

# Marine Ecosystem Analysis and Prediction (MEAP) Task Team



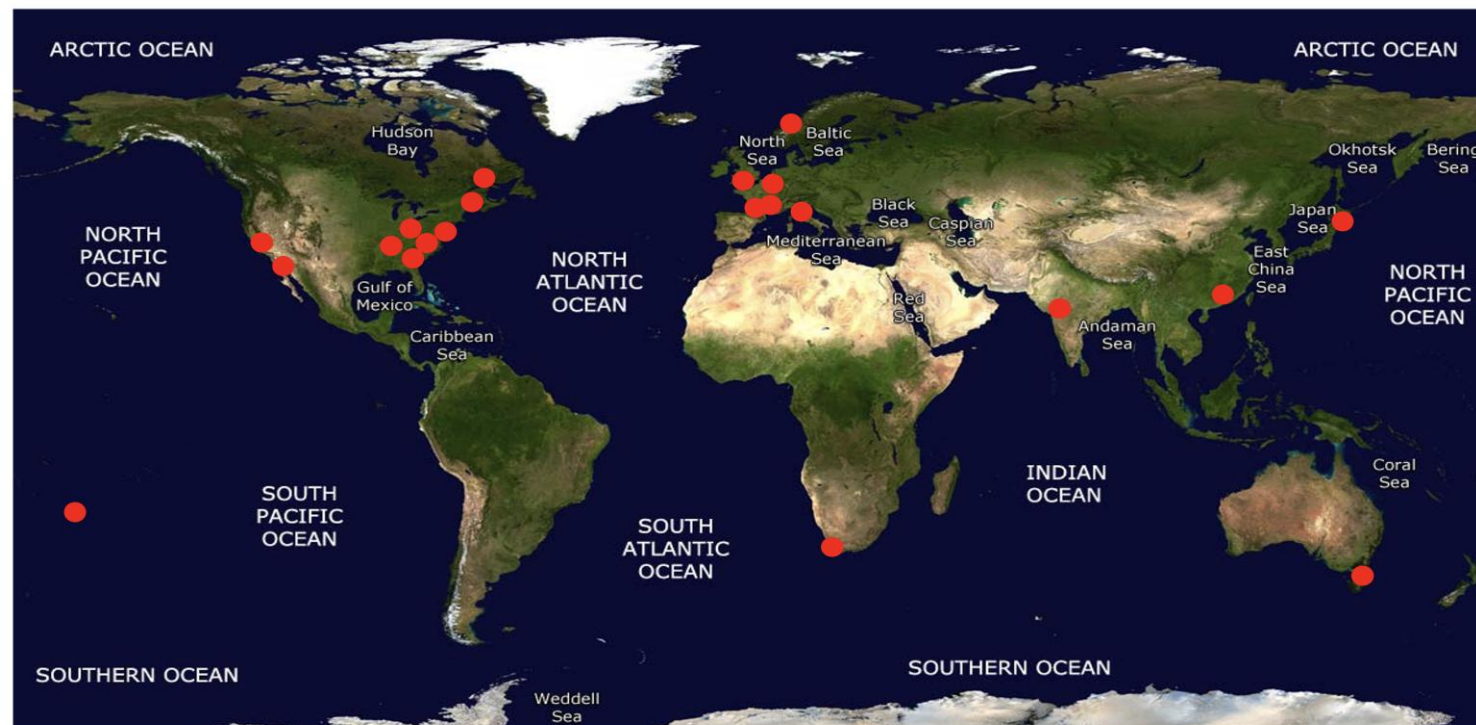
Co-chairs:  
Stefano Ciavatta (MOi), Liuqian Yu (HKUST(GZ))

