



Joint European Research Infrastructure network for Coastal Observatory – Novel European eXpertise for coastal observaTories - **JERICO-NEXT**

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1. Executive Summary

The deliverable D.8.8.3 presents the second version of the JERICO-NEXT Data Portal.

It describes the new web interface for the management and access of the JERICO NEXT as updated according to the feedback from the JERICO-NEXT annual assembly and the recommendations from WP5 and WP6. The overall aim of the JERICO-NEXT data portal is:

- To provide access to near real time and delay mode data from the JERICO-NEXT platforms
- To design and make (web) accessible data and aggregated data products (re-elaboration)
- To implement the JERICO-NEXT web portal with services (data discovery, data access, data download etc.)

The JERICO-NEXT data portal provides access to data and data visualization features and it is based on the data management infrastructure developed under WP5.

Data access is integrated into the JERICO-NEXT website and accessible at <http://www.jerico-ri.eu/data-access/>

The current version of the JERICO-NEXT data portal enables viewing and downloading of data for further analysis by users. Each dataset is providing information and metadata to let the user understand how the data was collected, where it is stored and who was involved in the data management and data flow process. Data is collected by platforms belonging to JERICO-NEXT Virtual Infrastructures (VIs) and the JERICO-NEXT data portal is showing that relationship. The data portal provides:

- an overview (table and map) of measurement stations, with full metadata including indications as to whether they provide real-time measurements and/or delayed mode/archived measurements;
- mechanisms for downloading data and metadata including "quick look graphical representations". Users should be able to download complete sets of data for one sea-basin within a given timeframe with a few mouse clicks;
- downloadable data in different data formats (e.g. data sheets and NetCDF)
- a platform page presenting relevant metadata information about data, provider, adopted quality control procedures, relevant publication for that platform and its parameters, data viewing and downloading tools.
- added value tools for data and information checking and management (via a dedicated dashboard) and interoperability towards other systems (via WMS/WFS and web services)



2. Introduction

The specific goal of the Task 8.7 is to provide a Data Portal for access to JERICO-NEXT Data and data visualisation.

The JERICO-NEXT portal is going to be an overarching portal over the main infrastructures (i.e. ROOSs and network of NODCs) and involved systems. It combines data into a common inventory directory and web accessible service. It interoperates with the underlying infrastructure (see WP5) to give access to the distributed acquired data sets in real-time, delayed mode, as well as validated archived data sets provided by the JERICO-NEXT Virtual Infrastructures (see WP6).

On top of the described infrastructure, the JERICO-NEXT portal offers added value services for machine-to-machine interoperability with other running projects and programs at European Level (e.g. MyOcean, SeaDataNet, EMODnet, Obis, etc.).

This document is presenting the updated version of the JERICO-NEXT data portal and available features.

3. JERICO NEXT data portal description

This section describes the first release of the JERICO-NEXT portal that was designed to exploit and integrate the already available marine data management main infrastructures.

Currently, the portal provides users with the following key services and functions:

1. **Dynamic map** facility for viewing and downloading, <http://www.jerico-ri.eu/data-access/>, which is the central tool for users to search, visualise and download data, metadata and products. For near real-time (NRT) data, the map allows viewing/retrieving, within a specified time (e.g. a 60-day sliding window), measurement points, values of data and quality of data. The geographical area (space window) defines the area of interest within which the measurement points, values of data and quality of data are presented. For the previous 60 days, a graph is provided with data availability within the timeframe. Information about the data originator, curator etc. is also provided. The tool also serves to visualise and retrieve data products such as time plots for specific parameters (e.g. monthly averaged temperature for data acquired during the specified time window).
2. **Dashboard**, www.emodnet-physics.eu/jerico/dashboard, which is a reporting service where users can view and export various statistics about the data portal content and usage. The EMODnet Physics dashboard represents a valuable tool to discover data availability and monitor performance of the infrastructure behind the portal. The tool also provides KPIs (Key Performance Indicators) presenting how much data and how many platforms are made available on a daily basis, and extracts statistics on page access and data downloads.
3. **Interoperability services**, the portal is providing OGC (Open Geospatial Consortium) compliant WMS and WFS layers offering information about which parameters are available (where and who is the data originator, etc.). The portal is providing API (REST/SOAP) - web services which allow linkage to external services with near real-time data stream and facilitate a machine-to-machine data fetching and assimilation.

3.1. JERICO-NEXT Dynamic Map Page

The Map page is the operational core tool for users to search, visualise and download data, metadata and products. For the near real-time (NRT) data, the map facility allows viewing/retrieving measurement points, values of data and quality of data within a specified time (e.g. a 60 days sliding window). The tool is also used to visualise and retrieve data products, such as time plots, for specific parameters (e.g. temperature data acquired during a specified time window).

