



EMODnet Thematic Lot n° 4/SI2.749773

EMODnet Phase III - Trimonthly Report

Reporting Period: 01/01/2018 - 31/03/2018

Date: 15/04/2018

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1. Highlights in this reporting period

The highlights for the period January-March 2018 are listed below:

- End 2017, the nutrients, chlorophyll and oxygen data collection has been handed over to the Sea-basins coordinators for validation, harmonization and aggregation of the heterogeneous collection in order to generate EMODnet Chemistry data products. This work has made considerable progress and will deliver products according to planning end of April 2018.
- Intensive interaction with TG – DATA, resulting in the development of EMODnet Chemistry use case mapping SeaDataNet CDI and ODV formats with INSPIRE data models for D5C1 “Nutrients concentrations in water” as contribution to EEA recommendations for MS for Accessing data and information according to MSFD Art. 19(3).
- Dialogue with CMEMS INSTAC to set the cooperation and exchange terms which must be 2-way oriented, well balanced, allowing a win-win situation, providing complementarity, and preventing mutual competition. EMODnet Chemistry will contribute with biochemical data and metadata, and generating aggregated, validated and harmonised data collections for e.g. eutrophication, needed as input for the CMEMS modelers and to be published for downloading at the CMEMS user portal.
- Organization of the first annual meeting.
- Active interaction with JRC to contribute in the aggregation and harmonization of beach litter data collected by JRC from MS and from various sources, covering period 2012-2016, as part of ML Baselines project. Win-win interaction where all available data can be made available through EMODnet Chemistry portal.
- All data providers populate EMODnet Chemistry data infrastructure with contaminants and litter data.
- Further integration of marine litter data into the EMODnet Chemistry central databases and development of the first version of Marine Litter maps.
- Organization of the second online workshop of the Board of MSFD experts focused on D8/D9.

2. Meetings held since last report

Date	Location	Topic	Attended/ Organised	Short Description
11/01/2018	videoconference	Agreement of the format and content for the INSPIRE use case	A	TG DATA meeting to contribute to Art 19.3 recommendations on publication of datasets
18/01/2018	Paris, France	SeaDataCloud-EMODnet Chemistry-CMEMS strategic meeting	A	Meeting to discuss the terms of reference for two bilateral MoU for data exchange
22-25/01/2018	Porto, Portugal	EUDAT Conference "Putting the EOSC vision into practice"	A	Presentation on Adopting and adapting SeaDataNet services for EMODnet Chemistry
06-08/02/2018	Roskilde, Denmark	EMODnet Chemistry Annual Plenary and SC meeting	O	
12-13/02/2018	Bruxelles, Belgium	TG DATA	A	INSPIRE compliance for EMODNet Chemistry data models
22-23/02/2018	Athens, Greece	MEDCIS Stakeholder Workshop on Marine Litter and Contaminants	A	EMODnet Chemistry activity and standards
27/02/2018	videoconference	Regional data aggregation and validation	O	Consultation on results and open issues faced by the RLs
09/03/2018	videoconference	Internal consultation	O	Internal consultation on the proposal for dedicated maps, it's implication in the selection of contaminants and in the P01/P35 mapping
13/03/2018	videoconference	Regional data aggregation and validation	O	Consultation on results and open issues faced by the RLs

16/03/2018	videoconference	Board of MSFD experts for EMODnet Chemistry: Contaminants online workshop	O	Second online workshop of the MSFD board of experts for EMODnet Chemistry focused on MSFD Descriptor 8/9 Contaminants, aimed to gather feedback on the new dedicated maps to be released by M20
20-23/03/2018	Majorca, Spain	EMODnet TWG and SC meeting	A	Representatives from all lots, DG MARE, EASME, Secretariat and TRUST-IT

Note: A new column “**Attended/Organised**” has been added to create the link with **Indicator 6.2**, reporting the number of events attended and organised in period.

3. Work package updates

In the following, the updates per WP mainly focused to the period January-March 2018.

WP1 – Project Management

The coordination activity in the trimester was mainly focused in the organisation of the first annual meeting, attended by most of the project participants, representing a unique communication and exchange moment with our very large consortium, crucial for the overall involvement and to get aligned on project planned deadlines.

Unfortunately, despite the effort dedicated, no progress can be noted on the definition of the Memorandum of Understanding to be formalised with INFO-RAC, aiming to improve marine data management in the Mediterranean region with a synergy between EMODnet Chemistry and INFO-RAC information platforms, with BSCS and UNEP/MAP, setting the cooperation framework needed to define the subcontracts, with OSPAR for the beach litter and ICES for seafloor litter data exchange.

A considerable energy was dedicated by the management board to reinforce the interaction with TG DATA and confirm the willingness to provide support in monitoring data management and delivery.

In addition, intense communication started with CMEMS INSTAC coordination to define a collaboration path that will include the joint development and deployment of delayed mode services to access datasets from both systems.

Finally, close interaction is initiated with JRC for marine litter data management.

WP2 – Data collection and metadata population

WP2 activity in this reporting period was focused on gathering data concerning selected **contaminants** and **marine litter data** and was undertaken by the majority of the partnership. CDI metadata already included in the infrastructure is increasingly enriched with metadata needed to identify monitoring/research purpose (with EDMERP references) and to describe Quality Assurance and Quality Control (QA/QC) procedures.

The guidelines for dataset preparation and formatting were circulated as a support for managing contaminants data collected in sediment and biota matrixes.

In parallel, the guideline for describing marine **micro litter** data sets using CDI and ODV files were updated with elements highlighted with the release of the first datasets and circulated for further implementation. The same happened for the Guideline for gathering **beach litter** and **seafloor litter**, updated with extensions identified when gathering new examples of datasets.

