

FORCOAST



Earth Observation Services For Wild Fisheries, Oystergrounds
Restoration And Bivalve Mariculture Along European Coasts

PROJECT DELIVERABLE REPORT

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Executive Summary

This deliverable D6.8 describes the data management aspects of the FORCOAST project and refers to task 6.4 (Technology Transfer, Data Management Plan). This is the final Data Management Plan and verifies that FAIR Data Management principles were followed. It is also a final update of the *Initial Data Management Plan (D6.7)*.

FORCOAST is a data-centred project, where data from different sources (Earth Observation, numerical models, in-situ monitoring, laboratory data) is used as input in order to create new data products from which useful information can be retrieved for the targeted sectors: fishery, bivalve mariculture and oysterground restoration. Although the formats of the pilot input data greatly vary, the FORCOAST platform accounts for data format standardization also targeting consistency in the generated data in terms of naming and versioning.

The FAIR (Findability, Accessibility, Interoperability and Reusability) data principle is followed as much as possible by the FORCOAST DMP, however, it must be noted that FORCOAST is not a data redistribution platform and therefore it is not sharing the (underlying) data itself. Instead, FORCOAST is sharing information services (e.g. bulletins) tailored to end-user needs. In principle, FORCOAST operates in a subscription-based model, which will account for both open and non-open (customized) data (accessible to active subscribed users). The FORCOAST platform will continue to deliver information service products after the project end-date, on demand expanding the available information services.

The cost for the management of the data, the accomplishment of the FAIR principles and subsequent resources to make the appropriate data publicly accessible have been included in *Work Package 6 – Innovation Management, Exploitation and Business Planning*. The data management work is overseen by Deltares and led by Eigen Vermogen Van Het Instituut Voor Landbouw-En Visserijonderzoek (EV ILVO).

Finally, it must be mentioned that the FORCOAST architecture is portable and for sustainability the DIAS cloud storage and computation services are used.

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1 Data Summary

In FORCOAST, 'data' is the collection of the input datasets provided from different project case studies (pilots), as well as outputs obtained from the platform (generated products). The purpose of the former type of data is to feed the platform with locally relevant and locally produced data, and after being processed, analysed and interpreted, the latter type of data is used to maximize the value and actionability of measured and modelled information in form of simple bulletins. The end-product is reliable water quality and met-ocean information targeting the wild fishery, bivalve mariculture and oysterground restoration sectors.

The FORCOAST project does not aim to collect user data for any other purposes than business or reviewing purposes. The user data for the business purpose is needed for setting up the scheduled 'premium' services FORCOAST offers. The user data for reviewing purposes consists of an email address that can be used for contacting users that have filled in the feedback form that can be found through the platform. This user data will not be openly available. More information can be found in the section about data privacy.

The whole project is centred around the usage, processing, fusion, integration and analysis of data to obtain useful and meaningful information for the sectors FORCOAST aims for. Different types of datasets for various sources are used in the project. Some examples are from Earth Observation sources (including Copernicus products such as CMEMS) or local hydrodynamic and water quality models (e.g. ROMS, NEMO) running at the partners' sites accessible through various protocols (e.g. THREDDS, ERRDAP). The source of the input data for the pilots vary depending on the pilot, however, all the input data from the various sources are in the standard data format netCDF-CF. The FORCOAST platform applies data format standardization to provide homogeneity to the process and ensuring its continuity over time. This standardization is also reflected in the output information that is obtained from the platform, which has consistent formatting and layout. This leads to improved consistency and thus improved user experience.

Data re-usability is considered for both the input-data and output-information. Regarding input data, datasets on a European level that contain valuable parameters for different pilots are used. An inventory and detailed description of the different Earth Observation datasets used per pilot is present in Deliverable *D3.6 – DWH use for 2022*. Considering data volume, the size of the FORCOAST model data varies depending on the pilot, spatial resolution, time resolution, beginning and end date/time and number of parameters, among others (more details in Annex II). On the other hand, input data size is restricted by the computational capability and storage of the different pilots and of the central FORCOAST service, as well as the capacity offered by the DIAS service where the system will be deployed. In general, one output bulletin is created per service run and these bulletins vary in data size, from a few hundred KB's an image to about one to three MB's per video.

Overall, the information retrieved from FORCOAST is primarily targeting the fishery, restoration and mariculture users in the pilot areas, as well as other ones that can be incorporated into the platform in the future due to the flexibility, and user-oriented focus of the project.



2 FORCOAST data architecture

The data used by FORCOAST is stored in various locations. The input data for the service modules is stored on various THREDDS servers of the project partners and on the CMEMS database servers in netCDF-format. Pre-processed data layers from these databases are stored in a FORCOAST dedicated GeoServer in ImageMosaic-format, from which WMS-services are used in the front-end. Output from the services that have been requested by the users are stored in a FORCOAST WPS web service in image/video-format. The figure below illustrates the relationships between the various databases along the data life-cycle. This is a generalization and may vary slightly from service to service. The following subsections describe the data architecture elements.

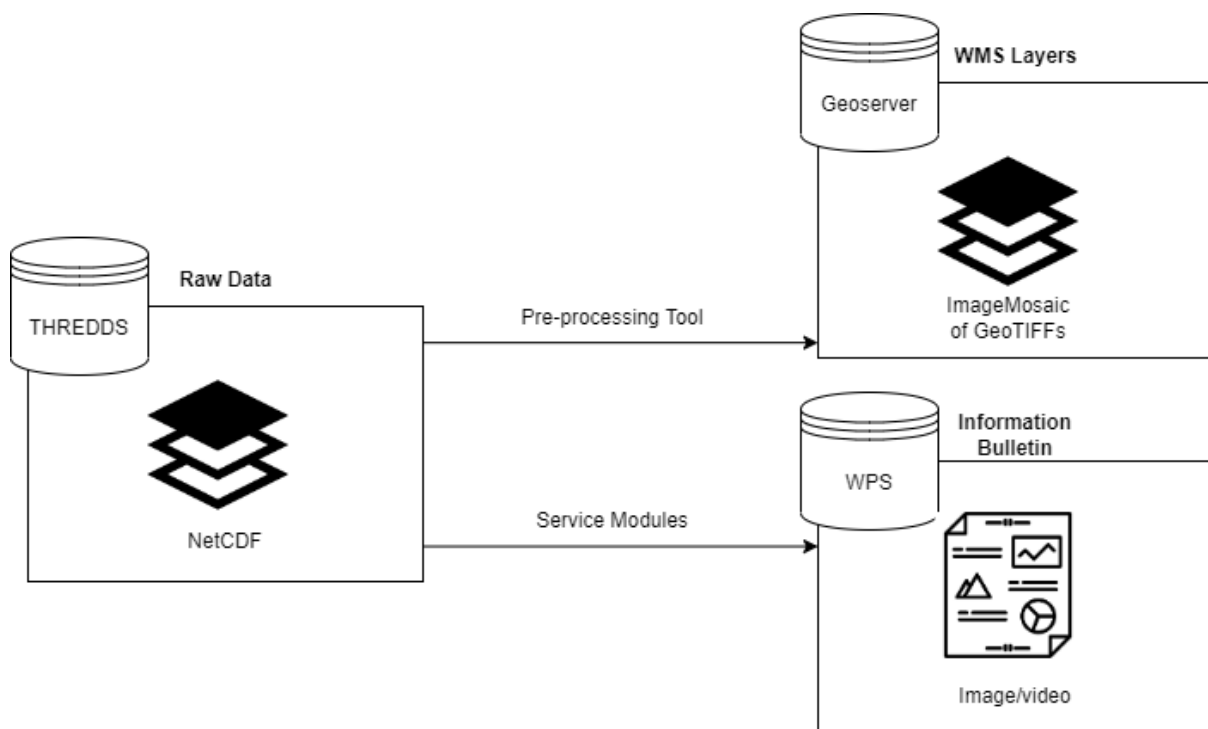


Figure 1 Databases in FORCOAST

2.1 Raw data

The raw data that is being used by both the pre-processing tools and service modules developed for FORCOAST are stored in various locations and are also retrieved using various protocols. This varies since not every data server allows for the same protocols, as well as some protocols allow for downloading subsets of data where other protocols don't. MOTU-client's and ERDDAP's HTTP protocol system allow for downloading specific subsets of data, potentially reducing the total file size of the downloaded data. FTP, WMS and HTTP at other data servers don't allow sub-setting data. The list of raw data sources used per service can be found in Annex II.

Table 1 Databases and protocols used by FORCOAST

Type of Database	Database	Protocol used	Used by service
Raw data	CMEMS	HTTP, MOTU-client	- Suitable Fishing Areas - Fronts detection (Bay of Biscay)

Raw data	THREDDS	HTTP	- Fronts detection - Marine Conditions and Scheduler (Sado Estuary) - Contaminants Source Retrieval
Raw data	ERDDAP	HTTP	- Spat Capture Assistance
Raw data	Private server	FTP	- Marine Conditions and Scheduler (Limfjord)
WMS Layers	GeoServer	WMS	- FORCOAST platform
Information Bulletin	WPS	HTTP	- FORCOAST platform

2.2 WMS Layer Data

The ‘toggleable layers’ (in the Data Viewer for each service) in the FORCOAST platform are all saved in the GeoServer database of the project. The data in the GeoServer is extracted from the aforementioned ‘Raw data’ databases and uploaded to the GeoServer using pre-processing tools developed for FORCOAST. There are three different tools that are being scheduled to extract NetCDF files, convert them to single GeoTIFF files, and upload them to the GeoServer. There are three different tools, because they vary in the data extraction protocols used:

- The ‘Remote Sensing Subsetter’ acquires data from the CMEMS database using HTTP protocol.
- The ‘Geoserver Ingestion’ acquires the data from THREDDS and Private server using both HTTP and FTP protocols.
- The ‘A4 ERDDAP Data’ tool acquires data from ERDDAP using the HTTP protocol with special subsetting properties.