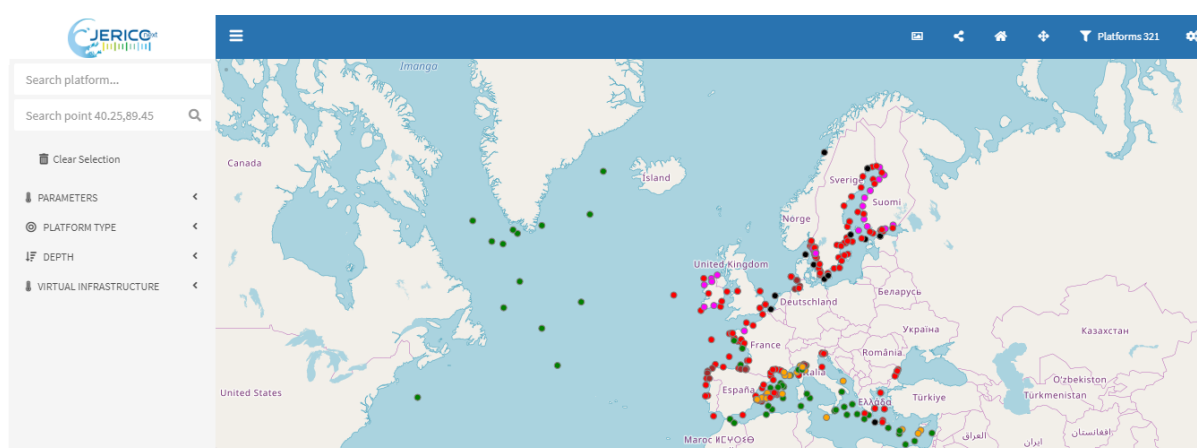


Figure 1. Map Page

The main windows can be divided in 3 main section: the left panel that allows the user to search and filter the platforms on the map, the top panel with icons for sharing information and layer visualization and the main panel with the map and the platform information.

Parameters and filters

The left panel is the *Parameters and Filters* panel that is used to filter the platforms on the map based on the criteria selected by the user.

Search platform...	1
Search point 40.25,89.45	2
Clear Selection	3
PARAMETERS	4
PLATFORM TYPE	5
DEPTH	6
VIRTUAL INFRASTRUCTURE	7

Figure 2. Parameters and Filters panel

The first two cells (1, 2) allows the user to search by platform name or by latitude and longitude. 4 to 7 are filters (Parameters, Platform type, Depth, Virtual Infrastructure), while 3 removes the applied filters. When a filter is applied, the map is updated accordingly and a popup shows the number of platforms matching the applied filters (see B in Figure 3)

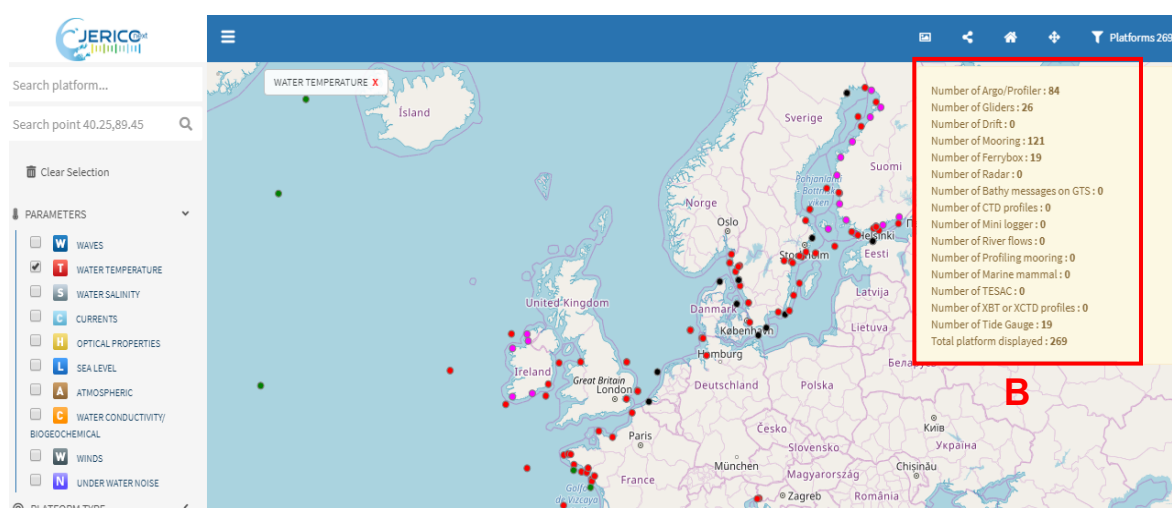


Figure 3. Selected platform summary

Filters are grouped according to some classes, namely Platform Type, Parameters, etc. The logic of the filters is AND between classes and OR within a class. Figure 4 shows an example of filtering with the following selection: dataset containing either currents OR sea temperature AND recorded by either a Mooring OR an HF Radar.

The available filters are:

- *Parameters*: type of measure (grouped by type) such as Water Temperature, Winds, Currents, Salinity, etc...
- *Platform Type*: typology of sensing unit (i.e. mooring, HF Radar, Profiler, Argo)
- *Depth*: the depth of the measurements
- *Virtual Infrastructure*: list of Virtual access services (for more information see <http://www.jerico-ri.eu/virtual-access/>)

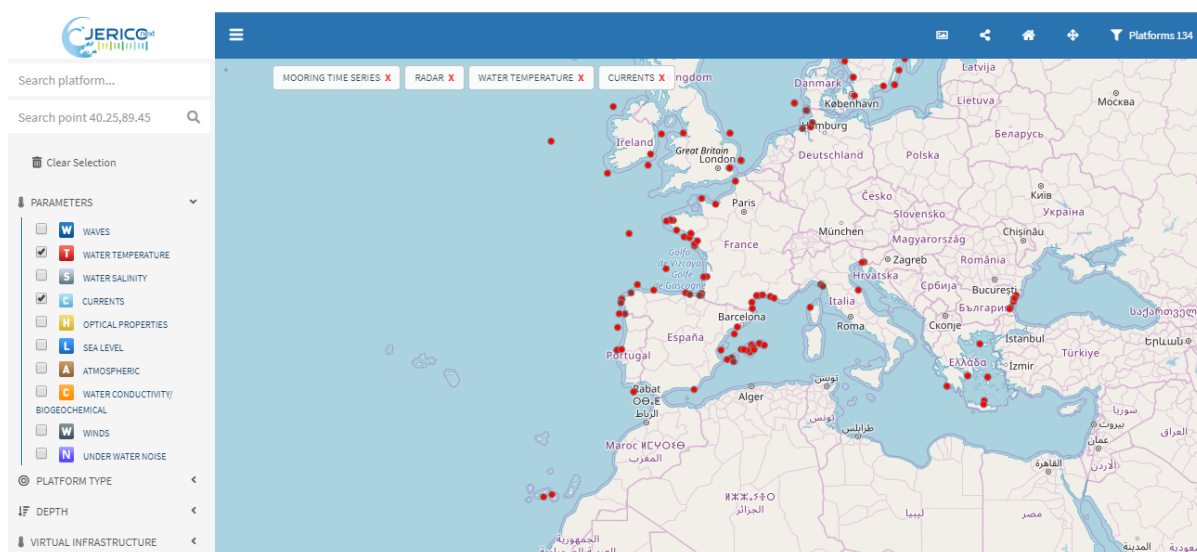


Figure 4. Example of data filtering.