28 members, 22 organizations

| No | First name     | Last name       | Affiliation                                        | Country      | Role            |
|----|----------------|-----------------|----------------------------------------------------|--------------|-----------------|
| 1  | Laurent        | Bertino         | NERSC                                              | Norway       | Member          |
| 2  | Pierre         | Brasseur        | CNRS/IGE                                           | France       | Member          |
| 3  | Chris          | Brown           | NOAA                                               | USA          | Member          |
| 4  | Kunal          | Chakraborty     | INCOIS                                             | India        | Member          |
| 5  | <b>Stefano</b> | <b>Clavatta</b> | Mercator Ocean international                       | France       | <b>Co-chair</b> |
| 6  | Gianpiero      | Cossarini       | OGS                                                | Italy        | Member          |
| 7  | Stephanie      | Dutkiewicz      | MIT                                                | USA          | Member          |
| 8  | Chris          | Edwards         | UCSC                                               | USA          | Member          |
| 9  | Katja          | Fennel          | Dalhousie University                               | Canada       | Member          |
| 10 | David          | Ford            | Met Office                                         | UK           | Member          |
| 11 | Shan           | Gao             | NMFC                                               | China        | Member          |
| 12 | Marilaine      | Gregoire        | University of Liege                                | Belgium      | Member          |
| 13 | Dodie          | Gutknecht       | Mercator Ocean international                       | France       | Member          |
| 14 | Hakase         | Hayashida       | JAMSTEC                                            | Japan        | New member      |
| 15 | Dante M L      | Horemans        | Virginia Institute of Marine Science               | USA          | Member          |
| 16 | Emlyn          | Jones           | CSIRO                                              | Australia    | Member          |
| 17 | Hae-Cheol      | Kim             | NOAA                                               | USA          | Member          |
| 18 | Julien         | Lamoureux       | Mercator Ocean international                       | France       | Member          |
| 19 | Patrick        | Lehodey         | CLS                                                | France       | Member          |
| 20 | Paul           | Mattern         | UCSC                                               | USA          | Member          |
| 21 | Ragu           | Murtugudde      | ESSIC/ University of Maryland                      | USA          | Member          |
| 22 | Helen          | Powley          | PML                                                | UK           | Member          |
| 23 | Coralie        | Perruche        | Mercator Ocean international                       | France       | Member          |
| 24 | Ariane         | Verdy           | Scripps Institution of Oceanography                | USA          | Member          |
| 25 | Marcello       | Vichi           | University of Cape Town                            | South Africa | Member          |
| 26 | Tsuyoshi       | Wakamatsu       | NERSC                                              | Norway       | Member          |
| 27 | Yongsheng      | Wu              | BIO                                                | Canada       | Member          |
| 28 | Peng           | Xiu             | Xiamen University                                  | China        | New member      |
| 28 | <b>Liuqian</b> | <b>Yu</b>       | The Hong Kong University of Science and Technology | China        | <b>Co-chair</b> |

The green integrated component of the OceanPredict vision, strategy and implementation

12 countries, 5 continents



## What works

- ✓ Meetings are valued, especially scientific content and networking
- ✓ One-hour length works well for most
- ✓ Recordings help those who miss live sessions

## What doesn't work

- ✓ Time-zone barriers remain the biggest obstacle
- ✓ Only a few can attend regularly
- ✓ Live interaction is important to many (recordings aren't enough for them)
- ✓ Split preference on monthly vs. bi-monthly meetings

## Recommendations

- ✓ Keep expert seminars but add more open discussion and deep dives
- ✓ Move to bi-monthly meetings as a compromise
- ✓ Start small thematic subgroups (top member request)
- ✓ Relax the one-person-per-institution rule
- ✓ Open seminars more widely to non-members
- ✓ Occasionally schedule an Asia-Pacific friendly time
- ✓ For those who can't attend regularly: send email summaries and allow junior colleagues to participate in their place

Based on 10 respondents





### Co-convened a session at OSM2026

#### Advancing marine ecosystem modelling for a predictable and sustainable ocean

##### *Conveners:*

Stefano Ciavatta (MEAP-TT & NECCTON),  
Jann Paul Mattern (MEAP-TT), Liuqian Yu (MEAP-TT),  
Drago Laetitia (NECCTON)



This session highlighted innovations in modeling to enhance analysis, prediction, and decision-making. We welcome contributions that:

- ✓ Integrate novel data (e.g., Argo floats, genomic surveys);
- ✓ Use advanced tools (e.g., AI, digital twins);
- ✓ Link lower and higher trophic levels (e.g., zooplankton and fishes);
- ✓ Predict and mitigate ocean threats (e.g., algal blooms, acidification);
- ✓ Improve understanding of nutrient cycling and trophic dynamics.

The session fostered interdisciplinary collaboration to advance marine ecosystem science and sustainability

### Animated a session at the EU Digital Ocean Forum



## Animated round-table at the EU Ocean Days

### Ocean data and applications for Ocean Health

Organised by: DG Mare, DG DEFIS, DG ENV

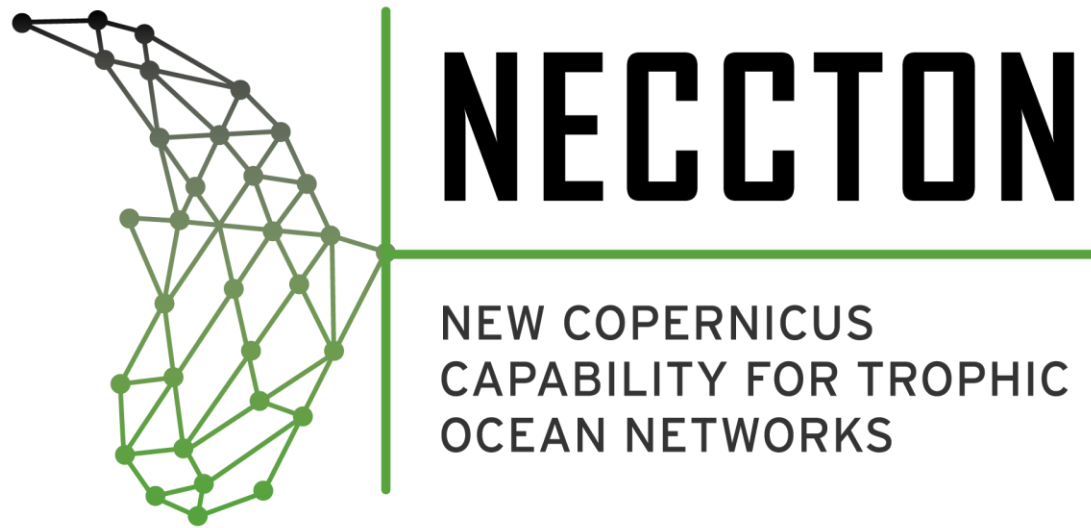
#### *Panelists:*

Stefano Ciavatta (MEAP-TT & NECCTON), Joana Beja (Vliz), Jan Ekebom (Ministry of the Environment of Finland) · Ander Erichsen (DHI), David Reid (ICES)



