ODYSSEA

Creating products and knowledge for the Mediterranean

ΔΗΜΟΚΡΙΤΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΡΑΚΗΣ | DEMOCRITUS UNIVERSITY OF THRACE

THE CMEMS AND EMODNET PLATFORMS AND PRODUCTS

2nd ODYSSEA Summer School, Alonissos, 2-6/9/2019

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Contents

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What is CMEMS

CMEMS

- CMEMS is the **Copernicus Marine Environment Monitoring Service**, operated by Mercator Ocean in Toulouse, France
- It is a service providing **full, free and open access marine data** to regular and systematic reference
- It covers **all European regional seas**
- It is **based** largely **on satellite measurements** of parameters such as surface temperature, ocean color, sea surface height and sea ice, **as well as information from** circulation, wave and biogeochemical **models** validated **from measurements received from instruments in the sea**.

CMEMS

COPERNICUS marine service encompasses 3 main components: **SPACE** , **INSITU** and **SERVICES**

1. **SPACE** includes the ESA Sentinels

2. **INSITU** includes monitoring networks as buoys, drifters, gliders, moorings, etc.

3. **SERVICES** includes all data products (reanalysis, forecasts, satellite data, etc)

CMEMS

marine.copernicus.eu

Which are CMEMS Products

CMEMS Data Products

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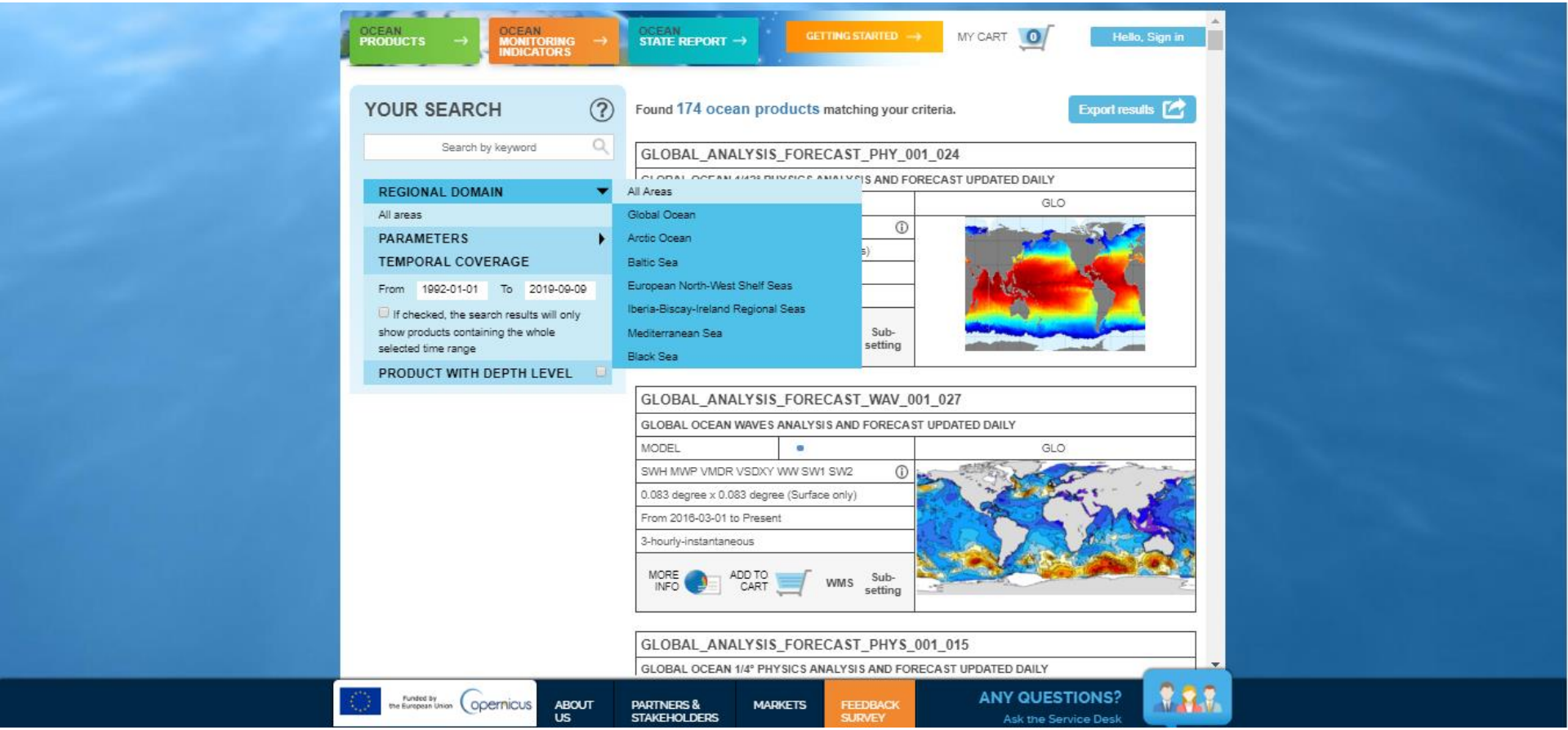

CMEMS Data Products for the Med

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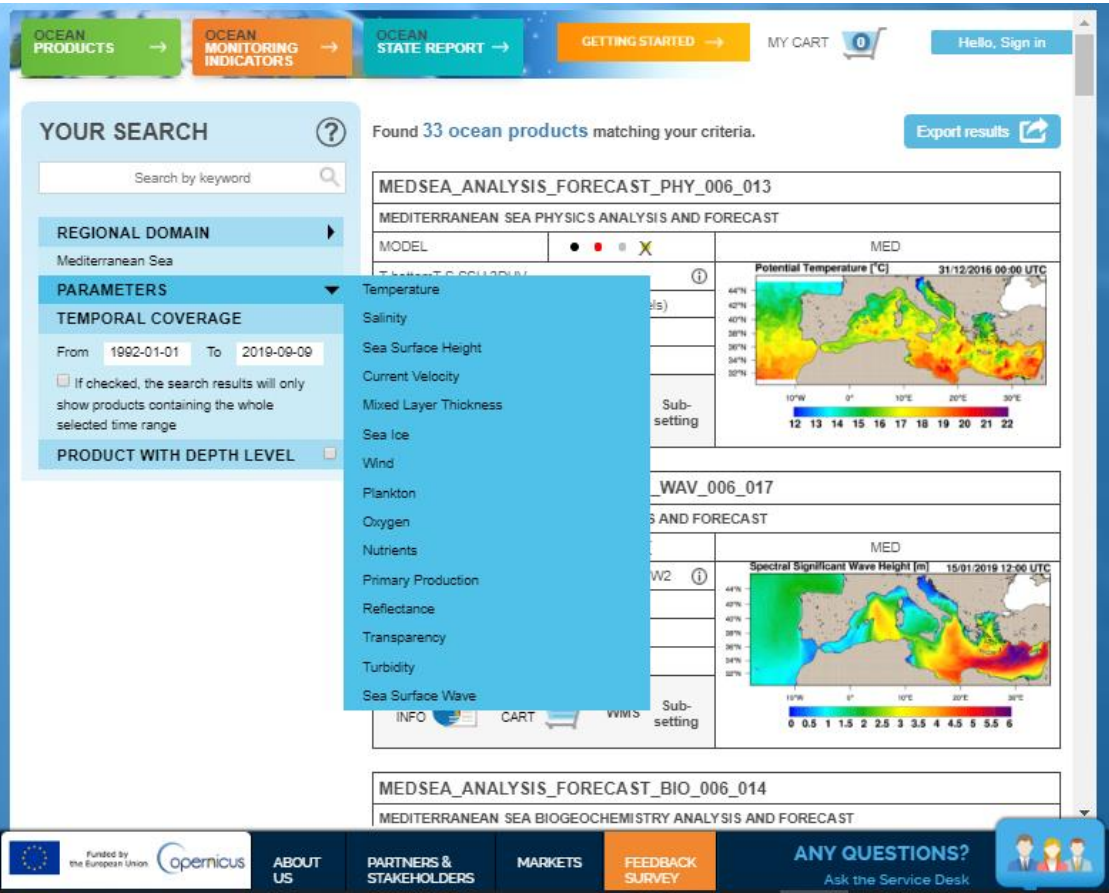
There are currently 33 marine data products for the Mediterranean Sea in CMEMS



CMEMS Data Products for the Med

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These data products are divided into:

- **Forecasts** from numerical models
- **Reanalysis of historic** data from assimilated numerical models
- **Insitu NRT** and delayed observations from on-site sensors
- **NRT and reprocessed** satellite data

CMEMS Data Products for the Med – Model Data

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Product	Analysis and Forecast	Reanalysis or Hindcast	Variables
SEA PHYSICS	**0.042 deg.** (~4.6km) 141 Layers	**0.0625 deg.** (~6.9km) 72 Layers	T bottomT S SSH 3DUV
SEA WAVES	**0.042 deg.** Surface only	**0.042 deg.** Surface only	SSH SWH MWP VMDR VSDXY W W SW1 SW2
SEA BIOGEOCHEMISTRY	**0.042 deg.** 125 Layers	**0.0625 deg.** 72 Layers	SSH CHL PHYC O2 NO3 PO4 PP

CMEMS Data Products for the Med - In-situ Observations Data

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Product	Resolution	Level	Variables
IN-SITU NEAR REAL TIME OBSERVATIONS	undefined	L2	T S CHL SWH VMDR

CMEMS Data Products for the Med - Satellite Data

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Product	Resolution	Level	Variables
SEA SURFACE HEIGHTS AND DERIVED VARIABLES NRT OR REPROCESSED	0.25 deg. (27.5km) 0.125 (13.75km)	L4	SSH UVG
SEA LEVEL ANOMALIES NRT OR REPROCESSED TAILORED FOR DATA ASSIMILATION	7km	L3	SSH
SEA SURFACE HEIGHTS NRT TAILORED FOR DATA ASSIMILATION	0.125 (13.75km)	L3	SSH
SEA SURFACE CHLOROPHYLL CONCENTRATION FROM MULTI SATELLITE OBSERVATIONS	1km	L3 and L4	CHL
SEA REMOTE SENSING REFLECTANCES AND ATTENUATION COEFFICIENT AT 490NM FROM MULTI SATELLITE AND SENTINEL-3 OLCI OBSERVATIONS	1km	L3 and L4	RRS CDM APHY BBP KD
SEA SURFACE TEMPERATURE MONO AND MULTI-SENSOR OBSERVATIONS	0.01 deg. (~1.1km) 0.02 deg. (~2.2km) 0.04 deg. (~4.4km) 0.0625 deg. (~6.9km)	L3 and L4	SST
SEA SURFACE WINDS	0.25 deg. (27.5km) 0.125 (13.75km)	L3 and L4	WIND

CMEMS Model Variables

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Physics

Potential Temperature [degC], T
Salinity, S
Sea Surface Height [m], SSH
Ocean mixed layer thickness [m], MLD
Horizontal Currents meridional and zonal component [m/s], CUR
Sea floor Potential Temperature [degC], bottomT

Waves

Spectral significant wave height [m], VHM0
Wave period at spectral peak / peak period [s], VTPK
Spectral moments (-1,0) wave period [s], VTM10
Spectral moments (0,2) wave period [s], VTM02
Mean wave direction from [degree], VMDR
Spectral significant wind wave height [m], VHM0 WW
Spectral moments (0,1) wind wave period [s], VTM01 WW
Mean wind wave direction from [degree], VMDR WW

CMEMS Model Variables

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Waves

Spectral significant primary swell wave height [m], VHM0 SW1
Spectral significant secondary swell wave height [m], VHM0 SW2
Spectral moments (0,1) primary swell wave period [s], VTM01 SW1
Spectral moments (0,1) secondary swell wave period [s], VTM01 SW2
Mean primary swell wave direction from [degree], VMDR SW1
Mean secondary swell wave direction from [degree], VMDR SW2
Wave principal direction at spectral peak [degree], VPED
Stokes drift U (m/s), VSDX Stokes drift V [m/s], VSDY

Biogeochemistry

Sea surface height above geoid [m], SSH
Mass concentration of chlorophyll a in sea water [mg m-3], CHL
Mole concentration of phytoplankton [mmol m-3], PHYC
Mole concentration of dissolved molecular oxygen in sea water [mmol m-3], O2
Mole concentration of nitrate in sea water [mmol m-3], NO3
Mole concentration of phosphate in sea water [mmol m-3], PO4
Net primary production of biomass [mg m-3 day-1], PP

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How to view available CMEMS parameters and data online

CMEMS GUI web portal

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CMEMS GUI web portal

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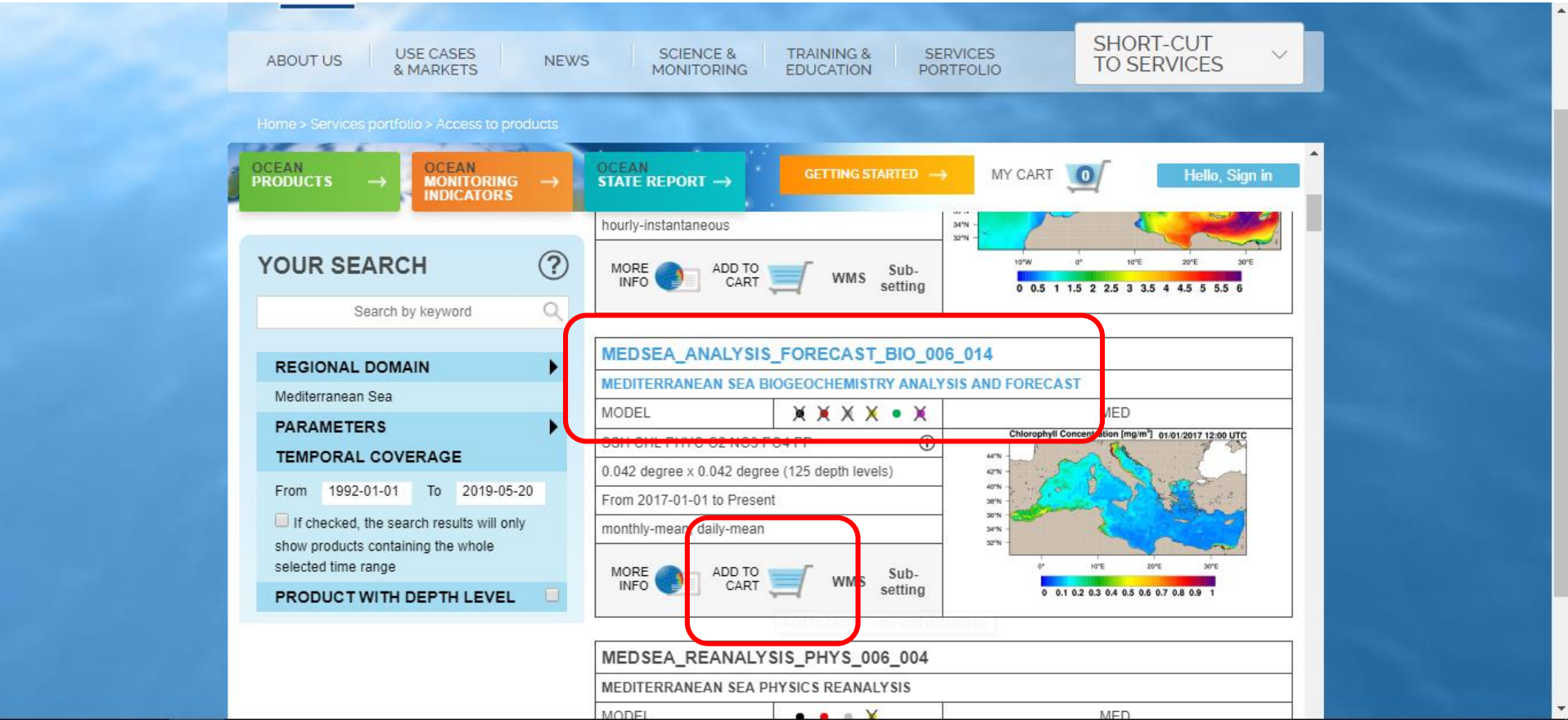
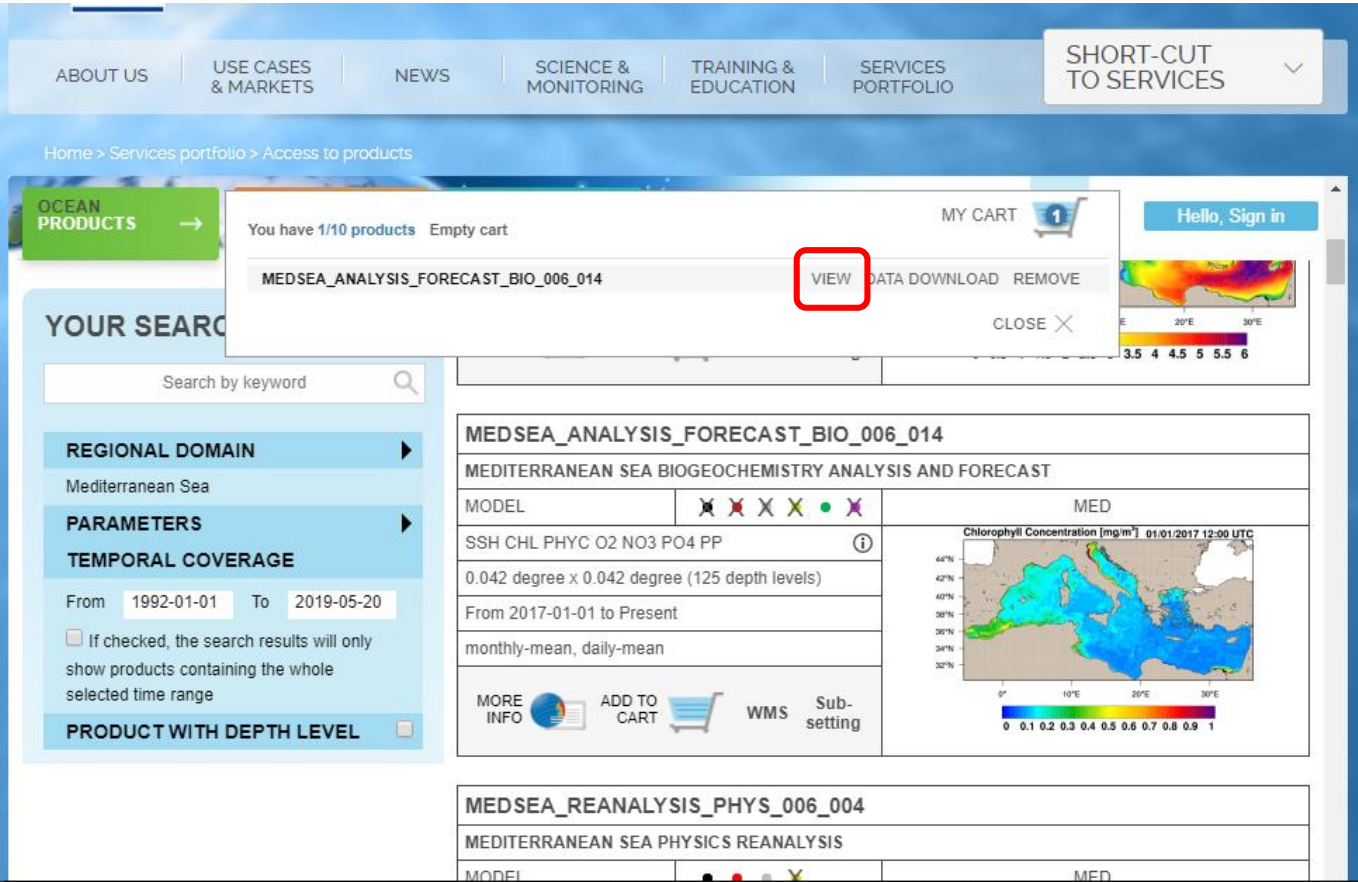