Once the data layers are present in GeoServer (as ImageMosaics of GeoTIFFs), WMS requests can be performed to overlay the data over a map in the FORCOAST-platform. These WMS request can only request for one spatial-temporal layer at a time. All of the data layers and their sources can be found in Annex III

2.3 Information Bulletin data

The data that is stored in the WPS database is output produced by the various FORCOAST service modules. This output is first saved in the Kubernetes cluster in which the service jobs are executed and are then uploaded to the WPS server using the Calrissian CWL implementation tool. These information bulletins are each assigned to their own HTTP link, which are requested by the FORCOAST-platform after the service execution has finished.

2.4 Relation between pilots, front-end and back-end

To extend on the simplified Figure 1, Figure 2 shows the full FORCOAST data architecture. In this diagram, it becomes clear that the raw data is based on regional models and remote sensing data and differs per pilot area, while the service module used for reading, processing, and post-processing the data remains constant. When the service module is requested and finished, the stored results from the service modules in the back-end database (GeoServer, WPS) are then requested by the front-end. The raw data databases are only requested by the back-end service modules, and never by the front-end directly.

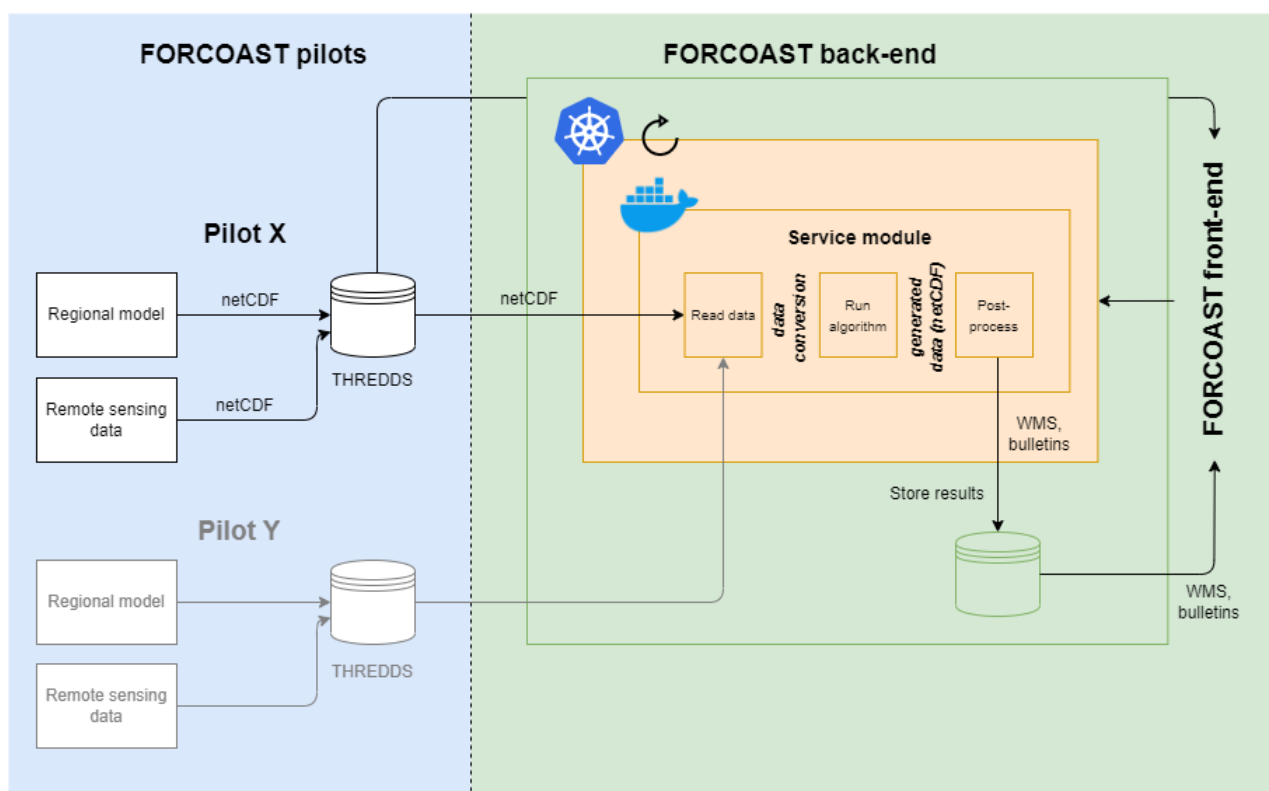


Figure 2. FORCOAST data architecture

3 FAIR Data

As computational support and data support for research has increased over the years, there is a need for a standardized framework to manage and treat project data. In 2016 a publication was released that describes exactly this framework. Under Horizon 2020, the EU states that all projects adhere to the FAIR data policy. As the project progressed, new elements were added to the data management plan and checked with the FAIR data principles. Frameworks that comply with ISO standards and FAIR principles like INSPIRE were followed by FORCOAST and as discussed below.

More specifically, in this section, the different aspects regarding the compliance of FORCOAST data management within the FAIR (Findability, Accessibility, Interoperability and Reusability) principles are treated.

3.1 Data Findability

Regarding data findability the most important remark is that FORCOAST data (underlying data used to generate information services such as bulletins) is by design non-findable. This was a deliberate choice as FORCOAST targets end-users who are only interested in simple actionable information services rather than the underlying data.

The information services generated by the platform (<https://forcoast.netlify.app/>) are, however, findable on the platform. These are promoted by giving visibility to the FORCOAST project and the service it provides since the platform and bulletins are the only ways the users can have access to the desired information. The discoverability of FORCOAST is ensured by following marketing and external communication approaches that are developed by the different tasks of *Work Package 7 – Marketing and Communication*, more specifically in deliverable *D7.2 - Communication and Marketing Plan for*

the FORCOAST project. These include online promotion in different media such as Twitter or LinkedIn, participation in events such as symposia or workshops, production and distribution of marketing material and development and updating of the project website among others.

The naming of the produced output bulletins is consistent, having a clear title, date specifications and either a map and/or coordinates reflecting the spatial domain. If relevant, the parameters that were used are also displayed. Following the same philosophy, the input datasets that are displayed in the platform are consistently named, have a clear time indication and have a small description alongside it. The spatial domain is clearly visualized by a grey bounding box in the main map-component of the platform. The source of the visualized input data can be retrieved by clicking the 'database'-icon in the bottom-right corner of the platform.

3.2 Accessibility of the Data

In short, open accessibility is guaranteed to the basic FORCOAST information services. The FORCOAST project is a Copernicus Market Uptake¹ activity and the provided water quality and met-ocean information services are marketed as such. In order to cover the cost of the platform infrastructure and equipment needed to maintain it and keep it operational beyond its completion date (thus having a real positive impact in the targeted sectors), a source of revenue is set-up. The revenue will be generated through subscription-based services. This way, users can subscribe to the services most suitable for their activities. This subscription provides 'premium' services while some basic functionalities, and information can be accessed freely. Thus, the latter is openly available while the former, would work on a paid basis.

The 'premium' FORCOAST products (bulletins) can be accessed through the Telegram messaging service. The users can use their personal (or business) telephone numbers to set up an account in order to receive the personalized bulletins. For the usage of the free services, as well as for the rest of the platform functions and use, the user manual can be consulted (*Deliverable D5.6 – Platform User Manual*), which will be accessible via the FORCOAST platform and website.

3.3 Interoperability of the Data

The information services accessible through the FORCOAST platform and the underlying data is provided homogeneously, in standard formats, whether these are the output information bulletins in image- or video-format, input source data in netCDF-format, or derived Geoserver data in WMS-format. These practices improve the overall flexibility and interoperability of the platform. Regarding the vocabulary used in the platform, no new vocabulary is introduced, making use of the standard water quality and hydrodynamic terms and variables.

Variables respect CF naming convention². An example metadata and the user variable names are shown in Annex I. Moreover, the pilot data description (Pilot, Type, Variable (CF name convention), Access (THREDDS), Example file name, Variable name (in .nc files), longitude variable name, latitude variable name, depth variable name, time variable name, WMS, Data storage size) can be found in Annex II. More details about technical specifications can be found in the Appendix of deliverable D3.8 – *Technical Specifications for Tailored Products*.

¹ Copernicus market uptake - https://cordis.europa.eu/programme/id/H2020_DT-SPACE-01-EO-2018-2020

² CF naming convention: <https://cfconventions.org/Data/cf-standard-names/29/build/cf-standard-name-table.html>

2.4 Data Reusability

Information services obtained from FORCOAST are open. However, this will only apply to the basic services and not to the 'premium' services obtained through subscription. Reuse of FORCOAST data is permitted. Users can download the information (figures, bulletins, etc) obtained from the services and they can also visualize (on the platform) the data used as input for the services.

Data quality is assured via the platform validation tasks, embedded within *Work Package 5 – Service Operationalisation, Demonstration and Validation*. The different services provide data that are validated for the different use cases, comparing it with other sources, ensuring the quality of the delivered products.

The FORCOAST platform continues to deliver information service products even after the project end-date for a period of 2 years. For this reason, up-to-date data will remain usable (and reusable) for the foreseeable future.