A very intense cooperation was undertaken with JRC to contribute to ML Baselines, where JRC collected beach, macro items, from regional, sub-regional and national sources, covering the period 2012-2016. This cooperation represented a very good opportunity for EMODnet in terms of data availability but requested an enormous effort because data were provided in 19 different formats, with large heterogeneity in sampling method (50m – 3km) and with high spatial-temporal heterogeneity.

JRC collected data from 23 Member States and obtained permission to provide all available data for future accessibility through EMODnet.

WP3 – Generation of data products

The regional leaders undertaken regional data aggregation and validation for nutrients, chlorophyll and oxygen compulsory for further preparation of DIVA interpolated maps (expected to be ready by end April 2018). Regular videoconference were organised and attended by all regional leaders to discuss issues and share the applied method.

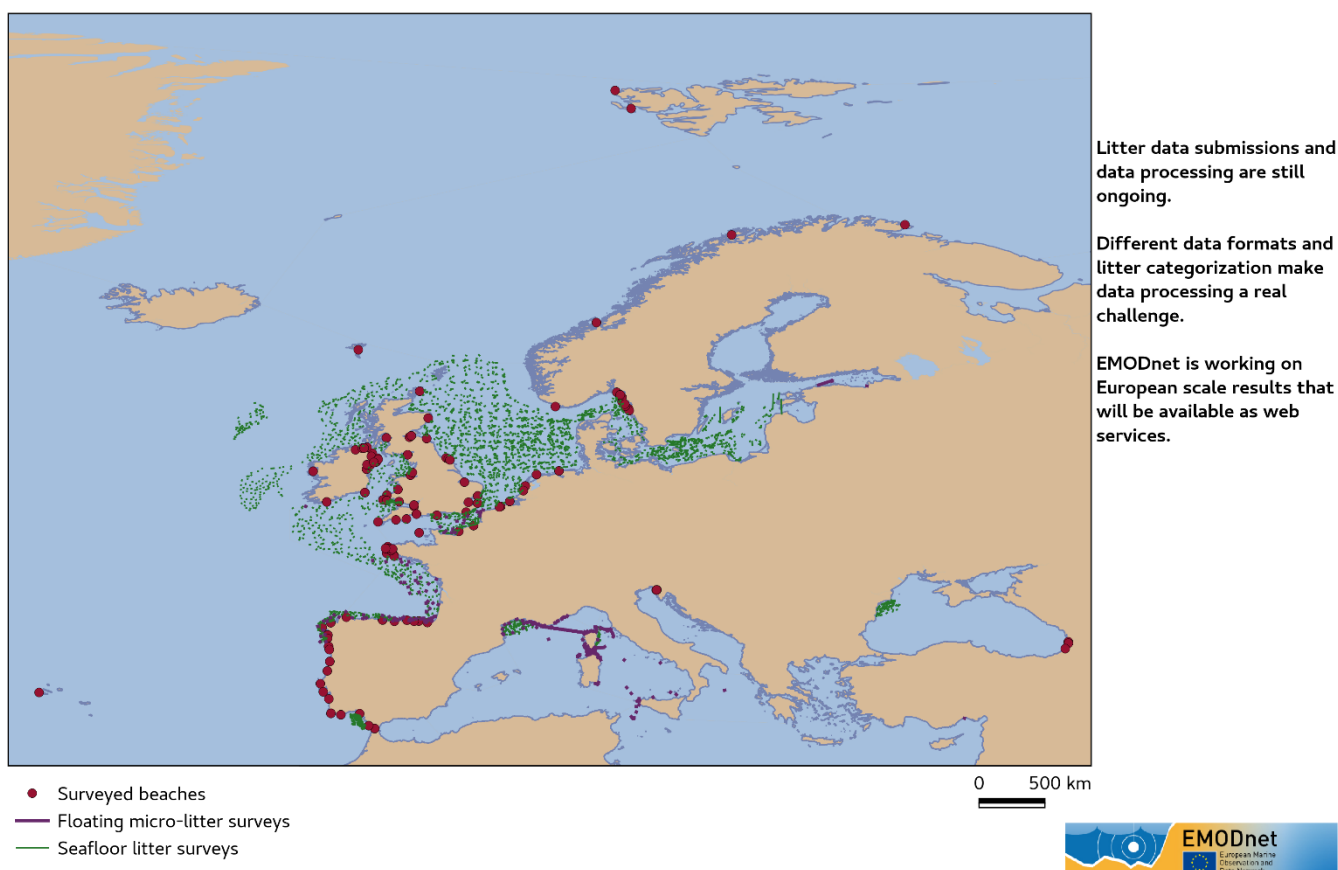
Intense dialogue and interaction was necessary to tune within the partnership, with the Steering Committee members and the board of MSFD experts the proposal for generating dedicated maps on contaminants, released by ISPRA. The board of MSFD experts was also consulted on the selection of parameters on which to focus the EMODnet Chemistry products.

In parallel, the **first maps** for seafloor litter and for beach litter at European scale were released. These have a partial coverage and are possible only thanks to the synergy and active interaction with OSPAR, HELCOM, EEA, DeFishGear, MEDITS, facilitated by MSFD Technical Group on Marine Litter and JRC.

Density maps for 2 "metacategories", namely **fishing gear and single use plastics**, were computed aggregating the data per MSFD regions and years. Data are provided by different sampling devices (gear types) and are not directly comparable between them as fully explained on the portal. Overall distribution of seafloor litter categories per MSFD regions (for the moment, North East Atlantic Ocean and Baltic Sea data have been analysed) was also provided as well as density maps of average quantity of **beach litter items** per number of surveys for the decade 2000-2010 and after 2010. Data were aggregated as average number of items considering the number of surveys.

