EMODnet Thematic Lot n°3 – Physics

EASME/EMFF/2020/3.1.11/Lot4/SI2.838612

Start date of the project: 23/08/2023 (24 months)

Centralisation Phase

Quarterly Progress Report (Q3.2023)

Reporting Period: *01/07/2023 – 30/09/2023*

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.

Contents

1. Highlights in this quarter

Task 1: Maintain and improve a common method of access to data held in repositories

Now that the new central portal is operational, Task 1 is primarily focused on improving the data flow towards this new central portal interface. This consists of refining the back-end interfaces to serve the central portal requirements. The primary focus during this phase is to keep updating the organization of metadata, data, data collections and products in the Physics backend.

Depending on the audience and context, there may be ambiguity in the definition of 'product.' In previous projects, we referred to a 'product' as a collection of sparse data that had been qualified by experts. Recognizing this ambiguity, we are now considering the following definitions: 1) data is a series of values (e.g., timeseries, profiles) sampled by an in-situ platform, 2) data collection is a grouping of similar in situ data (e.g., all CTD data, all sea level data with a sampling frequency of at least one value every 5 minutes, sea surface currents from HFR, in-situ data from a specific source), 3) product is the outcome of a reprocessing method, such as the PSMSL (monthly means) RLR or the Coriolis Ocean dataset for Reanalysis (CORA). The outcome of a numerical model (that uses in situ data) is a product. The result of QC/QF procedure is not considered a product; instead, it is a qualified dataset or qualified data collection. We can then schematize the flow as follow:

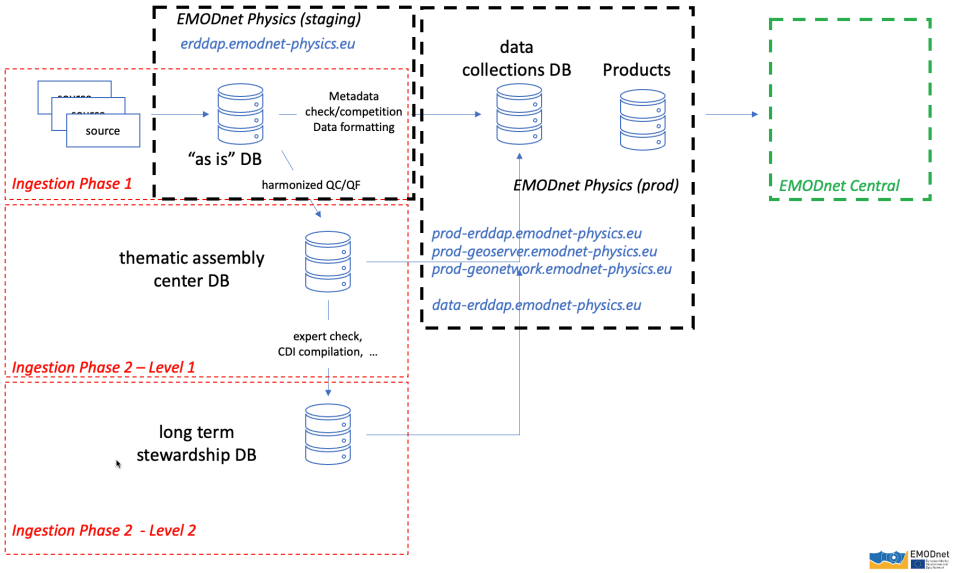

Figure 1. Data flows within EMODnet Physics involve various databases. Thematic assembly centers include entities like the European HFR Node, Coriolis, ARGO GDAC, and more. Long-term stewardship databases encompass resources such as the SeaDataNet – NODC databases, PANAGAEA, ICES database, and others. Occasionally, the same databases used as thematic assembly centers may also serve for long-term stewardship, as is the case with ICES or ARGO GDAC)

To move towards a better organization of the data flow to the central portal, during this period, we reorganized the EMODnet Physics ERDDAP into two endpoints: one for offering products (https://prod-erddap.emodnet-physics.eu/erddap/index.html) and one for offering the data collections (i.e., https://data-erddap.emodnet-physics.eu/erddap).

For each data collection, a 'metadata' dataset will be published to provide the user with information such as the list of platforms available in the datasets, the providers of those platforms, and the first available measurement, etc. These collections will be also used for reporting purposes.