3 Allocation of Resources

The cost for the management of the data, the accomplishment of the FAIR principles and subsequent resources to make the appropriate data publicly accessible have been included in *Work Package 6 – Innovation Management, Exploitation and Business Planning* under OPEX costs, system maintenance as it is for its current state. Data management efforts are overseen by Deltares and led by Eigen Vermogen Van Het Instituut Voor Landbouw-En Visserijonderzoek (EV ILVO).

The economic costs associated with long term management of the platform (for 2 years) after the project completion have been allocated in the project budget. The maintained platform will provide the same functionalities that were used during the project period (see deliverable *D6.2 – Final Market Analysis*).

4 Data Security and Privacy Policy

The FORCOAST service is deployed in one of the DIAS (Data Information Access Services) platforms, CREODIAS (<https://creodias.eu/>). This allows for cloud file processing and hosting, as well as enabling a safe environment for the data (<https://creodias.eu/networking-and-security/>). Whenever possible, the CREODIAS cloud storage service is used, making the retrieval and recovery of data for the project safer and improving the accessibility of data.

This website does not process any Personal Data as meant under the GDPR. Deltares and the set-up of this website comply with GDPR. Please find the Deltares policy statement on privacy and security policy [here](#).

4.1 Privacy policy

The FORCOAST privacy policy can be found here: <https://forcoast.eu/home/privacy-policy/>. This privacy policy applies to the processing of personal data collected via this website.

This website is dedicated to the dissemination of the FORCOAST Project, which aims to develop, test and demonstrate information services that provides high resolution data of water quality at sea. Therefore the safety and confidentiality of the personal data we process are a key concern for the members of the FORCOAST consortium.



When Are Your Personal Data Collected and Used?

We collect and use your personal data whenever you:

- use our website or social media or communicate with us via e-mail, phone, or any other digital communication channel;
- register for our newsletter;

What If This Privacy Policy Does Not Answer All of Your Questions?

The data protection laws require that we provide you with information on the processing of your personal data. Should you have further questions regarding the processing of your personal data, do not hesitate to contact us, info@forcoast.eu

Who Is “We”?

Whenever you see a reference to “we” in this privacy policy, it actually refers to Deltares who manages this website within the FORCOAST Consortium:

Stichting Deltares
Boussinesqweg 1
2629 HV Delft
The Netherlands
Tel: [+31883358273](tel:+31883358273)

Deltares is **responsible** for processing your personal data as explained in this privacy policy and acts in capacity of **data controller**.

What Personal Data Do We Process, Why and On What Legal Base?

We process your personal data for the following purposes:

- When you **use our website, social media or communicate with us via phone, e-mail or other digital communication channel**, we will collect and use your personal data to:
- Enable **the communication between you and the members of the FORCOAST Consortium**, for which we rely on our **legitimate interest** to be able to respond to requests, questions or remarks or to contact you proactively for inquiries of whatever kind (e.g. when you respond to a blog, use our contact form or contact us via social media, phone, e-mail);
- **Improve the website’s** and social media pages’ content and the overall experience, for which we rely on our own **legitimate interest** to offer our visitors an interesting online space;
- **Detect and prevent** malware, illegal content and behaviour and other types of misuse, for which we rely on our **legitimate interest** to keep our online presence safe.
- When you **register for our online newsletter**, we will collect and use your personal data to be able to send you our newsletter or other electronic communications to answer questions you may have about the FORCOAST project. We will always ask for your **explicit consent** before sending you our newsletter. You will always have the opportunity to unsubscribe from our newsletter. To send you our newsletter, we only process your basic identity information, i.e. your name and e-mail address.

- For all of the personal data we have collected in the aforementioned circumstances, we wish to make it clear that we will also process your personal data to **comply with legal obligations** or to comply, insofar we are legally allowed, with any reasonable request from competent law enforcement agents or representatives, judicial authorities, governmental agencies or bodies, including competent data protection authorities.

To achieve the above-mentioned purposes, we process the following personal data:

1. the basic identity information you provide us with, such as name, e-mail address, postal address, telephone number, the company you work for, your function;
2. the content of your communication and the technical details of the communication itself (with whom you correspond at our end, date and time, etc.);
3. technical information associated with the device you use, such as your IP address, browser type, geographical location and operating system;
4. information concerning your browsing behaviour, such as how long you visit, what links you click on, what pages you visit and how many times you visit a page.
5. any other personal data you choose to provide to us.

With Whom Do We Share Your Personal Data?

In principle we will not share your personal data with anyone but the members of the FORCOAST Consortium, as well as our suppliers who help us process your personal data. Anyone who has access to your personal data will always be bound by strict legal or contractual obligations to keep your personal data safe and confidential. This means that only the following recipients will receive your personal data:

- you;
- FORCOAST Consortium members;
- our suppliers when necessary;
- governmental or judicial authorities insofar we are required to send them your personal data (e.g. police or law enforcement).

We may share your personal data with FORCOAST Project Partners situated outside of the European Economic Area (the European Economic Area consists of the EU, Liechtenstein, Norway and Iceland). If a transfer would take place, we will take adequate safeguards to protect your personal when transferred, (e.g. by putting in place standard contractual clauses as drafted by the European Commission).

How Long Do We Keep Your Personal Data?

Your personal data are only processed for as long as needed to achieve the purposes which are described above or, when we asked for your consent, up until such time when you withdraw your consent. In this article we provide you with the information you need to assess how long we will keep your personal data identifiable: As a general rule, we will de-identify your personal data when they are no longer necessary for the purposes outlined above or when the retention period as explained in this article has expired. However, we cannot de-identify your personal data if there is a legal or regulatory obligation or a judicial or administrative order that prevents us from de-identifying them.

All personal data we collect through our interactions with you via the website, social media, phone, e-mail and other digital communication channels we keep for as long as required to communicate with you, but also to keep an historical archive of our communications. This allows us to revert back to earlier communications if you return to us with new questions, request, remarks or other input.

All personal data we collect to send you our newsletter we will keep for as long as you remain subscribed to our mailing list or for as long as you remain our client.

What Do We Do to Keep Your Personal Data Safe?

As explained earlier, as a member of a consortium promoting human immunological data storage, integration and controlled sharing for a wide range of clinical and scientific purposes the security and confidentiality of all data we process is very important to us. Hence, we have taken steps to ensure that all personal data processed are kept safe. These steps include processing only the personal data required for achieving the purposes we have communicated to you. We have also taken technical and organizational measures to secure our infrastructure, systems, applications, premises and processes.

Which Rights Do You Have with Regard To Your Personal Data?

When we collect and use your personal data, you enjoy a number of rights which you can exercise in the manner described below. Please be aware that whenever you wish to exercise a right, we will ask you for a proof of identity. We do this to avoid a data breach, e.g. because an unauthorized person pretends to be you and exercises a right in your name.

- You have the right to access your personal data, which means that you can ask us to provide you information regarding the personal data we have about you. You can even ask for a copy of your personal data. However, note that you must specify for which processing activities you would like to have access to your personal data. If you make the same request repeatedly, clearly causing us nuisance, we are allowed to refuse granting you these subsequent requests or charge an administrative fee covering the expenses. We can also refuse granting you a right to access your personal data, or only grant it partially, if such access would risk disproportional detriment to the rights and freedoms of others.
- You have the right to ask that we correct your personal data if you can show that the personal data we process about you are incorrect, incomplete or outdated. Please specify the context in which we use your personal data (e.g. to send you newsletters or to respond to a request), so that we may assess your request swiftly and accurately.
- If we asked for your consent to collect and use your personal data, e.g. to send you newsletters, you have the right to withdraw that earlier given consent.
- You can ask that we delete your personal data, if these personal data are no longer needed for the purposes for which we collected them in the first place, if our collection of them was illegitimate or if you have successfully exercised your right to withdraw your consent or your right to object to the processing of your personal data. When one of these circumstances applies, we will immediately delete your personal data unless the law, regulatory obligations or administrative or judicial orders prohibit us to delete your personal data.
- You can ask that we restrict the processing of your personal data:
- during the time we are assessing your request for correction of your personal data;

- we no longer need your personal data, but you require them for the establishment, exercise or defence of a legal claim.
- when such processing was unlawful, but you prefer restriction to erasure;
- during the time we are assessing your objection to the processing of your personal data.
- When we process your personal data on the basis of our own interests, i.e. you have not given us your consent and we do not need them for the execution or performance of an agreement nor to comply with legal obligations, you have the right to oppose our processing of your personal data. When our interest relates to direct marketing, we will grant you your request immediately. For other interests, e.g. our security interests, we will ask you to describe your specific circumstances giving rise to request. We then need to balance our interests against your circumstances. If this balancing exercise results in your circumstances outweighing our interests, we will cease processing your personal data.
- When we have collected your personal data on the basis of your consent or because they were necessary for the execution or the performance of an agreement with you, you have the right to obtain a copy from us in a structured, commonly used and machine-readable format. However, this right only applies to personal data you have provided to us.

If you wish to exercise any of these rights, we ask that you send us an e-mail. You can reach us at info@forcoast.eu. Be assured that we will not interpret an e-mail from you requesting to exercise a right as your consent with any processing of your personal data beyond what is required for handling your request. A request should clearly state and specify which right you wish to exercise. Always indicate the context in which we have obtained your personal data so that we may handle your request swiftly and diligently. Your request should also be dated and signed and accompanied by a digitally scanned copy of your valid identity card proving your identity. We will promptly inform you of having received this request. If the request proves valid, we will notify you as soon as reasonably possible and at the latest thirty (30) days after having received the request. If you have any complaint regarding the processing of your personal data, you may always contact us via the e-mail address mentioned in the first paragraph of this clause. If you remain unsatisfied with our response, you may file a complaint with the competent data protection authority. The list of the European data protection authorities is available on the website of European Data Protection Board (https://edpb.europa.eu/about-edpb/board/members_en).