This represented a first preliminary effort produced with data from more than 150 beaches, more than 5,500 seafloor trawling hauls and a few micro-plastics surveys. Data survey distribution map is shown in the following to demonstrate the extent of data made available in the period.

EMODnet litter data. First data survey distribution map (23/03/2018)



WP4 – Technical development and operation

OGS in cooperation with MARIS further progressed with the development of the central EMODnet databases to store **beach litter** data and **seafloor litter** data and in the definition of mapping tables between the different litter categories adopted by TG ML, OSPAR, UNEP/MAP, ICES and MEDITS. A number of issues were identified in MSFD Master List and will be reported, together with JRC, to the next TG ML meeting.

In this reporting period, further progress was made on the following items:

- The new restyled **EMODnet Chemistry portal** was further upgraded and has been constantly updated with new information, documents and highlights;

- **CDI Data Discovery and Access Service**, was further updated giving more option for searching and retrieving chemistry source data sets per MSFD region;
- **OceanBrowser Viewing Service**, was restyled following the new portal style templates and improved in viewing, browsing and downloading Chemistry data products;
- **Sextant Products catalogue service**, was moved to V6 and changed the grouping of available products (having together the 4 seasons). The link to DOIs has been added in the downloading facility;
- **Advanced viewing service for timeseries and profiles**, has been further discussed for its development, with the addition of APIs for controlled access by users;
- **PIWIK for general statistics** has been implemented by the operators of the portal and will be further expanded by related services after proper configuration for the different use cases.

WP5 – Uptake, outreach and interaction

After the first successful videoconference with the Board of MSFD experts focused on D5 (end of November 2017), a new remote event was organised in March 2018 focused on D8/9 to get feedback on the new proposal for dedicated maps. A questionnaire developed to illustrate it has been used to start the discussion and define the improvements highlighted by the Board.

A detailed description of the event, including the minutes of the workshop, are available at the following link: http://www.emodnet-chemistry.eu/newsevents/events/MSFD_board_of_experts_for_EMODnet_Chemistry_Contaminants_online_workshop_16_March_2018_Online

1.4.1. Tasks from Tender specifications

The progress on each of the tasks specified in Section 1.4.1 of the Tender Specifications is explicitly covered in the following section.

Task 1: Develop a common method of access to data held in repositories:

The CDI Data Access Service is regularly refined to meet the requirements of the users. In particular, after the addition of the possibility to search data by MSFD region, further improvements are discussed, also taking into account TG DATA (and EEA) requirements..

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

EMODnet Chemistry provides access to harmonized, aggregated and validated data collections and derived data products concerning eutrophication, contaminants, and, since this trimester, also for marine litter.

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

The development of API services for controlled access to the validated, aggregated and harmonised regional data collections was discussed and agreed during the TWG.

Presently, a number of web services to access and view metadata, data and data products are available and an API (allowing full machine-to-machine interaction) facilitates the extraction and delivery of regional data sets for the EMODnet Chemistry regional groups.

Additional APIs are planned for giving EEA, Regional Sea Conventions and other MSFD stakeholders direct access to the validated, aggregated and harmonised regional data collections

Task 4: Develop a web portal allowing users to find, visualise and download data:

A new version of the Chemistry web portal was released and is publicly available. EMODnet Chemistry portal was redesigned to give more emphasis to data and products released. The restyled and upgraded portal is in operation since the end of November 2017. It currently updated with up-to-date information, documents and highlights.

Task 5: Ensure the involvement of regional sea conventions:

A specific Board of MSFD experts (including representatives of Regional Sea Conventions) has been finalised, with a dedicated mailing list, and a remote conference was organised (end of November 2017) to strengthen the interaction. During the reporting period, a second videoconference was organised, with a focus on D8 and D9 (16 March 2018).

Task 6: Facilitate interoperability with data distributed by non-EU organisations:

EMODnet Chemistry takes advantage of the links and communication started within ODIP, the Ocean Data Interoperability Platform developed as a European effort together with Australia, Canada, and USA.. A reference to EMODnet infrastructure is included to the Joint WMO-IOC Strategy for Data Management (2018-2021).

Task 7: Install a process to monitor performance and deal with user feedback:

The usage of the service is closely and continuously monitored through indicators defined by EMODnet Secretariat and further tuned by TRUST-IT. Feedback from users are monitored, analysed and answered rapidly (see Section 5).

Task 8: Operate a help desk offering support to users:

The help-desk is available by online chat, email and telephone from 9:00 to 17:00 (Brussels time) from Monday to Friday. The online chat access icon is located at the right bottom of all pages and provides an immediate contact with a support agent. It is also possible to leave there a message while the service is offline. All contacts are recorded together with the reaction to them.

4. Specific challenges or difficulties encountered during the reporting period

- The integration of beach litter data coming from Member States, and collected by JRC in the framework of ML Baselines, presented huge information heterogeneity in the sampling method (with surveys on 100, 1000 (or both) or x (defined or unknown) meters, sometimes beach surveys are repeated along the same transect, sometimes not, sometimes data provided as sums or averages of different transects in the same beach), in the spatial-temporal information (not always spatial or temporal references are provided, when available these are heterogeneous), in the litter categories coding, presenting sometimes ad-hoc mapping between the used list and the TG-ML Master List. Weekly calls with JRC provided constant support and alignment on decisions to be taken.
- TG- ML Master List is a complete and useful reference document to convert from one coding to another. At the moment it is under review mainly because mapping between different lists is not always 1:1 correspondence and needs to be improved.
- Selection of the chemical parameters and definition of the dedicated maps for contaminants planned for the second year.
- Set up of the new monitoring indicators, including a multitude of additional information to be reported, in several cases to be filled manually.

