



Ocean Colour: Description & Monitoring

Copernicus User Uptake Information Sessions
Marine Monitoring



- **Objectives of this module :**
 - To understand *what is Satellite Ocean Colour*
 - To show you *the Copernicus CMEMS catalogue* with the various types of Ocean Colour products.
 - To show you *how to access Ocean Colour CMEMS products* using a python procedure
 - To use CMEMS functionality to *visualize Ocean Colour products*
- **Demo :**
 - Download of ocean colour products in the Black Sea (for ex. to evaluate the presence of algae bloom & suspended matter in sea water).



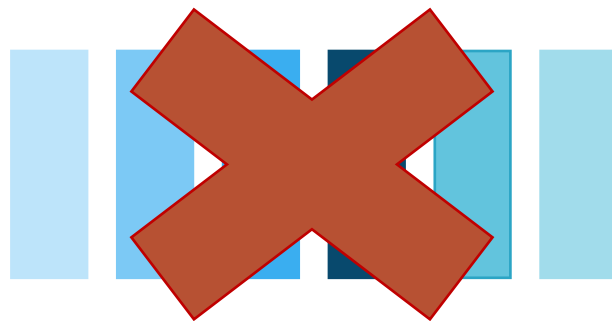
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WHAT is Satellite Ocean Colour



What is Ocean Colour

- Not literally the “color of the ocean”

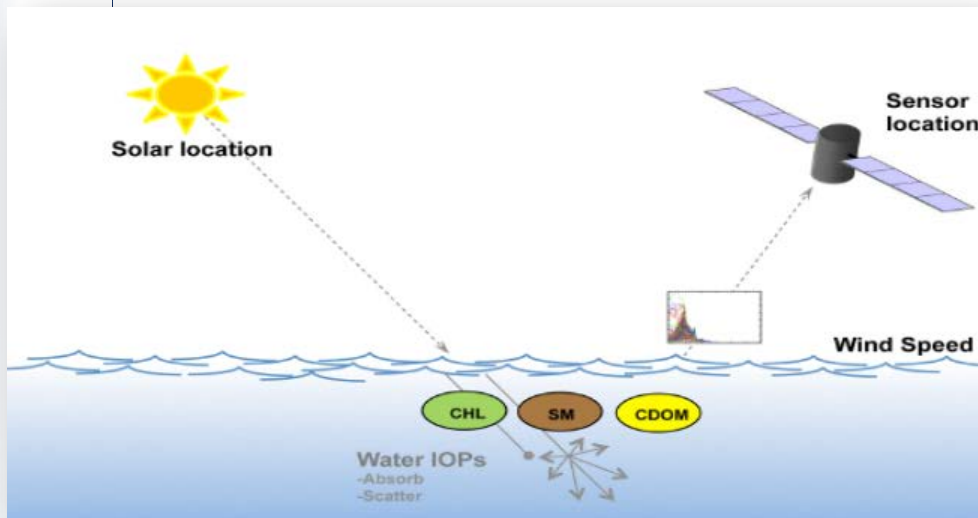


- Depending of the sea water constituents, 3 categories of colours can be observed :
 - **Chlorophyll-A**
 - **Non Algal Suspended Matter**
 - **Colour Dissolved Organic Matter**



Ocean Colour : How does it works ?

- **Instrument used** : A spectrometer on board of satellites.
- **How does satellite measure ?**





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What is Ocean Colour



Sentinel-3, acquired July 10, 2017 (OceanDataLab)



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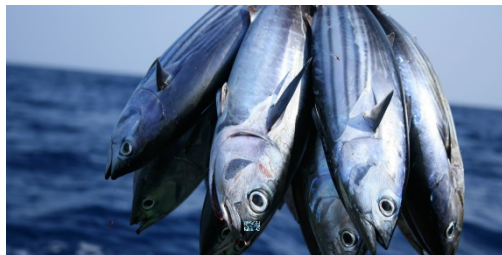
Ocean Colour = The Usage ?

Ocean colour = **window into the ocean ecosystem**

Examples of applications :



Coastal water quality



Marine resource management



Sediment transport



Harmful algal Bloom



Global Ocean Primary Production



Monitor climate change



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The Copernicus CMEMS catalogue with the various types of Ocean Color products



Ocean Colour : How to access to Copernicus Ocean Colour data ?

- Go to the website of the Copernicus Marine Environment Service:
<http://marine.copernicus.eu>

Search & Browse



- Sentinel data
- Graphical user interface

Discover & Visualise



- Visualise/ analyse data
- Access info

Register



- Order
- Customise
- Helpdesk

Download



- Select and download
- One-off or by scripts

Compute



- Use data
- Integrate
- Merge

Join Up



- Get trained
- Get inspired
- Meet partners



Demo : search Black Sea Ocean Colour products

- Search for **Ocean Colour products** :

- Overview of Ocean Colour products;
- Choose a product displaying **NRT** ocean colour from satellite observation;
- Choose your **area of interest** : **Black Sea**

The screenshot shows the Copernicus Marine Environment Monitoring Service (MEMS) website. The header includes the European Commission logo and the text 'COPERNICUS MARINE ENVIRONMENT MONITORING SERVICE Providing PRODUCTS and SERVICES for all marine applications'. A search bar is located in the top right. Below the header is a navigation menu with categories: ABOUT US, MARKETS & BENEFITS, NEWS, SCIENCE & MONITORING, TRAINING & EDUCATION, and SERVICES PORTFOLIO. The main content area is titled 'ACCESS YOUR OCEAN INFORMATION' and features several interactive elements: a 'GETTING STARTED' button, a '1' icon, and three main sections: 'OCEAN PRODUCTS' (with a 'DATA' button), 'OCEAN MONITORING INDICATORS' (with a 'TRENDS' button), and 'OCEAN 5 YEAR REPORT' (with an 'EXPERTISE' button). A 'SHORT-CUT TO SERVICES' sidebar on the right lists options like 'REGISTER NOW!', 'SCIENTIFIC QUALITY', 'ONLINE TUTORIALS', and 'COLLABORATIVE FORUM'. A 'LATEST NEWS FLASH' section at the bottom right mentions a '2018 22 MAR.' release.



Demo : Visualize Black Sea Ocean Colour products

- Visualize Ocean Colour products :

The catalogue has been upgraded and some products accesses still need to be updated. If you face any issue, please check [live status](#).

ONLINE CATALOGUE

CATALOGUE PDF FIRST VISIT? MY CART 0 My Account

YOUR SEARCH

ocean colour

REGIONAL DOMAIN
Black Sea

PARAMETERS

TEMPORAL COVERAGE
From 1992-01-01 To 2018-04-08
 If checked, the search results will only show products containing the whole selected time range

PRODUCT WITH DEPTH LEVEL

Found 8 ocean products matching your criteria. [Export results](#)

OCEANCOLOUR_BS_CHL_L4_NRT_OBSERVATIONS_009_045	
BLACK SEA MONTHLY, 8 DAYS AND DAILY INTERPOLATED SURFACE CHLOROPHYLL CONCENTRATION FROM MULTI SATELLITE OBSERVATIONS	
OBSERVATION	L4 BS
CHL	①
1 km x 1 km (Surface only)	
From 2015-01-01 to Present	
daily-mean, weekly-mean, monthly-mean	
MORE INFO	ADD TO CART WMS Sub-setting

OCEANCOLOUR_BS_CHL_L3_NRT_OBSERVATIONS_009_044	
BLACK SEA SURFACE CHLOROPHYLL CONCENTRATION FROM MULTI SATELLITE OBSERVATIONS	
OBSERVATION	L3 BS
CHL	①
1 km x 1 km (Surface only)	
From 2016-04-25 to Present	
daily-mean	
MORE INFO	ADD TO CART WMS Sub-setting

OCEANCOLOUR_BS_CHL_L3_REP_OBSERVATIONS_009_071	
BLACK SEA REPROCESSED SURFACE CHLOROPHYLL CONCENTRATION FROM MULTI SATELLITE OBSERVATIONS	
OBSERVATION	L3 BS
CHL	①
1 km x 1 km (Surface only)	
From 1997-09-04 to 2016-12-31	



Use case : Download Black Sea Ocean Colour products

- Download Ocean Colour products :

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ONLINE CATALOGUE

CATALOGUE.PDF FIRST VISIT? MY CART 1 My Account

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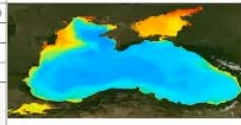
PARAMETERS

TEMPORAL COVERAGE
From 1992-01-01 To 2019-04-08
 If checked, the search results will only show products containing the whole selected time range

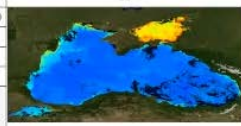
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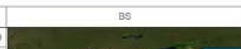
OBSERVATION	L4	BS
CHL		
1 km x 1 km (Surface only)		
From 2015-01-01 to Present		
daily-mean, weekly-mean, monthly-mean		
MORE INFO	ADD TO CART	WMS Sub-setting



OBSERVATION	L3	BS
CHL		
1 km x 1 km (Surface only)		
From 2016-04-25 to Present		
daily-mean		
MORE INFO	ADD TO CART	WMS Sub-setting



OBSERVATION	L3	BS
CHL		





USE CASE : SUPPORTING THE MSFD DIRECTIVE IN THE BLACK SEA

- **WHO** : The JRC.
- **WHERE** : Black Sea
- **WHY** : 1). Severe Ecological Degradation since the 1970s.
2). Creation of a tool to examine the present and future state of the marine ecosystem and to inform and support a variety of EU policies including the Marine Strategy Framework Directive.

CMEMS products in use :

Monthly mean temperature and salinity, chlorophyll_a, nitrate and phosphate fields are extracted from the Copernicus Marine Service Black Sea reanalysis model. Satellite sea surface temperature and ocean colour data in the Black Sea are also used. In situ data will be used in the future.

Black Sea Diffuse Attenuation Coefficient at 490nm (Kd 490)