4.2 Cookies policy

The cookies policy can be found here: <https://forcoast.eu/home/cookies-policies/>. This cookie policy applies to the processing of personal data collected through this website, dedicated to the dissemination of the FORCOAST Project which aims to develop, test and demonstrate information services that provides high resolution data of water quality at sea. Therefore the safety and confidentiality of the personal data we process are a key concern for the member of the FORCOAST Consortium. This is why we wish to be very clear and transparent about what happens when we collect and use your personal data, in this case when we place cookies on your device and collect those cookies afterwards.

Cookies are small text files which are placed on your computer when you visit our website (<https://www.forcoast.eu/>). Cookies help us to do different things, such enabling certain features on our website or measure how visitors such as you use our website.

What If This Cookie Policy Does Not Answer All of Your Questions?



The data protection laws require that we provide you with information on the processing of your personal data. Should you have further questions regarding the processing of your personal data, do not hesitate to contact us, info@forcoast.eu

Who Is “We”?

Whenever you see a reference to “we” in this cookie policy, it actually refers to Stichting Deltares:

Stichting Deltares
 Boussinesqweg 1
 2629 HV Delft
 The Netherlands
 Tel: +31883358273

Stichting Deltares is **responsible** for collecting and using your personal data as explained in this cookie policy.

Which Cookies Do We Use and Why?

When you **use our website**, we will place the following cookies:

Table 2 Cookies for the FORCOAST website and their purpose

Name cookie	How long a cookie will remain on your device (unless you delete it)	Purpose
PHPSESSID	Session cookie	This cookie retains information pertaining to the session of the user.
_gat, _ga and _gid	2 year lifespan	These are Google Analytics cookies which allow us to measure and determine how you and other visitors use our website.

We are required to place the PHPSESSID cookies. You can not choose whether or not we use these cookies, since they are mandatory for the website to operate.

For the _gat, _ga and _gid cookies we require your prior consent.

You can give your consent by clicking the appropriate button in the cookie banner. You can withdraw your consent at any time by deleting the cookies stored in your browser. You can find more information on how to do this on the websites of the respective browser manufacturers:

With Whom Do We Share Your Personal Data?

We will not share your personal data with anyone but the member of the FORCOAST Consortium, as well as our suppliers who help us process your personal data. Anyone who has access to your personal data will always be bound by strict legal or contractual obligations to keep your personal data safe and confidential. This means that only the following recipients will receive your personal data:

1. You;
2. FORCOAST consortium members;

3. Google (you may find more information on Google's processing activities here: <https://support.google.com/analytics/answer/6004245?hl=en>).

How Long Do We Keep Your Personal Data?

Your personal data are only processed at the first moment of collection. Afterwards we immediately use the anonymization features of Google Analytics to ensure that any information collected via cookies is anonymized. Please note, however, that the `_gat`, `_ga` and `_gid` cookie remain on your device for the whole duration of the indicated lifespan (unless you delete them manually). Each time you visit our website, these cookies will be collected again.

What Do We Do to Keep Your Personal Data Safe

As explained earlier, security and confidentiality of all data we process is very important to us. We have also technical, organizational and contractual measures to ensure that our infrastructure, systems, applications, premises and processes are and remain safe.

Which Rights Do You Have with Regard To Your Personal Data?

When we collect and use your personal data, you enjoy a right of access, correction, erasure, data portability as well as restriction and opposition to processing your personal data. Note, however, that where it concerns personal data processed through cookies, we anonymize immediately. We are no longer processing any personal data, hence no rights can be granted.

If you have any complaint regarding the processing of your personal data by us, you may always contact us via the e-mail address mentioned above. If you remain unsatisfied with our response, you may file a complaint with the competent data protection authority, the list of the European data protection authorities is available on the website of European Data Protection Board (https://edpb.europa.eu/about-edpb/board/members_en). The competent authorities in Israel is the Privacy Protection Authority (https://www.gov.il/en/Departments/the_privacy_protection_authority).

4.4 Platform user agreement

The platform user agreement has to be agreed to when opening the platform (FORCOAST Platform User Agreement consent pop-up window is shown in the figure below): <https://forcoast.netlify.app/>

FORCOAST Platform (beta) User Agreement

This legal agreement (hereinafter "User Agreement") governs the conditions of use of this Open Data website and the data products (hereinafter "Data Products") to be found, accessed and downloaded through our website.

Please read this User Agreement carefully.

This is a legal agreement between you – either as individual or acting on behalf of a legal entity - and the FORCOAST Consortium (hereinafter "the Consortium"). This agreement is effective upon your submission of consent, by checking and clicking on the "I-Agree" button below.

The use of this FORCOAST Platform website (hereinafter "Website"), and the Data Products resulting from the use of therefrom, is subject to the conditions of this User Agreement as set out below.

By marking the "I agree"-checkbox:

1. You expressly declare being authorized to act, either individually or on behalf of the legal entity (hereinafter "User") you represent, for the purposes of accepting this User Agreement;
2. User expressly accepts this User Agreement and accepts to be legally bound by the terms and conditions contained therein. If you are not authorized to act on behalf of User to agree upon this User Agreement, please do not mark the "I-agree" checkbox and exit this website page. Furthermore, do not mark the "I accept" checkbox and end the visit to this website page if User does not agree with the User Agreement.

You are not allowed to use this website and its Data Products without an agreement with the FORCOAST Consortium. If you do not agree to the terms of

- I agree with the Conditions of Use
- I consent with the use of cookies

I AGREE

Figure 3. FORCOAST Platform User Agreement consent pop-up window

5 Ethical Aspects

Ethics aspects of data protection policies, regulations and procedures implemented in FORCOAST by its partners aiming to comply with the General Data Protection Regulation (GDPR), moreover procedures that will be implemented for data collection, storage, protection, retention and destruction as well as informed consent procedures collection, storage and protection of personal data can be found in *Deliverable D8.1 - POPD Requirement No.1*, which complements the present deliverable. D8.1 provides details on the following subjects:

- Ethics Management
- GDPR – General Data Protection Regulation
- Data Protection
- Security Measures
- FORCOAST Data Protection

6 Changes from Initial Data Management Plan

In *Deliverable D6.7 – Initial Data Management plan*, it was mentioned that a review of the implementation process regarding data management within FORCOAST would be provided in this deliverable.

During the implementation process, some changes to the initial plan took place. Most important of which is the use of a FORCOAST dedicated Geoserver. In the initial plan, the databases (THREDDS, CMEMS etc.) would directly be connected to the FORCOAST-platform using WMS-services. However, making connections to these various sources proved problems in some cases and complicated the interoperability goals of the platform. Instead, a Geoserver was used to subset the data to a centralized database. This offered flexibility in WMS-services like styling, but also offered more flexibility in the geographic- and temporal extent of the data. Using one centralized database also improves the interoperability and homogeneity of the data that can be visualized in the platform. Upon reflection, standardizing all aspects of data throughout all the heterogenous and distributed databases of the consortium might have been a bit too ambitious.

In the initial plan, the expected output of all the services were not clear yet. In the end, information bulletins are used as a means of communicating information to the users, as this data is easily shared with the user and can take various shapes and forms depending on the service it's based on and the information the user wants to display. This also eliminated the use of 'user accounts' in the platform, as a third-party app (Telegram) is used to share the information bulletin.

7 Annex I – Example metadata and naming conventions

Example metadata of a FORCOAST generated data file

```
netcdf file: 20221025_forcoast_2_exp.nc {
  dimensions:
    lon = 253;
    lat = 127;
    time = 24;
  variables:
    float time(time=24);
      :long_name = "time";
      :units = "seconds since 2022-01-01 00:00:00";
      :calendar = "standard";

    float lat(lat=127);
      :long_name = "latitude";
      :units = "degree";
      :coordinates = "lat";

    float lon(lon=253);
      :long_name = "longitude";
      :units = "degree";
      :coordinates = "lon";

    float analysed_sst(time=24, lat=127, lon=253);
      :long_name = "potential temperature";
      :units = "Celsius";
      :time = "time";
      :coordinates = "lon lat time";

    float salt(time=24, lat=127, lon=253);
      :long_name = "salinity";
      :units = "psu";
      :time = "time";
      :coordinates = "lon lat time";
}
```

