



DATA FOR THE UN OCEAN DECADE

A EUROPEAN FOCUS

Matching marine data to the UN Ocean Decade challenges

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EUMETSAT and Marine Data - Copernicus

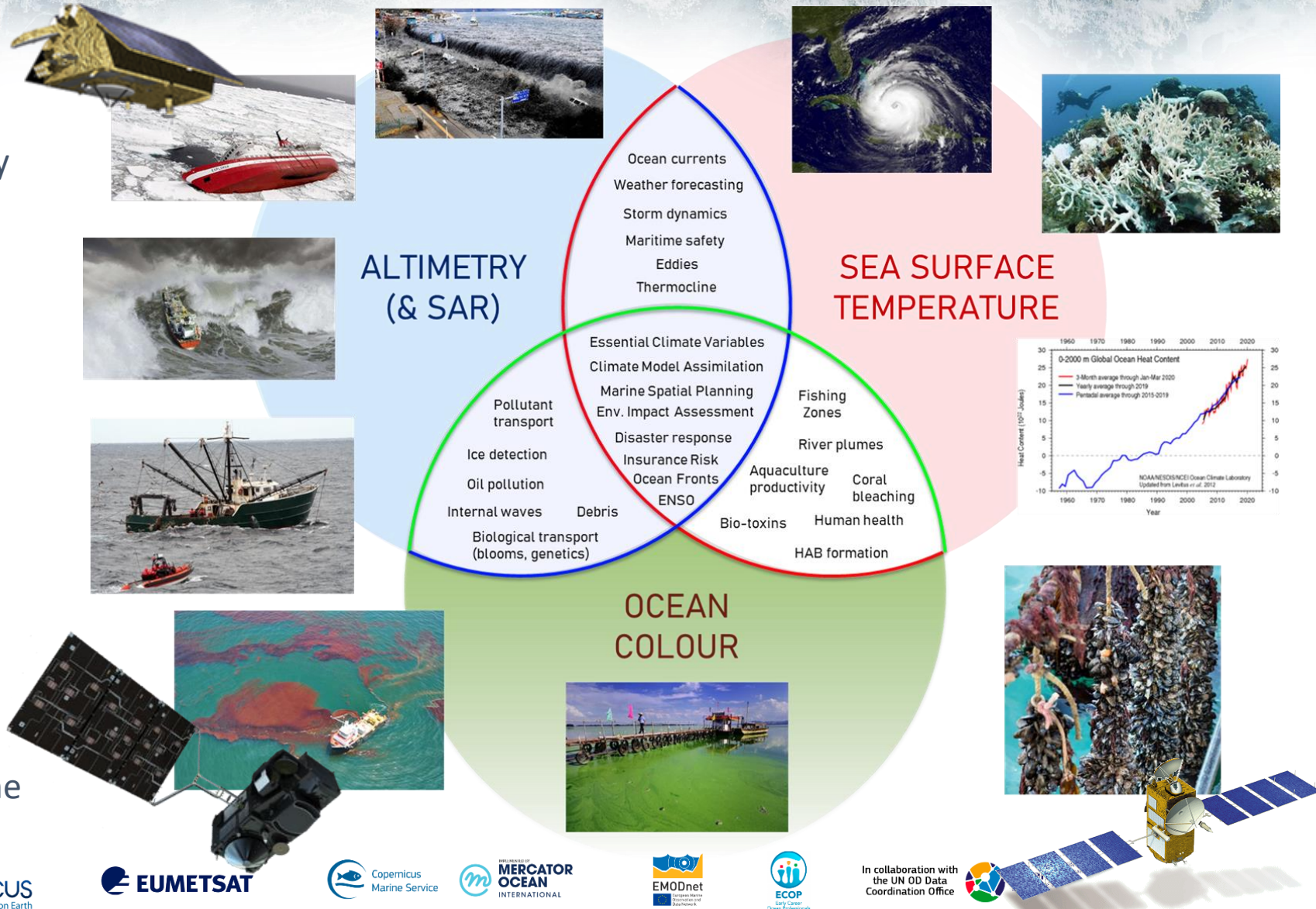
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Data from EUMETSAT operated Copernicus satellites (Sentinel-3 and 6) suits applications where rapid availability (within 3 hrs) and highest spatial resolution is key. Synergy applications benefit from multi-sensor platform of Sentinel-3.