Options



Figure 5. Options Menu.

The Options panel (see Figure 5) shows six icons with the following features:

1. *Screenshot*: clicking on this icon create a .png image of the current map
2. *Share feature*: this features allow to create a permanent link to access the map with the current filters to be shared with other users
3. *Home*: link to JericoNext main page (<http://www.jerico-ri.eu>)
4. *Fullscreen*: open the map in fullscreen mode
5. *Platform count*: number of platform selected on the map
6. *Layers*: clicking on the icon opens a popup window where the user can change the map projection or the base layer. Moreover, the *Add Layer* button enables to insert the URL endpoint and code or name of a WMS layer to be shown on the map (see Figure 6).

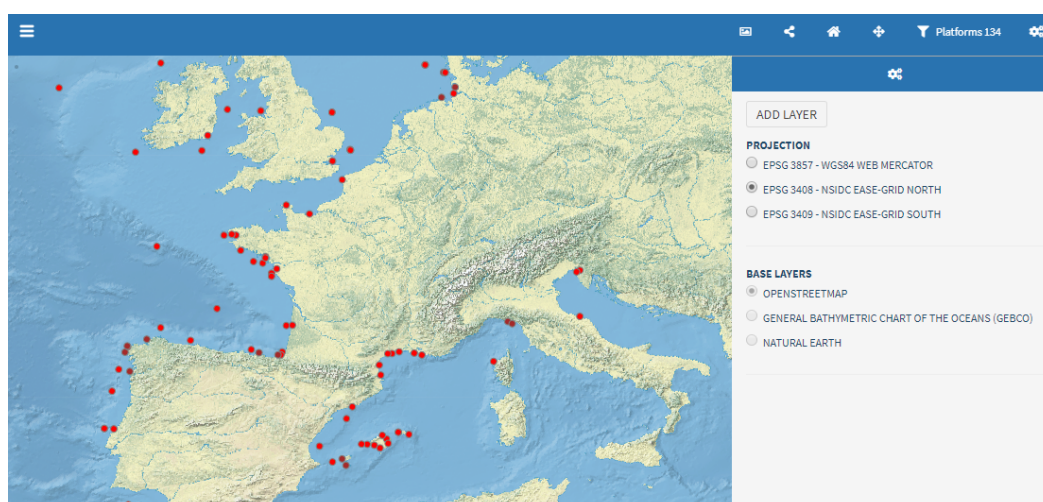


Figure 6. Layer selection panel

Platform Info

When you select a specific platform on the map, a panel at the bottom of the page opens showing data and metadata of the specific platform and some features to interact with the data.

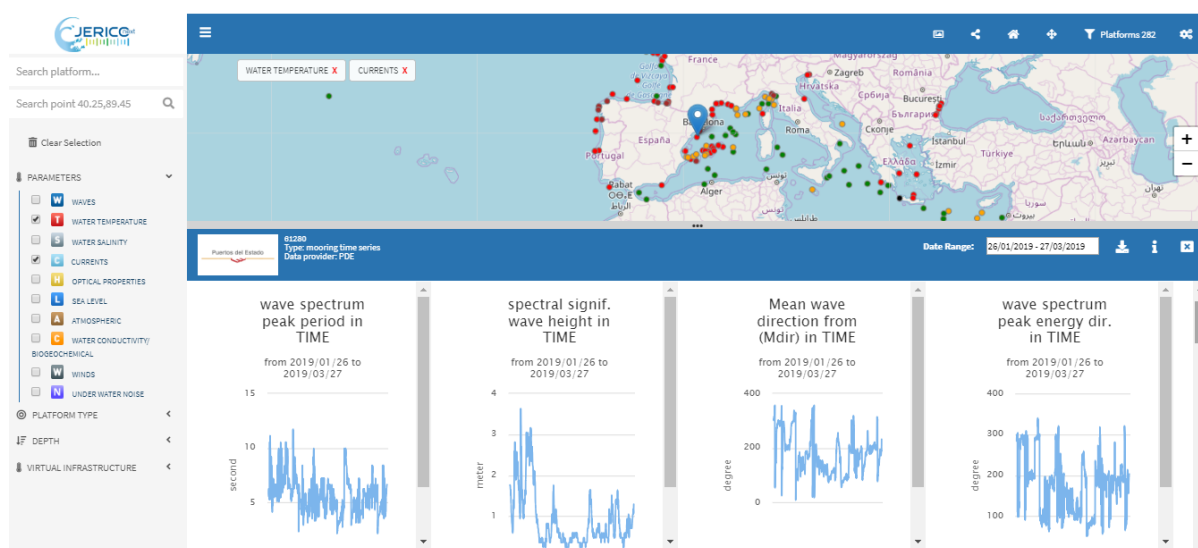


Figure 7. Platform Info panel.