- Opened with a concrete, **high-impact case for MEAP** (Bering Sea snow crab collapse)
- MEAP to understand responses of complex ecosystems to climate and human pressures
- Drew analogy with weather forecasting to emphasize the need for **predictive marine ecosystem forecasts**, not just reactive measures
- Combining **high-quality observations (EMODnet)** with **operational ecosystem models (Copernicus Marine Service)**
- Presented the **Digital Twin Ocean** for “what-if” ME scenario testing for policy and management
- Concluded by stressing MEAP to anticipate risks, support decision-making, and protect ocean health, food security, and human well-being**

**FR-UK Rise event organized by the French Embassy in London, UK Royal Society, London (November 2026)**



**2021  
2030** United Nations Decade  
of Ocean Science  
for Sustainable Development



**MBON**  
Marine Biodiversity  
Observation Network

- **Type:** Horizon Europe Copernicus Evolution project endorsed by UN Ocean Decade
- **Coordination:** S Ciavatta - Mercator Ocean int.
- **Duration:** 4 years (Jan 2023-Dec 2026)
- **Budget:** 10M Eur
- **Partners:** 23 (MOI, UKMO, NERSC, OGS, PML, CNRS, ...)
- **Advisors:** Katja Fennel, Fraser Davidson (?), Jason Link (NOAA), Frank Karger-Muller (U o Florida/MBON) et al.



# The EU Copernicus Marine Service



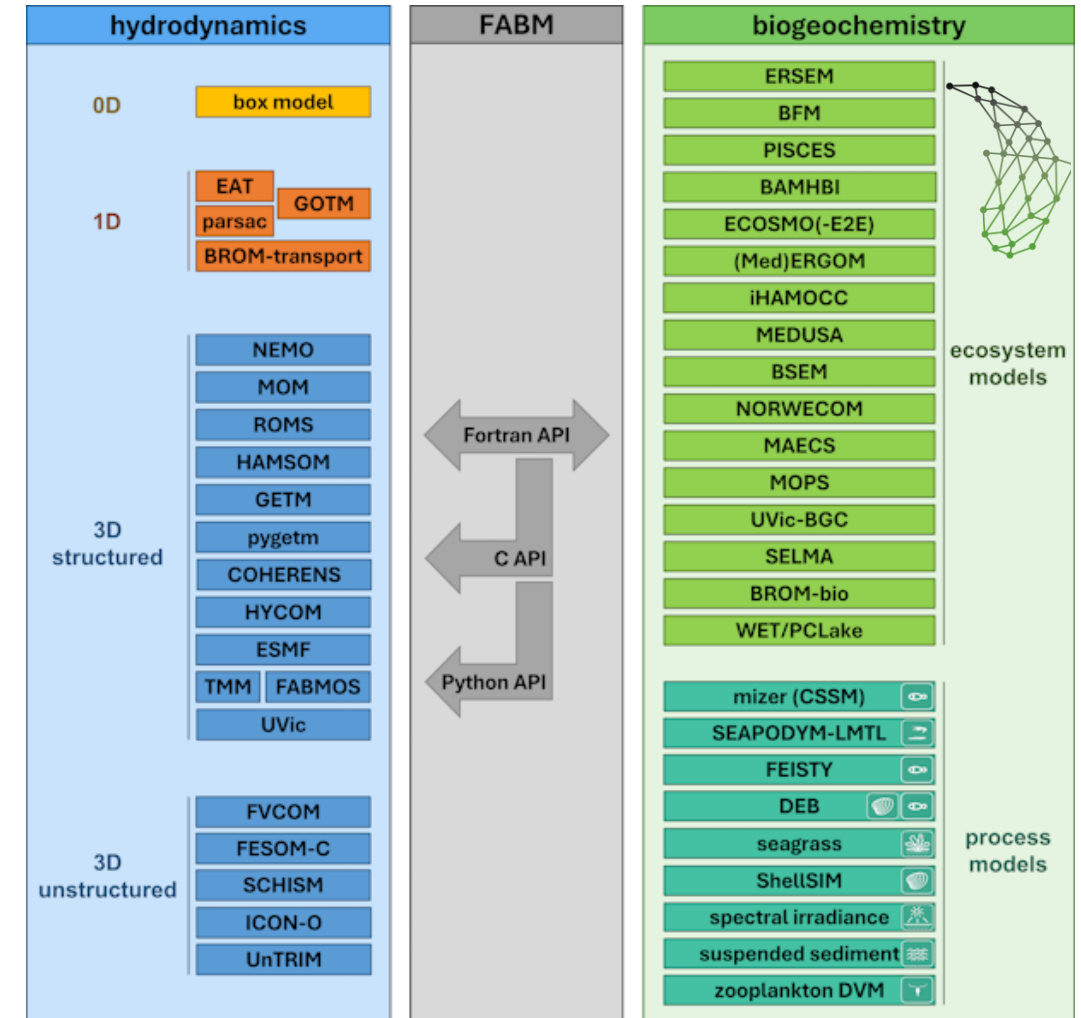
MEAP-TT, OPST-12, 16<sup>th</sup> April 2026



