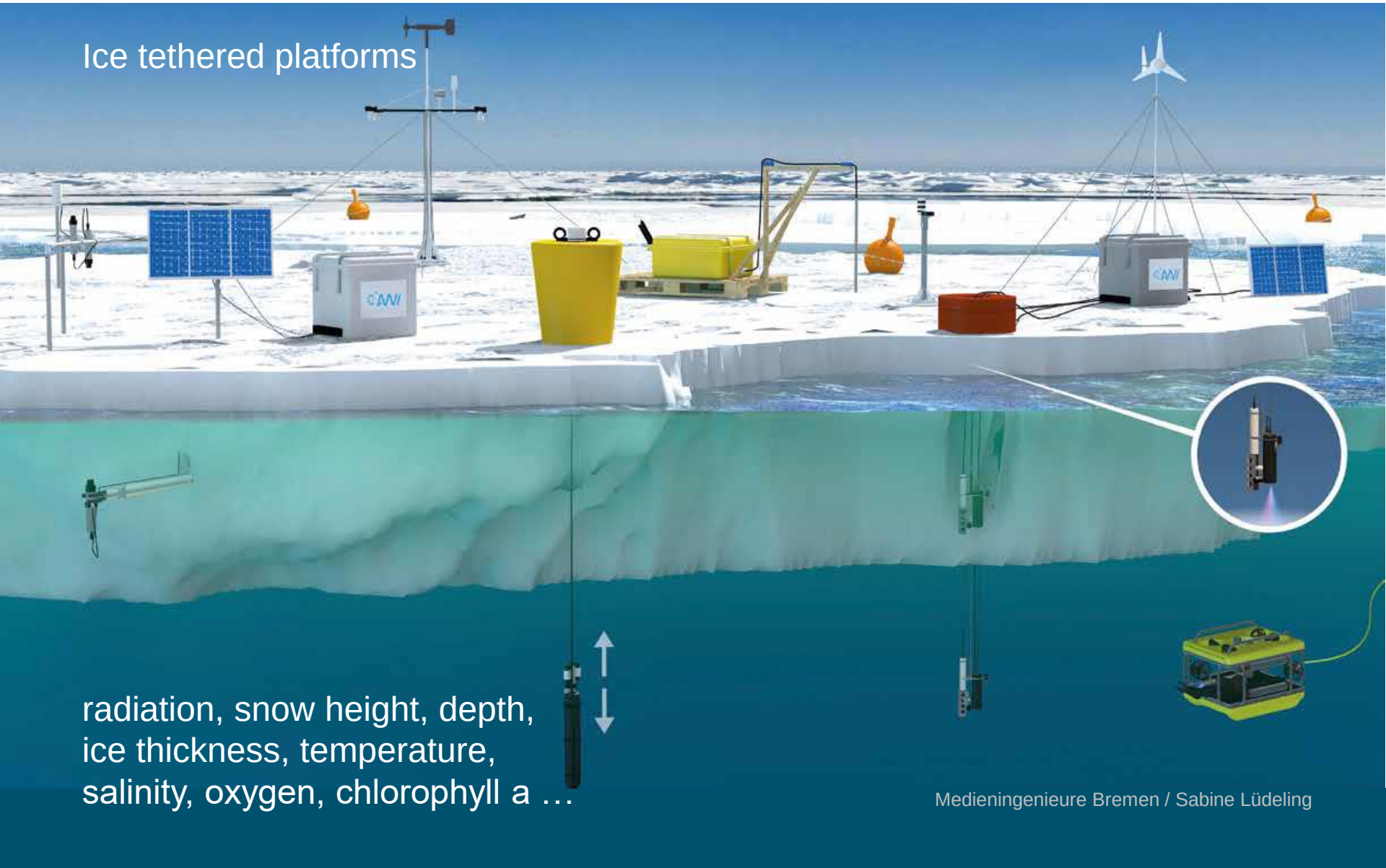
Objectives

- **Generic** infrastructure for data flows
- **Sustainability** and up-to-date services
- **Interoperability** and standards
  - e.g. Open Geospatial Consortium
- Seamless **integration** with our infrastructure
  - Web GIS
  - Web Portals
  - Data Archive

Challenges

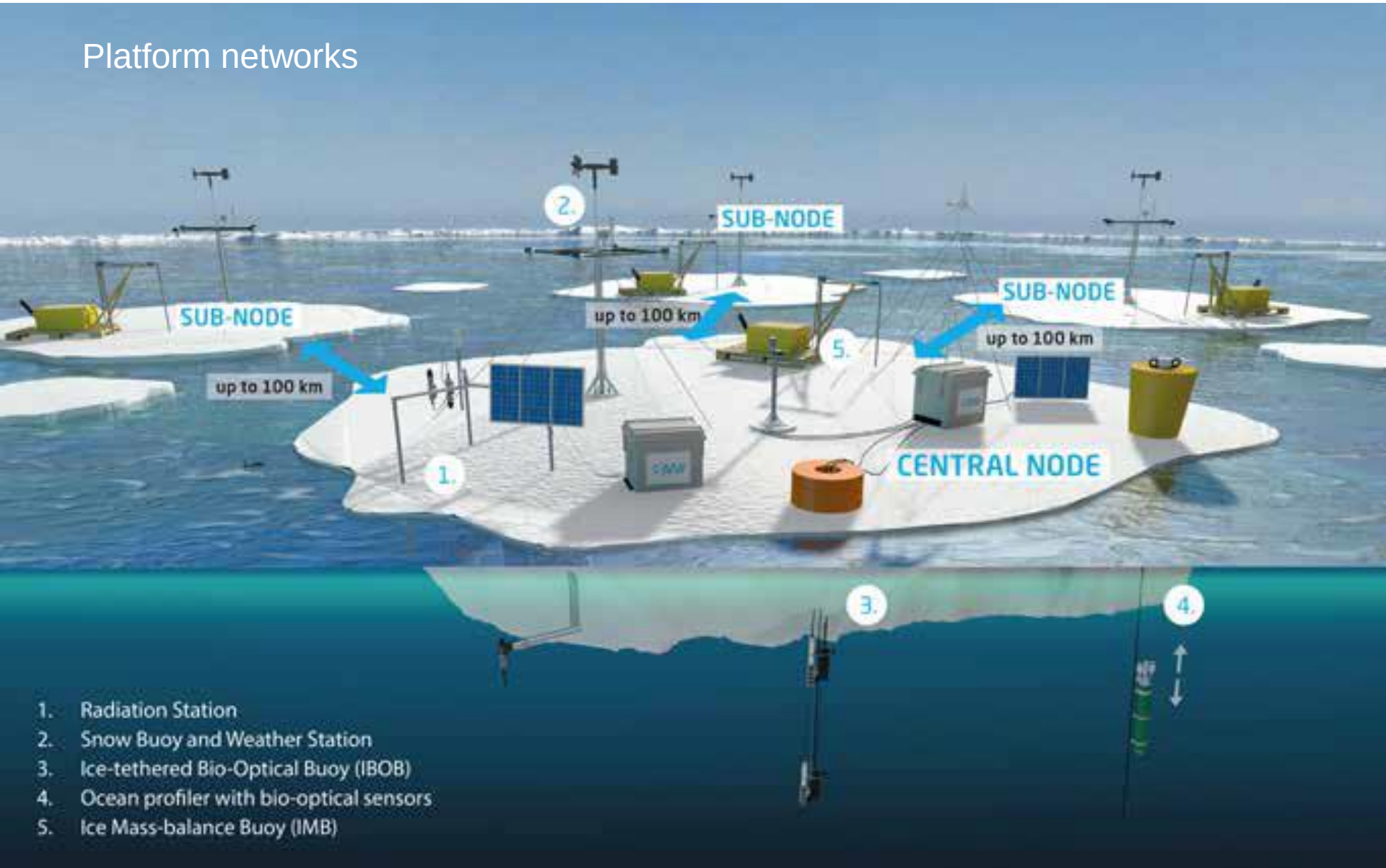
- Heterogeneity of scientific needs and workflows
- Number of different instruments, data sources and formats
- Integration with existing solutions, e.g. for the data flow, but also administrative information
- Effort and limited knowledge on standards