- Ocean Colour (OC, IOPs, Chl, TSM...)
- Sea Surface Temperature
- Altimetry (SSH, SWH, Wind)

Data features heavily in downstream level-3 and 4 products from Copernicus Marine Service.

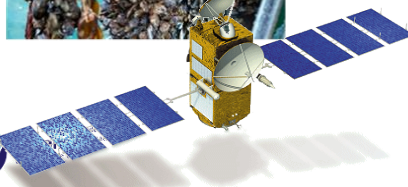
Further data from optional and mandatory programmes broadens marine relevance...



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EUMETSAT and Marine Data – OSI SAF

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The OSI SAF (Ocean and Sea Ice Satellite Application Facility) is the dedicated EUMETSAT centre for processing satellite data at the ocean-atmosphere interface.



*Operational and quality
controlled products*



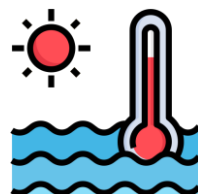
Sea Surface Winds

- ❖ *Speed and Direction*



Sea Ice Parameters

- ❖ *Concentration, Edge, Type, Emissivity, Drift*
- ❖ *IST - Sea Ice Surface Temperature*



Sea Surface Temperature

- ❖ *Surface temperature*



Radiative fluxes

- ❖ *Downward longwave irradiance*
- ❖ *Surface solar irradiance*



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EUMETSAT is mapping its data to the UNOD challenges...

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A UNOD endorsed action: A series of case studies designed to show how our data can be used to meet the challenges of the UN Ocean Decade.

Each case study includes:

- Web article – within EUMETSAT case study library

- Jupyter notebook

 - Narrative explaining data and use case

 - Data access

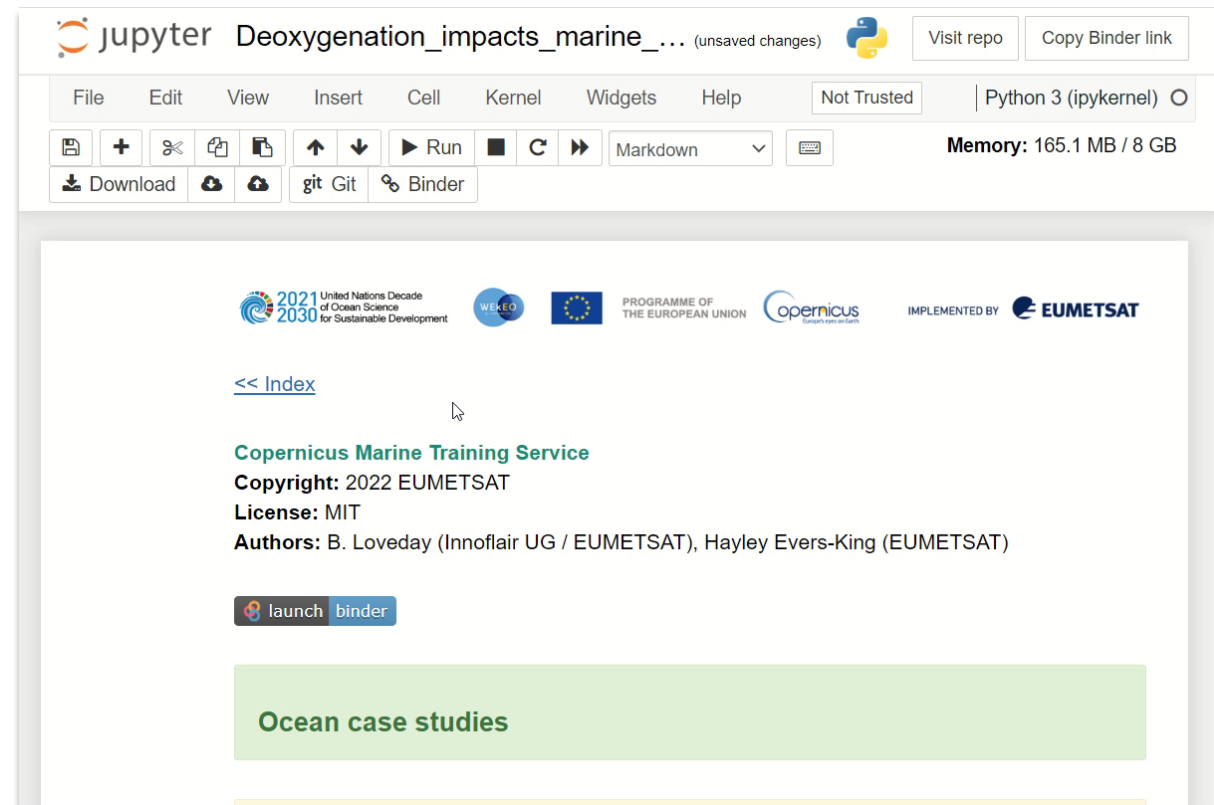
 - Analysis and visualization

Compatibility with WEkEO and Binder, also including downstream CMEMS products when appropriate to applications.

Open to collaboration to showcase your work!

Articles: https://bit.ly/UNOD_cases

Code: https://bit.ly/UNOD_code



Challenge 1: Understand and beat marine pollution

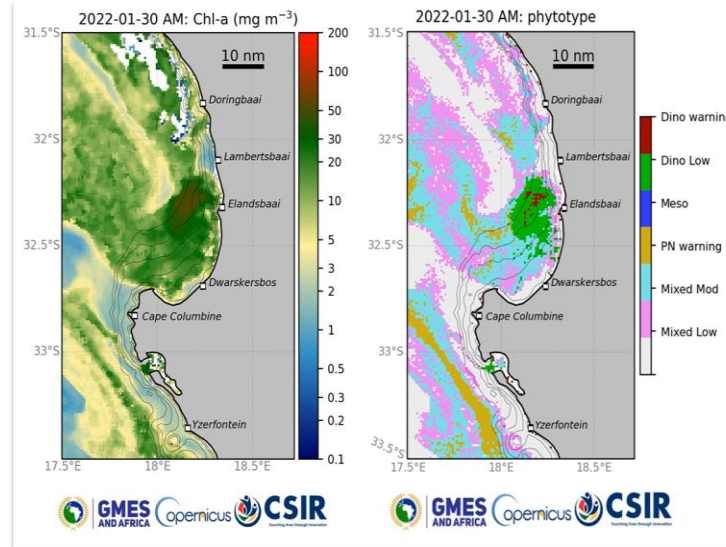
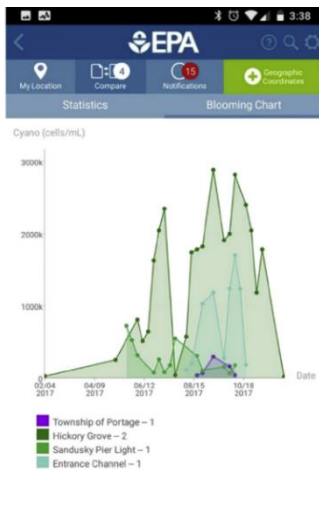
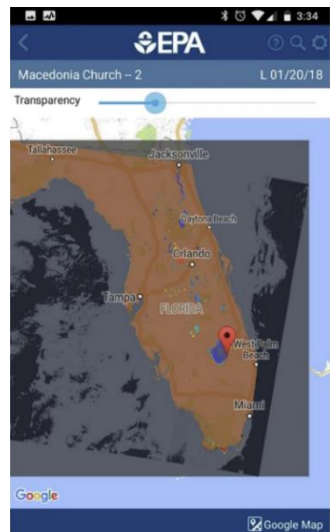
Data gives us...

