

O2A - AWI's data flow framework

Dr. Christian Schäfer-Neth
Alfred-Wegener-Institut
Helmholtz-Zentrum für Polar- und Meeresforschung

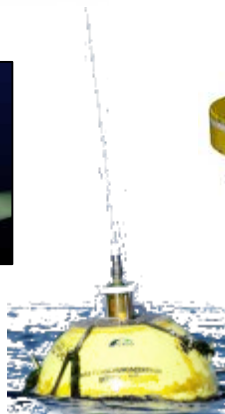
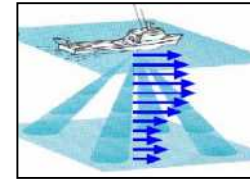
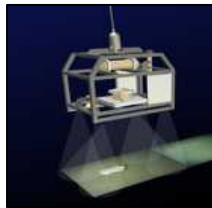
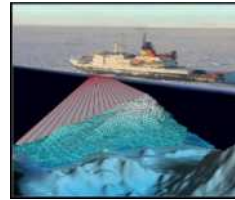
Data Flow Framework from Sensor **O**bservations **to A**rchives

Ideas, Concepts & Realisation by:

Peter Gerchow
Roland Koppe
Ana Macario
Steven Rehmcke
Antonie Haas
Andreas Walter
Christian Schäfer-Neth

Mass Data & Storage
Software Engineering
Web Servers
SensorML
Geographic Information Systems
GIS Applications
Databases & Storage

Variety of sensors and platforms



... Challenges ...

Different data types,
amounts,
rates



offline, database
TB / flight



offline, binary
GB / cruise



realtime, textual
kB / day



Different modes and requirements regarding

- Transfer / File formats
- Monitoring / Quality assessment
- Processing / Analysis / Visualisation
- Archival
- Publication / Portals / Journals