Naming convention

	CF standard name	Common name				
Coordinates	longitude					
	latitude					
			Units	Dimension		
				Longitude	Latitude	Depth
Hydrodynamics	eastward_sea_water_velocity	Zonal Velocity	m s-1	x	x	x
	northward_sea_water_velocity	Meridional Velocity	m s-1	x	x	x
	upward_sea_water_velocity	Vertical velocity	m s-1	x	x	x
	ocean_vertical_heat_diffusivity	Vertical eddy diffusivity	m ² s-1	x	x	x
	ocean_vertical_diffusivity	Vertical eddy diffusivity	m ² s-1	x	x	x
	sea_water_temperature	Temperature	K	x	x	x
	sea_surface_temperature	Surface temperature	K	x	x	
	sea_water_temperature_at_sea_floor	Bottom temperature	K	x	x	
	sea_water_salinity	Salinity	-	x	x	x
	sea_surface_salinity	Surface salinity	-	x	x	
	sea_water_salinity_at_sea_floor	Bottom Salinity	-	x	x	
	ocean_mixed_layer_thickness_defined_by_mixing_scheme	Mixed Layer Depth	m	x	x	
	water_surface_height_above_reference_datum	Sea Water Level	m	x	x	
	turbulent_generic_length_scale	Turbulent Generic Length Scale	m ³ s-2	x	x	x
	turbulent_kinetic_energy	Turbulent Kinetic Energy	m ² s-2	x	x	x
Waves	sea_surface_wave_significant_height	significant wave height	m	x	x	
	sea_surface_wave_mean_period	mean wave period	s	x	x	
	sea_surface_wave_stokes_drift_x_velocity	Stoke Drift Zonal Velocity	m s-1	x	x	
	sea_surface_wave_stokes_drift_y_velocity	Stoke Drift Meridional Velocity	m s-1	x	x	
	sea_surface_wave_mean_period_from_variance_spectral_density_second_frequency_moment		s	x	x	
	sea_surface_wave_period_at_variance_spectral_density_maximum		s	x	x	
Bio	mass_concentration_of_chlorophyll_a_in_sea_water	Chlorophyll	kg m-3	x	x	x



	mass_concentration_of_phytoplankton_expressed_as_chlorophyll_in_sea_water	Chlorophyll	kg m-3	x	x	x
	mole_concentration_of_nitrate_in_sea_water	Nitrate	mol m-3	x	x	x
	mole_concentration_of_phosphate_in_sea_water	Phosphate	mol m-3	x	x	x
	mole_concentration_of_dissolved_molecular_oxygen_in_sea_water	Oxygen	mol m-3	x	x	x
Index	hsi_suitability_index	Species favorability	x	x	x	x
	upwelling_area	Identified upwelling events area	x			
Bathymetry	bathymetry	Depth	m	x	x	x
	sea_floor_depth_below_sea_level	Depth	m	x	x	
	land_binary_mask	Mask		x	x	
Meteorology	x_wind	Wind Velocity X	m s-1	x	x	
	y_wind	Wind Velocity Y	m s-1	x	x	
	air_pressure	atmospheric pressure	Pa	x	x	
	air_temperature	air temperature	K	x	x	
	precipitation_amount	Rain	kg m-2	x	x	
	downwelling_shortwave_flux_in_air	Solar Radiation	W m-2	x	x	



8 Annex II – Pilot data description

Pilot	Type	Variable (CF name convention)	Access (thredds)	Example file name	Variable name (in .nc files)	longitude variable name	latitude variable name	depth variable name	time variable name	WMS	Data storage size
Pilot 1 - Portugal	Model	sea_water_salinity	http://thredds.maretec.org/thredds/catalog/MOHID_WATER/LISOCEAN_0.003DEG_50L_3H/F/ORECAST/catalog.html	http://thredds.maretec.org/thredds/fileServer/MOHID_WATER/LISOCEAN_0.03DEG_50L_3H/FORECAST/2020101800.nc	long_name: sea water salinity standard_name: sea_water_salinity	lon	lat	depth	time	http://thredds.maretec.org/thredds/wms/MOHID_WATER/LISOCEAN_0.003DEG_50L_3H/F/ORECAST/2020101800.nc?service=WMS&version=1.3.0&request=GetCapabilities	265.8 Mbytes
	Model	sea_water_temperature	http://thredds.maretec.org/thredds/catalog/MOHID_WATER/LISOCEAN_0.003DEG_50L_3H/F/ORECAST/catalog.html	http://thredds.maretec.org/thredds/fileServer/MOHID_WATER/LISOCEAN_0.03DEG_50L_3H/FORECAST/2020101800.nc	long_name: sea water temperature standard_name: sea_water_temperature	lon	lat	depth	time	http://thredds.maretec.org/thredds/wms/MOHID_WATER/LISOCEAN_0.003DEG_50L_3H/F/ORECAST/2020101800.nc?service=WMS&version=1.3.0&request=GetCapabilities	265.8 Mbytes
	Model	northward_sea_water_velocity	http://thredds.maretec.org/thredds/catalog/MOHID_WATER/LISOCEAN_0.003DEG_50L_3H/F/ORECAST/catalog.html	http://thredds.maretec.org/thredds/fileServer/MOHID_WATER/LISOCEAN_0.03DEG_50L_3H/FORECAST/2020101800.nc	long_name: northward sea water velocity standard_name: northward_sea_water_velocity	lon	lat	depth	time	http://thredds.maretec.org/thredds/wms/MOHID_WATER/LISOCEAN_0.003DEG_50L_3H/F/ORECAST/2020101800.nc?service=WMS&version=1.3.0&request=GetCapabilities	265.8 Mbytes
	Model	eastward_sea_water_velocity	http://thredds.maretec.org/thredds/catalog/MOHID_WATER/LISOCEAN_0.003DEG_50L_3H/F/ORECAST/catalog.html	http://thredds.maretec.org/thredds/fileServer/MOHID_WATER/LISOCEAN_0.03DEG_50L_3H/FORECAST/2020101800.nc	long_name: eastward sea water velocity standard_name: eastward_sea_water_velocity	lon	lat	depth	time	http://thredds.maretec.org/thredds/wms/MOHID_WATER/LISOCEAN_0.003DEG_50L_3H/F/ORECAST/2020101800.nc?service=WMS&version=1.3.0&request=GetCapabilities	265.8 Mbytes



			DEG_50L_3H/FORECAST/catalog.html	03DEG_50L_3H/FORECAST/2020101800.nc	eastward_sea_water_velocity						EG_50L_3H/FORECAST/2020101800.nc?service=WMS&version=1.3.0&request=GetCapabilities	
	Model	downwelling_shortwave_flux_in_air	http://thredds.maretec.org/thredds/METEO_Catalog.html	not uploaded yet	long_name: downwelling shortwave flux in air standard_name: downwelling_shortwave_flux_in_air	lon	lat	depth	time		http://thredds.maretec.org/thredds/wms/MOHID_WATER/LIS_OCEAN_0.003DEG_50L_3H/FORECAST/2020101800.nc?service=WMS&version=1.3.0&request=GetCapabilities	not yet implemented
	Model	X_Wind	http://thredds.maretec.org/thredds/METEO_Catalog.html	not uploaded yet	long_name: x wind standard_name: x_wind	lon	lat	depth	time		http://thredds.maretec.org/thredds/wms/MOHID_WATER/LIS_OCEAN_0.003DEG_50L_3H/FORECAST/2020101800.nc?service=WMS&version=1.3.0&request=GetCapabilities	not yet implemented
	Model	Y_Wind	http://thredds.maretec.org/thredds/METEO_Catalog.html	not uploaded yet	long_name: y wind standard_name: y_wind	lon	lat	depth	time		http://thredds.maretec.org/thredds/wms/MOHID_WATER/LIS_OCEAN_0.003DEG_50L_3H/FORECAST/2020101800.nc?service=WMS&version=1.3.0&request=GetCapabilities	not yet implemented
	Model	air_pressure_at_mean_sea_level	http://thredds.maretec.org/thredds/METEO_Catalog.html	not uploaded yet	long_name: air_pressure_at_mean_sea_level standard_name:	lon	lat	depth	time		http://thredds.maretec.org/thredds/wms/MOHID_WATER/LIS_OCEAN_0.003DEG_50L_3H/FORECAST/2020101800.nc?service=WMS&version=1.3.0&request=GetCapabilities	not yet implemented



					air_pressure_at _mean_sea_level					EG 50L 3H/FO RECAST/202010 1800.nc?service =WMS&version =1.3.0&request =GetCapabilities	
	Model	precipitation		not configured yet							
Pilot 2 - Spain	Model	sea_water_temperature	http://thredds.uskoos.eu/thredds/catalog/testAll/catalog.html !	20210609 fronts_exp.nc	sst	lon	lat		Filename (yyyymmdd_fro nts_exp)		3.09 Mb
	Model	sea_water_temperature_fronts	http://thredds.uskoos.eu/thredds/catalog/testAll/catalog.html !	20210609 fronts_exp.nc	fronts_sst	lon	lat		Filename (yyyymmdd_fro nts_exp)		3.09 Mb
	Model	sea_water_temperature	http://thredds.uskoos.eu/thredds/catalog/testAll/catalog.html !	20210609 exp.nc	temp	longitude	latitude	depth	Filename (yyyymmdd_ex p)		18.1 Mb
	Model	sea_water_salinity	http://thredds.uskoos.eu/thredds/catalog/testAll/catalog.html !	20210609 exp.nc	salt	longitude	latitude	depth	Filename (yyyymmdd_ex p)		18.1 Mb
	Model	northward_sea_water_velocity	http://thredds.uskoos.eu/thredds/catalog/testAll/catalog.html !	20210609 exp.nc	u	longitude	latitude	depth	Filename (yyyymmdd_ex p)		18.1 Mb
	Model	eastward_sea_water_velocity	http://thredds.uskoos.eu/thredds/catalog/testAll/catalog.html !	20210609 exp.nc	v	longitude	latitude	depth	Filename (yyyymmdd_ex p)		18.1 Mb
	Remote sensing	mass_concentration_of_chlorophyll_a_in_sea_water	CMEMS OCEANCOLOUR GLO_CHL_L4		mass_concentration_of_chlorophyll_a_in_sea_water						