Estimates of coastal (and inland) water quality...

Prediction of pathogen risk (HABs, cholera, e-coli etc)...

Society gets...

- Reduced monitoring costs and assessment of policy effects
- Operational planning for aquaculture, tourism
- Improved health outcomes (bathing water, food standards)



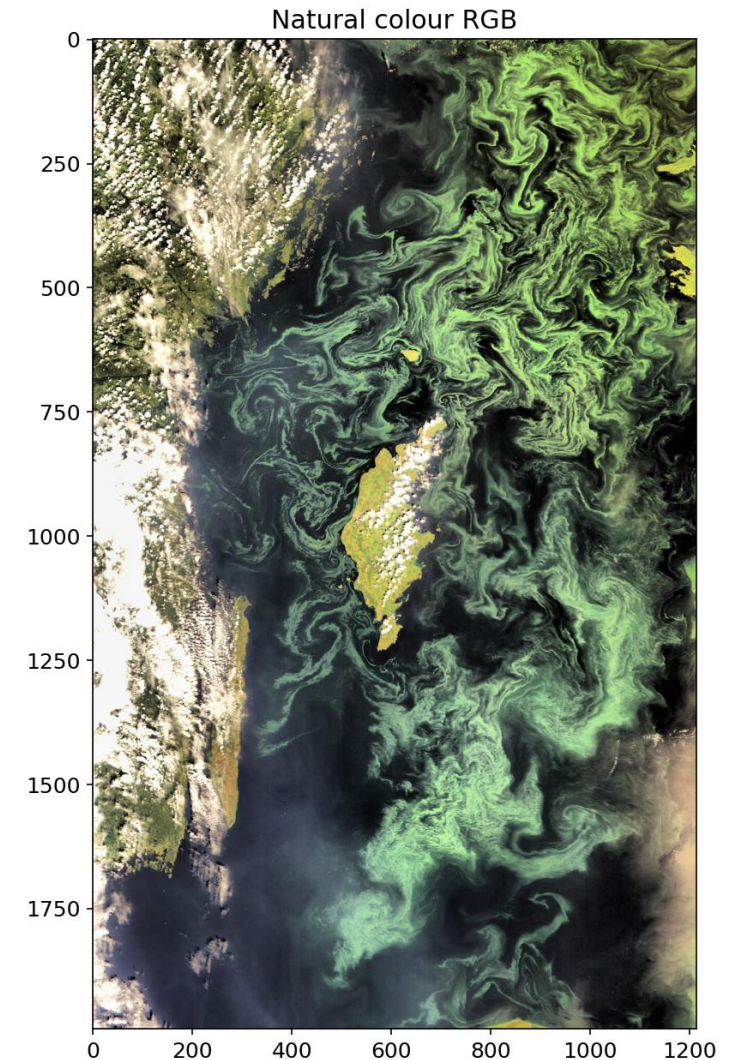
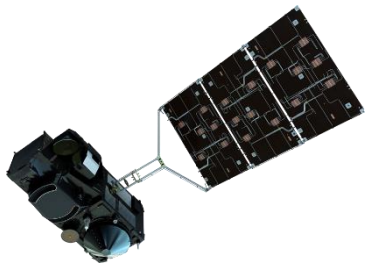
#EUdata4OceanDecade

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Challenge 1: Example workflow - Eutrophication

Satellite data contributing to monitoring algal blooms caused by excess fertiliser and more:

- Ocean colour data can be used to monitor algal blooms which impact water quality and health.
- Influenced by pollution by agricultural run off
- Important to monitor to provide warnings and assess policy impact
- Notebook shows how to access and process data on such blooms over time



Challenge 2: Protect and restore ecosystems and biodiversity

Data gives us...