Use Case: FRAM

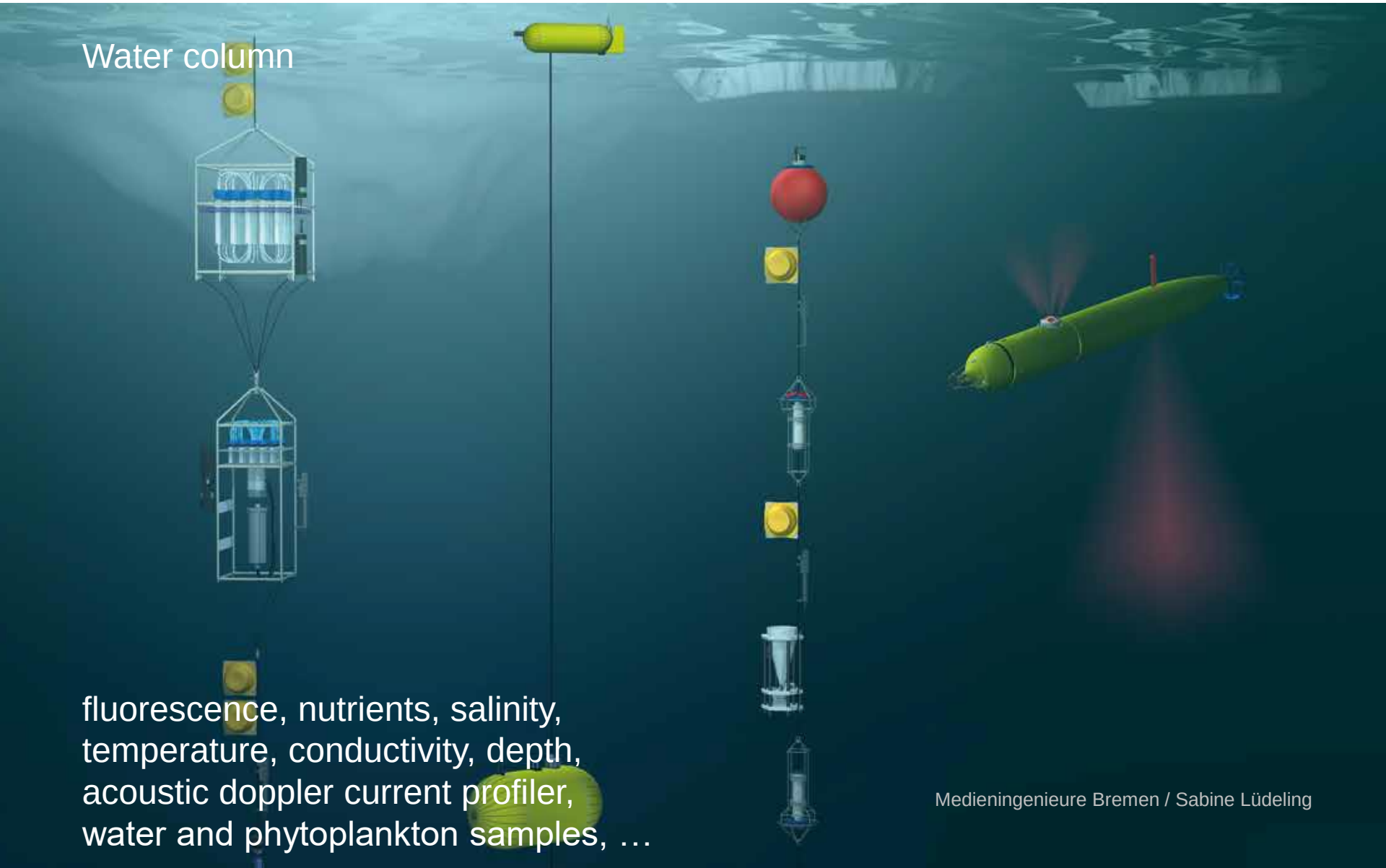


Use Case: FRAM

Platform networks



Use Case: FRAM