5. User Feedback

The full Help service with telephone, online chat and email with answer in 2 working days is now operative. It's clear that the online chat is the preferred helpdesk channel. No calls were received via email/phone. Website visitors got quick support via this channel. EMODnet Chemistry agents were handling also questions about SeaDataNet infrastructure, contacting SeaDataNet helpdesk only upon need.

Date	Name	Organization	Type of user feedback (e.g. technical, case study etc)	Response time to address user request
2018-01-18	Hong Minh Le	Royal Belgian Institute of Natural Sciences	A question about finding information.	<1 min.
2018-02-12	BMM		A question about why are there two different OceanBrowser interfaces	<1 min.
2018-03-22	Raymond		User wonders how to handle the downloaded ODV data files.	<1 min.
2018-03-09	Chantal Vanhove	European Commission	User: I would be interested to know when the map on marine litter will be available. Agent: we hope we'll have something within next months	<1 min.
2018-03-23	Raymond	Royal Belgian Institute of Natural Sciences	User: Thank you for answering. I would have hoped for something more explicit. Is it possible to e-mail me when you have a clear view on the release? People at DG MARE, and especially Directorate A which is responsible for Maritime Affairs and Blue Economy, are	<1 min.

			keen to use the map. Thank you in advance.	
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Publication:

A. Giorgetti, E. Partescano, A. Barth, L. Buga, J. Gatti, G. Giorgi, A. Iona, M. Lipizer, N. Holdsworth, M.M. Larsen, D. Schaap, M. Vinci, M. Wenzer, EMODnet Chemistry Spatial Data Infrastructure for marine observations and related information. Ocean and Coastal Management, in press.

A. Abramic, E. Bigagli, V. Barale, M. Assouline, A. Lorenzo-Alonso, C. Norton, Maritime spatial planning supported by infrastructure for spatial information in Europe (INSPIRE). Ocean and Coastal Management, 152 (1), 2018, pp. 23-36. <https://doi.org/10.1016/j.ocecoaman.2017.11.007>.

6. Outreach and communication activities

Date	Media	Title	Short description and/or link to the activity
18/01/2018	Presentation	EMODnet Chemistry objectives and possible interfaces to/from CMEMS	The available data products and the interoperability solutions are presented to evaluate possible collaborations
22-25/01/2018	Presentation	Adopting and adapting SeaDataNet services for EMODnet Chemistry	EMODnet Chemistry data infrastructure and its link to SeaDataNet was presented to a wider audience, Porto, Portugal
12-13/02/2018	Presentation	Using INSPIRE for describing MSFD Criterion D5C1 "Nutrients concentrations in water"	Bruxelles, Belgium
22/02/2018	Presentation	Marine litter data management at European scale EMODnet	Athens, Greece
23/02/2018	Presentation	How EMODnet could help to collect and manage data to be used for GES assessment, which are not in national databases (e.g. from regular monitoring or research projects)	Athens, Greece
16/03/2018	Video-conference	What is EMODnet?	New contaminants maps presented to MSFD board of experts
June 2018	Publication	Seasonal and interannual trends of trophic status in northern Adriatic Sea in relation to nutrient loadings	Makes use of EMODnet Chemistry data

7. Updates on Progress Indicators

The new set of indicators defined by EMODnet Secretariat and further tuned by TRUST-IT is reported on a dedicated document. In this transitional phase, here we kept AWSTATS results only.

Indicator 1 - Volume of data made available through the portal

See attached

Indicator 2 - Organisations supplying each type of data based on (formal) sharing agreements and broken down into country and organisation type (e.g. government, industry, science)

See attached

Indicator 3 - Organisations that have been approached to supply data with no result, including type of data sought and reason why it has not been supplied

See attached

Indicator 4 - Volume of each type of data and of each data product downloaded from the portal

See attached

Indicator 5 - Organisations that have downloaded each data type

See attached

Indicator 6 - Using user statistics to determine the main pages utilised and to identify preferred user navigations routes

Time period 1 January 2018 – 31 March 2018:

Chemistry main portal: <http://www.emodnet-chemistry.eu/>

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan-18	549	5666	33817	141239	15.74 GB
Feb-18	489	3681	26586	119077	95.05 GB
Mar-18	713	1528	4731	24380	8.50 GB

Chemistry CDI data discovery and access service: http://emodnet-Chemistry.maris2.nl/v_cdi_v3/search.asp

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan-18	152	281	6.472	15.414	376.21 MB
Feb-18	170	311	7.764	17.312	241.44 MB
Mar-18	198	411	7.889	18.841	440.33 MB

Chemistry Products – Ocean Browser service: <http://oceanbrowser.net/emodnet/>

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan-18	248	616	32,475	43,543	7.24 GB
Feb-18	272	606	40,894	53,933	40.85 GB
Mar-18	319	681	53,118	66,306	10.25 GB

Sextant- Products metadata catalogue:

http://sextant.ifremer.fr/en/web/emodnet_chemistry/catalogue#/search?sortBy=popularity&from=1&to=20

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan-18	66	158	19,465	23,672	739.16 MB
Feb-18	65	126	13,013	15,743	436.01 MB
Mar-18	16	23	1,471	1,899	53.70 MB

From march 2018, the above web statistics relates only to direct access to Sextant catalogue hosted by Ifremer. However, access via EMODnet Chemistry were not counted due to a new API integration. Due to Awstats limits only views are counted: **155 views during March 2018.**

Indicator 7 - List of what the downloaded data has been used for (divided into categories e.g. Government planning, pollution assessment and (commercial) environmental assessment, etc.)