This project has received funding from Horizon Europe RIA under Grant Number 101081273 and the [UK Research and Innovation](#)

# Framework for Aquatic Biogeochemistry Modelling (FABM)

- FABM for an international, operational marine ecosystem modelling community
- Mix & match PHY and BGC models
- An international consortium is being built through an MoU: join us!





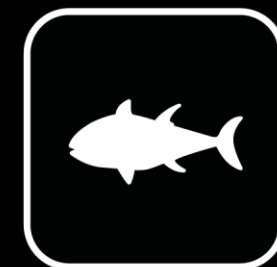
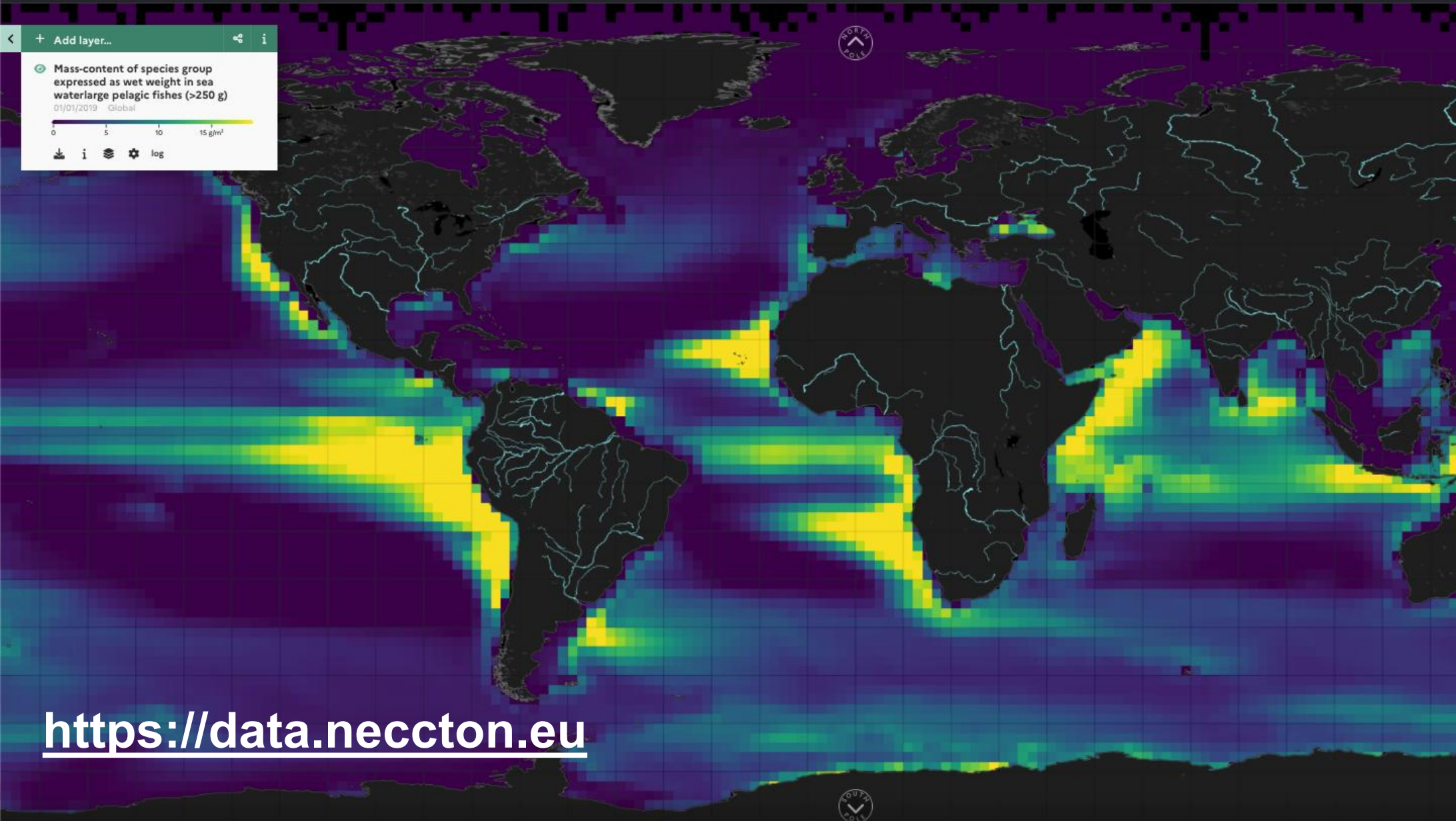
+ Add layer...