The platform menu comprises a small of metadata (Data Provider name and logo, platform name and type) plus four icons with the following features

1. *Data range*: this control is used to select a time range for the data chart. The user can select predefined data range (*Last 7 days*, *Last 30 days*, *Last 60 days*, *1 year*, *10 years*, *All Times*) or a custom range.

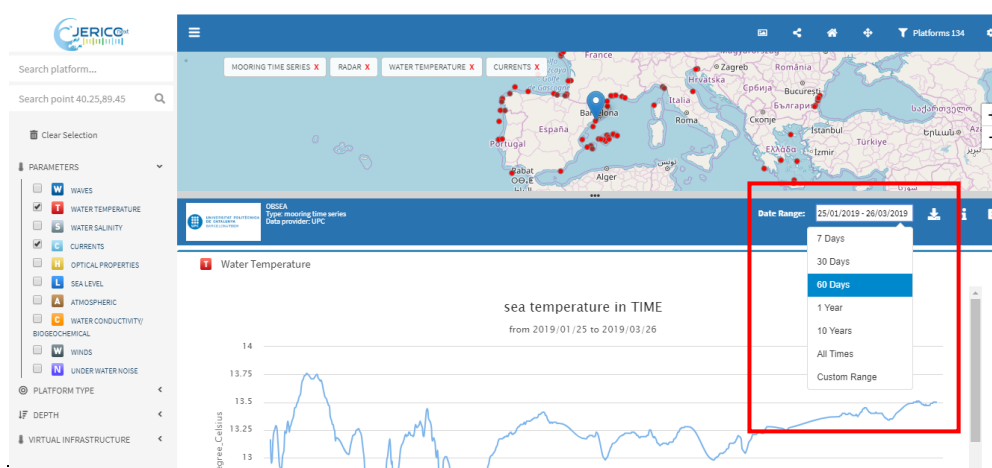


Figure 8. Platform Info panel

2. Data download: clicking on the download icon opens a pop up where the user can select the format, the data range and the parameters to be downloaded.

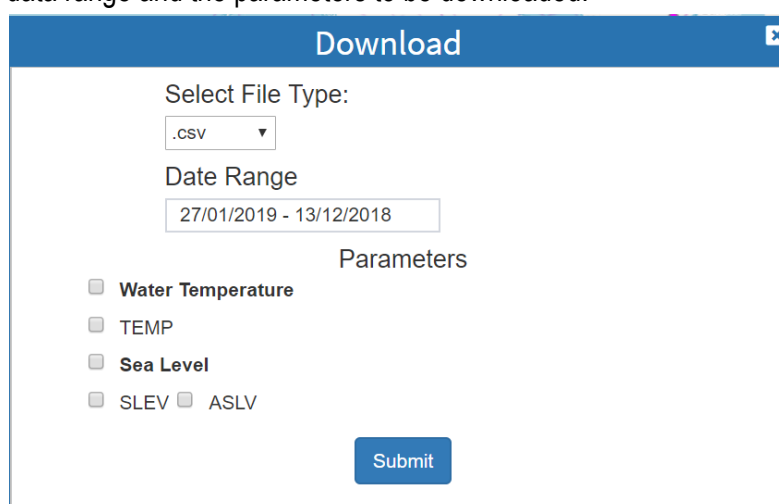


Figure 9. Download option panel

Clicking on the submit button starts the download process of the data in a compressed zip file.

3. Info: allows you to open the platform information windows on the EMODnet Physics data portal where the complete data and metadata can be accessed.



Figure 10. Platform page on EMODnet Physics

4. Close: close the Platform Info panel

If a station on a map represents more than one platform, the menu will show the name of all those stations and give the user the possibility to select the desired one.



Figure 11. Multi-platform selection menu

3.2. JERICO-NEXT Dashboard and monitoring tools

The *dashboard* is a reporting service where users can view and export various statistics about the data portal content and usage. The dashboard represents a valuable tool to discover data availability and monitor performances of the infrastructure behind the portal. The tool also provides KPI's showing how much data and how many platforms are made available on a daily basis, extracting statistics on page access and data downloads etc.