CMEMS GUI web portal

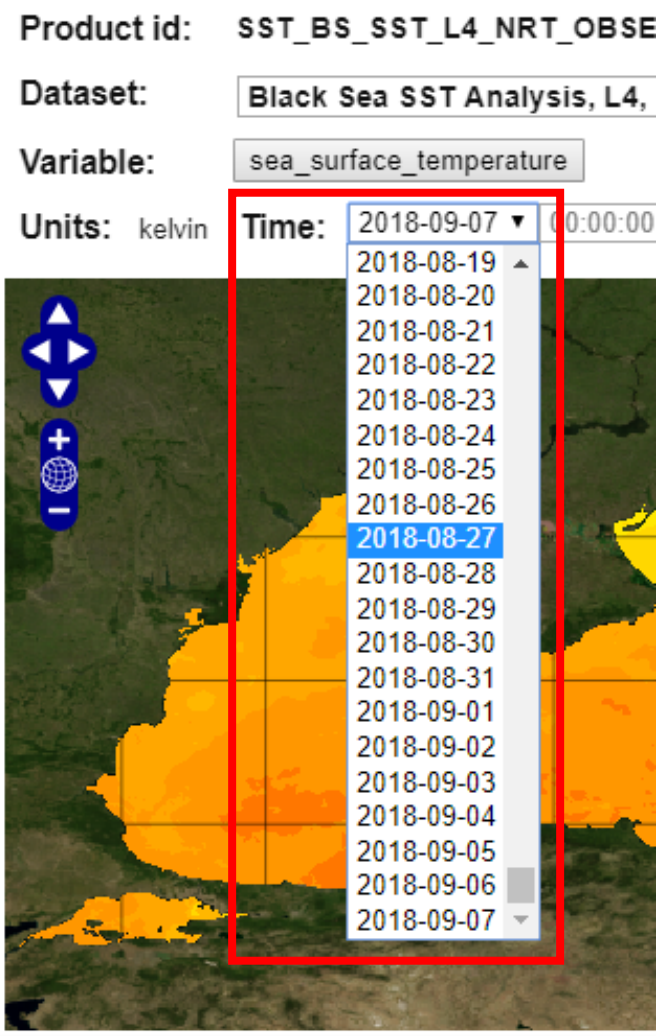
ODYSSEA

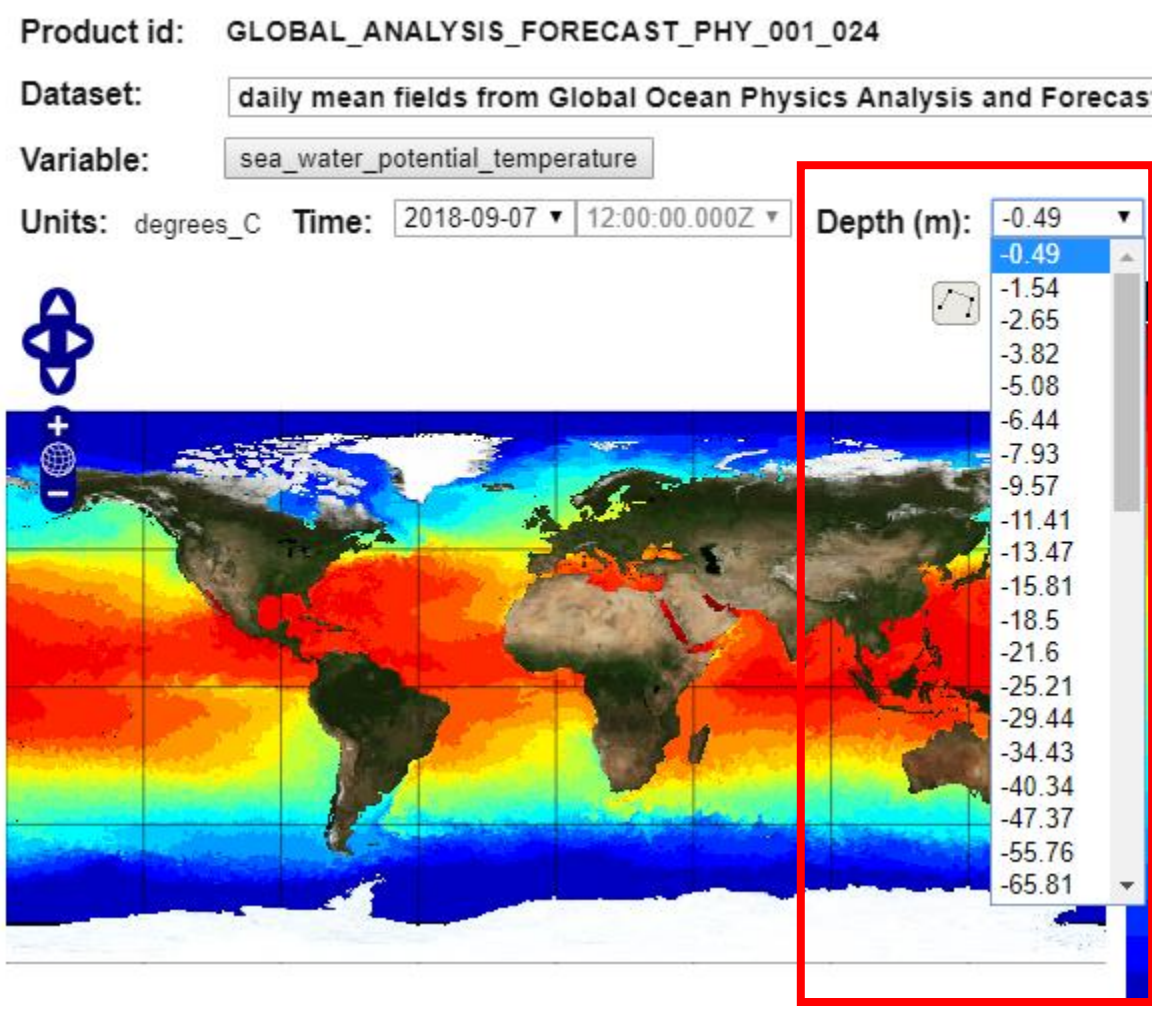


CMEMS Viewer

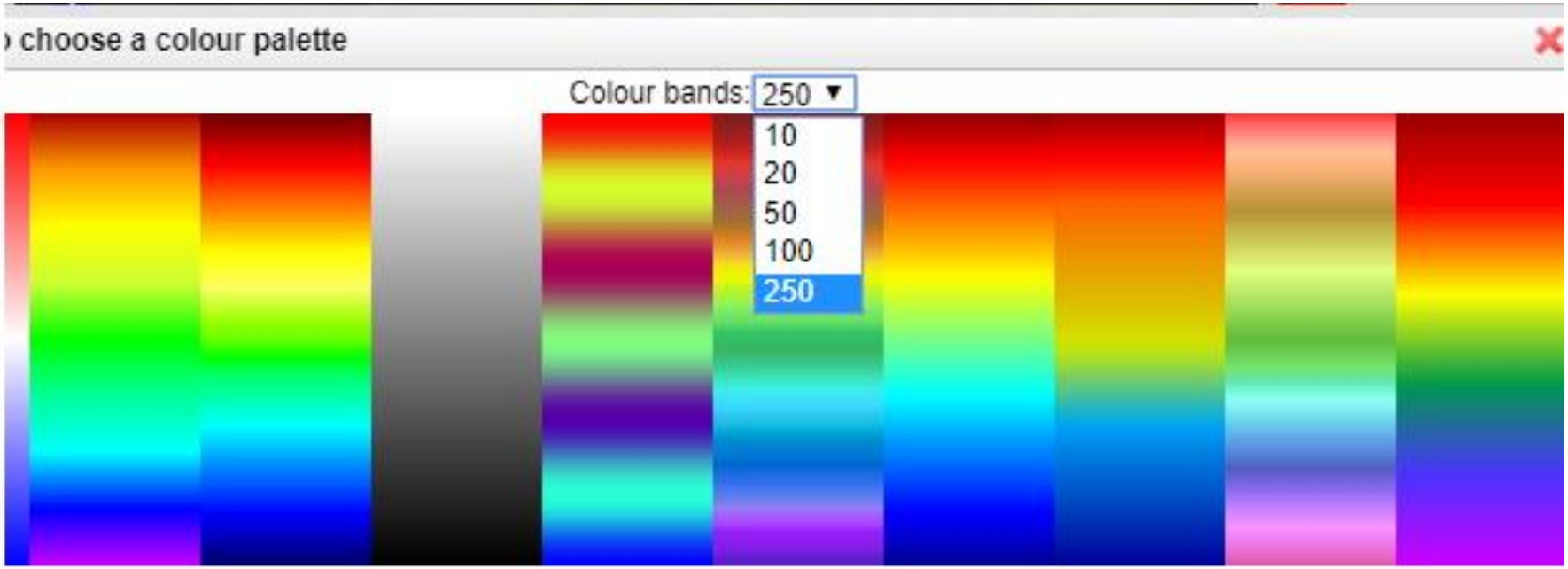
Date and Depth Selection

ODYSSEA



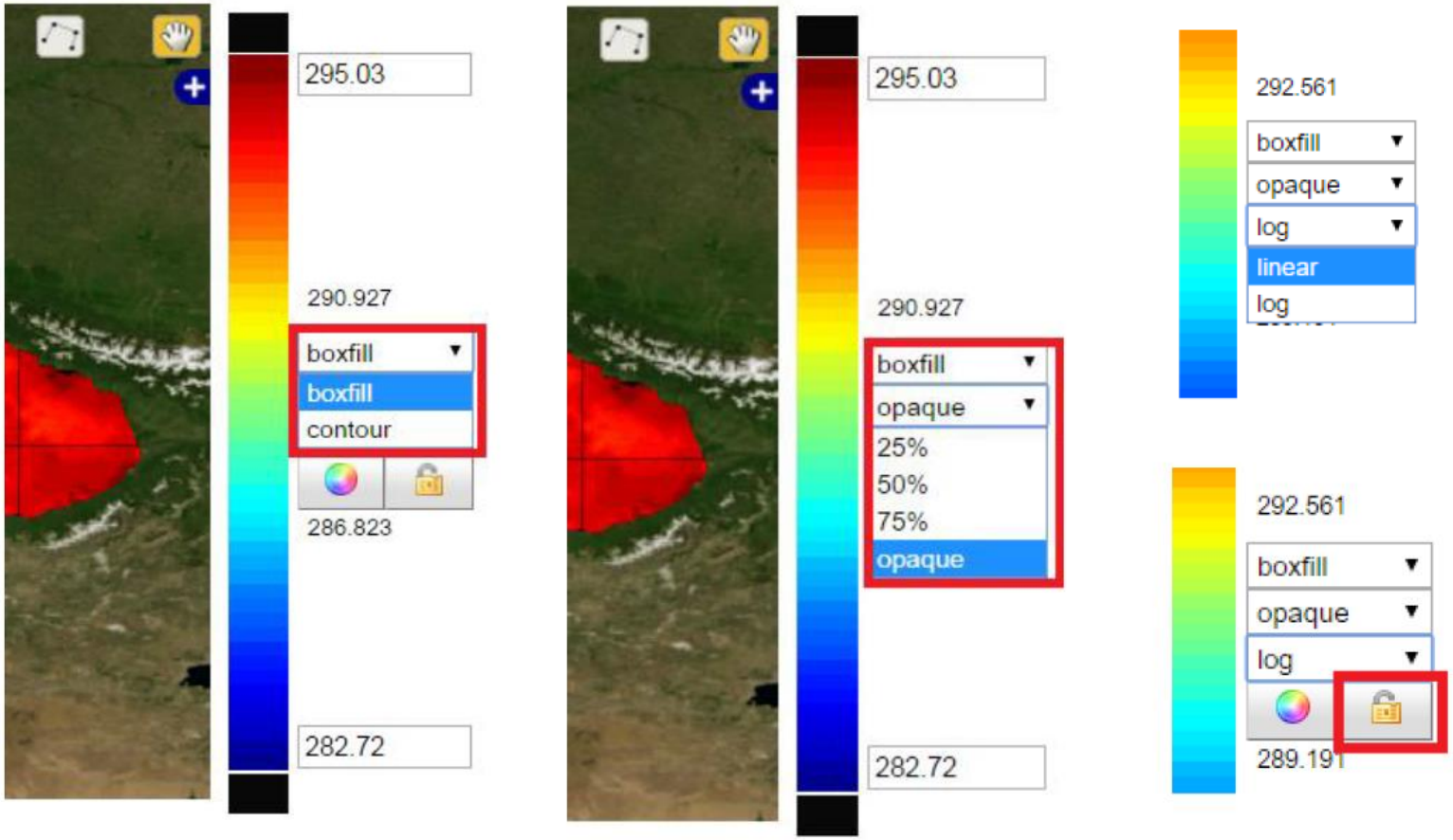


CMEMS Viewer
Color palette

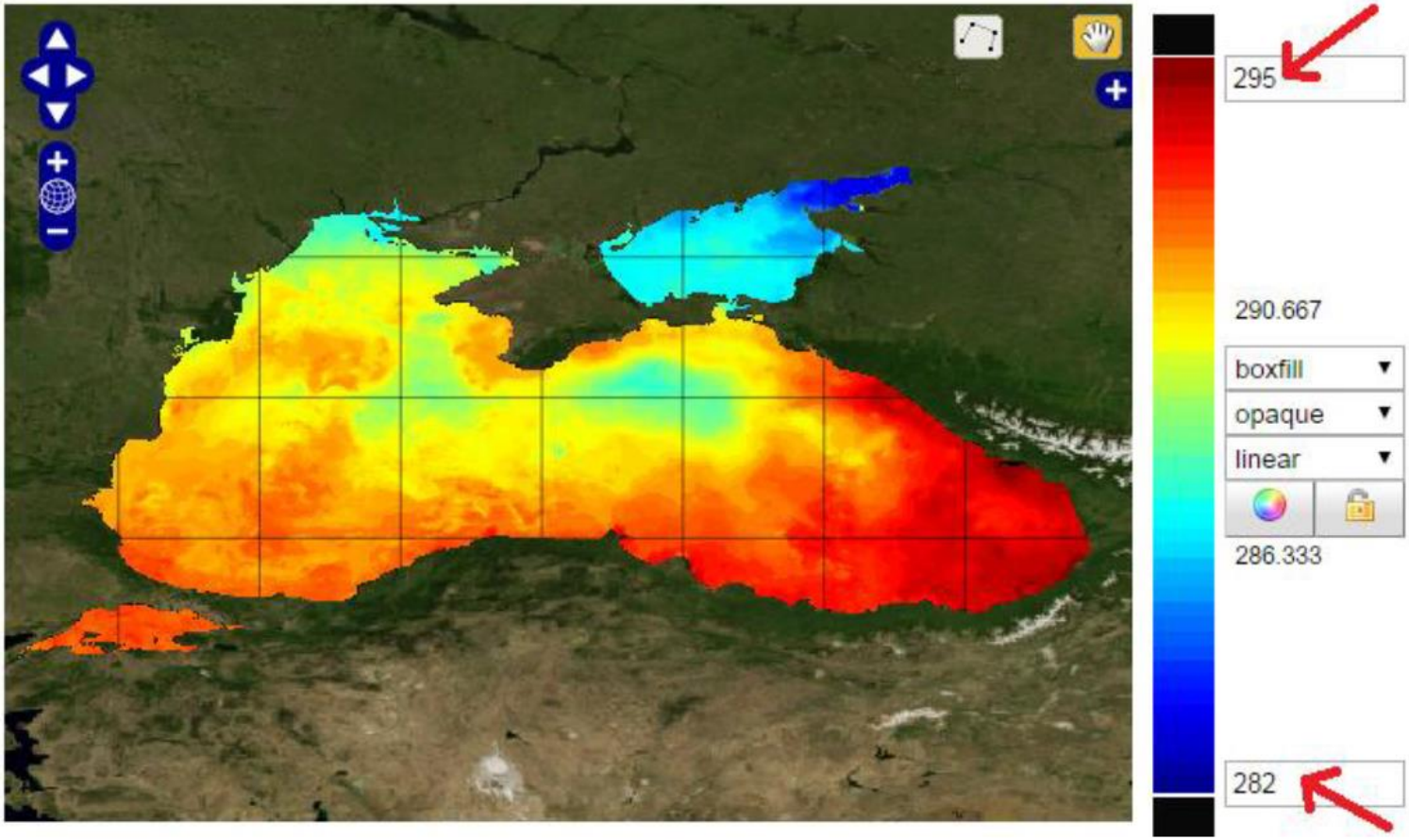


CMEMS Viewer

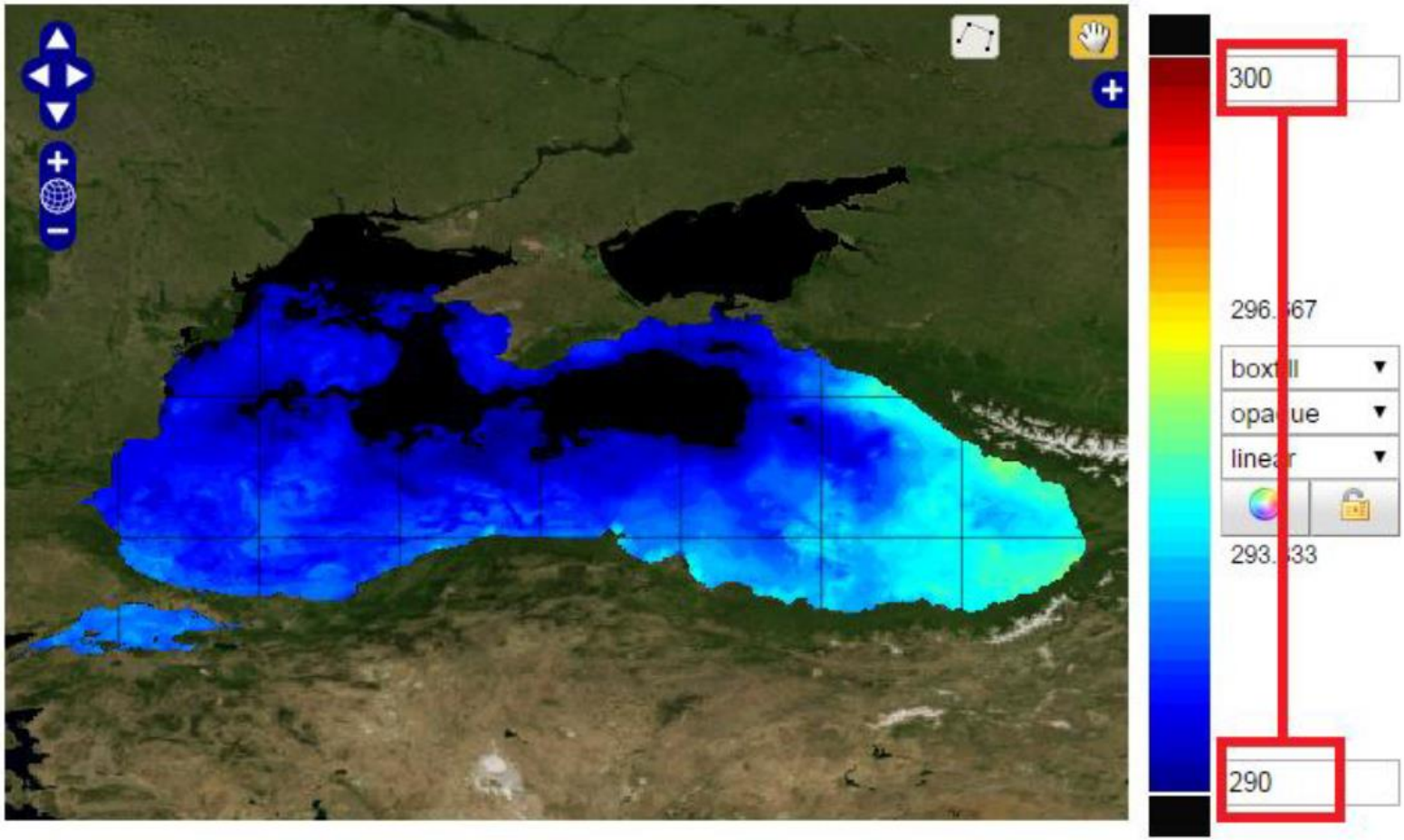
Boxfill, opacity and scale type



CMEMS Viewer
Scale Selection

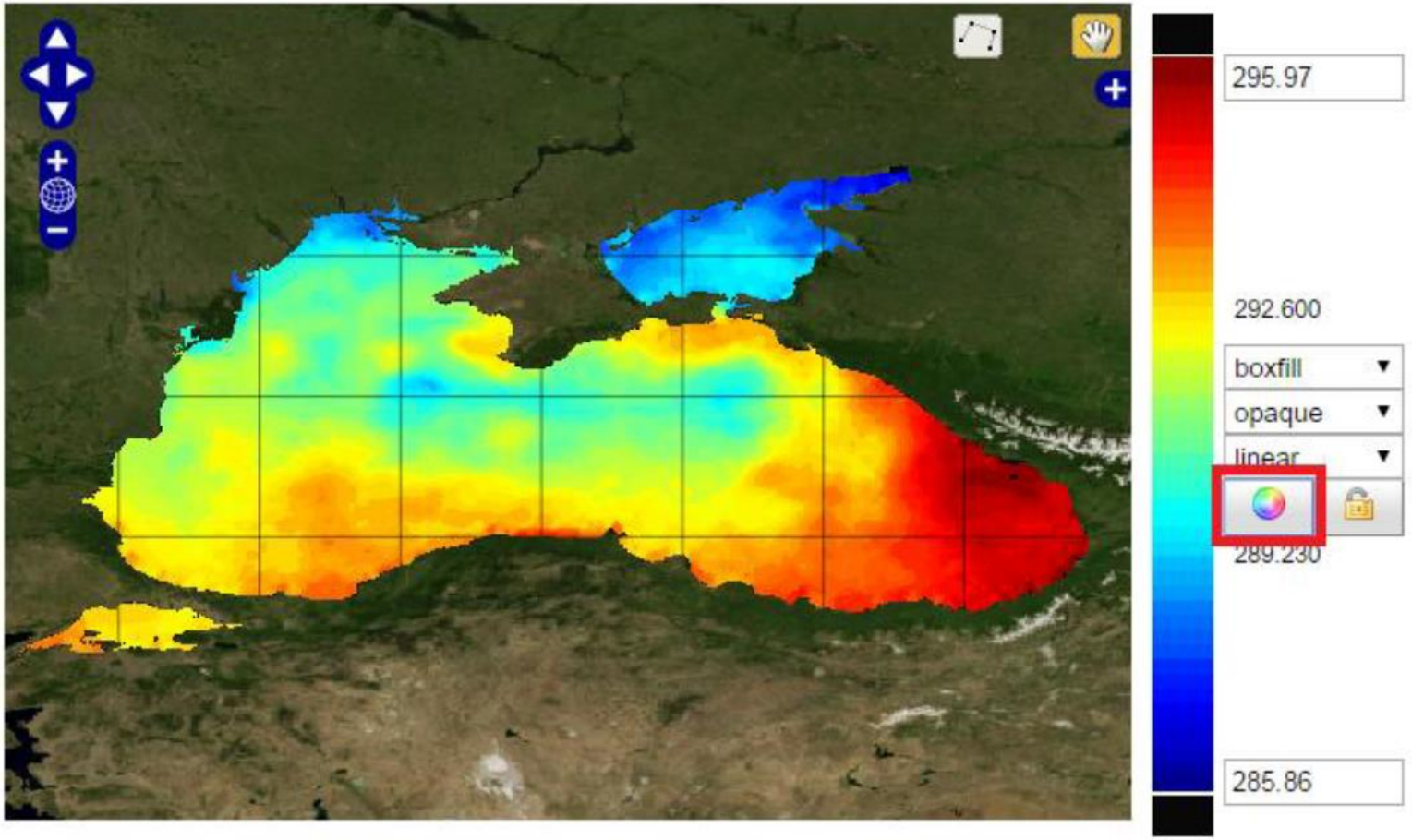


CMEMS Viewer
Color Scale Manual Adjust

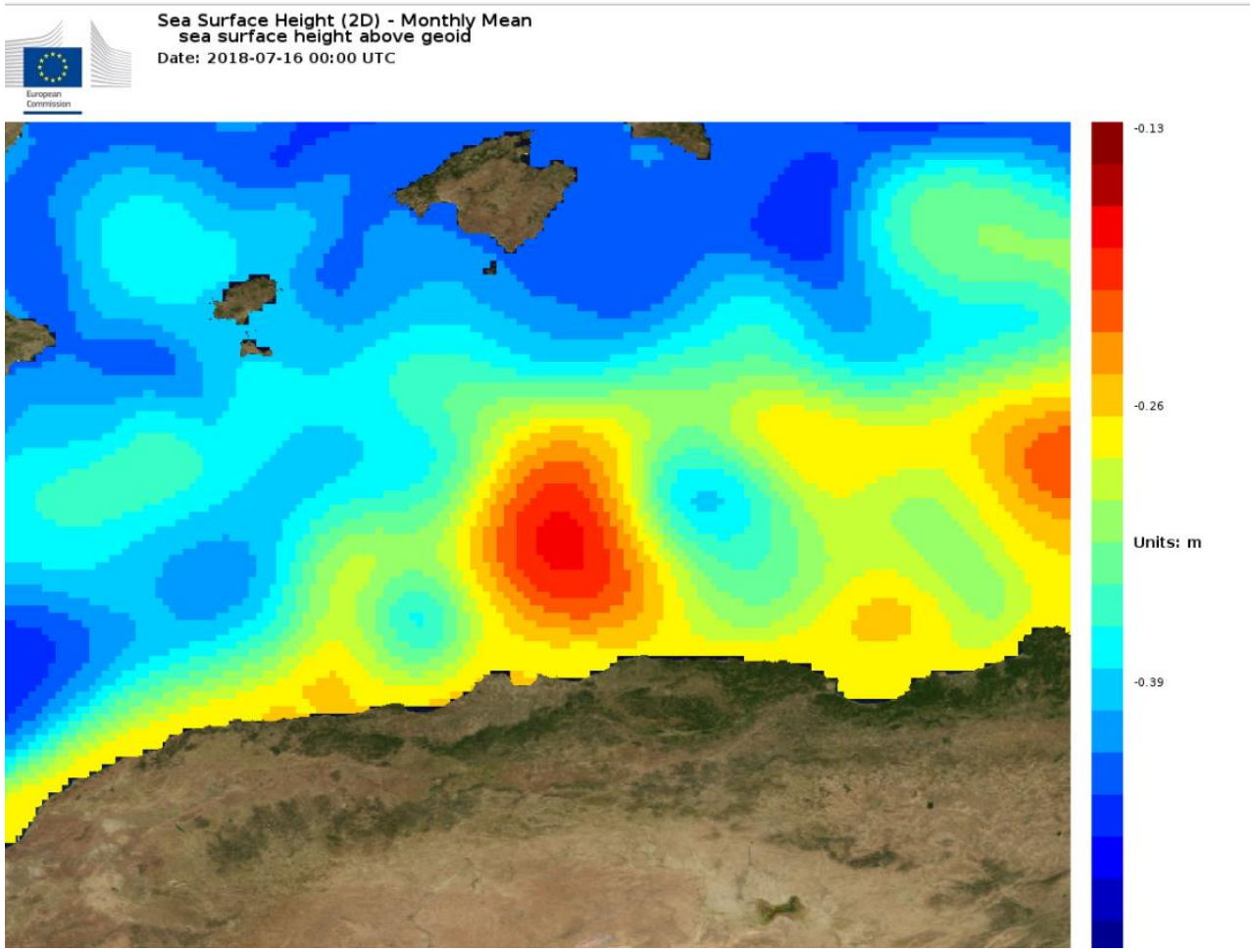


CMEMS Viewer

Color Scale Auto-adjust



CMEMS Viewer
PNG Image Export



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CMEMS Download Mechanisms

CMEMS Download Mechanisms

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CMEMS is offering 2 different authenticated Download Mechanisms. **For all of them, the user can authenticate with his CMEMS login and password**.

- **Subsetter**: The “Subsetter” allows you to subset the data, and should be used if you wish to download a small part of the total dataset.
- **CMEMS FTP**: The “FTP download” allows to download an entire dataset directly from the FTP server at the supply center.

Access on download services:

- via Graphical User Interface, GUI (through the web portal),
- via a machine to machine interface (script)

  For FTP:
  - via a web browser,
  - via an FTP client with GUI.
  - via a machine to machine interface (script)

What are the advantages of each Download Mechanism?

SUBSETTER

ODYSSEA

User can retrieve a subset of gridded datasets (exactly what he needs, variable, geospatial coverage, temporal coverage) through http and https protocol.

Advantages

- User **minimizes the volume of data** transiting on the network, and the volume of data to be stored on his computer.
- User **selects the different parameters of his request** in a “easy to understand” way: variable can be selected via their names or standard names.
- **Information on dataset** (notably the updated temporal coverage) and on the request (volume of the request), **can be provided to user before running the request** (via GUI or via script).
- Security of the authentication (https, CAS authentication with a ticket).

What are the advantages of each Download Mechanism?

CMEMS FTP DOWNLOAD

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User can retrieve data files by selecting files in a directory through FTP protocol.

- Download at once the **entire geospatial coverage and all variable(s) of dataset**.
- Performances of the server depend only on disk access performances and bandwidth.
- **FTP** protocol **is well known** among users.

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How to download CMEMS parameters and data via web browser

CMEMS GUI web portal

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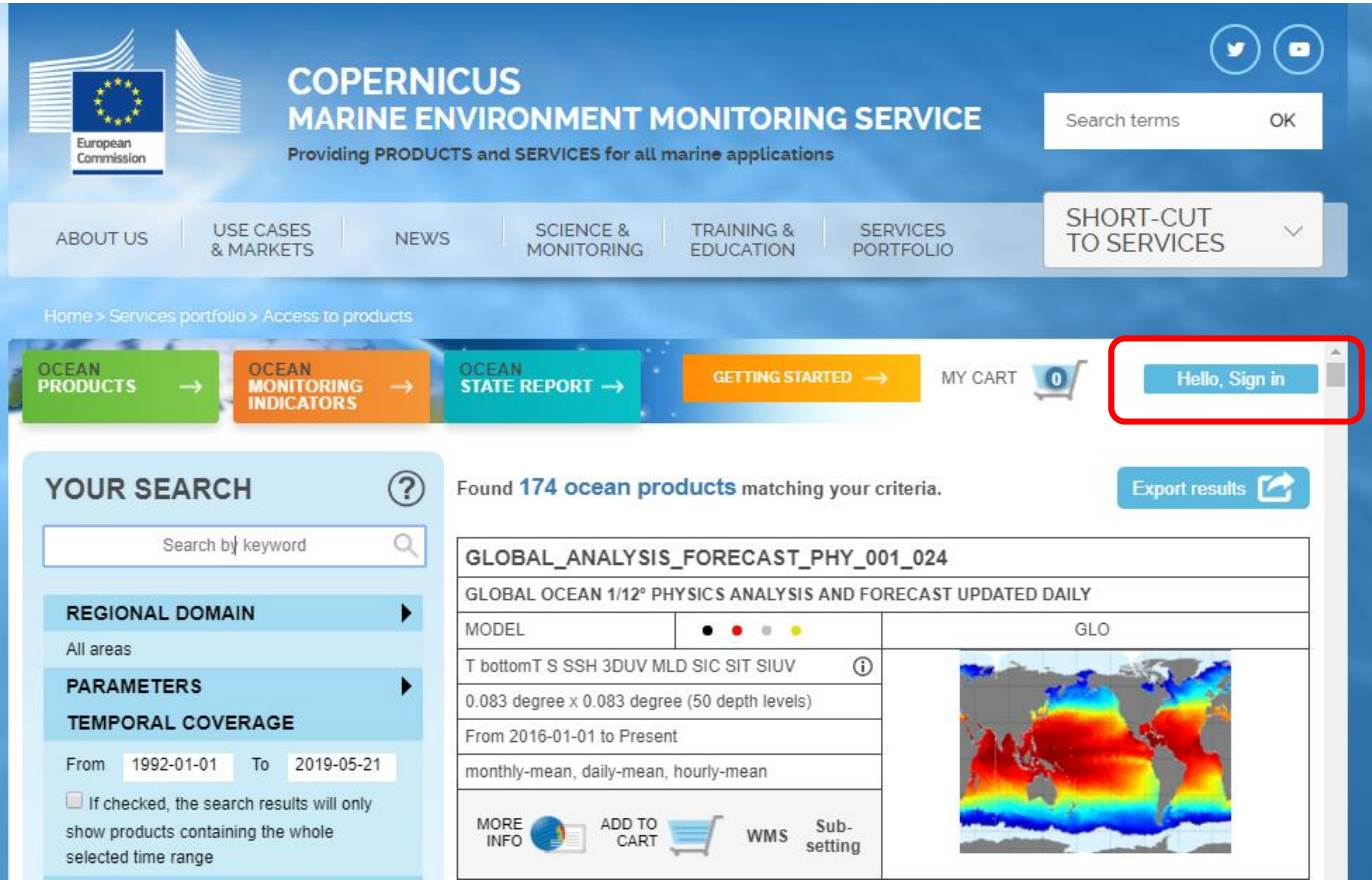

CMEMS GUI web portal

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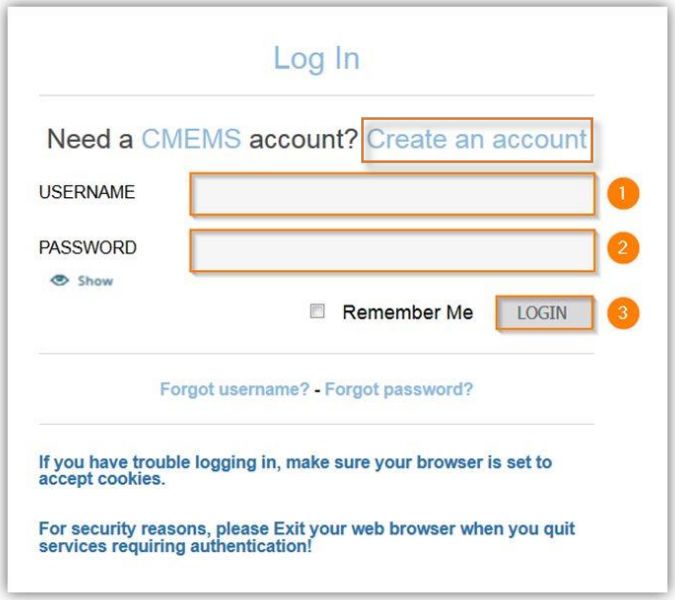
The **Graphical User Interface (GUI)** may offer (depending on Product Type) up to 2 data access options delivering standard format:



You can access this dialog box by selecting the product(s) from the Online Catalogue, adding it to cart, clicking on "DATA DOWNLOAD" button will redirect to LOGIN page (if not already signed in):

Credentials just for the 2nd ODYSSEA Summer School:

Username: sodyssea
Password: Sodyssea#2

CMEMS GUI web portal

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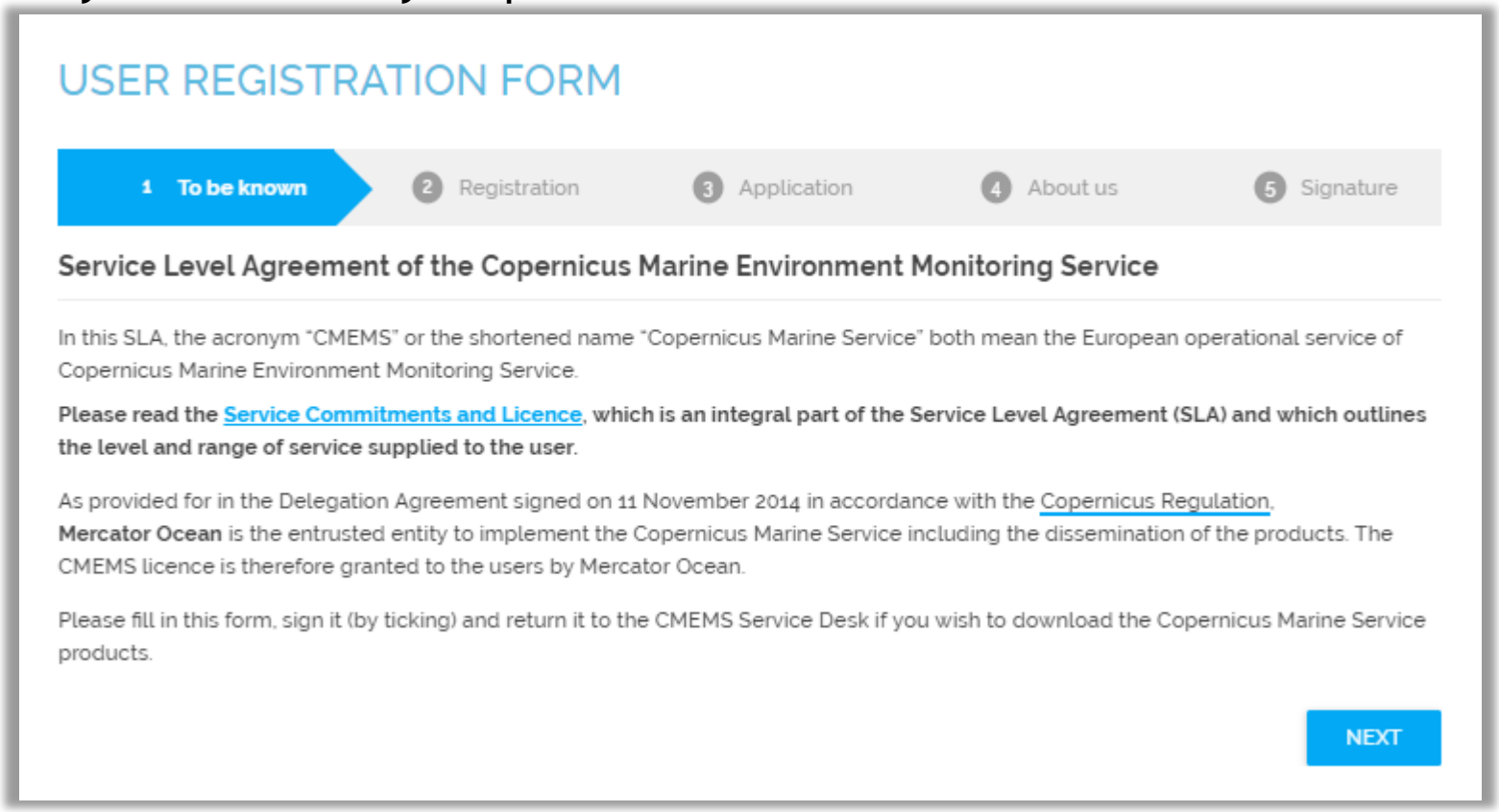
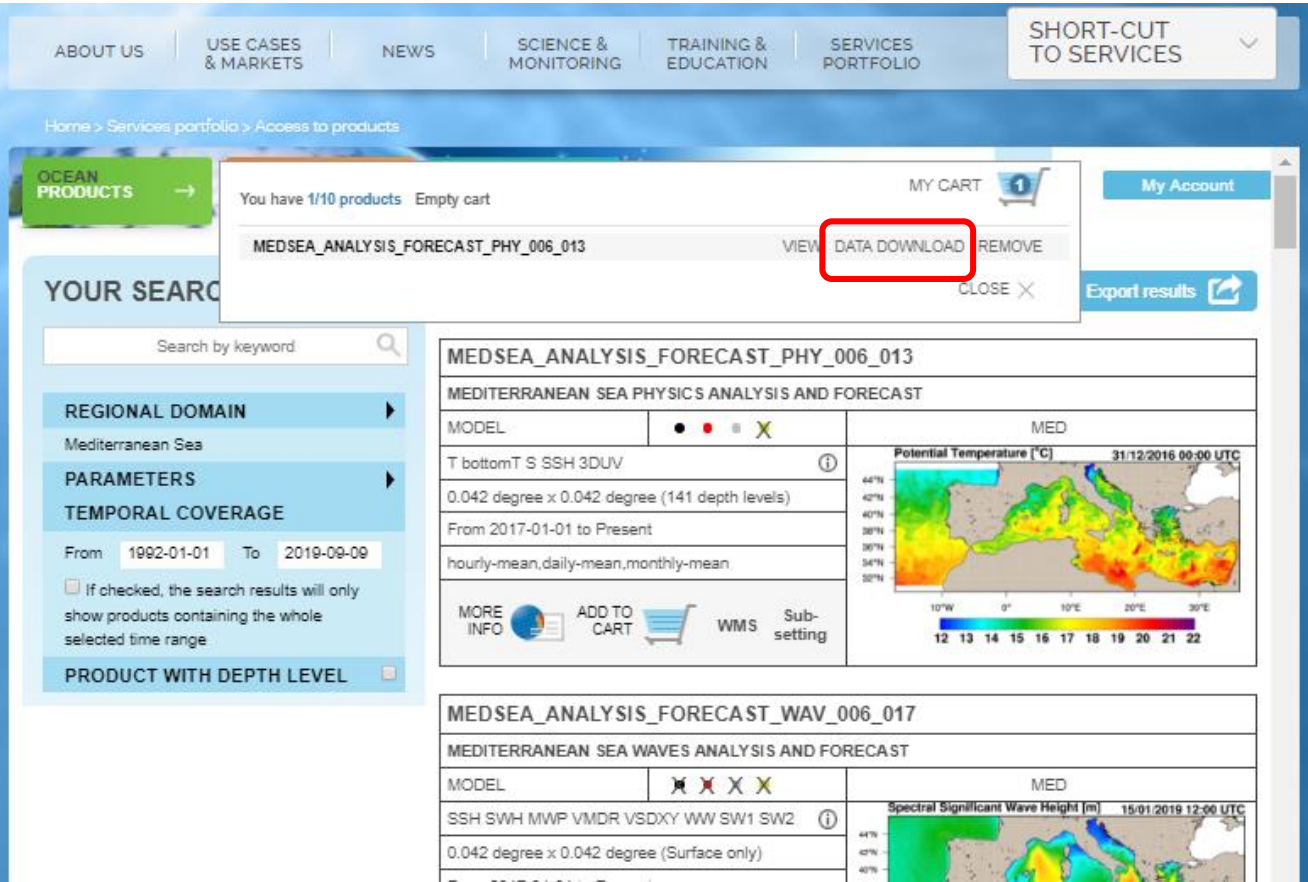
The Create an account link redirects you to the USER REGISTRATION FORM where you can create your personal account:



CMEMS GUI web portal

ODYSSEA



CMEMS GUI web portal

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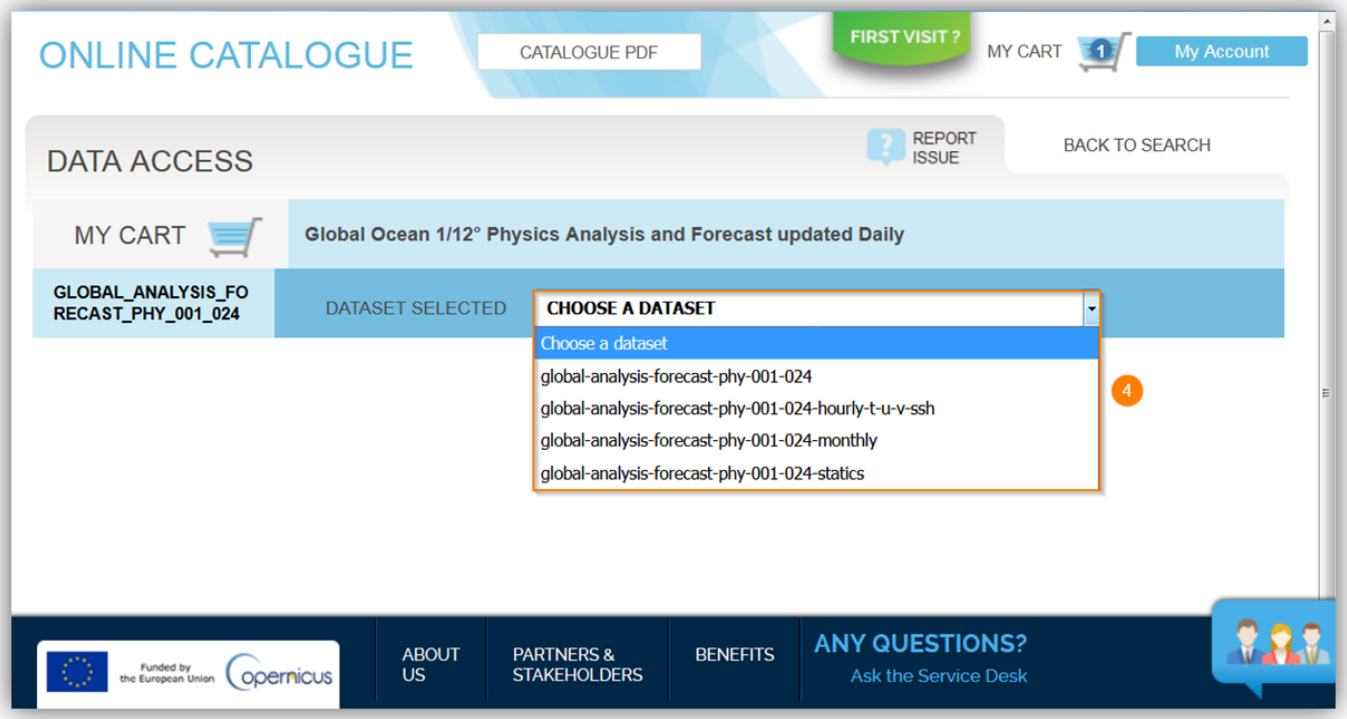
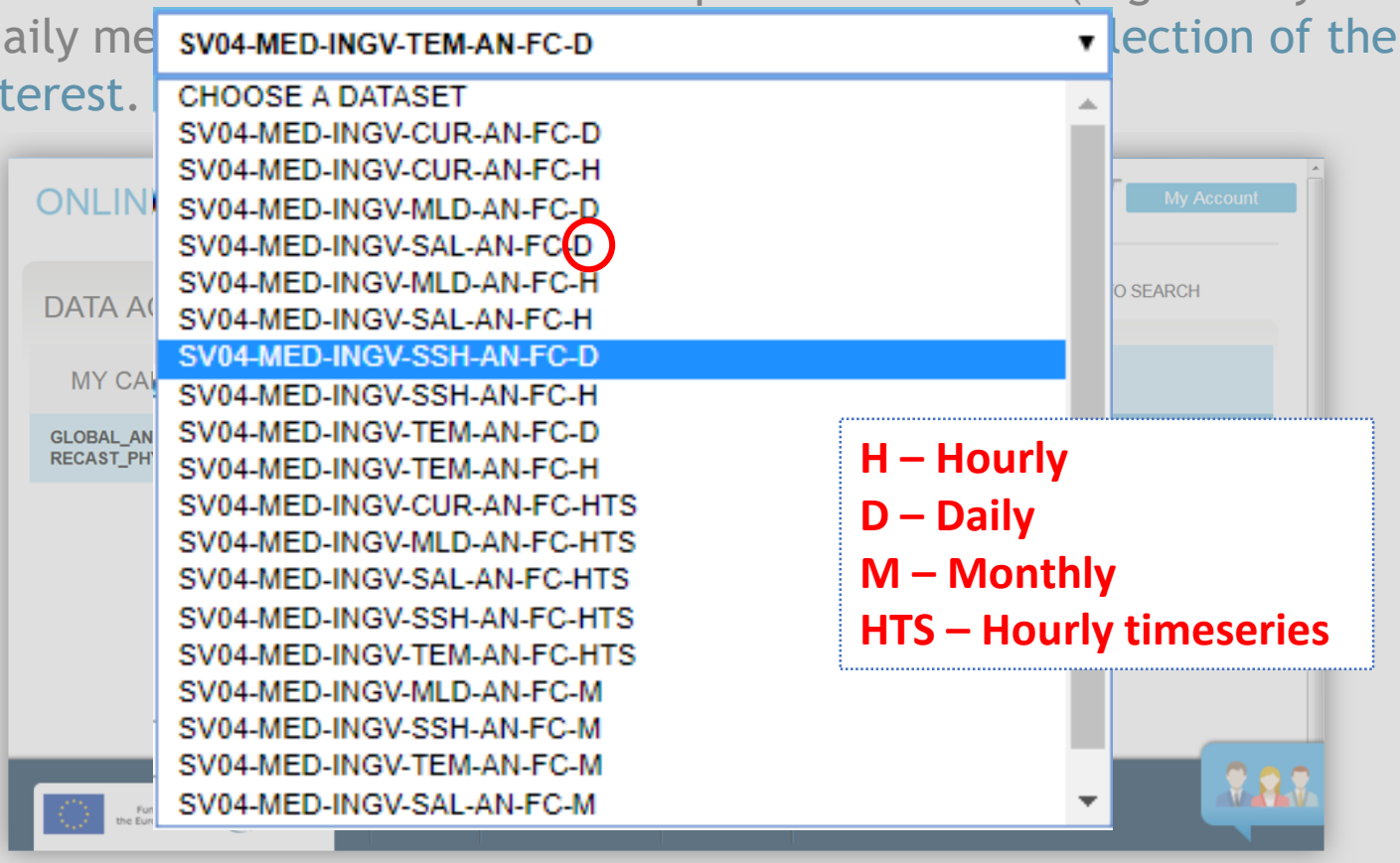
Since a Product is exposed as a set of Datasets and the latter usually contain a subset of the variables or different temporal resolutions (e.g. hourly means, daily means or monthly means),the GUI needs the selection of the one of interest.



CMEMS GUI web portal

ODYSSEA

Since a Product is exposed as a set of Datasets and the latter usually contain a subset of the variables or different temporal resolutions (e.g. hourly means, daily me lection of the one of interest.



CMEMS GUI web portal

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Depending on Product Type (namely GRID), the GUI will display the extraction settings to enable the creation of a subset of the dataset over its dimensions:

Geographical area (bounding box of longitudes and latitudes; NB: to select one point just input the same minimum and maximum)

CMEMS GUI web portal

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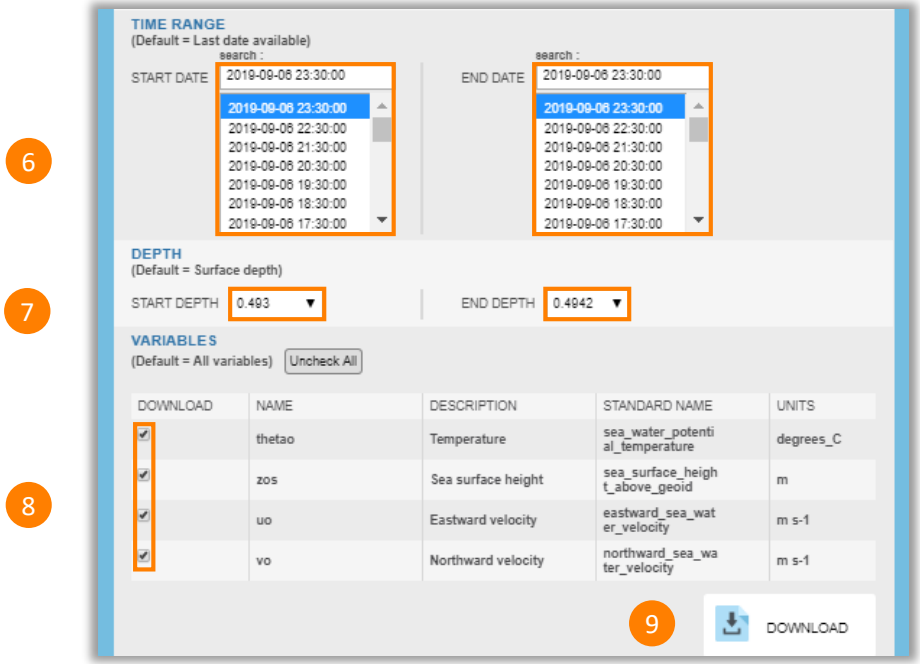
- Time range
- Depth (to select one layer, just select the same minimum and maximum)
- Ocean Variables



Validate the extraction by clicking on "DOWNLOAD" (9).

CMEMS GUI web portal

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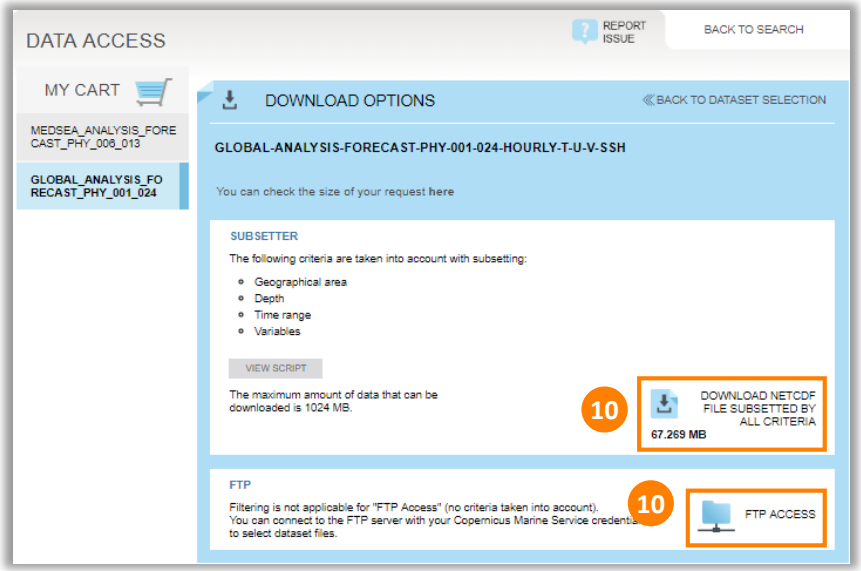
A new window displays the size of the file (either in .nc or .nc.gz format) and let you choose the one of your interest:



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How to download CMEMS parameters and data via scripts

Machine to machine interface
Motu Server

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Motu is a **high efficient and robust Web Server** which fills the gap between heterogeneous Data Providers to End Users.

Motu handles, extracts and transforms oceanographic huge volumes of data without performance collapse.

To download Copernicus Marine Products hosted on MOTU server, using scripts, there are two options:

1. via MOTU CLIENT (for End-Users)
2. via MOTU REST API (for Developers)

Machine to machine interface
Architecture

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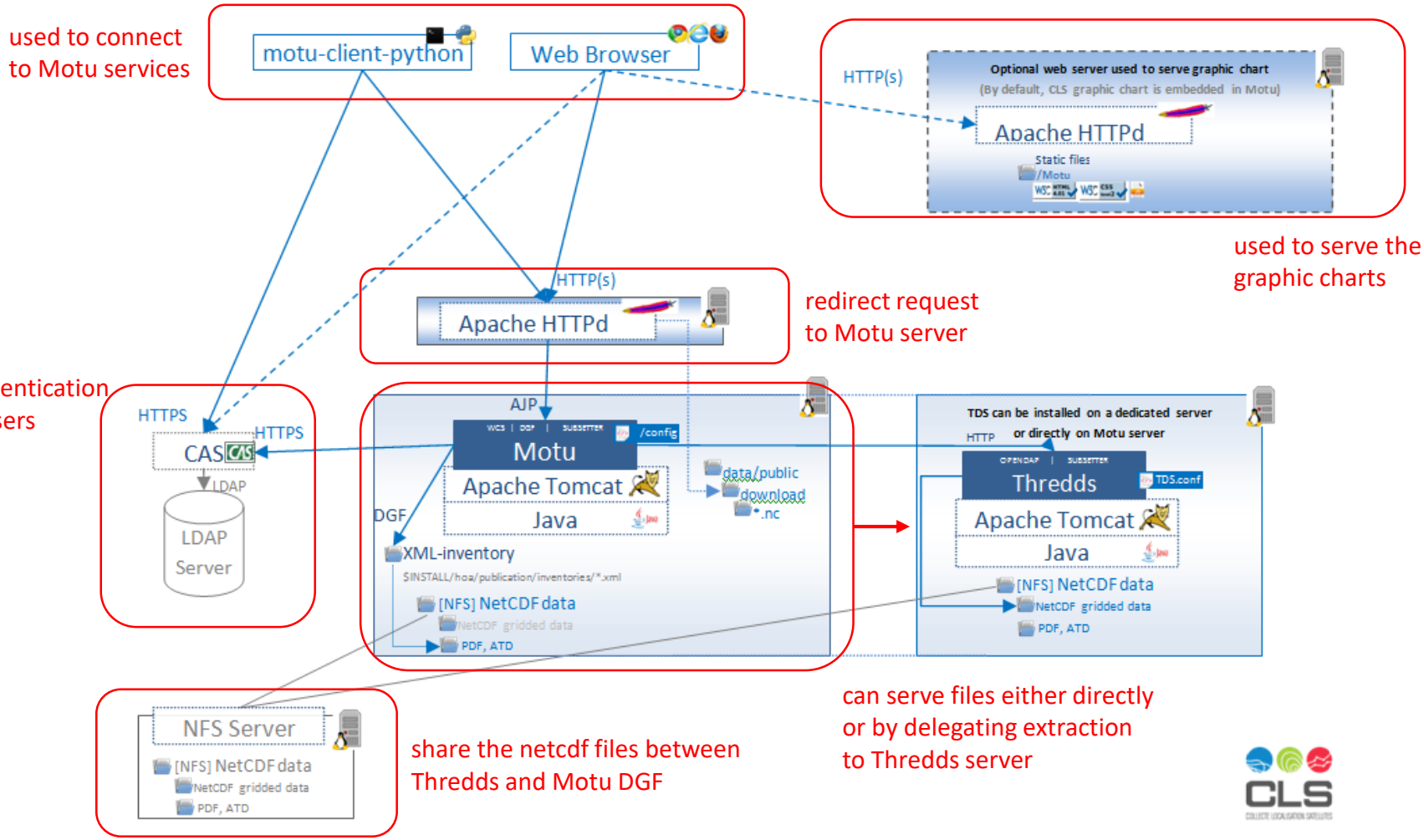


CLS

Machine to machine interface
MOTU CLIENT

ODYSSEA

Motu offers a multiplatform and easy to use **client for Command Line Interface** (CLI). Very useful in machine to machine context, it enables to download data by running a python script, used to connect to Motu HTTP server in order to:

- **get information** about a dataset,
- **get the size** of an extraction with geospatial, temporal and variable criteria,
- **extract a subset data** of a dataset, along its dimensions: temporal, geospatial (longitude, latitude, depth) and variable criteria, and
- it can be launched under **different environments** in order to be integrated into a processing chain.

The processing chain **can be written in any computer language** (it can be in bash, batch, Java, JS, R, perl, fortran etc... and thus **not necessarily in Python**), since the data extraction will only call the motu-client.py file to get the interaction with the MOTU server.

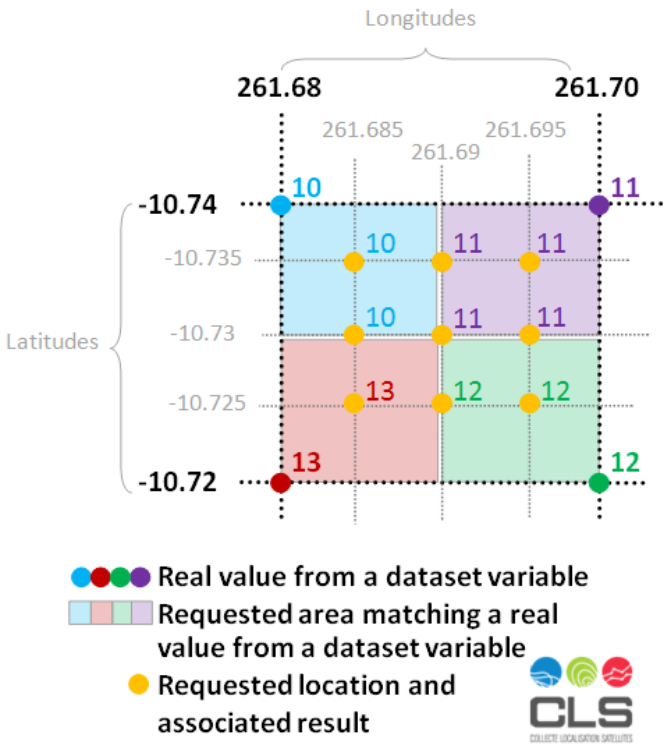
Machine to machine interface
MOTU REST API

ODYSSEA

It lets you use Motu server services with any package for **retrieving files using HTTP, HTTPS** (like cURL or Wget, but also Python requests module, R httr package or any other language implementing http requests).

