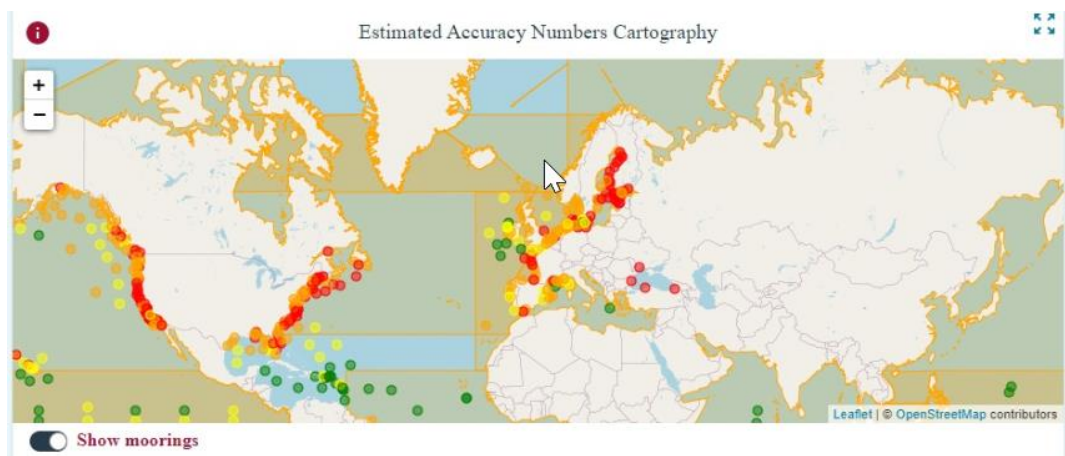


Purchase specifications for additional developments for the website called Copernicus Marine Service “Product Quality Dashboard PQD”

Contract n° 176-ADD-DEVL-PQD-CMEMS

Deadline for the receipt of bids:

26th of October 2020 at 16:00 (Paris time)



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1 ABOUT: MERCATOR OCEAN & THE COPERNICUS MARINE SERVICE, AND NEED FOR AN IMPROVED PRODUCT QUALITY WEBSITE

Mercator Ocean designs, develops and runs forecasting systems based on ocean numerical modelling fed by ocean observations, to describe the physical and biogeochemical states of the ocean at any time, above and beneath the surface, at global and regional scales. This enables Mercator Ocean to deliver a highly qualified and customized oceanographic service, adapted to any user needing to receive regular or one-off ocean information in specific area at the right time, delivering tailor-made products, maps, or expertise.

Mercator Ocean company is owned by nine major players in operational oceanography worldwide: CMCC (Centro Euro-Mediterraneo sui Cambiamenti Climatici), CNRS (French National Centre of Scientific Research), Ifremer (French Research Institute for Exploitation of the Sea), IRD (Institute of Research for Development), Météo-France, NERSC (Nansen Environmental and Remote Sensing Center), Puertos Del Estado, SHOM (Hydrographic and Oceanographic Service of the French Navy) and UK Met-Office.

In 2014, Mercator Ocean was entrusted by the European Commission to implement the Copernicus Marine Service (also referred to as CMEMS). The Copernicus Programme is the flagship Earth observation and monitoring programme of the European Union, funded by the European Commission. It aims to achieve an autonomous and operational Earth observation capacity (space and in-situ observation infrastructure) and to operate six different services: marine, atmosphere, land and climate change monitoring, together with support for emergency and security services. As part of the Copernicus Marine Service, Mercator Ocean disseminates observational and model products through a unique webportal. Useful information on the scientific quality of these products such as error levels for observations, or reliability of the forecasts, has to be displayed in a consistent and effective way on this website. To this aim, a new product quality website called “Product Quality Dashboard” was developed starting end 2019. **The following specifications relate to additional developments, which are necessary to improve the functionalities and look and feel of the website before its final implementation in December 2020.**

2 SERVICE REQUIRED

2.1 SUMMARY AND HIGH LEVEL REQUIREMENTS

The present document provides high-level specifications for a series of improvements to implement into a new product quality website for the Copernicus Marine Service to be implemented end of 2020, which is called hereafter “Product Quality Dashboard” (PQD).

- DR1: current CMEMS validation website :
<http://marine.copernicus.eu/services-portfolio/scientific-quality/>
- DR2: official style guide for the CMEMS website under DRUPAL
<https://projects.invisionapp.com/share/9TRJUC1Y7KG#/screens/358199173>
- DR3: short documentation/description of the Product Quality Dashboard frontend
<https://atlas.mercator-ocean.fr/s/KkPL7qttPGnsxd7>

The idea of the website is that it will provide **by default a regional and/or thematic view on the scientific quality of CMEMS catalogue products**. This quality information is displayed as time series of various scores.

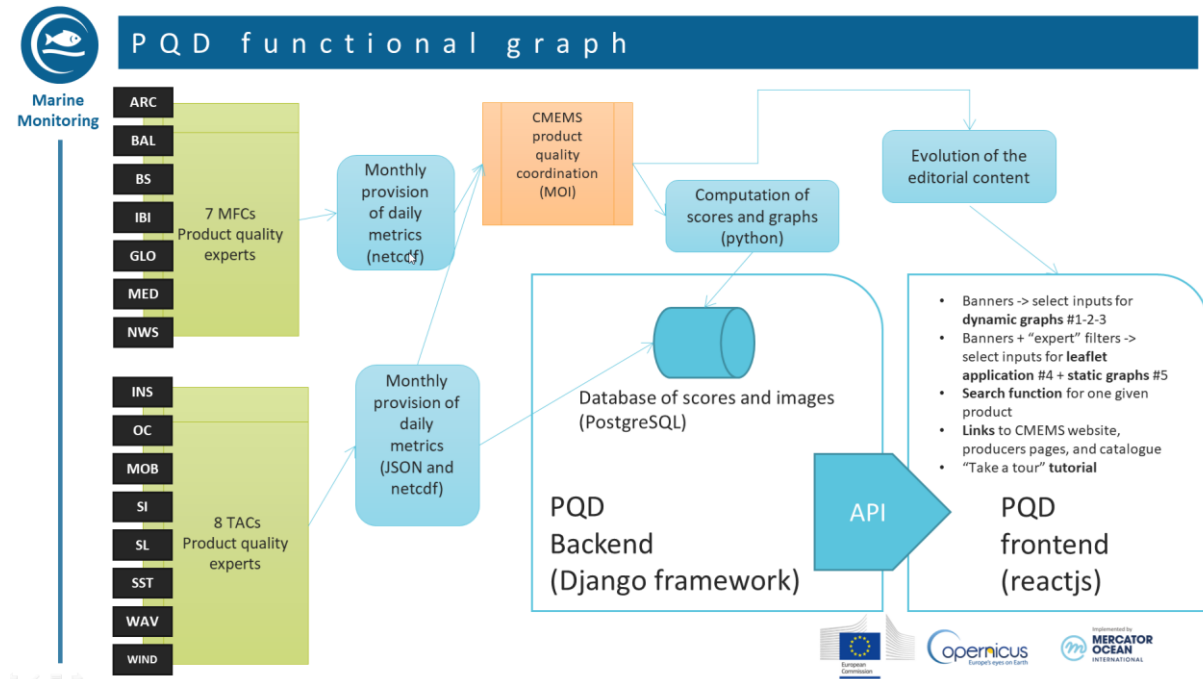
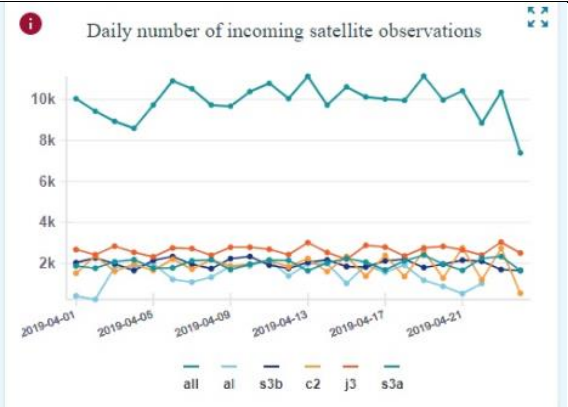
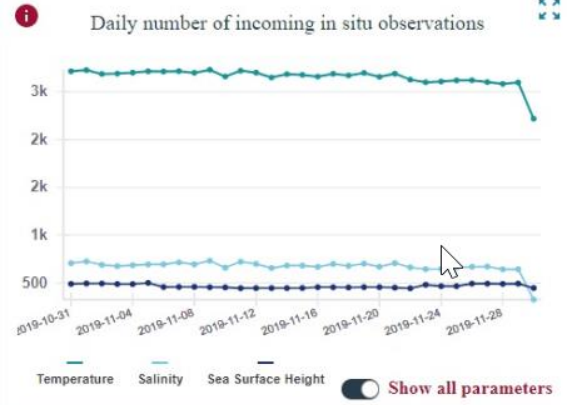

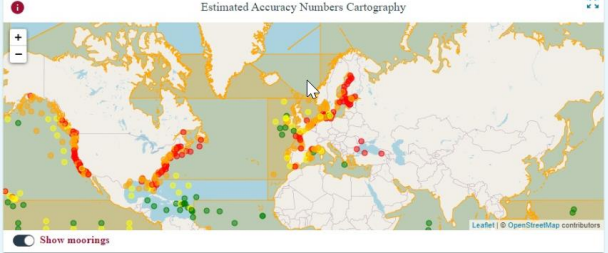


Figure 1 : schematic view of the architecture and main functions of the Product Quality Dashboard, see also Table 1

Hence, the website allows to display a number of scores using various tools: banners, filters, dynamic or static plots, leaflet map, search function. Contextual and explanatory text is available for each graph ((i) logo in the upper left corner), and a "take a tour" tutorial is available.

The main architectural features of the PQD are described in Figure 1 and Table 1. See also DR3 for more technical details about the frontend. Some backend and frontend evolutions are necessary, which will be split in 3 separate tasks. The inputs for the backend are provided by Mercator Ocean, after collection from 15 different production centers. Hence the verification of input files is a very important stage of the processing, which needs some consolidation, and for which developments are planned in Task1.

description	Illustration	Type of plot/input	Controlled by
Generic metric #1 : number of satellite observations in a given region, for a family of parameters or a single parameter		Dynamic reactjs plot /Database of scores	Regions banner Blue/white/green filters Parameter filter
Generic metric #2 : number of satellite observations in a given region, for a family of parameters or a single parameter		Dynamic reactjs plot /Database of scores	Regions banner Blue/white/green filters Parameter filter
Generic metric #3 : number of satellite observations in a given region, for a family of parameters or a single parameter		Dynamic reactjs plot /Database of scores	Regions banner Blue/white/green filters Parameter filter
Expert metric #4 : leaflet map which displays scores on a large area (shaded)+ time series at specific locations (color dots). Click on a dot and display the time series at		Leaflet app / database of images	Regions banner Blue/white/green filters Parameter filter Expert filters

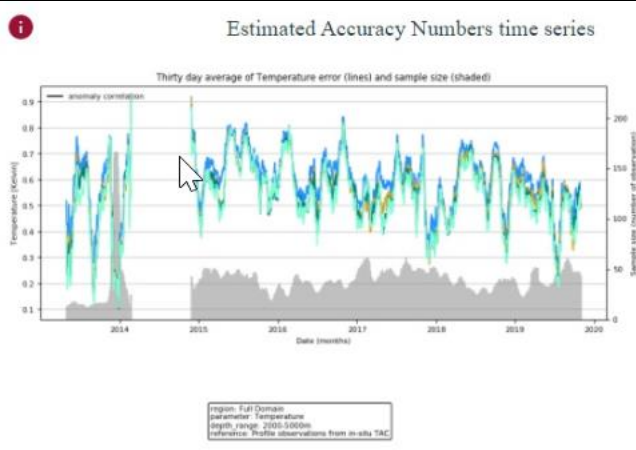
this location			
Expert metric #5 : display time series of expert metrics computed over large areas shown on the map #4		Static plot / database of images	Regions banner Blue/white/green filters Parameter filter Expert filters

Table 1: description of the PQD website graphs and functionalities

Snapshots of the current PQD website design are shown in Figure 2, Figure 3 and Figure 4.

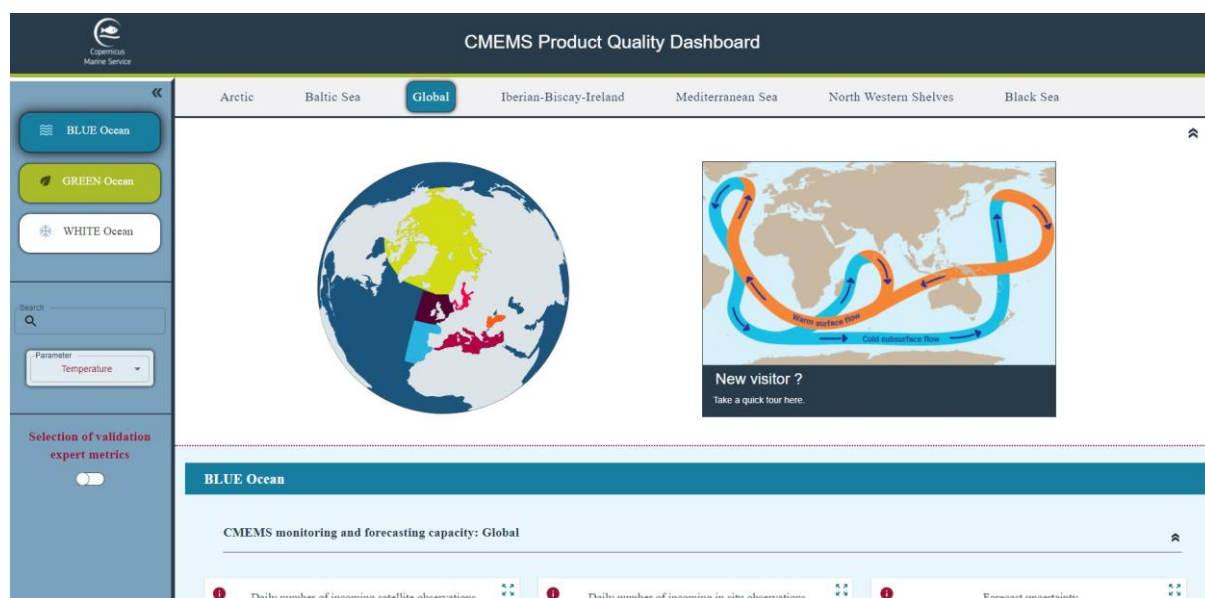


Figure 2 : current PQD website design, with a menu of regions at the top, a menu for families of parameters (blue/white/green) on the left. A rollup menu allows choosing a specific parameter when a family is selected. A “take a tour” tutorial begins when clicking on the right hand side image.

By default, the website opens on quality information for the global sea surface temperature model products. The user can select a region of interest (either the global ocean, or the European regional seas) and a family of parameters (Figure 3) in order to display generic quality information on this family of parameters¹.

¹ Generic quality information: As the quality of the forecast in a given area or thematic strongly depends on available observations, the number of observations received by the Thematic (observations) Assembly Centres (TACs) of CMEMS will be displayed together with metrics summarizing the reliability of the forecast (provided by the CMEMS Monitoring and Forecasting Centres MFCs) as relative errors over that area or for this thematic.

There are 3 families of parameters available on the CMEMS catalogue: BLUE for the physical ocean (currents, temperature salinity, waves etc...) WHITE for the sea ice (sea ice concentration, sea ice drift, sea ice thickness etc...) and GREEN for the biological and biogeochemical parameters (nutrients, oxygen, plankton, micronekton, chlorophyll, primary production, CO2 etc...).



Figure 3: current PQD website design, when a family of parameters is selected, 3 types of generic graphics appear, from left to right: number of satellite observations, number of in situ observations, and forecast skill scores.

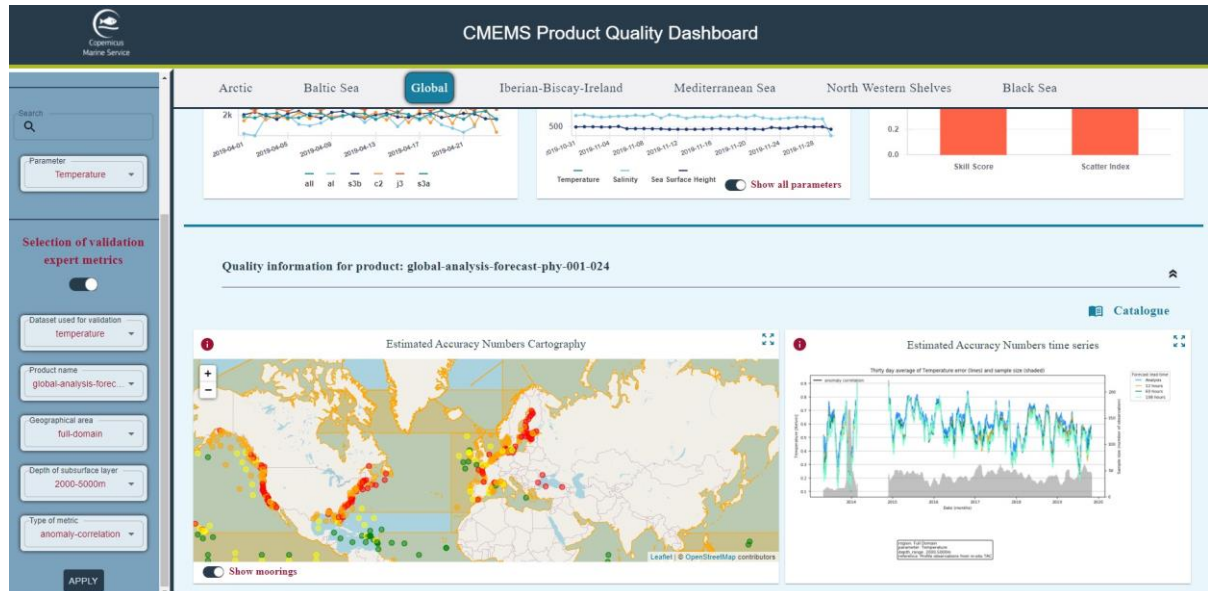


Figure 4 : current PQD website design, when "expert metrics" is on, the user can select the metric of his/her choice using the left menu, to display the metrics on the right hand side.

The graphics in Figure 3 are displayed either for all the parameters of the family, or for a specific parameter in the family chosen thanks to the rolling menu "parameter". When activating the button "expert metrics" shown in Figure 3, the user can choose (Figure 4) from

the left menu expert quality information² for a specific product (and only this product) to be displayed on the right as in Figure 4.

Finally, a “take a tour” tutorial is available, which describes the functionalities of the website and the content of the various graphics (the tutorial begins by clicking on the “new visitor” window shown in Figure 2)

The development tasks will be the following:

Task 1: Additional developments of the backend: add database relations and new developments in the Django framework

Task 2: Modify the frontend to match the design illustrated in Figure 5

Task 3: Ensure a responsive behaviour on mobile phones, ensure the compatibility with the main web browsers: Firefox, Chrome, Safari, Edge

The tasks will consist of refactoring existing code, thus it will require many interactions and iterations with Mercator Ocean.

The developments will be followed and integrated by Mercator Ocean’s Evaluation team (part of the research and development department in charge of developing product quality monitoring tools).

The following high-level general requirements are identified, which will condition the acceptance of the deliverables and the payment:

- [REQ-GEN-1] All developments shall be delivered as individual commits pushed on Project’s Gitlab <https://gitlab.mercator-ocean.fr/> hosted on Mercator-Océan’s premises.**
- [REQ-GEN-2] Commits shall be performed on a daily basis over working days.**
- [REQ-GEN-3] Deliverables shall be provided as Merge Requests from a dedicated branch on the reference branch defined by Project Owner, including Release Notes, and shall be accepted by the latter.**
- [REQ-GEN-4] Both backend and frontend deliverables shall include clear documentations (docx) and additionally the frontend deliverable shall include build scripts and web server configuration files (nginx).**
- [REQ-GEN-5] The contractor shall assist Mercator Ocean for the integration of the website on Mercator Ocean’s server at the URL pqd.marine.copernicus.eu**
- [REQ-GEN-6] The development method shall be interactive (preferably AGILE) and English will be the working language (French can also be the working language but part of the meetings will be in English).**
- [REQ-GEN-7] The developments shall be based on react JS for the frontend, python/django and PostgreSQL for the backend. The main part of the User Interface is developed in MaterialUI it’s highly recommend to have a strong experience with that framework. The main part of the backend is developed**

² Expert quality information : absolute uncertainties expressed as statistics of the differences between CMEMS products and reference observations or climatological values.

with Python Django a strong experience with that framework is highly recommended.

[REQ-GEN-8] The look and feel will be optimized for an improved user experience, and following recommendations from Mercator Ocean (see DR2 for a reference style guide).

[REQ-GEN-9] The display of requests should not take longer than 3 secs.

[REQ-GEN-10] The website will be full responsive, will be displayed either on computers, mobile phones or pads, and will work with Firefox, Edge, Safari, Chrome.

[REQ-GEN-11] The external modification and access to the server will be secured (https, + other security requirements)

2.2 DETAILED DESCRIPTION OF THE EXPECTED DEVELOPMENTS AND DELIVERIES

2.2.1 TASK 1: ADDITIONAL DEVELOPMENTS OF THE BACKEND: ADD SOME RELATIONS BETWEEN VARIABLES

When activating the button “expert metrics” shown in Fig 2, the user can choose (fig 3) from the left menu expert quality information for a specific product (and only this product) to be displayed on the right as in fig 3. A series of filters must be positioned in order to obtain one single graphic in the end. The following developments will be led:

[REQ-TASK1-1] The Contractor shall deliver, in collaboration with Mercator-Océan, a revised input graphic file naming convention.

[REQ-TASK1-2] The naming of input graphic files shall follow the conventions defined in [REQ-TASK1-1]

[REQ-TASK1-3] The Contractor shall consolidate the pre-processing stage for avoiding problems at the parsing stage.

[REQ-TASK1-4] The relations between variables of the backend shall be enriched using the models already defined in Django, so that a selection in one given menu/filter restrains the choices available in the other menus/filters, and that the choices that are proposed in the rolling menus do all correspond to existing graphs. A hierarchy can be organized between the filters.

[REQ-TASK1-5] After updating the models in Django some adaptations shall be done in the Frontend and probably in the API[REQ-TASK1-4]

[REQ-TASK1-6] Database requests shall be added in order to enable the display of scores inside the leaflet map.

[REQ-TASK1-7] The front-end website shall be tested to ensure compatibility with the improvement of the so-called expert metrics filters on backend (each setting of the expert filters corresponds to a static plot).

[REQ-TASK1-8] The Contractor shall deliver a Test Definition document detailing all tests to be performed on Frontend to ensure [REQ-TASK1-7]

[REQ-TASK1-9] The Contractor shall deliver a Test Report as defined in the accepted version of Test Definition document from [REQ-TASK1-8], reporting all missing plots/cases.

<i>delivery name</i>	<i>type of delivery</i>	<i>deadline</i>
Task 1 : new versions of back and front ends with improved and linked expert metrics filters		
PQD backend version 2 (Requirements [REQ-TASK1-1] to [REQ-TASK1-6])	<ul style="list-style-type: none"> Backend version is delivered on Project's Gitlab page (as per [REQ-GEN-1] to [REQ-GEN-7]) 	No later than November 30 th 2020
PQD frontend version 2 for desktops, with improved expert metrics filters (requirement [REQ-TASK1-7])	<ul style="list-style-type: none"> Frontend version is delivered on Project's Gitlab page (as per [REQ-GEN-1] to [REQ-GEN-7]) 	No later than November 30 th 2020
Test Definition document (requirement [REQ-TASK1-8])	<ul style="list-style-type: none"> Document (gitlab readme file or docx or xlsx file) 	No later than November 15 th 2020
Test report as defined in Test Definition document (requirement [REQ-TASK1-9])	<ul style="list-style-type: none"> report (gitlab readme file or docx or xlsx file) 	No later than November 30 th 2020

2.2.2 TASK 2: MODIFY THE FRONTEND TO MATCH THE DESIGN ILLUSTRATED IN FIGURE 5



Figure 5 : Requested design for the website frontend

The design of the website was reviewed in order to match DR2 and be consistent with the new CMEMS website currently under development. A new design was drafted using the Figma software (Figure 5) and will be available for the contractor. The following developments will be undertaken:

- [REQ-TASK2-1] Evolutions of the frontend shall be developed in order to match as closely as possible the design and colors of Figure 5
- [REQ-TASK2-2] Evolutions shall be proposed to improve the look and feel of the 3 upper graphs (generic metrics #1-2-3 in Table 1)
- [REQ-TASK2-3] Functionalities shall be added in the leaflet map, in order to display figures on the map that come from an external JSON file, or eventually from the backend via the API.

<i>delivery name</i>	<i>type of delivery</i>	<i>deadline</i>
Task 2 : final version of PQD frontend which matches the design of Figure 5		
PQD front version 3 for desktops: adaptation of the frontend to obtain the design of Figure 5, new functionalities for the leaflet map, and improvement of the look of the graphs #1-2-3 of Table 1 (requirements [REQ-TASK2-1] to [REQ-TASK2-3] and [REQ-GEN-8] to [REQ-GEN-11])	<ul style="list-style-type: none"> Version of the frontend delivered on Mercator Ocean gitlab (as per [REQ-GEN-1] to [REQ-GEN-7]) 	No later than December 9th 2020.

2.2.3 TASK 3: ENSURE A RESPONSIVE BEHAVIOUR ON MOBILE PHONES

The candidate will develop a specific adaptation of the frontend to ensure that the website is fully responsive, in particular for android smartphones and i-phones. A preliminary design of what the website should look like is presented in Figure 6. The developments will include:

- [REQ-TASK3-1] The adaptation of the frontend to ensure that the graphs align on the vertical when the website is visited using a smartphone
- [REQ-TASK3-2] The adaptation of the left menu so that it can be folded away for navigation on a smartphone, the adaptation of the top banner to the size of the screen
- [REQ-TASK3-3] The Contractor shall deliver a Test Definition document detailing all tests to be performed on Backend and Frontend which are necessary to ensure the compatibility with mobile phones, and most platforms, OS, and browsers (Firefox, Chrome, Edge, Safari)
- [REQ-TASK3-4] The Contractor shall deliver a Test Report as defined in the accepted version of Test Definition document from [REQ-TASK3-3], reporting all detected incompatibilities.