Mass-content of species group expressed as wet weight in sea waterlarge pelagic fishes (>250 g)

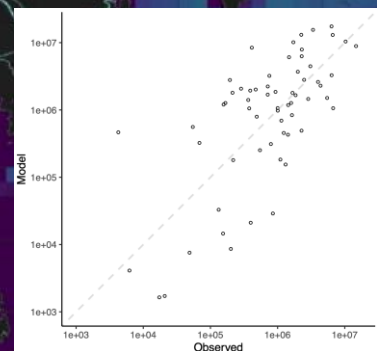
01/01/2019 Global

0 5 10 15 g/m<sup>2</sup>

Download Info Layers Settings Log



Large-pelagics



<https://data.neccton.eu>

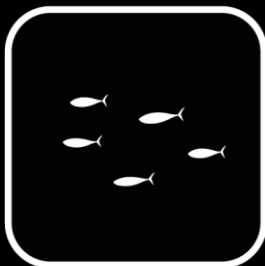
Technological  
Readiness  
Level



Mesozooplankton



Macrozoobenthos



Small-pelagic



Large-pelagics



Plastic

27  
total



Arctic

5

4



North West  
Shelf seas

5

4

4, 5

5

4



Baltic

4



Iberian  
Biscay  
Irish

5

4, 4, 4, 4, 5 5



Med Sea

5

5, 5

5



Black Sea

5



Global Ocean

5

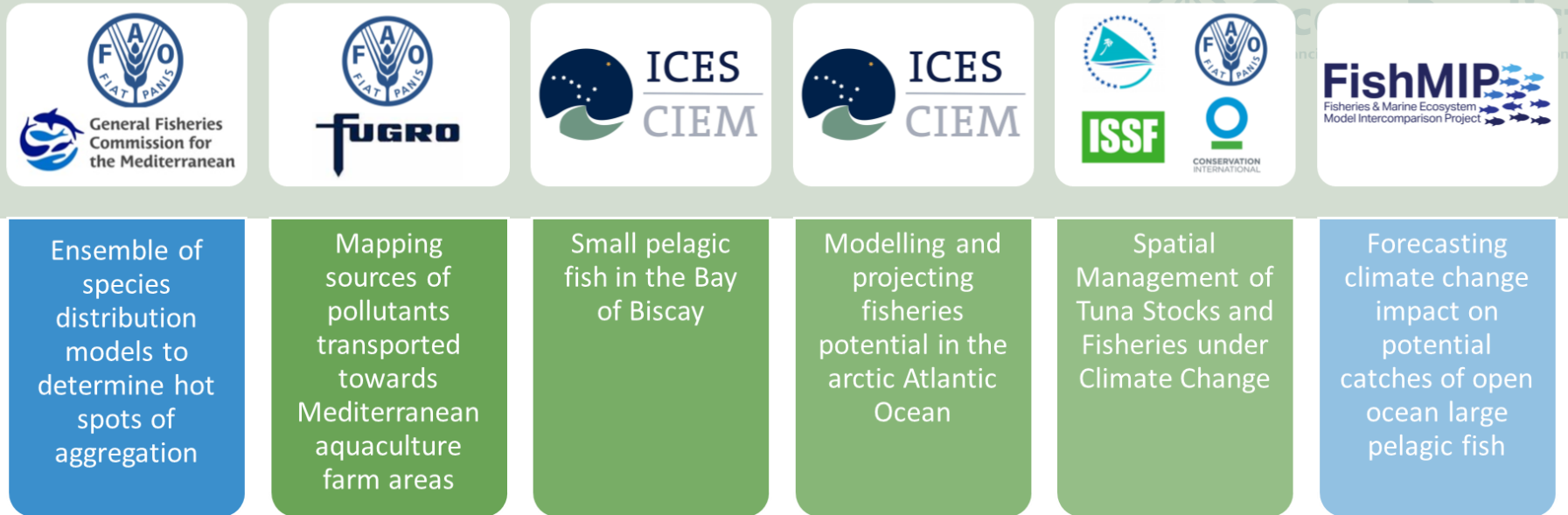
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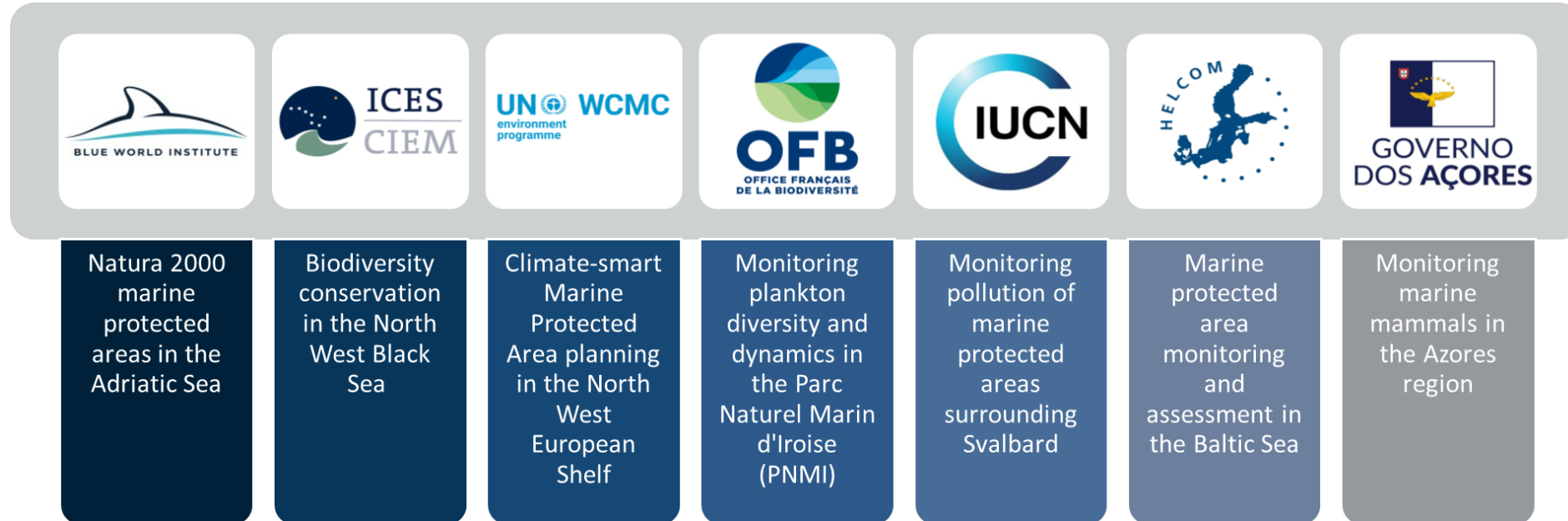