All URLs have always the same pattern:
http://motuServer/${context}/Motu?action=$actionName

Download data – MOTU CLIENT
Specification of point retrieval

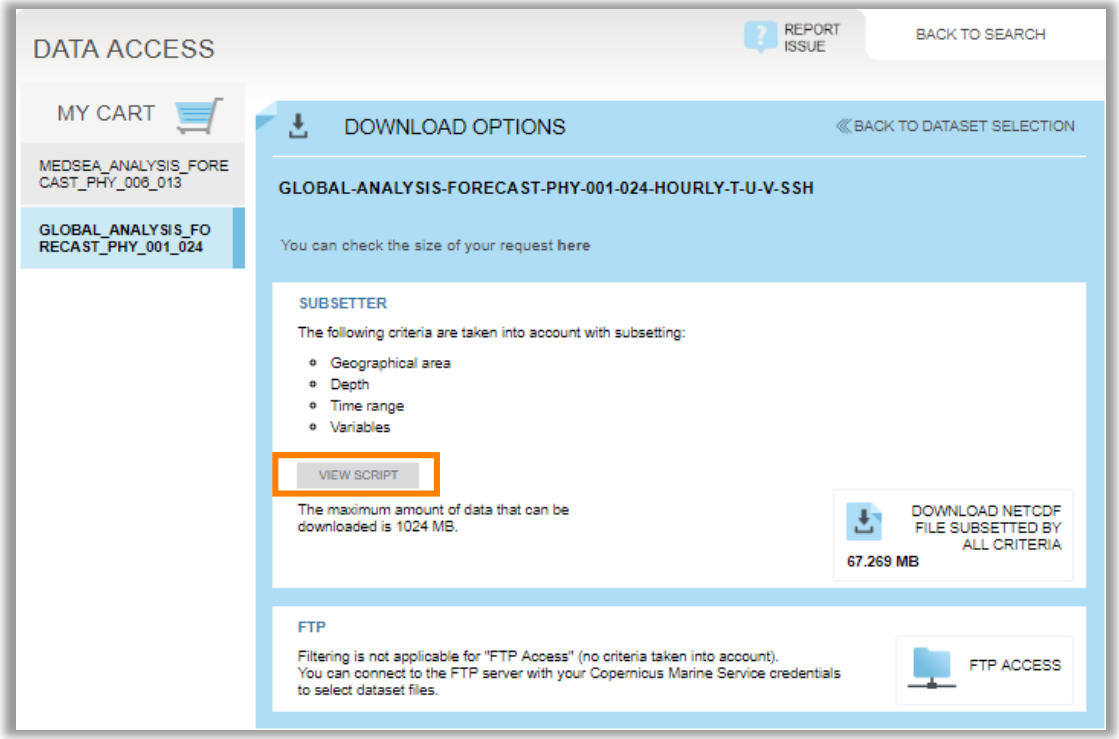


Schema displays a subset of a dataset variable as an array of 2 longitudes and 2 latitudes.

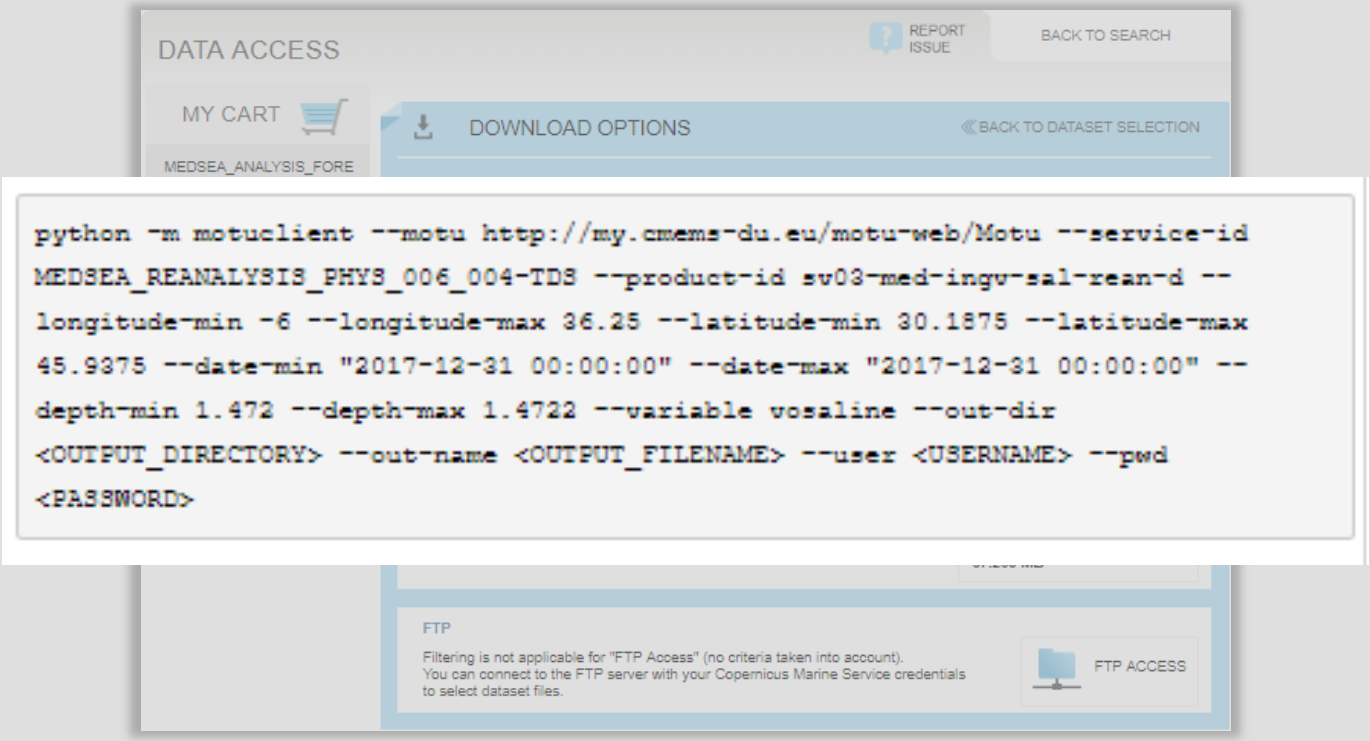
At each intersection, we have got 1 real value (10, 11, 12, 13) as defined in the gridded data.

As we can see, 4 areas are displayed and the nearest value from the requested location is returned.

Download data – MOTU CLIENT
Download script



Download data – MOTU CLIENT
Download script



Download data – MOTU CLIENT
Download script

python <PATH TO MOTUCLIENT DIR>/motu-client.py **--user** <USERNAME> **--pwd** <PASSWORD> **--motu** http://nrt.cmems-du.eu/motu-web/Motu **--service-id** MEDSEA ANALYSIS FORECAST PHY 006 013-TDS **--product-id** sv04-med-ingv-tem-an-fc-h **--longitude-min** 23 **--longitude-max** 23.5 **--latitude-min** 40 **--latitude-max** 40.5 **--date-min** "2018-06-01 00:30:00" **--date-max** "2018-06-01 23:30:00" **--depth-min** 1.0181 **--depth-max** 5754.045 **--variable** thetao **--out-dir** <OUTPUT DIR> **--out-name** <OUTPUT FILENAME>

python <PATH TO MOTUCLIENT DIR>/motu-client.py

--user <USERNAME>

--pwd <PASSWORD>

--motu http://nrt.cmems-du.eu/motu-web/Motu

--service-id MEDSEA ANALYSIS FORECAST PHY 006 013-TDS

--product-id sv04-med-ingv-tem-an-fc-h

--longitude-min 23 **--longitude-max** 23.5 **--latitude-min** 40 **--latitude-max** 40.5

--date-min "2019-08-01 00:30:00" **--date-max** "2019-08-01 23:30:00"

--depth-min 1.0181 **--depth-max** 5754.045

--variable thetao

--out-dir <OUTPUT DIR> **--out-name** <OUTPUT FILENAME>

Download data – MOTU CLIENT
Download 1 point – surface – timeseries

ODYSSEA

```
import os

user = your username                                                    #You have to be registered on CMEMS platform
pwd = your password                                                     #You have to be registered on CMEMS platform
motu service id  = 'http://nrt.cmems-du.eu/motu-web/Motu'               #may change due to different service id
motu client = 'motu-client-python/motu-client.py'                       #path of motu client python script
service id = 'MEDSEA ANALYSIS FORECAST PHY 006 013-TDS'                 #may be the same for different parameters
product id = 'sv04-med-ingv-tem-an-fc-h'                                #notice the last terms (tem, an, fc, h)
variable = 'thetao'                                                     #may be more than one parameters
out dir = os.path.join(os.getcwd(), 'Netcdf')                           #directory to store the netcdf file
out name = 'thetao.nc'                                                  #name of netcdf file that is stored
-------------------------------------------------------------------------------------------------------------
min lon = '23'                                                          #minimum longitude
max lon = '23'                                                          #maximum longitude
min lat = '40'                                                          #minimum latitude
max lat = '40'                                                          #maximum latitude
min depth = '1.0181'                                                    #minimum depth
max depth = '1.0184'                                                    #minimum depth
min date = '2019-08-01 00:00:00'                                        #minimum date
max date = '2019-08-10 00:00:00'                                        #maximum date
-------------------------------------------------------------------------------------------------------------
cmd = 'python {motu client} --user {user} --pwd {pwd} --motu {motu service id} --service-id {service id}
--product-id {product id} --longitude-min {min lon} --longitude-max {max lon} --latitude-min {min lat} --
latitude-max {max lat} --date-min "{min date}" --date-max "{max date}" --depth-min {min depth} --depth-
max {max depth} –variable {variable} --out-dir "{out dir}" --out-name {out name}'.format(motu client,
user, pwd, motu service id, service id, product id, min lon, max lon, min lat, max lat, min date, max
date, min depth, max depth, variable, out dir, out name)
os.system(cmd)
```

Download data – MOTU CLIENT
Download 1 area – surface – timeseries

ODYSSEA

```
import os

user = your username                                                    #You have to be registered on CMEMS platform
pwd = your password                                                     #You have to be registered on CMEMS platform
motu service id  = 'http://nrt.cmems-du.eu/motu-web/Motu'               #may change due to different service id
motu client = 'motu-client-python/motu-client.py'                       #path of motu client python script
service id = 'MEDSEA ANALYSIS FORECAST PHY 006 013-TDS'                 #may be the same for different parameters
product id = 'sv04-med-ingv-tem-an-fc-h'                                #notice the last terms (tem, an, fc, h)
variable = 'thetao'                                                     #may be more than one parameters
out dir = os.path.join(os.getcwd(), 'Netcdf')                           #directory to store the netcdf file
out name = 'thetao.nc'                                                  #name of netcdf file that is stored
-------------------------------------------------------------------------------------------------------------
min lon = '23.0'                                                        #minimum longitude
max lon = '23.5'                                                        #maximum longitude
min lat = '40.0'                                                        #minimum latitude
max lat = '40.5'                                                        #maximum latitude
min depth = '1.0181'                                                    #minimum depth
max depth = '1.0184'                                                    #minimum depth
min date = '2019-08-01 00:00:00'                                        #minimum date
max date = '2019-08-10 00:00:00'                                        #maximum date
-------------------------------------------------------------------------------------------------------------
cmd = 'python {motu client} --user {user} --pwd {pwd} --motu {motu service id} --service-id {service id}
--product-id {product id} --longitude-min {min lon} --longitude-max {max lon} --latitude-min {min lat} --
latitude-max {max lat} --date-min "{min date}" --date-max "{max date}" --depth-min {min depth} --depth-
max {max depth} –variable {variable} --out-dir "{out dir}" --out-name {out name}'.format(motu client,
user, pwd, motu service id, service id, product id, min lon, max lon, min lat, max lat, min date, max
date, min depth, max depth, variable, out dir, out name)
os.system(cmd)
```

define the coordinates of your area

Download data – MOTU CLIENT
Download 1 point – profile – timeseries

ODYSSEA

```
import os

user = your username                                                    #You have to be registered on CMEMS platform
pwd = your password                                                     #You have to be registered on CMEMS platform
motu service id  = 'http://nrt.cmems-du.eu/motu-web/Motu'               #may change due to different service id
motu client = 'motu-client-python/motu-client.py'                       #path of motu client python script
service id = 'MEDSEA ANALYSIS FORECAST PHY 006 013-TDS'                 #may be the same for different parameters
product id = 'sv04-med-ingv-tem-an-fc-h'                                #notice the last terms (tem, an, fc, h)
variable = 'thetao'                                                     #may be more than one parameters
out dir = os.path.join(os.getcwd(), 'Netcdf')                           #directory to store the netcdf file
out name = 'thetao.nc'                                                  #name of netcdf file that is stored
-------------------------------------------------------------------------------------------------------------
min lon = '23'                                                          #minimum longitude
max lon = '23'                                                          #maximum longitude
min lat = '40'                                                          #minimum latitude
max lat = '40'                                                          #maximum latitude
min depth = '1.0181'                                                    #minimum depth
max depth = '5754.045'                                                  #minimum depth
min date = '2019-08-01 00:00:00'                                        #minimum date
max date = '2019-08-10 00:00:00'                                        #maximum date
-------------------------------------------------------------------------------------------------------------
cmd = 'python {motu client} --user {user} --pwd {pwd} --motu {motu service id} --service-id {service id}
--product-id {product id} --longitude-min {min lon} --longitude-max {max lon} --latitude-min {min lat} --
latitude-max {max lat} --date-min "{min date}" --date-max "{max date}" --depth-min {min depth} --depth-
max {max depth} –variable {variable} --out-dir "{out dir}" --out-name {out name}'.format(motu client,
user, pwd, motu service id, service id, product id, min lon, max lon, min lat, max lat, min date, max
date, min depth, max depth, variable, out dir, out name)
os.system(cmd)
```

define the minimum and maximum depth that you want to retrieve

Download data – MOTU CLIENT
Download 1 area – surface – 1 time

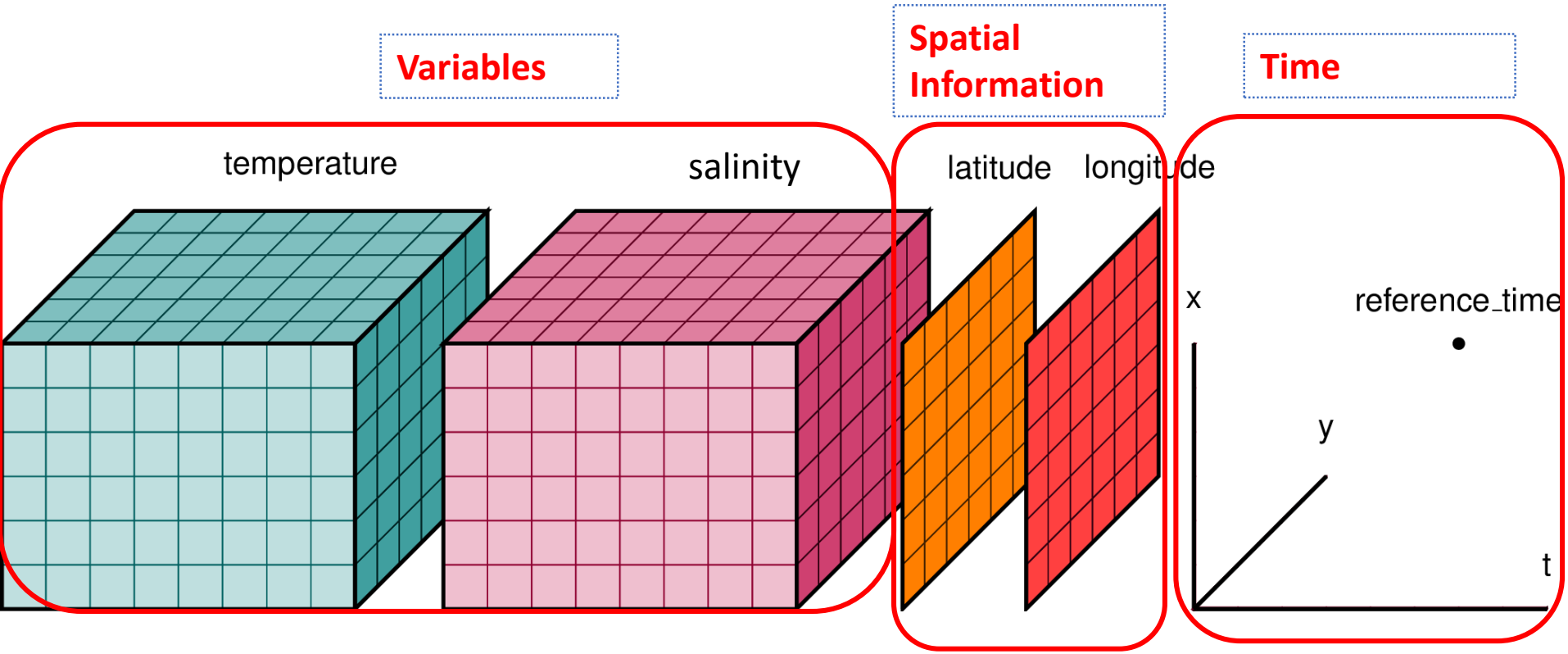
```
import os

user = your username                                          #You have to be registered on CMEMS platform
pwd = your password                                           #You have to be registered on CMEMS platform
motu service id  = 'http://nrt.cmems-du.eu/motu-web/Motu'     #may change due to different service id
motu client = 'motu-client-python/motu-client.py'             #path of motu client python script
service id = 'MEDSEA ANALYSIS FORECAST PHY 006 013-TDS'       #may be the same for different parameters
product id = 'sv04-med-ingv-tem-an-fc-h'                      #notice the last terms (tem, an, fc, h)
variable = 'thetao'                                           #may be more than one parameters
out dir = os.path.join(os.getcwd(), 'Netcdf')                 #directory to store the netcdf file
out name = 'thetao.nc'                                        #name of netcdf file that is stored
-------------------------------------------------------------------------------------------------------
min lon = '23.0'                                              #minimum longitude
max lon = '23.5'                                              #maximum longitude
min lat = '40.0'                                              #minimum latitude
max lat = '40.5'                                              #maximum latitude
min depth = '1.0181'                                          #minimum depth
max depth = '1.0184'                                          #minimum depth
min date = '2019-08-01 00:00:00'                              #minimum date
max date = '2019-08-01 00:00:00'                              #maximum date
-------------------------------------------------------------------------------------------------------
cmd = 'python {motu client} --user {user} --pwd {pwd} --motu {motu service id} --service-id {service id}
--product-id {product id} --longitude-min {min lon} --longitude-max {max lon} --latitude-min {min lat} --
latitude-max {max lat} --date-min "{min date}" --date-max "{max date}" --depth-min {min depth} --depth-
max {max depth} –variable {variable} --out-dir "{out dir}" --out-name {out name}'.format(motu client,
user, pwd, motu service id, service id, product id, min lon, max lon, min lat, max lat, min date, max
date, min depth, max depth, variable, out dir, out name)
os.system(cmd)
```

define the new time coordinates

What is a netCDF file

ODYSSEA



Exercise

ODYSSEA

- Download salinity data for a region close to Alonissos island all layers for the dates: 5 days after today and 10 years ago the same date

Which CMEMS products are you using?

Alonissos Island coordinates:

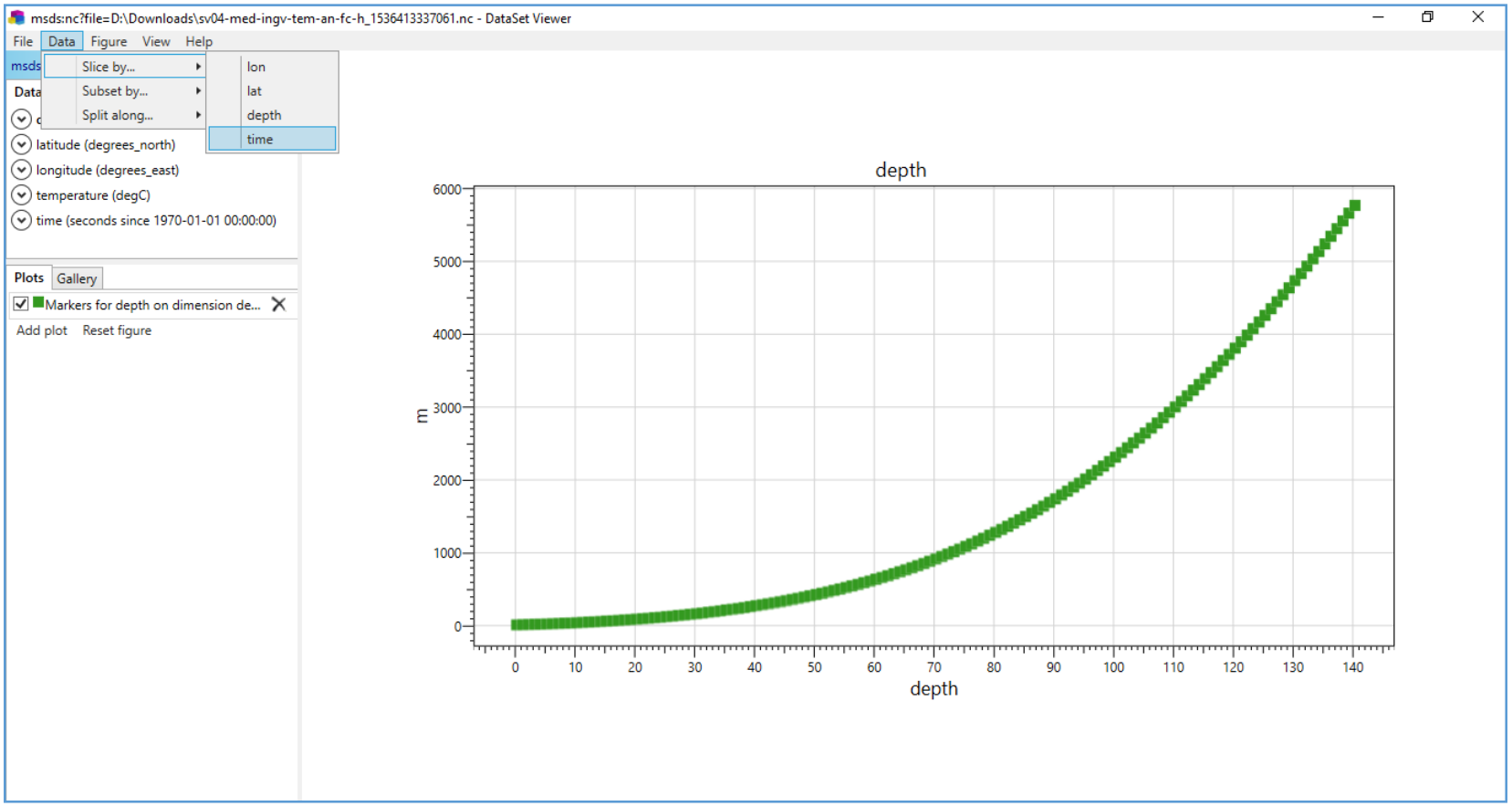
Latitude = 39.1499994

Longitude = 23.83333

ODYSSEA

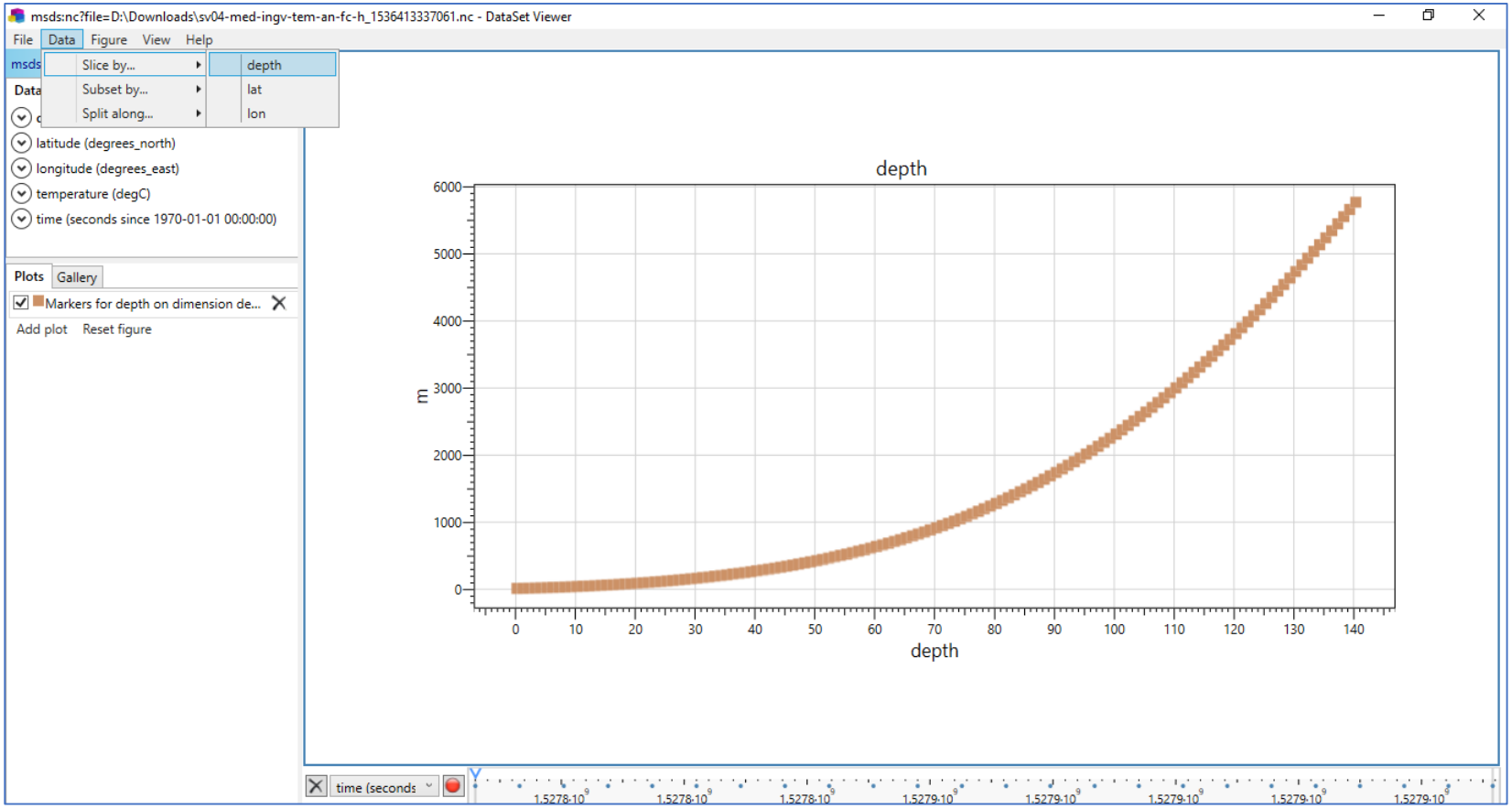
How to view retrieved CMEMS parameters and data locally (on PC)