Long-term baselines of environmental status (Chlorophyll, fronts, heat risk, sediments etc)...

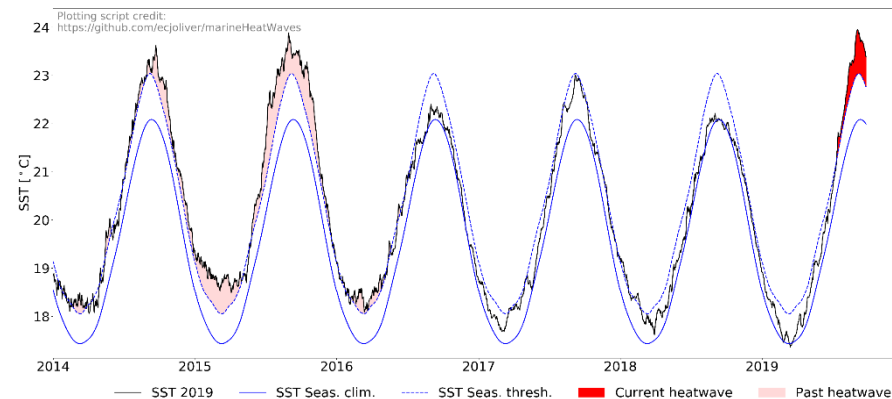
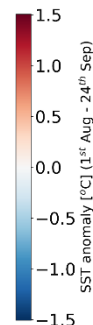
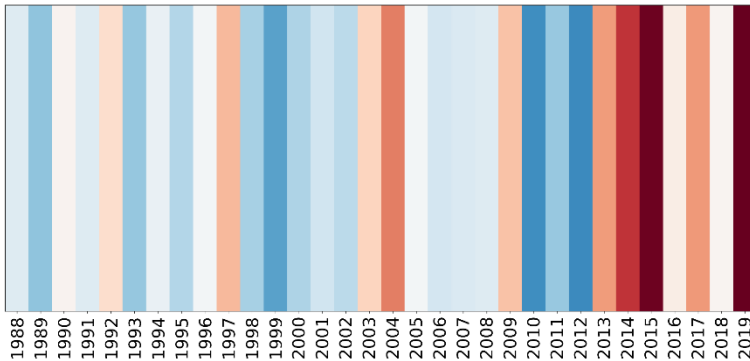
Detection of phytoplankton functional types...

Society gets...

Optimal Marine Protected Area siting and biodiversity protection

Fisheries management (PFZs)

Efficient and appropriate Marine Spatial Planning and Environmental Impact Assessments



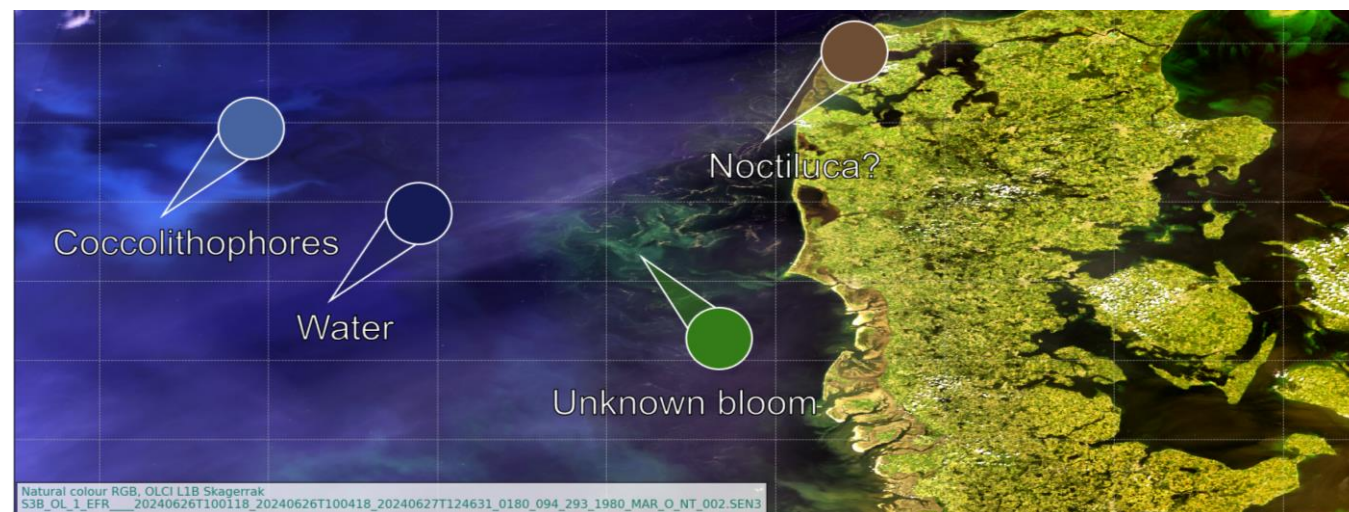
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Challenge 2: Example workflow – Phytoplankton types

