

Copernicus Marine Service and Ocean Energy Europe Partnership



Marine Monitoring

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Implemented by





OUTLINE

- **WHICH OCEAN DATA OFFER FOR MARINE RENEWABLE ENERGY**
- **HOW OCEAN DATA ANSWER MARINE RENEWABLE ENERGY NEED**
- **HOW IS ORGANISED INDUSTRY REQUIREMENT FEEDBACK**
- **USE CASES**



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WHICH OCEAN DATA OFFER FOR MARINE RENEWABLE ENERGY

OCEAN DATA BASE TARGETING ALL SECTORS



And more...

OCEAN KNOWLEDGE AND DATA BASE TARGETING MRE SECTOR



And more...





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WHICH PRODUCTS? + 15 OCEAN PARAMETERS

Temperature
Salinity

Currents
Waves

Transparency
Turbidity

Oxygen

Sea surface
elevation

Sea ice
Surface Wind

Nutrients
Plankton

Bathymetry

Primary
production

Also
TRAINING
WEBINARS



INTERNATIONAL



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WHICH OCEAN DATA OFFER FOR RENEWABLE MARINE ENERGY



- marine.copernicus.eu
- Sustained in the long term
- Open and Free
- User-Driven

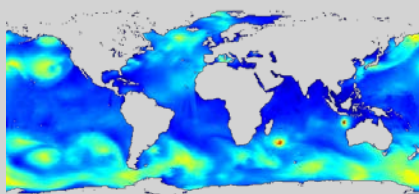




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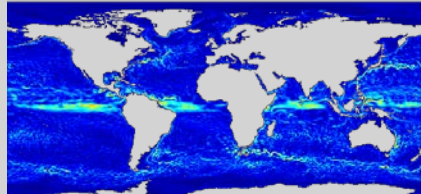
COPERNICUS MARINE SERVICE HIGH QUALITY OCEAN DATA

Wave Energy



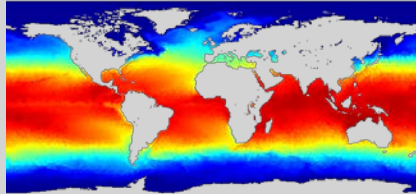
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Ocean Currents



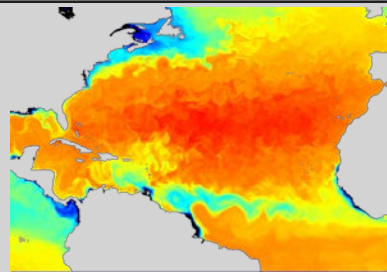
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OTEC SWAC



2018-04-07T00:30:00.000Z

Salinity Gradient



2017-09-22T11:00:00.000Z

**Hourly and daily
surface ocean waves**

GLO : 8km

MED: 4km

NWS: 7km

**Hourly and daily 3D
ocean currents**

GLO : 8km

MED: 4km

NWS: 7km

**Hourly and daily 3D
ocean temperature**

GLO : 8km

MED: 4km

NWS: 7km

**Hourly and daily 3D
ocean salinity**

GLO : 8km

MED: 4km

NWS: 7km





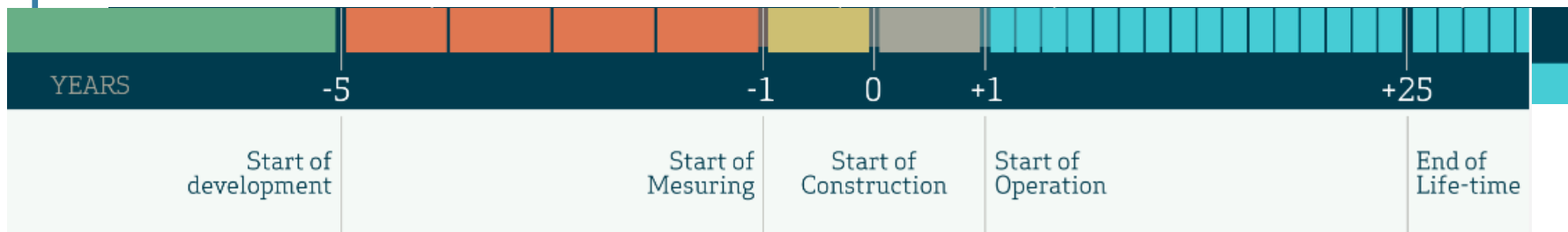
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RENEWABLE MARINE ENERGY FARM LIFE CYCLE



Copernicus
Europe's eyes on Earth

Implemented by
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OCEAN**
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HOW OCEAN DATA ANSWER RENEWABLE MARINE ENERGY NEED

1. Evaluation of **ocean energy resources** (tidal, wave, heat, currents, salinity)
2. **Performance validation and technology certification**
3. Evaluation of met-ocean conditions for **operations at sea**
4. Evaluation of **constraints applied on the sea-exposed machines**
5. **Environmental impact assessment** of farm (before / after implementation)