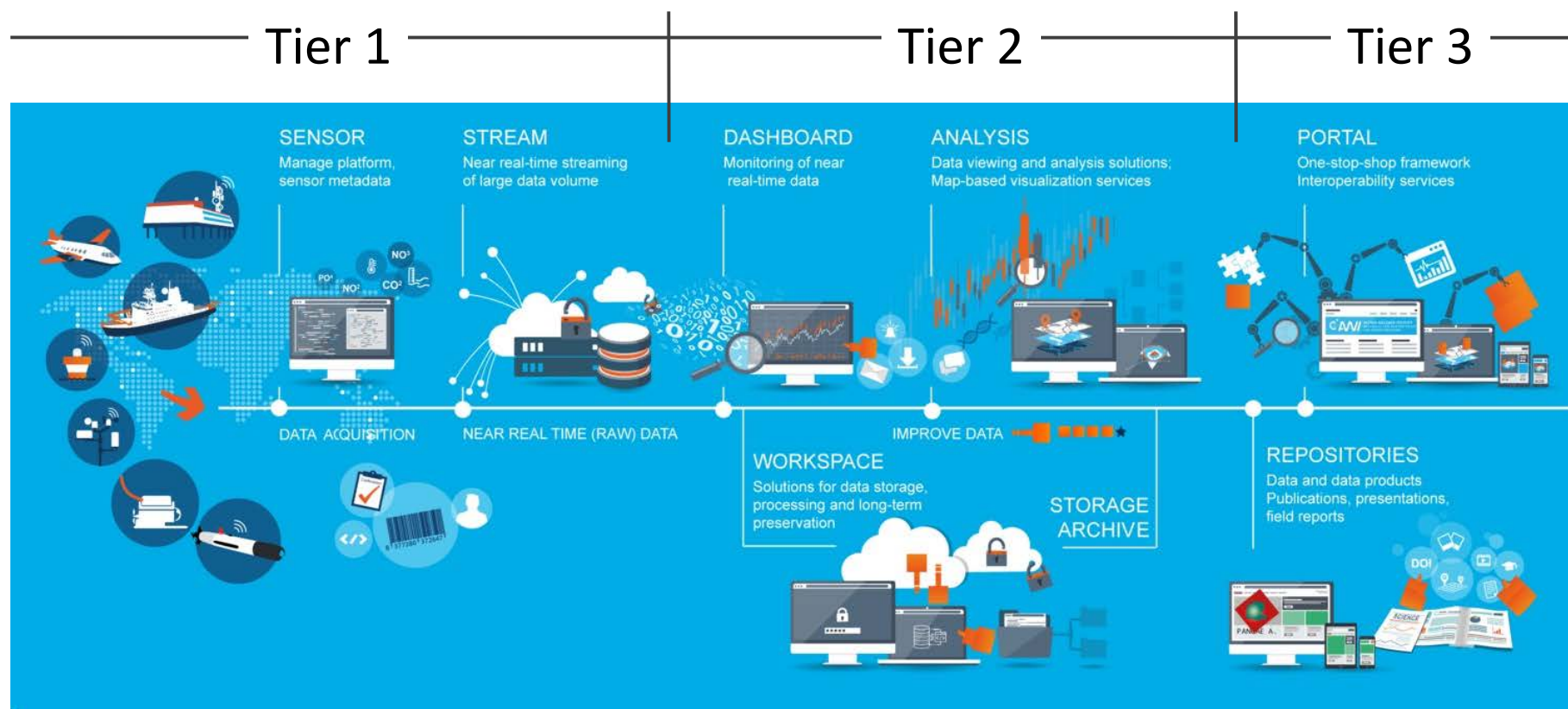
On all levels: Documentation / Metadata

But:

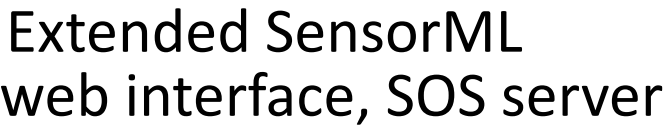


**Basically,
all scientists
do need similar
tools to achieve
similar goals...**

Generalized building blocks – flexible workflow



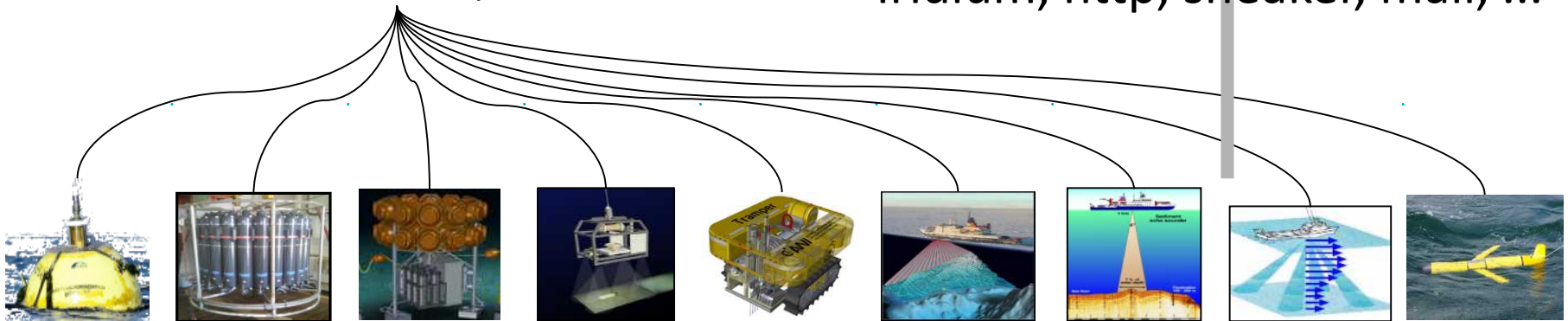
sensor.awi.de



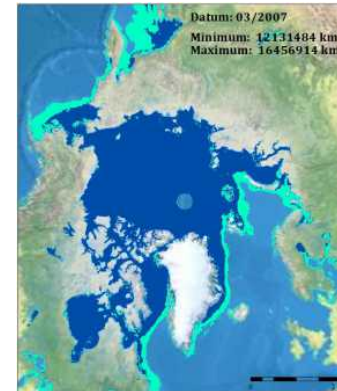
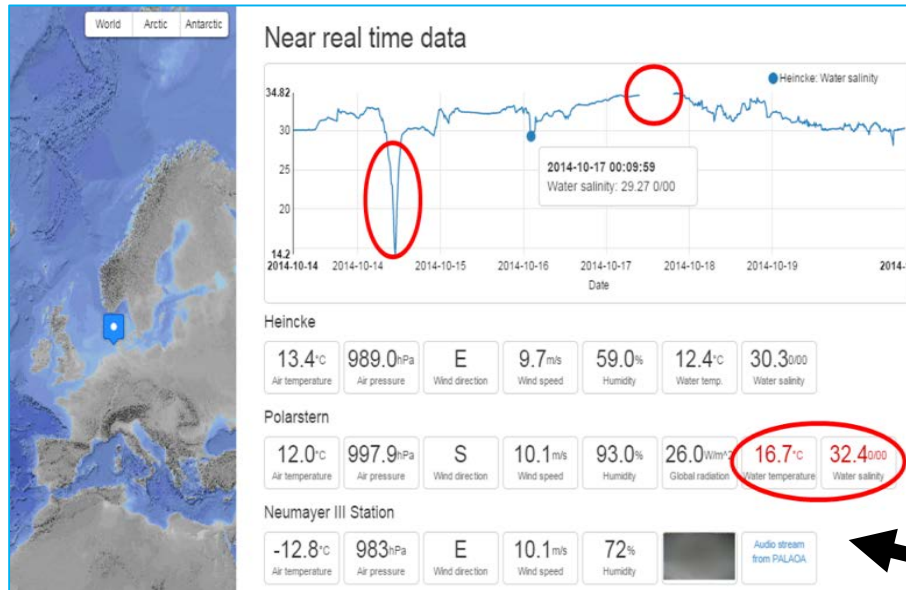
offline



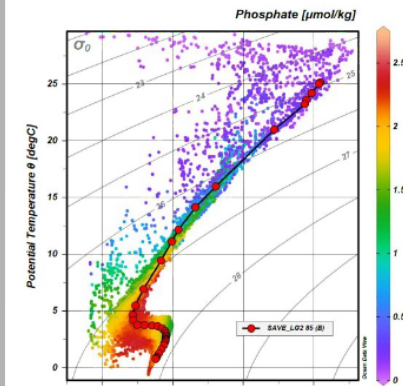
Iridium, http, sneaker, mail, ...



Monitoring, processing, analysis, archive



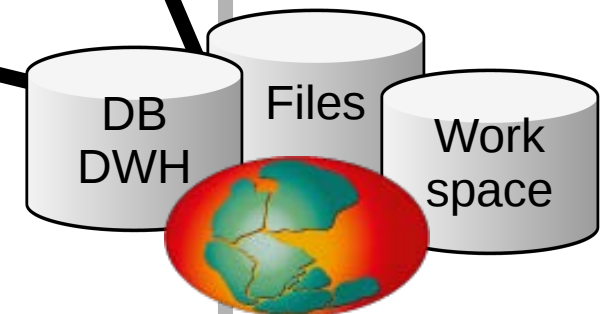
GIS



ODV

Analysis

Customizable dashboards
Monitoring
Alert functionality
Direct download of NRT data



Tier 3



Discovery, access, publication

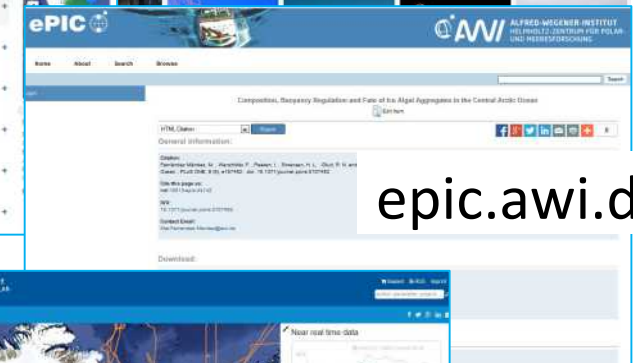
pangaea.de



manida.awi.de



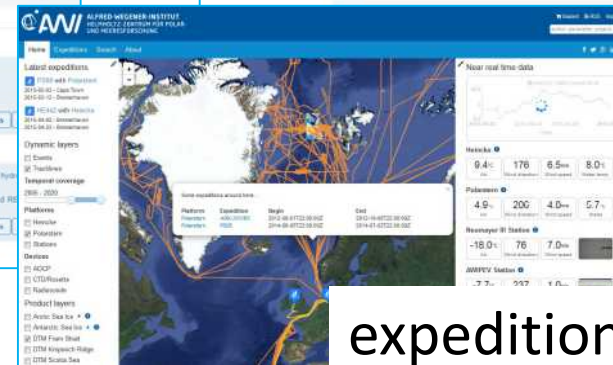
epic.awi.de



maps.awi.de



expedition.awi.de



Metadata standards

- OGC SensorML
- NERC Vocabulary Server V 2.0 / SeaDataNet
- OAI-PMH, ISO19139

Metadata contents

- Platform – Cruise – Event – Device – Sensor
- Parameter value thresholds
- Calibration, Deployment, Recovery, ...
- Documentation: manuals, fact sheets, ...

... Under the Hood



Storage

- Oracle HSM + dedicated file and compute server
- PostgreSQL, MySQL, SAP ASE, Infobright, PostGIS
- ArcGIS for Server + GeoServer (raster data)

Software

- Java, JavaScript, HTML5, jQuery, Leaflet, D3.js

Visualisation and analysis

- OGC compliant WMS / WFS, REST services; JSON + CSV

NRT Example, Tier 1



sensor.awi.de

1 Tree View Table View Device Store Search

Platforms
Show 25

Platforms

- Aircraft
- Buoy
- Laboratory
- Mooring
- Satellite
- Station
- Towed Systems
- Vehicle
- Vessel**

Showing 1 to 9 of 9 entries

2 Tree View

Platforms -> Vessel
Show 25 entries

Info	Device (Short Name)
	Polarstern (Polarstern)
	Heincke (Heincke)
	Mya II (Mya-II)
	MS Helgoland (MS_Helgoland)

Showing 1 to 4 of 4 entries

3 Tree View Table View

Platforms -> Vessel -> Polarstern
Show 25 entries

Info	Device (Short Name)
	Thermosalinograph Bow (TSB)
	Weather Station (Weather)
	Ferrybox (FB_PS)
	pCO2 Analyser (pCO2)
	Thermosalinograph Keel (TSK_SBE21)

4 Tree View Table View

Platforms -> Vessel -> Polarstern -> Thermosalinograph
Show 25 entries

Info	Device (Short Name)
	Temperature Keel, Water (SBE38)

Showing 1 to 1 of 1 entries



NRT Example, Tier 1



Temperature Keel, Water

Overview Contacts Actions Parameters

ID: 88

Parent: Thermosalinograph Keel

Device URN: vessel:polarstern:tsk_sbe21:sbe38

Short Name: SBE38

Long Name: Temperature Keel, Water

Collections:

Description:

Serial:

Manufacturer: Seabird

AWI 4 Tree View Table View

Platforms -> Vessel -> Polarstern -> Thermosalinograph

Show 25 entries

Info	Device (Short Name)
	Temperature Keel, Water (SBE38)

Temperature Keel, Water

Overview Contacts Actions Parameters Resources Properties

Show 25 entries

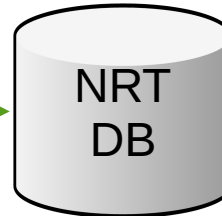
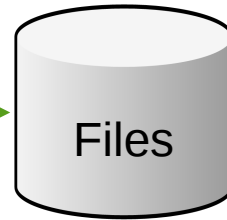
ID	Name	Sensor Output Type
412	water temperature	temperature, water