View data – Scientific Viewer
Plot surface data



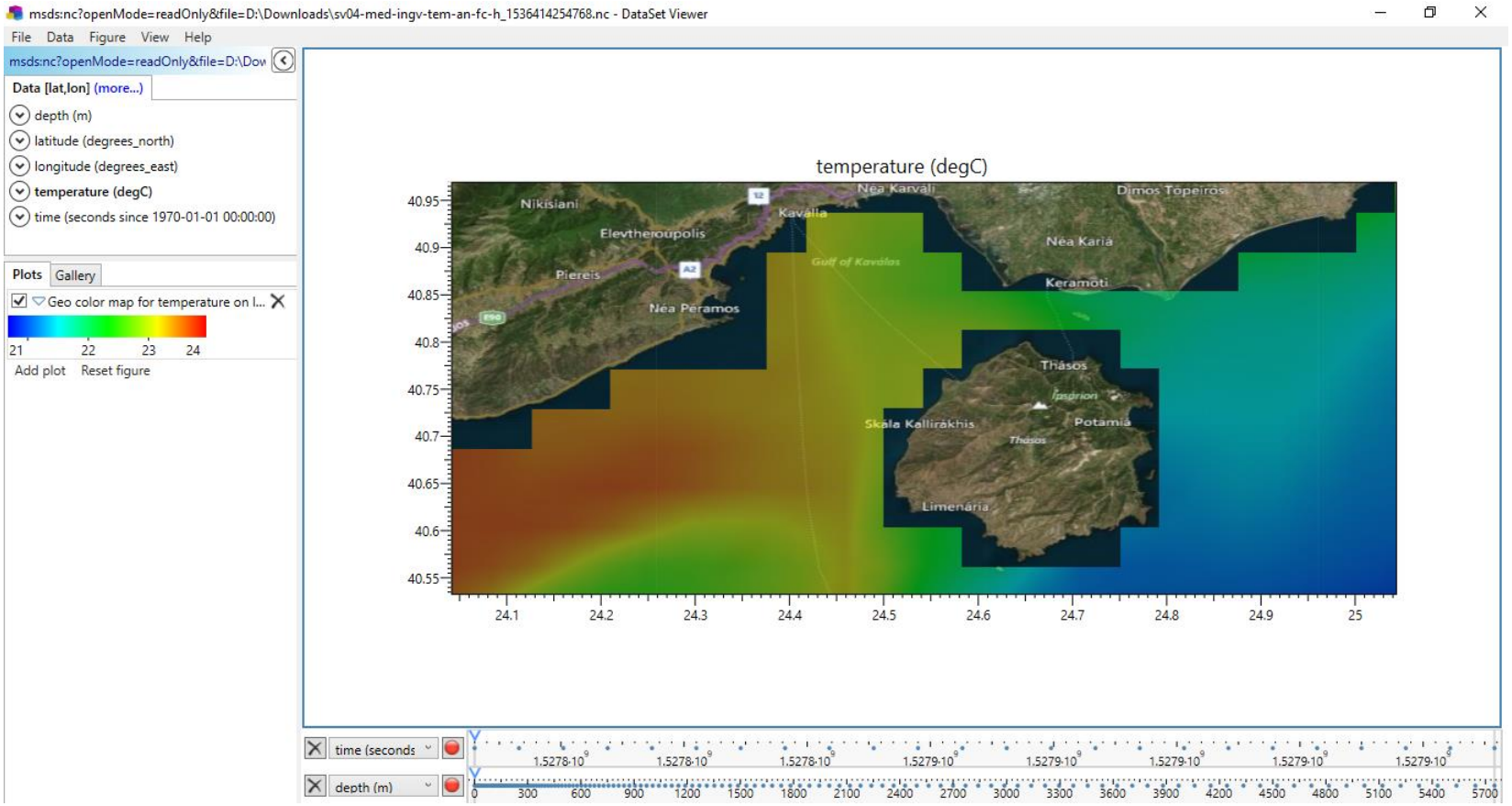
View data – Scientific Viewer

Plot surface data



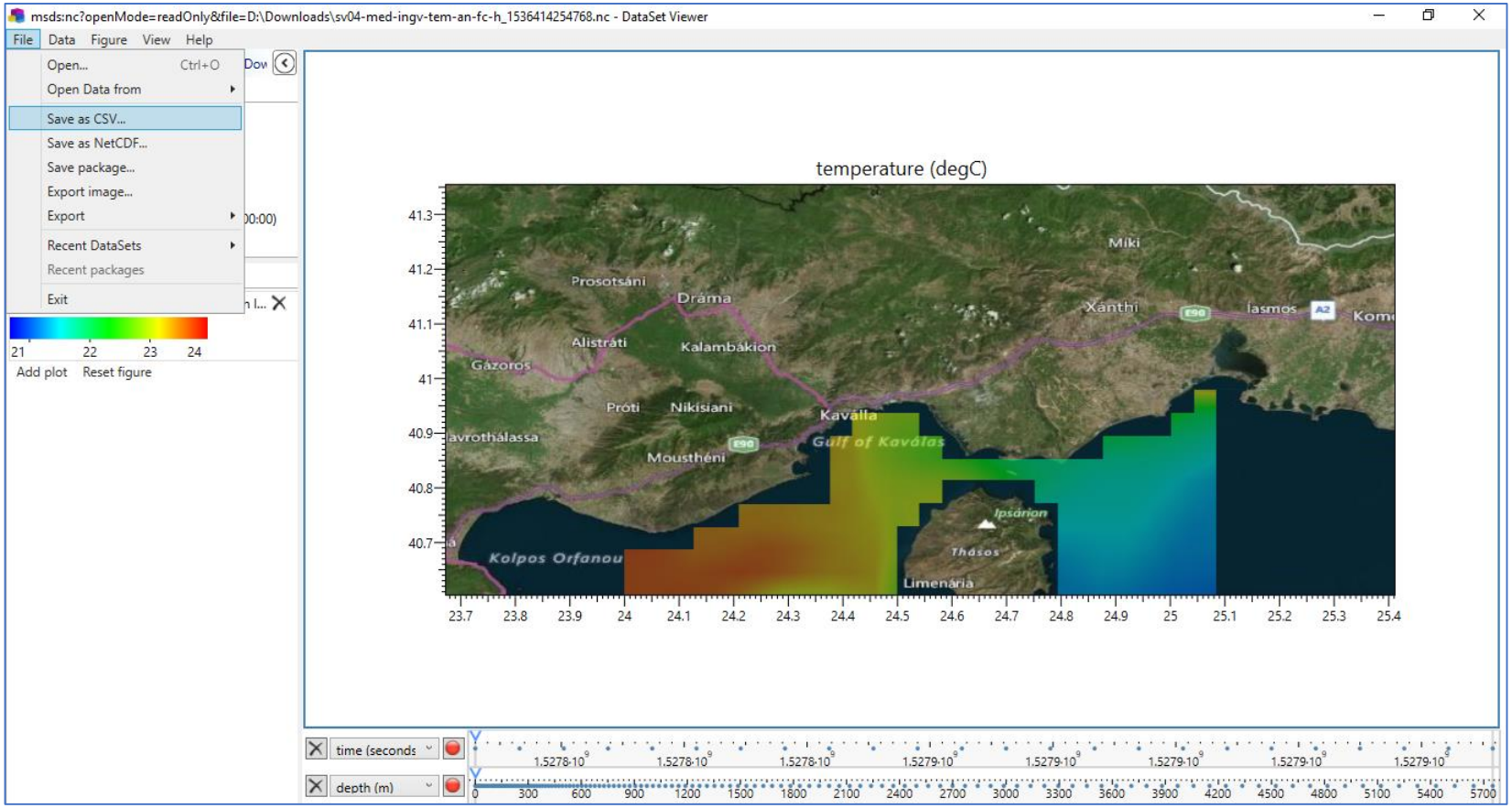
View data – Scientific Viewer

Plot surface data

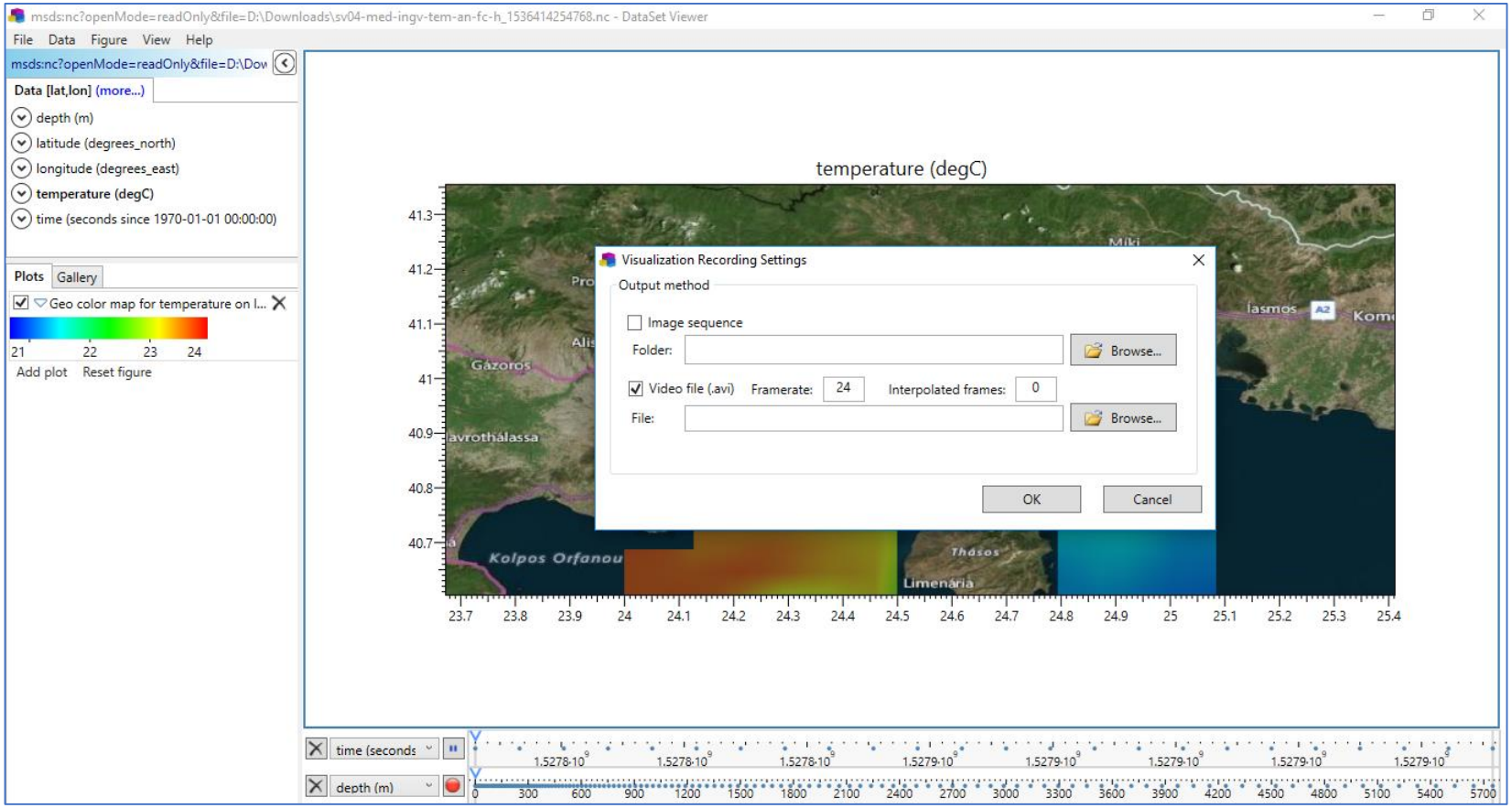


View data – Scientific Viewer

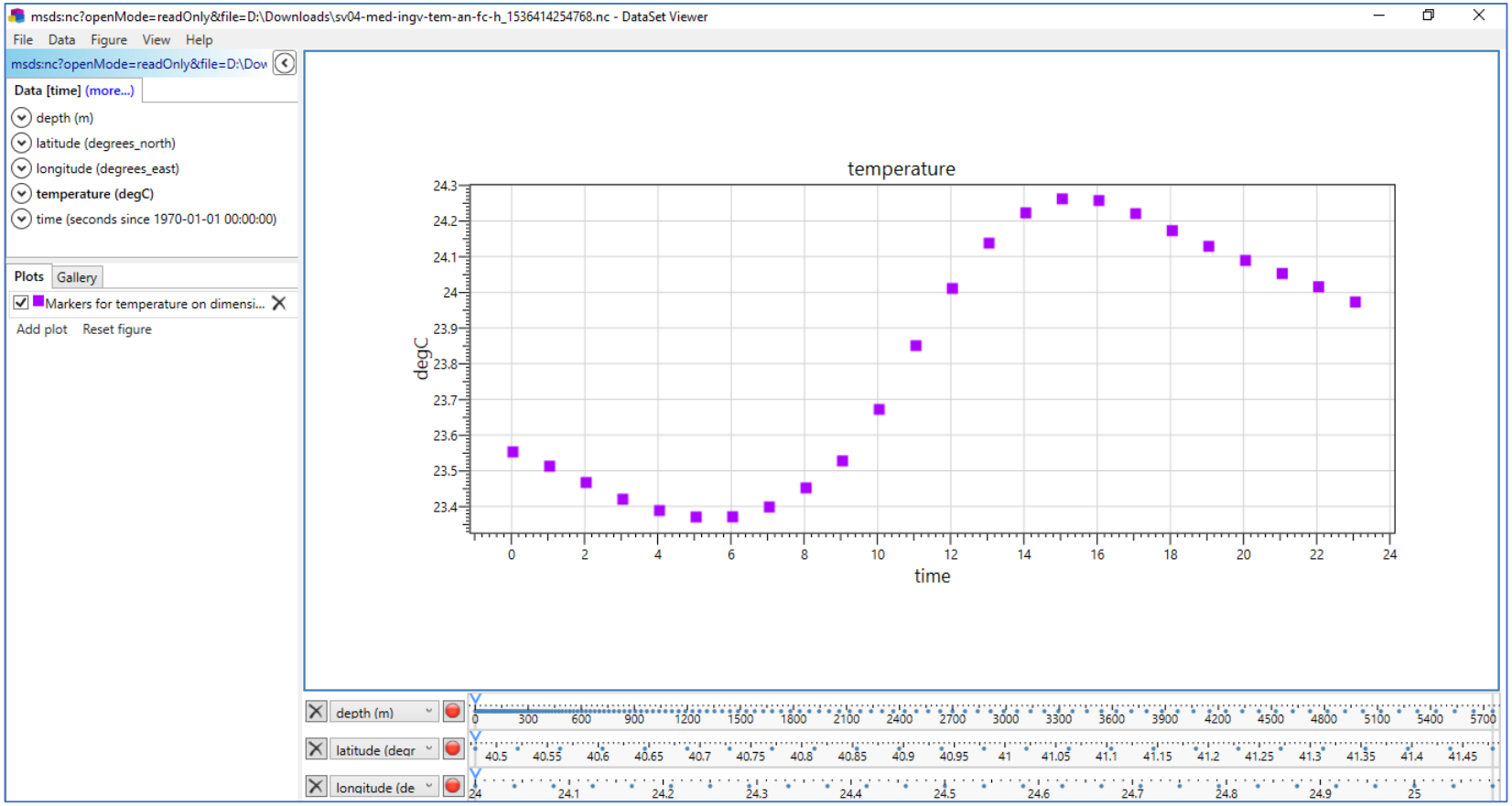
Export surface data to csv file



View data – Scientific Viewer
Export plot in video file

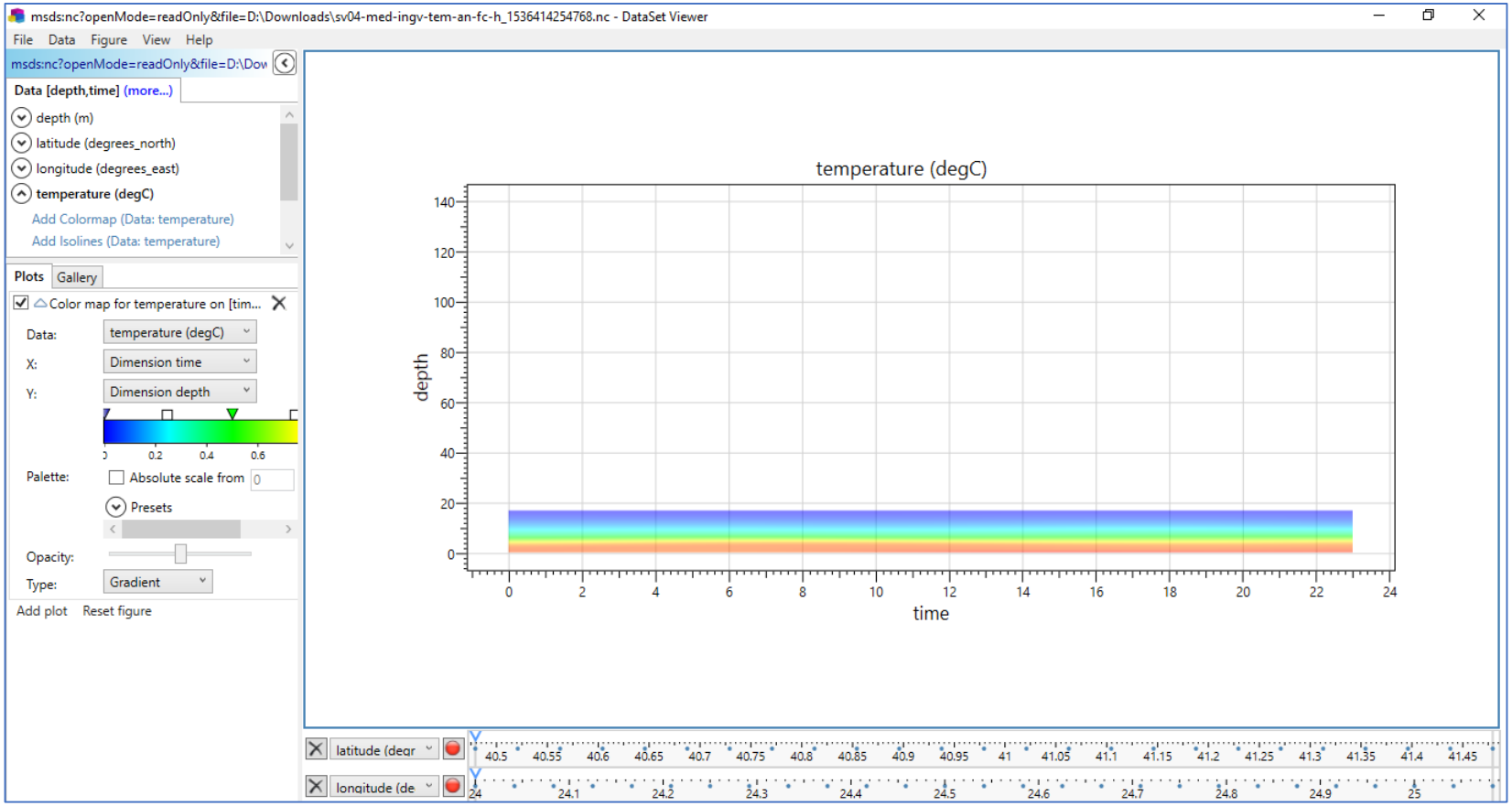


View data – Scientific Viewer
Plot timeseries



View data – Scientific Viewer

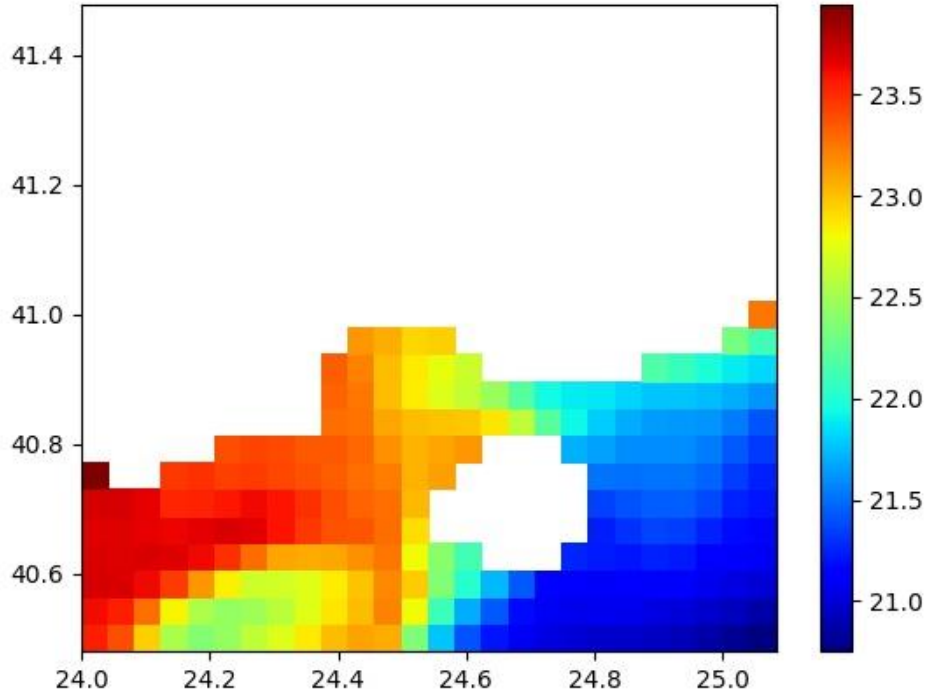
Plot profile data



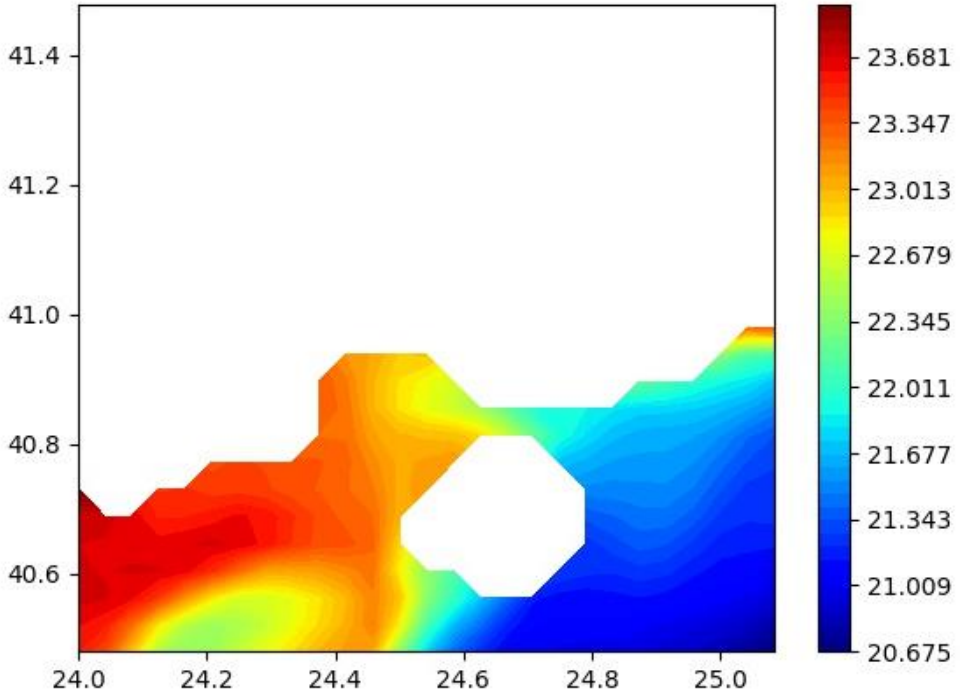
View data – python
Plot surface data – Water Temperature

