

<p style="text-align: center;">Copernicus Marine Service Training Workshop for the Black Sea Region <i>(Mariana Golumbeanu, Fabrice Messal, Răzvan Mateescu, Elena Vlăsceanu)</i></p>	<p style="text-align: center;">“Cercetări Marine” Issue no. 49 Pages 158 - 165</p>	<p style="text-align: center;">2019</p>
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COPERNICUS MARINE SERVICE TRAINING WORKSHOP FOR THE BLACK SEA REGION

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ABSTRACT

The Training workshop Copernicus Marine Service 2019 BLACK SEA organized in Constanta, Romania, falls within the programme of activities of the Copernicus Marine Service, namely to create training opportunities which will strengthen the existing of all maritime regions in their activities ranging from harbour management, aquaculture to water quality monitoring in the frame of national and European policies.

The Training was hosted by the National Institute for Marine Research and Development “Grigore Antipa” (NIMRD) Constanta, Romania (26-27 of June 2019). The planning of the training workshop was done jointly by Mercator Ocean International and CMEMS.

The overall scientific objectives of Copernicus Marine Service 2019 Black Sea Training Workshop were to increase the knowledge of users about the EU Copernicus Programme and the CMEMS capacity (products portfolio releases, new services, opportunities), facilitate the acquisition and improvement of skills and competencies of users and potential users linked by a common region, by common needs or common domain of interests and to design an effective and innovative research governance framework based on sound scientific knowledge.

The training covered the main issues focused on: Black Sea Model Products (ocean currents, sea level, waves, chlorophyll-a); Satellite Ocean Color products; Satellite Wave Products; Satellite Sea Level Products; In Situ Products.

Key-Words: Copernicus Marine Service, training, Black Sea region, Model Products, Satellite ocean color products

AIMS AND BACKGROUND

Mercator Ocean International (MOI) pays particular attention to users and potential users by organizing regular CMEMS users and training workshops. The Copernicus Marine Service supports all maritime regions in

their activities ranging from harbour management, aquaculture to water quality monitoring in the frame of national and European policies.

In this context, the Training workshop on Black Sea Region was designed to train existing Copernicus Marine Service users and also gain new users with the support of the Mercator Ocean International and the National Institute for Marine Research and Development “Grigore Antipa” Constanta, Romania (CMEMS, 2019).

The main objectives of the training workshop can be condensed as follows :

- ✓ To increase the knowledge of users about the EU Copernicus Programme and the CMEMS capacity (products portfolio releases, new services, opportunities).
- ✓ To listen to users/potential users’ expectations
- ✓ To facilitate the acquisition and improvement of skills and competencies of users and potential users linked by a common region, by common needs or common domain of interests
- ✓ To ensure the adaptation of the service by collecting direct feedbacks and requirements.

The theme for this Training Workshop was targeted to give participants detailed insight into the most relevant experimental methodology. Lectures on ecosystem and oceanographic modelling showed how local processes can be scaled up to regional scales. The training covered the main issues focused on: Black Sea Model Products (ocean currents, sea level, waves, chlorophyll-a); Satellite Ocean Color products; Satellite Wave Products; Satellite Sea Level Products; In Situ Products (CMEMS <http://marine.copernicus.eu/services-portfolio/access-to-products/>). The lectures on theoretical aspects were supplemented with dedicated practical applications in selecting, computing and using such tools (Fig. 1).



Fig. 1. Plenary session during Copernicus Marine Service Training Workshop 2019 Black Sea (*original photo*).

EXPERIMENTAL

The Training workshop appealed to a broad range of participants, young researchers, PhD students, from Black Sea region and not only, with a scientific background in biological, physical and/or chemical oceanography, meteorology, geology, fishery, willing to expand their field of interest and to disseminate the experience gained from the school to others.

A preliminary screening phase of 71 applicants was conducted by the MOI. Overall, 60 participants attended the course. Participants hailing a number of countries: from Bulgaria (1), United Kingdom (3), Turkey (3) and Romania (53).

The training workshop was scientifically coordinated by Mercator International Ocean and featured the participation of leading international experts from Euro-Mediterranean Center on Climate Change (CMCC), Bologna, Italy, Université de Liege, Belgium and Mercator Ocean International, France.

RESULTS AND DISCUSSION

The Plenary session focused on presenting the Copernicus programme and in particular the Copernicus Marine Service, the Service objectives and the main players; the Copernicus Marine Service Desk with an overview of the Copernicus Marine Service Portfolio and with a focus on the portfolio for the relevant ocean basin and Workshop theme(s); use-cases on the relevant ocean basin and Workshop theme(s) regarding the attendees' maritime activities (marine spatial planning, water quality monitoring, aquaculture and fisheries management, marine protected areas monitoring, renewable energy farm implementation, EU Directive and Sustainable Development Goal reporting, etc.) and their expectations about the potential of the Copernicus Marine Service in this regard.

In particular, this session briefed trainees about Copernicus Marine Service Introduction + use cases and Copernicus Marine Service Desk. Such a session also gave an insight about the size based Black Sea Bio model products, Black Sea Bio model products, Black Sea Bio model products & Black Sea Ocean Color products, Sea Level Observations products (Figures 2-3).

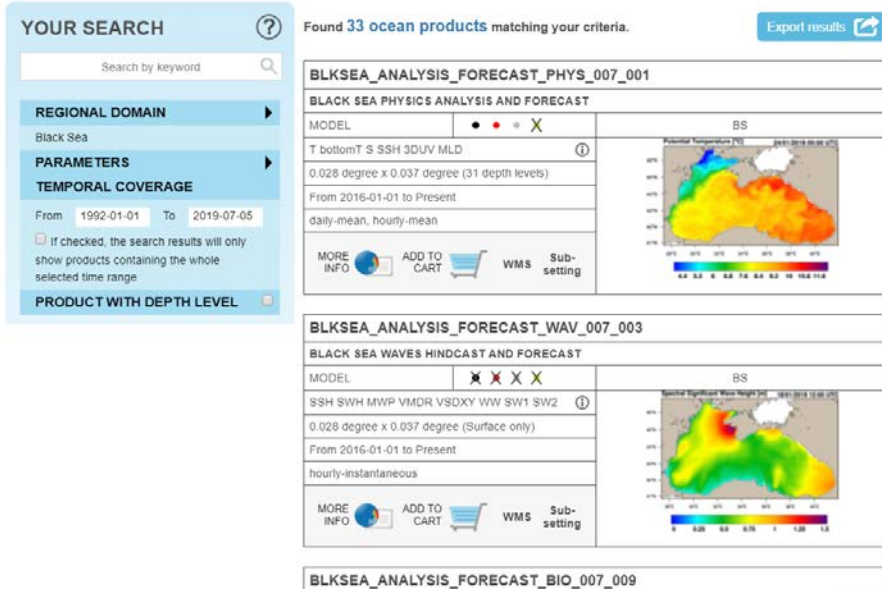


Fig. 2. CMEMS catalogue (Source: <http://marine.copernicus.eu/services-portfolio/access-to-products/>).

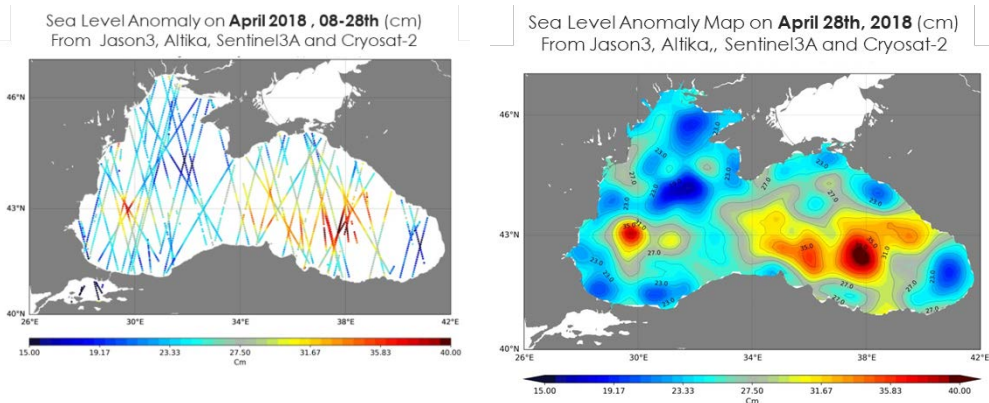


Fig. 3. Satellite Black Sea Level Products.