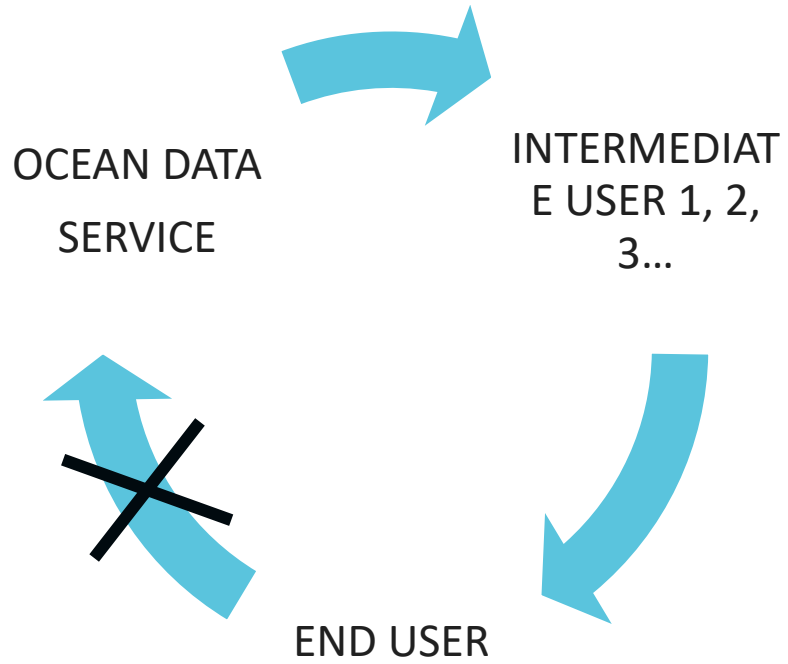
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HOW IS ORGANISED INDUSTRY REQUIREMENT FEEDBACK





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MERCATOR OCEAN/OEE PARTNERSHIP

Ocean Energy Europe

Mercator Ocean International



**A leader Trade Association
for Renewable Marine Energy**
<https://www.oceanenergy-europe.eu>



Copernicus
Marine Service



**MERCATOR
OCEAN**
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Free Ocean Data Provider
<https://marine.copernicus.eu>





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OBJECTIVES OF PARTNERSHIP

FOR CMEMS

- Better understand OEE member behavior regarding Ocean data
- Increase number of CMEMS users in the MRE sector
- Improve CMEMS portfolio to better fit MRE sector needs

FOR OEE

- Help OEE members using Ocean data
- Raise awareness about OEE among DG GROW units





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HOW IS ORGANISED INDUSTRY REQUIREMENT FEEDBACK

- Survey sent by OEE to its members to get feedbacks about Copernicus Marine Service data
- Information and Training session during annual OEE event.
- Webinar among OEE members





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OCEAN THERMAL ENERGY CONVERSION - OTEC

Ocean Thermal Energy Conversion (OTEC) exploits the difference in temperature between warm surface and cooler deep waters (temperature difference of at least 20 °C).

Using the ocean database of Copernicus Marine Service, **Bluerise in collaboration with TU Delft**, has evaluated the year round and ten year average ocean characteristics in the **Caribbean** analyzing the ocean currents, density and temperature profiles over depth. Particular attention was spent on ocean upwelling and seasonal fluctuations. **This enables a quick assessment of the feasibility of OTEC locations.**

Example of CMEMS user:





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BIMEP TEST SITE

The Biscay Marine Energy Platform (**BiMEP**) is an open sea test site with grid connection for demonstrating and validating **wave energy collectors and floating wind** platforms. BiMEP provides manufacturers with ready-to-use facilities to test technical and economic feasibility of their prototype.

BiMEP and IH Cantabria have developed a Prediction System to forecast wind, wave, currents and sea level conditions to be considered in the **planning of marine operations at BiMEP** and feed the Decision Support System developed in TRL+ project. The Copernicus Marine Service **physics and wave** models are used as forcing conditions in a very high resolution model.

Example of CMEMS user:





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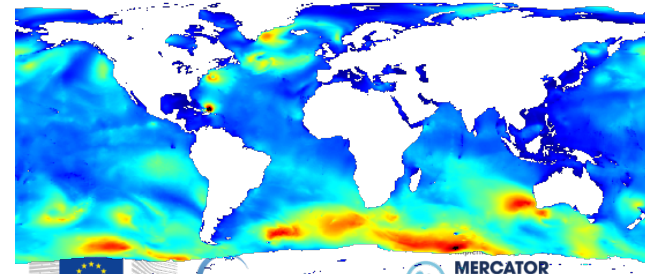
CONSTRAINT EVALUATION ON SEA-EXPOSED MATERIAL

A harsh ocean environment with strong winds and waves over decades of use causes significant wear and tear on offshore structures. The angle from which waves hit a platform, and the wave height are important factors, but in addition the wave frequency is an important factor due to the resonance frequency of the structure itself.

AHPA, Asset Health and Probabilistic Analyses, focuses on **probability analyses of fractures and strains on offshore structures**. The Copernicus Marine Service wave height combined with period is used to predict the 3-dimensional motion of floating bodies.

Example of CMEMS USER:

AHPA



Wave Height Evolution during 5days in October 2017



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THANK YOU