# The NECCTON case studies co-created with stakeholders

## Fishery management



## Biodiversity conservation

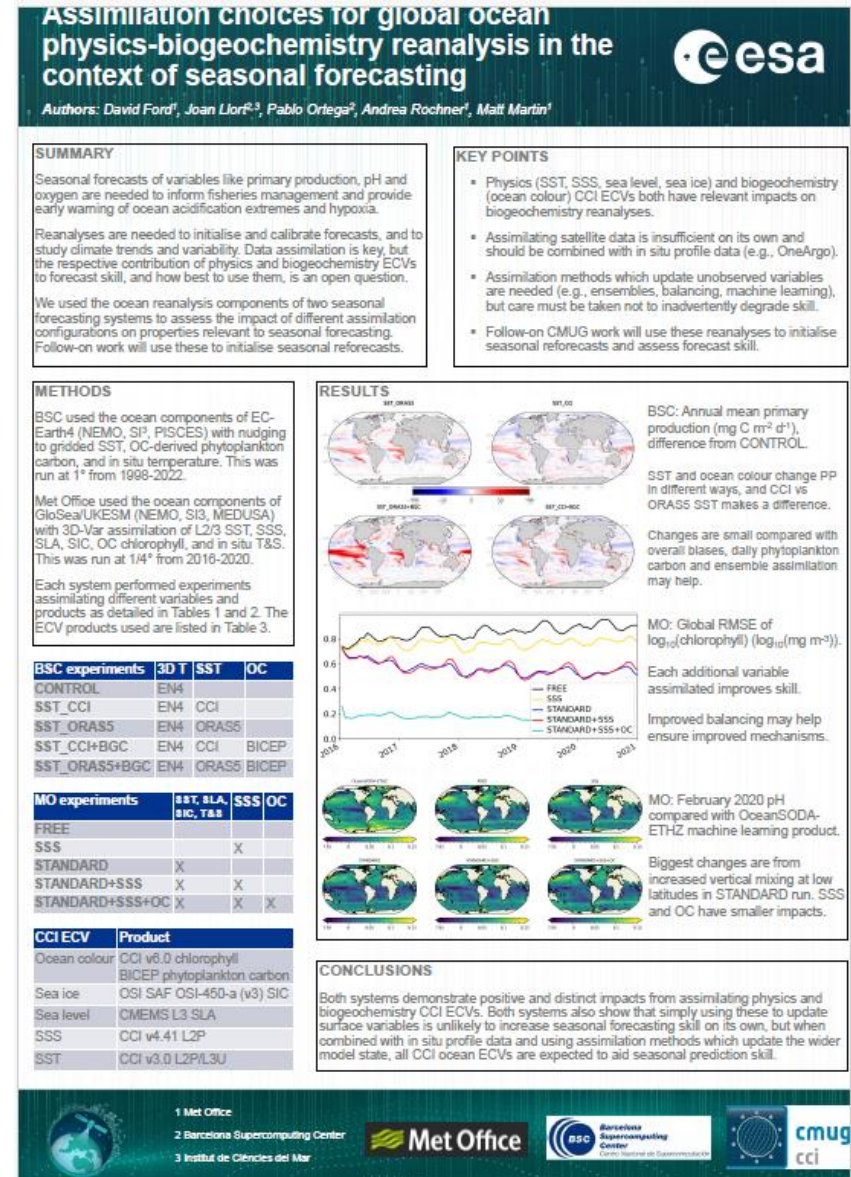




**Met Office and Barcelona Supercomputing Center working together as part of ESA Climate Change Initiative to look at physics and biogeochemistry assimilation choices to provide optimal reanalyses for seasonal forecasting systems**