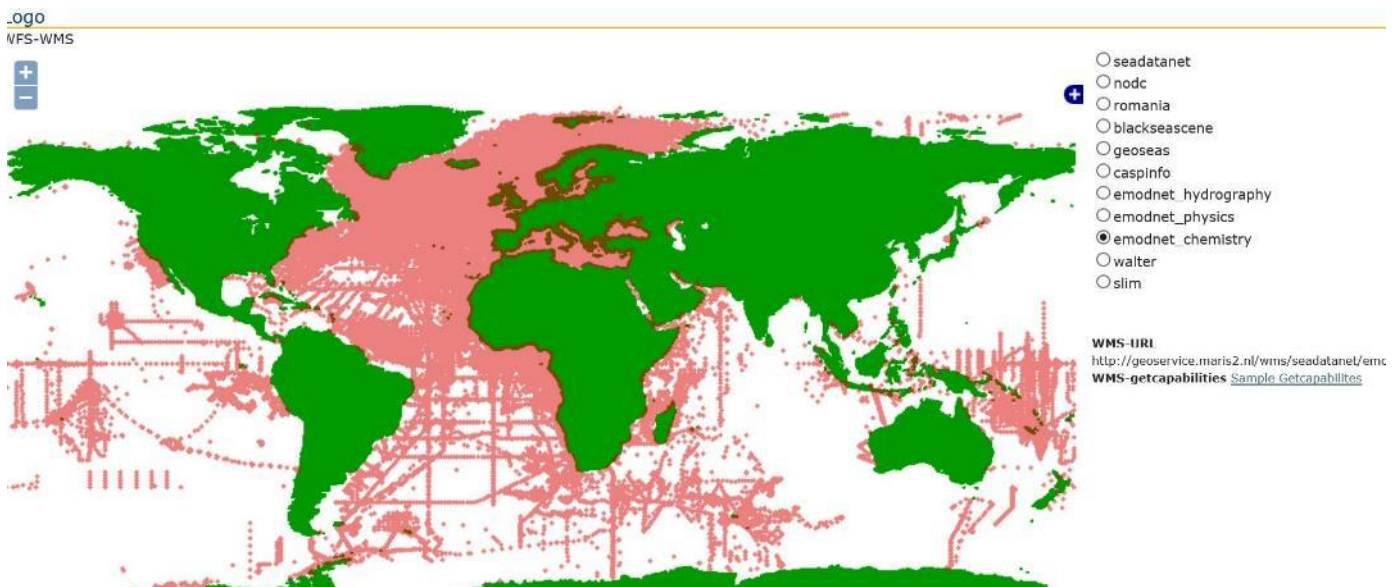
See attached

Indicator 8 - List of web-services made available and user organisations connected through these web-services

CDI Data Discovery and Access service:

The CDI service has WMS and WFS services which are used primarily internally and by the OceanBrowser service for providing a layer of CDI entries and option for retrieving CDI metadata:

WMS and WFS service: http://geoservice.maris2.nl/wms/seadatanet/EMODnet_chemistry



Example of EMODnet Chemistry WMS layer for points

GetCapabilities:

http://geoservice.maris2.nl/wms/seadatanet/EMODnet_chemistry?service=WMS&request=GetCapabilities

Note: Getcapabilities indicates what is available. In CDI case it is both WMS and WFS. Implementing WFS is depending on the client and needs programming. We provide WFS request through WMS:

http://geoservice.maris2.nl/wms/seadatanet/EMODnet_chemistry/?LAYERS=points&QUERY_LAYERS=points&STYLES=&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetFeatureInfo&BBOX=-25.168107%2C39.506018%2C25.808455%2C64.994299&FEATURE_COUNT=10&HEIGHT=290&WIDTH=580&FORMAT=image%2Fpng&INFO_FORMAT=text%2Fhtml&SRS=EPSG%3A4326&X=296&Y=129

with BBox as LON,LAT,LON,LAT for the layer points.

Data product Viewing and Downloading service:

The analysed field generated by DIVA (Data-Interpolating Variational Analysis) can be visualised using the WMS protocol which supports the following requests:

- GetCapabilities

This request is used to provide all layers of the map server. To every parameter and to every region corresponds a different WMS layer. An example of such a request would be:

<http://ec.oceanbrowser.net/EMODnet/Python/web/wms?request=GetCapabilities&service=WMS&version=1.3.0>

- GetMap

This request allows to extract a horizontal section of the 4D NetCDF file at the specified depth and time ([Example URL](#)). Per default, the axis are not displayed on a map. This can be activated by setting the parameter DECORATED to true ([Example URL](#)).

The GetMap can also be used to extract a vertical section ([Example URL](#)). The path of the section is encoded in the SECTION parameter: the longitude and latitude are separated by a comma and the coordinates by the pipe-symbol (|). The x-axis corresponds to the distance in arc degrees along the section (the first point is the origin) and the y-axis in the depth in meters. The parameter RATIO defines the aspect ratio of the vertical section.

Images can be returned in raster (PNG) and vector image formats (SVG, EPS, PDF). They can also be saved as a KML file so that the current layer can be visualized in programs like Google Earth and combined with other information imported in such programs.

By providing multiple time instances, the web map server can also return animation in the WebM or MP4 format using this GetMap request ([Example URL](#)). As the animation are generated dynamically, it usually takes a couple of minutes to create them. The frame rate of the animation is controlled through the parameter rate.

- GetFeatureInfo

This request returns a simple XML file with the underlying value of the analysed field ([Example URL](#)).

However, the WMS standards (in version 1.1.1 and 1.3.0) is not completely adequate for ocean analyses. A WMS allows to represent a data set according a list of different styles. A legend is attributed to each style which for scalar is colorbar. The legend for a given style is represented by a link to an image.

