



Marine Data 4 Africa

Training Workshop
3 & 5 March 2025



PROGRAMME OF
THE EUROPEAN UNION



Implemented by
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Introduction

Here you will find the unanswered questions of the training workshop “Marine Data 4 Africa” held the 3rd and 5th of March 2025. More than 1300 people took part of the event, hence this post-event report. You can also have a look at the replays on our YouTube Channel [here](#).

Please keep in mind that some questions asked were very similar, as a result we've summarized the different topics you covered in the Q&A 😊

We thank you again for your presence and hope to see you again!

1) Session #1 – Products & Use Cases

General questions about the Copernicus Marine Service

Some useful links :

- [Home | CMEMS](#)
- Products catalogue : [Copernicus Marine Data Store | Copernicus Marine Service](#)
- Past use cases : [Use Cases | CMEMS](#)
- Everything you need as a user : [User Corner | CMEMS](#)
- Tutorials from past events : [E-learning materials | CMEMS](#)
- Is the data freely available or do we need to pay? Can it be use for commercial purposes or to inform policy makers ?

The vizualisation, the access and the download of data are totally free: [Access data | CMEMS](#).

Once it is downloaded, you can do whatever you want with the data, you just need to cite the Copernicus Marine Service in your work (the citations are pre-made on each product to facilitate the task).

- Is it possible to use a format other than netcdf ?

Yes, it is possible to use a data format other than .nc for Copernicus Marine products. You can specify the format of the downloaded data to be either NetCDF or Zarr. To do this, you can use the following options:

- For the Command Line Interface (CLI), use `--file-format <format>` where `<format>` can be `[netcdf | zarr]`.
- For the Python Library (API), use `file_format=<format>` where `<format>` can also be `[netcdf | zarr]`.

By default, the data is delivered in NetCDF format, but if you specify Zarr format, you can download the data in that format as well. Additionally, the majority of Copernicus Marine products are produced in NetCDF format, but they can also be downloaded

in Zarr format via the Copernicus Marine Toolbox, and some datasets provide GeoTIFF and Shapefile data.

Here is a link to an article to look into it in detail:

[What are the formats of Copernicus Marine products? | Copernicus Marine Help Center](#)

- How can you be sure about Copernicus data accuracy ?

Copernicus data come from several sources : satellite, in-situ and model data. All of them are tested, updated, scientifically-driven data. Useful information, such as error levels of observations or indicators on the reliability of forecasts is provided consistently and effectively.

- Do I need to be part of an institution to have access to your software and data ?

Not at all. The data are accessible to everyone, it doesn't matter if where and with who you work. All the data are free of charge to access and download, everything is open source.

MyOceanPro Viewer Demonstration : [MyOcean Viewer | CMEMS](#)

- Can we save our progress or history to continue our work later or to make some corrections or edits?

Yes, in MyOcean Pro Viewer, you can save your work progress. The tool allows you to save graphs in your session, which means you can continue your work later or make corrections and edits as needed. Additionally, you can minimize and expand graph windows, which can be useful for managing your workspace and focusing on specific data or analyses.

- What is the programming language used to analyze the ocean data using Myocean Viewer? Are the results justifiable?

Most of MyOcean is in JavaScript/TypeScript, including the data analysis the user refers to. There is a small amount of Python in the viewer, which is the part that creates the netCDF subset files.

The only data analysis done are statistics : averages (geographic and temporal), minimum, maximum, very basic calculation.

We'd like to see examples of calculations that could be questioned.

- Please, can we find this data and work in cloud with Google earth engine?

We don't think so, but that's more up to Google. The user should communicate to Google that they should give access to this CMEMS data.

- The CMEMS presents results of numerical simulation of the vast field dataset and satellite data? or we can find raw field data and raw satellite data?

CMEMS provide numerical model output and satellite observations. The observations are provided in different level of processing (Level 3 & Level 4).

- Is it possible to download data in CSV or JSON format?

It is possible to download data from objects drawn directly from the Viewer (point, line, area) in CSV format by clicking on the "... " icon in the graphics window > Export to CSV

You can download data in their NetCDF native format and convert them into CSV as explained [in this article](#).

It's not possible to download data as JSON, except when downloading the metadata of the Copernicus Marine catalogue via the [describe function](#) of the Toolbox (cf. [self-versioned documentation](#) to see JSON as output dictionary).

- Does CMEMS have downscaled projections data?

Copernicus Marine funds research projects and participates in projects on climate projections (example: [Towards downscaled regional climate change projections for marine environments](#), May 2021). But for the moment, we do not provide climate projections in our data catalog.

- When we download forecast data it is often blank for some parameters like swell and wind speed in the golfe of Guinea.?

When you don't see any expected data, please check the product and dataset are providing data for the area and date of interest. There are NRT products for present/forecast and 2 years in the past data, and MY products for decades in the past. Also, check the date picked from the bottom timeline in the Viewer.

- Can we extract on the water column or just surface parameters data?

You can download data not only at the surface but also at any depth you'd like. It's just depend on the parameters you want to download, you will have to check the information of the product.

OceanPrediction DCC & OPERA project – Enrique Alvarez & Lillian Diarra

- Useful links (for partnership, submitting, etc.) :

OceanPrediction DCC Atlas: <https://www.unoceanprediction.org/en/atlas/>

OceanPrediction DCC African Regional Team:
<https://www.unoceanprediction.org/en/regional-team-african-seas>

DCC technical framework (with links to guides):

<https://www.unoceanprediction.org/en/about/technical>

To register on DCC website and feature on the ATLAS:

<https://www.unoceanprediction.org/en/user/register>

Also follow us on linkedin and X :

<https://www.linkedin.com/company/ocean-predictiondcc>

OceanPrediction Decade Collaborative Centre (@OceanPrediction) / X

- Do you have timelines for capacity building and other important components of the project?

The OPERA project capacity development activities should start in Q4 2025, beginning with a massive online open course (MOOC) closely following the ETOOFS guide - reference manual on "Implementing Operational Ocean Monitoring and Forecasting Systems (<https://www.unoceanprediction.org/en/resources/etooofs-guide>)

In year 2 (2026), a second MOOC should be launched on the Ocean Forecasting System Architecture Guide

(<https://www.unoceanprediction.org/en/resources/architecture>) and in year 3 (2027)

on the operational readiness guide

(<https://www.unoceanprediction.org/en/resources/orl>).

The last year will focus on integration of applications.

Regarding important dates:

In mid-May (exact date to be confirmed), we will hold an open information session online on the OPERA project including different calls for tender to be launched.

June-Sept – Launch of calls for tenders on consortium and capacity development activities to be launched.

January 2026 – Start of OPERA development phase with the three consortia in place (one focused on ocean forecasting systems and two on application development)

- Do you have a list of specific institutions eligible to participate ?

There is no list, but the criteria would include institutions in the public sector, in a coastal county in sub-Saharan Africa, working or willing to work in the field of ocean forecasting/application development.

- Are there any ongoing initiatives to strengthen collaboration between Copernicus and Africa institutions ?

The GMES and Africa programme and its marine consortia (MarCOSIO and MarCNoWA) supports the uptake of Copernicus data by African Institutions. There is also ESA's EO4Africa facility. GEO Blue Planet, also is a platform that brings together both EU and AU efforts, see <https://geoblueplanet.org/ocean-observation-and-prediction-for-coastal-sustainability-in-africa/>.

- How could this project be used in assessing the effectiveness of coastal protection works ?

Better Ocean forecasting translates directly into better coastal protection. We do not yet know the applications to be developed in this project, these will be determined by the outcome of the calls we launch. However, if there is an application for example, on nature-based solutions (seagrass/mangroves) to support coastal protection, after its development part of the work will be to assess its impact.

- **What are the strategies used by united nations to mitigate environmental impacts today? How and when can we apply for Africa?**

The United Nations (UN) implements several strategies to mitigate marine environmental impacts, focusing on sustainable development, pollution reduction, and biodiversity conservation. Key initiatives include:

1. **Sustainable Development Goal 14 (SDG 14):** This goal aims to conserve and sustainably use oceans, seas, and marine resources. It addresses issues such as marine pollution, overfishing, and ocean acidification.
2. The **BBNJ** treaty also presents a significant opportunity for African nations to enhance marine conservation, secure sustainable fisheries, and gain access to marine genetic resources. By actively engaging in the treaty's mechanisms, Africa can protect its marine environment while benefiting from global ocean governance initiatives. The Treaty has so far been signed by over 100 countries and is in ratification process. It is relevant to note that to enter into force it will need 60 ratifications.
3. The **Global Plastics Treaty**, currently in negotiation (5th round of INC negotiations took place in Nov last year in Korea). When this treaty is agreed on, signed and ratified, it will also serve to protect marine environments by putting a cap on marine pollution, particularly important for Africa.

User testimony #1 – Protasius Mutjida (Kelp Blue, Namibia)

Link : [A geochemical baseline study of giant kelp \(macrocystis pyrifera\) at the kelp blue farm to assess carbon sequestration potential](#)

- What is causing the heavy metal concentration ?

The main cause of these heavy metal concentrations could be linked to anthropogenic activities within the harbor and marine vessel traffic.

- How were we able to determine ocean pollutant levels without modern devices ?

Modern devices are key to support and determine ocean pollutant levels at the same time they compliment with the traditional method of in situ sampling such as collecting water/sediment samples to the lab to analyse and quantify the pollutant levels.

User testimony #2 – Valentina Santarsiero (Planetek Italia, Italy)

- What is the difference between Global Ocean Colour data you presented before and chlorophyll-a concentration, and when should you use which one ?

Global Ocean Colour data and Sentinel 2 chlorophyll-a concentration measurements are related but distinct datasets and their use depends on the specific research or application.

Global Ocean Colour data and Sentinel 2 data refer to a large set of spectral measurements collected by satellite sensors. They include reflectance data from different wavelengths (visible and near-infrared). Used to derive multiple ocean properties, including chlorophyll-a concentration, suspended sediment, and dissolved organic matter.

The difference between the two is in spatial and temporal resolution. In situ chlorophyll-a concentration measurements, on the other hand, is a specific biogeochemical product derived from ocean colour measurements. It represents the concentration of chlorophyll-a, a pigment in phytoplankton, often used as a proxy for phytoplankton primary production and biomass. Estimated using bio-optical algorithms that link reflectance to chlorophyll concentration.

When to use each? Use Global Ocean Colour data when you need a broader analysis of the optical properties of the ocean. You want to study different constituents of the water (e.g. suspended sediment, coloured dissolved organic matter - CDOM). You need raw reflectance data for custom algorithm development. Use chlorophyll-a concentration when: You want to specifically study phytoplankton biomass or primary productivity. You need a direct indicator of biological activity in the ocean.

User testimony #3 – Karim Thiam (LEGOS Laboratory, France)

Link : <https://doi.org/10.3389/fmars.2024.1500753>

- I am a marine engineer from Algeria. I would like to know if your work is reliable for the design of infrastructure ?

My study may be relevant to the installation of infrastructure in the open ocean. In fact, if there are mesoscale activities linked to eddies in the area where you want to install your infrastructure, a good knowledge of the dynamics of these eddies, their trajectory and the associated energy is crucial to better predict their impact and better design your infrastructure.

2) Session #2 – Practical session

General questions

- How do I download CMEMS data directly using R?

You can refer to this article to look into this in detail!
<https://help.marine.copernicus.eu/en/articles/8638253-how-to-download-data-via-the-copernicus-marine-toolbox-in-r>

- How can a user navigate all of this for different data/analysis alone, without any prepared code ?

You can find on our website articles about everything : technical issues, how to use our tools, how to download the data and others here : [User Corner | CMEMS](#)

If you don't find the information you want, you can also contact our user support 😊

- How can I look at bathymetry data ?

A lot of Copernicus Marine products provide a [bathymetry dataset](#) (i.e. sea floor topology). You can download this dataset to do the analysis.

The Copernicus Marine Toolbox

Some useful links :

- [Copernicus Marine Toolbox - Introduction | Copernicus Marine Help Center](#)
- [Copernicus Marine Toolbox - Installation | Copernicus Marine Help Center](#)

- Can I use Mamba in the terminal of VS Code to try downloading my data ?

If you download Mamba, you will get the mamba's miniforge prompt. This is where you should be downloading the data.

- Is it possible to connect MATLAB data to Jupyter Notebook? If I have image processing data in MATLAB, can I visualize it within Jupyter? If so, how can I do?

Although User Support does [not guarantee MATLAB support](#), it is perfectly possible to import and visualize MATLAB data in a Jupyter Notebook, provided you export it in a Python-compatible format (e.g. CSV, MAT via the [scipy.io](#) library, etc.). Once the data has been exported, you can load it into Jupyter using Python libraries adapted to image processing and visualization.

Jupyter Notebooks – Daria Andrievskaia (Noveltis)

All of the questions were answered during the event. You can watch the replay if you wish or download the tutorial if you didn't yet 😊 : [Jupyter Notebook tutorial](#)

QGIS – Daria Andrievskaia (Noveltis)



You can watch the replay if you wish or download the tutorial if you didn't yet 😊 : [QGIS tutorial](#)

- We can almost see harmonic oscillations from the Antarctic Ocean in the SST presentation. Could you elaborate a bit on those ?

Even though our study does not focus on the Antarctic Ocean, here are some possible explanations for the near-harmonic oscillations observed in SST there:

- Tidal and Seasonal Variability – The Southern Ocean is strongly influenced by seasonal changes, and we often see temperature fluctuations due to shifts in ocean circulation patterns and due to the melting and freezing of sea ice.
 - Upwelling and Mixing – The Antarctic Ocean is a highly dynamic system where deep, cold water rises to the surface due to wind-driven upwelling. This process can cause periodic SST changes, giving the appearance of oscillations.
- Why did you choose only February data for the timescale ? What was specific about it ? Is the choice specific to this tutorial ?

The timeframe was selected solely based on the values of the studied variables, as February exhibited the highest SST. Given the time constraints of the tutorial, we omit a more in-depth analysis. However, users are encouraged to explore the data further and utilize QGIS features independently. This approach allows you to apply the same procedure to other months, potentially identifying interesting trends or gaining additional insights into the event.

R Studio – Simon Millet (Noveltis)

All of the questions were answered during the event. You can watch the replay if you wish or download the tutorial if you didn't yet 😊 : [R Studio tutorial](#)

Thanks again for your participation 😊