			NRT OBSERVATIONS_009_033								
	Remote sensing	potential_temperature	CMEMS SST_GLO_SST_L4_NRT_OBSERVATIONS_010_001		sea_surface_temperature						
Pilot 3 - Bulgaria	Model	upwelling_area	No operational delivery								
	Remote sensing	hsi_suitability_index	No operational delivery	20180606_hsi.tif	hsi_suitability_index	lon	lat	surface	Filename(yyyyymmdd_hsi.tif)		3 Mb
	Model	sea_surface_wave_significant_height	No operational delivery	20191002_h-HZG--WAVES-BSeas3-BS-b2020*.nc		lon	lat	surface			
	Model	sea_surface_wave_mean_period	No operational delivery	20191002_h-HZG--WAVES-BSeas3-BS-b2020*.nc		lon	lat	surface			
	Model	batymetry	No operational delivery	Black_Sea_EMO_DNET.tif				depth	timeless	https://portal.e-modnet-bathymetry.eu/	630 Kb
	Model	sea_surface_salinity	Operational delivery	sv03_bs_cmcc_sal_an_fc_d_20191002.nc	sea_surface_salinity			surface	Filename(sv03_bs_cmcc_sal_an_fc_d_yyyymmdd.nc)	https://my.cmes-du.eu/thredds/wms/bs-cmcc-sal-rean-d	150 kb
	Model	sea_surface_temperature	Operational delivery	sv03_bs_cmcc_tem_an_fc_d_20191002.nc	sea_water_potential_temperature			surface	Filename(sv03_bs_cmcc_tem_an_fc_d_yyyymmdd.nc)	https://my.cmes-du.eu/thredds/wms/bs-cmcc-tem-rean-d	150 kb
Pilot 4 - Belgium	Model	sea_surface_temperature	https://erddap.naturalsciences.be/erddap/griddap/NOS_HydroState_V1.html	NOS_HydroState_V1_6819_7b73_04cc.* (free outputformat: nc, txt, csv, ...)	sea_surface_temperature,	Lon	Lat	surface	Time		depending on erddap variables requested
	Model	sea_surface_salinity	https://erddap.naturalsciences.be/erddap/grid		sea_surface_salinity	Lon	Lat	surface	Time		depending on erddap variables requested

			dap/NOS_Hydro_State_V1.html								
	Model	eastward_sea_water_velocity	https://erddap.naturalsciences.be/erddap/griddap/NOS_Hydro_State_V1.html		bottom_baroclinic_eastward_sea_water_velocity surface_baroclinic_eastward_sea_water_velocity	Lon	Lat	surface and bottom	Time		depending on erddap variables requested
	Model	northward_sea_water_velocity	https://erddap.naturalsciences.be/erddap/griddap/NOS_Hydro_State_V1.html		bottom_baroclinic_northward_sea_water_velocity surface_baroclinic_northward_sea_water_velocity	Lon	Lat	surface and bottom	Time		depending on erddap variables requested
	Model	upward_sea_water_velocity	http://milas.marinie.ie/thredds/catalog/IMI_ROMS_HYDRO/GALWAY_BAY_NATIVE_70M_8L_1H/ANALYSIS/catalog.html		bottom_upward_sea_water_velocity surface_upward_sea_water_velocity	Lon	Lat	surface and bottom	Time		depending on erddap variables requested
	Model	sea_surface_wave_significant_height	https://erddap.naturalsciences.be/erddap/griddap/WAM_ECMWF.html and https://erddap.naturalsciences.be/erddap/griddap/WAM_UKMO.html	WAM_ECMWF_d61b_a29e_1c27.* (free outputformat: nc, txt, csv, ...) or WAM_UKMO_d61b_a29e_1c27.* depending if wind forcing came from ECMWF or UKMO	hs	Lon	Lat	na	Time		depending on erddap variables requested
	Model	sea_surface_wave_mean_period	https://erddap.naturalsciences.be/erddap/griddap/WAM_ECMWF.html	WAM_ECMWF_d61b_a29e_1c27.* (free outputformat:	tm_1	Lon	Lat	na	Time		depending on erddap variables requested



			WF.html and https://erddap.naturalsciences.be/erddap/griddap/WAM_UKMO.html	nc, txt, csv, ...) or WAM_UKMO_d61b_a29e_1c27.* depending if wind forcing came from ECMWF or UKMO							
Pilot 5 - Galway	Model	eastward_sea_water_velocity	http://milas.marine.ie/thredds/catalog/IMI_ROMS_HYDRO/GALWAY_BAY_NATIVE_70M_8L_1H/ANALYSIS/catalog.html		u	lon_u	lat_u	z_u	ocean_time		48.6 Mb
	Model	northward_sea_water_velocity	http://milas.marine.ie/thredds/catalog/IMI_ROMS_HYDRO/GALWAY_BAY_NATIVE_70M_8L_1H/ANALYSIS/catalog.html		v	lon_v	lat_v	z_v	ocean_time		48.6 Mb
	Model	upward_sea_water_velocity	http://milas.marine.ie/thredds/catalog/IMI_ROMS_HYDRO/GALWAY_BAY_NATIVE_70M_8L_1H/ANALYSIS/catalog.html		w	lon_rho	lat_rho	z_w	ocean_time		48.6 Mb
	Model	sea_water_temperature	http://milas.marine.ie/thredds/catalog/IMI_ROMS_HYDRO/GALWAY_BAY_NATIVE_70M_8L_1H/ANALYSIS/catalog.html		temp	lon_rho	lat_rho	z_rho	ocean_time		48.6 Mb
	Model	sea_water_salinity	http://milas.marine.ie/thredds/catalog/IMI_ROMS_HYDRO/GALWAY_BAY_NATIVE_70M_8L_1H/ANALYSIS/catalog.html		salt	lon_rho	lat_rho	z_rho	ocean_time		48.6 Mb





			M_8L_1H/ANALYSIS/catalog.html								
	Remote sensing	sea_water_turbidity	CMEMS OCEANCOLOUR _NWS_BGC_HR _L4_NRT_009_2 09		TUR	lon	lat		time		
	Remote sensing	mass_concentration_of_suspended_matter_in_sea_water	CMEMS OCEANCOLOUR _NWS_BGC_HR _L4_NRT_009_2 09		SPM	lon	lat		time		
	Remote sensing	mass_concentration_of_chlorophyll_a_in_sea_water	CMEMS OCEANCOLOUR _NWS_BGC_HR _L4_NRT_009_2 09		CHL	lon	lat		time		
Pilot 6 - Denmark (HBM)	Model (Harmonie) interpolated	eastward_wind	ftp://forcoast@ftp.dmi.dk	outgoing/lim_hr_nest_wsid2021_061712.nc	uwind	lon	lat		time		520 MB
	Model (Harmonie) interpolated	northward_wind	ftp://forcoast@ftp.dmi.dk	outgoing/lim_hr_nest_wsid2021_061712.nc	vwind	lon	lat		time		520 MB
	Model	sea_surface_elevation	ftp://forcoast@ftp.dmi.dk	outgoing/lim_hr_nest_wsid2021_061712.nc	elev	lon	lat		time		520 MB
	Model	sea_ice_area_fraction	ftp://forcoast@ftp.dmi.dk	outgoing/lim_hr_nest_wsid2021_061712.nc	ice_cov	lon	lat		time		520 MB
	Model	sea_ice_thickness	ftp://forcoast@ftp.dmi.dk	outgoing/lim_hr_nest_wsid2021_061712.nc	ice_thk	lon	lat		time		520 MB
	Model	eastward_sea_water_velocity	ftp://forcoast@ftp.dmi.dk	outgoing/lim_hr_nest_wsid2021_061712.nc	uvel	lon	lat	depth	time		520 MB
	Model	nothward_sea_water_velocity	ftp://forcoast@ftp.dmi.dk	outgoing/lim_hr_nest_wsid2021_061712.nc	vvel	lon	lat	depth	time		520 MB
	Model	sea_water_salinity	ftp://forcoast@ftp.dmi.dk	outgoing/lim_hr_nest_wsid2021_061712.nc	salt	lon	lat	depth	time		520 MB



	Model	sea_water_temperature	ftp://forcoast@ftp.dmi.dk	outgoing/lim_hr_nest_wsids2021061712.nc	temp	lon	lat	depth	time		520 MB
	Model	sea_water_temperature_at_sea_floor	sharepoint AU	not uploaded yet	temp	lon	lat	bottom	time		not yet implemented
	Model	sea_water_salinity_at_sea_floor	sharepoint AU	not uploaded yet	salt	lon	lat	bottom	time		not yet implemented
	Model	Bottom stress	sharepoint AU	not uploaded yet	stress	lon	lat	bottom	time		not yet implemented
	Model	mass_concentration_of_chlorophyll_a_in_sea_water	sharepoint AU	not uploaded yet	chl_a	lon	lat	bottom	time		not yet implemented
	Model	mole_concentration_of_dissolved_molecular_oxygen_in_sea_water	sharepoint AU	not uploaded yet	oxygen	lon	lat	bottom	time		not yet implemented
	Model	mass_concentration_of_detritus_in_sea_water	sharepoint AU	not uploaded yet	detritus	lon	lat	bottom	time		not yet implemented
Pilot 7 - Romania	Model	eastward_sea_water_velocity	http://seamod.ro:8080/thredds/catalog/PHY/catalog.html	http://seamod.ro:8080/thredds/fileServer/PHY/2020/12/2_EFO_RIE_1h_20201201_20201231_grid_U_20201203-20201203.nc	vozocrtx	nav_lon	nav_lat	depthu	time_centered	seamod.ro:8080/thredds/wms/PHY/2021/04/1_NWS_1h_20210401_20210430_grid_T_20210401-20210401.nc?service=WMS&version=1.3.0&request=GetCapabilities	37 Mb
	Model	northward_sea_water_velocity	http://seamod.ro:8080/thredds/catalog/PHY/catalog.html	http://seamod.ro:8080/thredds/fileServer/PHY/2020/12/2_EFO_RIE_1h_20201201_20201231_grid_V_20201203-20201203.nc	vomecrtx	nav_lon	nav_lat	depthv	time_centered	seamod.ro:8080/thredds/wms/PHY/2021/04/1_NWS_1h_20210401_20210430_grid_T_20210401-20210401.nc?se	37 Mb