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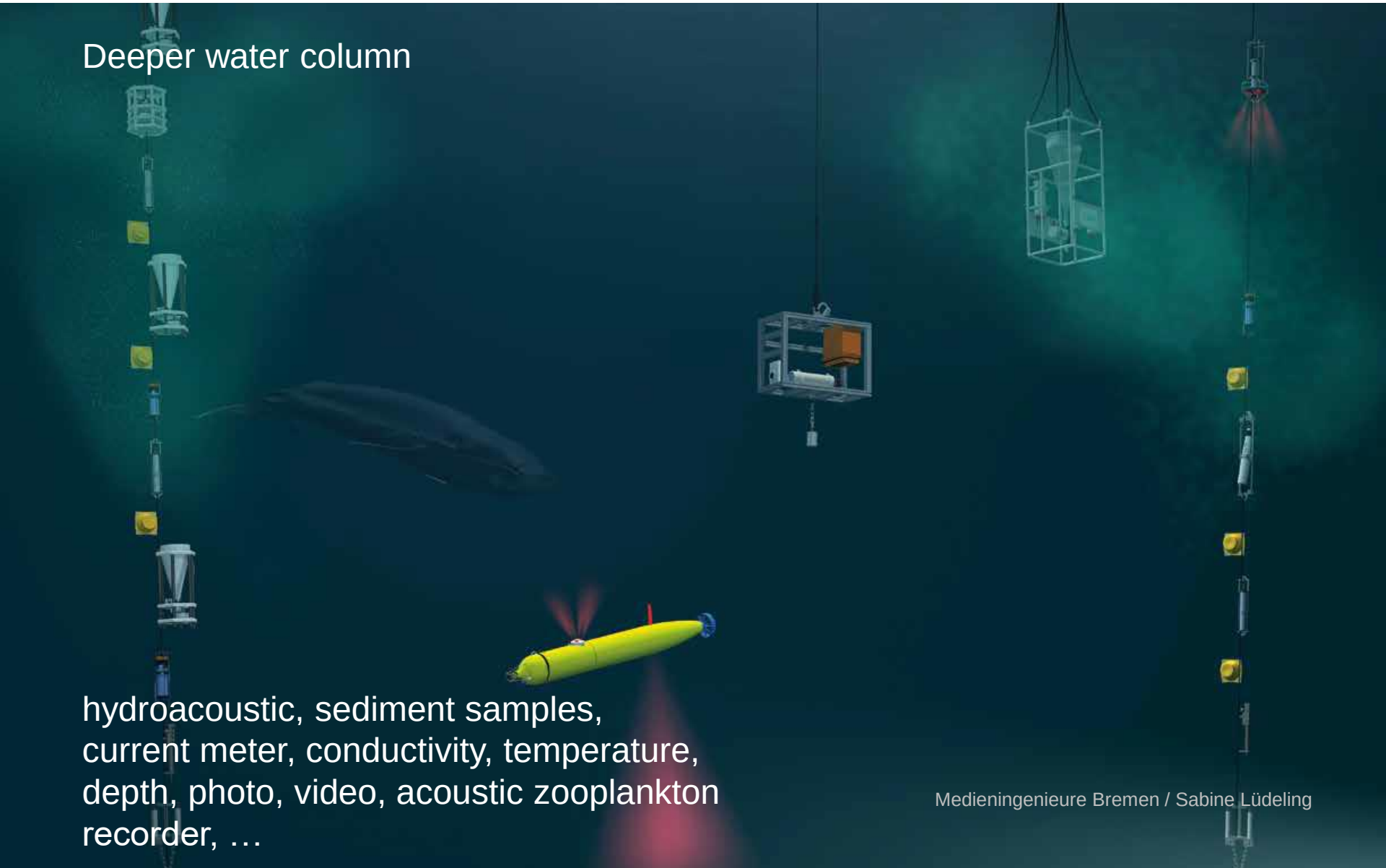
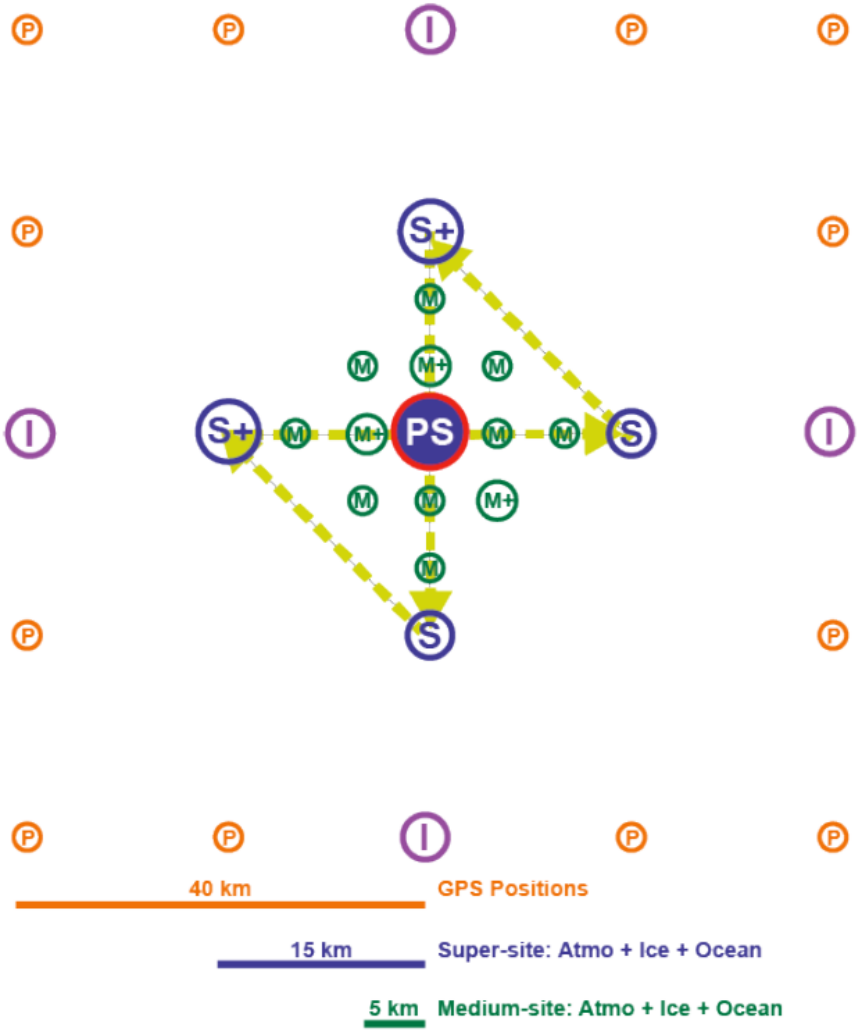