Among others, we would like to mention two sea-level data collections. Both of them integrate operational data in near real-time flow. One groups platforms providing at least one value per hour, and the other groups platforms with higher sampling frequencies, such as tsunami warning platforms:

https://data-erddap.emodnet-physics.eu/erddap/search/index.html?page=1&itemsPerPage=1000&searchFor=SLEV

Recommendations on standards for river outflow data were also revised and updated as follows:

Table 1- Applied standards

Metadata field	Vocabulary exists	Link to vocabulary	Vocabulary governance
Platform id	*		EMODnet Physics
Station		https://www.bafg.de/SharedDocs/ExterneLinks/GRDC/grdc_reference_stations_zip.html?nn=201698	GRDC
Owner/provider Institution	Yes	https://edmo.seadatanet.org/	SeaDataNet
variable names	Yes	http://vocab.nerc.ac.uk/collection/PXX/current/ where XX=02;01;07	BODC:NVS
unit	yes	https://vocab.nerc.ac.uk/collection/P06/current/	BODC:NVS
Quality Flag Scheme	yes	http://www.oceansites.org/docs/oceansites_data_format_reference_manual.pdf	OceanSites
Time	yes	ISO8601	ISO
Datum	Yes	WGS84	ISO
Country	yes	ISO3166	ISO
License	Yes	https://creativecommons.org/	CC
INSPIRE	Yes	ISO 19115	ISO/INSPIRE

* Currently EMODnet Physics is assigning a unique id to river stations, anyhow this inventory will adopt a new convention based on river name and river station, and integrate the GRDC station number.

Table 2 – Parameters

Metadata field	Definition	Link to term
SDN::P09::RVFL	Volume of water passing a given point in the course of a river per unit time	http://vocab.nerc.ac.uk/collection/P09/current/RVFL/
SDN:P02::RVDS	Parameters related to the volume of water passing through a point in a river system per unit time, including the rates of freshwater, dissolved material and particulate load discharge from a river into the sea.	https://vocab.nerc.ac.uk/collection/P02/current/RVDS/
SDN:P01::RVDSCH02	Riverine discharge of water by direct reading current meter and calculation from flow	https://vocab.nerc.ac.uk/collection/P01/current/RFDSCH02/
SDN:P01::RVDSCH03	Riverine discharge of water by water level gauge and calculation from level	https://vocab.nerc.ac.uk/collection/P01/current/RFDSCH03/
SDN:P01::	Height of river water relative to ground surface	Under the validation/publishing process

Task 2: Construct products from one or more data sources that provide users with information about the distribution and quality of parameters in time and space

As planned, the following products were updated and made available (as links to the Physics Static page): the CORA – Coriolis Ocean datasets for reanalysis (research quality until 2021)[1]; the temperature and salinity along the trajectories (extended with views until 12 months)[2], the MEOP dataset (research quality - until 2018)[3].

Task 3. Develop procedures for machine-to-machine connections to data and data products

Activities were focused on actions in support of Task 1 and in promoting the adoption of ERDDAP as the tool for implementing native machine-to-machine interoperability. Importantly, participation in the SOOS Symposium (Hobart, Australia) opened dialogues with potential new providers from Australia and New Zealand. Outcomes will be reported as soon as possible.

Task 4. Contribute data, data products and content to a central portal that allows users to find, view and download data and data products

Task 4 focused on improving the user experience when downloading in situ data from EMODnet Physics layers. When the user selects the 'in situ' layer from Physics, the central viewer displays the positions of the in situ platforms. If the user selects a platform, the viewer loads the platform box that fetches the data from the Physics backend. These data are presented as an HTML page within the box, which is a production of EMODnet Physics. This tool was enhanced in terms of the clarity of metadata presentation and updated with a new data downloading feature that offers users data in various formats, such as netCDF, the community-standard format, in addition to the already available CSV format.