Satellite data contributing to monitoring phytoplankton diversity:

- Ocean colour data can be used to support the identification of different phytoplankton species.
- Many have specific biogeochemical roles.
- Notebook shows access to ocean colour data and understand the signal.



....and marine heatwaves (see demo!)



Challenge 5: Unlock ocean-based solutions to climate change

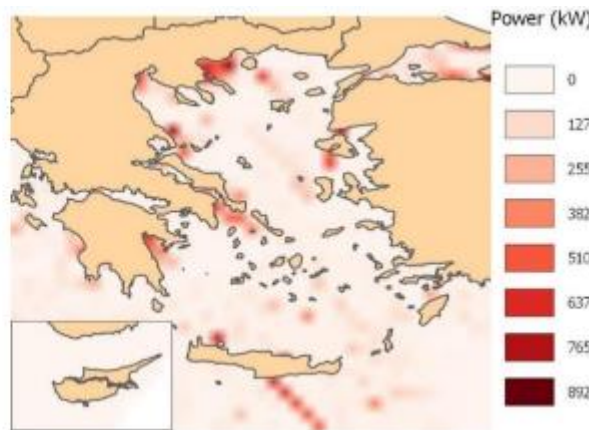
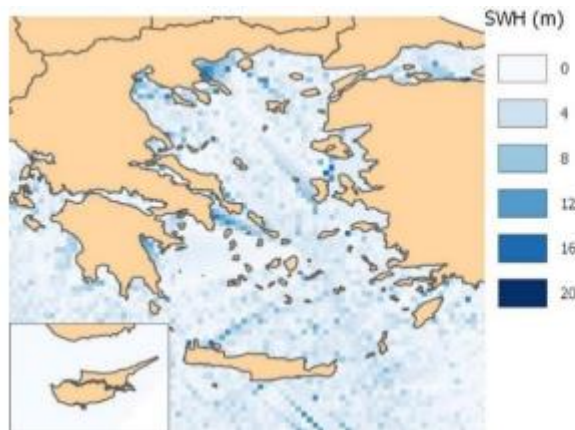
Data gives us...

Improved current/wave/wind/ice measurements and model forecasts (CMEMS etc)...

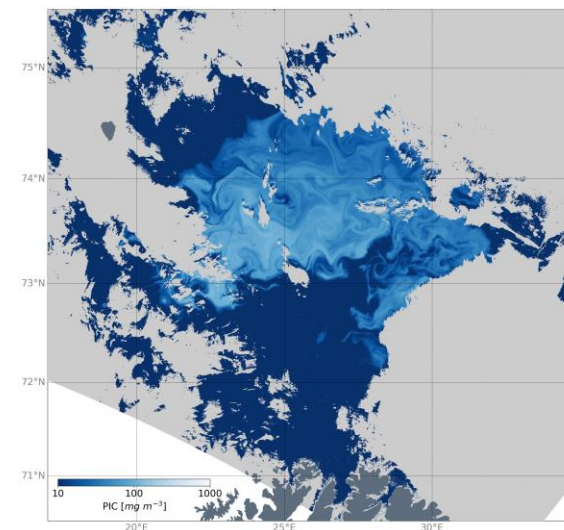
Understanding of ocean carbon pools via ocean colour....