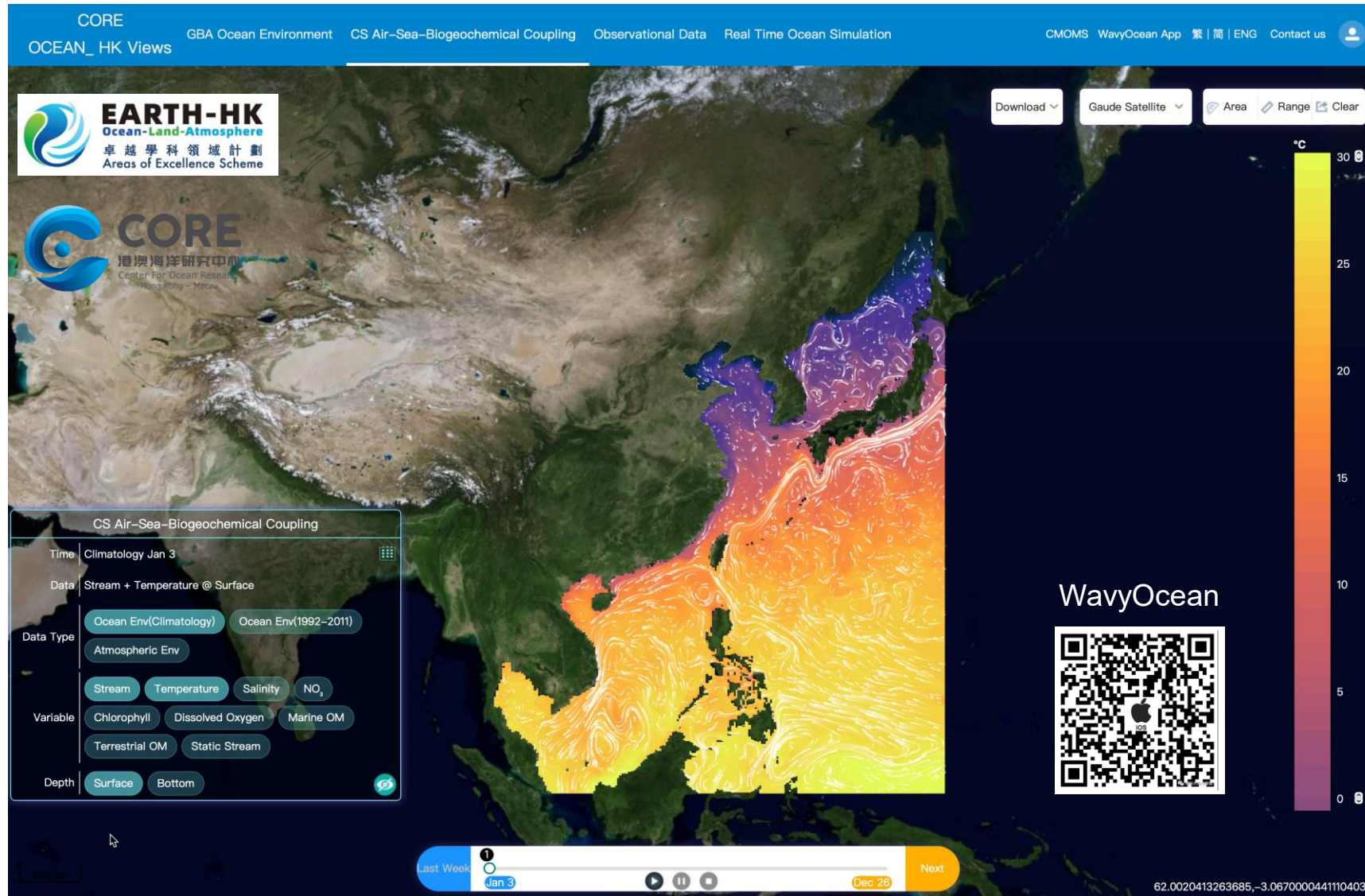
Next steps include running **seasonal forecasts of ocean biogeochemistry** (e.g. primary production, pH, oxygen)

Will present at future MEAP-TT meeting and further collaboration hoped for





# Recent activities: EARTH-HK project



EARTH-HK project (funded by Hong Kong Research Grants Council, US\$ 11M for 2024-2028)

- Aiming at building a digital twin Regional Earth System to support sustainable development of the Guangdong-Hong Kong-Macao Greater Bay Area under climate change

PI:

Jianping Gan (HKUST; COSS-TT member)

Co-I:

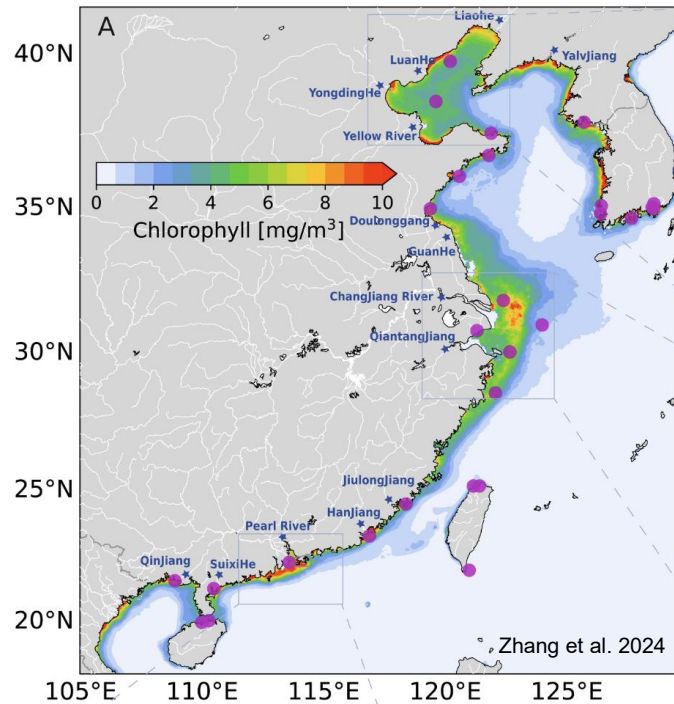
Liuqian Yu (MEAP-TT) & many others

WavyOcean



## Coastal Oxygen and Hypoxia in Asian waters (2024-2029, core member: Liuqian Yu)

- endorsed as a project under the UN Decade programme *Global Ocean Oxygen Decade (GOOD)*
- aims to advance understanding about deoxygenation and seasonal hypoxia in Asian coastal waters under the dual-control of intense eutrophication and global warming.



10+ publications on this topic since 2024

- ✓ Invited webinar on deoxygenation at Marine Geoscience Forum (Mar 2026)
- ✓ Invited talk on hypoxia modeling at Youth Geoscience Forum (Apr 2026)



Invited instructor for ocean biogeochemical modeling workshop for graduate students

- ✓ Xiamen University (Dec 2025)
- ✓ Hainan University (planned in May 2026)





## Other recent & planned activities

Improve GOOS essential ocean variables

**BIOGEOSEA** biogeochemistry  
Ocean Insights for the Future

**Bio Eco**  **cean** biology

 **EDITO**  **DTO-BioFlow**  
Integration of biodiversity monitoring data into the Digital Twin Ocean  
Developing marine ecosystem offer of the DTO

 **ceanICU**  
Understanding Ocean Carbon

Contribution of the “biological carbon pump” and fisheries on the ocean carbon sink

**SEACLIM**  
**Rivierade**

Regional decadal and centennial marine ecosystem predictions in CMEMS and EDITO

**Climate and Marine Production (CAMP)**

Improve biogeochemical model parameterizations and projections



Marine ecosystem component of operational systems in Costa Rica

More “MEAP” projects to kick-off and proposals in the pipeline





## Planned conference sections in 2026/2027

– Engage members from Asia, Australia, and beyond

### Physical and Biogeochemical Processes: Observational and Modeling Studies

*Conveners:*

Hajoon Song (Yonsei University)

Liuqian Yu (HKUST(GZ))

Xinru Li (Tohoku University)

Shinichiro Kida (Kyushu University)



AOGS2026 in Fukuoka, Japan  
August 02-07, 2026

### Advancing marine ecosystem modelling for a predictable and sustainable ocean

*Conveners:*

Liuqian Yu (HKUST(GZ))

Hakase Hayashida (JAMSTEC )

Peng Xiu (Xiamen University)

Bin Wang (Second Institute of Oceanography, MNR)



XMAS2027 in Xiamen, China  
January 11-14, 2027

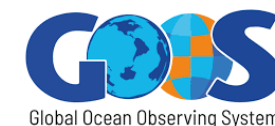
# Plans: planned dissemination & coms meetings and panels



OCG-17

## 17th session of Observations Coordination Group (OCG-17)

11 – 14 May 2026, Valparaiso, Chile



1. Final NECCTON Stakeholder meeting
2. Convened session: 3.1 Bringing marine ecosystem modelling in operation to predict and protect ocean biodiversity.



1. Making marine **ecosystem models operational** (e.g. in the Copernicus Marine)
2. International coordination of model developments (e.g. **FABM Consortium**)
3. Work closely with **marine biogeochemistry and biology observation programmes** for validation, assimilation, OSSE (e.g. BGC-ARGO, ESA CCI, GOOS BGC & BIO panels, MBON)
4. Develop and promote marine **ecosystem indicators** (e.g. OMIs, GOOS- EOVI based)
5. Integrated marine ecosystem models in **the Digital Twin Ocean** (e.g. EDITO)
6. Co-create MEAPs applications with **stakeholders** (e.g. ICES, FAO GFCM, RFMOs)
7. Convince marine ecosystem managers & policymakers to use MEAPs (e.g. OSPAR, HELCOM, EU DGs, RFMOs, FAO RFMOs)