<i>delivery name</i>	<i>type of delivery</i>	<i>deadline</i>
Task 3 : responsive design aiming primarily at mobile phones		
PQD front version 1 for mobile phone, or PQD front version 3 fully responsive : Adaptation of the frontend to ensure that the website is fully responsive, in particular for android smartphones and i-phones (requirements [REQ-TASK3-1][REQ-TASK3-2])	<ul style="list-style-type: none"> Version of the frontend delivered on Mercator Ocean gitlab (merge request only) 	No later than December 16th 2020.

Test Definition document (requirement [REQ-TASK3-3])	<ul style="list-style-type: none"> Document (gitlab readme file or docx or xlsx file) 	No later than December 1 st 2020
Test report as defined in Test Definition document (requirement [REQ-TASK3-4])	<ul style="list-style-type: none"> report (gitlab readme file or docx or xlsx file) 	No later than December 16 th 2020



Figure 6: proposed layout for the mobile version of the website

2.3 CONTROL AND CONTACTS

The responsible person at Mercator Océan is Marie Drevillon.

The candidates will designate a contact person to monitor the planned work.

2.4 DURATION OF THE CONTRACT

The contract will be executed in the time frame of 2 months, starting at the latest **on November 9th 2020**.

The contract will take effect as from its notification.

2.5 LOCATION

The contractor will work at its own premises, and using its own computer resources.

Regular meetings will take place at Mercator Ocean, Parc technologique du Canal, 8-10 rue Hermès, 31520 Ramonville-St-Agne, France, or remotely using zoom.us.

The implementation of the software on Mercator Ocean's server will be done by the candidate, with support from Mercator Ocean.

2.6 PRICE

The price of the services will be a lump sum payment and it will be made at the end of the contract after acceptance of the deliverables.

2.7 REVIEW CLAUSE

As part of additional services, Mercator Océan reserves the right to acquire additional developments relating to:

- Correction (bugs that would be detected after the last delivery)
- Functionalities that would need slight improvements

Mercator Ocean will ask the holder to calculate the desired additional service, and possibly negotiate the response provided. The contractualization will take the form of an addendum signed by both parties.

The maximum amount of these additional services is 30% of the budgetary allocation allocated to the operation.

3 PROPOSAL

3.1 REQUIRED ELEMENTS IN THE OFFER

3.1.1 RELATED TO THE ENTITY

- Presentation of the legal entity
- Presentation of the activities and of the users or customers
- Sample of the portfolio of scientific applications developed in the past five years (the candidate is experienced in designing and implementing computer codes and websites for scientific applications).

3.1.2 RELATED TO THE OFFER

The offer has to clearly establish in English:

- The level of experience in developing scientific websites for earth observation sciences using postgresql and reactjs
- The candidate's understanding of the required developments
- The description of the dedicated manpower (position, expertise...) and man-month effort. The objective elements demonstrating the capability to work for a research and development entity, involving both technical and scientific partners.
- The price (in euros)

3.2 CONTRACT FORM

Mercator Ocean will sign a contract listing all the requirements and obligations linked to the goals and execution of the contract.

4 CRITERIA OF EVALUATION

The relevance of the proposals is evaluated through weighted criteria:

- Price (40 %).
- Technical criteria (60%):
 - The description of the technical work proposed 30%
 - The valuation of organization and key people 30%

5 SUBMISSION PROCEDURE

Proposals must be sent to the following email address: mdrevillon@mercator-ocean.fr

Proposals must be submitted before : **October 26th 2020 at 12 pm CET.**

Proposals received after will not be studied.

Should you need more information about this purchase agreement, please contact:

mdrevillon@mercator-ocean.fr before October 20th 2020 at 6 pm CET.