Society gets...

- Optimised siting for renewable energy
 - Safety at sea – lives and infrastructure
 - Coastal resilience – storm protection
 - Efficient route planning – reduced fuel costs and emissions
-
- Information on which processes and where can be linked to carbon uptake



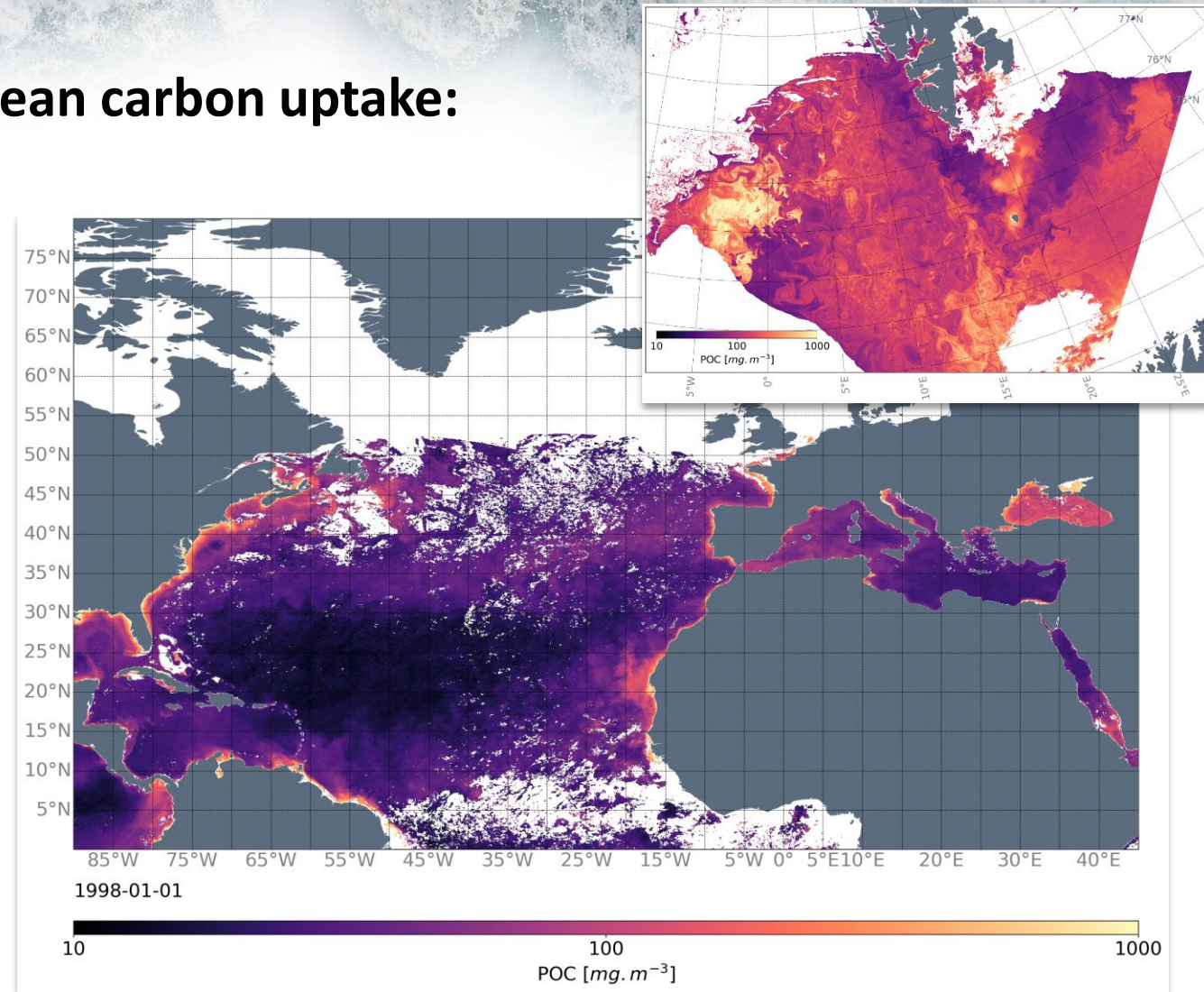
SWH wave energy potential derived from Sentinel-3 SRAL (Credit: Kaselimi et al., 2019)