Showing 1 to 1 of 1 entries

NRT Example, Tier 2



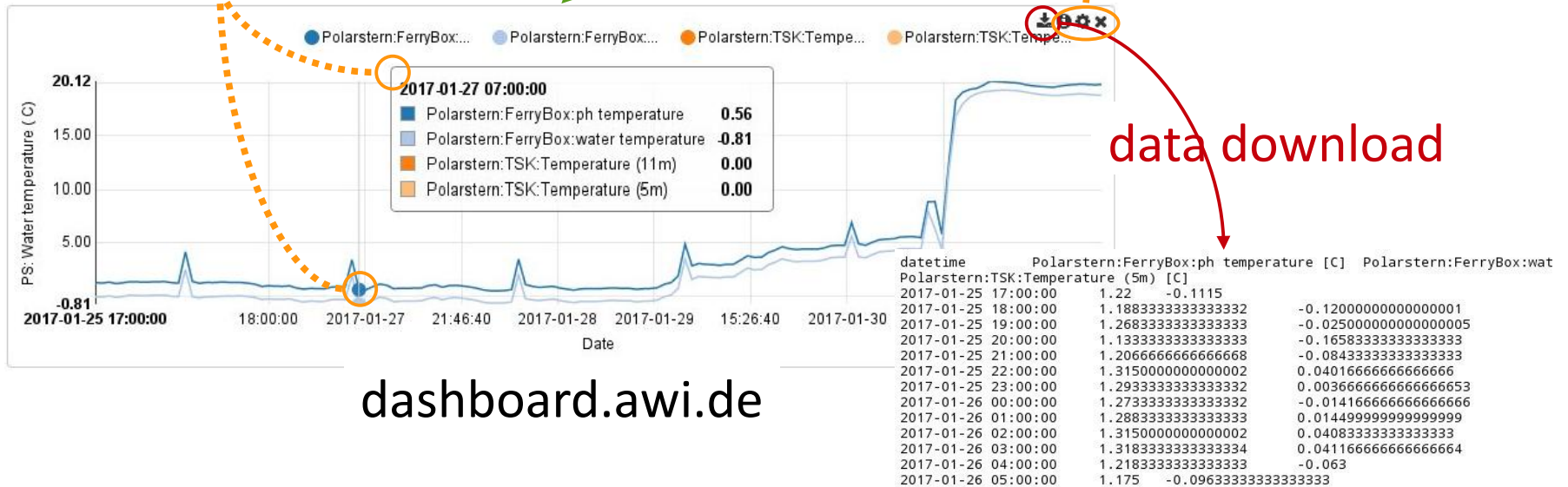
ID:	88
Parent:	Thermosalinograph Keel
Device URN:	vessel:polarstern:tsk_sbe21:sbe38
Short Name:	SBE38
Long Name:	Temperature Keel, Water



/hs/datex/ingest/vessel/ps/dship/...

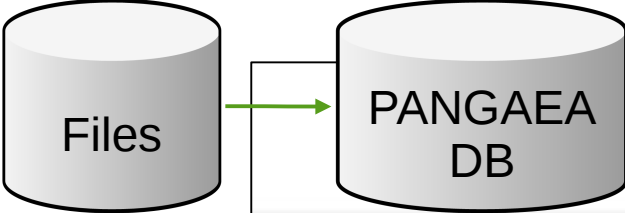
slider and
data display

configure
layout and
contents



dashboard.awi.de

NRT Example, Tier 3



Files → PANGAEA DB



PANGAEA.

ALL TOPICS

Filter by...

Dataset Author

- Rohardt, Gerd (13)
- König-Langlo, Gert (8)
- Bakker, Dorothee C E (2)
- Knust, Rainer (2)
- Pfeil, Benjamin (2)
- Stein, Ruediger (2)
- Boebel, Olaf (1)
- Boetius, Antje (1)
- [more...](#)

Dataset Publication Year

- ☒ 2016 (24)
- ☐ 2015 (10)

24 datasets found on search for »Thermosalinograph pola...«

< 1 2 3 >

- Peeken, I; Rohardt, G (2016):** Continuous thermosalinograph cruise track PS92
Related to: **Peeken, I (2016):** The Expedition PS92 of the Research Vessel *Berichte zur Polar- und Meeresforschung = Reports on Polar and M*
Size: 7104 data points
[doi:10.1594/PANGAEA.863234](#) - Score: 1.08 - [Similar datasets](#)
- Soltwedel, T; Rohardt, G (2016):** Continuous thermosalinograph cruise track PS93.2
Related to: **Soltwedel, T (2015):** The Expedition PS93.2 of the Research Vessel *Berichte zur Polar- und Meeresforschung = Reports on Polar and M*
Size: 3482 data points
[doi:10.1594/PANGAEA.863230](#) - Score: 1.08 - [Similar datasets](#)



NRT Example, Tier 3





PANGAEA.
Data Publisher for Earth & Environmental Sciences

Citation: **Peeken, Ilka; Rohardt, Gerd (2016):** Continuous thermosalinograph oceanography along POLARSTERN cruise track PS92. *Alfred Wegener Institute, Helmholtz Center for Polar and Marine Research, Bremerhaven*, doi:10.1594/PANGAEA.863234

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Related to: **Peeken, Ilka (2016):** The Expedition PS92 of the Research Vessel POLARSTERN to the Meeresforschung = Reports on Polar and Marine Research, **694**, 153 pp, doi:10.2312/Bz

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

Coverage: **Median Latitude:** 77.997646 * **Median Longitude:** 11.911219 * **South-bound Latitude:** 57. bound Latitude: 82.212948 * **East-bound Longitude:** 21.670834
Date/Time Start: 2015-05-20T15:20:00 * **Date/Time End:** 2015-06-27T16:10:00
Minimum DEPTH, water: 11 m * **Maximum DEPTH, water:** 11 m

Event(s): **PS92-track** * **Latitude Start:** 53.563960 * **Longitude Start:** 8.548130 * **Latitude End:** 7. 2015-05-19T00:00:00 * **Date/Time End:** 2015-06-28T00:00:00 * **Campaign:** PS92 (ARK cruise track measurements (CT))

Comment: Version 2, 2016-10-20

Parameter(s):

#	Name	Short Name	Unit	Principal Investigator	Method
1	DATE/TIME	Date/Time		Rohardt, Gerd	
2	LATITUDE	Latitude		Rohardt, Gerd	
3	LONGITUDE	Longitude		Rohardt, Gerd	
4	DEPTH, water	Depth water	m	Rohardt, Gerd	
5	Temperature, water	Temp	°C	Rohardt, Gerd	Thermosalinograph
6	Salinity	Sal		Rohardt, Gerd	Thermosalinograph

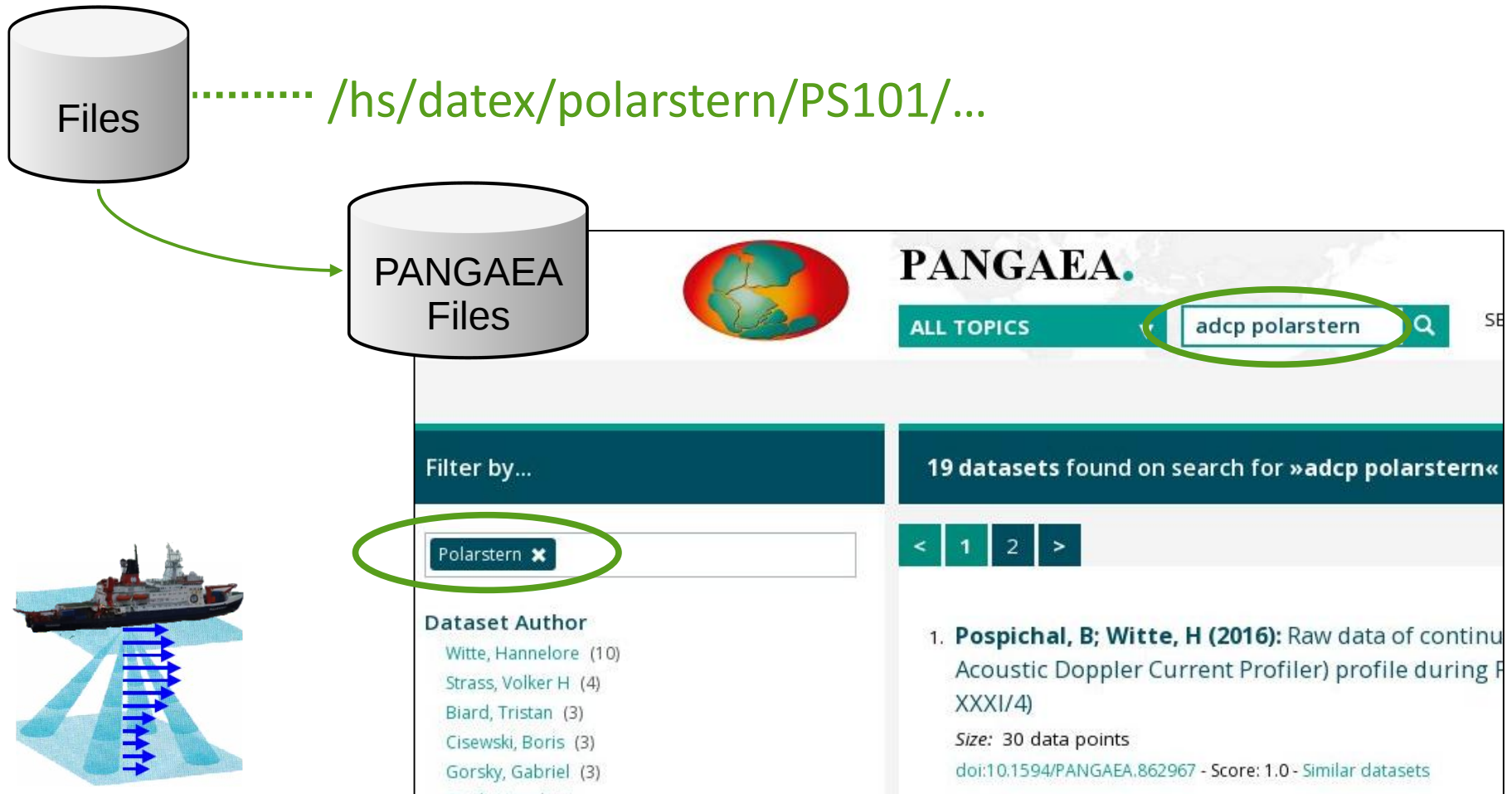
License:  **Creative Commons Attribution 3.0 Unported**

Size: 7104 data points

Download Data
[Download dataset as tab-delimited text \(use the following character encoding: UTF-8; Unicode \(PANGAEA\)\)](#)
[View dataset as HTML \(shows only first 2000 rows\)](#)

Download Data
[Download dataset as tab-delimited text \(use the following character encoding: UTF-8; Unicode \(PANGAEA\)\)](#)

Non-NRT Example, Tier 3



Non-NRT Example, Tier 3



Download Data

Download dataset as tab-delimited text

View dataset as HTML

Data

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

1 ⓘ File name	2 ⓘ URL raw	3 ⓘ Content
PS98085_000000.ENR.tar	Link	raw binary data ENR-files in tar-archive
PS98085_000000.ENS.tar	Link	binary data after having been screened ENS-files in tar-archive
PS98085_000000.ENX.tar	Link	raw binary data in earth coordinates ENX-files in tar-archive
PS98085_000000.LOG.tar	Link	ASCII error data LOG-files in tar-archive
PS98085_000000.LTA.tar	Link	raw binary long-term averaged data LTA-files in tar-archive
PS98085_000000.N1R.tar	Link	raw ASCII NMEA data N1R-files in tar-archive
PS98085_000000.NMS.tar	Link	binary NAV data after having been screened NMS-files in tar-archive
PS98085_000000.STA.tar	Link	raw binary short-term averaged data STA-files in tar-archive
PS98085_000000.VMO.tar	Link	option settings data VMO-files in tar-archive
aux.tar	Link	auxiliary data AUX-files in tar-archive

http://hs.pangaea.de/adcp/PS98/PS98085_000000.ENR.tar

Read on



EGU 2015

- Poster: <http://hdl.handle.net/10013/epic.44872>

OCEANS 2015

- Poster: <http://hdl.handle.net/10013/epic.46020>
- Paper: <http://dx.doi.org/10.1109/OCEANS-Genova.2015.7271657>

RDIF – Raw Data Ingest Framework, EUDAT 2014

- <http://hdl.handle.net/10013/epic.44298>

Or

- Christian.Schaefer-Neth@awi.de