ODYSSEA

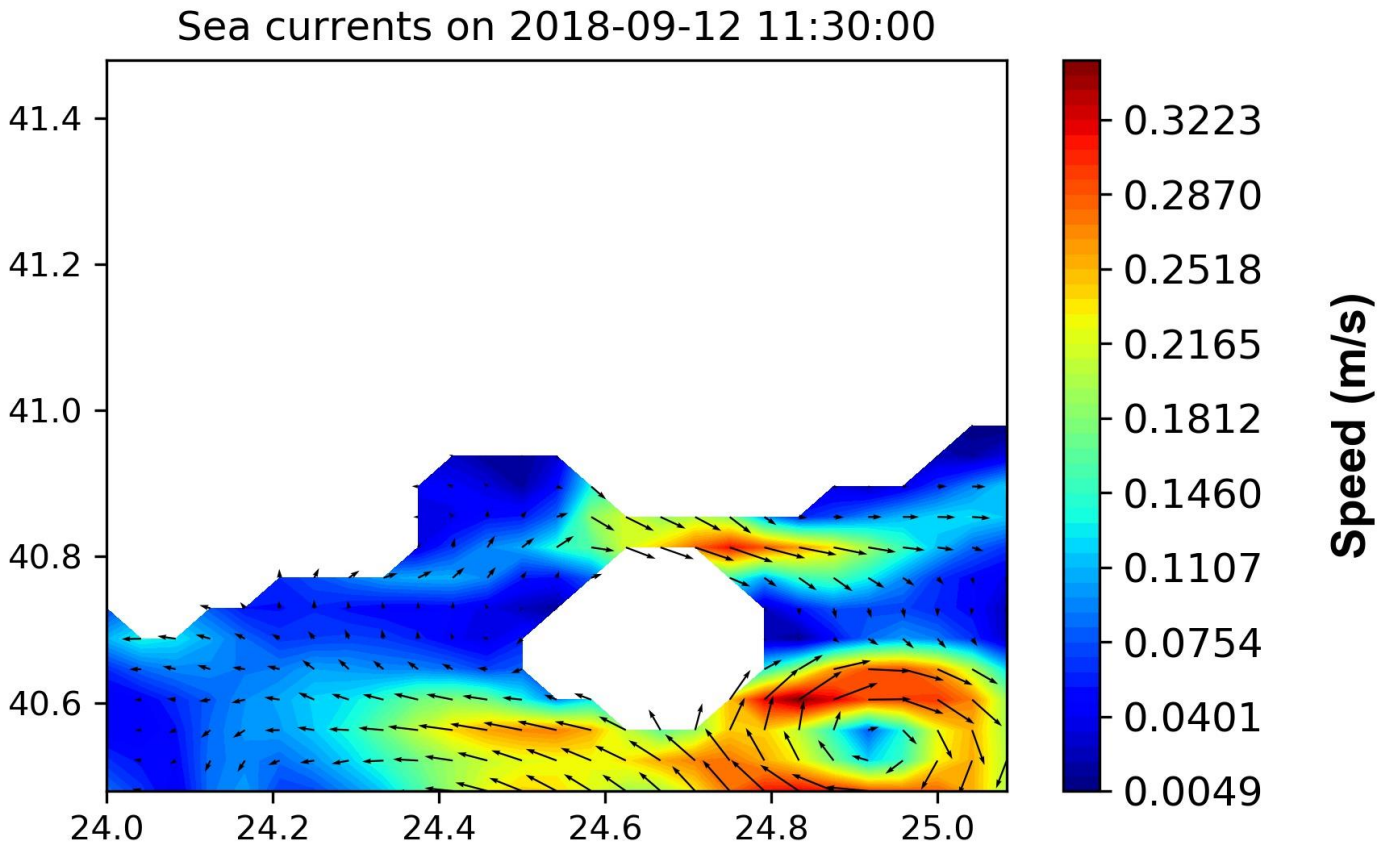
pcolormesh



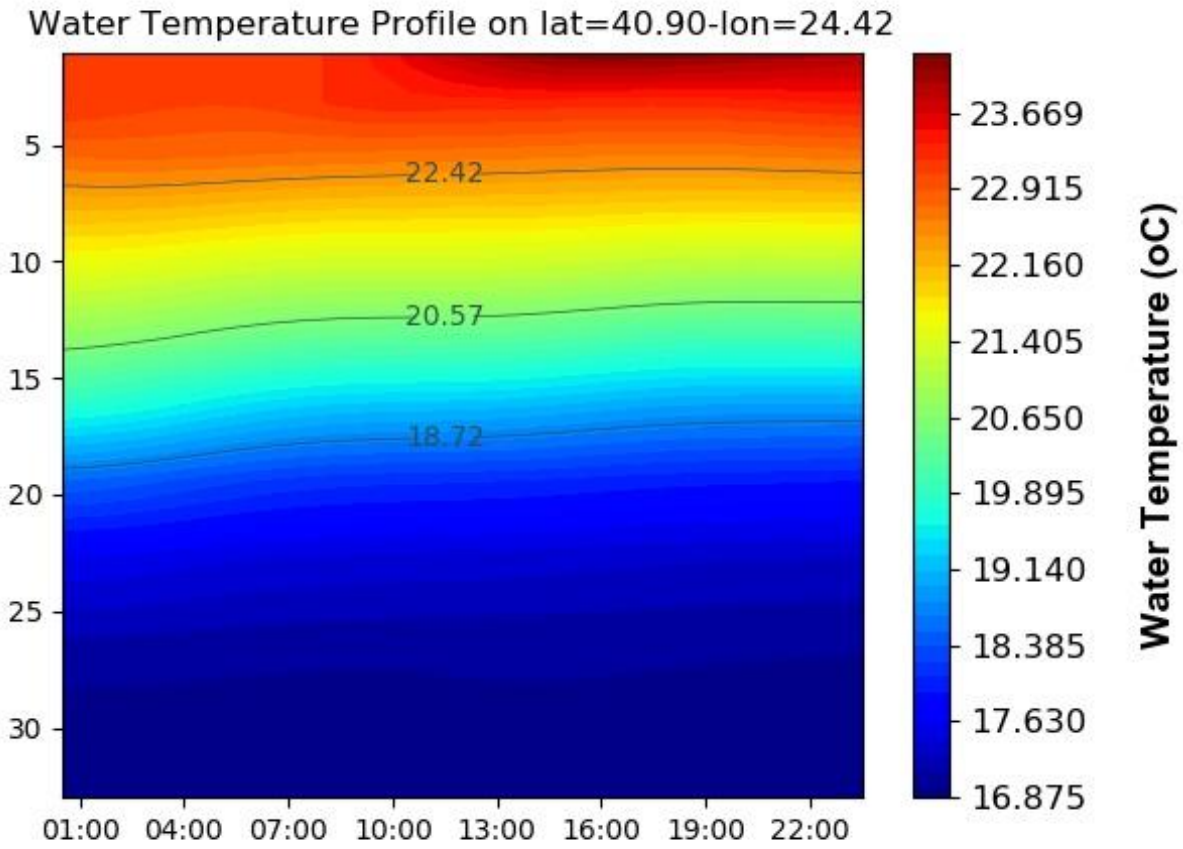
contourf



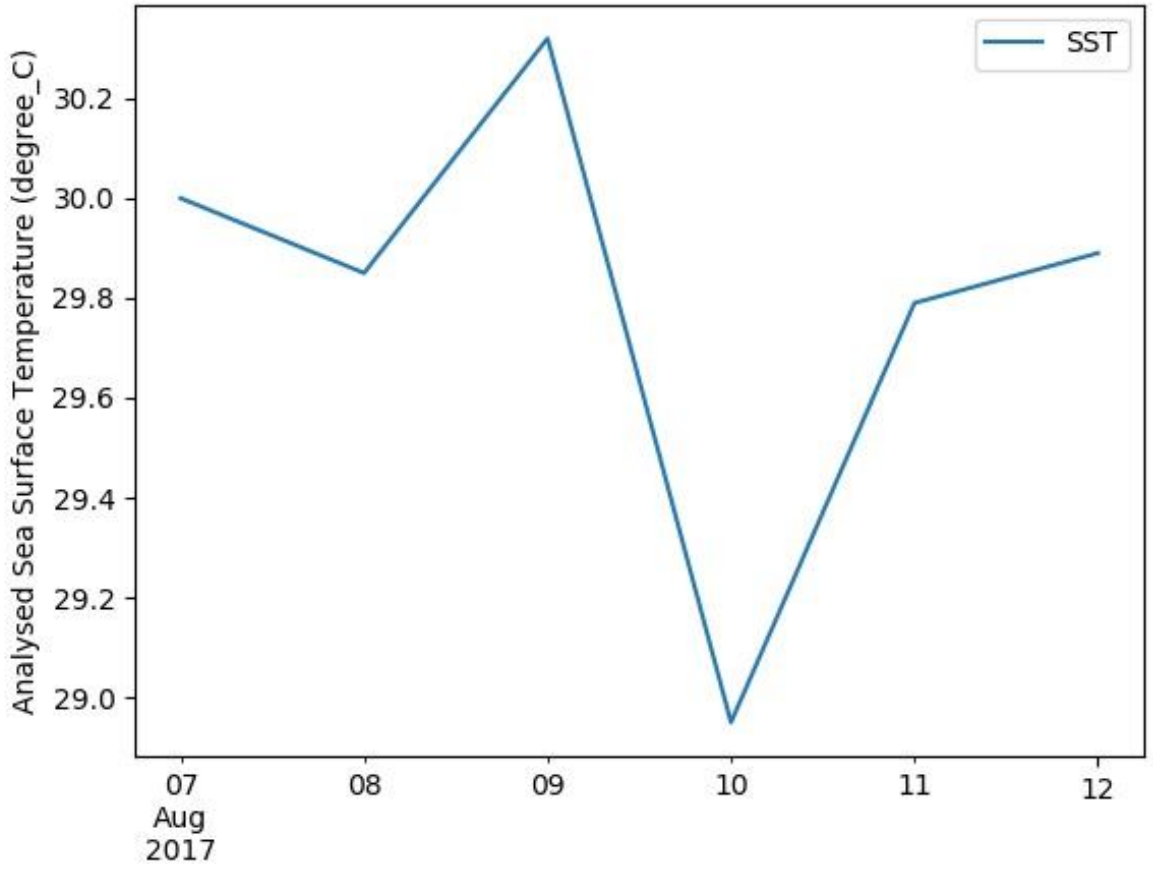
View data – python
Plot surface data – Currents



View data – python
Plot Profile data – Water Temperature



View data – python
Plot timeseries – Water Temperature



ODYSSEA

What is EMODnet

EMODnet

- The **European Marine Observation and Data Network** (EMODnet) consists of more than 150 organisations assembling marine data, products and metadata to make these fragmented resources more available to public and private users relying on quality-assured, standardised and harmonised marine data which are interoperable and free of restrictions on use.

- EMODnet has created a gateway to a range of data archives managed by local, national, regional and international organisations. **Through these gateways, users have access to standardized observations**, data quality indicators and processed data products, such as basin-scale maps. These data products are free to access and use.

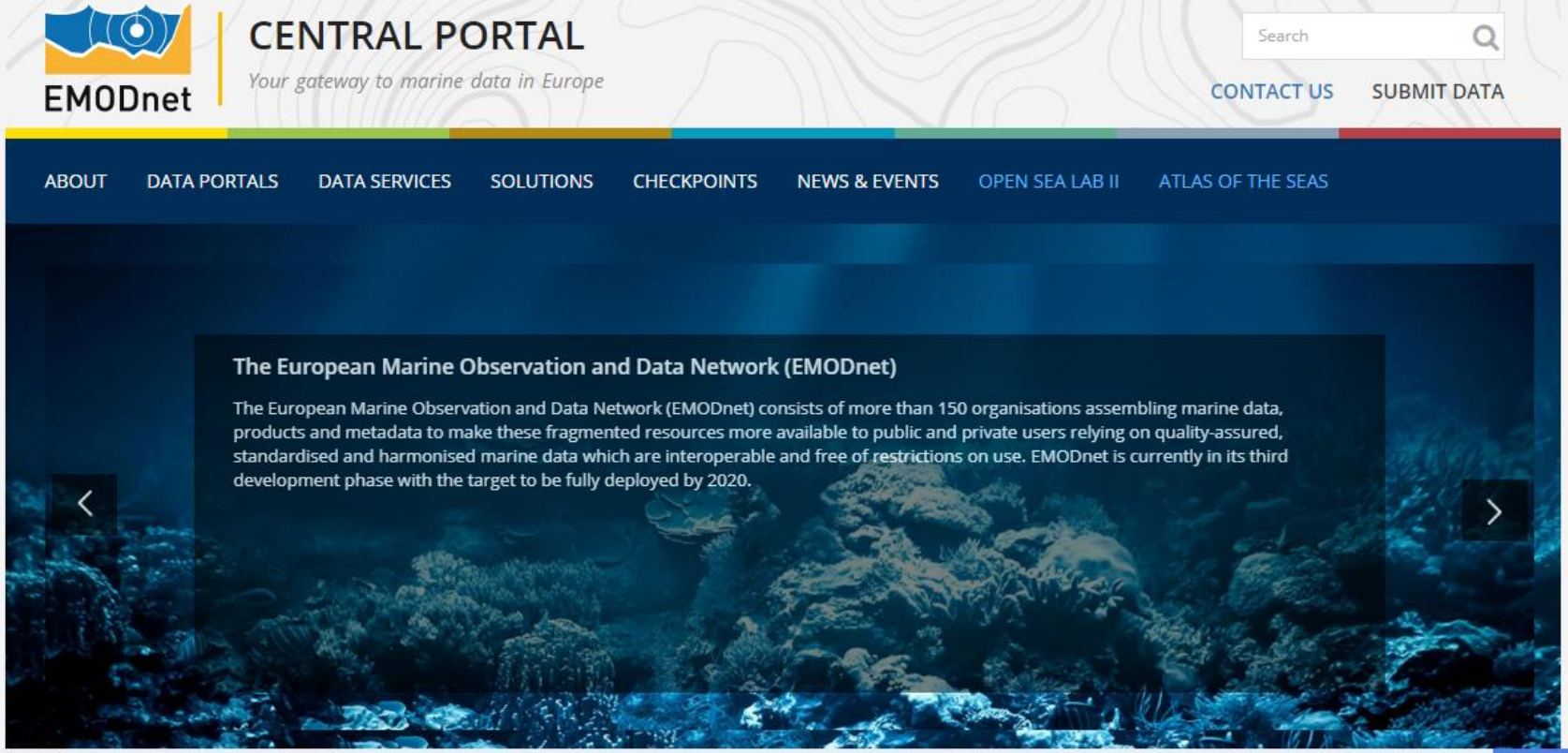
- EMODnet **comes** where Copernicus **fails**

ODYSSEA

EMODnet Data Portals

EMODnet

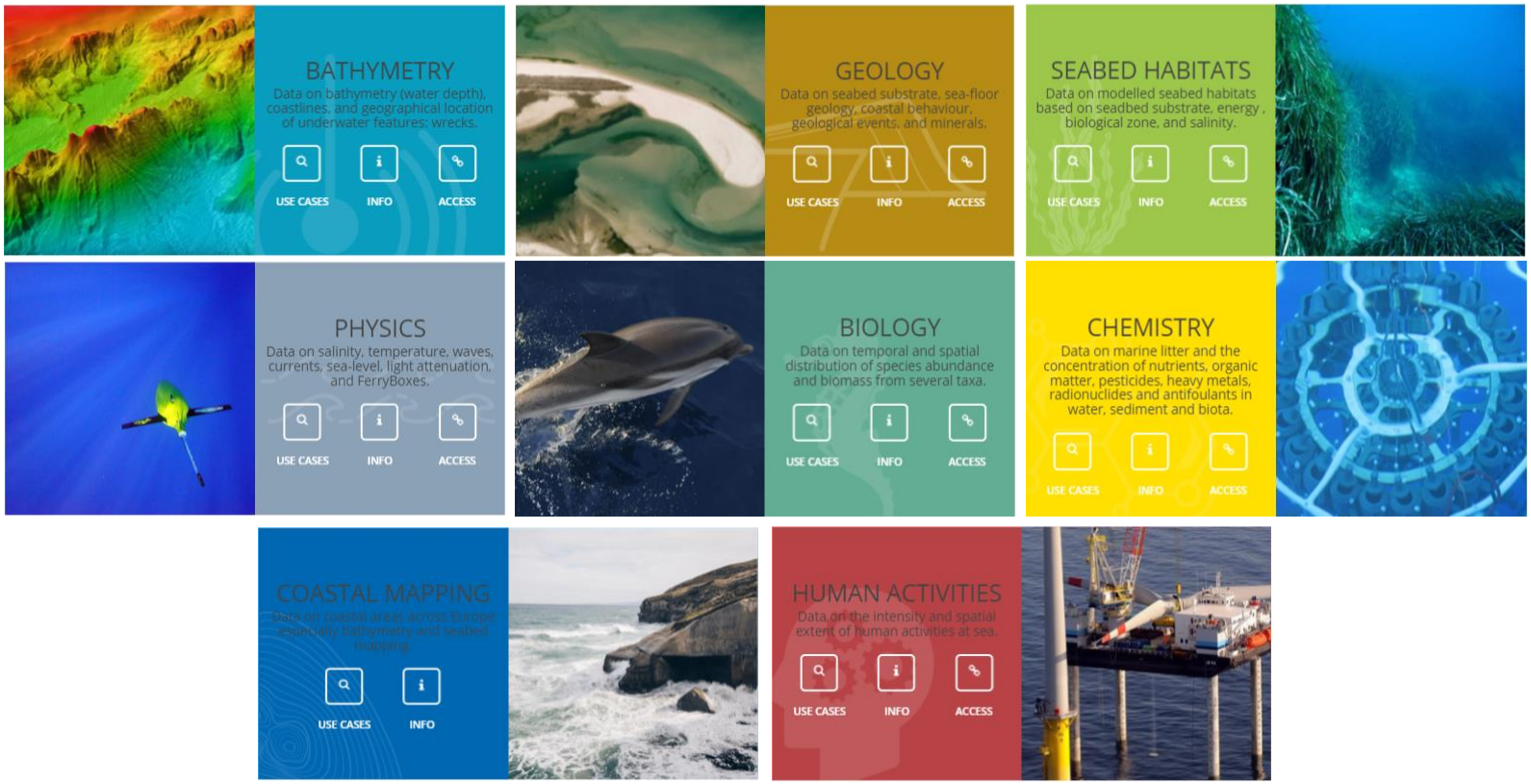
ODYSSEA



EMODnet Data Portals

ODYSSEA

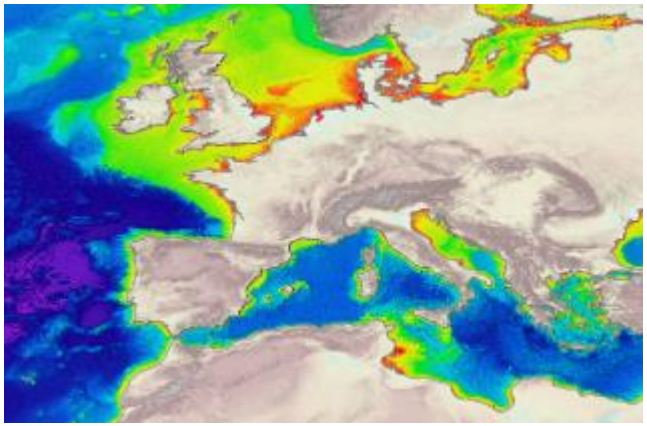
EMODnet provides access to European marine data across **7 discipline-based themes-portals**:



EMODnet
Bathymetry Portal

ODYSSEA

The **EMODnet Bathymetry portal** provides a range of services and functionalities to users for **viewing and downloading bathymetry data** products and for identifying and requesting access to the survey data sets that are used as basis input for the Digital Terrain Models.

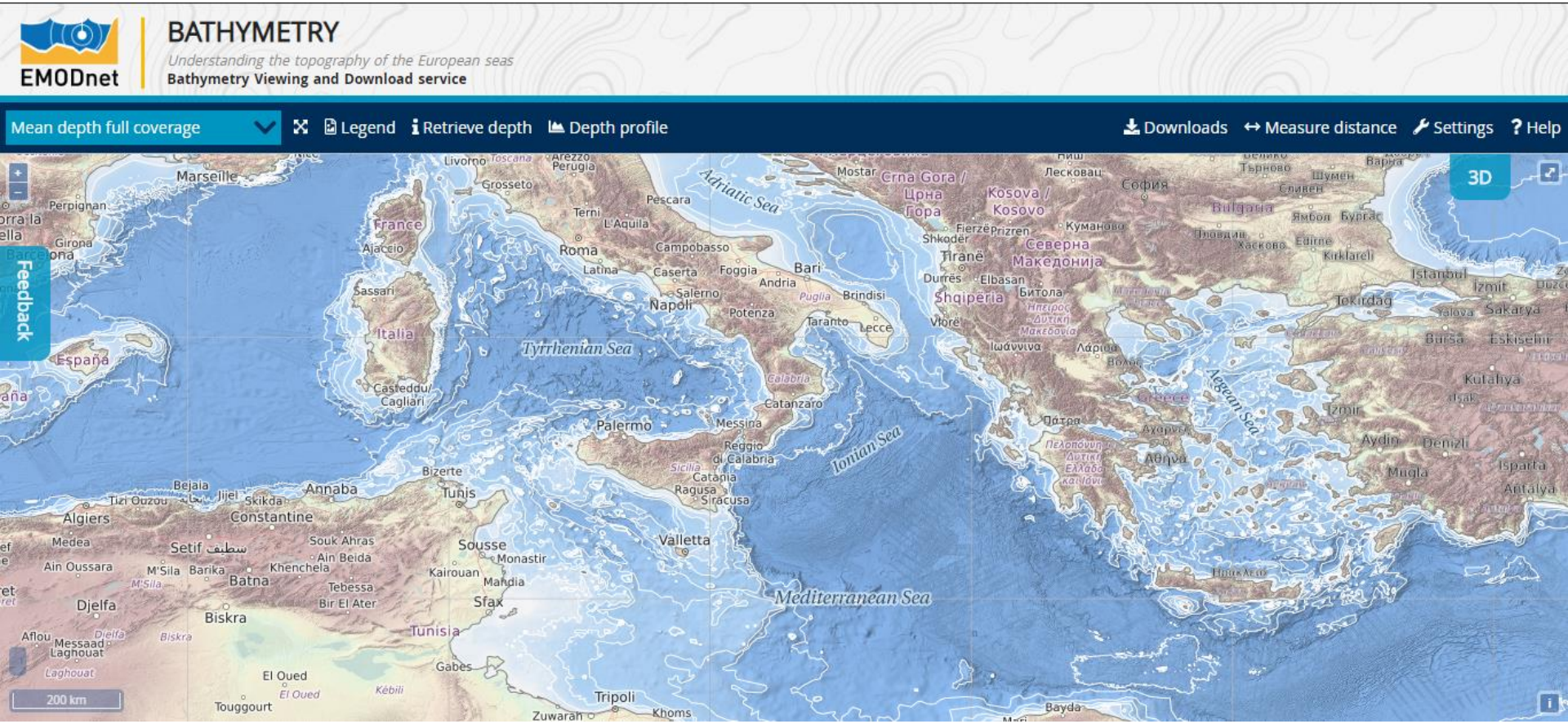


Available Data

1. Minimum, maximum, average and standard deviation of cell water depth
2. Number of values used for interpolation of cell water depth

EMODnet
Bathymetry Portal

ODYSSEA



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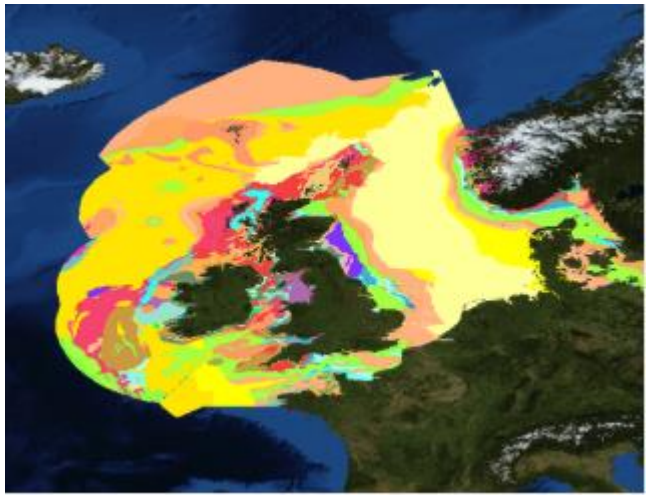
EMODnet
Geology Portal

ODYSSEA

The **EMODnet Geology portal** provide free access to:

i. **geological data** and metadata held by various organisations in Europe based on international standards and
ii. geological data products compiled at a scale of 1:250,000.

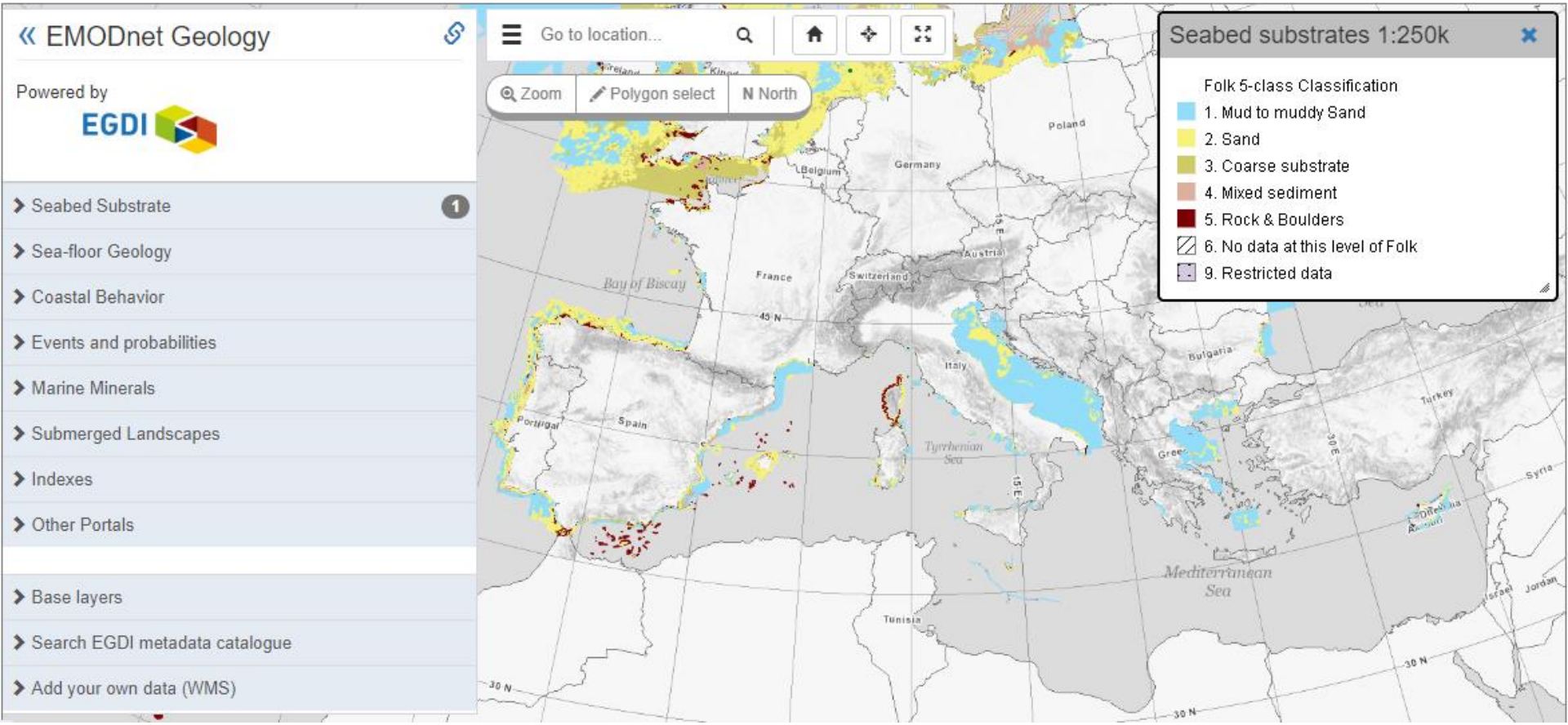


Available Data

1. Seabed substrate
2. Sediment accumulation rate
3. Sea-floor geology
4. Seabed lithology
5. Stratigraphy
6. Coastline migration
7. Aggregate resources
8. Geological events
9. Submerged landscapes

EMODnet
Geology Portal

ODYSSEA

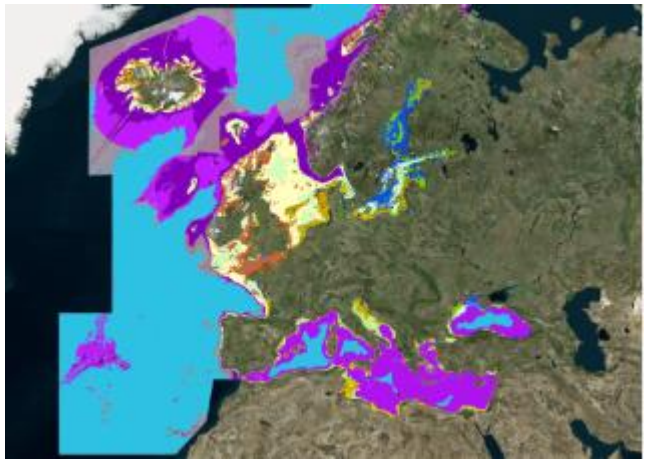


EMODnet
Seabed Habitats Portal

ODYSSEA

The **EMODnet Seabed Habitats portal** provides a single access point **to European seabed habitat data** and products by assembling individual point datasets, maps and models from various sources.
Data are published as interoperable data products for assessing the environmental state of ecosystems and sea basins.

Furthermore, it continues to update the EMODnet broad-scale seabed habitat map for Europe, known as EUSeaMap.



