Powering the European Marine Data Ecosystem

For a digital and green future

EMODnet
European Marine Observation and Data Network

Townhall:
EMODnet Best Practices and Interoperability

Co-Chairs: **Marie-Francoise Voidrot** (OGC) and **Conor Delaney** (EMODnet)

Townhall: EMODnet, Ocean Best Practices and Interoperability

Townhall introduction

- **Objectives:**

The primary objective of the Townhall is to **gather valuable stakeholder feedback and recommendations** regarding the **future evolution of EMODnet** content and services for the period up to 2030 and beyond.

This Townhall will foster a discussion on **data and metadata standardisation, harmonisation, flows and digital services best practices**. The session will gather **community recommendations on existing and emerging EMODnet best practices and how EMODnet can increase engagement with other regions worldwide to increase data interoperability for a Global Ocean Data Ecosystem**.

- **Reporting to Plenary:**

The insights and key messages obtained from the Townhall will be collated and presented to the Plenary on November 30th.

Townhall: EMODnet, Ocean Best Practices and Interoperability

Agenda

16:45-16:50 Townhall Introduction (5')

- **16:50-17:20 (20'): Presentations (4' each) on best practices on data products publishing and data services, and how to improve interoperability. Q&A (1-2 questions after each presentation), if needed for clarification purposes.**

  - **Conor Delaney**, EMODnet – technologies overview
  - **Marie-Francoise Voidrot**, OGC, OGC standards
  - **Frederic Leclercq**, VLIZ,EMODnet CP - OpenDAP
  - **Virgine Van Dongen-Vogels**, EuroGOOS, OBPS and EMODnet
  - **Pier Luigi Buttigieg**, AWI, semantics and publishing, OIH

- **17:20-17:55 (35'):** Open discussion in plenary
- **18:00: Closing of the Townhall**

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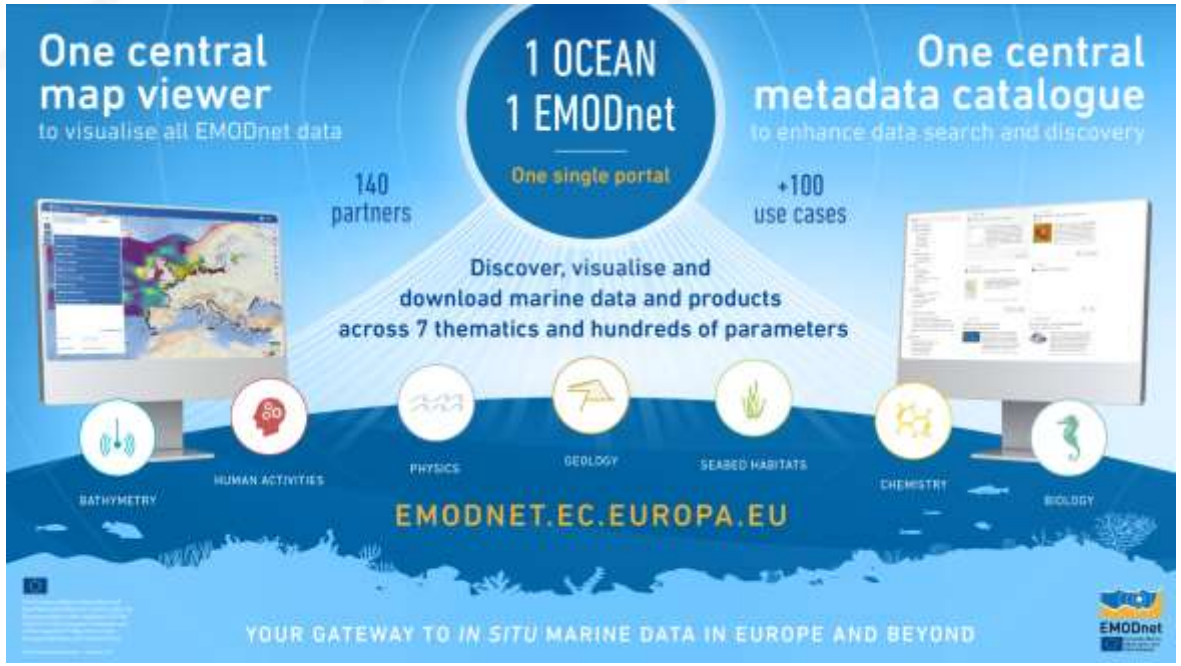
EMODnet, Ocean Best Practices and interoperability: An overview

Conor Delaney, EMODnet

EMODnet centralised 7 distinct portals into 1

EMODnet is a federated Spatial Data Infrastructure



Built on standards and best practices

Efficient use of time - Don't reinvent the wheel

Collaborative opportunities

Improved systems interoperability

Data comparability

Greater trust in data

Streamlined regulatory approval

Higher funding success

Ocean best practices

Ocean Best Practices of the International Oceanographic Data and Information Exchange (IODE)
Virginie van Dongen-Vogels

EMODnet centralised 7 catalogues portals into 1

EMODnet GeoNet catalogue depends on OGC Catalogue Services for the Web (CSW)