										rvice=WMS&version=1.3.0&request=GetCapabilities	
Model	upward_sea_water_velocity	http://seamod.ro:8080/thredds/catalog/PHY/catalog.html	http://seamod.ro:8080/thredds/fileServer/PHY/2020/12/2_EFORIE_1h_20201201_20201231_grid_W_20201203-20201203.nc	vovecrtz	nav_lon	nav_lat	depthw	time_centered	seamod.ro:8080/thredds/wms/PHY/2021/04/1_NWS_1h_20210401_20210430_grid_W_20210401-20210401.nc?service=WMS&version=1.3.0&request=GetCapabilities	72 Mb	
Model	ocean_vertical_heat_diffusivity	http://seamod.ro:8080/thredds/catalog/PHY/catalog.html	http://seamod.ro:8080/thredds/fileServer/PHY/2020/12/2_EFORIE_1h_20201201_20201231_grid_W_20201203-20201203.nc	votkeavt	nav_lon	nav_lat	depthw	time_centered	seamod.ro:8080/thredds/wms/PHY/2021/04/1_NWS_1h_20210401_20210430_grid_W_20210401-20210401.nc?service=WMS&version=1.3.0&request=GetCapabilities	72 Mb	
Model	sea_water_temperature	http://seamod.ro:8080/thredds/catalog/PHY/catalog.html	http://seamod.ro:8080/thredds/fileServer/PHY/2020/12/2_EFORIE_1h_20201201_20201231_grid_T_20201203-20201203.nc	votemper	nav_lon	nav_lat	deptht	time_centered	seamod.ro:8080/thredds/wms/PHY/2021/04/1_NWS_1h_20210401_20210430_grid_T_20210401-20210401.nc?service=WMS&version=1.3.0&request=GetCapabilities	64 Mb	
Model	sea_water_salinity	http://seamod.ro:8080/thredds/catalog/PHY/catalog.html	http://seamod.ro:8080/thredds/fileServer/PHY/2020/12/2_EFORIE_1h_20201201_20201231_grid_S_20201203-20201203.nc	vosaline	nav_lon	nav_lat	deptht	time_centered	seamod.ro:8080/thredds/wms/PHY/2021/04/1_NWS_1h_20210401_20210430_grid_S_20210401-20210401.nc?service=WMS&version=1.3.0&request=GetCapabilities	64 Mb	



				RIE_1h_20201201_20201231_grid_T_20201203-20201203.nc						0401_20210430_grid_T_20210401-20210401.nc?service=WMS&version=1.3.0&request=GetCapabilities	
	Model	sea_surface_wave_significant_height	ftp://nrt.cmems-du.eu/Core/BLK_SEA_ANALYSISFORECAST_WAV_007_003/bs-hzg-wav-an-fc-h/	VHM0	lon	lat		time	https://nrt.cmems-du.eu/thredds/wms/bs-hzg-wav-an-fc-h	138 Mb	
	Model	sea_surface_wave_mean_period	ftp://nrt.cmems-du.eu/Core/BLK_SEA_ANALYSISFORECAST_WAV_007_003/bs-hzg-wav-an-fc-h/	VTM10	lon	lat		time	https://nrt.cmems-du.eu/thredds/wms/bs-hzg-wav-an-fc-h	138 Mb	



	Model	sea_surface_wave_stokes_drift_x_velocity	ftp://nrt.cmems-du.eu/Core/BLK_SEA_ANALYSISFORECAST_WAV_007_003/bs-hzg-wav-an-fc-h/2021/05/20210501_h-HZG--WAVES-BSeas3-BS-b20210501_sm-sv07.00.nc	ftp://nrt.cmems-du.eu/Core/BLK_SEA_ANALYSISFORECAST_WAV_007_003/bs-hzg-wav-an-fc-h/2021/05/20210501_h-HZG--WAVES-BSeas3-BS-b20210501_sm-sv07.00.nc	VSDX	lon	lat		time	https://nrt.cmems-du.eu/thredds/wms/bs-hzg-wav-an-fc-h	138 Mb
	Model	sea_surface_wave_stokes_drift_y_velocity	ftp://nrt.cmems-du.eu/Core/BLK_SEA_ANALYSISFORECAST_WAV_007_003/bs-hzg-wav-an-fc-h/2021/05/20210501_h-HZG--WAVES-BSeas3-BS-b20210501_sm-sv07.00.nc	ftp://nrt.cmems-du.eu/Core/BLK_SEA_ANALYSISFORECAST_WAV_007_003/bs-hzg-wav-an-fc-h/2021/05/20210501_h-HZG--WAVES-BSeas3-BS-b20210501_sm-sv07.00.nc	VSDY	lon	lat		time	https://nrt.cmems-du.eu/thredds/wms/bs-hzg-wav-an-fc-h	138 Mb
	Remote sensing	sea_surface_temperature	ftp://nrt.cmems-du.eu/Core/SST_BS_SST_L4_NRT_OBSERVATIONS_010_006/SST_BS_SST_L4_NRT_OBSERVATIONS_010_006_c_V2	ftp://nrt.cmems-du.eu/Core/SST_BS_SST_L4_NRT_OBSERVATIONS_010_006/SST_BS_SST_L4_NRT_OBSERVATIONS_010_006_c_V2	analysed_sst	lon	lat		time	https://nrt.cmems-du.eu/thredds/wms/SST_BS_SST_L4_NRT_OBSERVATIONS_010_006_c_V2	14 Mb





			ONS_010_006_c_V2	ONS_010_006_c_V2/2020/12/20201203000000-0-GOS-L4_GHRSSST-SSTfnd-OISST_UHR_NRT-BLK-v02.0-fv02.0.nc							
	Remote sensing	mass_concentration_of_chlorophyll_a_in_sea_water	ftp://nrt.cmems-du.eu/Core/OCEANCOLOUR_BS_CHL_L4_NRT_OBSERVATIONS_09_045/dataset-oc-bs-chl-multi-l4-interp_1km_daily-rt-v02	ftp://nrt.cmems-du.eu/Core/OCEANCOLOUR_BS_CHL_L4_NRT_OBSERVATIONS_09_045/dataset-oc-bs-chl-multi-l4-interp_1km_daily-rt-v02/2020/12/2021203_d-OC_CNRL4-CHL-INTERP_MULTI_1KM-BS-DT-v02.nc						https://nrt.cmems-du.eu/thredds/wms/dataset-oc-bs-chl-multi-l4-interp_1km_daily-rt-v02	1.4 Mb
Pilot 8 - Italy	Model	eastward_sea_water_velocity	https://dsecho.inogs.it/thredds/catalog/testForecast/catalog.html		U	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	northward_sea_water_velocity	https://dsecho.inogs.it/thredds/catalog/testForecast/catalog.html		V	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	upward_sea_water_velocity	https://dsecho.inogs.it/thredds/catalog/testForecast/catalog.html		W	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)



	Model	ocean_vertical_heat_diffusivity	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		diff_KzT	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	ocean_vertical_salt_diffusivity	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		diff_KzS	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	sea_water_temperature	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		T	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	sea_surface_temperature	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		SST	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	sea_water_salinity	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		S	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	sea_surface_salinity	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		SSS	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	ocean_mixed_layer_thickness_defined_by_mixing_scheme	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		mld	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	mass_concentration_of_phytoplankton_expressed_as_chlorophyll_in_sea_water	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		PI	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)

	Model	mole_concentration_of_nitrate_in_sea_water	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		N3n	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	mole_concentration_of_phosphate_in_sea_water	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		N1p	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Model	mole_concentration_of_dissolved_molecular_oxygen_in_sea_water	https://dsecho.inogs.it/thredds/catalog/testForcoast/catalog.html		O2o	lon	lat	depth (cell center)	time		16 MB (to be compressed into NetCDF4)
	Remote sensing	sea_surface_temperature (L4)	ftp-gos.artov.isac.cnr.it	20210223_sst_l4_1km.nc	sea_surface_temperature	lon	lat		time		250 KB (to be compressed into NetCDF4)
	Remote sensing	sea_surface_temperature (L3)	ftp-gos.artov.isac.cnr.it	20210223_sst_l3_1km.nc	sea_surface_temperature	lon	lat		time		250 KB (to be compressed into NetCDF4)
	Remote sensing	mass_concentration_of_chlorophyll_a_in_sea_water	ftp-gos.artov.isac.cnr.it	20210223_oc_l3_300m.nc	CHL	lon	lat		time		3000 KB (to be compressed into NetCDF4)