[1] TEMP_001 https://productmaps.s4oceandata.eu/EP_MAP_TEMP_001/; PSAL_001 https://productmaps.s4oceandata.eu/EP_MAP_PSAL_001/
[2] TEMP_002 https://productmaps.s4oceandata.eu/EP_MAP_TEMP_002/; PSAL_002 https://productmaps.s4oceandata.eu/EP_MAP_PSAL_002/
[3] TEMP_003 https://productmaps.s4oceandata.eu/EP_MAP_TEMP_003/; PSAL_003 https://productmaps.s4oceandata.eu/EP_MAP_PSAL_003/

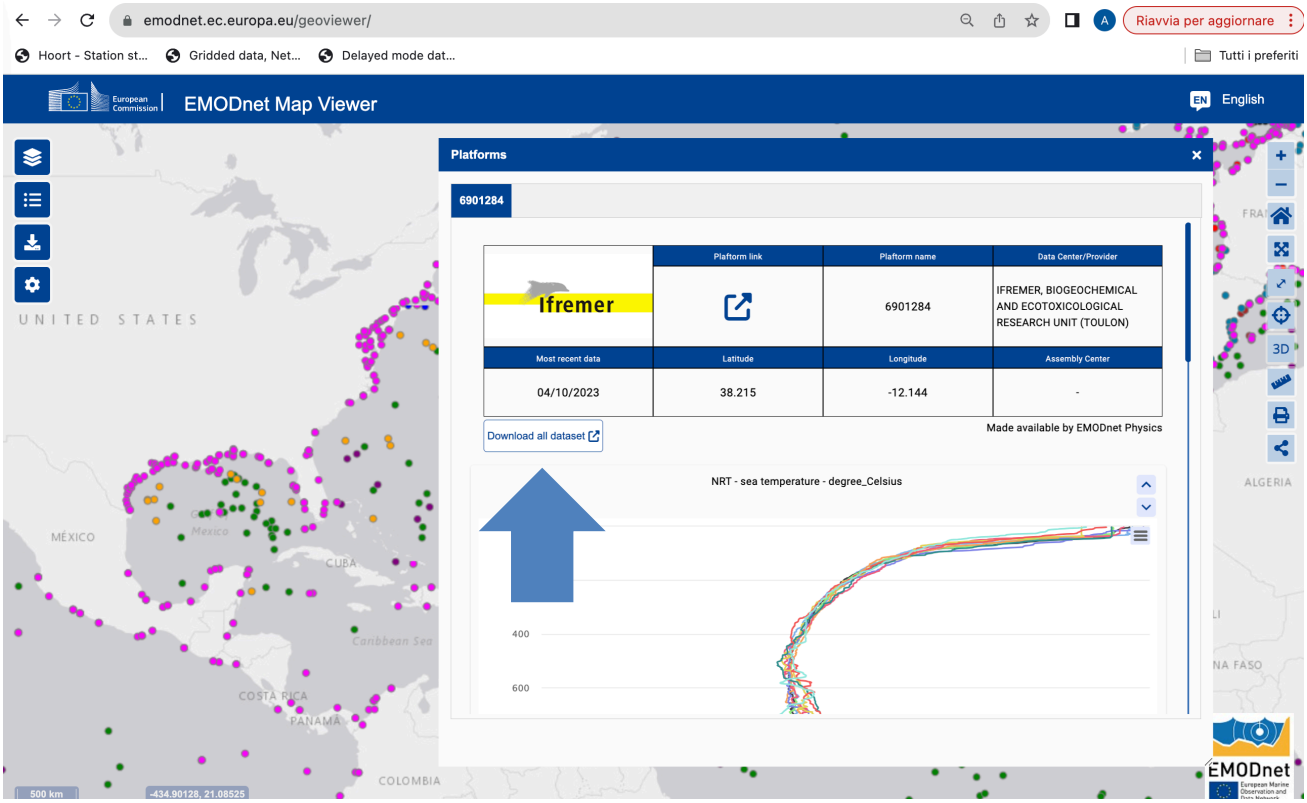

Figure 2. EMODnet Physics Platform page in the Central viewer platform popup feature

As previously mentioned in previous reports, all exchanges are tracked using Jira tickets. Some tickets require follow-up by the Physics team, while others are managed by the Central Portal team. It's important to note that while JIRA is an excellent tool for listing and tracking tickets and issues, it doesn't provide an overview of the schedule for actions. For instance, as already reported, there is a ticket aimed at improving the usability of the platform popup, which is currently very small when loaded and covers the in situ layer filters (all displayed in the top right of the page). As described earlier, the Physics team updated the service that offers the HTML page wrapped in the box. However, we currently lack information about when (and if) the box will be modified to meet Physics' requests and needs.