Challenge 5: Example workflow – ocean carbon

Satellite data contributing to monitoring ocean carbon uptake:

- Ocean colour data can be used to derive information about carbon pools e.g. POC, PIC
- Other data can be used towards studies of carbonate system (ocean acidification).
- Data offers insight in to event scale dynamics and long-term trends.
- Notebook shows access to ocean colour data and applications of a simple, published algorithm for POC.



Learn more!

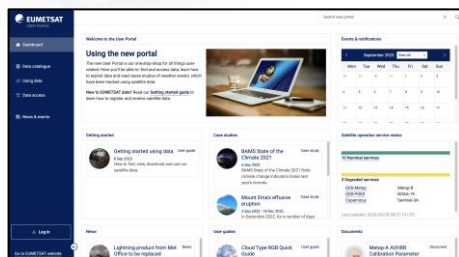
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EUMETSAT Helpdesk

OPS@eumetsat.int

User portal

Copernicus
& mandatory
missions
Data access



Contact the EUMETSAT helpdesk with any
questions about EUMETSAT data products
or services

Courses



moodle

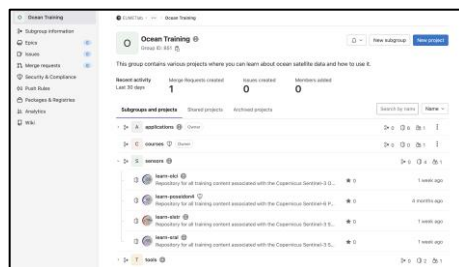


Code distribution

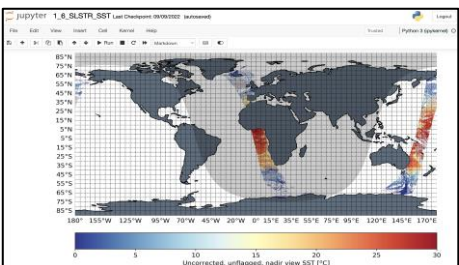
CONDA



GitLab



Jupyter Notebooks

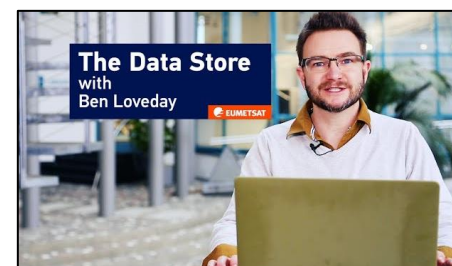


Cloud
services

 binder



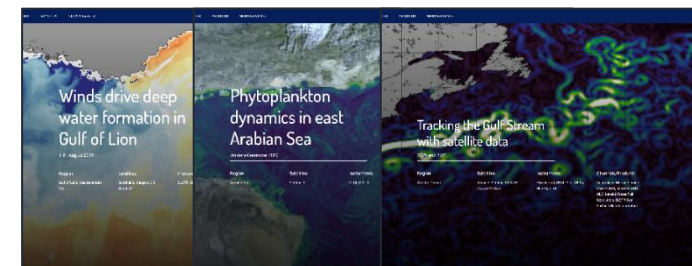
Video tutorials



YouTube



Case studies



THANK YOU

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Contact ops@eumetsat.int for any help you need



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