Use Case: FRAM

Use Case: MOSAiC

Use Case: MOSAiC

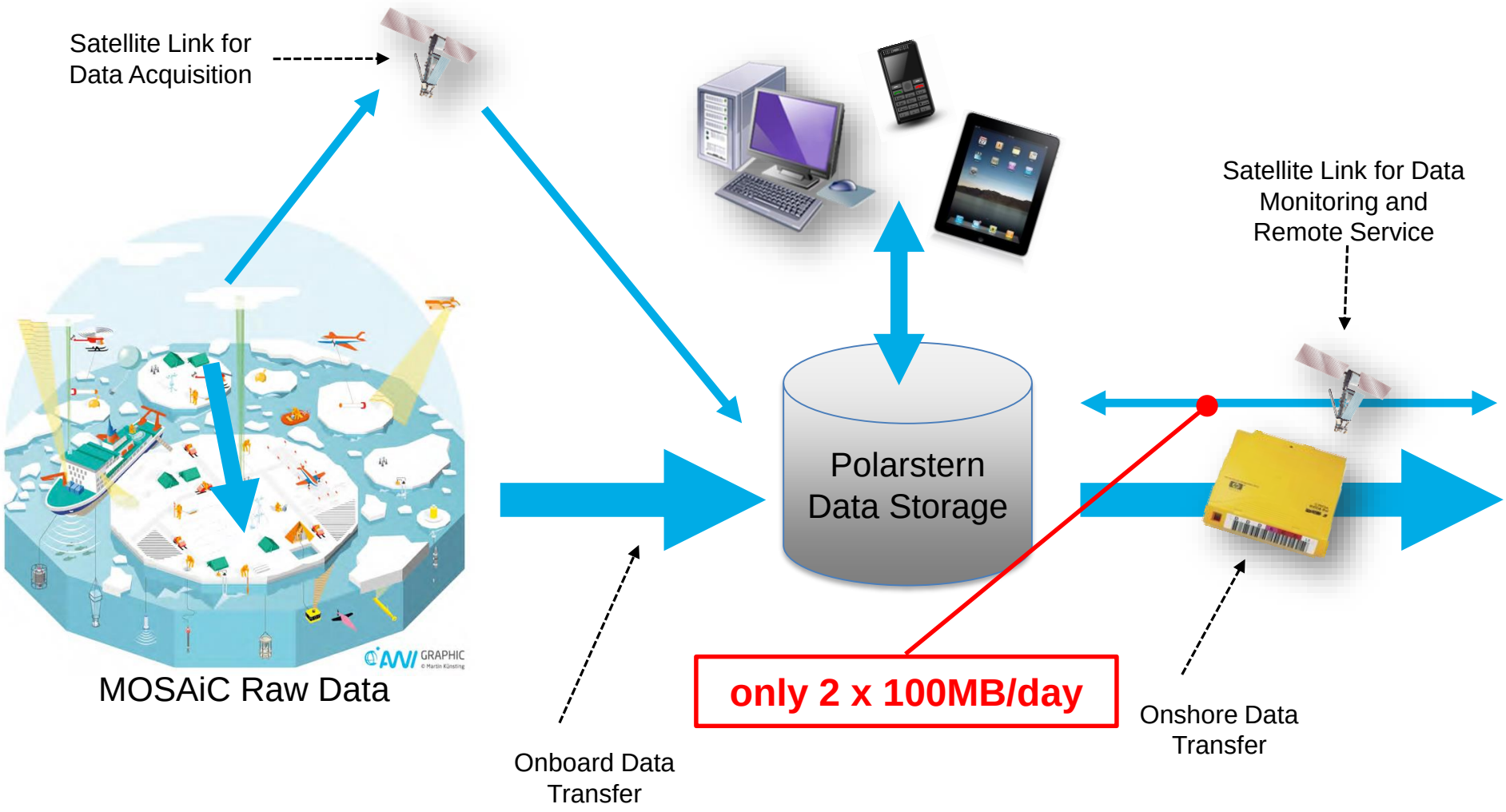
- Different sites in a distributed network around Polarstern



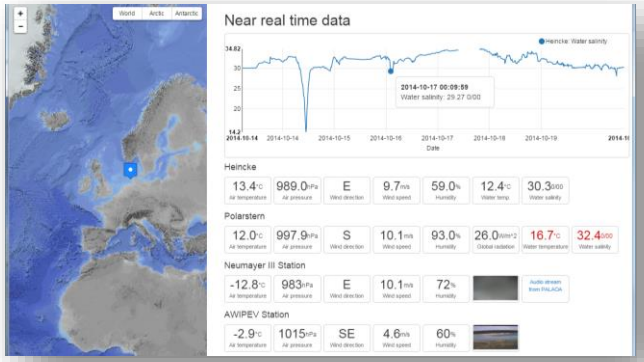
Chlorophyll a, nitrate, oxygen, ice thickness, snow depth, pressure, temperature, radiation, velocity, acoustic, bio sampling, photo, video, ...