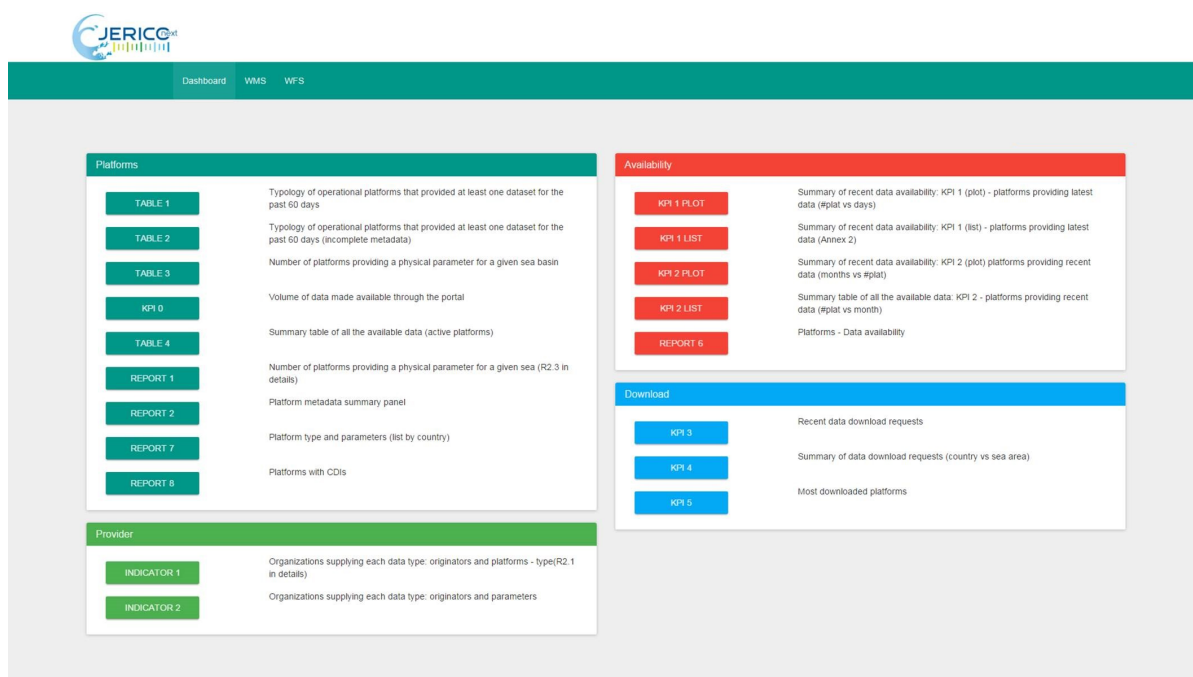


Figure 12. Dashboard main panel

The following figures show examples of the available reports. Legends describe the provided information.

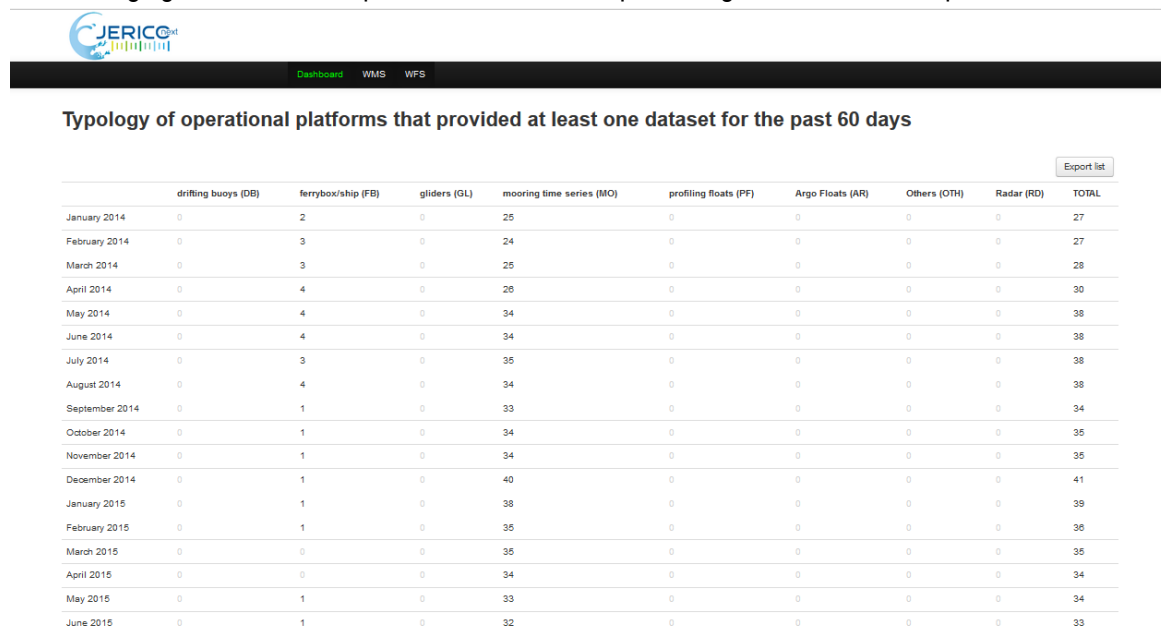


Figure 13. Report on available platforms, which provided data for past 60 days ordered by platform type



Summary table of all the available data (active platforms)

[Export data with param group](#) [Export data with param code](#)

Latitude	Longitude	Country	Data provider	Platform	Type	Data assembly center	Recent data From - To	Recent data #files	Long term TS From - To	CDI dataset ID - validated historical data From - To	CDI dataset ID #files	State	60 days	Parameters group
28,18604	-15,80078	ES	PDE	13130	MO	Puertos del Estado	2002 - 2016	162/170	1997 - 2016	N.D.	N.D.		True	
27,99622	-16,60339	ES	PDE	13131	MO	Puertos del Estado	2002 - 2016	169/170	1998 - 2016	N.D.	N.D.		True	
41,90552	3,65356	ES	PDE	61196	MO	Puertos del Estado	2002 - 2016	155/170	2001 - 2016	N.D.	N.D.		True	
39,71191	4,42139	ES	PDE	61197	MO	Puertos del Estado	2002 - 2016	161/170	1993 - 2016	N.D.	N.D.		True	
36,56982	-2,34131	ES	PDE	61198	MO	Puertos del Estado	2002 - 2016	158/170	1998 - 2016	N.D.	N.D.		True	
35,723	25,462	GR	HCMR	61277	MO	HCMR	2007 - 2015	73/96	2007 - 2015	N.D.	N.D.		False	
40,08301	1,25977	ES	PDE	61280	MO	Puertos del Estado	2004 - 2016	139/146	2004 - 2016	N.D.	N.D.		True	
39,52148	0,20508	ES	PDE	61281	MO	Puertos del Estado	2005 - 2016	122/134	1949 - 2016	N.D.	N.D.		True	
43,3189	4,8662	FR	IFREMER	61284	MO	Coriolis	2009 - 2016	81/86	2009 - 2014	N.D.	N.D.		True	
39,55078	2,10449	ES	PDE	61430	MO	Puertos del Estado	2006 - 2016	111/122	2006 - 2016	N.D.	N.D.		True	
43,64746	-3,0542	ES	PDE	62024	MO	Puertos del Estado	2002 - 2016	160/170	1990 - 2016	N.D.	N.D.		True	

Figure 14. This report is listing all the connected platforms and available data. The report can be exported in CSV format for further uses. The export is one of the most complete reports of the Jerico data portal.