Map Viewer – JavaScript application

- OGC – WFS
- OGC – WMS
- OGC - WCS

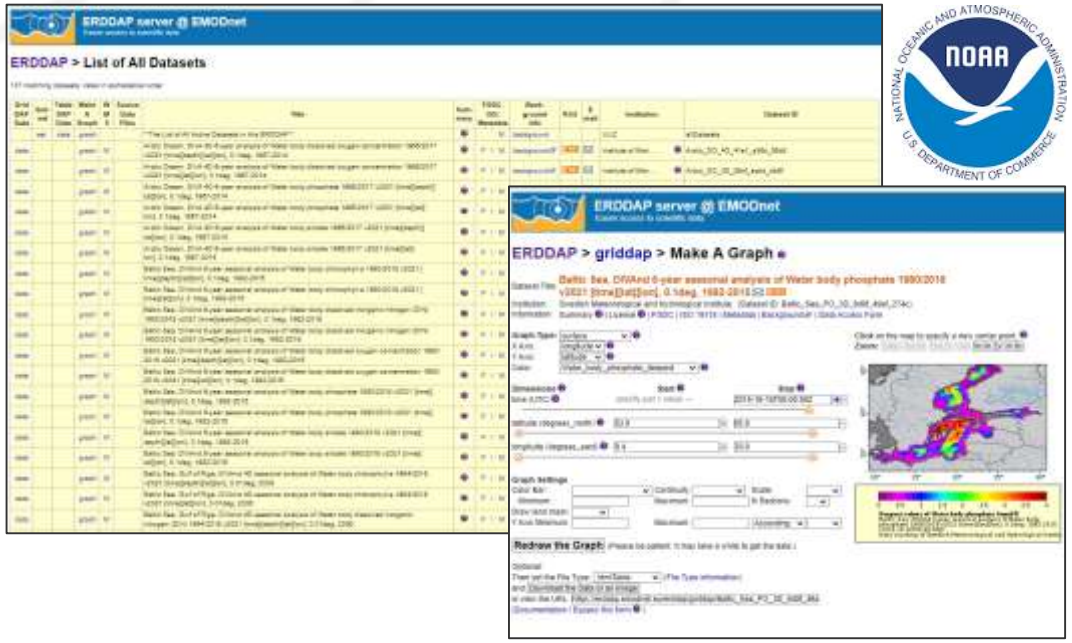
OGC – CSW

Federation of Geo services

Marie-Francois Voidrot from the ***Open Geospatial Consortium***

EMODnet follows best practises

Leverages Open-source Project for a Network Data Access Protocol



Frederic Leclercq from Flanders Marine Institute (***VLIZ***) to explain the benefits of using OPeNDAP?

Pier Liugi Buttigieg from ***Ocean Info Hub*** of IODE

British Oceanographic Data Centre (BODC) Controlled Vocabulary

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EMODnet, Ocean Best Practices and interoperability: The Open Geospatial Consortium

Marie-Francoise Voidrot, OGC

Townhall “EMODnet, Ocean Best Practices and interoperability’

Co Chair: Marie-Francoise Voidrot, OGC, Europe Director with the OGC Innovation Program

- Focus on initiatives related to Earth Observations and strongly involved in several initiatives of importance to GEO, the Group on Earth Observations, including the European projects ILIAD, E-SHAPE, and NextGEOSS. OGC representative to the GEO Program Board and Co-Chair of the GEOSS Infrastructure Development Task Team (GIDTT) and of the GEO Data Sharing and Data Management Working Group.

- Prior to joining OGC, Senior Project Manager at Meteo-France for numerous meteorological operational information systems for use by Meteo-France and by major customers in spatial, defense and aeronautical activities developing a global end-to-end view of information systems, from production to a large variety of community application activities.

The Open Geospatial Consortium - OGC

Speaker: Marie-Francoise Voidrot, OGC, Europe Director with the OGC Innovation Program

What is OGC?

A hub for thought leadership, innovation, and standards for all things related to location

Our Vision

Building the future of location with community and technology for the good of society

Our Mission

Make location information Findable, Accessible, Interoperable, and Reusable (FAIR)

Our Approach

A proven collaborative and agile process combining consensus-based standards, innovation project, and partnership building

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ogc.org

Location information and the Standardization bodies landscape

- The Open Geospatial Consortium (OGC) is a not-for-profit international consensus organization comprised of over 550 industry, government, academic, research, and not-for-profit organizations. OGC standards and best practices enable seamless discovery, sharing, integration, and application information in a **location context** across networks, systems, enterprises, organizations, and jurisdictions.

- OGC cooperates with ISO, in particular via ISO/TC211, but also with IEEE, IHO, WMO, UNGGIM, JRC/INSPIRE, W3C….as needed