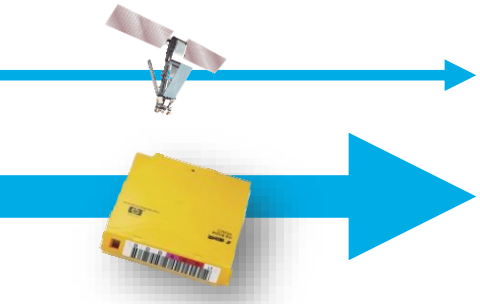
M. Nicolaus

Use Case: MOSAiC

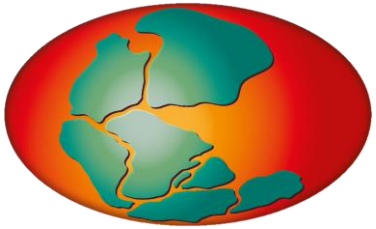


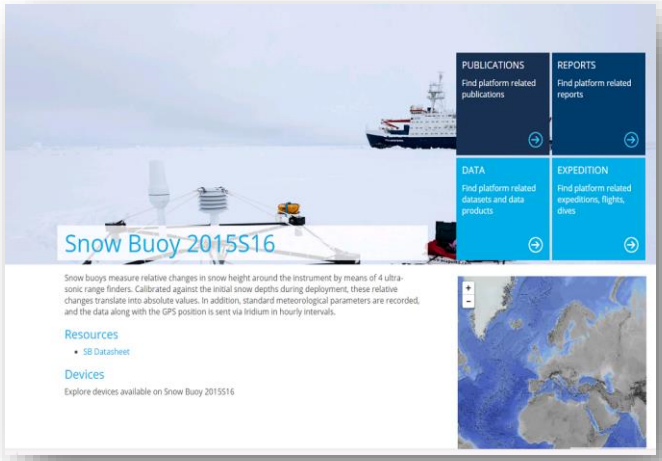
Use Case: MOSAiC





Raw Data





Solutions

sensor.awi.de

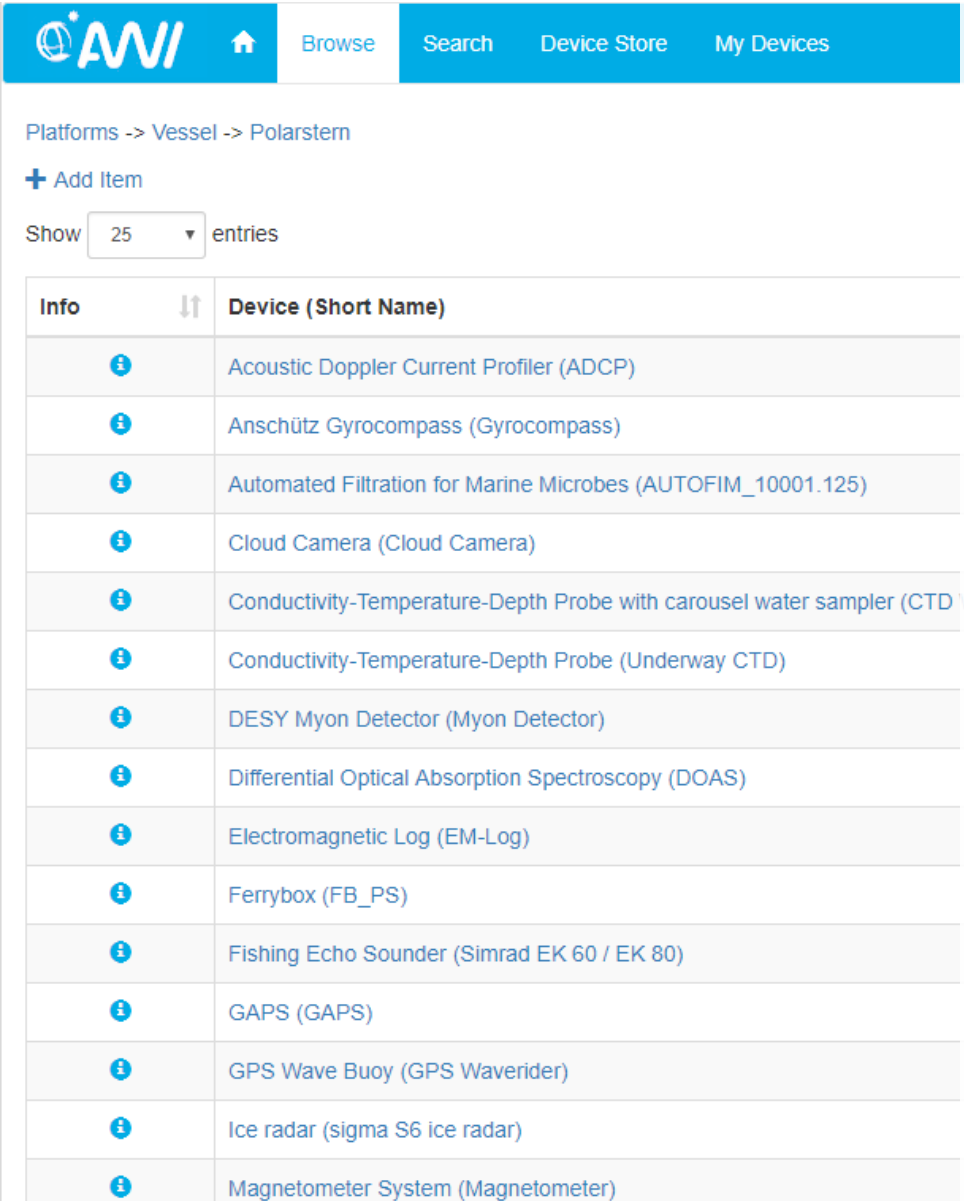
dashboard.awi.de

maps.awi.de

pangaea.de

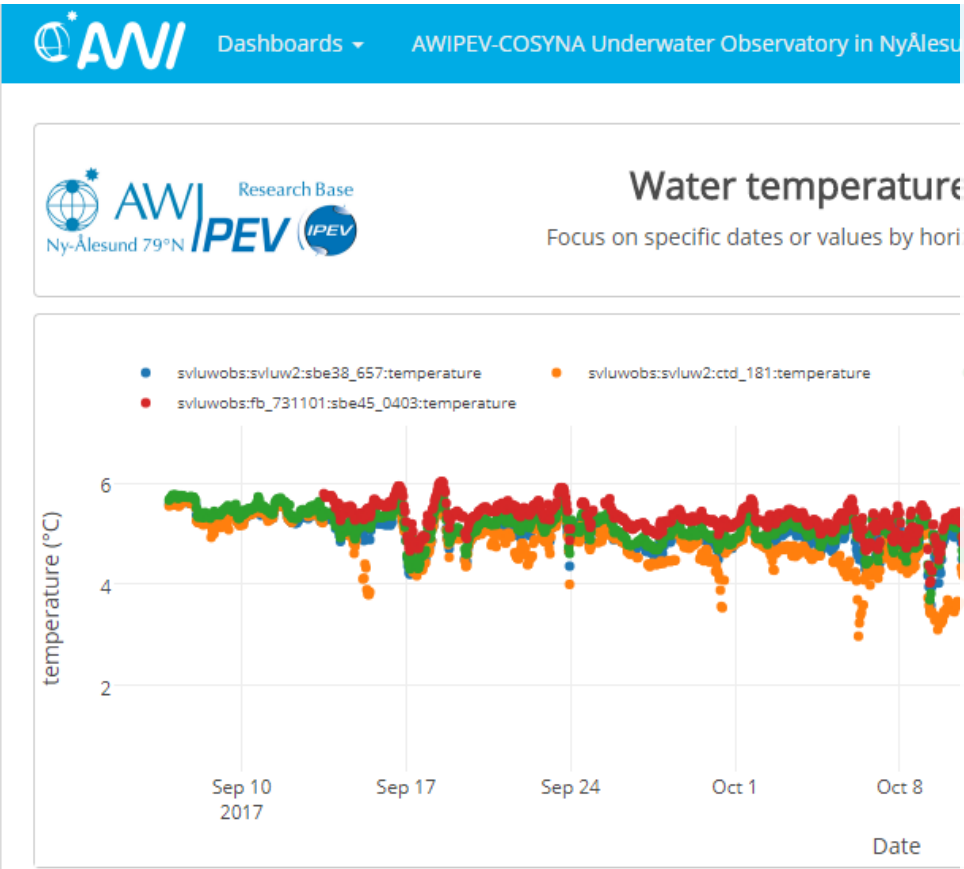
data.awi.de

Sensor Description



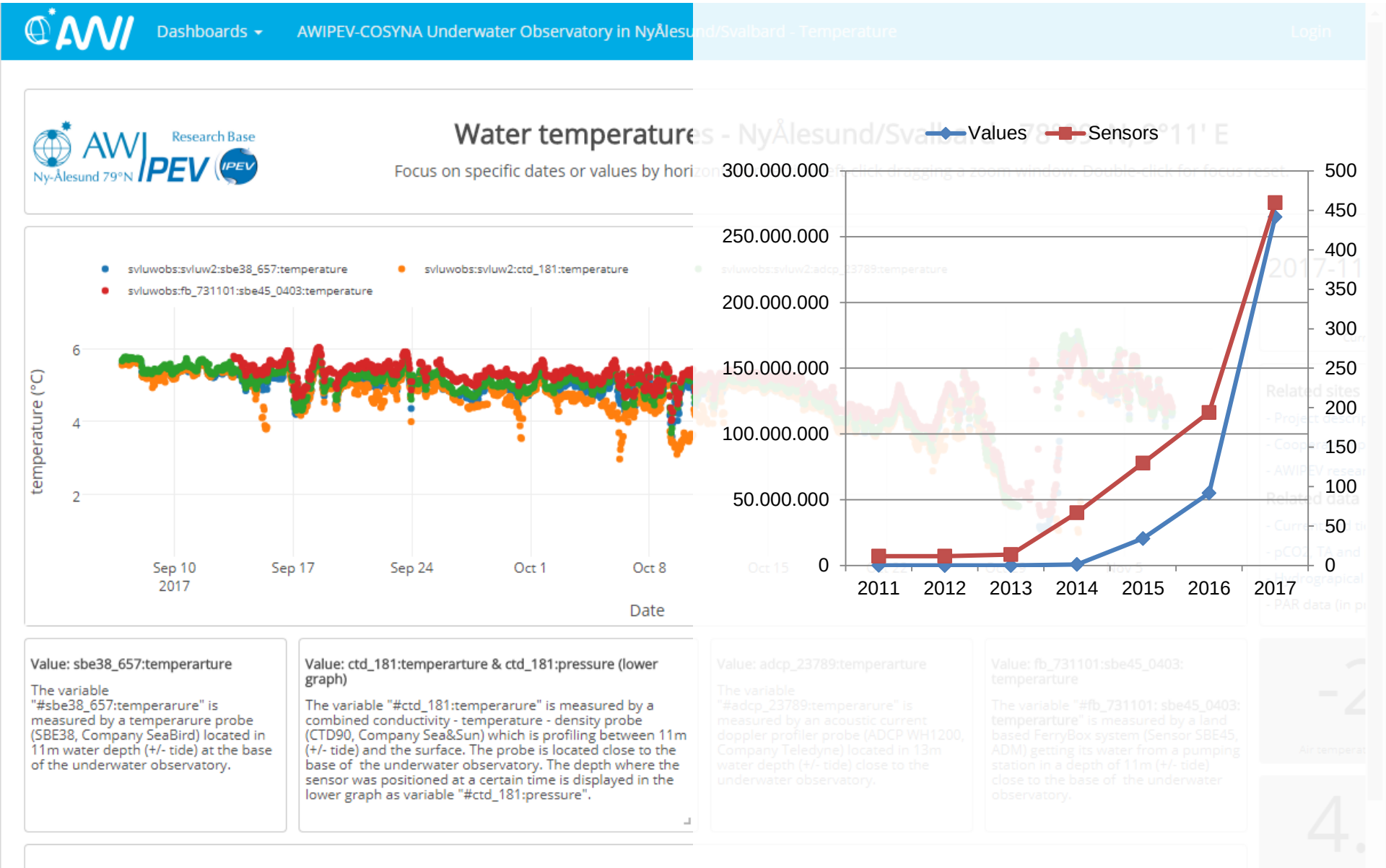