3.3. JERICO-NEXT Interoperability tools

The interoperability services are based on the EMODnet Physics services and, where pertinent, they are specific to fulfil the JERICO-NEXT scope.

3.3.1. Web Map Service (WMS) and Web Feature Services (WFS)

The Web Map Services and Web Feature Services are accessible at the following links:

- (WMS) <http://www.emodnet-physics.eu/jerico/Service/GeoServerDefaultWMS.aspx>
- (WFS) <http://www.emodnet-physics.eu/jerico/Service/GeoServerDefaultWFS.aspx>

These OGC compliant services are based on GeoServer (<http://docs.geoserver.org>). The JERICO-NEXT WMS provide a standard interface for requesting a geospatial map image (WMS 1.1.1).

The WMS page provides a user-friendly interface (*Figure 15*) to see and plug the available layers. Instructions on how to link/import into their page/service are presented when the user clicks the “?” button.

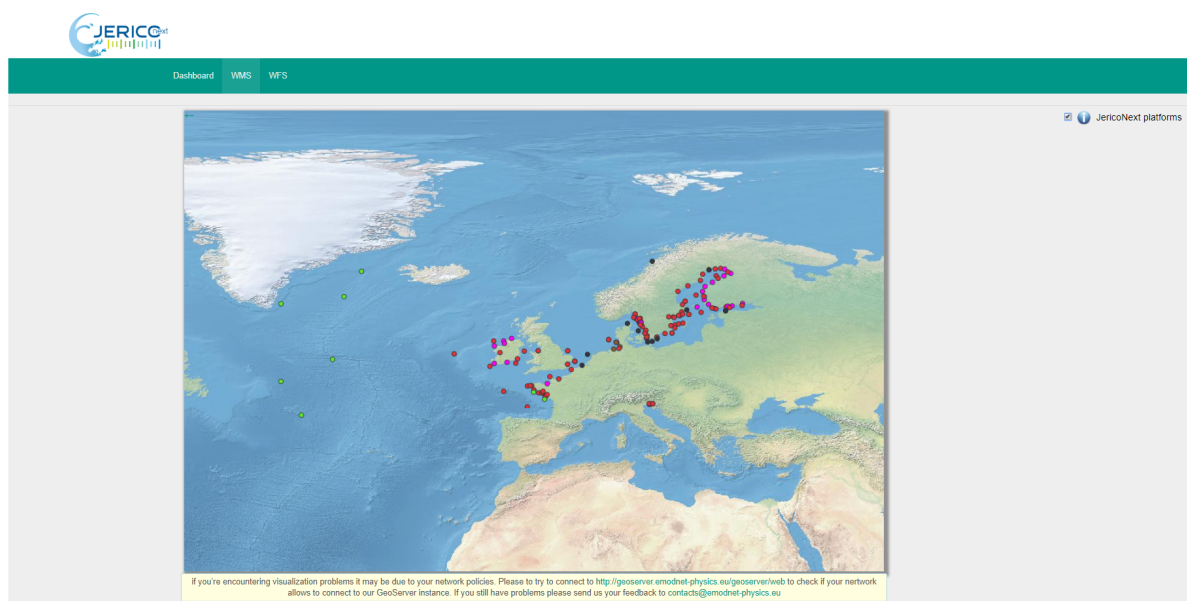


Figure 15. WMS page

```
http://geoserver.emodnet-physics.eu/geoserver/emodnet/ows?service=WMS&version=1.1.1&request=GetMap&format=image/png&transparent=true&SRS=EPSG%3A900913&BBOX=-2101155.3884615,5291639.887125,1655877.4252884,9048672.700875&WIDTH=768&HEIGHT=768&LAYERS=JN_PLATFORMS
```


The WMS also supply information about the available layers, server capabilities, and contact/publisher information:

<http://geoserver.emodnet-physics.eu/geoserver/emodnet/ows?service=WMS&version=1.1.1&request=GetCapabilities>

The WFS encode and transfer information in Geography Mark-up Language (GML), a subset of XML.

http://www.emodnet-physics.eu/jerico/UserControls/GenericProxy/geoserver.emodnet-physics.eu/geoserver/emodnet/ows?request=GetFeature&service=wfs&version=1.0.0&typeName=JN_PLATFORMS&bbox=-84.15625,9.12109375,76.15625,100.87890625