ogc.org

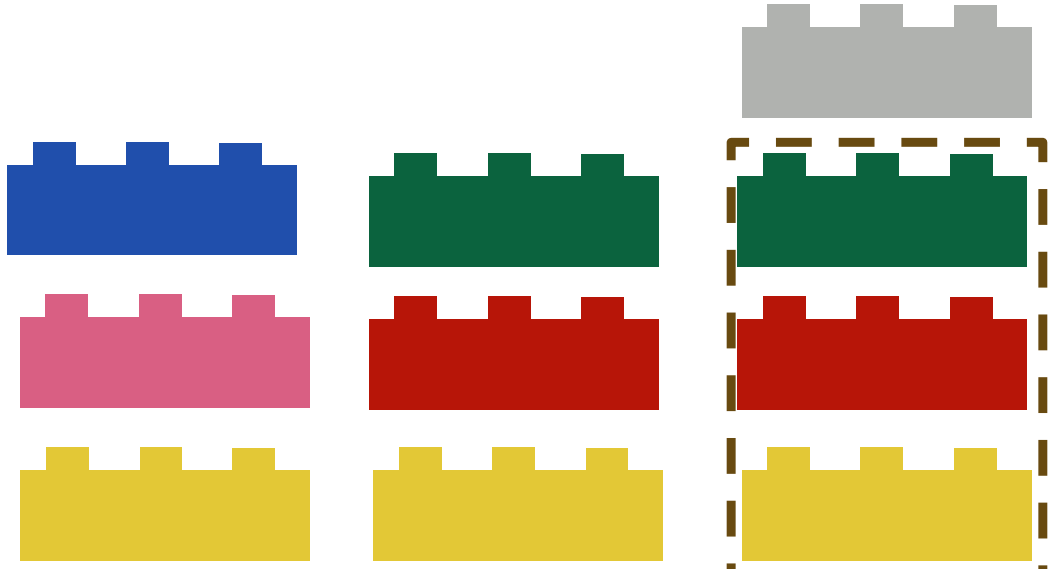
Ongoing major evolution

From Web Services Standards to APIs relying on modular Building Blocks

Specific building blocks

Flavors of same building block

Same building block



Schema1, Conformance classes 1, API 1, … Standard 1,

Schema2, Conformance classes 2, API 2, … Standard 2,

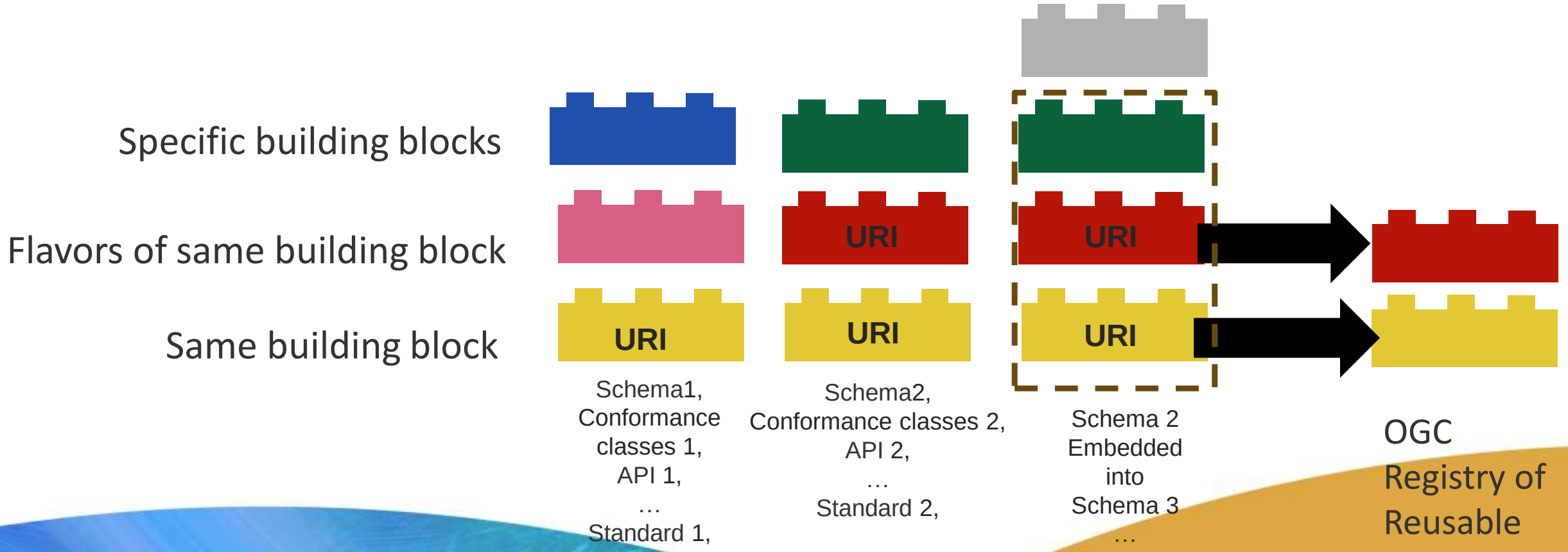
Schema 2 Embedded into Schema 3 …

OGC Registry of Reusable Blocks

Ongoing major evolution

From Web Services Standards to APIs relying on modular Building Blocks

Transparency of interoperability by referencing



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EMODnet Centralization and OpenDAP