Another example relates to the number of simultaneous requests that the Central Portal (CP) generates when there is a multidimensional product, such as a climatology. If a user attempts to play the animation, the CP calls all available layers simultaneously, without implementing any buffering or slicing policy. We are currently testing a combination of low-resolution and high-resolution views for the same products to adjust data transfer based on the zoom level of the request. In other words, if a user is exploring a gridded product with a zoom level showing the entire globe, the system provides a layer with a larger grid resolution. Conversely, when the user zooms in, the system switches to a different product (the original) that has a smaller grid resolution.

Task 5. Contributing content to dedicated spaces in Central Portal

Static contents on EMODnet Physics consolidated and published: https://emodnet.ec.europa.eu/en/physics
Other means of supporting the central space include contributing news, posting on social media, organizing events, and providing materials (documents, presentations, feedback) when necessary. It is worth noting that teams are becoming increasingly synergistic in this regard.

Task 6. Ensure the involvement of regional sea conventions

Nothing to report for this period

Task 7. Contribute to the implementation of EU legislation and broader initiatives for open data

The promotional activities for contributing and using EMODnet as a service for EU legislation and broader initiatives, as well as the promotion for open data (CC-BY). By participating to SOOS Symposium and SOOS Data Management Steering Committee, EMODnet Physics is contributing to widen the adoption of EU standards for open and FAIR data worldwide. The MIC (Marine In situ Collaboration) technical working group is also to streamline a common ingestion procedure, to provide near real-time data to the operational community and facilitate its availability in National Oceanographic Data Centers and other official repositories for long-term stewardship of these valuable data.

Task 8. Monitor quality/performance and deal with user feedback

Looking at the report, EMODnet Physics section (to the https://emodnet.ec.europa.eu/en/physics) is not the most visited EMODnet section, neither the less one. The current monitoring system is mainly focused on the static page and EMODnet Physics never collected big number in that section, it would be much more interesting to see the visits and interactions on the CP Geoviewer. During the period there was a main down of the system due to a failure in the GeoServer serving the central portal. A new VM was promptly set up and configured, anyhow a test with multiple requests indicated that there are still some pending issues with the allocated memory. To overcome this, following the advice of the CP team, we are increasing the memory to 32GB on both the VMs hosting ERDDAP and GeoServer.

Table 3. Milestones and Deliverables - EASME/EMFF/2020/3.1.11/Lot4/SI2.83861

Status of the Milestones and Deliverables listed in the workplan					
Deliverable #	**Deliverable Title**	**WP**	**Delivery Date (by)**	**Status (Delivered/Delayed)**	**If Delayed: reason for delay and expected delivery date**
D1.01	Annual assembly (Q2.2024)	1	31/12/24		Will take place 27th Nov 2023, back-to-back the EMODnet Jamboree
D1.02	Annual assembly (Q2.2025)	1	31/12/25		
D1.03	EMODnet SC (Q4.2023)	1	31/12/23		
D1.04	Quarterly report Q3.2023	1	15/10/23		This report
D1.05	EMODnet TWG (Q4.2023)	1	31/12/23		Will take place 18th Oct on line.
D1.06	EMODnet SC (Q4.2024)	1	31/12/24		
D1.07	EMODnet TWG (Q4.2024)	1	31/12/24		
D1.08	EMODnet SC (Q2.2025)	1	31/07/25		
D1.09	EMODnet TWG (Q2.2025)	1	31/07/25		
D1.10	EMODnet event (Q4.2025)	1	31/07/25		
D1.11	Quarterly report Q4.2023	1	15/01/24		
D1.12	Quarterly report Q1.2024	1	15/04/24		
D1.13	Quarterly report Q2.2024	1	15/07/24		
D1.14	Quarterly report Q3.2024	1	15/10/24		
D1.15	Quarterly report Q4.2024	1	15/01/25		
D1.16	Quarterly report Q1.2025	1	15/04/25		
D1.17	Quarterly report Q2.2025	1	15/07/25		
D1.18	Annual progress report	1	23/08/24		
D1.19	Final progress report	1	22/08/25		
D1.20	Handover note	1	22/08/25		