A single legend is used for entire data set (for all depth layers and time instances in particular). However, the ocean is strongly stratified and unique legend does not provide sufficient contrast because the ocean

properties at depth are often very different from the properties near the surface. The solution is to make the legend dynamic so that it can be adjusted based on a range of value at a specified depth and time

Dynamic Timeseries visualizations and requests for graphs:

Oceanbrowser uses three different services to enable end users to select, display and evaluate time series and profiles of data of a certain kind of parameter. Oceanbrowser uses the OGC web services WFS and WPS for this purpose. These three services are:

1. WFS get parameters request
2. WFS get locations and features
3. WPS get time series and plot in graph

Basic requests

OGC web services WFS consists of various requests, for WFS these are:

- GetCapabilities
- DescribeFeatureType
- GetFeature

<http://EMODnet02.cineca.it/geoserver/wfs?service=WFS&request=GetCapabilities> yields a capabilities document from the web feature service, or in other words all functionality provided by the services.

DescribeFeatureType describes all features described. In this case 2 services are available. The result of <http://EMODnet02.cineca.it/geoserver/wfs?service=WFS&request=DescribeFeatureType> is displayed in the figure below.

This information can be used to get a certain feature via the GetFeature statement. This GetFeature statement can be completed with a query to filter on geometry and all other available entities (columns in a database) of the type names available.

For instance

http://EMODnet02.cineca.it/geoserver/EMODnet/ows?service=WFS&version=1.0.0&request=GetFeature&typeName=EMODnet:p35_used&filter=<PropertyIsEqualTo><PropertyName>EMODnet:p35_id</PropertyName><Literal>EPC00005</Literal></PropertyIsEqualTo> gives the contents of P35_ID EPC00005

Above is used for the first 2 services used by OceanBrowser

1. Getting parameters

The first WFS is a very basic process that returns a table in xml with the list of available parameters. This table is used by OceanBrowser.

and displayed as follows:

Select data products ×

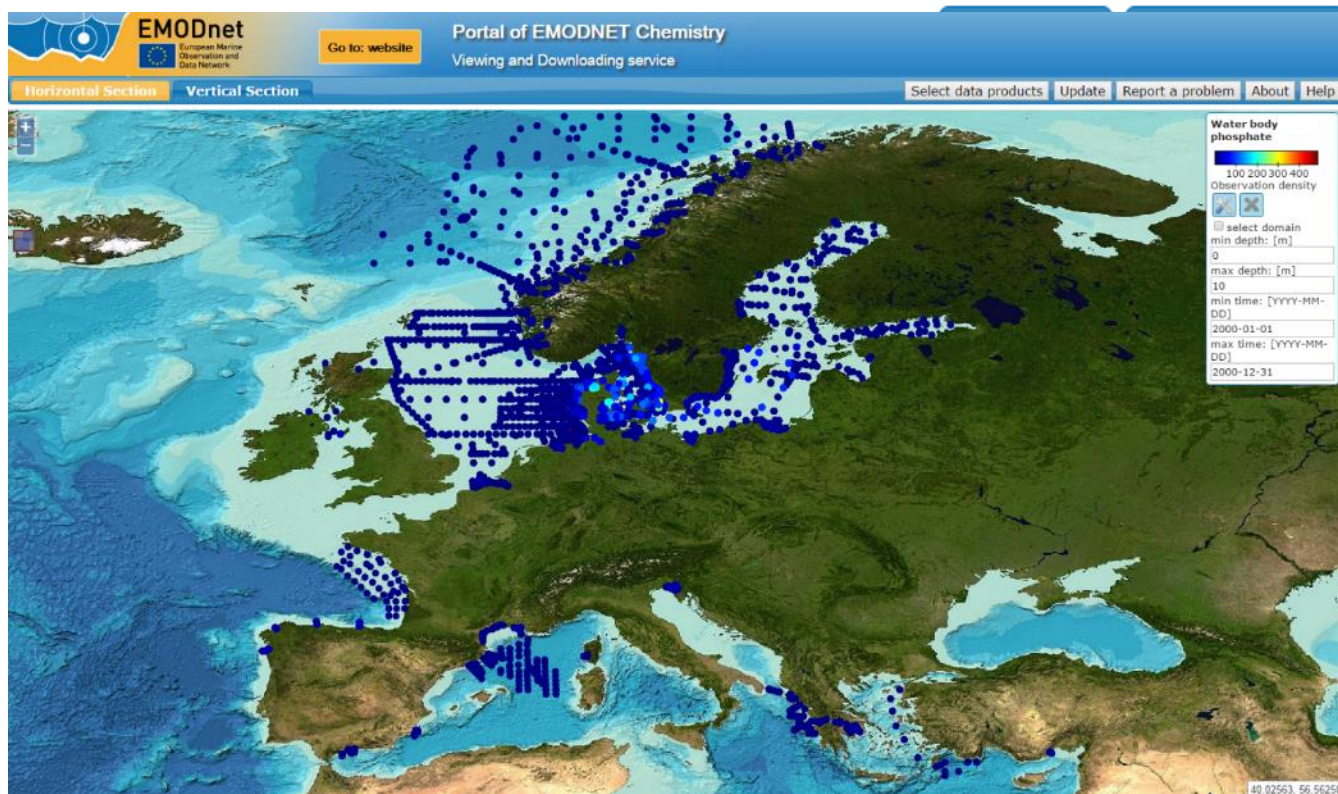
Search:

Add external layers

Layer

- ☒ Fertilisers
 - ☐ Water body phosphate
 - ☐ Water body nitrate plus nitrite
 - ☐ Water body ammonium
 - ☐ Water body nitrite
 - ☐ Water body total phosphorus
 - ☐ Water body total nitrogen
 - ☐ Water body nitrate
- ☒ Silicates
 - ☐ Water body silicate

EMODNET Chemistry - Static Plots ×



OceanBrowser: distribution density of monitoring stations.