Frederic Leclerq, VLIZ

EMODnet Centralization

EMODnet | Technical Architecture - OPeNDAP

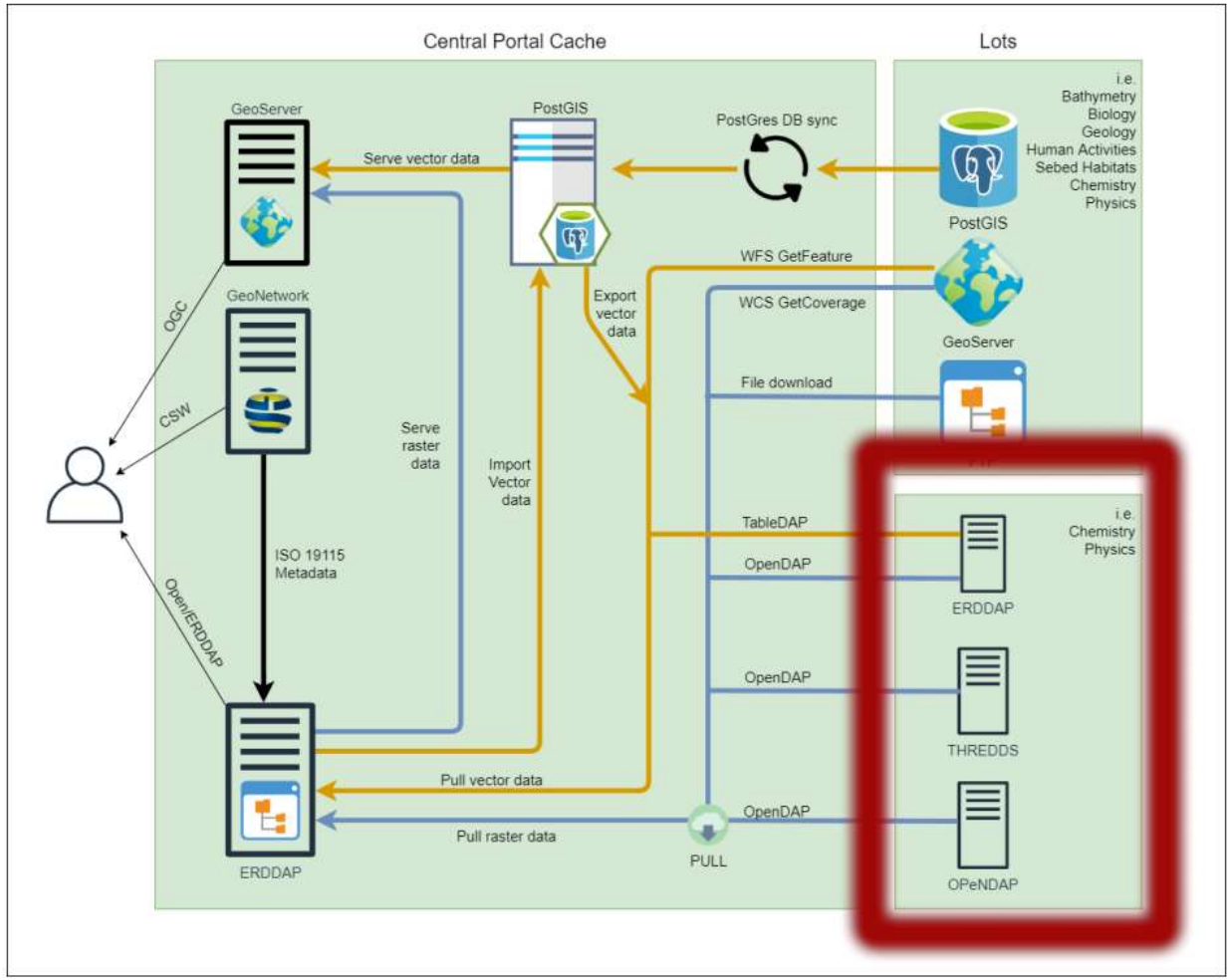


Figure 1: proposed architecture for EMODnet Central Portal

Open-source Project for a Network Data Access Protocol

- Facilitates efficient and flexible data access over the internet

OPeNDAP

OPeNDAP| Key Benefits

Interoperability

- Enables interoperability among various data formats (NetCDF, GeoTIFF, …)
- Seamlessly integrates with different scientific data systems (caching)
- Scalability (large files/datasets)

Efficient data transfer:

- Optimizes data transfer for large datasets
- Reduces bandwidth usage through smart data access mechanisms
- Sub-setting of large data files.

OPeNDAP

OPeNDAP | Flexibility and Adaptability

Multi-dimensional data support:

- Handles multi-dimensional data support effortlessly
- Ideal for scientific datasets with complex structures
- Generates a searchable meta-data catalogue

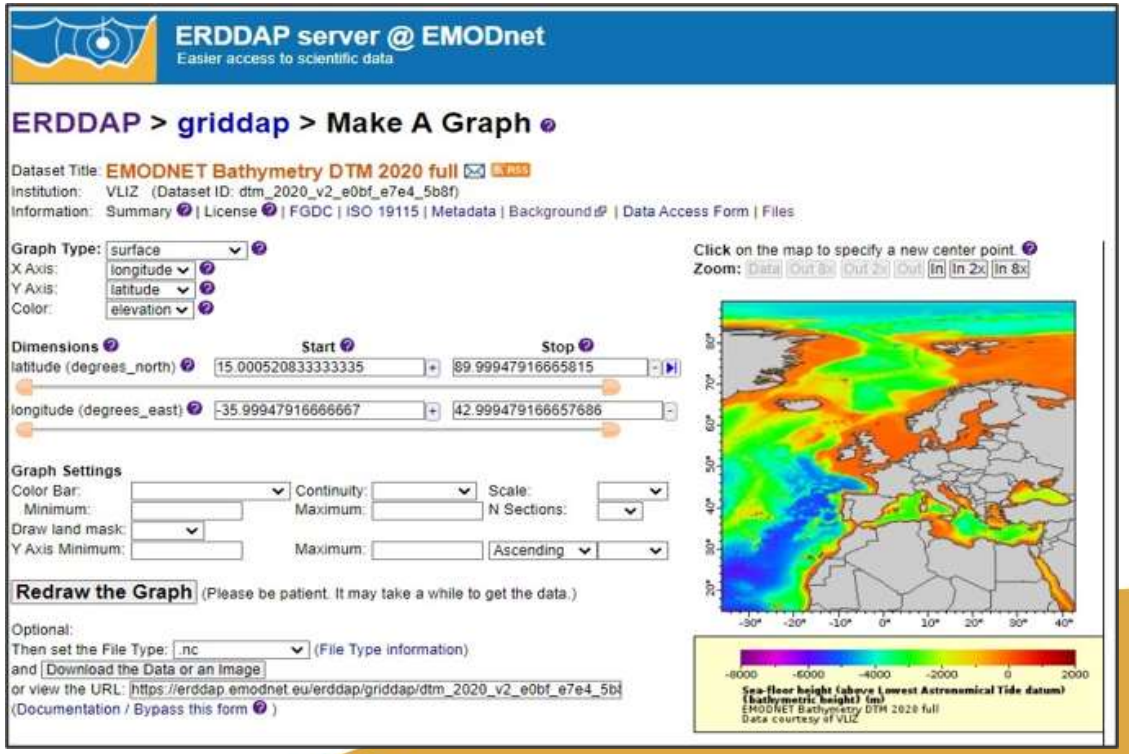
Adaptable to diverse platforms:

- Works across different operating systems
- Support various programming languages, enhancing accessibility (REST API)
- Does on demand conversion of data from original file formats in the user requested file format

OPeNDAP

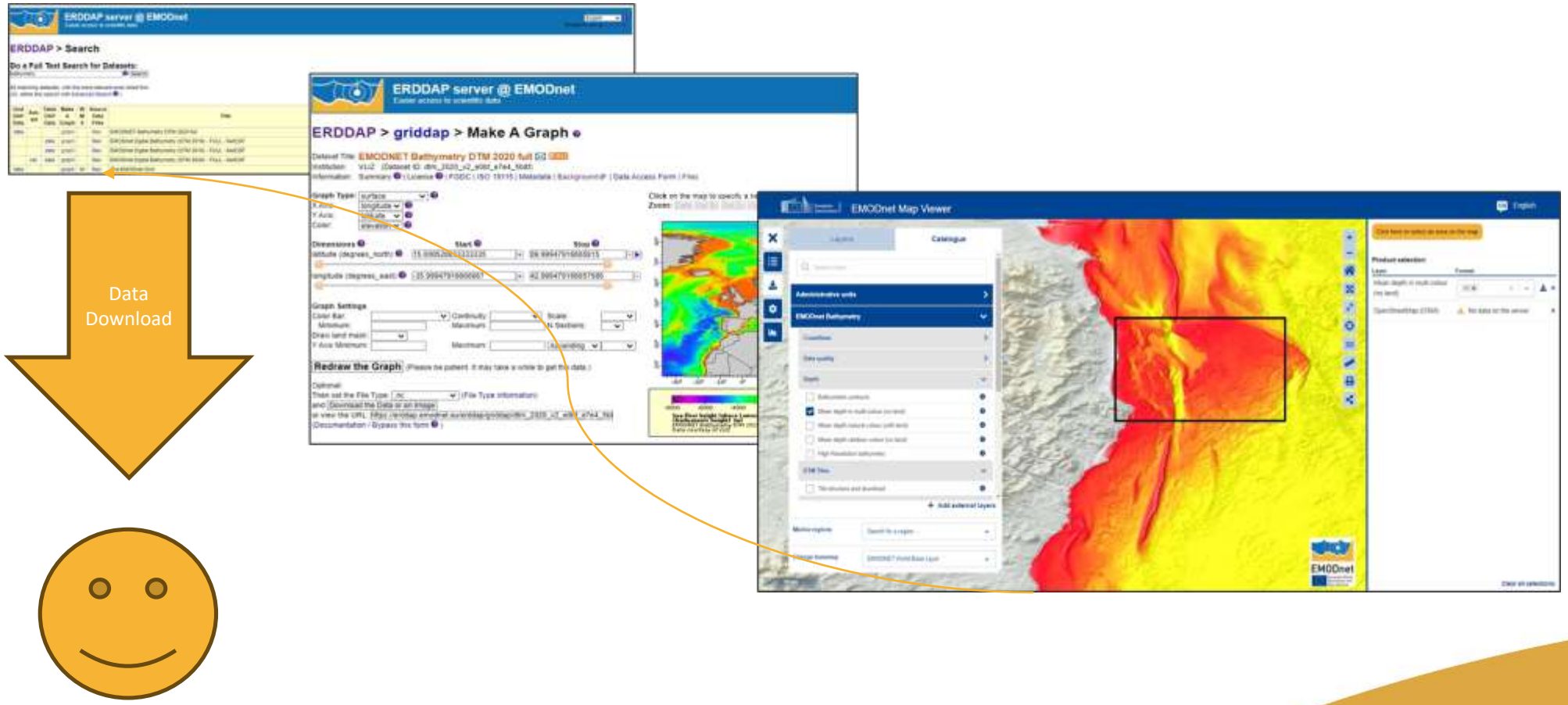
OPeNDAP| In Action

- NASA, NOAA, Copernicus, ..
- Multiple implementations: ERDDAP, THREDDS, Hyrax (RDF description => semantic web)
- Multiple OPeNDAP clients: Python/R -
  - MATLAB, Panoply, Ferret …
- Metadata in json/XML



EMODnet Centralization

OPeNDAP| Provided features which we could call from Map Viewer



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EMODnet, Ocean Best Practices and interoperability: OBPS

Virginie VanDongen, EuroGOOS and OBPS

What is the Ocean Best Practices System (OBPS)?

Link with EMODnet

An International IOC project, co-sponsored by IODE and GOOS

Our Vision: ***To have agreed and broadly adopted methods across ocean research, operations and applications.***

www.oceanbestpractices.org

Four Core Capacities

- Repository
- Journal
- Training
- User Support

Extended Capacities

- Task teams
- Early Career Ocean Practitioner (ECOP) Ambassadors
- International annual workshop
- OceanPractices – a UN Decade of Ocean Sciences for SD Program

The OBPS repository and submission process?