D1.21	Guideline on data ingestion procedures for new real time and near real time streams v.2024	1	23/08/24		
D1.22	Guideline on data ingestion procedures for new real time and near real time streams v.2025	1	22/08/25		
D1.23	Contribution to central space with background information and EMODnet Physics contents, Contribution to the EMODnet Annual report	1	22/08/25		
D1.24	TGs - RSCs events attendance	2	22/08/25		
D2.01	Data sources gap analysis v.2024	2	22/08/24		
D2.02	Data sources gap analysis v.2025	2	22/08/25		
D2.03	EMODnet Physics data management including metadata and metadata governance v.2024	2	22/08/24		
D2.04	EMODnet Physics data management including metadata and metadata governance v.2025	2	22/08/25		
D2.05	EMODnet Physics List of products v.2024	2	22/08/24		
D2.06	EMODnet Physics List of products v.2025	2	22/08/25		
D3.01	Tools and methods to implement interoperability v.2024	3	22/08/24		
D3.02	Tools and methods to implement interoperability v.2025	3	22/08/25		
D3.03	Maintenance and update of the back-end services and infrastructure	3	-		This activity is continuous and special actions or issues (if any) will be reported in the quarterly reports.

2. Identified issues: status and actions taken

Table 4. Priority issues identified by CINEA/ DG MARE/ Secretariat

A. Priority issue(s) identified and communicated by CINEA/ DG MARE/ SECRETARIAT				
Priority issue	**Status (Pending/ Resolved)**	**Action(s) taken/ remaining actions planned**	**Date due**	**Date resolved**
Coordinate axis order in your metadata	Work In Progress			
Central Portal - Review of the EMODnet Physics static page content	In Review	Provided the hyperlink document		
TWG13 Action 17 Thematics to provide helpdesk email	Done			2023-07-18 10:44
Physics to send email address	In Progress	Sent the email address, waiting to be closed		
Map physics layers used in the Atlas from old physics geoserver to new physics geoserver	In Progress	Typos in the request		
Error displayed in catalogue when you click on certain Physics products	Done			2023-08-15 22:02
Promotion of EMODnet	Done			2023-08-08 16:21
River outflow layer	Done			2023-08-10 16:39
Arrange dimensions for TSM layers	In Progress			
Physics ERDDAP products metadata fields duplicated in geonetwork	Done			2023-08-15 21:50
Typo "in In situ data - Platforms" info description	Done			2023-09-14 01:05
Physics Quality of Service Monitoring	Done		Created 2021-01-27 15:50	2023-08-28 11:47
EMODnet Physics Salinity Layer Requests - EMODnet Viewer Portal	Done		Created 2023-06-26 15:02	2023-08-14 11:13
Broken Links in EMODnet Viewer	Done		Created 2022-12-21 12:39	2023-08-11 11:57
Layer EP_HFR_CFM_EUROPE not working in Physics WMS	Done		Created: 2022-03-16 15:28	2023-08-11 10:28
Physics - EMODnet Catalogue Tags	Done		Created: 2022-03-11 15:16	2023-08-09 11:21
TEMPERATURE & SALINITY MAY 2023	Done		Created: 2023-05-31 09:36	2023-08-07 10:08
Remove old Physics OGC Services (+from monitor.emodnet.eu)	Done		Created: 2022-09-08 10:27	2023-08-01 15:55

HA review of the new CP map viewer	Done		Created: 2021-11-16 13:59	2023-07-31 11:39
RE: EMODnet Platform Data	Done		Created: 2023-06-21 15:47	2023-07-18 14:48
Request for Permission and Attribution Guidelines for Integrating EMODnet WMS Servers into Golden Software's Surfer Product	Done		Created: 2023-06-07 15:25	2023-07-18 10:35
Missing periods in insitu sealevel data	Done		Created: 2023-01-20 14:43	2023-07-18 10:34
D2.3 Documentation of the Centralisaion of each portal	Done		Created: 2022-01-24 14:15	2023-07-12 15:26
Add Physics ncWMS to GeoHealthCheck and Web Service Documentation	Done		Created: 2023-06-02 11:35	2023-07-05 12:01

Table 5. Priority issues group

B. Issues / challenges identified by the thematic assembly group itself				
Priority issue / challenge	Status (Pending/ Resolved)	Action(s) taken / remaining actions planned	Date due	Date resolved

3. Communication assets

Table 6. Communication assets

A. (Co-)Authored peer-reviewed publications in the quarter					
Date of publication	**Type of publication**	**Full reference**	**ISBN**	**DOI**	**Is it open access? Yes/No**

Table 7. Other publications

B. Other/non-peer reviewed types of publications (co-)authored in the quarter					
Date of publication	Type of publication	Full reference	ISBN	DOI	Is it open access? Yes/No

To facilitate the management of Physics related publication we set up a Zenodo Community – https://zenodo.org/communities/emodnetphysics/

For a compressive overview of publications referring to/making use of EMODnet data and/or data products, please consult Google Scholar.