The Practical sessions concentrated on Registering for the service, browsing through the catalogue; Data selection and viewing; Data selection, manual downloading and automatic downloading using scripts; 1 out of 3 practical scenarios and handling of Copernicus Marine Service data on the relevant ocean basin and Workshop theme(s) (Fig. 4).



Fig. 4. Practical session during Copernicus Marine Service Training Workshop 2019 Black Sea (*original photo*).

Actually, the Practical Session by Service Desk CMEMS focused on Jupyter Notebook introduction, how to register and browse in the catalogue, and how to extract, visualize and download data examples and exercises were included, together with region specific applicability and future proposals.

The practical sessions were held in the same time in two different halls, the participants being divided into two groups. Thus, all participants had successive access to the both themes of the practical section (Fig. 5).

The different steps of CMEMS products were presented and practiced using Jupyter notebook application. The first step was to create a free account on <http://marine.copernicus.eu/>. Some details about NetCDF file format of Copernicus Marine Product and how to understand the different type of data conversion (from n.c to c.s.v, etc). have been presented for those participants who are not familiar with oceanographic data. The Sea Level Observations product have been explained in details starting from the features identification, the processing level of data, the temporal coverage and temporal resolution, the different type of data selection (selection by region of interest, selection by a specific type of data).



Fig. 5. Practical session during Copernicus Marine Service Training Workshop 2019 Black Sea (*original photo*).

Participants learned to search SeaLevel Satellite Observations data, to download a Level 4 product using the SubSet Download Service and Level 3 product using the DirectGetFile Service, to read a netCDF file and to plot the Copernicus SeaLevel Satellite Observations data, using Jupyter Notebook.

A highly flexible didactic approach was adopted throughout the training workshop, with an interactive Speed Training based on 10 minutes meeting directly with speakers and trainers in the afternoon. During the course, open discussion sessions were held where participants were given the opportunity to challenge and question concepts delivered during the lectures and to express their own views (Fig. 6).

All lecturers at the training workshop provided participants with extensive bodies of valuable examples related to Black Sea model products applied for the assessments of several aspects of the state of the marine environment (Golumbeanu *et al.*, 2014, Raileanu A. *et al.*, 2016, Cristescu T.M. *et al.*, 2016) and familiarised them with the most recent developments in such a field (Fig. 7).

In order to gauge participants feedback on the conduction of the training workshop and its didactic content, a short Satisfaction survey via Slido in the end was presented. Course participants who consistently attended the course sessions were presented with Attendance Certificates for the Copernicus Marine Service Training Workshop dedicated to the Black Sea Region at the end of the course.



Fig. 6. Practical examples during with an interactive Speed Training (Copernicus Marine Service Training Workshop 2019 Black Sea) (*original photo*).



Fig. 7. Group Photo Copernicus Marine Service Black Sea Training Workshop, June 2019, (*original photo*).

CONCLUSIONS

The training workshop attained a high degree of interest, namely as a result of the high qualifications of lecturers, who briefed participants throughout the training workshop and also as a result of the participant screening process, which ensured a high degree of quality, interest and enthusiasm amongst participants as well.

The training workshop format was a highly interactive one and lecturers continuously prodded participants into conveying their own professional black sea models-related experience in order to provide further insight to the other participants and into asking thought-provoking questions. Participants were generally receptive to the synergistic approach assumed by lecturers and actively contributed towards making the course a success.

As a result of the conduction of this training workshop, a number of young researchers were trained in the basics of Black Sea models, which they can utilise in their respective institutes for the better management of marine resources, thus contributing to build experience in the formulation of scientifically based synthetic assessment of the state of the marine environment.

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