Link with EMODnet

https://repository.oceanbestpractices.org/

Ocean best practices

Repository of community practices in Ocean Research, Applications and Data/Information Management

Repository OceanBestPractices

OceanBestPractices (OBP) is a secure, permanent document (and other objects) repository. It aims to provide a discovery point for research groups to search and find community accepted existing ocean best practices. This service also invites the ocean research, observation and data/information management communities to submit their own best practice documents to share globally with their colleagues. More...

Please note unless it has been accepted and annotated in OBPS as an Endorsed Practice by an Expert Panel, inclusion of a methodology in the OBPS, does not indicate that the methodology is recommended by OBPS.

User Guides

- Guidelines for Depositors
- Guidelines for Editors
- Guidelines for Collection Administrators

Best Practices Document Template Collection

Communities in OceanBestPractices

Select a community to browse its collections.

⇒ CMEMS: Copernicus Marine Service [4]

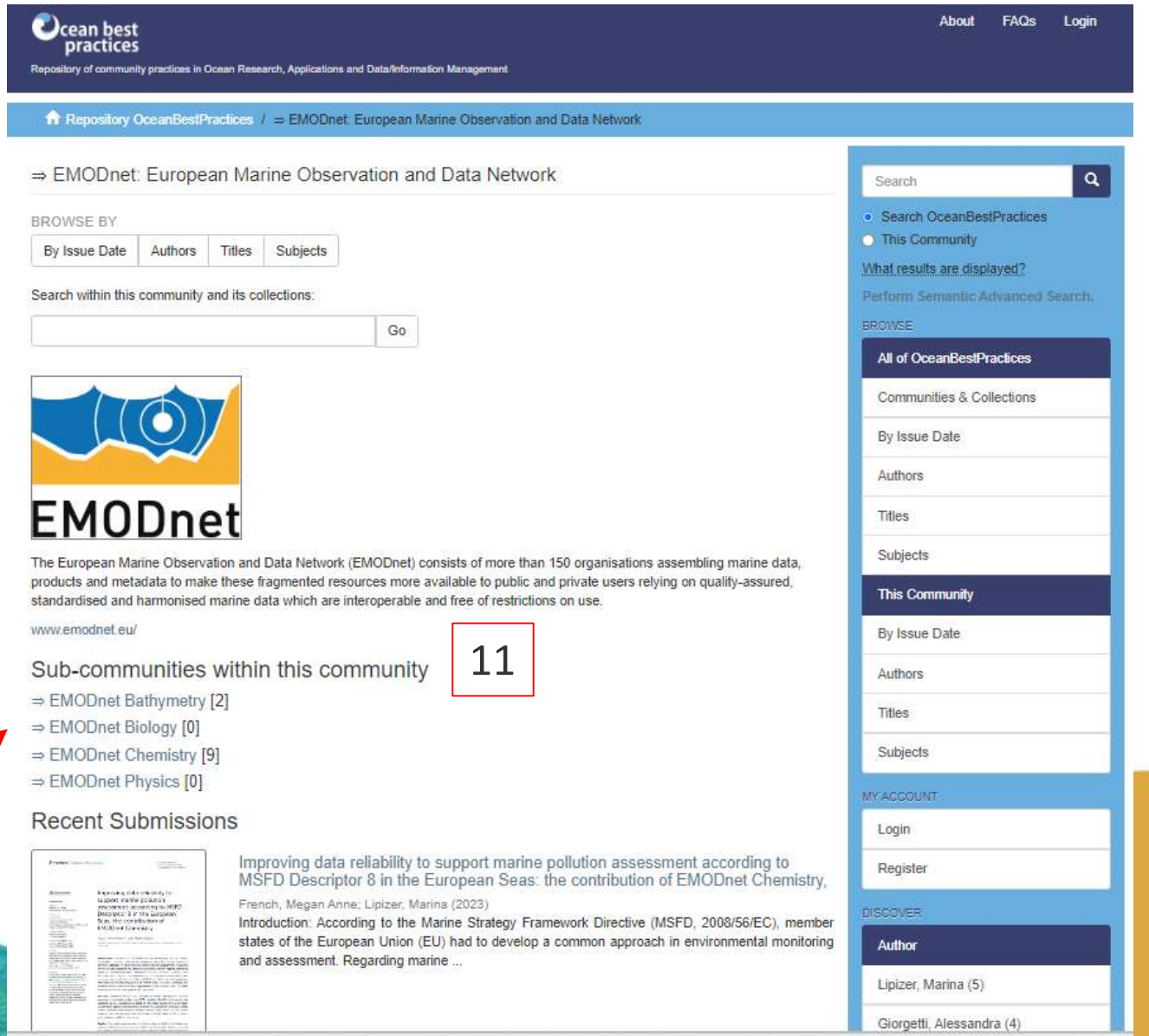
⇒ DBCP: Data Buoy Cooperation Panel [8]

⇒ EAF-Nansen Programme [8]

⇒ EMB: European Marine Board [2]

⇒ EMBRC: European Marine Biological Resource Centre [7]

⇒ EMODnet: European Marine Observation and Data Network [11]



What is the Ocean Best Practices System (OBPS)?