4. Monitoring indicators

Table 8. Indicators

Comments on the progress indicators in the indicators spreadsheet		
Progress indicator	Means of collecting figures	Comment
1. Current status and coverage of total available thematic data A) Volume and coverage of available data	*Number of platforms*	EMODnet Physics input data is sparse, and for this indicator, we consider the "platform" as the "unit" for monitoring assessment. A platform is a logical system that hosts data, where data may consist of a single dataset (e.g., a profile in the case of CTD), a time series (e.g., a sea-level station), or a series of profiles (e.g., ARGO). For indicator 1.A, we report the percentage variation in the number of platforms for the given basin. It's worth noting that some platforms may move from one basin to another. Since we report figures based on the latest position, the percentages are significantly influenced by this movement. EMODnet Physics integrates data from several sources, which can result in duplicates in the system. Cleaning duplicates is an ongoing activity and also affects the percentage of available platforms. When a duplicate is identified, the two sources are linked to the same dataset to show full provenance. Some of the platforms that were originally categorized under 'Other Seas' are now classified under the Caribbean Sea. As anticipated, during the period, we continued cleaning duplicates, and we are in the process of reorganizing the parameters that are mapped under the themes. This process is not yet completed and is particularly affecting the figures related to the number of platforms collecting optical and biogeochemical properties, which are significantly smaller than in the previous report. The number of platforms reporting currents is also much smaller than in the previous report. We noted that we were counting the current parameters instead of counting only the platforms. Currents included in EMODnet Physics are sourced from drifting buoys, HF Radar, and ADCP
What is your opinion on the data coverage within EMODnet for your thematic?		The available coastal data is still very limited and new data sources (e.g. Citizen Science projects) have to be approached. Metadata on Wind data should be improved. In situ underwater noise is still very limited. Data on Ice should include new data type (e.g. cameras). We need some focus actions to link in some other integrators (e.g. SIOS).

		During this period, the service that connects EMODnet Physics to PANGAEA and ARICE was updated and it linked in a large amount of new CTDs. During last MIC meeting it was identified that INSTAC can provide Physics with about 7M more CTDs (action is started).
B) Usage of data in this quarter	*Server logs*	Now that the CP (Central Portal) is up and running, the Physics team can only report on the overall volume of downloaded data when it is mediated by the EMODnet Physics backend (as some products are cached centrally, EMODnet Physics cannot track this volume). Previously, the volume of data downloaded for each theme was calculated using an algorithm that considered the number of viewed map pages. However, since EMODnet Physics is no longer hosting the map viewer, this calculation can no longer be applied. From now on, EMODnet Physics will report on the number of available platforms (units - col C) and the overall volume of downloaded gigabytes (col D) from ERDDAP, which is hosting the in-situ data
2. Current status and coverage of total number of data products A) Volume and coverage of available data products	*Matomo and server logs*	The EMODnet Physics backend has been reorganized to better serve the central portal with products and data collections. Table 2A now lists the products available at prod-erddap.emodnet-physics.eu, which are linked through the central portal (plus the underwaternoise products that are availble on prod-geoserver)
B) Usage of data products in this quarter	*Matomo and server logs*	As described in the report, Physics is continuing the updates of the backend to serve the central portal. In this report, we updated the definition of data, data collection, and product, and improved the quality of the monitoring. From now on, the products available in the prod-env are the ones listed in table 2A. With this update, it will be easier to have a common understanding of progress. In the coming month, data-env will be updated with consolidated data collections. We have yet to decide if we should report stats on these data collections under indicator 1 or indicator 2 (2 seems more fitting)
3. Internal and external organisations supplying/approached to supply data and data products within this quarter	*Please specify*	There are a number of new sources integrated (some are old provders that inlcuded new sources in the package). During the period we organized a series of events to unlock new data sources (Southern Ocean providers). Most of these data are not yet in the system but teams are working to ingest it.