2. Get locations and features

The Add layer button lets Oceanbrowser constructs a GetFeature request on the second WFS (observed_cindex) layer made available as a service.

OceanBrowser extents the filter with Datetime and BoundingBox. Especially the boundingbox takes care of a limited amount of data transferred. For EMODnet the entire Water body phosphate locations for the link above is visualised through next image.

Image: OceanBrowser

3. Plot time series of certain location

This is done by the OGC WPS that Deltares created to be able to extract data directly from the database. WPS stands for Web Processing Service and acts as middle ware between client side software and server side software. In this case, WPS acts between OceanBrowser and a database with all observations. The above described WFS processes are used to extract information end-users are interested in. By selecting a location, data and metadata extracted from the database can be visualised in the form of a graph. WPS also makes use of:

- getCapabilities (what can you do for me, what processes are available)
- DescribeProcess (how does a process work)
- Execute (execute a process)

getCapabilities

Gives the list of processes available.

<http://EMODnet02.cineca.it/wps?service=wps&version=1.0.0&request=getCapabilities> returns the list of processes.

DescribeProcess

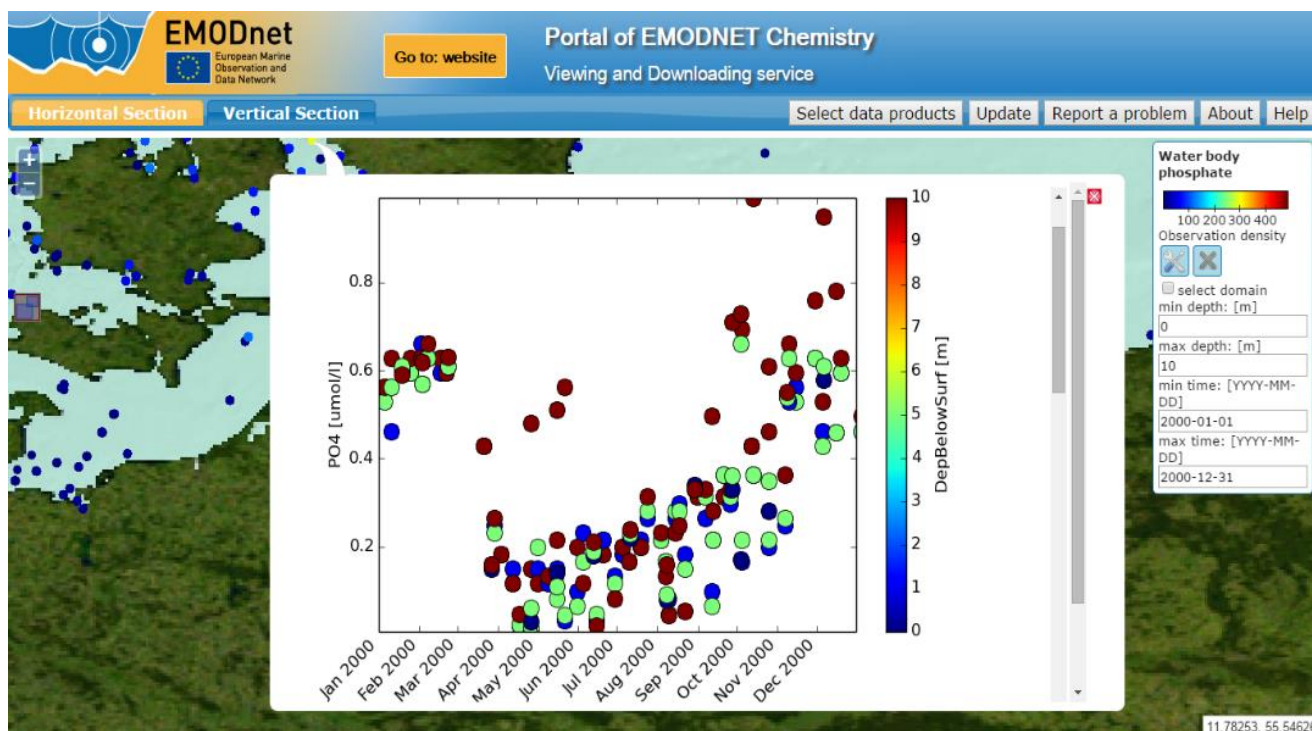
This describes the available processes of the WPS, including the inputs required, their allowable formats, and the outputs that can be produced.

http://EMODnet02.cineca.it/wps?service=wps&version=1.0.0&request=describeProcess&identifier=bbox_plot_timeseries

ExecuteProcess

The execute process is build-up on the user choice which can be found on the right hand side of the OceanBrowser portal. OceanBrowser constructs the entire HTML including the ExecuteProcess statement which triggers the WPS.

Figure 59. Ocean Browser: time series.