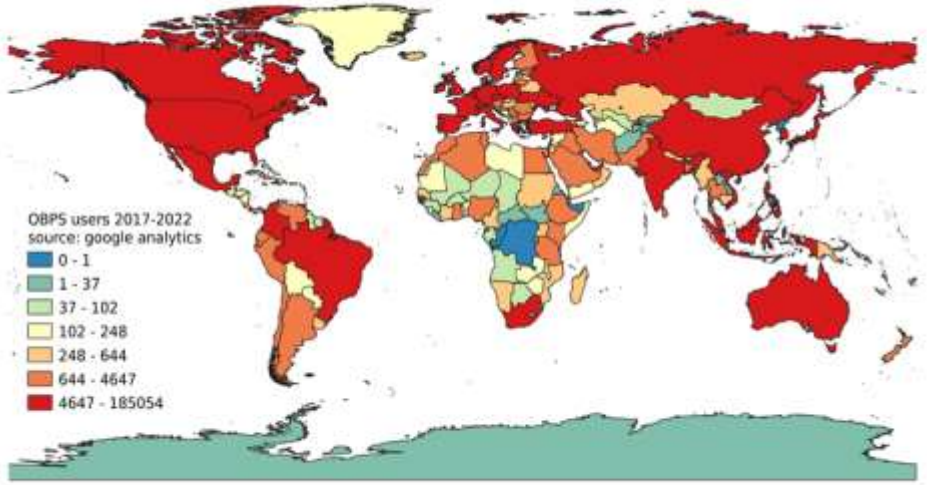
Link with EMODnet

Why use "Best Practices" ?

- ✓ Efficient use of time
- ✓ Collaborative opportunities
- ✓ Improved systems interoperability
- ✓ Data comparability and collectability
- ✓ Greater trust in data
- ✓ Streamlined regulatory approval
- ✓ Higher funding success

What are the IMPACTS?

- Best Practices creation and use is now an expected component of most project proposals
- Active ocean best practice community
- Global spread of users
- Training and workflow to find or develop an ocean best practice
- GOOS/OBPS endorsement builds trust



EMODnet-OBPS linking data to methods: building trust and interoperability

https://data-erddap.emodnet-physics.eu/erddap/info/ERD_EP_TS_RVFL_NRT_METADATA/index.html

ERDDAP
Easier access to scientific data

EMODnet

ERDDAP > info > ERD_EP_TS_RVFL_NRT_METADATA

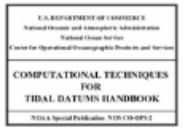
Grid DAP Data	Sub-set	Table DAP Data	Make A Graph	WMS	Source Data Files	Title	Sum-mary	FGDC, ISO, Metadata	Back-ground info	RSS	E mail	Institution	Dataset ID
	set	data	graph		files	EMODnet Physics - Collection of river flow rate (RVFL) TimeSeries - MultiPointTimeSeriesObservation - METADATA		F I M	background			EMODnet Physics	ERD_EP_TS_RVFL_NRT_METADATA

The Dataset's Variables and Attributes

Row Type	Variable Name	Attribute Name	Data Type	Value
attribute	NC_GLOBAL	cdm_data_type	String	Other
attribute	NC_GLOBAL	Conventions	String	COARDS, CF-1.10, ACDD-1.3, NCCSV-1.2
variable	BEST_PRACTICES_DOI		String	
attribute	BEST_PRACTICES_DOI	long_name	String	BEST PRACTICES DOI
variable	DATA_DOI		String	
attribute	DATA_DOI	long_name	String	DATA DOI

http://dx.doi.org/10.25607/OBP-190

Computational techniques for tidal datums handbook.



This handbook is intended to provide education and training for both internal and external audiences to NOAA. It presents the National Ocean Service (NOS) methodology for the computation of tidal datums and explains how to use the Center for Operational Oceanographic Products and Services (CO-OPS) water level data and bench mark information available on the internet for tidal datum computations. Fundamental background for tide measurement and data processing is also reviewed. Detailed descriptions of tidal datum procedures, the background mathematical formulas, and example spreadsheets are interwoven in the various sections. The handbook is designed to be both a technical reference and a guidance document for the practical determination of tidal datums using tide gauge measurements. It does not present methods for surveying, or address the problems associated with instrument installation, calibratio.....

Resource URL
Publisher: https://tidesandcurrents.noaa.gov/pub.html
Dataset: https://data-erddap.emodnet-physics.eu/erddap/tabledap/ERD_EP_TS_RVFL_NRT_METADATA.html

View/Open
PDF (2.321Mb)

Publisher
NOAA, NOS Center for Operational Oceanographic Products and Services
Silver Spring, MD

Date
2003

Series;Nr
NOAA Special Publication NOS CO-OPS;2

Corporate Author
NOAA NOS Center for Operational Oceanographic Products and Services

Document Language
en

Status
Published

Essential Ocean Variables (EOV)
Sea surface height

Pages
98pp. & Appendices

Best Practice Type
Best Practice
Guide

Metadata
Show full item record

Citation
NOAA NOS Center for Operational Oceanographic Products and Services (2003) Computational techniques for tidal datums handbook. Silver Spring, MD, NOAA NOS Center for Operational Oceanographic Products and Services, 98pp & Appendices (NOAA Special Publication NOS CO-OPS 2). DOI: http://dx.doi.org/10.25607/OBP-190

URI
http://hdl.handle.net/11329/631
http://dx.doi.org/10.25607/OBP-190

Collections
NOAA Special Publication NOS CO-OPS [3]