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:FeatureCollection xmlns="http://www.opengis.net/wfs" xmlns:wfs="http://www.opengis.net/wfs" xmlns:emodnet="http://geoserver.emodnet-physics.eu/emodnet"
  xmlns:gml="http://www.opengis.net/gml" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://geoserver.emodnet-physics.eu/emodnet
  http://geoserver.emodnet-physics.eu:80/geoserver/emodnet/wfs?service=WFS&version=1.0.0&request=DescribeFeatureType&typeName=emodnet%3AJN_PLATFORMS
  http://www.opengis.net/wfs http://geoserver.emodnet-physics.eu:80/geoserver/schemas/wfs/1.0.0/WFS-basic.xsd">
  <gml:boundedBy>
    <gml:null unknown</gml:null>
  </gml:boundedBy>
  <gml:featureMember>
    <emodnet:JN_PLATFORMS fid="JN_PLATFORMS.fid-2acca1e1_169c9acedf7_-1735">
      <emodnet:fid>751</emodnet:fid>
      <emodnet:position>
        <gml:Point srsName="http://www.opengis.net/gml/srs/epsg.xml#4326">
          <gml:coordinates xmlns:gml="http://www.opengis.net/gml" decimal="." cs="," ts=" ">17.0972,57.3661</gml:coordinates>
        </gml:Point>
      </emodnet:position>
      <emodnet:PlatformID>442</emodnet:PlatformID>
      <emodnet:PlatformCode>OlandsNorraUdde</emodnet:PlatformCode>
      <emodnet:WMOCode></emodnet:WMOCode>
      <emodnet:SeaRegionCode>Baltic</emodnet:SeaRegionCode>
      <emodnet:SeaRegionDescr>Baltic Sea</emodnet:SeaRegionDescr>
      <emodnet:ParametersGroupCode>6</emodnet:ParametersGroupCode>
      <emodnet:ParametersGroupDescr>Sea Level</emodnet:ParametersGroupDescr>
      <emodnet:ParametersCodeDescr>DEPH;SLEV;ASLV</emodnet:ParametersCodeDescr>
      <emodnet:DataTypeDescr>NRT_M;REP_VAL</emodnet:DataTypeDescr>
      <emodnet:LastDataMeasured>2019/03/28 15:00:00</emodnet:LastDataMeasured>
      <emodnet:Country>Sweden</emodnet:Country>
      <emodnet:DataOwner>
        SMHI - Swedish Meteorological and Hydrological Institute - Sweden
      </emodnet:DataOwner>
      <emodnet:DataProvider>SMHI</emodnet:DataProvider>
      <emodnet:LogoURL>
        http://www.emodnet-physics.eu/Map/includes/images/dataProviders/loghi/SMHI.png
      </emodnet:LogoURL>
      <emodnet:PlatformTypeCode>MO</emodnet:PlatformTypeCode>
      <emodnet:PlatformInfoLink>http://www.emodnet-physics.eu/map/spi.aspx?id=442</emodnet:PlatformInfoLink>
      <emodnet:ColorFeatures>#DC3238</emodnet:ColorFeatures>
      <emodnet:ProjectsCode>JRC,SDN,INSTAC,FIXEDMOORINGS</emodnet:ProjectsCode>
    </emodnet:JN_PLATFORMS>
  </gml:featureMember>
  <gml:featureMember>
    <emodnet:JN_PLATFORMS fid="JN_PLATFORMS.fid-2acca1e1_169c9acedf7_-1734">
      <emodnet:fid>761</emodnet:fid>
      <emodnet:position>
        <gml:Point srsName="http://www.opengis.net/gml/srs/epsg.xml#4326">
          <gml:coordinates xmlns:gml="http://www.opengis.net/gml" decimal="." cs="," ts=" ">16.4781,57.275</gml:coordinates>
        </gml:Point>
      </emodnet:position>
      <emodnet:PlatformID>443</emodnet:PlatformID>
      <emodnet:PlatformCode>Oskarshamn</emodnet:PlatformCode>
      <emodnet:WMOCode></emodnet:WMOCode>
      <emodnet:SeaRegionCode>Baltic</emodnet:SeaRegionCode>
      <emodnet:SeaRegionDescr>Baltic Sea</emodnet:SeaRegionDescr>
      <emodnet:ParametersGroupCode>6</emodnet:ParametersGroupCode>
      <emodnet:ParametersGroupDescr>Sea Level</emodnet:ParametersGroupDescr>
      <emodnet:ParametersCodeDescr>DEPH;SLEV;ASLV</emodnet:ParametersCodeDescr>
      <emodnet:DataTypeDescr>NRT_M;REP_VAL</emodnet:DataTypeDescr>
      <emodnet:LastDataMeasured>2019/03/28 15:00:00</emodnet:LastDataMeasured>
      <emodnet:Country>Sweden</emodnet:Country>
      <emodnet:DataOwner>
        SMHI - Swedish Meteorological and Hydrological Institute - Sweden
      </emodnet:DataOwner>
      <emodnet:DataProvider>SMHI</emodnet:DataProvider>
      <emodnet:LogoURL>
        http://www.emodnet-physics.eu/Map/includes/images/dataProviders/loghi/SMHI.png
      </emodnet:LogoURL>
      <emodnet:PlatformTypeCode>MO</emodnet:PlatformTypeCode>
      <emodnet:PlatformInfoLink>http://www.emodnet-physics.eu/map/spi.aspx?id=443</emodnet:PlatformInfoLink>
      <emodnet:ColorFeatures>#DC3238</emodnet:ColorFeatures>
      <emodnet:ProjectsCode>JRC,SDN,INSTAC,FIXEDMOORINGS</emodnet:ProjectsCode>
    </emodnet:JN_PLATFORMS>
  </gml:featureMember>
</gml:featureMember>
</wfs:FeatureCollection>
```

Figure 16. Example of the XML in response to a WFS request

3.3.2. THREDDS (HFR data only)

The THREDDS Data Server (TDS) communicates with clients by sending them a THREDDS Catalogue that describes what datasets the server has, and how they can be accessed. THREDDS Catalogues are logical directories of on-line data resources, encoded as XML documents, which provide a place for annotations and other metadata about the data resources. JERICO-NEXT THREDDS catalogue is hosted by EMODnet Physics: <http://hfr-thredds.emodnet-physics.eu/thredds/catalog.html>

3.3.3. ERDDAP

The ERDDAP Data Server is a web server for search and download subsets of gridded and tabular scientific datasets in common file formats. All the time series provided by JERICO-NEXT are accessible through a dedicated ERDDAP instance located at: <http://erddap.jerico-ri.eu>

4. Conclusions

The JERICO-NEXT data portal provides access to data and data visualization features and it is based on the data management infrastructure developed under WP5 and compliant to Vis needs (WP6). It provides the web interface for the management and access of the JERICO-NEXT data with a specific focus on:

- Providing access to near real time and delay mode data from the JERICO-NEXT platforms as collected by the JERICO-NEXT VIs
- Designing and making (web) accessible data and aggregated data products (re-elaboration)
- Implementing the JERICO-NEXT web portal with services (data discovery, data access, data download etc.)

The JERICO-NEXT data portal is operational and provides:

- an overview (table and map) of measurement stations, with full metadata including indications as to whether they provide real-time measurements and/or delayed mode/archived measurements;
- mechanisms for downloading data and metadata including "quick look graphical representations". Users should be able to download complete sets of data for one sea-basin within a given timeframe with a few mouse clicks;