EMODnet
Seabed Habitats Portal

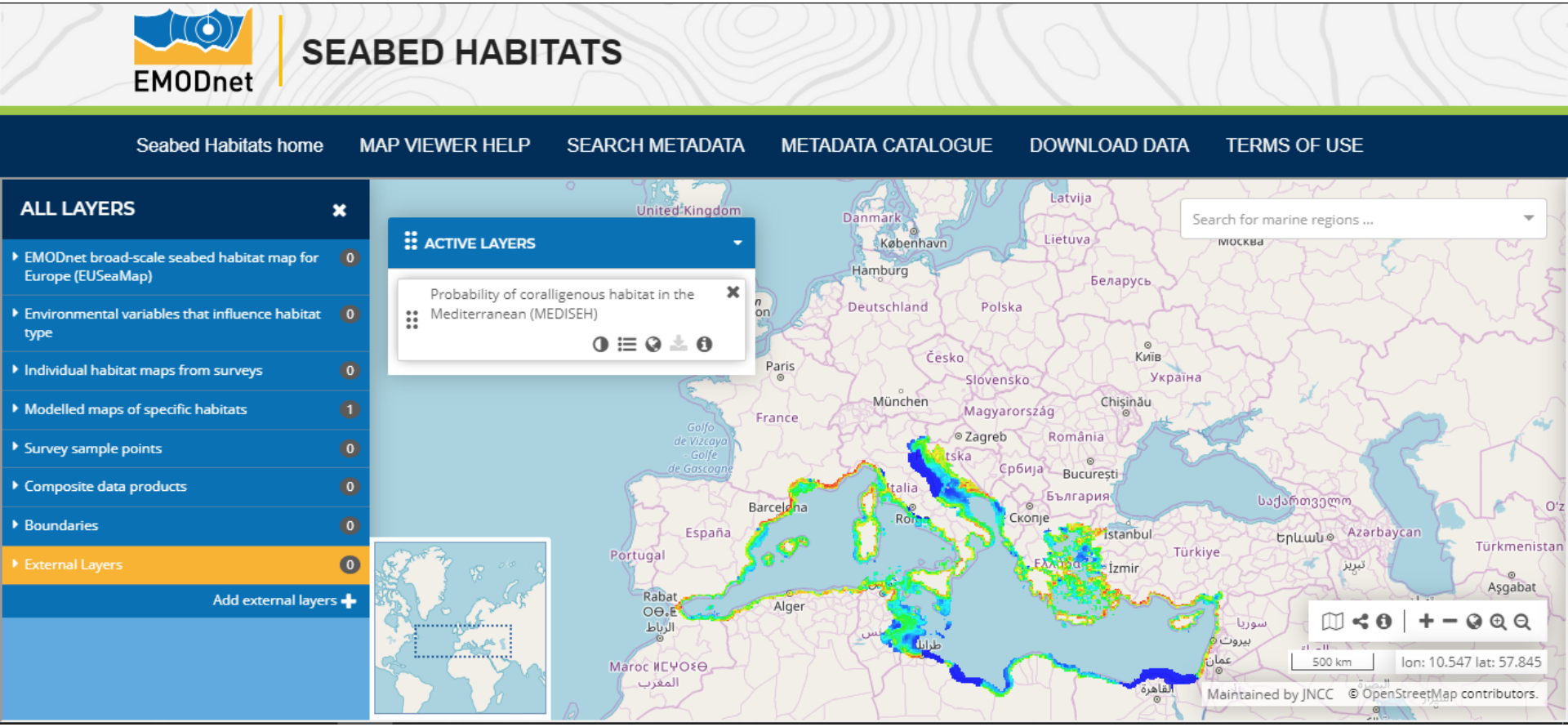
ODYSSEA

Available Data

1. Habitats – various classification systems
2. Broad-scale physical habitat map for Europe
3. Broad-scale habitat map regional case studies
4. Detailed habitat maps from surveys
5. Individual habitat modelling outputs
6. Habitat point data
7. Depth
8. Seabed substrate
9. Broad scale Biological Zone
10. Oceanographic variables
11. Light at seabed
12. Energy at seabed due to waves & current
13. Wave Exposure Index (Baltic)
14. Halocline probability (Baltic)
15. Salinity regime (Baltic)
16. Oxygen regime (Black Sea)
17. Confidence assessments

EMODnet
Seabed Habitats Portal

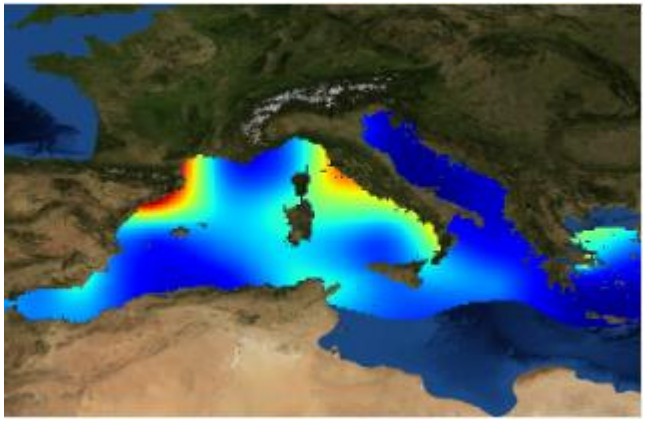
ODYSSEA



EMODnet
Chemistry Portal

ODYSSEA

The **EMODnet Chemistry portal** provides easy access to **marine chemical data**, standardised harmonized validated data collections and reliable data products, highly relevant to assess ecosystem status according to the Marine Strategy Framework Directive, based upon inputs gathered and collated from national monitoring efforts and activities from research institutes in all European coastal states.



EMODnet
Chemistry Portal

ODYSSEA

Available Data

Pesticides & Biocides
1. DDT
2. PCB

Antifoulants
3. TBT
4. TPT

Pharmaceuticals
5. Oxytetracycline
6. Heavy Metals
7. Mercury
8. Cadmium
9. Lead

Hydrocarbons
10. Anthracene
11. Fluoranthene

Radionuclides
12. Cs^{137}
13. Pu^{239}

Fertilizers
14. Nitrogen (Din, TN)
15. Phosphorus (DIP, TP)

Acidity
16. pH
17. pCO_2
18. alkalinity

Dissolved Gasses
19. O_2
20. CO_2

Plastics
21. Polyethylene
22. Polypropylene

Marine Litter
23. Beach litter (nets, bottles etc.)
24. Seafloor litter (i.e. litter collected by fish trawl surveys)
25. Micro litter (microplastics)

Chlorophyll

Silicates

Organic Matter

EMODnet
Chemistry Portal

ODYSSEA

EMODnet

CHEMISTRY

Data & products on marine water quality

CDI Data Discovery and Access Service - Extended search

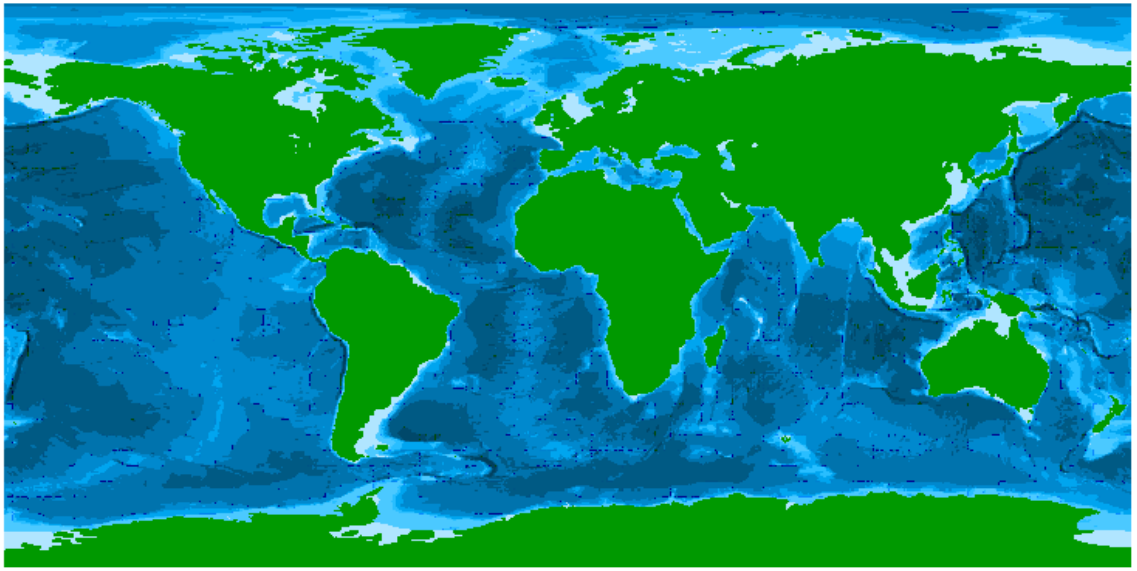
Datasets 0 | Proceed to check out | Reset basket

Layer control

- CDI entry Points
- CDI entry Tracks
- CDI entry Areas
- Grid Lines
- Regional sea
- Regional sea labels
- Main sea
- Main sea labels
- Bathymetry
- Blue Marble
- World

Lat/long

Upper-left Lower-right

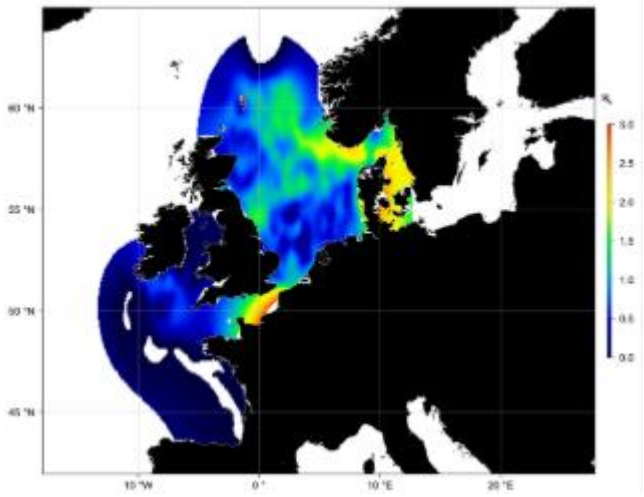


Enlarge map | Help | Position | Index

EMODnet
Biology Portal

ODYSSEA

The **EMODnet Biology portal** provides free access to data on **temporal and spatial distribution of marine species and species traits** from all European regional seas.
It is built upon the World Register of Marine Species and the European Ocean Biogeographic Information System.



EMODnet
Biology Portal

ODYSSEA

Available Data

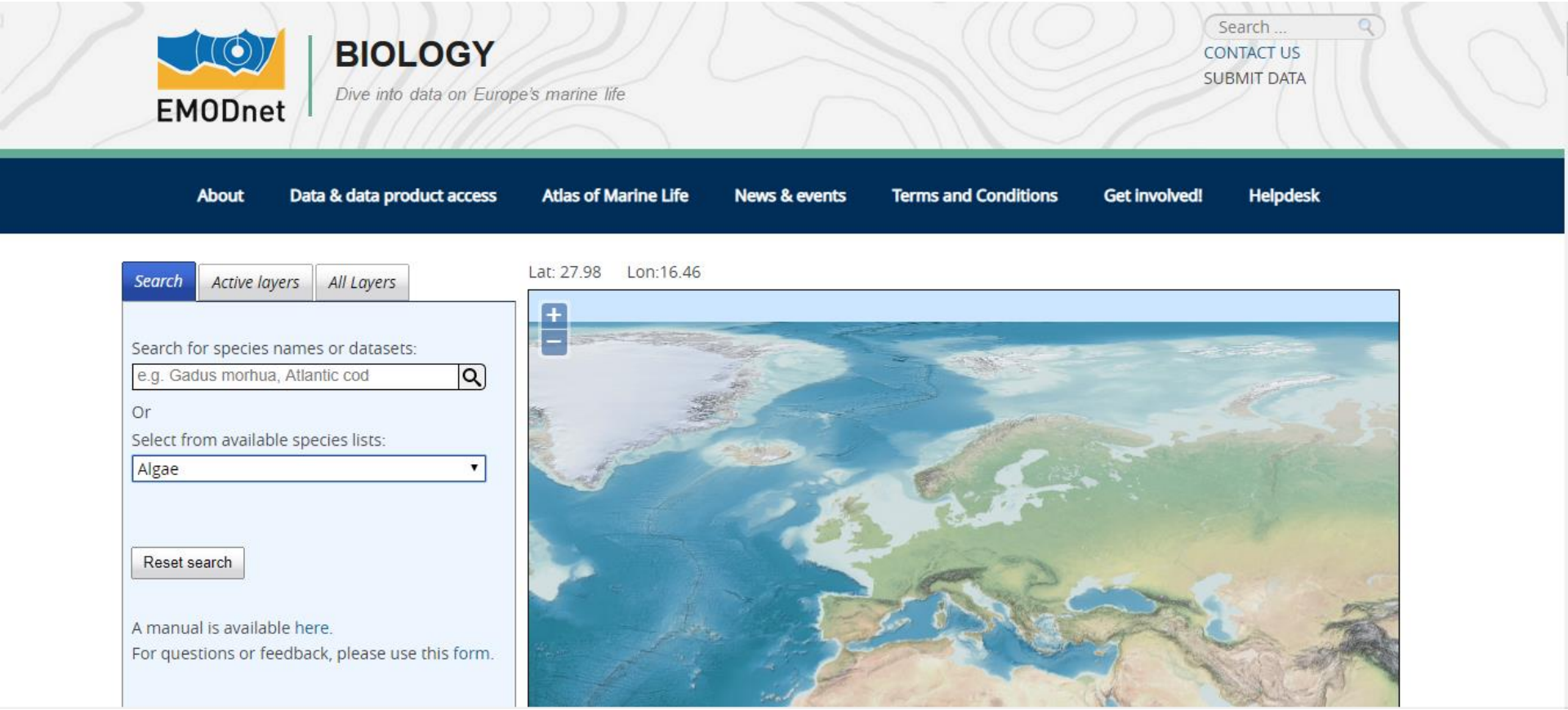
1. **Biomass**
2. **Abundance**

Species groups

- phytoplankton
- zooplankton
- angiosperms
- macro-algae
- invertebrate bottom fauna
- birds
- mammals
- reptiles
- fish

EMODnet
Biology Portal

ODYSSEA



EMODnet
Physics Portal

ODYSSEA

The **EMODnet Physics portal** provides access to **archived and near real-time data on physical conditions** in Europe's seas and oceans. These data are provided by measurement stations and ferryboxes.

EMODnet
Physics Portal

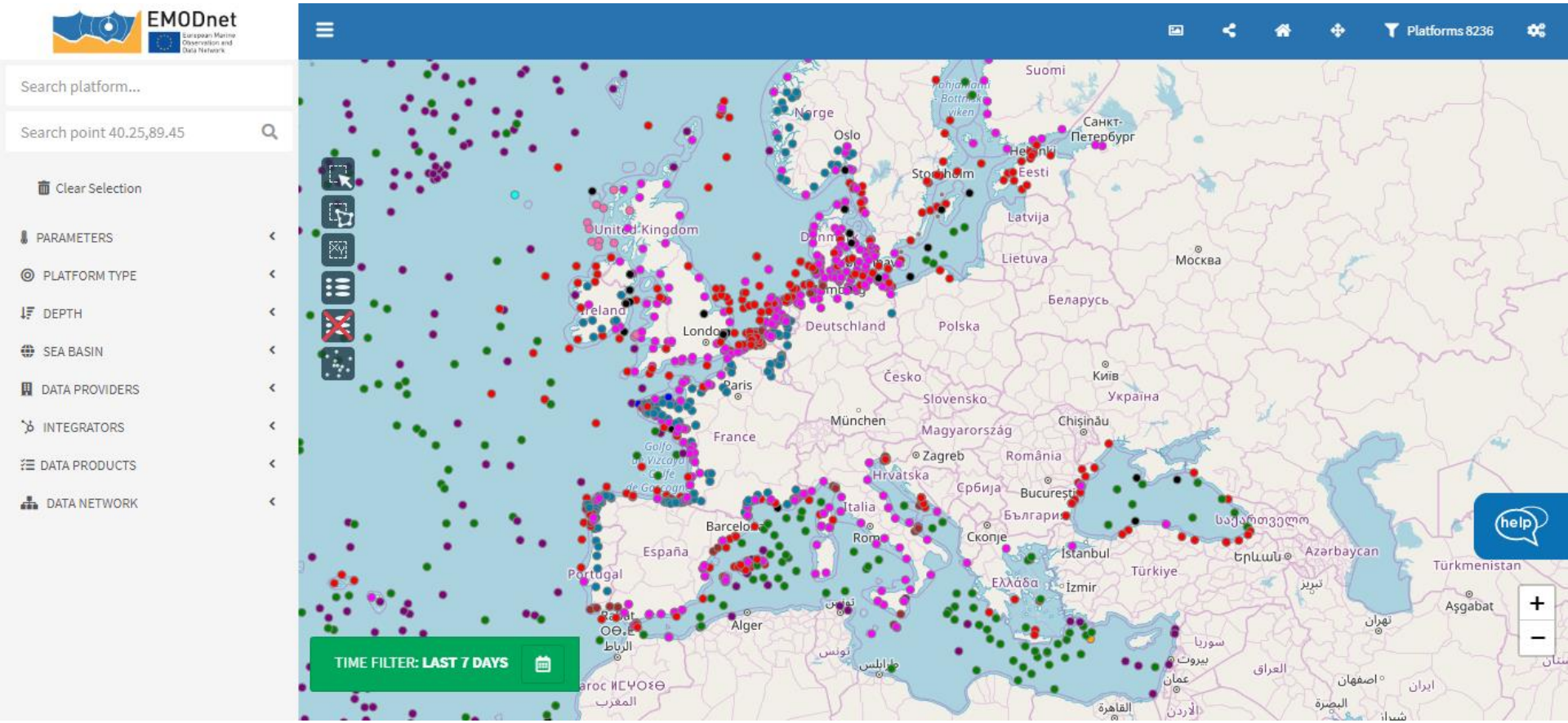
ODYSSEA

Available Data

1. Sea water temperature
2. Sea water salinity or density
3. Sea water currents
4. Sea level
5. Waves and winds (speed & direction)
6. Water clarity (light attenuation)
7. Atmospheric parameters at sea level
8. Underwater noise
9. River data

EMODnet
Physics Portal

ODYSSEA



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EMODnet
Human Activities Portal

ODYSSEA

The **EMODnet Human Activities portal** provides access to **existing marine data on activities carried out in EU waters**, by building a single-entry point for geographic information on 14 different themes.

The portal makes available information such as geographical position, spatial extent of a series of activities related to the sea, their temporal variation, time when data was provided, and attributes to indicate the intensity of each activity.

EMODnet
Human Activities Portal

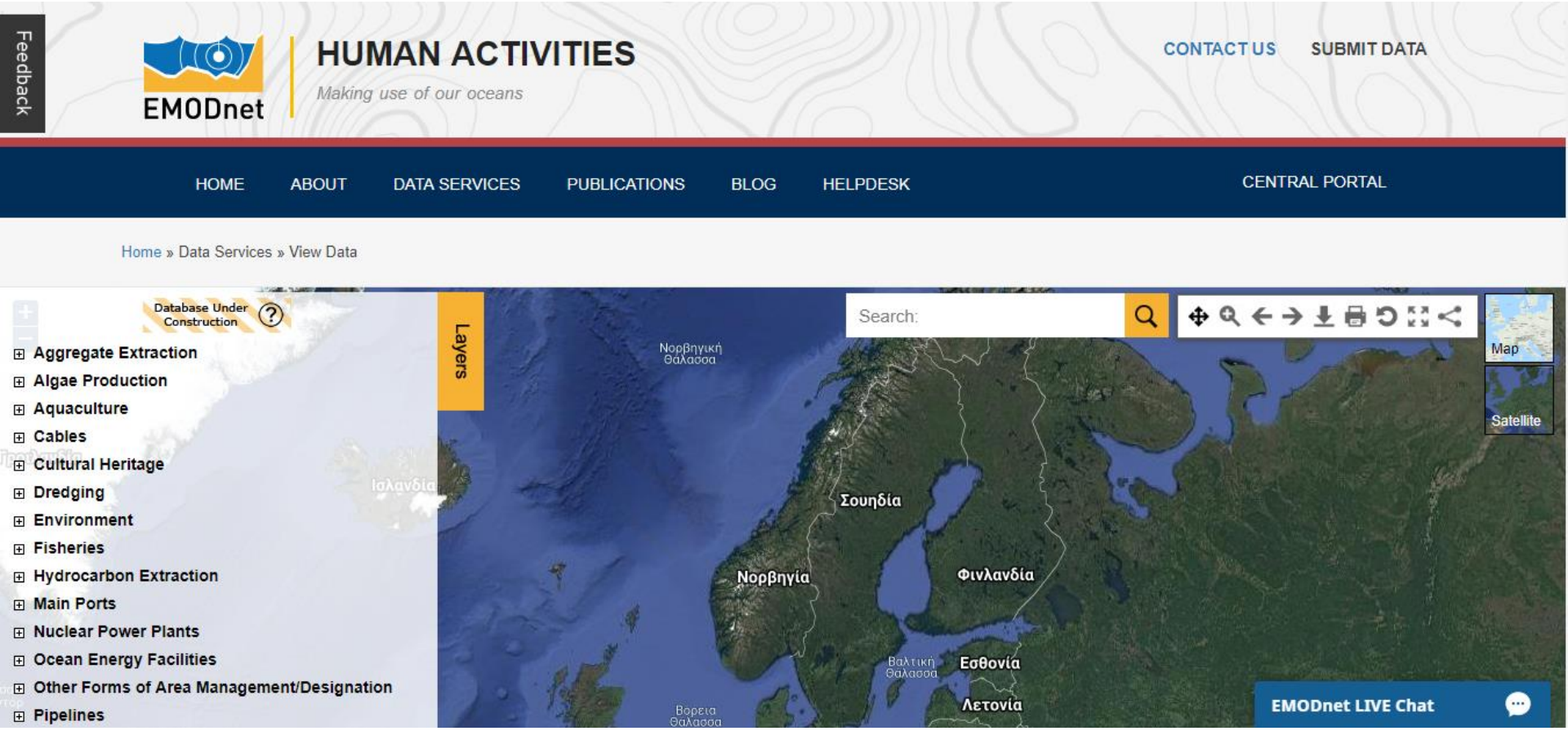
ODYSSEA

Available Data

1. Aggregate Extraction
2. Aquaculture
3. Cultural Heritage
4. Dredging
5. Environment
6. Fisheries
7. Hydrocarbon Extraction
8. Main Ports
9. Ocean Energy Facilities
10. Other Forms of Area Management/Designation
11. Pipelines and Cables
12. Waste Disposal
13. Wind Farms

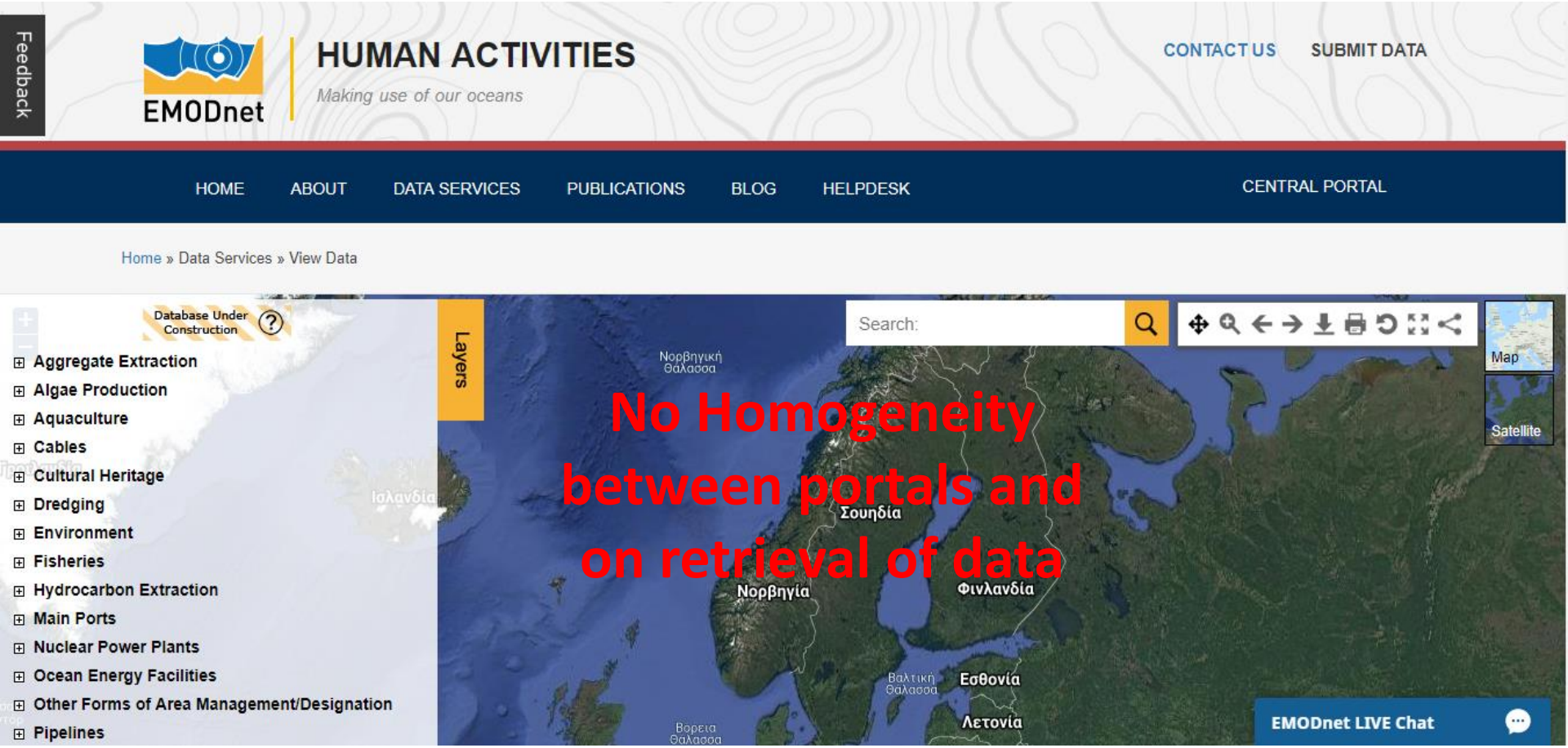
EMODnet
Human Activities Portal

ODYSSEA



EMODnet
Portals

ODYSSEA



ODYSSEA

PRACTICAL
Accessing EMODnet Bathymetry data

EMODnet
Bathymetry Portal – Download data

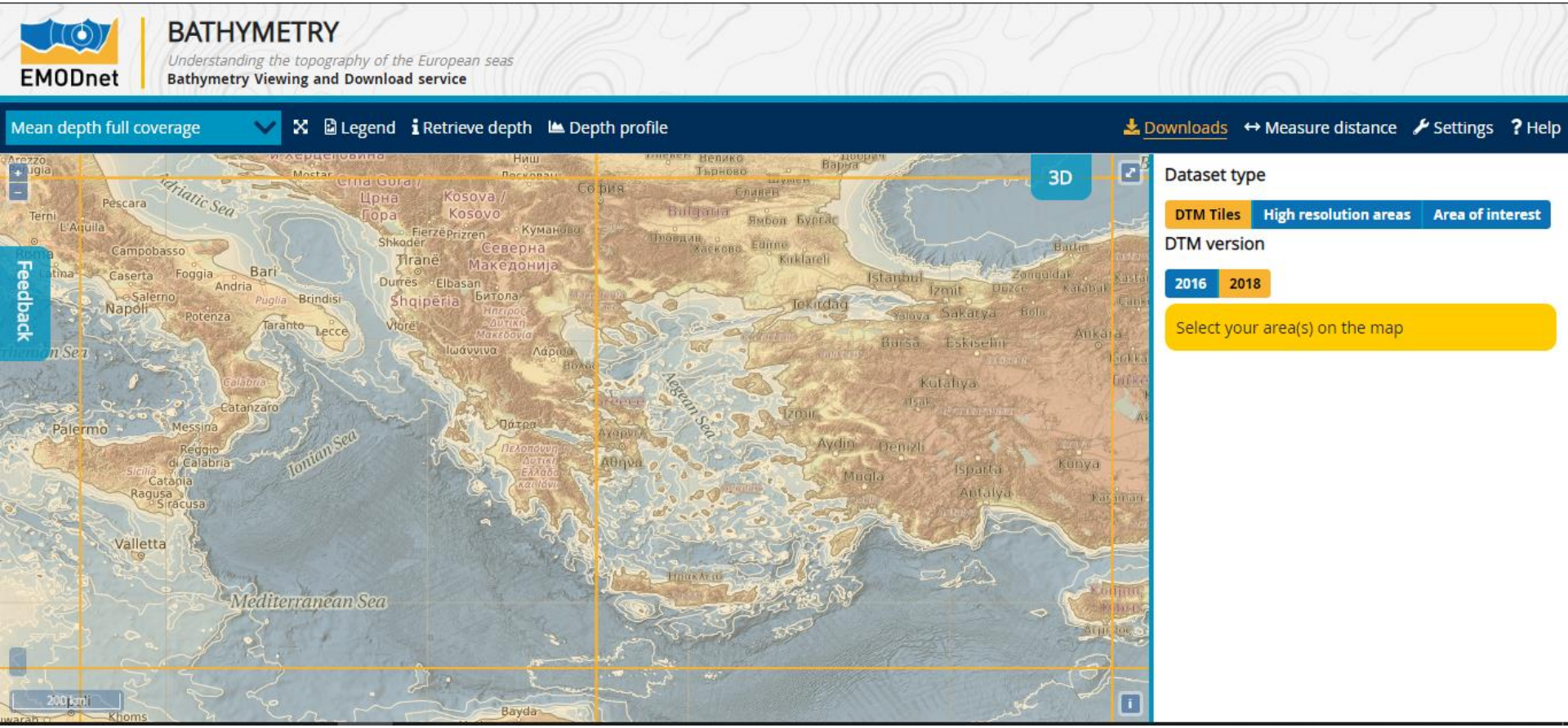
ODYSSEA

Bathymetry data can be retrieved with 2 ways:

1. Through the **Bathymetry Viewing and Download service** in Bathymetry EMODnet Portal
2. Through **OGC WMS and WCS services** which can be found at the following URLs:

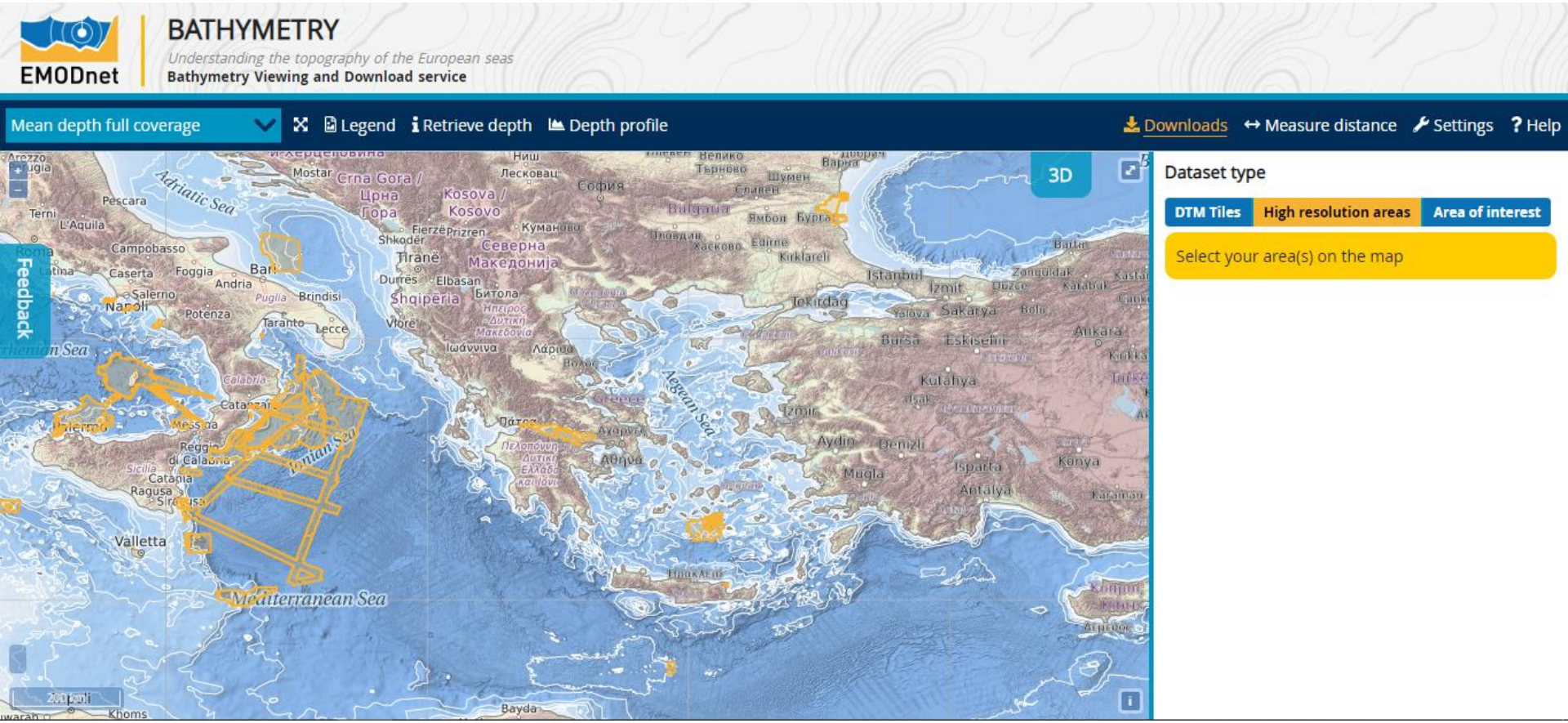
WMS: **https://ows.emodnet-bathymetry.eu/wms**
WFS: **https://ows.emodnet-bathymetry.eu/wfs**
WMTS: **https://tiles.emodnet-bathymetry.eu**
WCS: **https://ows.emodnet-bathymetry.eu/wcs**

EMODnet
Bathymetry Portal – Download data

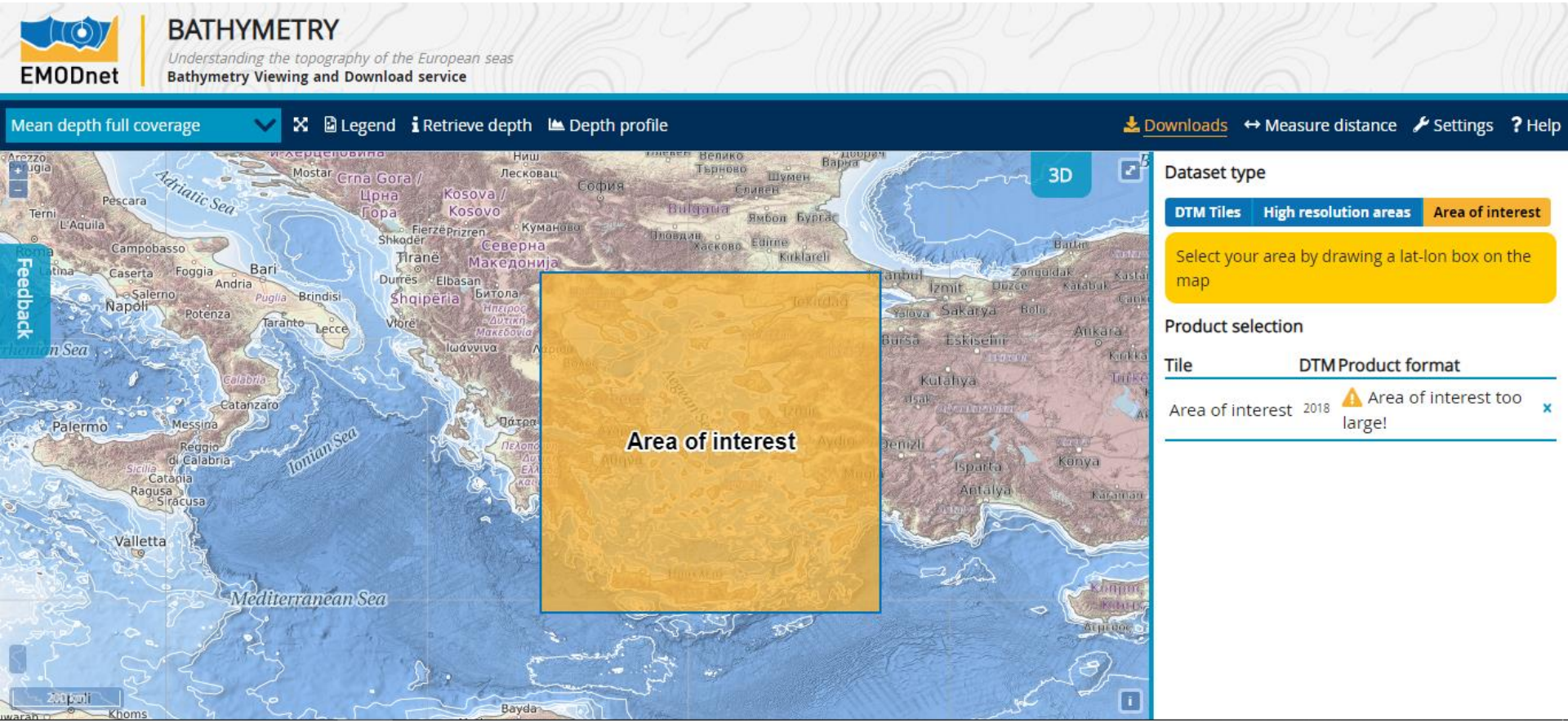


EMODnet
Bathymetry Portal – Download data

ODYSSEA

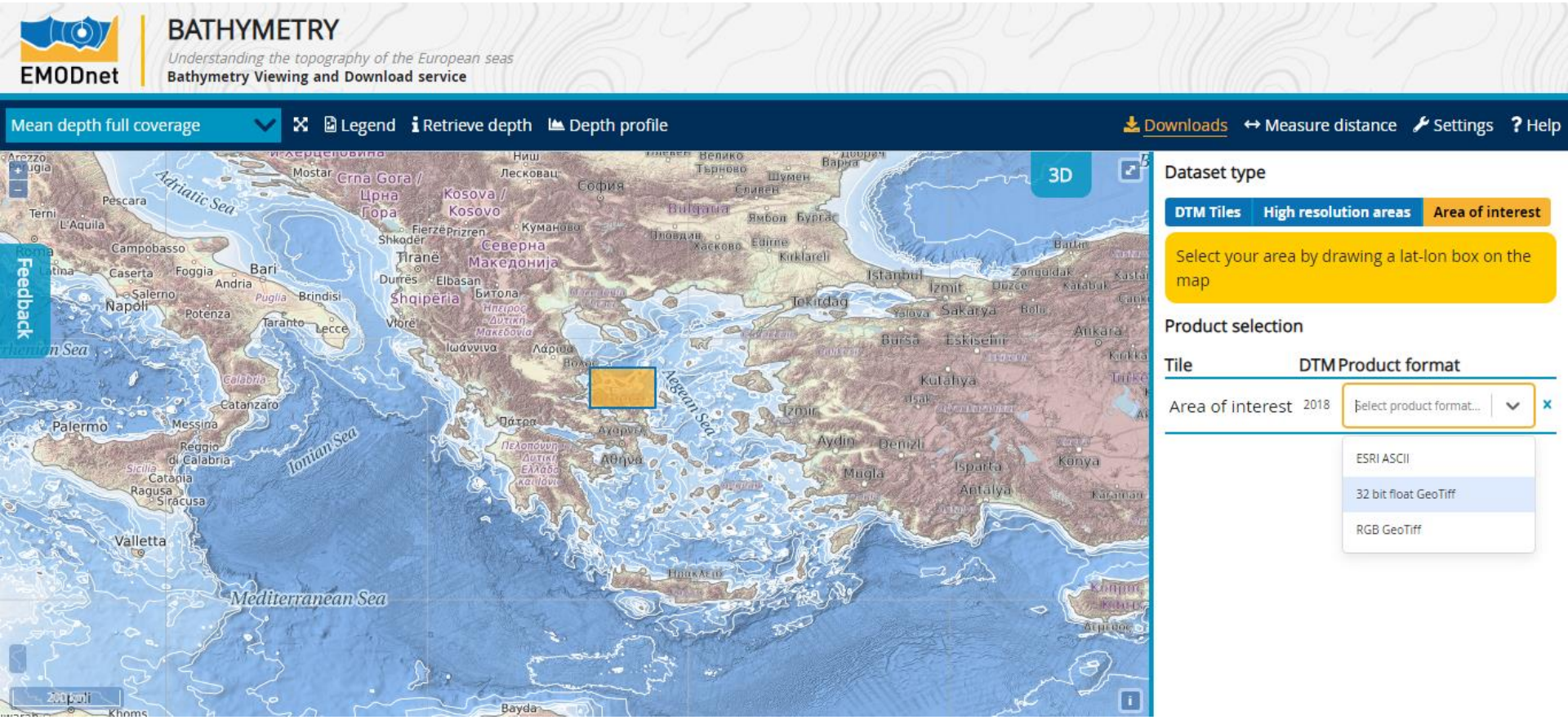


EMODnet
Bathymetry Portal – Download data

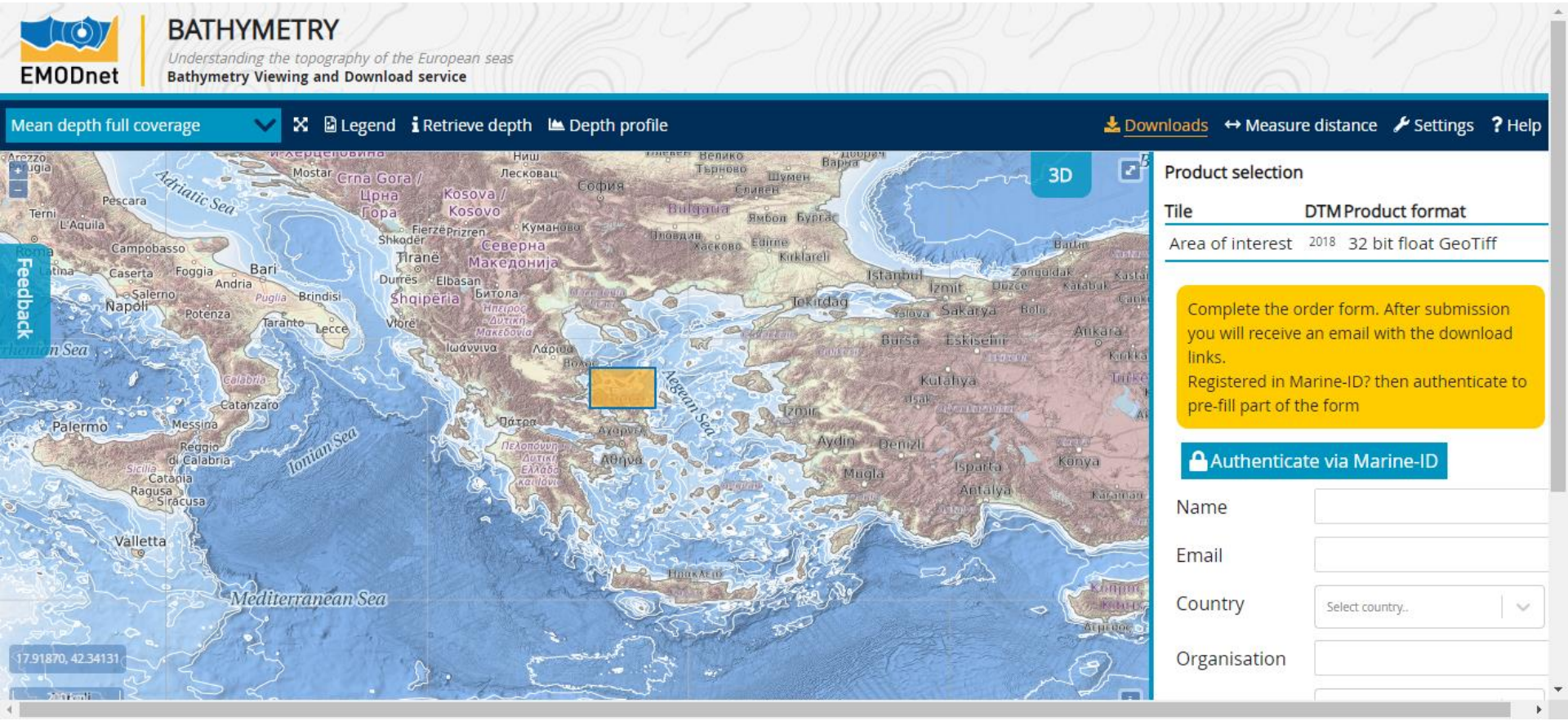


EMODnet
Bathymetry Portal – Download data

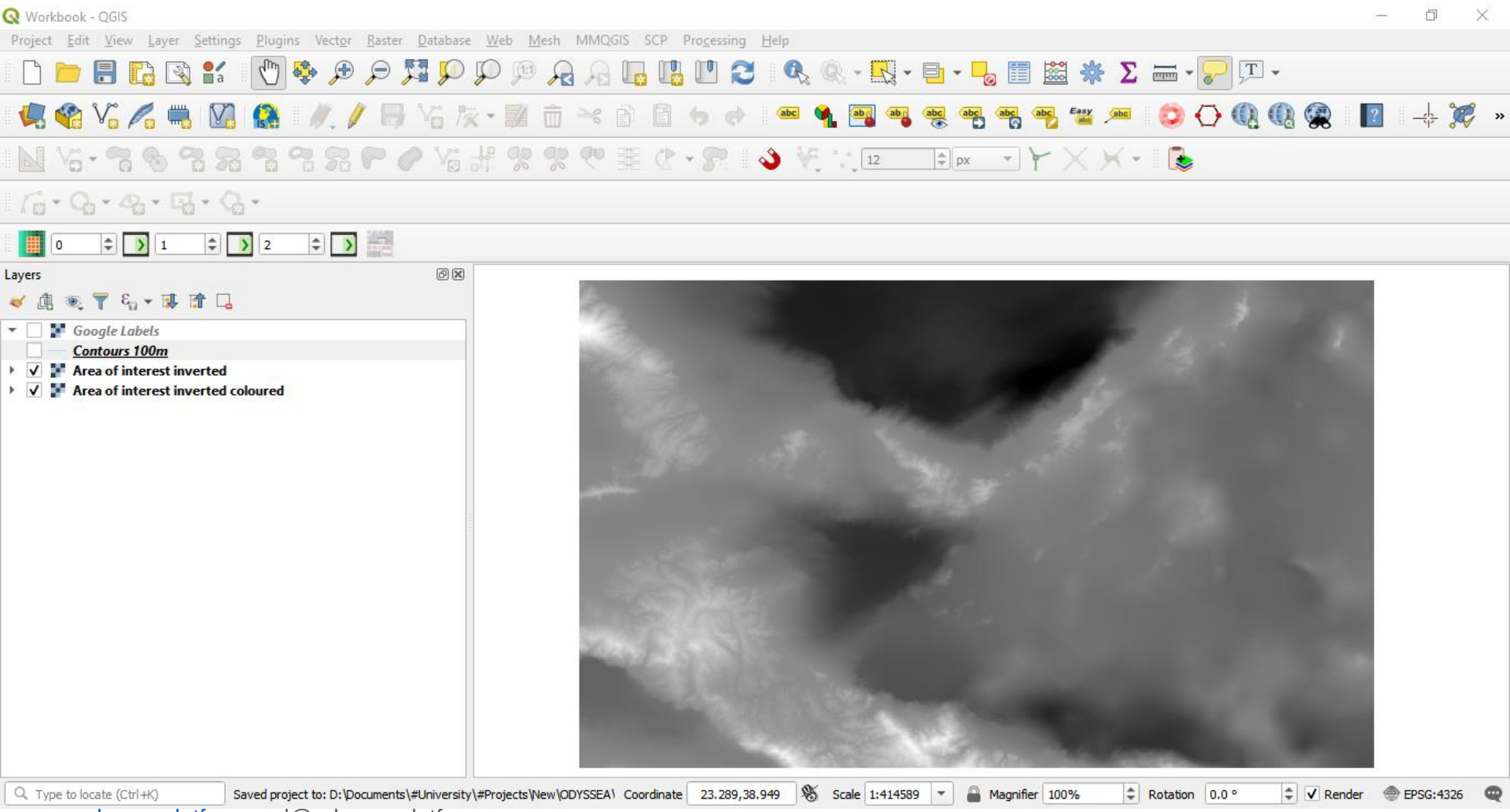
ODYSSEA



EMODnet
Bathymetry Portal – Download data

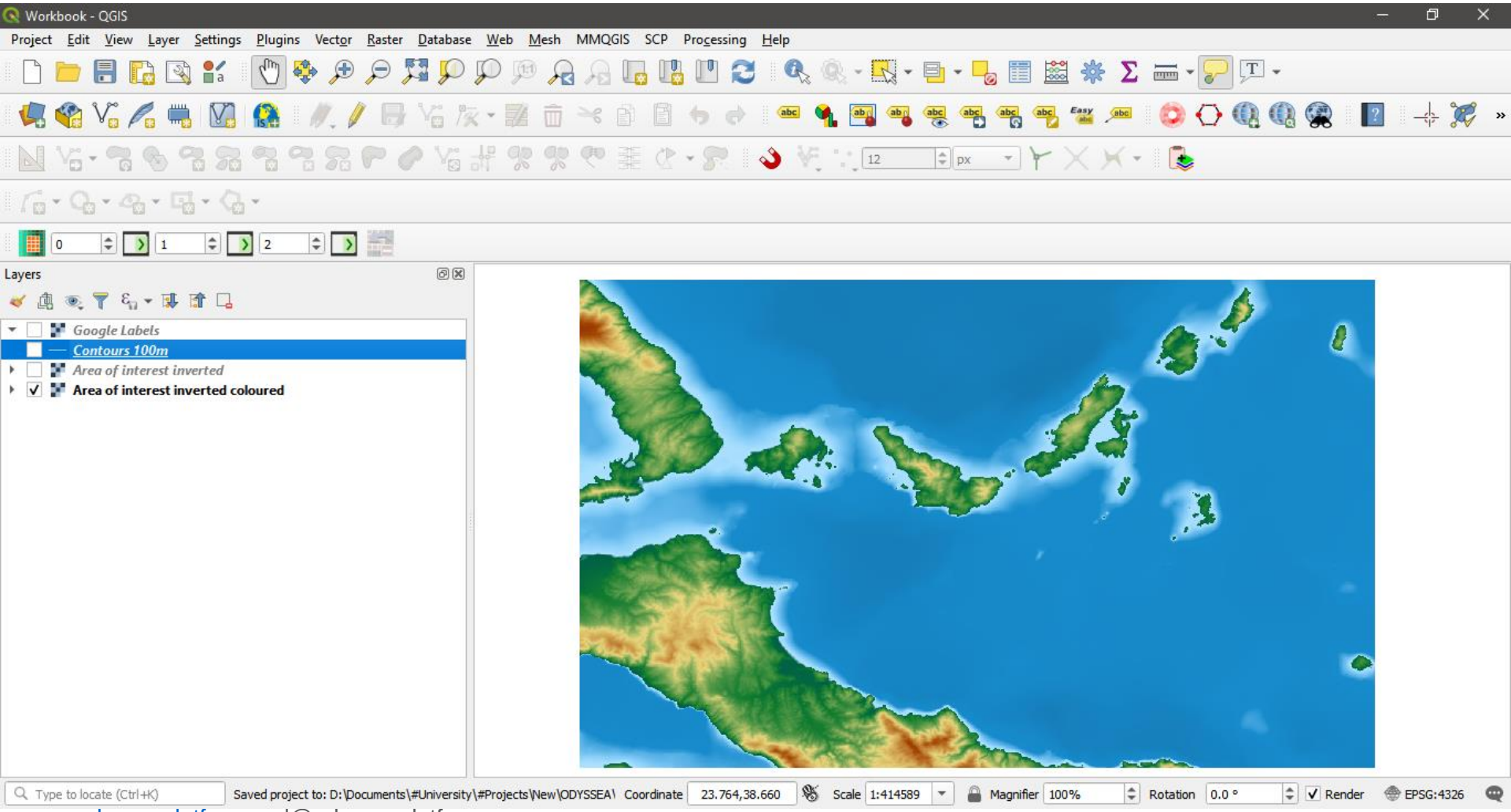


EMODnet
Bathymetry Portal – Visualize data



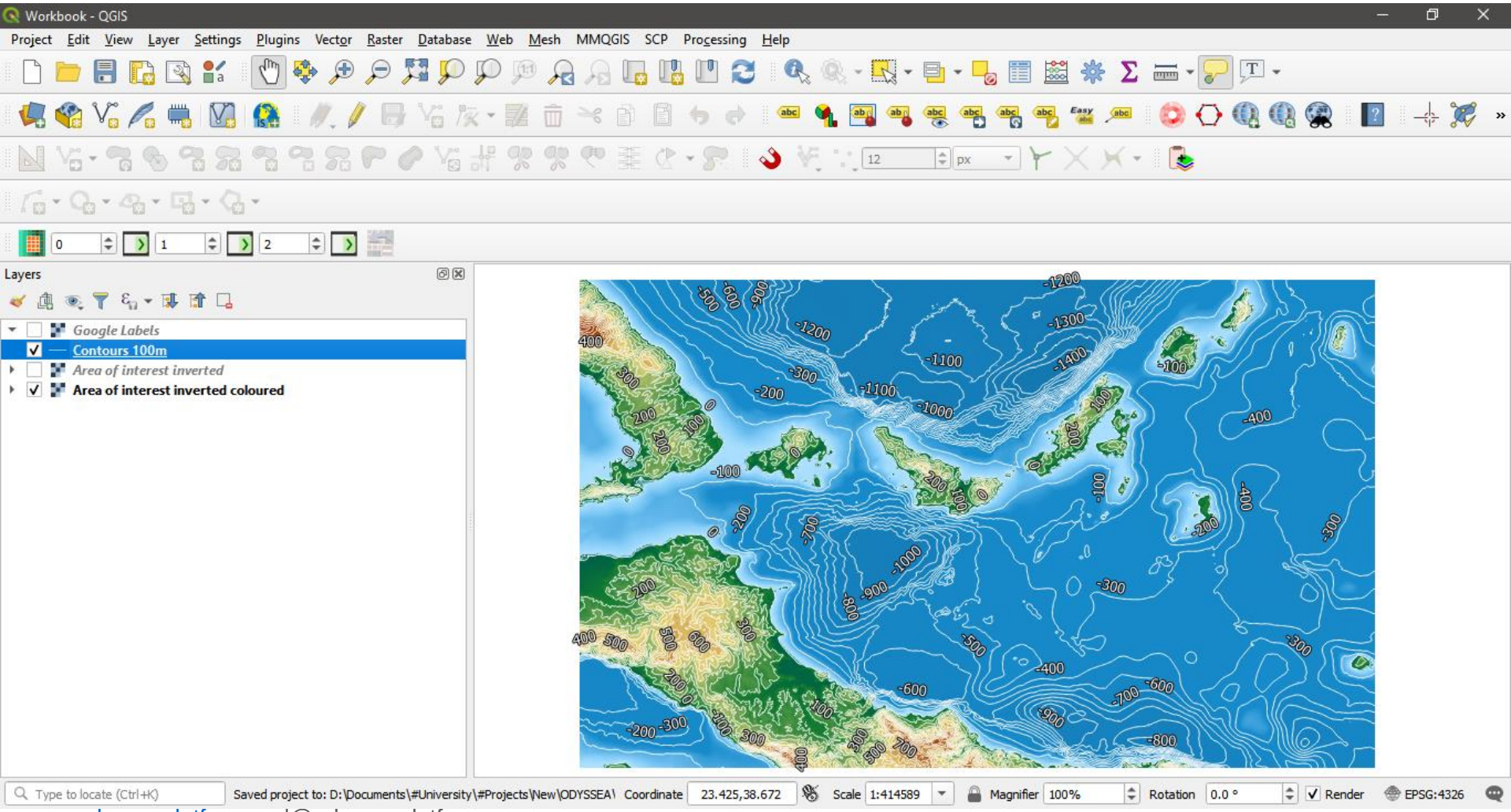
EMODnet
Bathymetry Portal – Visualize data

ODYSSEA



EMODnet
Bathymetry Portal – Visualize data

ODYSSEA



Exercise

ODYSSEA

- Download and visualize bathymetry data of your area of interest

ODYSSEA

Creating products and knowledge for the Mediterranean

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THANK-YOU

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