9 Annex III – GeoServer data layers

Pilot	Source	Layers	Original data product
1. Sado Estuary	CMEMS	pilot_1_CMEMS_chl	cmems_mod_ibi_bgc_anfc_0.027deg-3D_P1D-m
1. Sado Estuary	CMEMS	pilot_1_CMEMS_east_v	global-analysis-forecast-phy-001-024
1. Sado Estuary	CMEMS	pilot_1_CMEMS_nh4	cmems_mod_ibi_bgc_anfc_0.027deg-3D_P1D-m
1. Sado Estuary	CMEMS	pilot_1_CMEMS_north_v	global-analysis-forecast-phy-001-024
1. Sado Estuary	CMEMS	pilot_1_CMEMS_oxy	cmems_mod_ibi_bgc_anfc_0.027deg-3D_P1D-m
1. Sado Estuary	CMEMS	pilot_1_CMEMS_po4	cmems_mod_ibi_bgc_anfc_0.027deg-3D_P1D-m
1. Sado Estuary	Maretec THREDDS	Sado_Estuary_v2_salinity	Latest.nc
1. Sado Estuary	Maretec THREDDS	Sado_Estuary_v2_ssh	Latest.nc

1. Sado Estuary	Maretec THREDDS	Sado_Estuary_v2_temperature	Latest.nc
1. Sado Estuary	Maretec THREDDS	Sado_Estuary_wind_modulus	Latest.nc
1. Sado Estuary	Maretec THREDDS	Sado_Estuary_x_wind	Latest.nc
1. Sado Estuary	Maretec THREDDS	Sado_Estuary_y_wind	Latest.nc
1. Bay of Biscay	CMEMS	pilot_2_CMEMS_chl_v2	cmems_mod_ibi_phy_anfc_0.027deg-3D_PT1H-m
1. Bay of Biscay	CMEMS	pilot_2_CMEMS_east_v	cmems_mod_ibi_phy_anfc_0.027deg-3D_PT1H-m
1. Bay of Biscay	CMEMS	pilot_2_CMEMS_north_v	cmems_mod_ibi_phy_anfc_0.027deg-3D_PT1H-m
1. Bay of Biscay	CMEMS	pilot_2_CMEMS_swpt	cmems_mod_ibi_phy_anfc_0.027deg-3D_PT1H-m
1. Bay of Biscay	CMEMS	pilot_2_CMEMS_sws	cmems_mod_ibi_phy_anfc_0.027deg-3D_PT1H-m
1. Bay of Biscay	CMEMS	pilot_2_CMEMS_zos	cmems_mod_ibi_phy_anfc_0.027deg-2D_PT1H-m
1. Bay of Biscay	EuskOOS THREDDS	Bay_of_Biscay_sst	(YYYYmdd)_fronts_exp.nc
1. Bay of Biscay	Service Module	Bay_of_Biscay_fronts_sst	Service Module F2
1. Bay of Biscay	Service Module	biscay_fronts_chl	Service Module F2
3. Black Sea BG	Service Module	HSI_Whiting	Service module F1
3. Black Sea BG	CMEMS	pilot_3_CMEMS_sst	SST_BS_SST_L4_NRT_OBSERVATIONS_010_006_c_V2
3. Black Sea BG	CMEMS	pilot_3_CMEMS_east_v	bs-cmcc-cur-an-fc-d
3. Black Sea BG	CMEMS	pilot_3_CMEMS_north_v	bs-cmcc-cur-an-fc-d
3. Black Sea BG	CMEMS	pilot_3_CMEMS_swpt	bs-cmcc-cur-an-fc-d
3. Black Sea BG	CMEMS	pilot_3_CMEMS_sws	bs-cmcc-cur-an-fc-d
3. Black Sea BG	CMEMS	pilot_3_CMEMS_wave_drift_x	cmems_mod_blk_wav_anfc_2.5km_PT1H-i
3. Black Sea BG	CMEMS	pilot_3_CMEMS_wave_drift_y	cmems_mod_blk_wav_anfc_2.5km_PT1H-i
3. Black Sea BG	CMEMS	pilot_3_CMEMS_wave_mean_per	cmems_mod_blk_wav_anfc_2.5km_PT1H-i
3. Black Sea BG	CMEMS	pilot_3_CMEMS_wave_sig	cmems_mod_blk_wav_anfc_2.5km_PT1H-i
3. Black Sea BG	CMEMS	pilot_3_CMEMS_zos	bs-cmcc-ssh-an-fc-d
4. North Sea	RBINS ERDDAP	pilot_4_ERDAPP_north_v_v2	NOS_HydroState
4. North Sea	RBINS ERDDAP	pilot_4_ERDAPP_east_v_v2	NOS_HydroState
5. Galway Bay	M. Institute THREDDS	Galway_Bay_forecast_temp	galway_bay_(YYYYmddHH)_FC.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_forecast_salt	galway_bay_(YYYYmddHH)_FC.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_forecast_u	galway_bay_(YYYYmddHH)_FC.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_forecast_temp	galway_bay_(YYYYmddHH)_FC.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_forecast_w	galway_bay_(YYYYmddHH)_FC.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_forecast_zeta	galway_bay_(YYYYmddHH)_FC.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_analysis_temp	galway_bay_(YYYYmddHH)_AN.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_analysis_salt	galway_bay_(YYYYmddHH)_AN.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_analysis_u	galway_bay_(YYYYmddHH)_AN.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_analysis_v	galway_bay_(YYYYmddHH)_AN.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_analysis_w	galway_bay_(YYYYmddHH)_AN.nc
5. Galway Bay	M. Institute THREDDS	Galway_Bay_analysis_zeta	galway_bay_(YYYYmddHH)_AN.nc

6. Limfjord	DMI FTP	limfjord_elev	ftp://forcoast@ftp.dmi.dk/outgoing/
6. Limfjord	DMI FTP	limfjord_salt	ftp://forcoast@ftp.dmi.dk/outgoing/
6. Limfjord	DMI FTP	limfjord_temp	ftp://forcoast@ftp.dmi.dk/outgoing/
6. Limfjord	DMI FTP	limfjord_uvel	ftp://forcoast@ftp.dmi.dk/outgoing/
6. Limfjord	DMI FTP	limfjord_vvel	ftp://forcoast@ftp.dmi.dk/outgoing/
6. Limfjord	DMI FTP	limfjord_uwind	ftp://forcoast@ftp.dmi.dk/outgoing/
6. Limfjord	DMI FTP	limfjord_vwind	ftp://forcoast@ftp.dmi.dk/outgoing/
7. Black Sea RO	CMEMS	pilot_7_CMEMS_chl_v2	bs-ulg-pft-an-fc-d
7. Black Sea RO	CMEMS	pilot_7_CMEMS_no3	bs-ulg-nut-an-fc-d
7. Black Sea RO	CMEMS	pilot_7_CMEMS_oxy	bs-ulg-bio-an-fc-d
7. Black Sea RO	CMEMS	pilot_7_CMEMS_ph	bs-ulg-car-an-fc-d
7. Black Sea RO	CMEMS	pilot_7_CMEMS_wave_drift_x	cmems_mod_blk_wav_anfc_2.5km_PT1H-i
7. Black Sea RO	CMEMS	pilot_7_CMEMS_wave_drift_y	cmems_mod_blk_wav_anfc_2.5km_PT1H-i
7. Black Sea RO	CMEMS	pilot_7_CMEMS_wave_mean_per	cmems_mod_blk_wav_anfc_2.5km_PT1H-i
7. Black Sea RO	CMEMS	pilot_7_CMEMS_wave_sig	cmems_mod_blk_wav_anfc_2.5km_PT1H-i
7. Black Sea RO	CMEMS	pilot_7_CMEMS_zos	bs-cmcc-ssh-an-fc-d
7. Black Sea RO	Seamod.ro THREDDSS	Eforie_bay_T_vosaline	2_EFORIE_1h_grid_T_(YYYYmmdd).nc
7. Black Sea RO	Seamod.ro THREDDSS	Eforie_bay_T_votemper	2_EFORIE_1h_grid_T_(YYYYmmdd).nc
7. Black Sea RO	Seamod.ro THREDDSS	Eforie_bay_U_vozocrtx	2_EFORIE_1h_grid_U_(YYYYmmdd).nc
7. Black Sea RO	Seamod.ro THREDDSS	Eforie_bay_V_vomecrtz	2_EFORIE_1h_grid_V_(YYYYmmdd).nc
7. Black Sea RO	Seamod.ro THREDDSS	Eforie_bay_W_vovecrtz	2_EFORIE_1h_grid_W_(YYYYmmdd).nc
8. Northern Adriatic	OGS THREDDSS	northernadriatic_thetao	(YYYYmmdd)_fronts_exp.nc
8. Northern Adriatic	Service Module	northernadriatic_fronts_sst	Service module F2
8. Northern Adriatic	Service Module	northernadriatic_fronts_chl	Service module F2
8. Northern Adriatic	CMEMS	pilot_8_CMEMS_chl	med-ogs-pft-an-fc-d
8. Northern Adriatic	CMEMS	pilot_8_CMEMS_east_v	med-cmcc-cur-an-fc-d
8. Northern Adriatic	CMEMS	pilot_8_CMEMS_north_v	med-cmcc-cur-an-fc-d
8. Northern Adriatic	OGS THREDDSS	Northern_Adriatic_sea_hindercast_thetao	(YYYYmmdd)_h-OGS--TEMP-MITgcmBFM-pilot8-b(YYYYmmdd_T0)_sm-v01.nc
8. Northern Adriatic	OGS THREDDSS	Northern_Adriatic_sea_forecast_thetao	(YYYYmmdd)_h-OGS--TEMP-MITgcmBFM-pilot8-b(YYYYmmdd_T0)_fc-v01.nc