

## EMODnet Physics

EASME/EMFF/2016/006 - Operation, development and maintenance  
of a European Marine Observation and Data Network  
EASME/EMFF/2016/1.3.1.2 – Lot 3/SI2.749411

Antonio  
Novellino | ETT

The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation (EU) No 509/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund.

- Physics and Data Ingestion activities
- Data, metadata and products
- Progress on data management (HFR, river)
- Portal updates and products
- new M2M services (widget, ERDAPP, etc)
- Users and portal use



# EMODnet Physics & Data Ingestion

## Near Real Time

- 30 tide gauge stations, Italian TG network, ISPRA via GLOSS
- 4 fixed stations, 2 gliders, 2 turtles, 2 FB, SOCIB
- HFR data (Brest bay: Pointe de Brézellec- Pointe de Garchine), SHOM
- 23 Ferrybox (StenaLines), SMHI

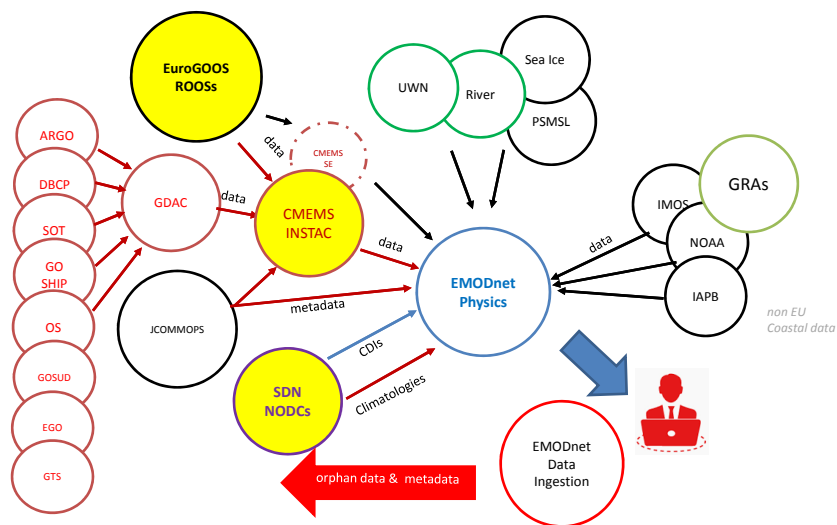
## Historical data

- >1100 sea mammals data, 2004 – 2015, MEOP DB
- 3 fixed buoys (Civitavecchia, Gaeta), 2012 -2017, Uni. Tuscia
- HFR data (Naples, Manfredonia, Trieste), CNR ISMAR, RITMARE prj.
- HFR data (MESA, VADE), 2014-2015, SMHI



# data management

## Data Collection, Metadata Compilation, Data Access and Products





## data management

### Near Real Time data/operational data

- Platform: fixed mooring, ferrybox, tide gauge, drifting buoy, ARGO, profiling mooring, HF Radar, ships
- Time dimension: Daily files, Monthly files aggregations, Rep long term files
- Metadata + Transport format: Netcdf (CF convention), csv
- Repositories: CMEMS INSTAC - EuroGOOS ROOS (6 assembly centres)  
Institutes\*  
GDAC/IOOS/AIMOS\*\*

### Historical validated data sets

- Platform: fixed stations (mooring, tide gauge)
- Time dimension: Depending on datasets (ranging from month to years)
- Metadata + Transport format: CDI + ODV4/Netcdf (CF)
- Repositories: CDI: centralized  
Datasets: NODC and SeaDataNet nodes (100 centres)



## EMODnet Physics & CMEMS

### Common data infrastructure MoU

(NRT + 5Y)

INSITU\_GLO\_NRT\_OBSERVATION\_013\_030  
INSITU\_ARC\_NRT\_OBSERVATIONS\_013\_031  
INSITU\_BAL\_NRT\_OBSERVATIONS\_013\_032  
INSITU\_NWS\_NRT\_OBSERVATIONS\_013\_036  
INSITU\_IBI\_NRT\_OBSERVATIONS\_013\_033  
INSITU\_MED\_NRT\_OBSERVATIONS\_013\_035  
INSITU\_BS\_NRT\_OBSERVATIONS\_013\_034

(1990-2014)

INSITU\_ARC\_TS\_REP\_OBSERVATIONS\_013\_037  
INSITU\_IBI\_TS\_REP\_OBSERVATIONS\_013\_040  
INSITU\_NWS\_TS\_REP\_OBSERVATIONS\_013\_043  
INSITU\_BAL\_TS\_REP\_OBSERVATIONS\_013\_038  
INSITU\_MED\_TS\_REP\_OBSERVATIONS\_013\_041  
INSITU\_BS\_TS\_REP\_OBSERVATIONS\_013\_042

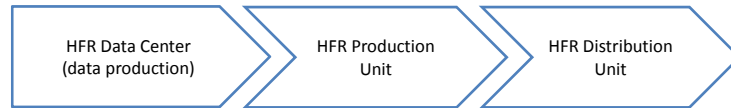


	available	CMEMS
ARGO/Profilers	>7200	>7200
CTD Profiles	>1000	>1000
Drifting buoys	>9550	>8400
Ferrybox/Ship	138	115
Gliders	180	50
Mooring	>1600	>950
Tide Gauge	>1630	>430
Rivers Stations	>160	>160
Sea Mammals	>290	<100
HF Radar	>140	

	available	CMEMS
ARGO/Profilers	>6500	>6500
CTD Profiles		
Drifting buoys	>6100	>5600
Ferrybox/Ship	208	98
Gliders	>90	>40
Mooring	>950	>680
Tide Gauge	>1280	>400
Rivers Stations	>150	>150
Sea Mammals	>1010	>150
HF Radar		



## data management



### HFR Data Production:

- **Data Production:** run HFR site or assemble HFR data
- **Quality control:** apply automatic quality controls that have been agreed at the EuroGOOS HFR TT. These procedures are defined by parameter, elaborated in coherence with international recommendations

### HFR Production Unit:

- **Acquire Data:** Gather available HF Radar data through collaboration with regional and national partners.
- **Data format and naming harmonization**
- **Validation/Assessment:** Assess the consistency of the data over a period of time and an area to detect data that are not coherent with their neighbors but could not be detected by automatic QC.

### HFR Distribution Unit:

- **Distribution Unit:** assemble data into an integrated dataset and uniform catalogue, make the data available in NRT within the European infrastructures (EMODnet, CMEMS SE) and to the external users.

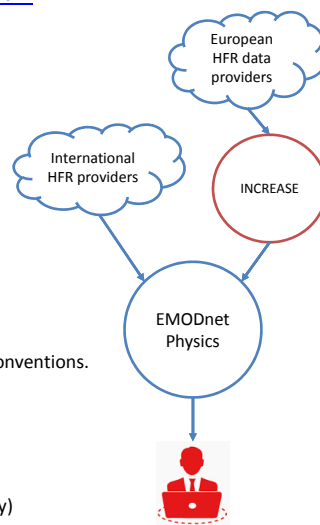


## HFR data management

<http://thredds.cmems-increase.eu/threddsINCREASE/catalog.html>

<http://thredds.emodnet-physics.eu/thredds/catalog.html>

- Data format
  - netCDF-4, CF 1.6
- Data infrastructure
  - THREDDS data server + CMEMS INSTAC naming conv
    - Last day - RR\_LATEST\_XX\_CODE\_YYYYMMDD.nc
    - Latest - RR\_LATEST\_XX\_CODE.nc
    - Monthly - RR\_YYYYMM\_XX\_CODE.nc
    - History - RR\_YYYY\_XX\_CODE.nc (e.g. IR\_2016\_TL\_HR\_BasqueHFR.nc)
  - SDN P09 data variable names
- metadata structure
  - Mandatory: CF-1.6 and OceanSITES
  - Recommended: INSPIRE and Unidata Dataset Discovery conventions.
  - Suggested: other relevant to the data
- QC flagging scheme
  - CMEMS INSTAC & OceanSites: QF [0-9]
- QC tests
  - QARTOD, independent from manufacturer
  - Level 2B (for radial velocity) and Level 3B (for total velocity)

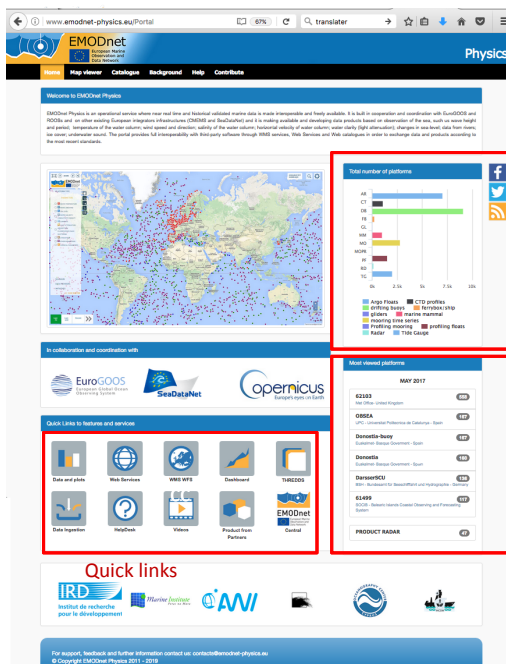






## Portal development:

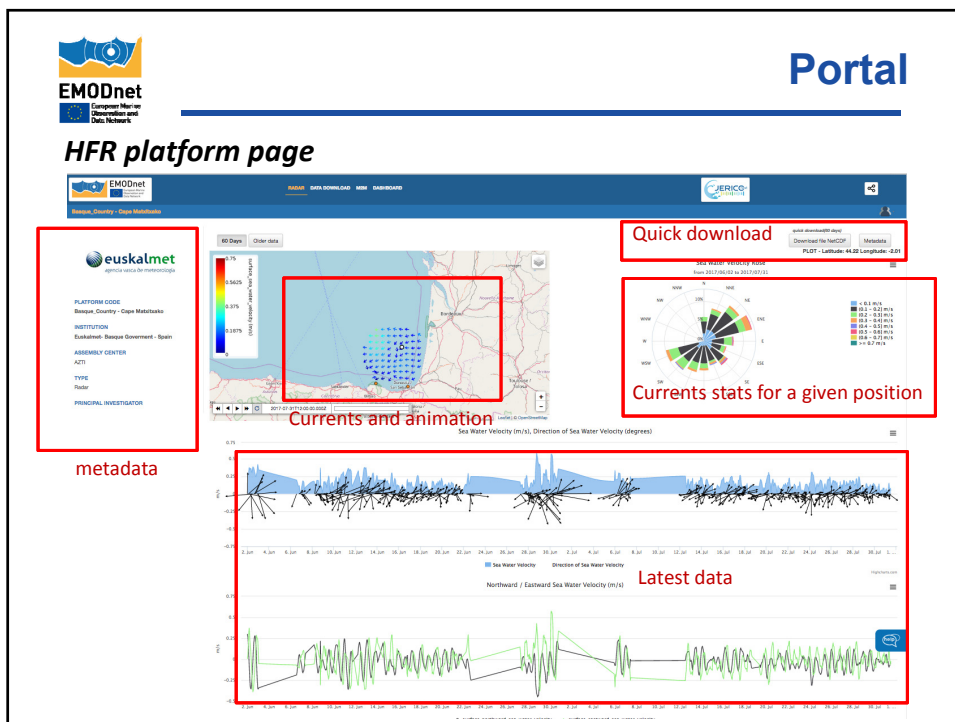
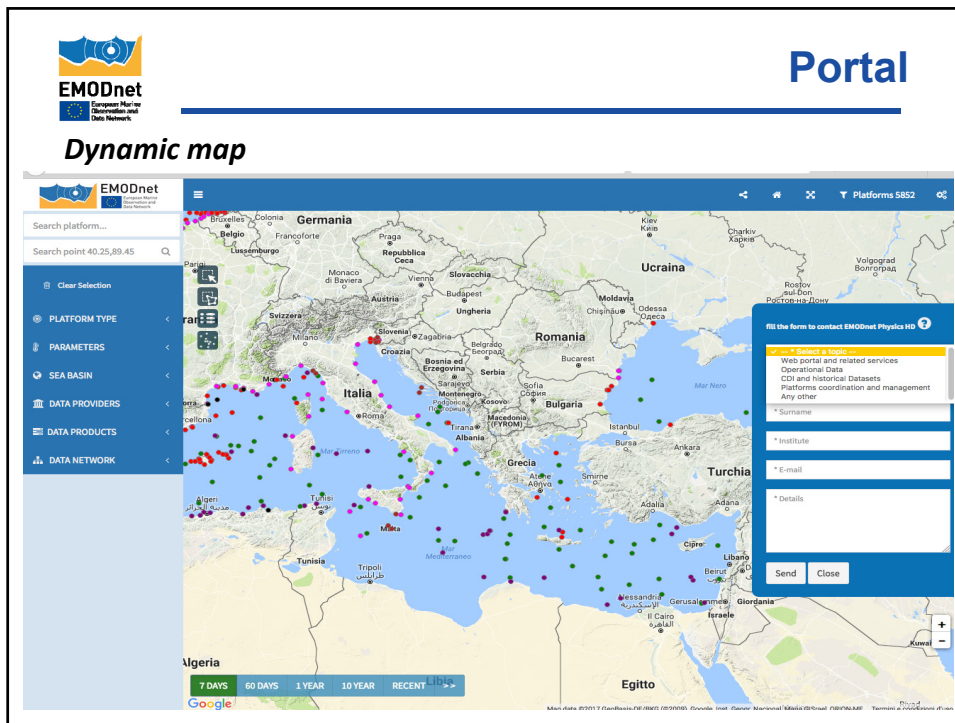
- **Landing page:** to give background information and links
- **Dynamic map:** to explore capacity, search for metadata and data
- **Platform page:** to pre-view and metadata and data, trends, and download data
- **Products page:** to pre-view and interact with operational data, data collections, climatologies,
- **Interoperability and M2M services:** to facilitate data and products uptake and further uses
- **Monitoring tools:** to monitor system and infrastructure performances, platform data and products uptake and use, and to report back to data providers
- **Help desk**



The screenshot shows the EMODnet Physics Portal interface. At the top, there is a navigation bar with 'Home', 'Map viewer', 'Catalogue', 'Background', and 'Help'. Below the navigation bar, a 'Welcome to EMODnet Physics' section provides an overview of the portal's purpose. The main content area includes a dynamic map of Europe with data points, a 'Total number of platforms' bar chart, a 'Quick links to features and services' section, and a 'Latest released platform' list. Red boxes highlight the map, the bar chart, and the quick links section.

### Menu bar:

- Home: landing page and brief introduction to EMODnet Physics
- Map viewer: link to the dynamic map with datasets ([www.emodnet-physics.eu/map](http://www.emodnet-physics.eu/map))
- Catalogue
  - o Products: link to the dynamic map with (plot) products (<http://www.emodnet-physics.eu/map/Products/V2/PRODUCTS.aspx>)
  - o Catalogue: sextant catalogue for products released by the EMODnet Physics partners (CMEMS and SeaDataNet)
- Background
- Help
  - o term of use
  - o QC/QA protocols
  - o User guide & legend
  - o Documents and services
- Data Use Contribute
  - o Associate partners (alphabet order of the data contributors)
  - o How to contribute (introduction and links to EMODnet Data Ingestion)
  - o Near Real Time data exchange



**EMODnet** European Marine Observation and Data Network

**Portal**

### HFR platform page

www.emodnet-physics.eu/msojplatforminfo/parameterdownload.aspx?platformid=10273

Recent data time series availability (monthly files)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2017	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2018	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Historical data availability, download and pre-view

Sea Water Velocity Rose

Currents stats for a given position and given time selection

Sea Water Velocity (m/s), Direction of Sea Water Velocity

Northward / Eastward Sea Water Velocity (m/s)

**EMODnet** European Marine Observation and Data Network

**Portal**

DATA PLATE TRENDS DATA DOWNLOAD 1986 - 2017 WIND PRODUCT MENU DASHBOARD

7 Days 60 Days Older data

Quick download NetCDF CSV Download Preview

Water Temperature / sea temperature - degree\_Celsius

latest

sea temperature - Min/Max/Average

sea temperature - AnnualAVG

Averages/trends

metadata

Platform Code: S054  
 Wind Code: S054  
 Institution: PNE - Puertos del Estado - Spain  
 Assembly Center: BROSOS DAC (Puertos del Estado)  
 Principal Investigator: PNE  
 EMENS - PRO ID: PRO11181107  
 Observations: 013 033



## platform page

EMODnet Physics provides a link to external sites because they may contain related information of interest to you. Links do not imply endorsement of any particular product, service, organization, company, information provider or content.

EMODnet Physics does not own or operate those external sites and is not responsible for their site maintenance or their data accuracy. Use their data at your own risk.

**MM**

Service: SOAP API  
 General SOAP API description and methods: <http://www.emodnet-physics.eu/registration/EMODnetAPI>

General description of Government services and capabilities: <http://openapi.emodnet-physics.eu/government/>

Available: [SOAP Capabilities](#) [WFS](#) [WFS Capabilities](#) [WFS](#)

Service: THREDDS  
 Address: <http://thredds.emodnet-physics.eu/thredds/cataloging.html>

Category: Platform

Receive daily/weekly digest  
 All  Add

Selection list

Server Metadata

Interoperability, documentation, links, platformML

Mail service with periodic report (contact us if interested!)

Data use



Views

Downloads

EMODnet Analytics

Showing information on the number of observations in real time

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Showing information on the number of observations in real time

Year	Count	Percentage	Year
2015	1	0%	2016
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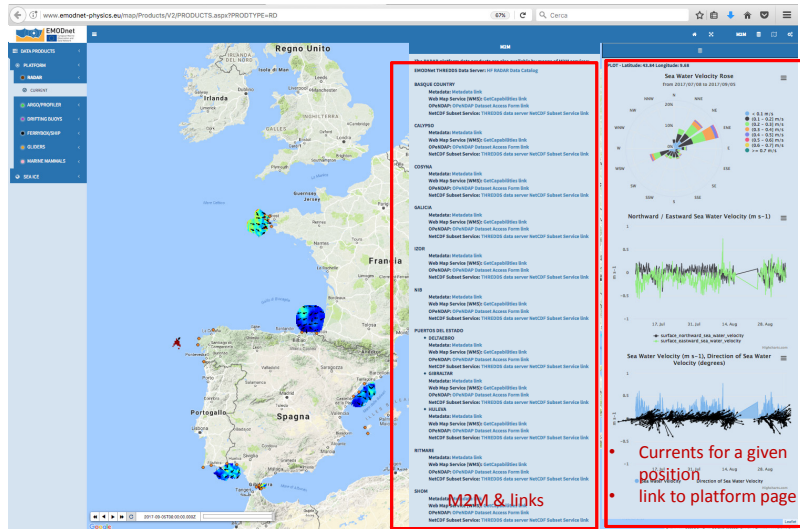
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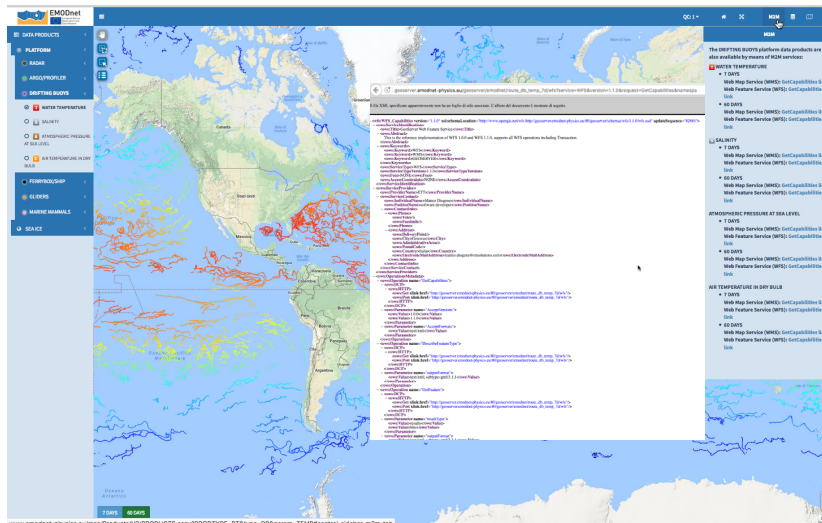
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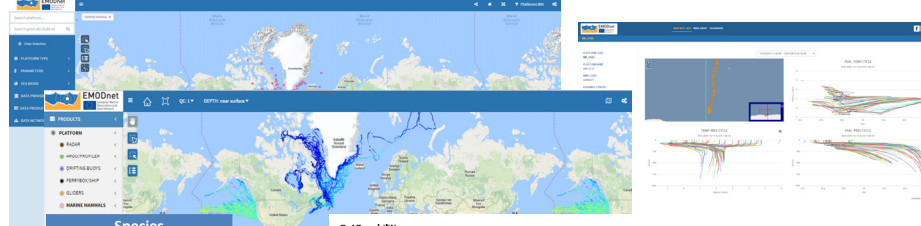
## HFR product page: NRT currents



## DB product page: NRT Temp



## Sea Mammals product page:



The screenshot shows the EMODnet interface with a map of the North Atlantic and a sidebar menu. The 'Species' menu is expanded to show the following options:

- Southern ellie
- Green turtle
- Crabeater seal
- Hooded seal
- Harp seal
- Ringed seal
- Grey seal
- Weddell seal
- Northern ellie

Below the menu, a code block shows the WMS configuration for the 'Southern ellie' species:

```

GetCapabilities
WMS Sea http://geoserver.emodnet-
physics.eu/geoserver/emodnet/route_mm_temp_0d/wms?
wmsOptions={
  layers: "emodnet:route_mm_temp_0d",
  style: "line",
  format: "image/png",
  transparent: "true",
  elevation: "0/2",
  time: "2010-01-01T00:00:00.000Z/2010-06-30T23:59:59.999Z",
  cql_filter: "qc=1",
  viewparams: "species: 'Southern ellie'"
};
var wmsLayer = L.tileLayer.wms("http://geoserver.emodnet-
physics.eu/geoserver/emodnet/route_mm_temp_0d/wms?", wmsOptions).addTo(map);

```

## EMODnet Physics M2M

- **uniqueURL**  
<http://www.emodnet-physics.eu/map/Ser>  
<http://www.emodnet-physics.eu/map/Ser>  
 Service description @ <http://www.erddap.noaa.gov/erddap>
- **API (REST, SOAP) → web ser**  
[www.emodnet-physics.eu/map/Ser](http://www.emodnet-physics.eu/map/Ser)  
[www.emodnet-physics.eu/map/Ser](http://www.emodnet-physics.eu/map/Ser)
- **OGC (WMS, WFS, ...) → post**  
[www.emodnet-physics.eu/map/Ser](http://www.emodnet-physics.eu/map/Ser)  
[www.emodnet-physics.eu/map/Ser](http://www.emodnet-physics.eu/map/Ser)  
[geoserver.emodnet-physics.eu/geoserver](http://geoserver.emodnet-physics.eu/geoserver)
- **Opendap/THREDDS [HFR dat**  
[thredds.emodnet-physics.eu/thredds](http://thredds.emodnet-physics.eu/thredds)
- **ERDDAP [latest 60 days of da**  
[erddap.emodnet-physics.eu](http://erddap.emodnet-physics.eu)

<https://coastwatch.pfeg.noaa.gov/erddap/download/setup.html>





# Interoperability

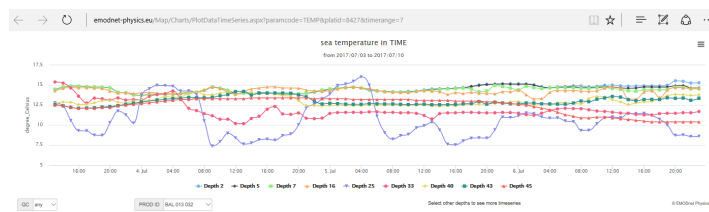
## Widgets

general syntax is:

[www.emodnet-physics.eu/Map/Charts/PlotDataTimeSeries.aspx?paramcode=PPPP&platid=ZZZZ&timerange=YY](http://www.emodnet-physics.eu/Map/Charts/PlotDataTimeSeries.aspx?paramcode=PPPP&platid=ZZZZ&timerange=YY)

where PPPP is the parameter (e.g. TEMP = sea temperature), ZZZZ is the platform ID (e.g. 8427 is Arkona) and YY is either 7 or 60 (days)

[www.emodnet-physics.eu/Map/Charts/PlotDataTimeSeries.aspx?paramcode=TEMP&platid=8427&timerange=7](http://www.emodnet-physics.eu/Map/Charts/PlotDataTimeSeries.aspx?paramcode=TEMP&platid=8427&timerange=7)



# Users

Messaggio inoltrato  
Da: "Ouellet, Mathieu" <Mathieu.Ouellet@dfo-mpo.gc.ca>  
Data: 07 Mar 2017 11:28  
Oggetto: TR: Drifter beached on Grande-Maison Island  
A: "arnack@omni.ca"

As discussed earlier, you beached. It was a man you can see the EMOD.

For the record, the box Search point 40,25,89,45

De: Simon-Paul, V. Envoyé : jeudi 3 février 2017, 11:28  
A: "Ouellet, Mathieu"  
Cc: "Dumont, Sebastien"  
Objet: RE: Drifter be

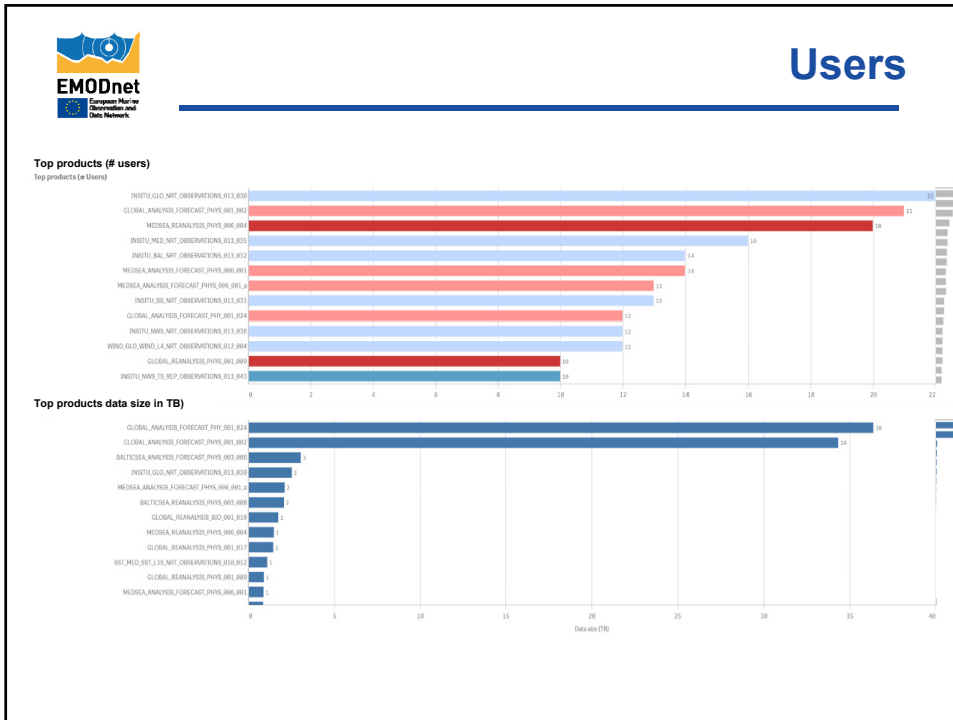
Hello Mathieu,  
Thank you for the e-mail.

LiFC

metOcean







Wake up your data and join us

**EMODnet**  
European Marine Observation and Data Network

[www.emodnet.eu](http://www.emodnet.eu)

Your gateway to marine data in Europe

**Data policy:**

**Download without authentication:**

- Latest 60 days of operational data
- Operational data from platforms contributing to international programs (e.g. ARGO)
- Data already available free and open/explicit request from the provider (e.g. SOCIB)

**Download with authentication (CMEMS Service Level Agreement):**

- Data older than 60 days (European Coastal platforms)
- Reprocessed/delay mode data

**Download with authentication (SDN Service Level Agreement):**

- CDI - historical data hosted by NODCs
- some data may require negotiation/specific agreements

Processing Level	Description	Processing sub-Level	Definition
Level 0	raw data: Unprocessed instrument/payload data at full resolution including synchronisation methods (e.g. elimination of CTD up-down duplicates) and excluding communication artifacts	LEVEL 0	Reconstructed, unprocessed instrument/payload data at full resolution; any and all communications artifacts, e.g. synchronization frames, communications headers, duplicate data removed.
Level 1	Full resolution data reconstructed with calibration coefficients, geo and time referenced	LEVEL 1A	Reconstructed, unprocessed instrument data at full resolution, time-referenced and annotated with ancillary information, including radiometric and geometric calibration coefficients and georeferencing.
		LEVEL 1B	Level 1A data that have been processed to sensor units for next processing steps. Not all instruments will have data equivalent to Level 1B.
Level 2	Derived geophysical data processed with a minimum QC (e.g. gross range test)	LEVEL 2A	Derived geophysical variables at the same resolution and locations as the Level 1 source data.
		LEVEL 2B	Level 2A data that have been processed with a minimum set of QC.
Level 3	Data resampled regularly and with delayed mode QC applied (including climatology comparison).	LEVEL 3A	Variables mapped on uniform space-time grid scales, usually with some completeness and consistency
		LEVEL 3B	Level 3A data that have been processed with a minimum set of QC.
Level 4	Data quality assured from multiple campaign, measurements or model outputs.	LEVEL 4	Model output or results from analyses of lower level data, e.g. variables derived from multiple measurements