- Platform and device descriptions for provenance information and reduced data integration effort
- Versioning and citability
- Interoperability and standards
- ~1200 descriptions available and counting

Dashboard

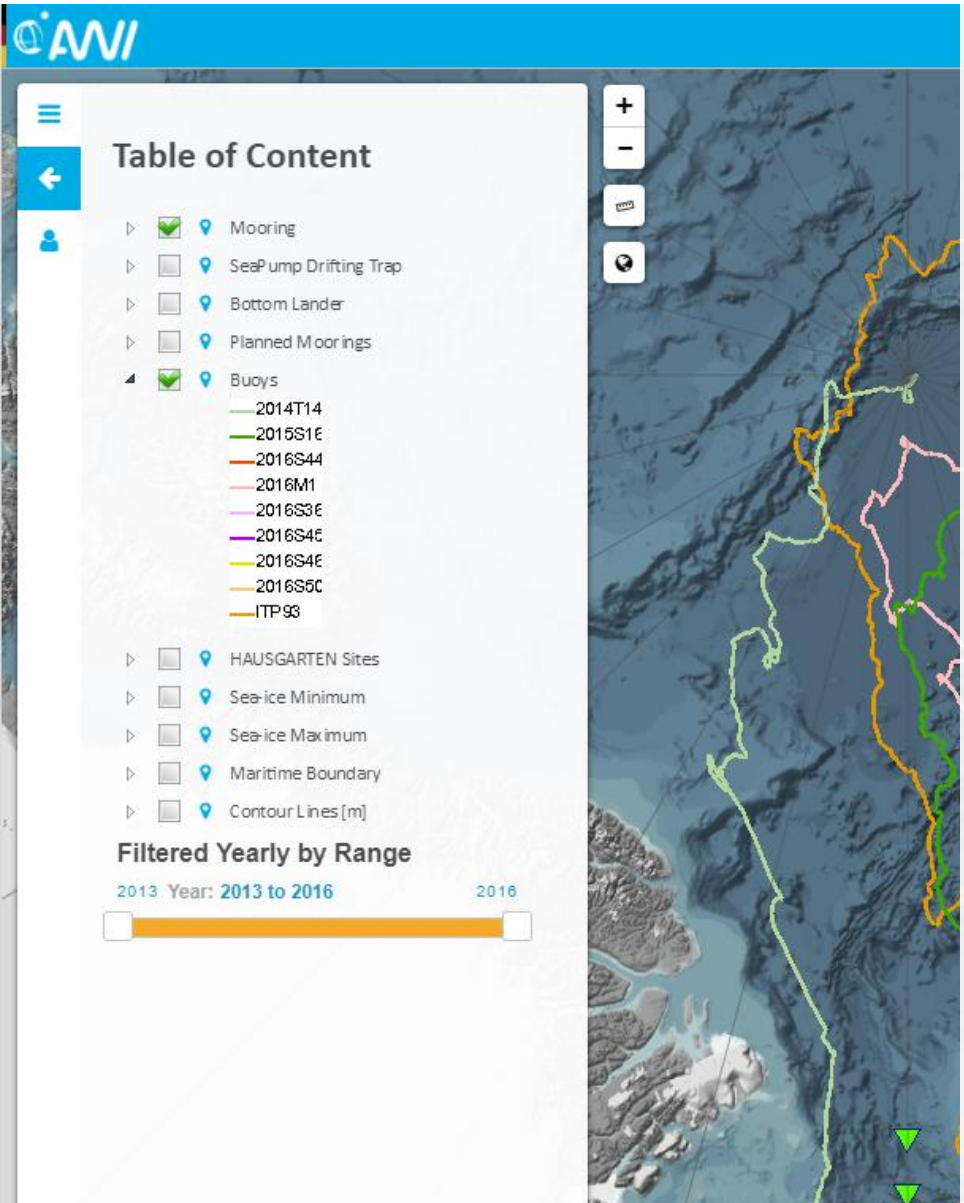


- User-customizable, flexible dashboards for data monitoring
- Automatic data streaming of near-real time and delayed-mode data
- Based on sensor descriptions and configurations