4. Online 'Web' interfaces to access or view data		The monitoring of WMS, WFS, and other services that offer data and products to CP is now centralized and conducted every 10 minutes. The web page https://monitor.emodnet.eu/resources?lang=en&tag=Physics presents real-time status. It would be very useful to have the option to download statistics for a custom period and conduct a more in-depth analysis of the instantaneous status.
5.1 Daily number of page views of EMODnet Thematic entry page	*Europa Analytics*	We monitor the typical working hours' usage of the portal. The system tracks the EMODnet Physics static page, which provides a general overview of the activity. Traffic remains quite limited, and we need to plan extra efforts to increase interaction and promote the recently activated links for advanced products. Additionally, since the map viewer was the most frequently used page in Physics, we suggest monitoring the CP GeoViewer, particularly focusing on thematic sessions.
5.2 Quarterly total number of visitors, page views, unique page views and percentage of returning visitors	*Europa Analytics*	We recorded lower interaction than in the previous period, likely reflecting the summer break. It would be more interesting to observe user interaction with the GeoViewer, where data are not as static as on the static Physics presentation page

The monitoring numbers reported as part of the progress monitoring of EMODnet performance are collected through Europa Analytics, unless reported otherwise.

5. Annex: Other documentation attached

5.3 Events

A. Meetings/events Organized and attended							
from	to	Location	Type event (internal or external meeting, training/work shop)	PPT given	A/O	link ppt/ doi/web	Short description and main results (# participants, agreements made, etc.)
14/8/2023	18/8/2023	Hobart, Tasmania, Australia	workshop	yes	A		SOOS Symposium
19/8/2023	19/8/2023	Hobart, Tasmania, Australia	meeting	no	A		SOOS DMSC
28/8/2023		web	technical working group	yes	A		GOOS - Low cost technology TWG
29/8/2023	29/8/2023	web	internal - meeting	No	A		EMODnet Vision 2030-2035 & Communication strategy
4/9/2023	7/9/2023	Oslo, Norway	summer school	Yes	A		NAUTILOS Summer School
13/9/2023	13/9/2023	web	internal - meeting	No	A		EMODnet: achievements
13/9/2023	13/9/2023	web	internal - tech meeting	Yes	A		NAUTILOS - TIB (data management)
19/9/2023	22/9/2023	Paris, France	workshop	No	A		EuroSEA Annual Assembly + EuroSEA WS
26/9/2023	27/9/2023	web	workshop	Yes	A		EMODnet for Business
27/9/2023	28/9/2023	Toulose, France	workshop	No	A		Ocean Predict Task Team
28/9/2023		Gothenburg, Sweden	meeting	yes	A		CMEMS INSTAC Stakeholder + MIC coordiantion

Planned

A. Meetings/events planned							
from	to	Location	Type event (internal or external meeting, training/work shop)	PPT given	A/O	link ppt/ doi/web	Short description and main results (# participants, agreements made, etc.)
3/10/2023	5/10/2023	Galway, Ireland	conference				EuroGOOS Conference 2023
5/10/2023	6/10/2023	The Hague, The Netherlands	workshop				FAIR-IMPACT
18/10/2023	18/9/2023	web	internal - tech meeting				EMODnet Technical working group

16/10/2023	17/10/2023	Brussels, Belgium	technical working group				TG NOISE
27/11/2023	30/11/2023	Brussels, Belgium	conference				EMODnet Jamboree
27/11/2023	30/11/2023	Faro, Portugal	meeting				NAUTILOS General Assembly - EMODnet is a key stakeholder and was invited to present and discuss on metadata, ingestion and data flow

5.3 Report on the Ocean Data Week – The Ocean Race Grand Finale Genova.

During the Ocean Race Grand Finale – Genova - ETT organized the Ocean Data Week, consisting in 4 days of talks, roundtables, pitches to present insights on ocean data collection and processing, with over 24 hours of live streaming on YouTube, still available as recordings. The 4-day event organized by ETT was marked by 109 presentations and speeches, held almost entirely in presence, and more than 300 audience participants.

The Ocean Data Week has had a social presence that resulted in 46 posts published on ETT's LinkedIn page and which received 28,970 impressions, 9 comments, 63 shares and 896 likes.

The topic was also very successful in relation to the traffic generated on ETT's web pages. The web page dedicated to the sailing competition with a focus on European programmes in which ETT is actively involved in the collection, management and processing of data collected through sensing technologies has collected almost 800 visualizations, including over 200 new users. The web page dedicated to the Ocean Data Week has had over 500 visualizations, gaining the attention of more than 100 new users.