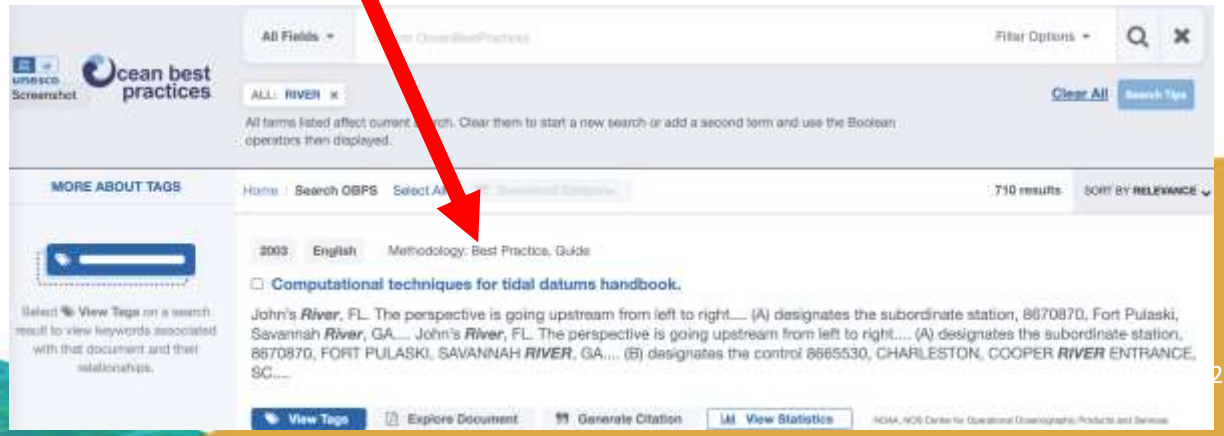
EMODnet-OBPS linking data to methods: building trust and interoperability

Link with EMODnet

https://data-erddap.emodnet-physics.eu/erddap/tabledap/ERD_EP_TS_RVFL_NRT_METADATA.html

lists the includes the "data doi" and "method doi" that points to the OPBS

PLATFORMCODE	call_name	latitude	longitude	firstDateObservation	lastDateObservation	DOI	platform_type_longname
		degrees_north	degrees_east	UTC	UTC		
AbbevilleSomme	AbbevilleSomme	50.094498	1.8297544	2022-01-10T12:40:00Z	2022-06-02T11:00:00Z		River Station
AbromollaVegea	AbromollaVegea	56.07419967651367	12.974499702453613	2022-03-16T00:00:00Z	2023-10-17T00:00:00Z		River Station
Abzacisle	Abzacisle	45.02180480957031	-0.12619030475616455	2021-12-28T00:00:00Z	2023-07-11T14:00:00Z		River Station
AgdeHerault	AgdeHerault	43.32530975341797	3.4796884059906006	2021-12-22T00:00:00Z	2023-10-12T06:00:00Z		River Station
AkerselvaNordmarkvassdraget	AkerselvaNordmarkvassdraget	59.96883010864258	10.787599563598633	2022-03-12T00:00:00Z	2023-10-12T22:00:00Z		River Station
AlabaleineAlabaleine	AlabaleineAlabaleine	57.8885612487793	-67.60008239746094	2023-01-19T00:00:00Z	2023-10-12T21:00:00Z		River Station
AlnabadStrathmore	AlnabadStrathmore	58.34717559814453	-4.644620895385742	2018-01-01T00:00:00Z	2023-10-17T22:00:00Z		River Station
AlmondbankAlmond	AlmondbankAlmond	56.41527557373047	-3.5135984420776367	2022-06-08T02:30:00Z	2023-10-17T16:30:00Z		River Station
AlnessAlness	AlnessAlness	57.69601058959961	-4.258760929107666	2018-01-01T00:00:00Z	2023-10-17T23:00:00Z		River Station
AnctevilleAy	AnctevilleAy	49.108009338378906	-1.4670926332473755	2021-12-22T00:36:00Z	2023-10-12T03:30:00Z		River Station
AndelGouessant	AndelGouessant	48.484573	-2.568232	2021-12-22T00:00:00Z	2023-08-23T10:05:00Z		River Station
Anllons-Carballo	Anllons-Carballo	43.21009826660156	-8.692700386047363	2023-07-18T02:00:00Z	2023-10-06T23:50:00Z		River Station



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EMODnet, Ocean Best Practices and interoperability: An overview

Pier Luigi Buttigieg, AWI

Townhall: EMODnet, Ocean Best Practices and Interoperability

Sli.do questions

1. Before this meeting which data sharing and data publishing (best practice) standards were you familiar with? (multiple choice)
    a. Open Geospatial Consortium web services.
    b. OpenDap standards for searching gridded data.
    c. The concept of metadata catalogue services (numerous standards)
    d. Ocean Best Practises of IODE
2. Which other Data publishing best practice standards do you recommend for EMODnet to improve interoperability (free text for word-cloud).
3. How have you interacted with the OBPS repository (multiple choice)
    a. Not used
    b. Recommended to colleagues as a resource for best practices
    c. Used it to consult and implement best practices
    d. Contributed best practices developed by my organisation

Townhall: EMODnet, Ocean Best Practices and Interoperability

Structured questions

- **EMODnet uses best practices and standards to publish and distribute marine data and marine data products, how can they be improved?**
- **What can EMODnet do to become a reference use case as a global data ecosystem?**
- **What are the main barriers in the interoperability of data and metadata to prevent data sharing with other regional initiatives that can be overcome with best practice?**

- **How can EMODnet work with OBPS to record best practices across the marine knowledge value chain and to develop a community of best practice?**

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the latest news

The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation (EU) 2021/1139 of the European Parliament and of the Council of 7 July 2021 establishing the European Maritime, Fisheries and Aquaculture Fund and its predecessor, Regulation (EU) No. 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund.