EMODnet
European Marine Observation and Data Network

Your gateway to marine data in Europe

EMODnet Physics

EASME/2019/OP/0003 - European Marine Observation and Data Network - Physics
EASME/EMFF/2018/1.3.1.8/Lot3/SI2.810790

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Outline of the presentation

- Data scope
- Data sources
- Handling of data from input to products
  - QA-QC methods
  - Metadata and data formats
  - Vocabularies
- Data policies
- Discovery and access services
  - Viewing services
  - Web services

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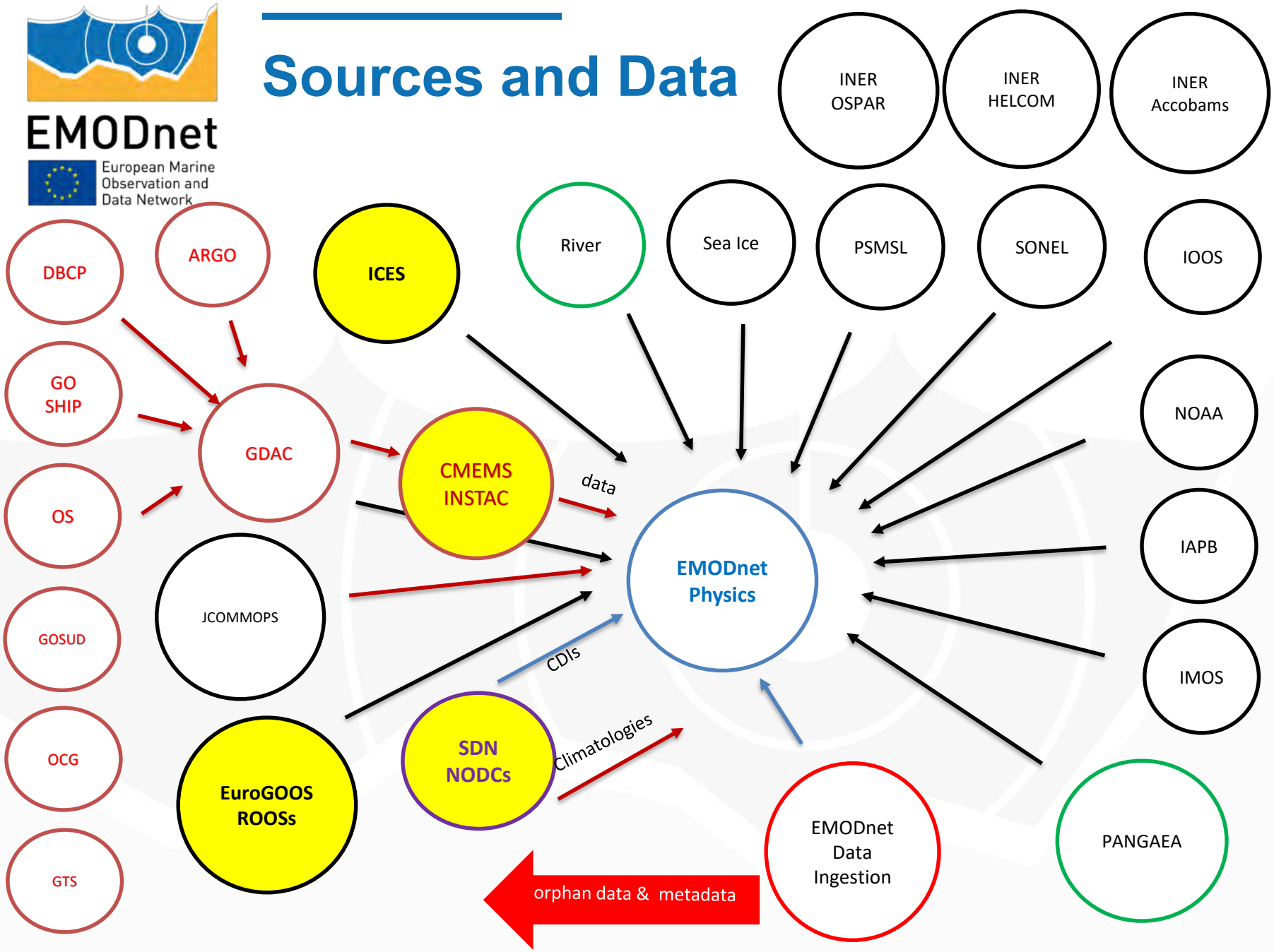
Data and Scope

- Integrate and make available Ocean Physics data
  - Real Time, Near Real Time, Historical Reprocessed & Validated
- Make available Products on Ocean Physics
  - Build on available infrastructures
  - redistribute available products
  - develop products (collection of data and elaborations)
- Make data, metadata and products Findable, Accessible, Interoperable, Reusable
  - Use and promote harmonization and common standards

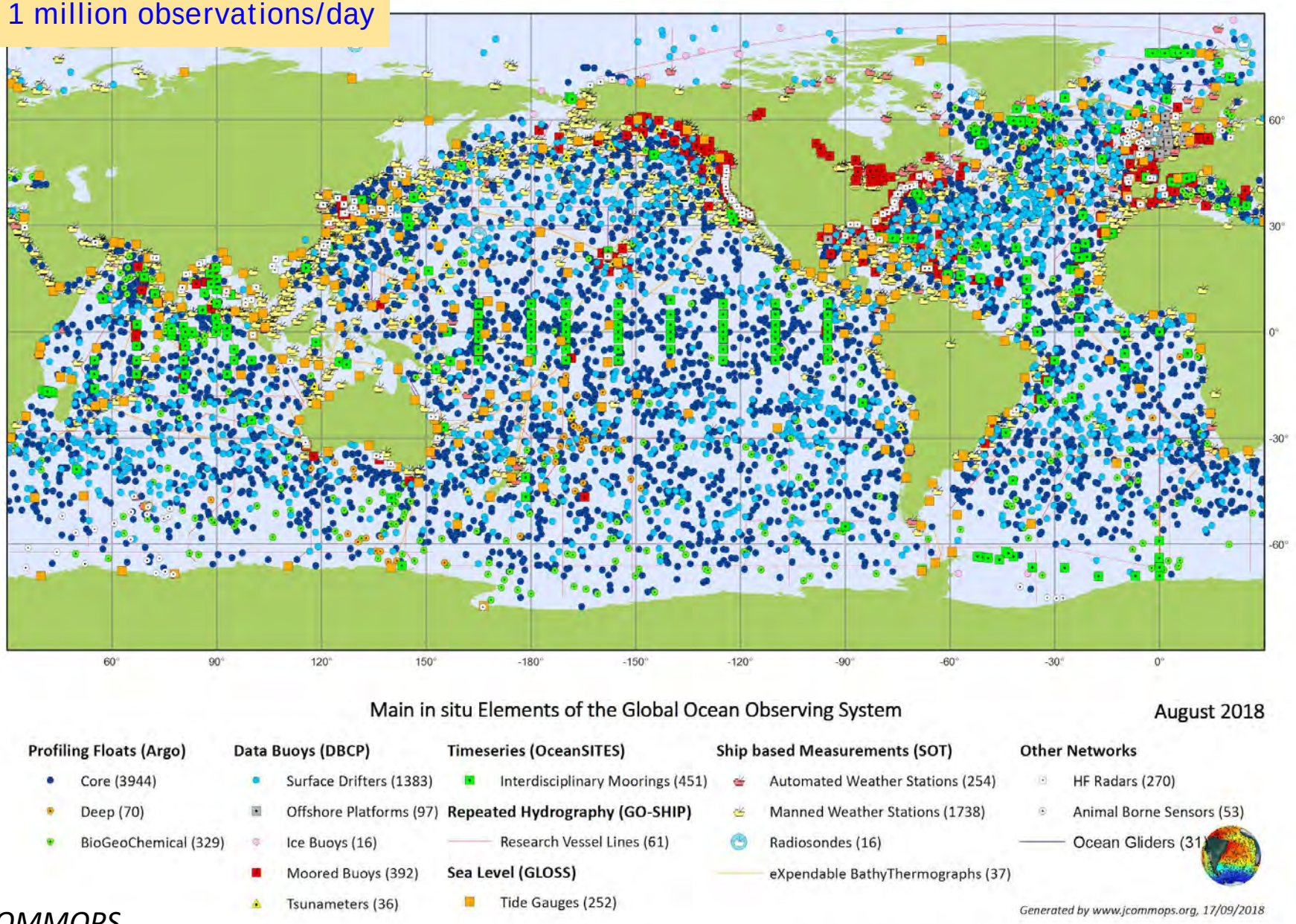
Data and Scope

- Temperature in the water column
- Salinity in the water column
- Wave direction, height
- Wind @ Sea Level, direction, intesity
- Sea Currents direction, intensity
- Sea Level and sea level trends
- Optical properties
- Sea Ice
- River outflow
- Acoustic pollution
- Atmospheric - Meteorological data @ sea level

Sources and Data



1 million observations/day



JCOMMOPS

Handling of data

- **SeaDataNet and NODCs**
- **CMEMS INSTAC**
- ICES
- PSMSL,
- GLOSS,
- SONEL,
- IOC SL
- PANGAEA
- GDAC (Coriolis)
  - OCEAN SITES, ARGO
- OSPAR, HELCOM, ACCOBAMS
- JCOMMOPS (metadata)
- EU HFR node, OceanGliders,
- SOOS, IOOS, IMOS, IAPB, DBCP,
- …

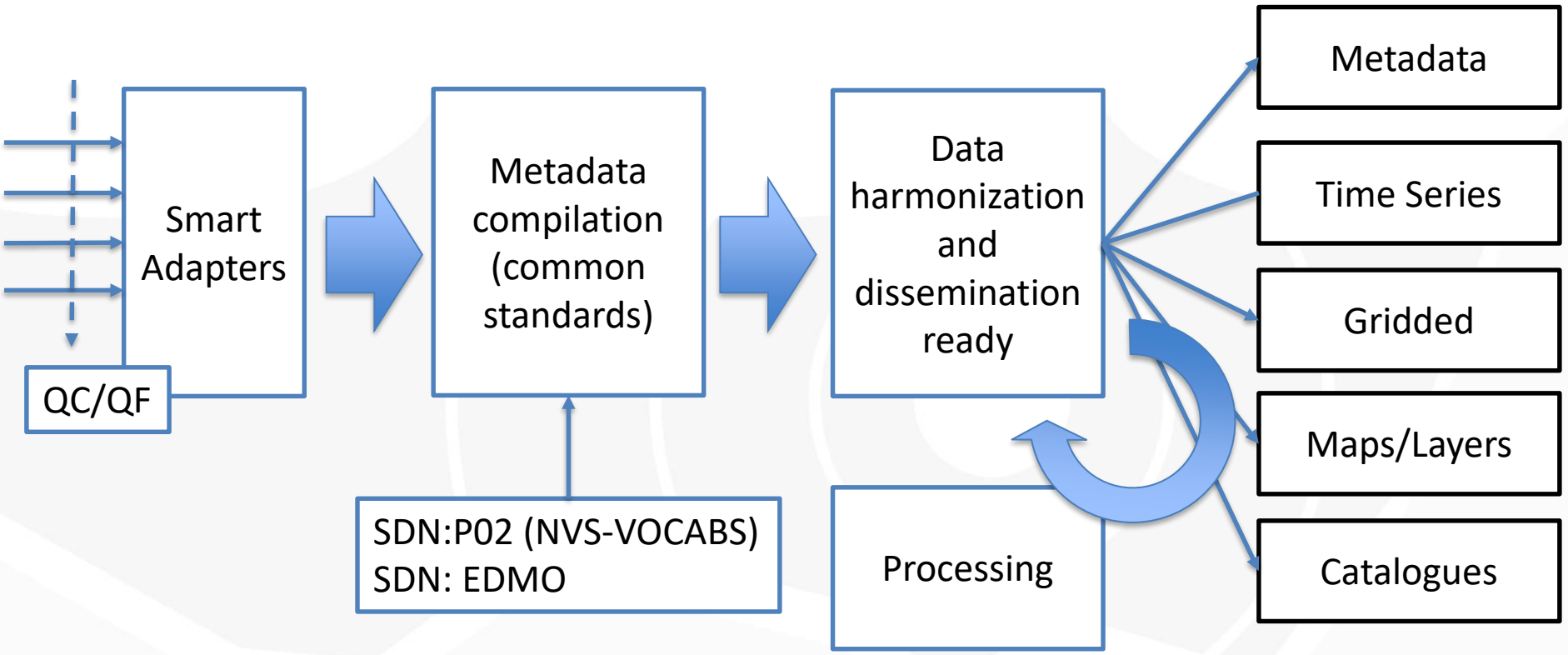
Ocean Data

- Link sources into a single discoverable DB
- Develop smart adapter

Data flow is designed in collaboration and coordination with EU key integrators and programs (**CMEMS INSTAC, SDN-NODCs**, ICES) with an eye on international systems (GDAC, SOOS …)

For themes not covered yet EMODnet Physics develops new data flow

From input to products



QC/QF are semi-automatic or done by experts
according the age of the data, es. NRT flow: is semi-automatic
HV: experts from SDN do apply a multi-level QC/QF

Handling of data from input to products

Data age	technology	format
Real Time	SOS SWE	XML
Near real-time (NRT) data at in situ observatories at sea	Hourly/daily synch via ftp/thredds/erddap/APIs	CSV, netCDF (JSON, TXT)
Reprocessed NRT data (average/trends)	Internal processing/ periodic synch via APIs (REST)	CSV, netCDF, ODV4
Archived data derived from further elaboration and validation	Periodic synch via ftp/thredds	netCDF (CF, SDN)*

QC/QF are semi-automatic or done by experts according the age of the data, es.
NRT flow: is semi-automatic
HV: experts from SDN do apply a multi-level QC/QF

* Harmonized global attributes and CF/SDN:NVS standards are key elements for data sharing with marine community (and beyond) and implement M2M services

Behind the scene e.g. HFR

2014
EMODnet to work on HFR
EuroGOOS HFR TT

HFR coord. event

2015
HFR data
in EMODnet Physics

H2020 JERICO NEXT
HFR data QC/QF

2016
CMEMS SE INCREASE
HFR towards CMEMS

2018
HFR EU node

2019
CMEMS INSTAC
Operational HFR prod.

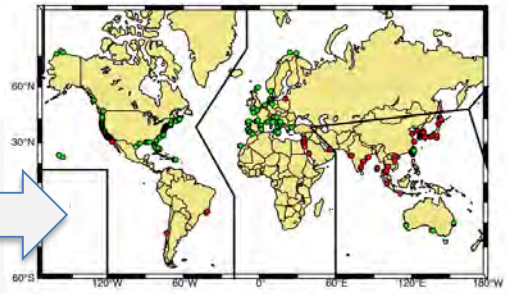
H2020 SeaDataCloud
Long term HFR data man.

2020

EMODnet Physics
CMEMS INSTAC
SeaDataCloud
JERICO S3

Global HFR network

R&D



http://global-hfradar.org

HF operations continue. Working to develop products with ocean modellers and other stakeholders

Similar activities with OceanGliders, under water acoustic pollution, …

Rivers

2016
EMODnet to work on River

2017
RR data in EMODnet Physics

2018
CMEMS SE LAMBDA
RR towards CMEMS

2019
RR EU node

2020

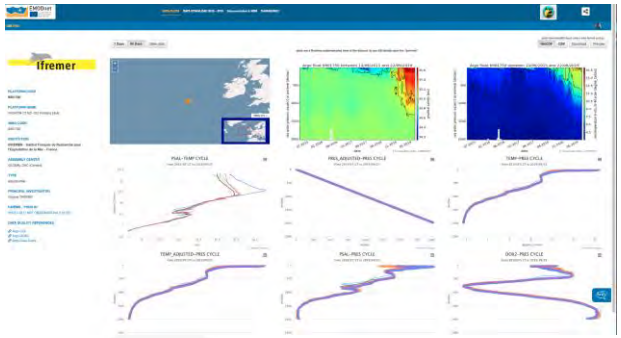
EMODnet Physocs
CMEMS
Increasing interst from any coastal mapping initiative

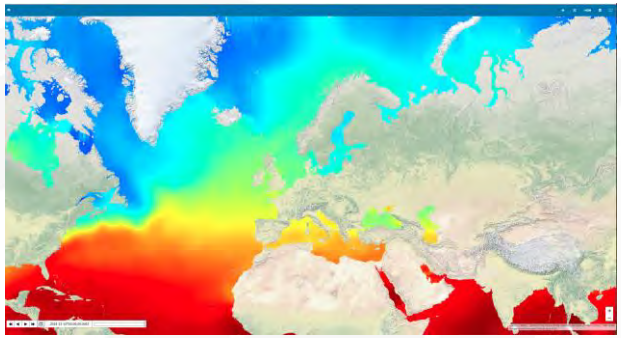
R&D

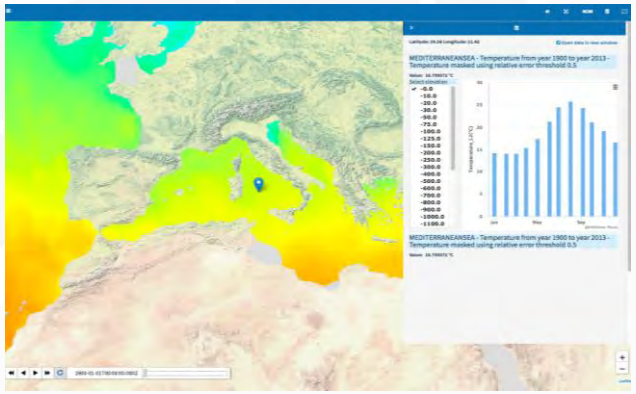
Temperature and Salinity in the water body

Input
CMEMS INSTAC
CORIOLIS
MEOP
PANGAEA
IAPB
IOOS, NOAA
IMOS
…
SDN climatology
CORA – Coriolis Ocean Dataset for Reanalysis v.5.2

Output
Nowcast timeseries and profiles
Trends
Climatology
Maps (assett mapping)







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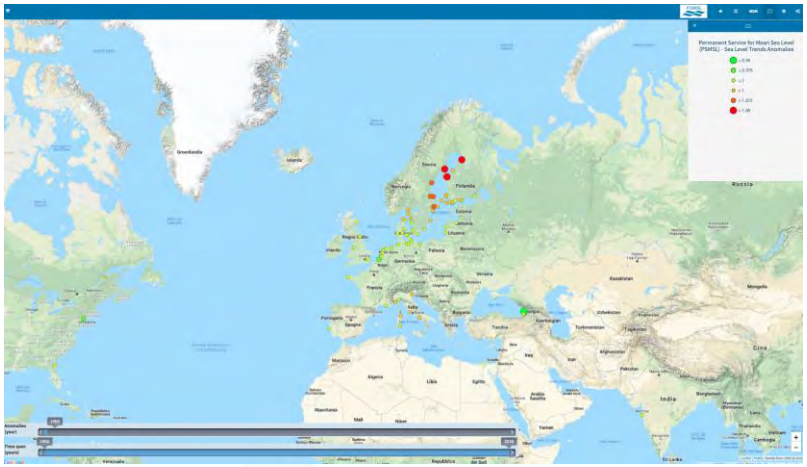
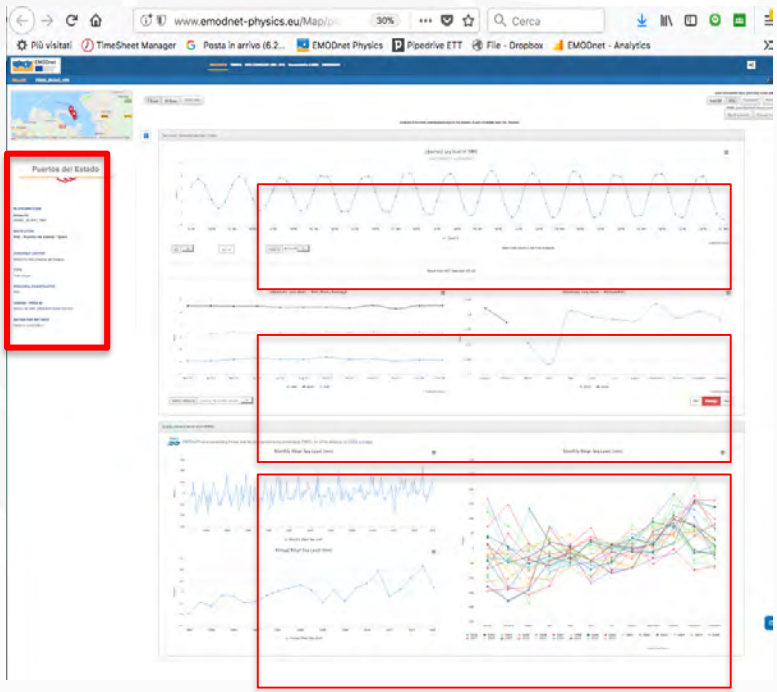
Sea Level



Sources
EU Tide Gauge network
PSMSL
IOC GLOSS
SONEL
UHSLC

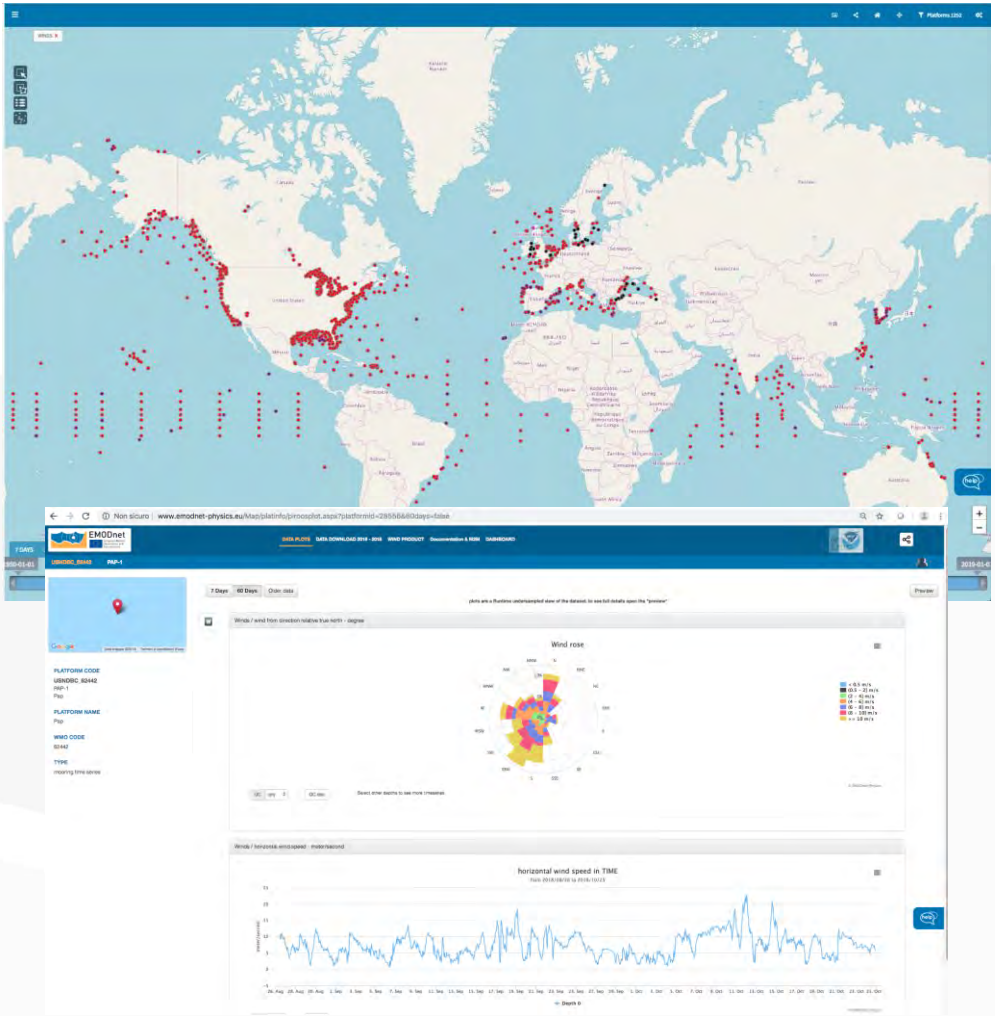
Output
Nowcast data
Rel Sea Level trends
Abs Sea Level trend
Sea Level Anomalies



Wave and Wind

Sources
CMEMS INSTAC
CORIOLIS
National/Regional wave networks

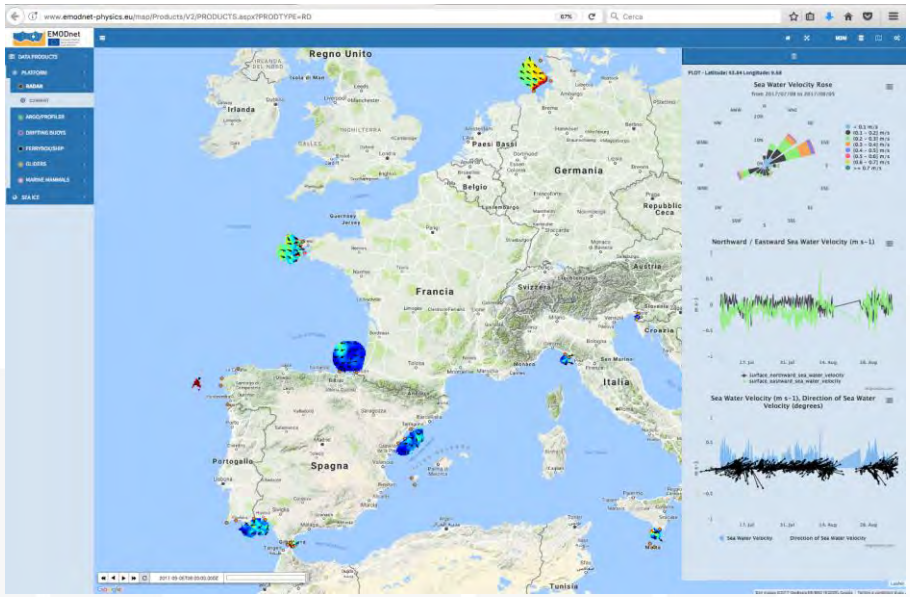
Output
Nowcast timeseries
Max/Min
Maps



Sea Surface Currents

Sources
EU HFR NODE
IOOS
IMOS
Regional HFR data providers
CORIOLIS
CMEMS INSTAC
DBCP

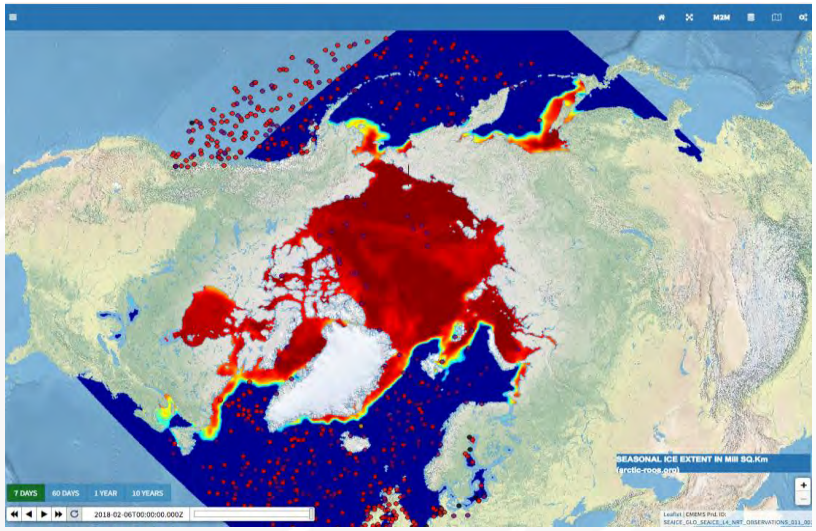
Output
Nowcast data
Currents fields
Currents rose



Sea Ice contour & tickness

Sources
CMEMS-SEAICE_GLO_SEAICE_L4_NRT
IAPB
CORIOLIS

Output
Ice edge/coverage
Ice tickness
Ice type
Timeseries
Profiles



10km resolution in a polar stereographic projection

Impulsive Noise

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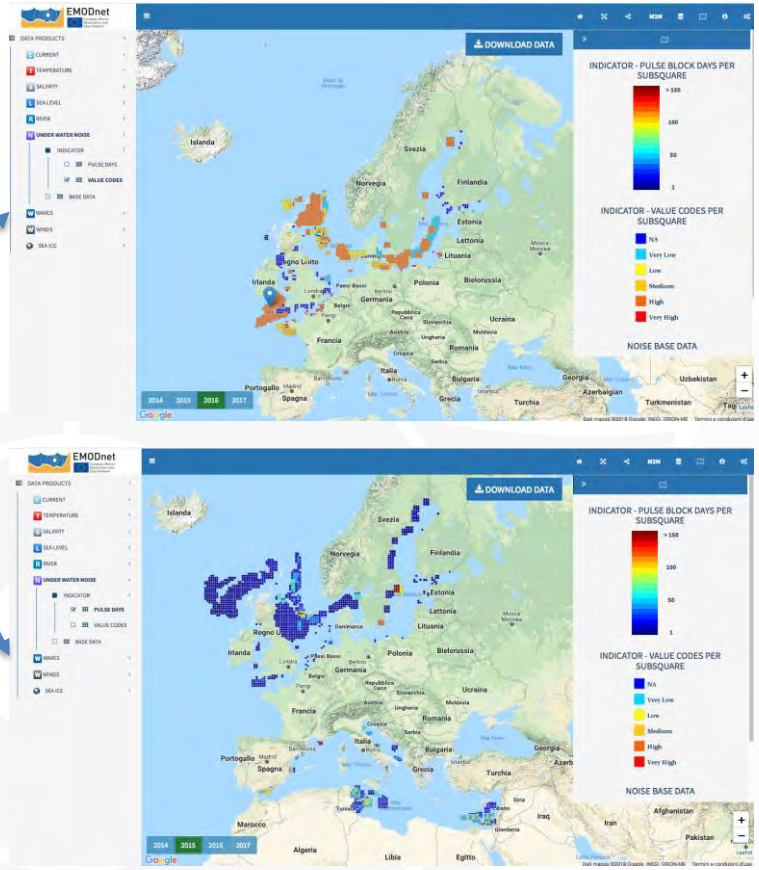
Input
OSPAR – ODIMS
HELCOM - ICES
ACCOBAMS - QuiteMED

Pulse per day per block count

Grid = ICES statistical subrectangles (10' lat*20' lon) down to MED



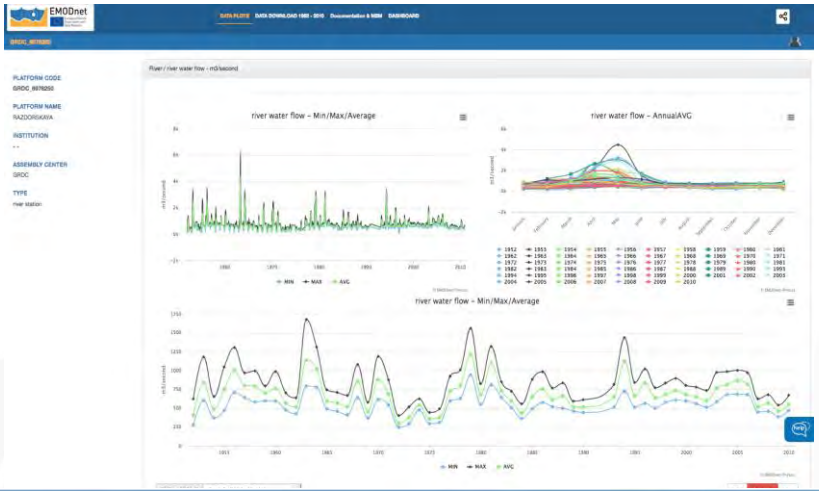
Unit: pulse event days per block; period: 2015 – 2018; value code

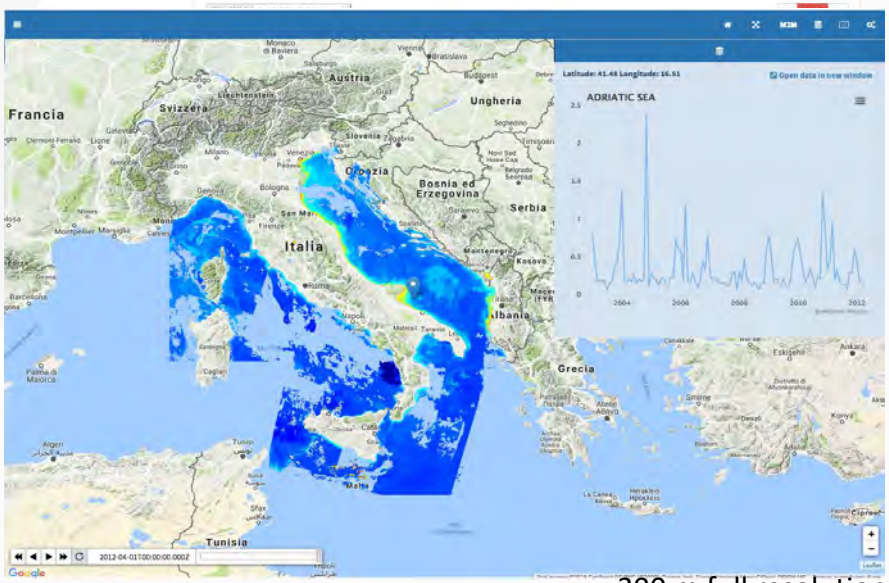
Cooperation with ICES and QuietMED (new statistical grid, updates, etc.)
TGNOISE, JOMOPANS, BIAS

River Runoff and Total Suspended Matter

Sources
GRDC
RIVER NODE
CMEMS LAMBDA
…
OCEAN COLOR

Output
Nowcast data
Climatology
Runoff timeseries
Maps of TSM





300 m full resolution

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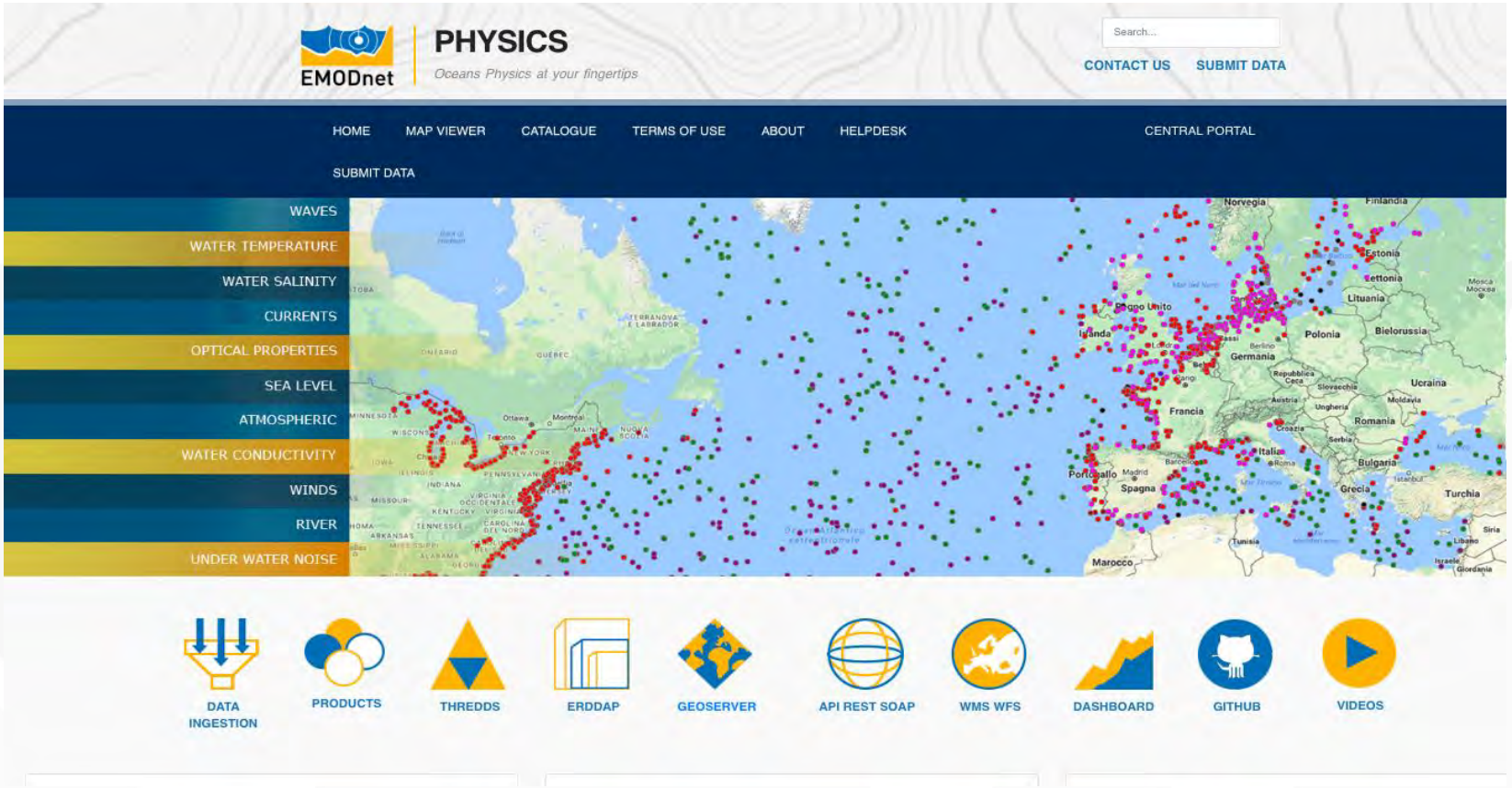
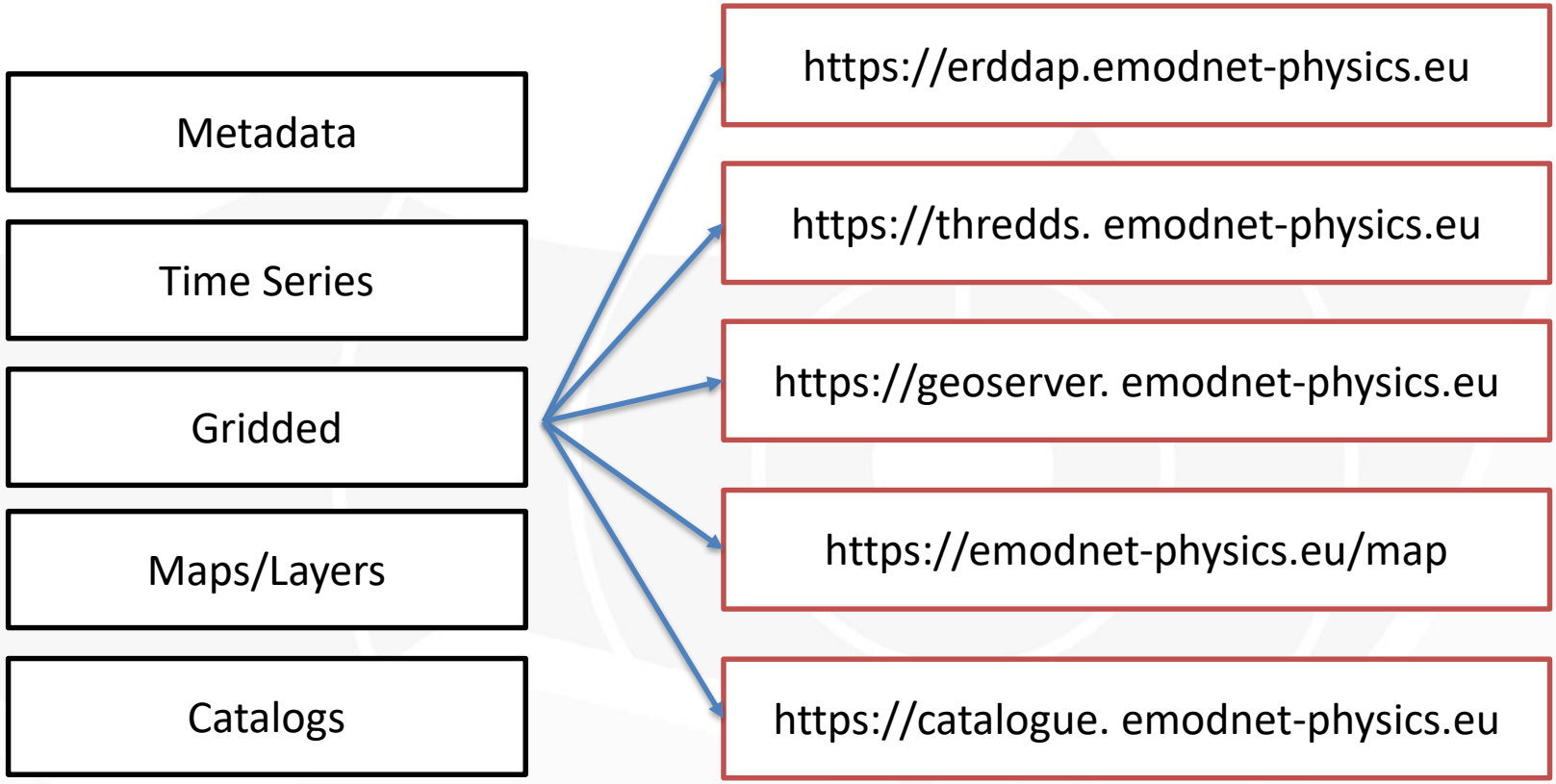
Discovery and access services

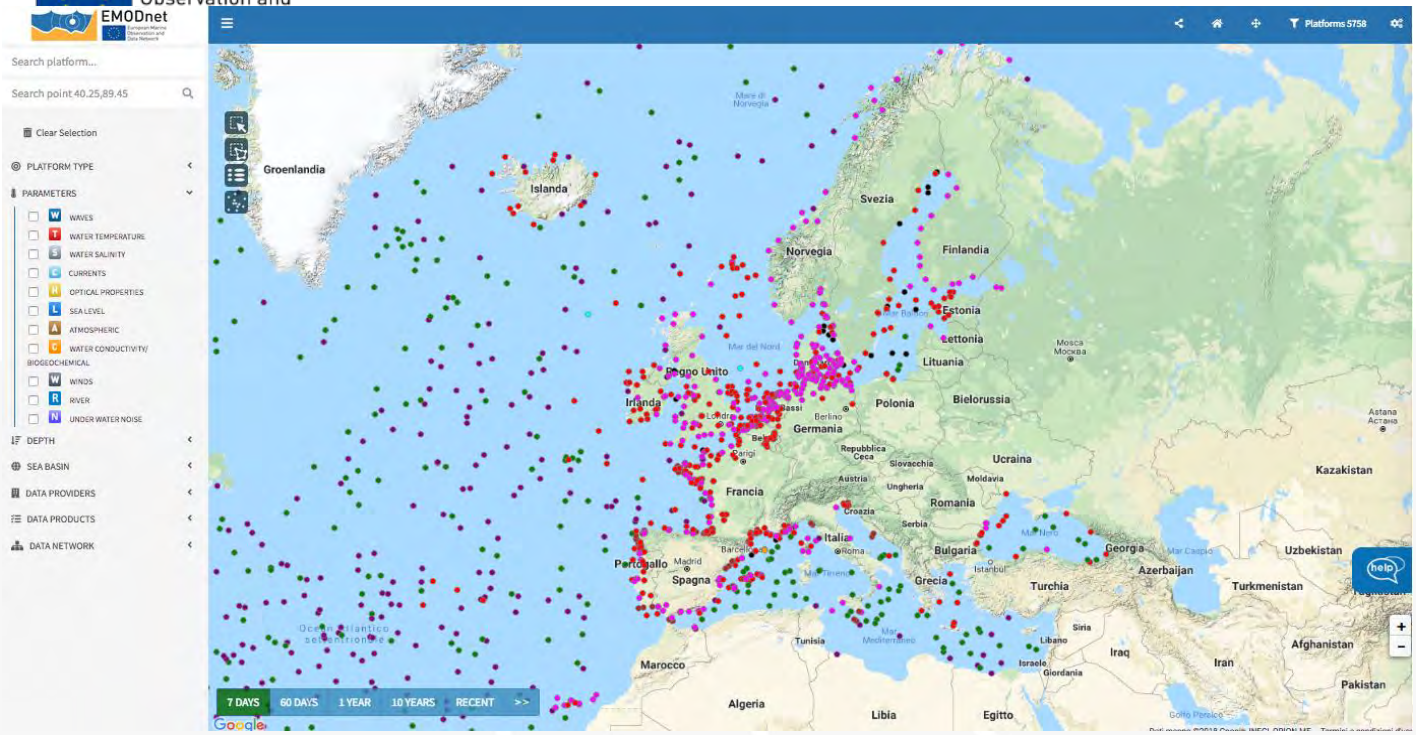


Discovery and access services



Dissemination Channels

Map viewer


EMODnet
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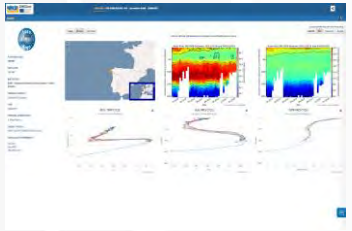
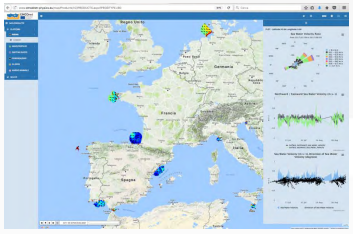
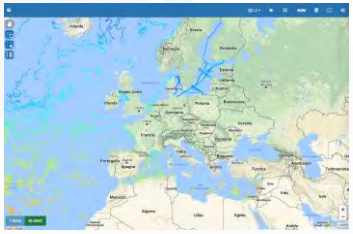
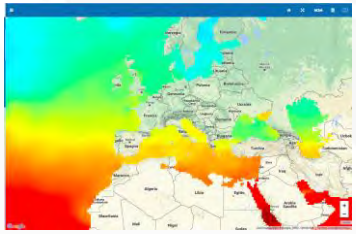
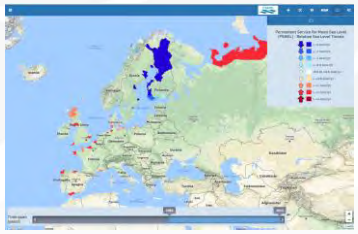
Search platform...
Search point 40.25,89.45
Clear Selection
PLATFORM TYPE
PARAMETERS
WAVES
WATER TEMPERATURE
WATER SALINITY
CURRENTS
OPTICAL PROPERTIES
SEA LEVEL
ATMOSPHERIC
WATER CONDUCTIVITY/
BIOGEOCHEMICAL
WINDS
RIVER
UNDER WATER NOISE
DEPTH
SEA BASIN
DATA PROVIDERS
DATA PRODUCTS
DATA NETWORK
Platforms 5758
7 DAYS
60 DAYS
1 YEAR
10 YEARS
RECENT
Groenlandia
Islanda
Svezia
Norvegia
Finlandia
Estonia
Lettonia
Lituania
Regno Unito
Irlanda
Polonia
Bielorussia
Germania
Repubblica Ceca
Slovacchia
Ucraina
Austria
Ungheria
Moldavia
Romania
Francia
Croazia
Serbia
Italia
Bulgaria
Portogallo
Spagna
Grecia
Turchia
Georgia
Azerbaijan
Kazakistan
Uzbekistan
Turkmenistan
Siria
Libano
Iraq
Iran
Afghanistan
Pakistan
Tunisia
Marocco
Algeria
Libia
Egitto
Israele
Giordania

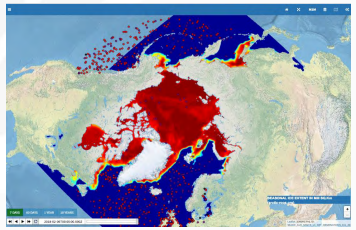






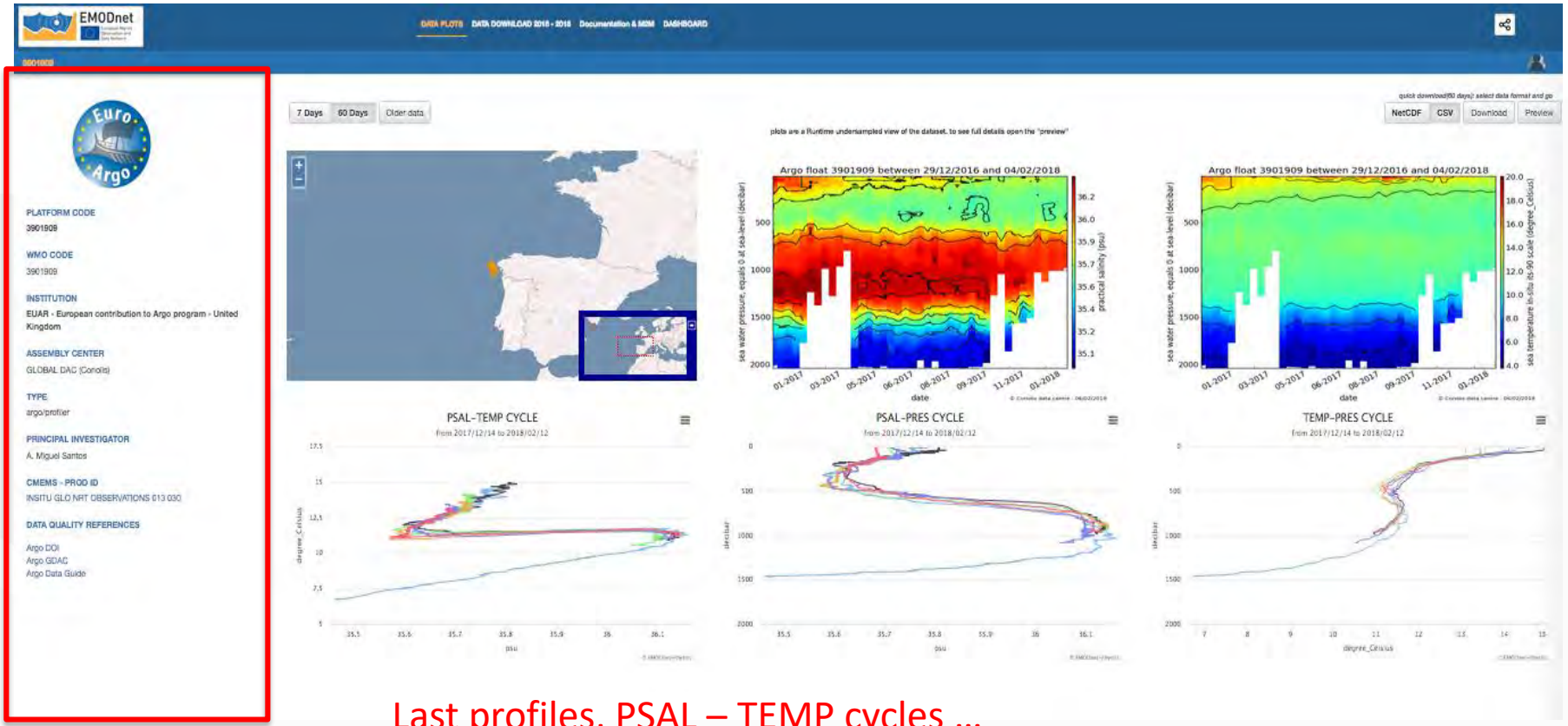






Discovery and access services

ARGO – data presentation



metadata

Last profiles, PSAL – TEMP cycles …

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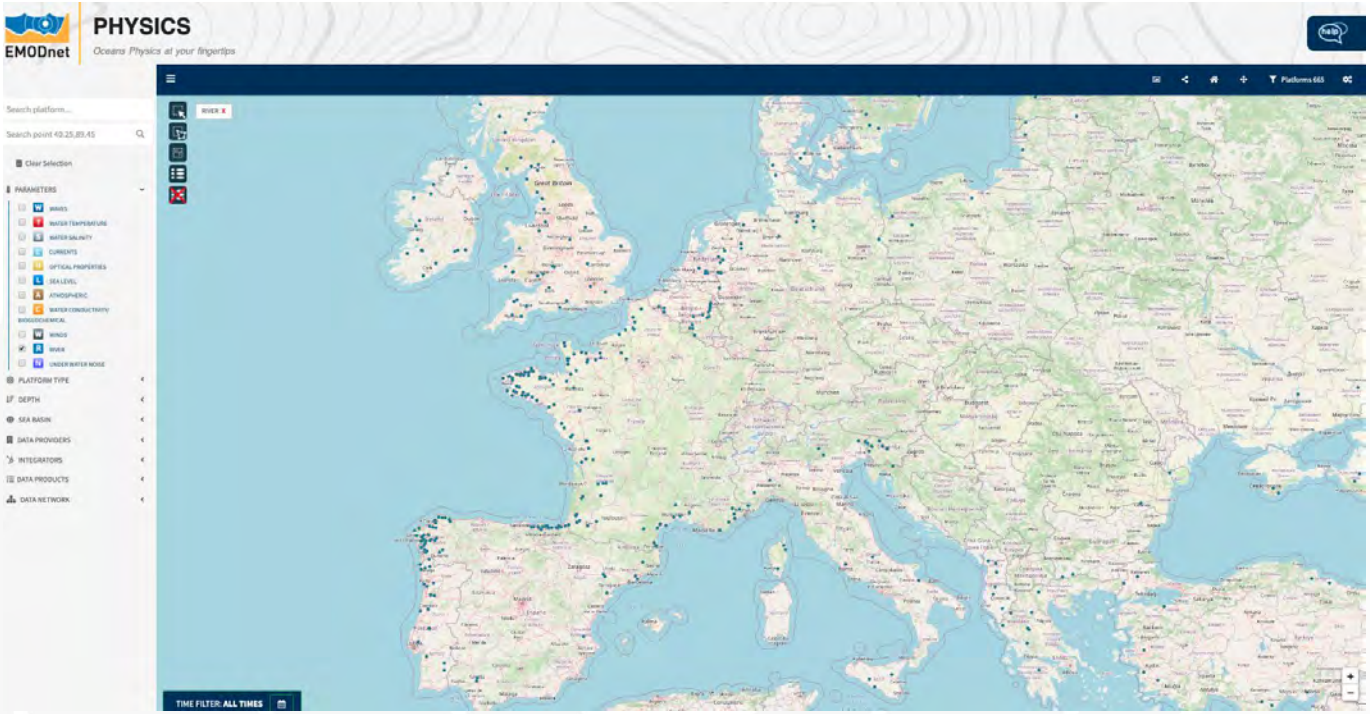
RIVER



- DB with 665 INS River Station
  - 178 Operational
  - ~ 500 GRDC
- Total Suspended Matter

Discovery and access services

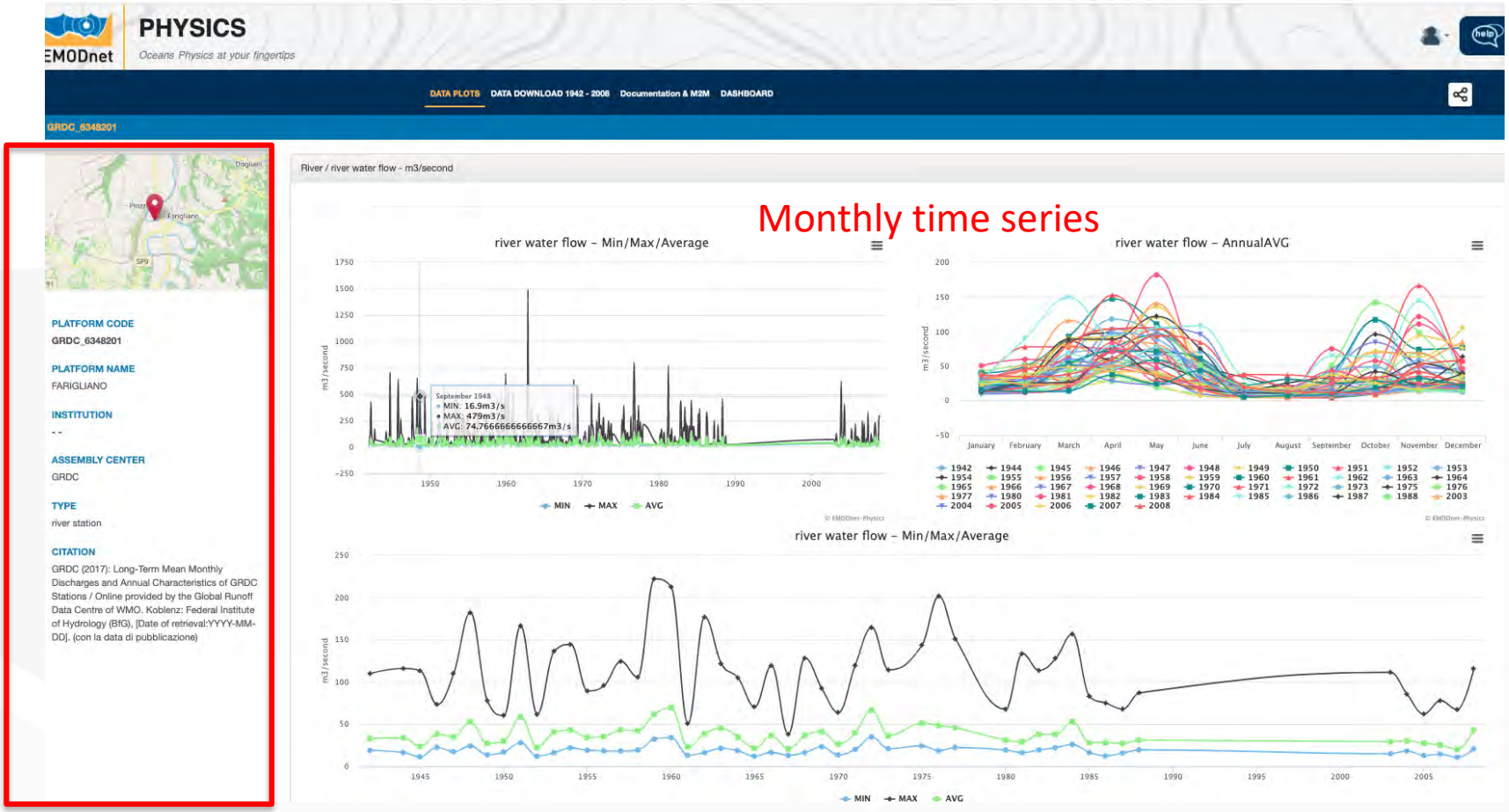
River Station – data presentation

Near real time data charts

metadata

Discovery and access services

River Station – data presentation



metadata

Annual trends

Total Suspended Matter

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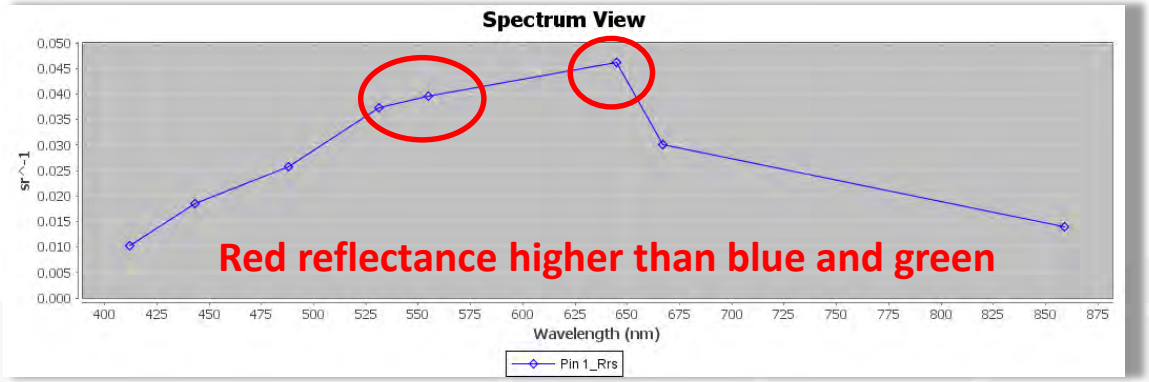
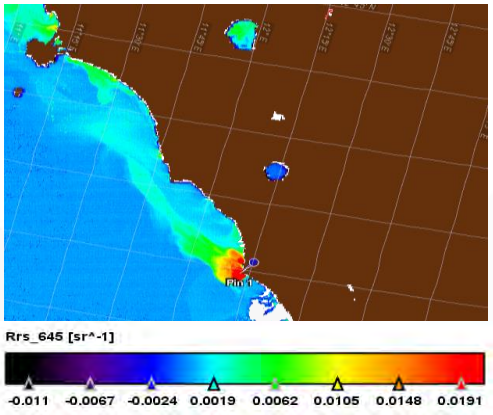
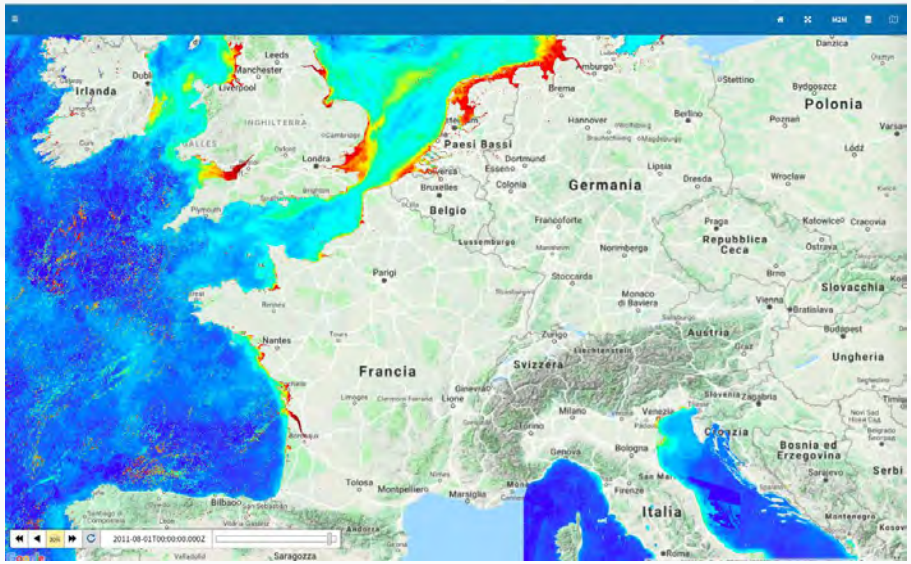
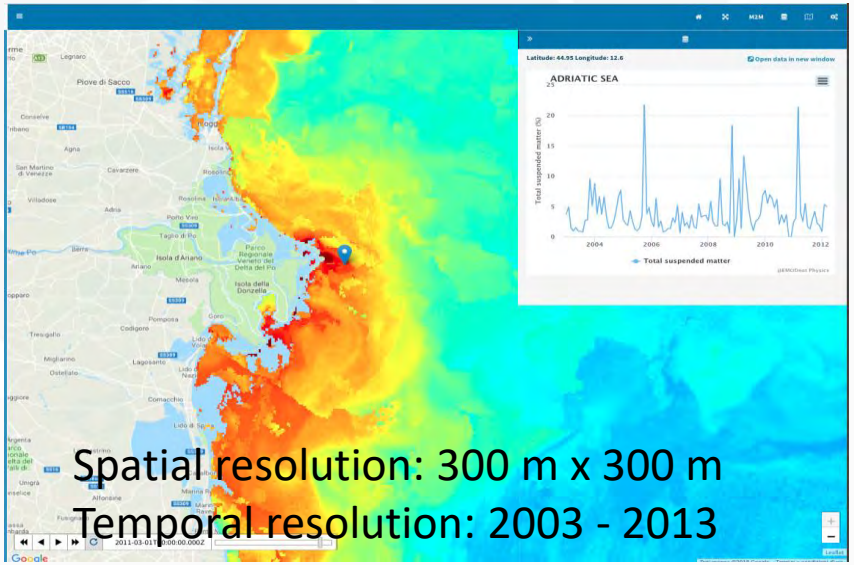


Spectral properties of the plume & sediment characteristics





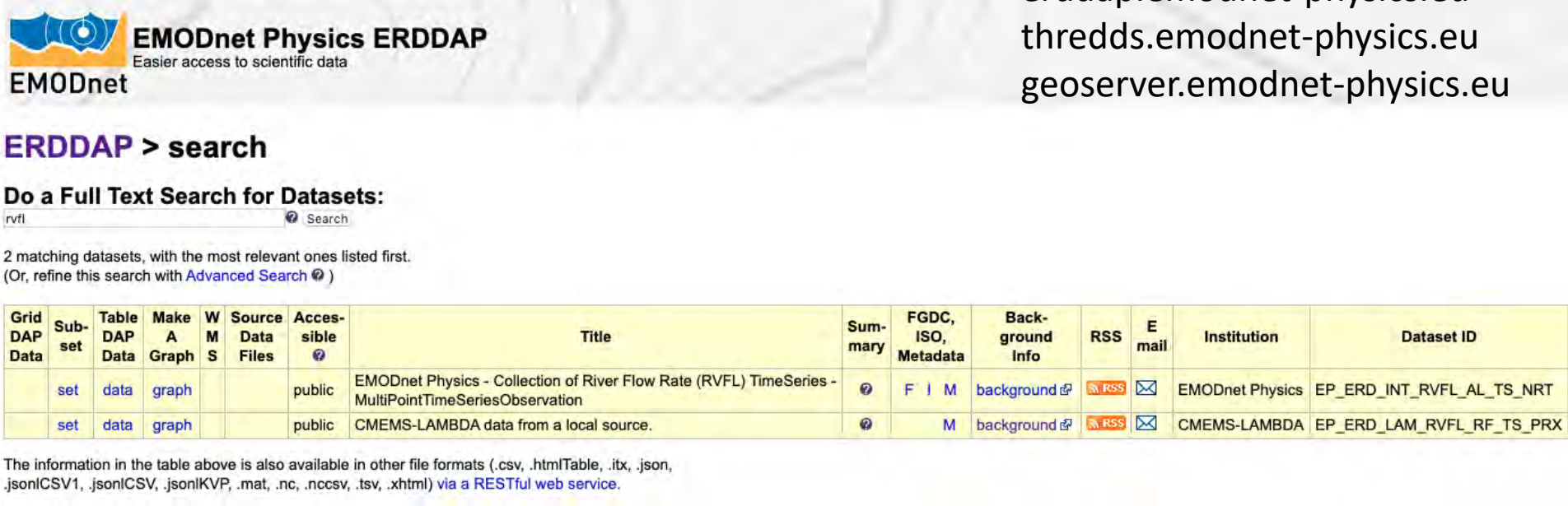


Spatial resolution: 300 m x 300 m

Temporal resolution: 2003 - 2013

Discovery and access services

map.emodnet-physics.eu
erddap.emodnet-physics.eu
thredds.emodnet-physics.eu
geoserver.emodnet-physics.eu



EMODnet Physics ERDDAP
Easier access to scientific data

ERDDAP > search

Do a Full Text Search for Datasets:

rvfl Search

2 matching datasets, with the most relevant ones listed first.
(Or, refine this search with Advanced Search)

Grid DAP Data	Sub-set	Table DAP Data	Make A Graph	WMS	Source Data Files	Acces-sible	Title	Sum-mary	FGDC, ISO, Metadata	Back-ground Info	RSS	E mail	Institution	Dataset ID
	set	data	graph			public	EMODnet Physics - Collection of River Flow Rate (RVFL) TimeSeries - MultiPointTimeSeriesObservation		F I M	background	RSS		EMODnet Physics	EP_ERD_INT_RVFL_AL_TS_NRT
	set	data	graph			public	CMEMS-LAMBDA data from a local source.		M	background	RSS		CMEMS-LAMBDA	EP_ERD_LAM_RVFL_RF_TS_PRX

The information in the table above is also available in other file formats (.csv, .htmlTable, .itx, .json, .jsonlCSV1, .jsonlCSV, .jsonlKVP, .mat, .nc, .nccsv, .tsv, .xhtml) via a RESTful web service.

https://erddap.emodnet-physics.eu/erddap/tabledap/EP_ERD_INT_RVFL_AL_TS_NRT.htmlTable?EP_PLATFORM_ID%2CEP_PLATFORM_TYPE%2CEP_PLATFORM_CODE%2CEP_PLATFORM_LINK%2Ctime%2CTIME_QC%2Cdepth%2CDEPTH_QC%2Cpres%2CPRES_QC%2Clatitude%2Clongitude%2CPOSITION_QC%2CRVFL%2CRVFL_QC%2CRVFL_DM%2Csite_code%2Cplatform_code%2Cplatform_name%2Cpi_name%2Carea%2Cauthor%2Csource%2Ccontributor_name%2Ccontributor_url%2Cdata_assembly_center%2Cinstitution_edmo_code%2Cinstitution_references%2Cinstitution%2Cwmo_platform_code&time%3E=2020-05-19T08%3A28%3A29Z

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erddap.emodnet-physics.eu/erddap/tabledap/EP_ERD_INT_RVFL_AL_TS_NRT.htmlTable?EP_PLATFORM_ID%2CEP_PLATFORM_TYPE%2CEP_PLATFORM_CODE%2CEP_PLATFORM_LINK%2Ctime%2CTIME_QC%2Cdept...

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Easier access to scientific data

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log in
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EP_PLATFORM_ID	EP_PLATFORM_TYPE	EP_PLATFORM_CODE	EP_PLATFORM_LINK	time	TIME_QC	depth	DEPTH_QC	pres	PRES_QC	latitude	lo
				UTC	1	m	1	dbar	1	degrees_north	deg
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372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T08:40:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T08:50:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T09:00:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T09:10:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T09:20:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T09:30:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T09:40:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T09:50:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T10:00:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T10:10:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T10:20:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T10:30:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T10:40:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T10:50:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T11:00:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T11:10:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T11:20:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T11:30:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
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372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T11:50:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
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372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T12:20:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
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372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T12:40:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T12:50:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
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372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T13:10:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T13:20:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T13:30:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-
372771	RF	AgueraPando	http://www.emodnet-physics.eu/Map/spi.aspx?id=372771	2020-05-19T13:40:00Z	0	9.969209968386869E36	9	9.969209968386869E36	9	43.27757	-

EMODnet

Service	Description	Examples
platformURL	All platforms	http://www.emodnet-physics.eu/map/platinfo/piradar.aspx?platformid=10273 http://www.emodnet-physics.eu/map/platinfo/pidashboard.aspx?platformid=10273 Service description @ http://www.emodnet-physics.eu/map/spi.aspx
widgets	All plots	www.emodnet-physics.eu/Map/Charts/PlotDataTimeSeries.aspx?paramcode=TEMP&platid=8427&timerange=7

http://www.emodnet-physics.eu/Map/Charts/PlotDataTimeSeries.aspx?paramcode=RVFL&platid=930153&timerange=60

Ocean physics at your fingertips

contacts@emodnet-physics.eu

EMODnet

European Marine Observation and Data Network

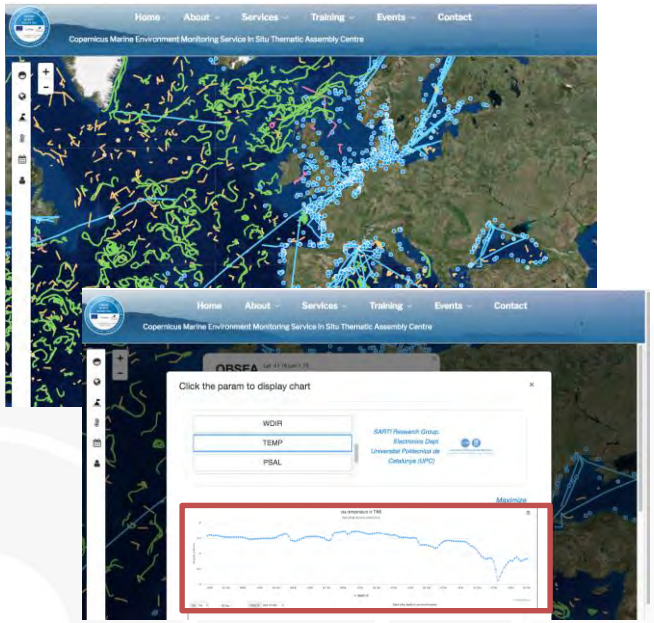
www.emodnet.eu

Your gateway to marine data in Europe

Use case of available services

EMODnet
European Marine Observation and Data Network

CMEMS INSTAC uses the EMODnet Physics widgets to improve the viewing service developed for outreach and promotion activities



The Copernicus Marine Environment Monitoring Service (CMEMS) In Situ Thematic Assembly Centre (In Situ TAC) is the component of the Copernicus Marine Service which ensures a consistent and reliable access to a range of *in situ* data for the purpose of service production and validation.

Service: WIDGET

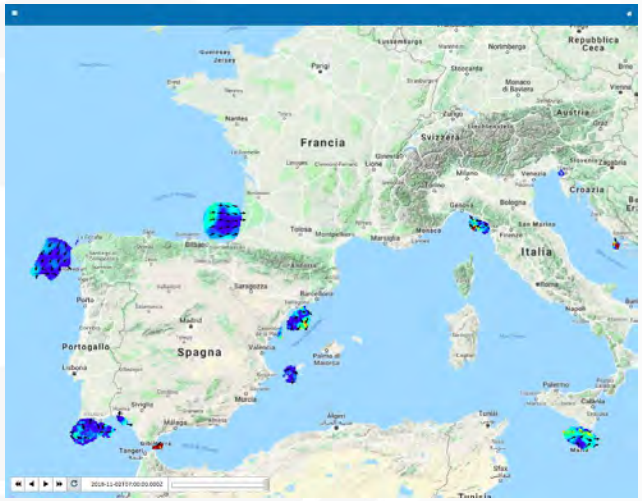
http://www.emodnet-physics.eu/MapTest/Charts/PlotDataTimeSeries.aspx?paramcode=TEMP&platid=8805&plattype=MO&timerange=7

Paramcode: TEMP, PSAL, SLEV, WDIR, …
Plattype: MO, FB, AP, GL …
timerange: 7, 60,

http://www.emodnet.eu/emodnet-physics-enhances-services-cmems-situ-thematic-assembly-centre

Use case of available services

Water-pollutants-dispersion studies are usually performed with numerical codes, which require both meteorological and marine **surface current inputs**. The inputs are usually provided by circulation models and/or by radar data analysis, **such as those available in the EMODnet Physics database.**



PM_TEN (Physical Methods and Technologies for Environmental Needs) is an Italian supporting assesssment on the analysis of air pollution, atmospheric impact and the effects of harbours and ships on urban air quality.

Service: THREDDS SERVER

- http://thredds.emodnet-physics.eu/thredds/catalog.html
- http://thredds.emodnet-physics.eu/thredds/HFRADARCatalog.html

http://www.emodnet.eu/capitalising-emodnet-radar-data-water-dispersion-studies

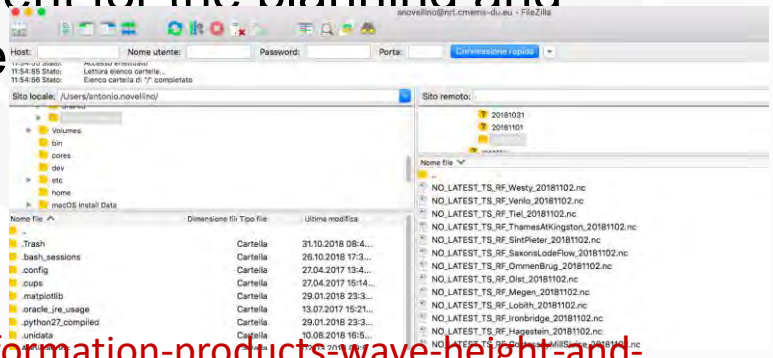
Use case of available services

DLR's German Remote Sensing Data Center (DFD) implemented a **validation chain of SAR** (Synthetic Aperture Radar) **satellite based products (wind and wave) on the in situ station data distributed by EMODnet Physics**

- The German Aeropspace Center (DLR) DLR has been given responsibility by the federal government for the planning and implementation of the German space

Service:

ad-hoc FTP-distribution-server



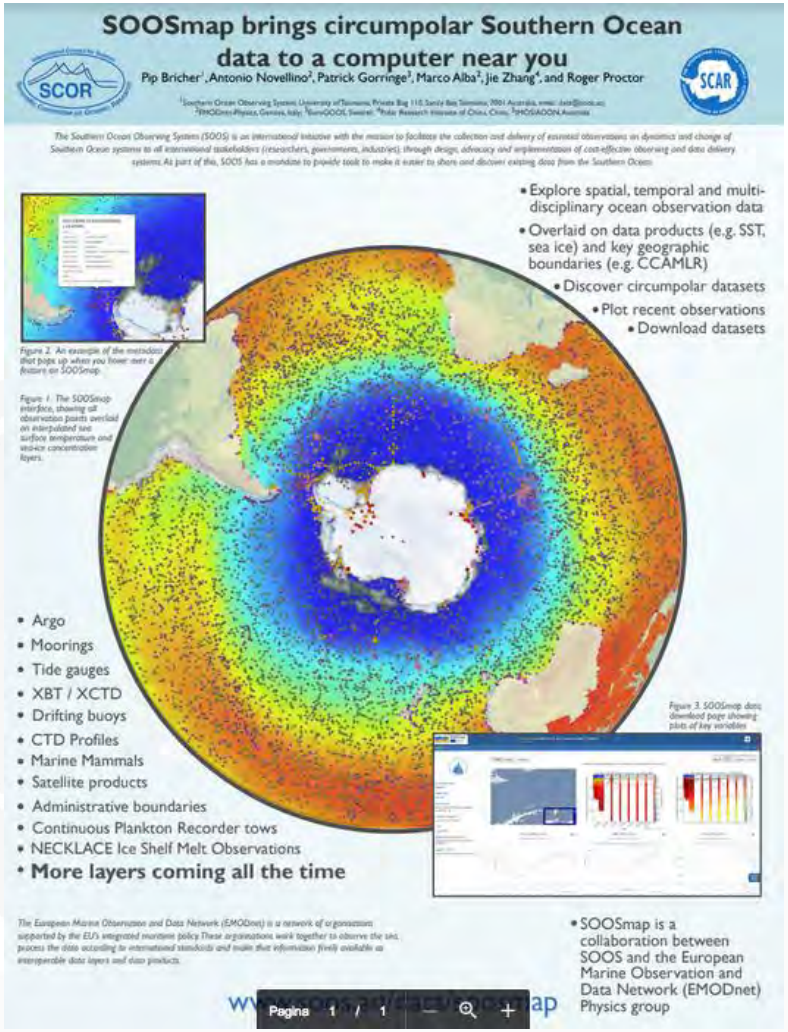
http://www.emodnet.eu/validation-sar-satellite-based-information-products-wave-height-and-combination-emodnet-station-data

Use case of available services

SOOSmap builds on the data aggregation and sharing **infrastructure of EMODnet** to bring circumpolar datasets into a single web-based discovery portal.

Through SOOSmap, users can discover, plot, explore, and download datasets of relevance to biologists, ecologists, ice scientists, and physical oceanographers.

The use of EMODnet allows SOOS to develop the data-sharing tools it needs **without duplicating existing infrastructure** and without placing undue burden on its member organisations



Service: spin-off portal

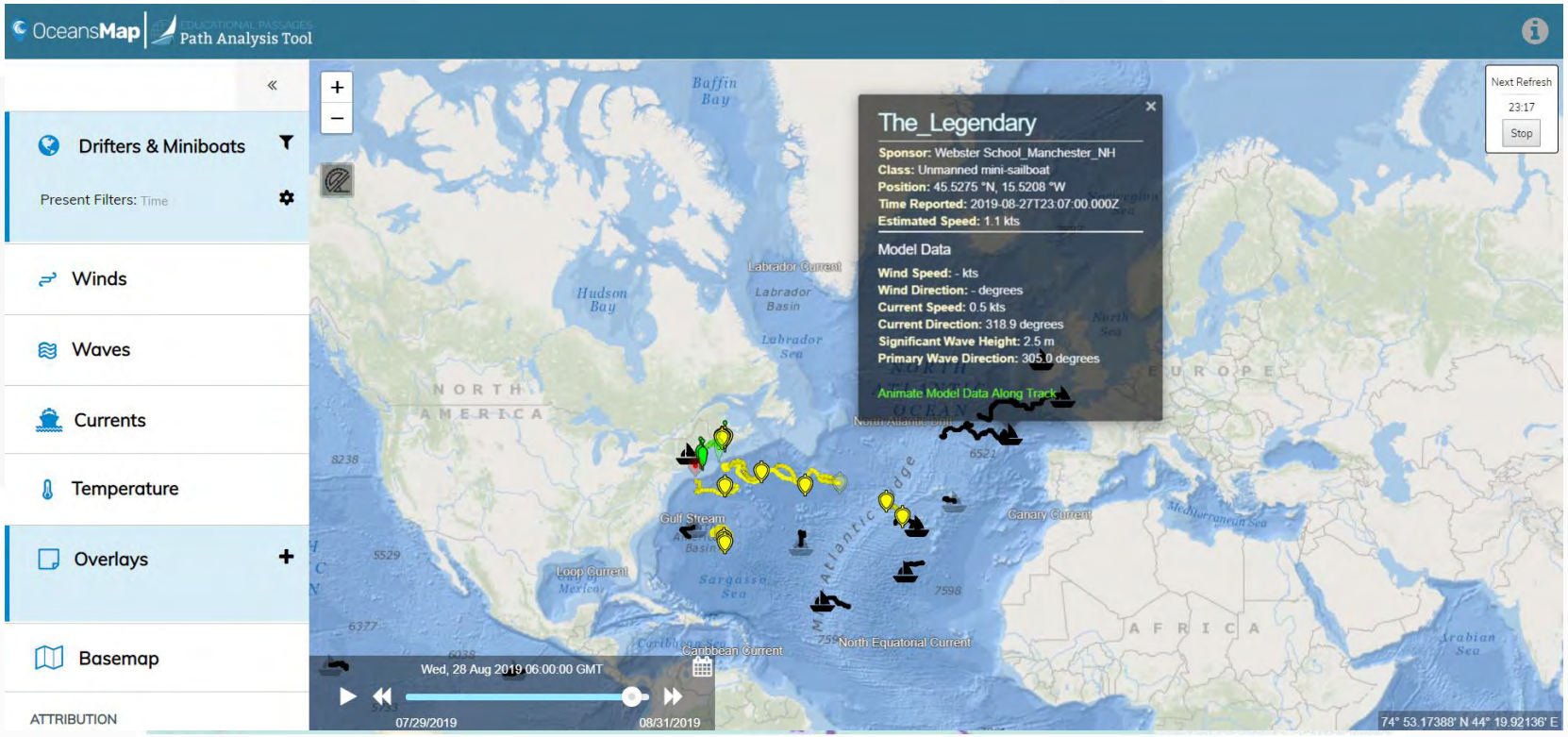
http://www.soos.aq

EMODnet
European Marine Observation and Data Network

EDUCATIONAL PASSAGES

Expanding the data coverage

Students around the world prepare, deploy, and track their very own miniboat while learning about ocean currents, weather, technology, and more.



Expanding the data coverage

EMODnet
European Marine Observation and Data Network

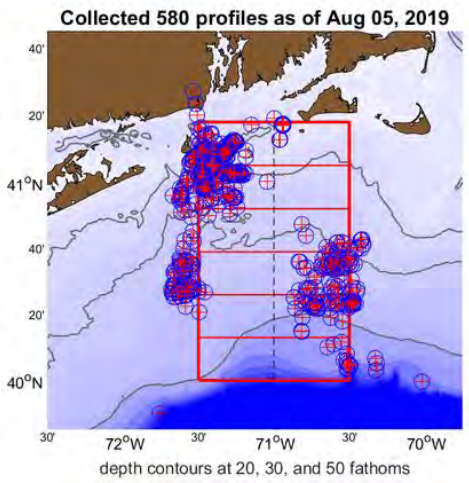
Real-time CTD profiles in data poor shelf seas and coastal waters

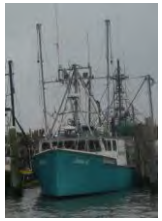
Collecting data in the North Sea, Skagerrak, and the Kattegat. In the USA they are collecting samples in the Bering Sea, Alaska and the Gulf of Maine.

CFRF COMMERCIAL FISHERIES RESEARCH FOUNDATION

Partnership between commercial fishermen and scientists

CFRF - WHOI Shelf Research Fleet





EMODnet
European Marine Observation and Data Network

TMEDNet

Expanding the data coverage

T-MEDNet is devoted to develop an **observation network** on climate change effects in marine coastal ecosystems by spreading the acquisition of standard monitoring protocols on **seawater temperature and biological indicators** over large-scale and long-term.

T-MEDNet members are Public Research Institutions, Marine Protected Areas and NGOs working in near-shore and coastal zone around the Mediterranean Sea.