Dashboard


Dashboards
AWIPEV-COSYNA Underwater Observatory in NyÅlesund/Svalbard - Temperature
Login
Research Base
Ny-Ålesund 79°N
Water temperature
Focus on specific dates or values by hori
svluwobs:svluw2:sbe38_657:temperature
svluwobs:svluw2:ctd_181:temperature
svluwobs:fb_731101:sbe45_0403:temperature
temperature (°C)
6
4
2
Sep 10
2017
Sep 17
Sep 24
Oct 1
Oct 8
Date
Values
Sensors
300.000.000
250.000.000
200.000.000
150.000.000
100.000.000
50.000.000
0
500
450
400
350
300
250
200
150
100
50
0
2011
2012
2013
2014
2015
2016
2017
Value: sbe38_657:temperarture
The variable "#sbe38_657:temperarure" is measured by a temperarure probe (SBE38, Company SeaBird) located in 11m water depth (+/- tide) at the base of the underwater observatory.
Value: ctd_181:temperarture & ctd_181:pressure (lower graph)
The variable "#ctd_181:temperarure" is measured by a combined conductivity - temperature - density probe (CTD90, Company Sea&Sun) which is profiling between 11m (+/- tide) and the surface. The probe is located close to the base of the underwater observatory. The depth where the sensor was positioned at a certain time is displayed in the lower graph as variable "#ctd_181:pressure".

Maps



- Map visualization and composition of data products
- Maintaining world base maps in different projections
- Providing standard products, e.g. chloro-phyll a and sea ice

Data Publication

PANGAEA.

Data Publisher for Earth & En

Citation:

Kaleschke, Lars; Nicolaus, Marcel; Maas
(2017): Snow height on sea ice and sea i
measurements from buoy 2015S27, dep
Norwegian Young sea ICE cruise N-ICE 2
Institute, Helmholtz Center for Polar and Mar
PANGAEA, https://doi.org/10.1594/PA

In: **Nicolaus, Marcel; Hoppmann, Mari**
Hendricks, Stefan; Katlein, Christian;
Nicolaus, Anja; Rossmann, Leonard; S
Schwegmann, Sandra; Langevin, Dani
Annekathrin (2017): Snow height and a
Alfred Wegener Institute, Helmholtz Center for
https://doi.org/10.1594/PANGAEA.87

Always quote above citation when using data! You can do

RIS Citation | BibTeX Citation | Text Citation | Facebook | T

Abstract:

Snow height was measured by the Snow Depth Buoy 2
Norwegian Young sea ICE cruise (N-ICE 2015) project. T
place and time between 23 Apr 2015 and 09 Jun 2015 i
sonar measurements representing the area (approx. 1
barometric pressure, air temperature, and an internal i
ablation continues into the sea ice. Thus, these measur

- Data archiving and publication including curation and harmonization
- Linking with articles, platforms and expeditions
- Semi-automatic data flows when using O2A

Data Publication

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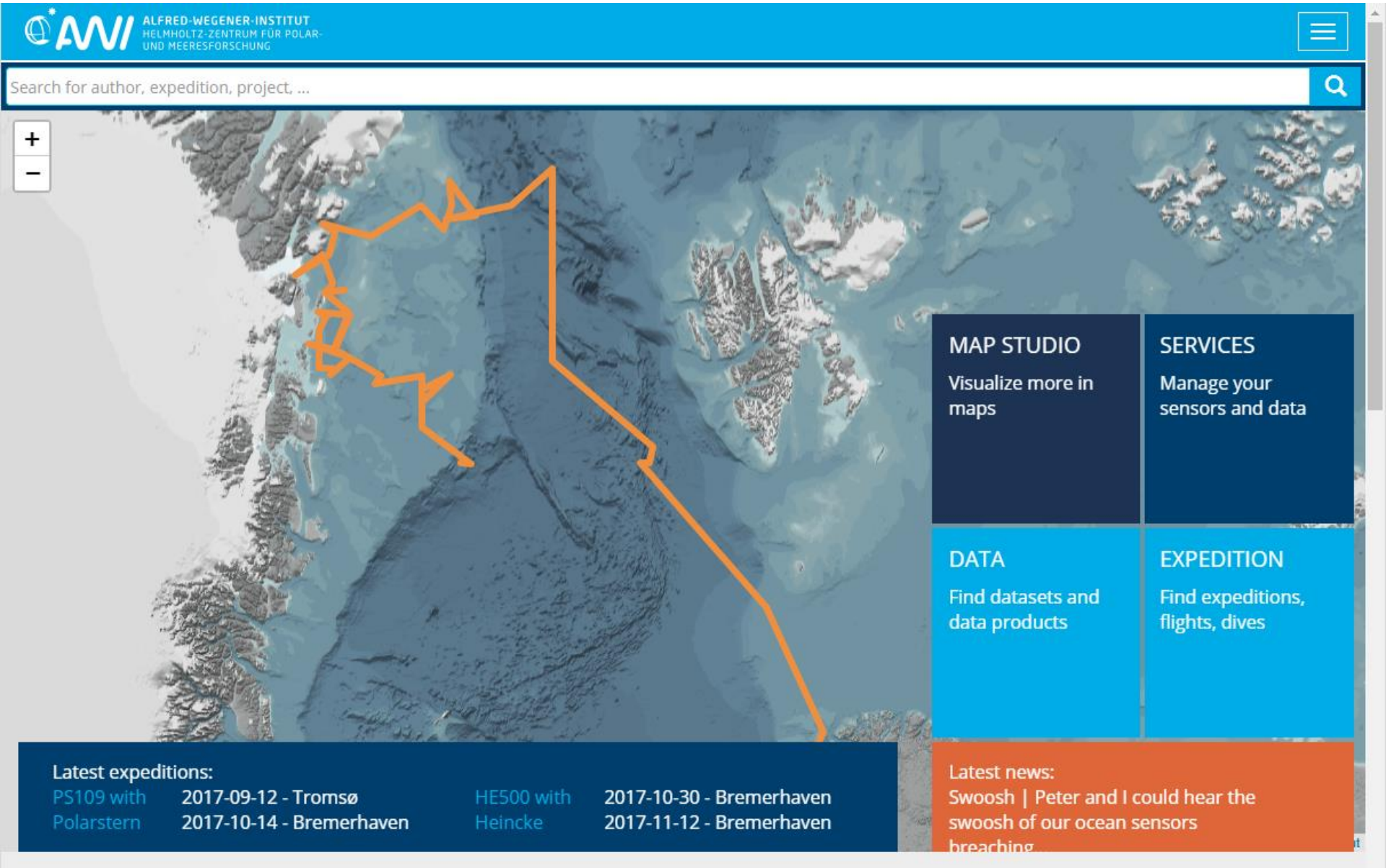
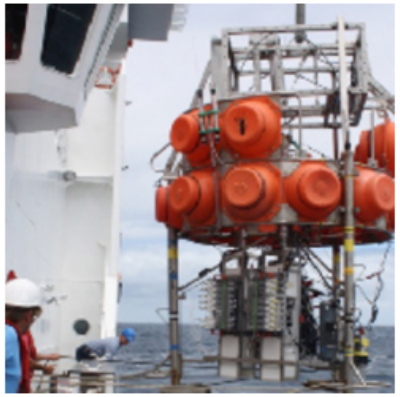
Portal – data combined