[http://ec.oceanbrowser.net/EMODnet/proxy?url=http://EMODnet02.cineca.it/wps?DataInputs=\[z=ADEPZZ01;zlim1=10;bbox=11.8750340184,11.9848973101,57.6323448275,57.742208087;starttime=2000-01-01T00:00:00Z;endtime=2001-01-01T00:00:00Z;parameter=EPC00007;zlim0=0;log10=0;markersize=12.0;alpha=1\]&service=wps&request=Execute&Identifier=bbox_plot_timeseries&version=1.0.0](http://ec.oceanbrowser.net/EMODnet/proxy?url=http://EMODnet02.cineca.it/wps?DataInputs=[z=ADEPZZ01;zlim1=10;bbox=11.8750340184,11.9848973101,57.6323448275,57.742208087;starttime=2000-01-01T00:00:00Z;endtime=2001-01-01T00:00:00Z;parameter=EPC00007;zlim0=0;log10=0;markersize=12.0;alpha=1]&service=wps&request=Execute&Identifier=bbox_plot_timeseries&version=1.0.0)

Eventually, end-users would like to gain insight in observation distribution for a certain location. OceanBrowser executes the process like the above example and retrieves a timeseries like the next picture.

For the same observation, different flavours can be given (from OceanBrowser). The following is a profile call, triggered from the OceanBrowser:

[http://ec.oceanbrowser.net/EMODnet/proxy?url=http://EMODnet02.cineca.it/wps?DataInputs=\[z=ADEPZZ01;zlim1=10;bbox=11.8750340184,11.9848973101,57.6323448275,57.742208087;starttime=2000-01-01T00:00:00Z;endtime=2001-01-01T00:00:00Z;parameter=EPC00007;zlim0=0;log10=0;markersize=12.0;alpha=1\]&service=wps&request=Execute&Identifier=bbox_plot_profile&version=1.0.0](http://ec.oceanbrowser.net/EMODnet/proxy?url=http://EMODnet02.cineca.it/wps?DataInputs=[z=ADEPZZ01;zlim1=10;bbox=11.8750340184,11.9848973101,57.6323448275,57.742208087;starttime=2000-01-01T00:00:00Z;endtime=2001-01-01T00:00:00Z;parameter=EPC00007;zlim0=0;log10=0;markersize=12.0;alpha=1]&service=wps&request=Execute&Identifier=bbox_plot_profile&version=1.0.0)

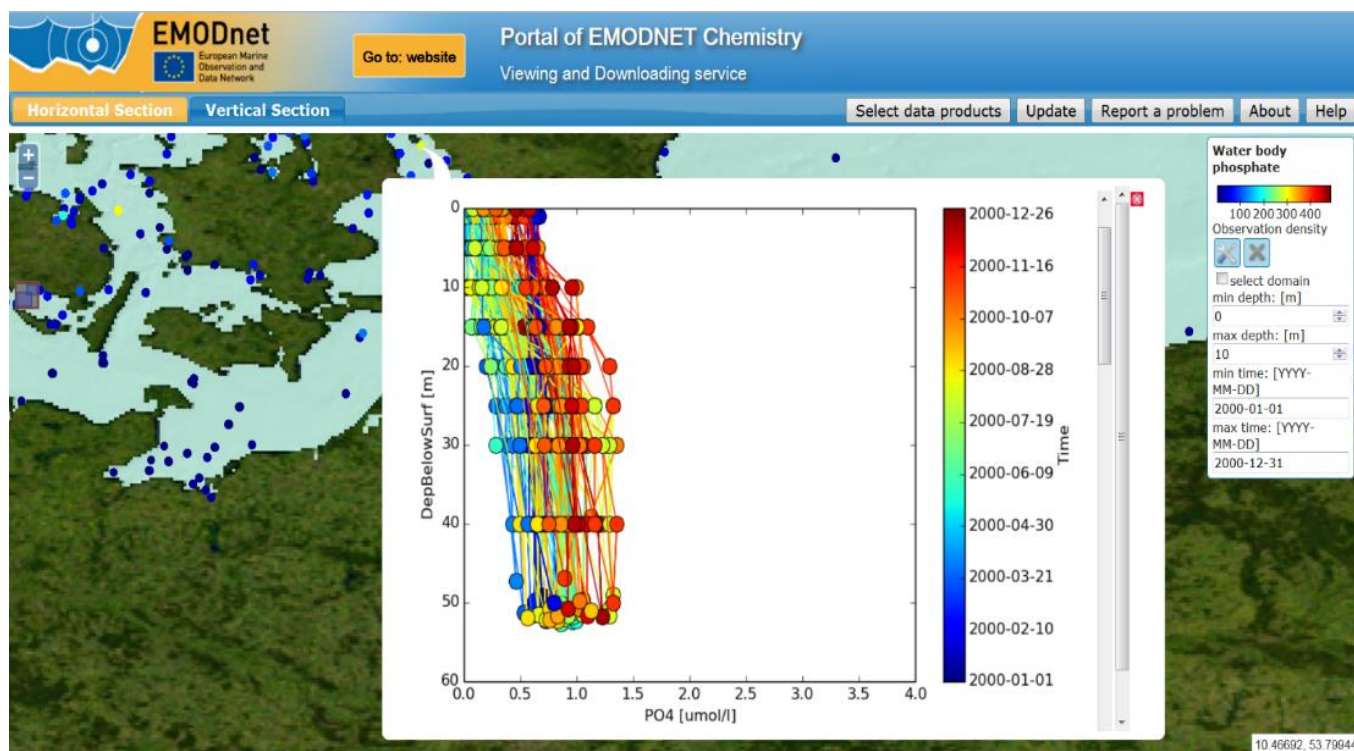


Figure 60. Ocean Browser: temporal profiles.

The output is:

Together with a picture, a list of EDMO codes, LOCAL_CDI's and links to the data shopping of the used observation is provided. For instance, this is a part of the list generated in OceanBrowser for the profile above:

- EDMO code: 729 - local CDI: [Vand 111095](#)
- EDMO code: 729 - local CDI: [Vand 111096](#)
- EDMO code: 729 - local CDI: [Vand 111097](#)
- ...
- EDMO code: 729 - local CDI: [Vand 111121](#)
- ...