

First lessons from the implementation of a biosample management system

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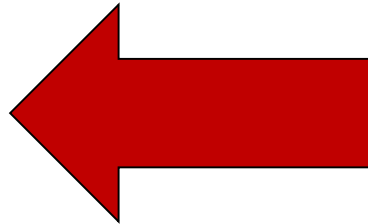
Why do we need a central sample management system?

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Making research F.A.I.R. = Making sample collections F.A.I.R.

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Not F.A.I.R.

Metadata is key

Sampling

- What ?
- Where ?
- When ?
- By whom ?
- How ?

Sampling

- What ?
- Where ?
- When ?
- By whom ?
- How ?

Downstream

- How treated ?
- How analysed ?
- Data deposition ?
- Publication ?
- Are there other samples?
- Where stored ?

Sampling

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- When ?
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Downstream

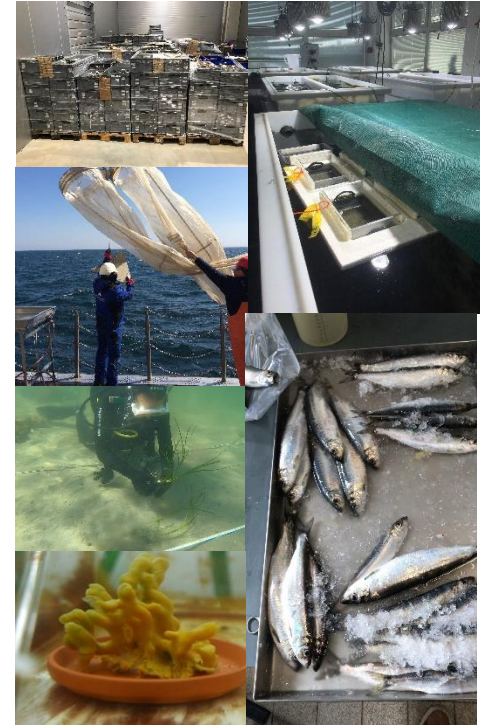
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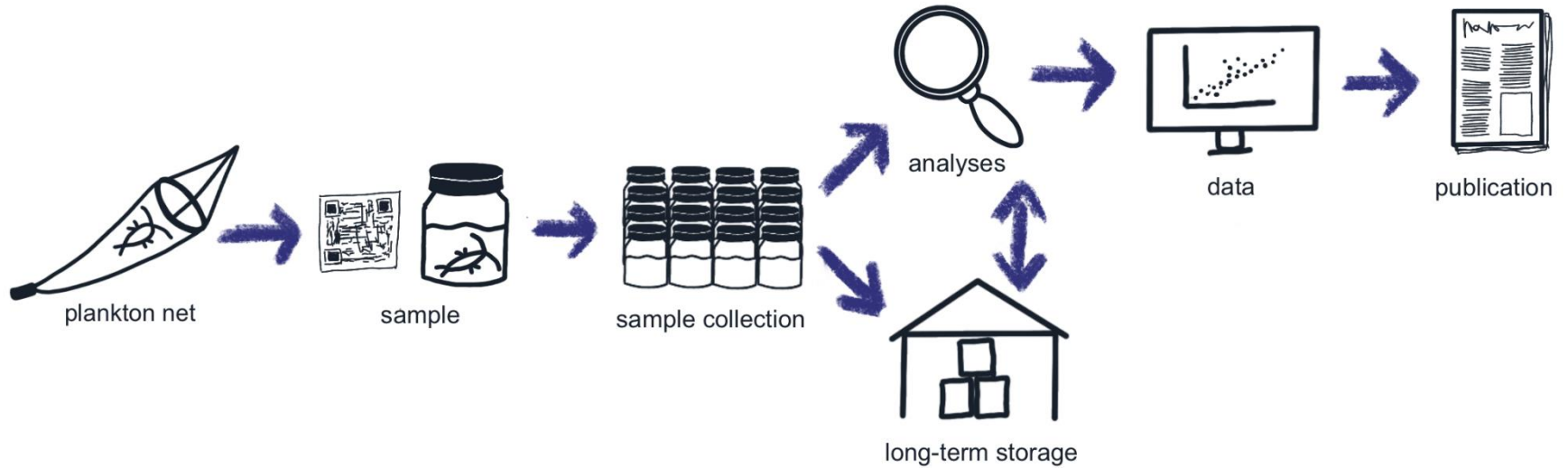
Biosample
Information
System

Biosample ≠ Biosample ≠ Biosample

- Selected ten Lighthouse projects, covering different disciplines and working groups of the RDs Marine Ecology and Biogeochemistry
- Developend metadata and sample input files for various samples types
- Exchange with other members in AG samplemanagment
- Describe and publish SOPs for import into BIS

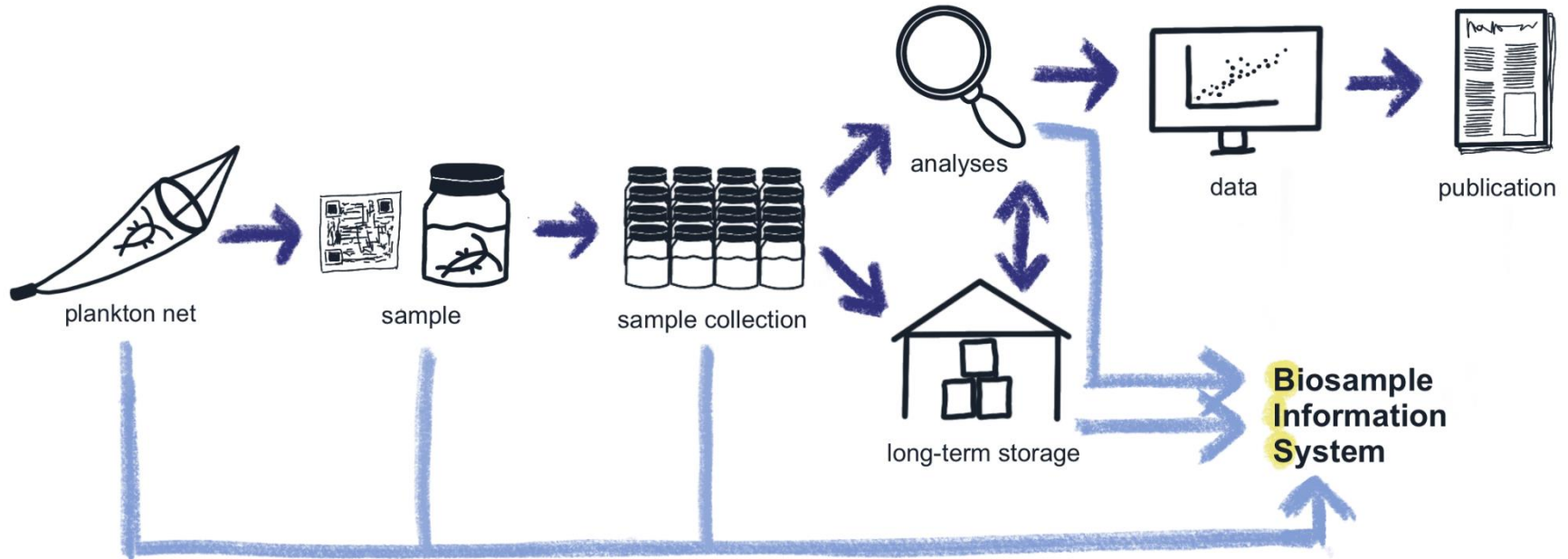


Workflows and import to BIS



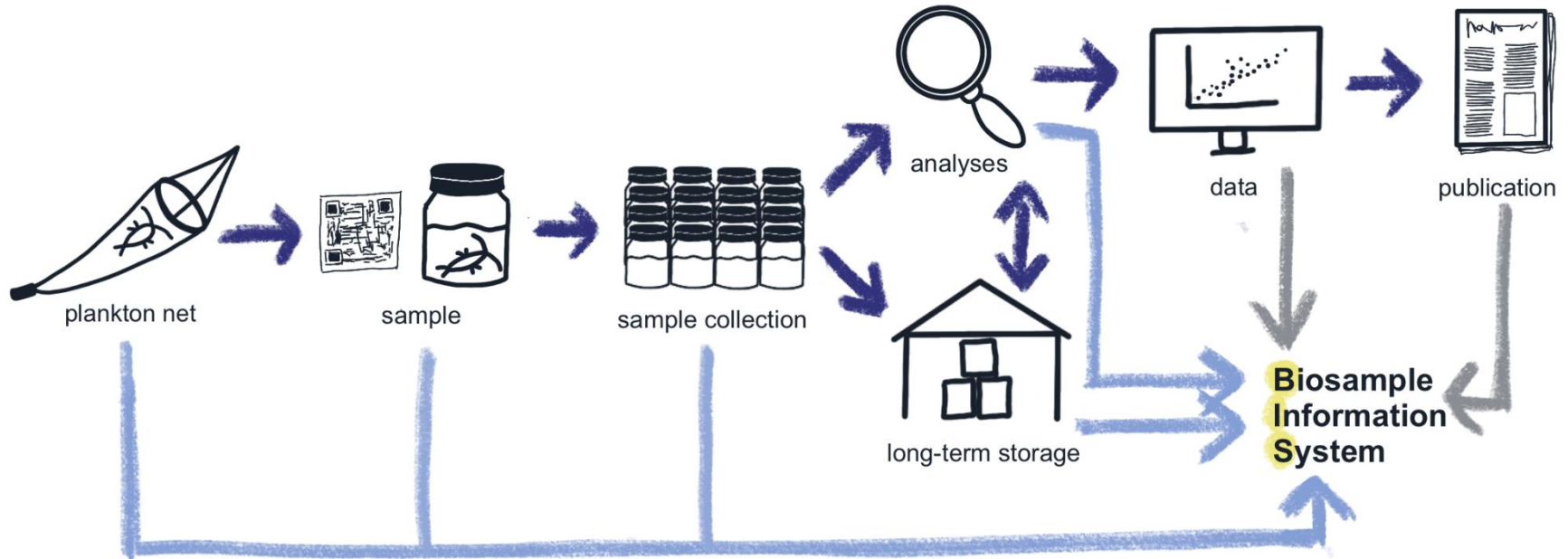
workflow

Workflows and import to BIS



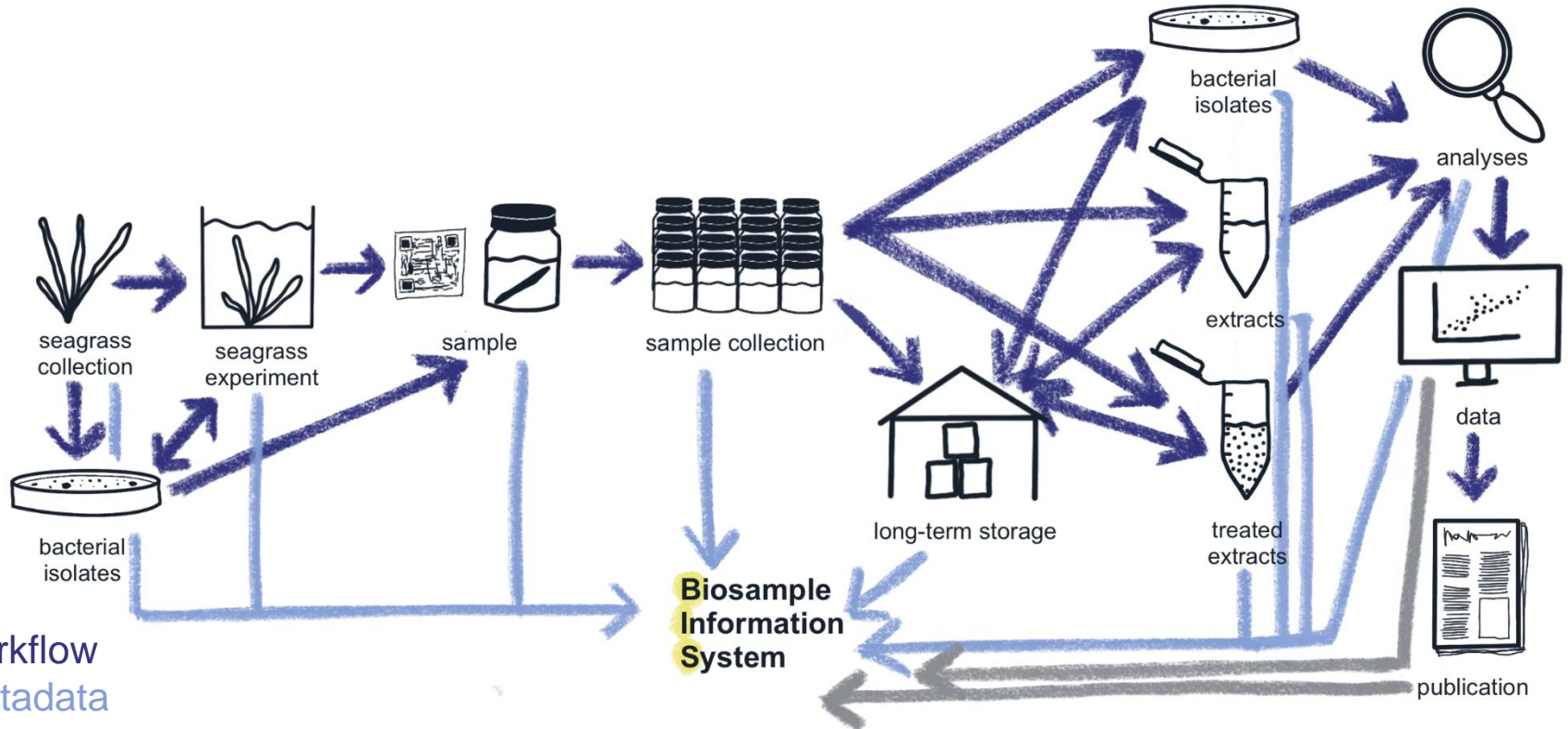
workflow
metadata

Workflows and import to BIS



workflow
metadata
external databases

Workflows and import to BIS



Challenges



Labellinlyroej



Metadata availability



Scientist's availability

Nagoya-Protocol on access to genetic resources

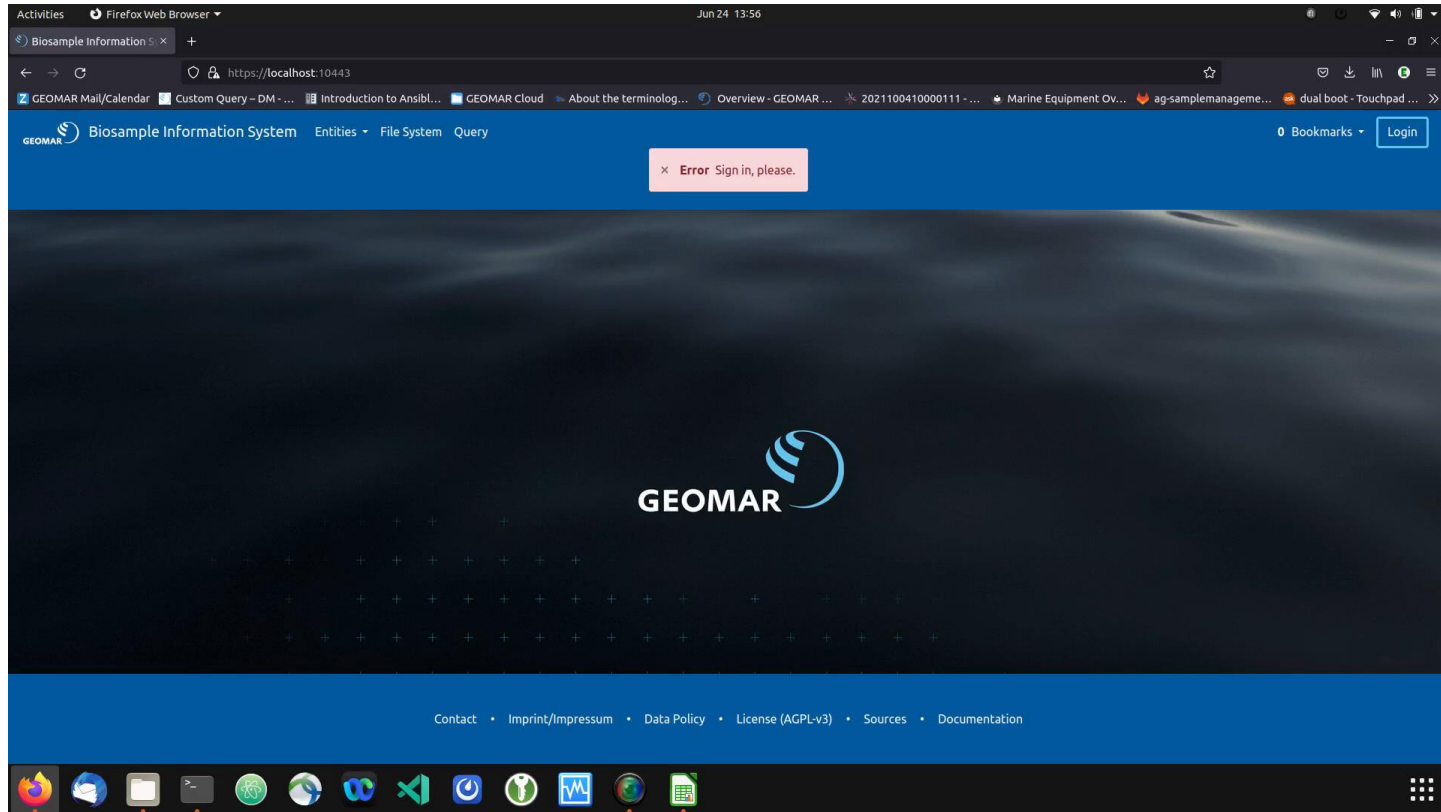
- For every sample collected in a non-german EEZ after 12.10.2014 a waiver from the national focal point of the country in question is needed
- Nagoya case number and information on possible restrictions (yes/no) is deposited in BIS
- Nagoya coordinator can produce waiver upon request and inform about possible restrictions



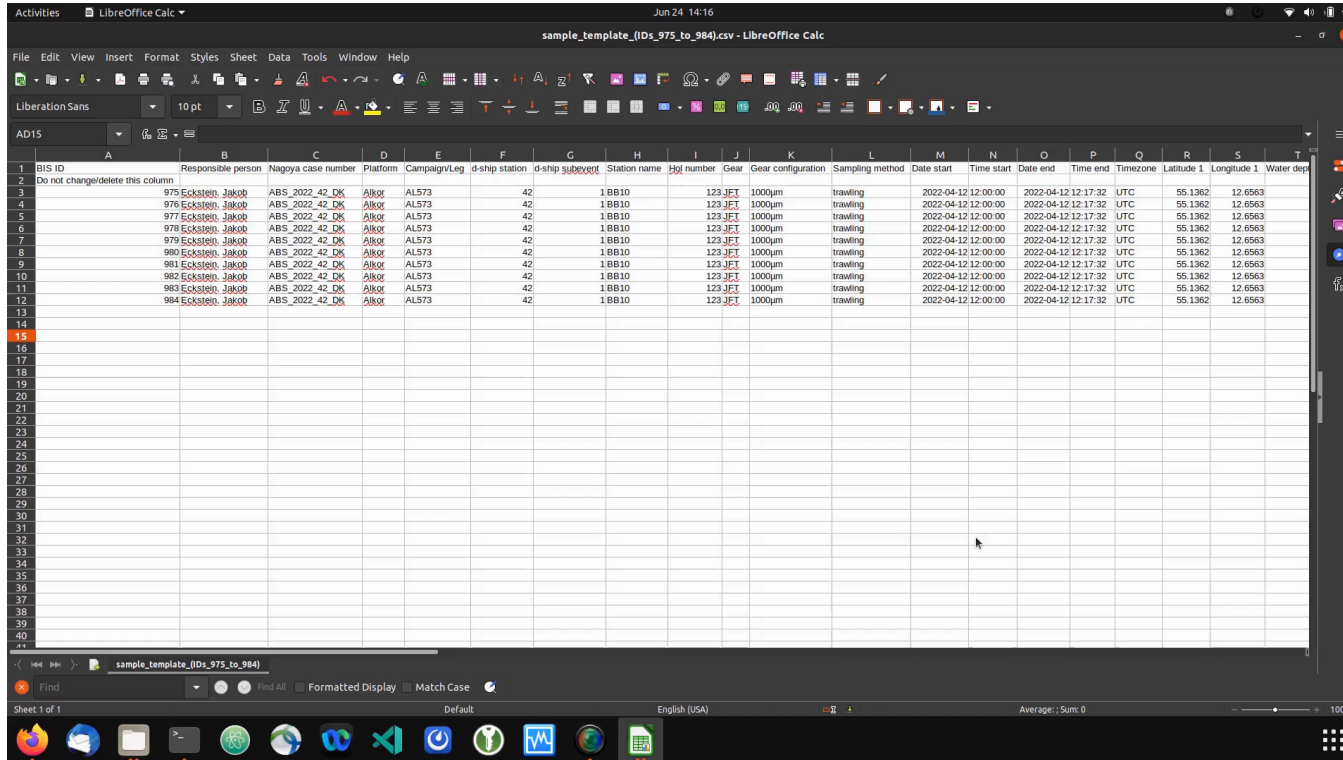
Dr. Jan Dierking
nagoyaprotokoll@geomar.de

- Based on CaosDB – An Open and Scientific Database:
 - Flexible Database Backend
 - WebUI (Web User Interface)
 - Different APIs (python, C++, julia, Matlab, ...)
 - Open Source (AGPL v3)

Demo: Sample Import 1

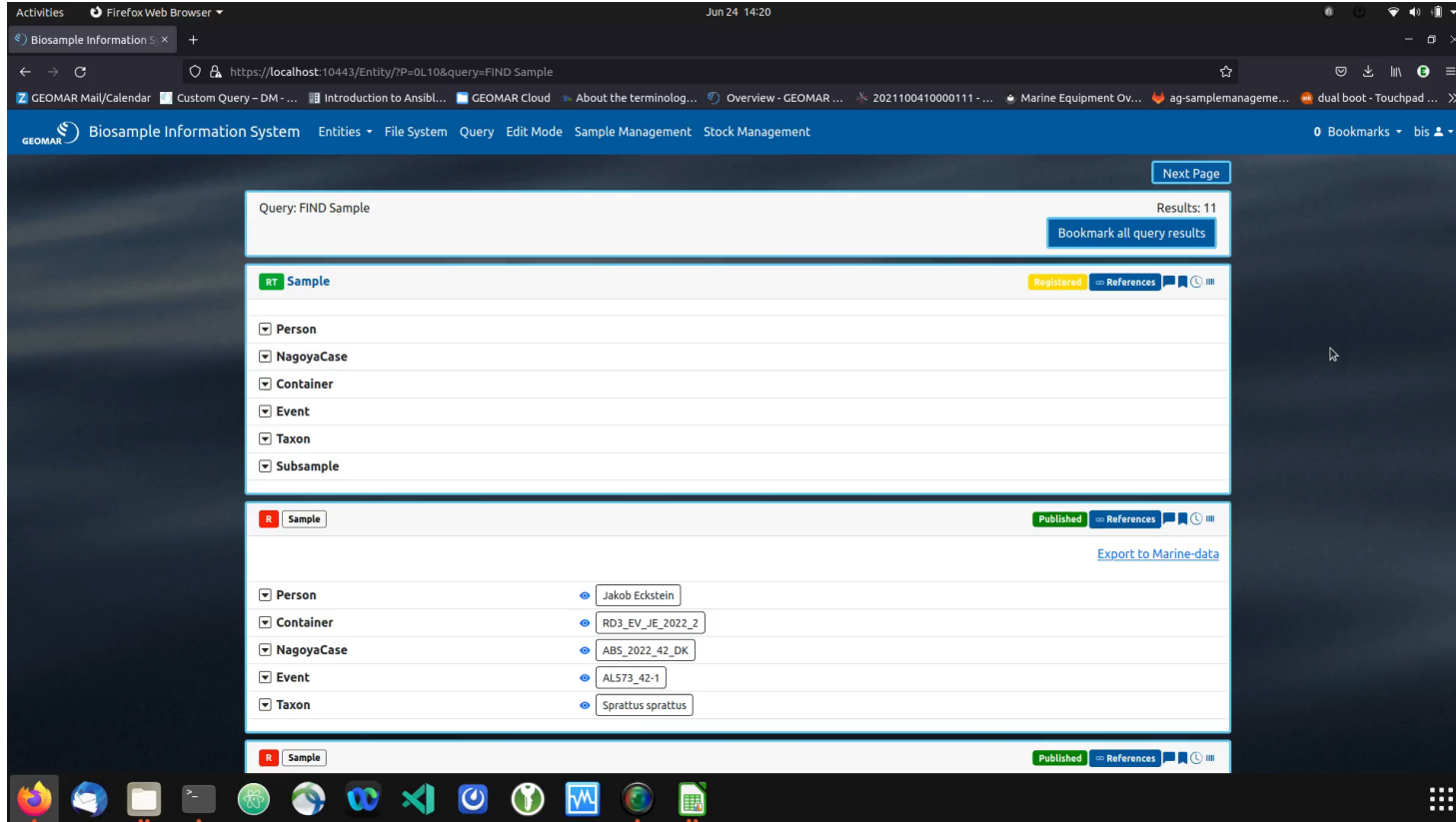


Demo: Sample Import 2



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
	BIS ID	Responsible person	Nagoya case number	Platform	Campaign/Leg	d-ship station	d-ship subport	Station name	Hpl number	Gear	Gear configuration	Sampling method	Date start	Time start	Date end	Time end	Timezone	Latitude 1	Longitude 1	Water depth
3	Do not change/delete this column																			
4	975	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
5	976	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
6	977	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
7	978	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
8	979	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
9	980	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
10	981	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
11	982	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
12	983	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
13	984	Eckstein, Jakob	ABS_2022_42_DK	Alkor	AL573	42	1.BB10	123.JET	1000µm	trawling	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	2022-04-12 12:00:00	UTC	55.1362	12.6563			
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Demo: Sample Export



Activities Firefox Web Browser Jun 24 14:20

Biosample Information System

Query: FIND Sample Results: 11

Bookmark all query results

RT Sample Registered References

- Person
- NagoyaCase
- Container
- Event
- Taxon
- Subsample

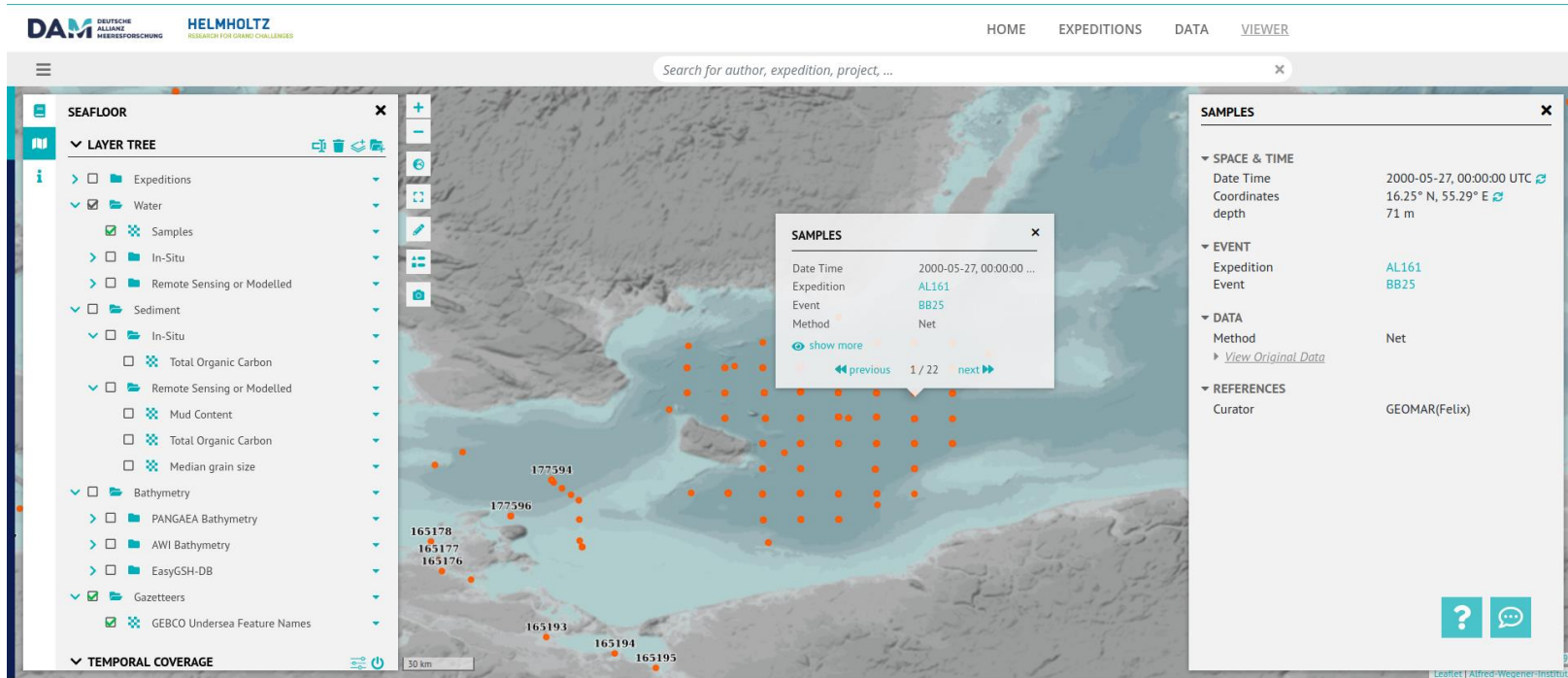
R Sample Published References

Export to Marine-data

- Person Jakob Eckstein
- Container RD3_EV_JE_2022_2
- NagoyaCase ABS_2022_42_DK
- Event AL573_42-1
- Taxon Sprattus sprattus

R Sample Published References

Demo: Sample on MarineData



The screenshot displays the MarineData web application interface. At the top, there are logos for DAM (Deutsche Allianz Meeresforschung) and HELMHOLTZ (Research for Grand Challenges), along with navigation links for HOME, EXPEDITIONS, DATA, and VIEWER. A search bar is present with the placeholder text "Search for author, expedition, project, ...".

The main interface is divided into several sections:

- SEAFLOOR**: A sidebar on the left containing a "LAYER TREE" with various data layers such as "Expeditions", "Water", "Samples", "In-Situ", "Remote Sensing or Modelled", "Sediment", "Bathymetry", and "Gazetteers".
- Map**: A central map showing a bathymetric view of the North Atlantic region. Numerous orange dots represent sample locations, with some labeled with IDs like 165178, 165177, 165176, 165193, 165194, 165195, 177594, and 177596. A 30 km scale bar is visible at the bottom left of the map.
- SAMPLES**: A popup window in the center-right of the map displaying details for a selected sample:
 - Date Time: 2000-05-27, 00:00:00 ...
 - Expedition: AL161
 - Event: BB25
 - Method: NetNavigation controls for "show more", "previous", "1 / 22", and "next" are also present.
- SAMPLES**: A sidebar on the right providing a summary of the selected sample's metadata:
 - SPACE & TIME**: Date Time (2000-05-27, 00:00:00 UTC), Coordinates (16.25° N, 55.29° E), and depth (71 m).
 - EVENT**: Expedition (AL161) and Event (BB25).
 - DATA**: Method (Net) and a link to "View Original Data".
 - REFERENCES**: Curator (GEOMAR(Felix)).

Lessons learned

- ‚Biosamples‘ are very diverse
- Managing them centrally can be pretty demanding
- To become FAIR, we still have to centralize biosample management
- Developing the Biosample Information System is possible

Resources and funding

- SOPs for data collection and labelling for BIS will be available soon
- Guest log-in to BIS available upon request (biosamples@geomar.de)
- Contact us biosamples@geomar.de
- CaosDB: <https://caosdb.org/>
- BIS: <https://git.geomar.de/dm/bis>