COLLECTIONS

Explore data and products thematically grouped



FRAM - FRontiers in Arctic Marine Monitoring

Large-scale Ocean Observation Infrastructure designed to support various types of long-term time series observations in the Arctic Ocean

Show next / previous

NEAR REAL TIME DATA

Near real time data is presented in hourly averages and no quality control is applied.

Air temperature

18.10 °C	14.20 °C	-5.35 °C
Polarstern	Heincke	Neumayer III

Water temperature

9.52 °C	14.26 °C
Polarstern	Heincke

LATEST PUBLICATIONS

Datasets, publications and reports from AWI repositories

Publish your data

Dataset

Jessen, Gerdhard L et al.

Biogeochemical measurements of sediments collected in the Black Sea during the MSM15/1 cruise in 2010 (2017)

Article

Fortelius, Carl et al.

New methodologies to observe wind gusts: research aircraft and Doppler lidar measurements (3201)

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Boebel, Olaf

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hdl:10013/epic.51616

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hdl:10013/epic.51699

1523	367700	39392	1691
EXPEDITIONS	DATASETS	PUBLICATIONS	REPORTS

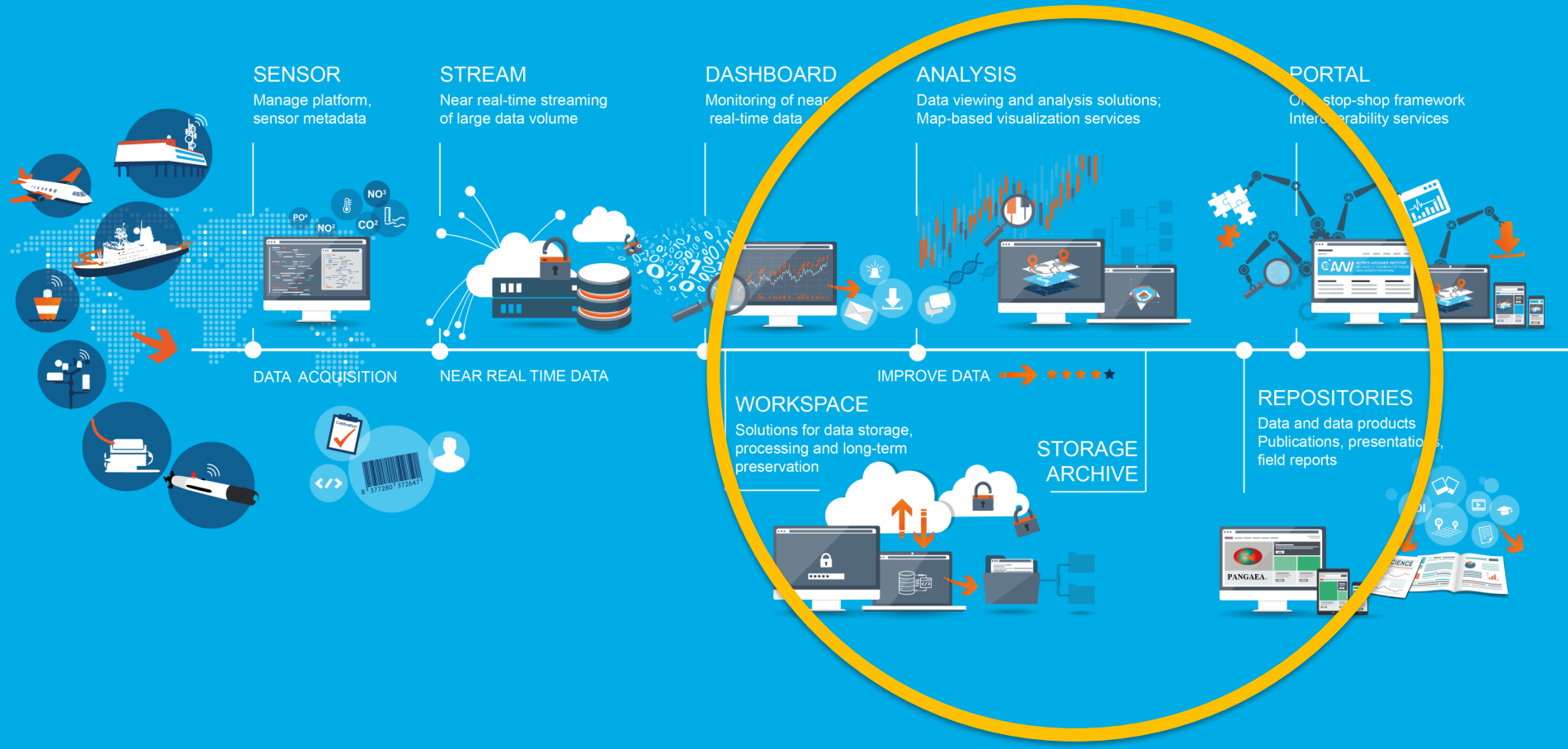
SENSOR

DASHBOARD

WORKSPACE

MAP

Data Flow Framework



Current work

- Developing a science community workspace for data sharing and data analyses within the **Helmholtz Data Federation** (HDF)
- State-of-the-art storage, replicated between Bremerhaven and Potsdam
- User-friendly “one-click” compute solutions with virtual machines and containers
- Hadoop big data analysis based on Hortonworks data flow and data platform
- Raster data management and analysis with rasdaman

Resources

- Solutions need manpower for data **curation**, **organization** and technology **development** and **maintenance**

- 4.5 funded through FRAM
- 3.0 funded for PANGAEA developments – offers available
- 5.0 funded through HDF – offers available
- plus permanent staff

- Still gaps for ingest, PANGAEA curation, and further developments e.g. of SENSOR

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