- downloadable data in different data formats (e.g. data sheets and NetCDF);
- a platform page presenting relevant metadata information about data, provider, adopted quality control procedures, relevant publication for that platform and its parameters, data viewing and downloading tools;
- added value tools for data and information checking and management (via a dedicated dashboard) and interoperability towards other systems (via WMS/WFS and web services)

5. Annexes and references

5.1. Glossary and abbreviations

CF	Climate Forecast (convention for NetCDF)
CMEMS	Copernicus Marine Environment Monitoring Service. CMEMS has been designed to respond to issues emerging in the environmental, business and scientific sectors. Using information from both satellite and in situ observations, it provides state-of-the-art analyses and forecasts daily, which offer an unprecedented capability to observe, understand and anticipate marine environment events.
CSV	Comma-separated values. It is a file stores tabular data (numbers and text) in plain text. Each line of the file is a data record. Each record consists of one or more fields, separated by commas. The use of the comma as a field separator is the source of the name for this file format
EC	European Commission
EMODnet	European Marine Observation and Data network (EMODnet) is a long term marine data initiative from the European Commission Directorate-General for Maritime Affairs and Fisheries (DG MARE) underpinning its Marine Knowledge 2020 strategy. EMODnet is a consortium of organizations assembling European marine data, data products and metadata from diverse sources in a uniform way. The main purpose of EMODnet is to unlock fragmented and hidden marine data resources and to make these available to individuals and organizations (public and private), and to facilitate investment in sustainable coastal and offshore activities through improved access to quality-assured, standardized and harmonized marine data which are interoperable and free of restrictions on use.
ERDDAP	Environmental Research Division's Data Access Program (ERDDAP) is a tool that can read from a variety of the most common data transport standards, and can output the data in a wide variety of formats used by analysis and visualization applications as well as in scripts.
EuroGOOS	European Global Observing System. EuroGOOS is a pan-European ocean observing network operating within the context of the Global Ocean Observing System of the Intergovernmental Oceanographic Commission of UNESCO (IOC GOOS).
FP	Framework Programmes for Research and Technological Development, also called Framework Programmes or abbreviated FP1 through FP7 with "FP8" being named "Horizon 2020", are funding programmes created by the European Union/European Commission to support and foster research in the European Research Area (ERA).
FTP	Protocol to download files
GMES	EU FP7 programme for the Global Monitoring for Environment and Security
HFR	High Frequency Radar
ICES	International Council for the Exploration of the Sea
INS TAC	In Situ Thematic Assembly Center
KPI	Key Performance Indicator
My Ocean	MyOcean is a series of projects (European Commission within the FP7.GMES Program) to define and to set up a concerted and integrated pan-European capacity for ocean monitoring and forecasting
NetCDF	Network Common Data Form. NetCDF is a set of software libraries and self-describing, machine-independent data formats that support the creation, access, and sharing of array-oriented scientific data.
NODC	National Oceanographic Data Centre. The NODCs are national data centres whose mission statement is to provide scientific stewardship of marine data and information
NRT	Near Real Time
Obis	Ocean Biogeographic Information System is a web-based access point to information about the distribution and abundance of living species in the ocean
OGC	Open Geospatial Consortium is an international not for profit organization committed to making quality open standards for the global geospatial community. These standards are made through a

	consensus process and are freely available for anyone to use to improve sharing of the world's geospatial data
ROOS	Regional Oceanographic Observing System
SDN	SeaDataNet
SeaDataNet	SeaDataNet project (FP6.GA026212 and FP7.GA283607) - Pan-European infrastructure for providing access to ocean and marine metadata
SOAP	Simple Object Access Protocol. SOAP is a protocol specification for exchanging structured information in the implementation of web services in computer networks. It uses XML Information Set for its message format, and relies on application layer protocols, most notably Hypertext Transfer Protocol (HTTP) or Simple Mail Transfer Protocol (SMTP), for message negotiation and transmission
SOS	Sensor Observation Service is a web service to query real-time sensor data and sensor data time series and is part of the Sensor Web. The offered sensor data comprises descriptions of sensors themselves, which are encoded in the Sensor Model Language (SensorML), and the measured values in the Observations and Measurements (O & M) encoding format. The web service as well as both file formats are open standards and specifications of the same name defined by the Open Geospatial Consortium (OGC).
THREDDS	Thematic Real Time Environmental Distributed Data Services is a web server that provides metadata and data access for scientific datasets, using a variety of remote data access protocols.
Web service	the Web Service is a service offered by an electronic device to another electronic device, communicating with each other via the world wide web
WFS	Web Feature Service Interface Standard (WFS) provides an interface allowing requests for geographical features across the web using platform-independent calls.
WMO	World Meteorological Organization
WMS	Web Map Service is a standard protocol for serving (over the Internet) georeferenced map images which a map server generates using data from a Geographic information system (GIS) database

5.1. EuroGOOS ROOSs

Name	Region	CMEMS bigram
Arctic ROOS	Arctic Seas	AR
BOOS	Baltic Seas	BO
Black Sea GOOS	Black Sea	BS
IBI ROOS	Iberic-Biscay-Irish Seas	IR
MOON	Mediterranean Sea	MO
NOOS	North West Shelves	NO