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**OPST12**

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# ForeSea – The ocean prediction capacity of the future

**Vision:** Strong international coordination and community building of the ocean prediction capacity for the future.

## FORESEA: the Ocean Decade programme of OceanPredict

### *Overarching goals*

- Advance the science, capacity, efficacy, use, and impact of ocean prediction systems
- Build impactful, relevant, integrated, and interconnected ocean prediction systems
- Contribute a seamless end to end ocean information value chain

=> make ocean prediction science more impactful and relevant.



# ForeSea: Transformative

## ➤ OceanPredict:

- International coordination mechanism across national centers to exchange on and improve ocean prediction system science

## ➤ ForeSea's Vision:

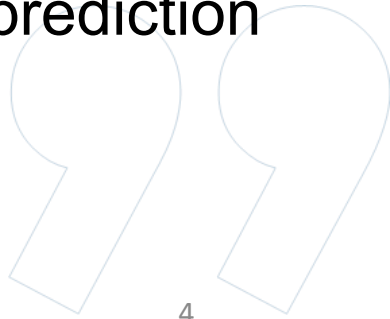
- Strong international community building of the ocean prediction of the future that:
  - advances ocean prediction science, but also
  - increases capacity, efficacy, use, and societal impacts of the ocean predictions systems.
- A collaborative and sustainable oceanography ecosystem responsive to user needs.





# ForeSea: Transformative and beyond “business as usual”

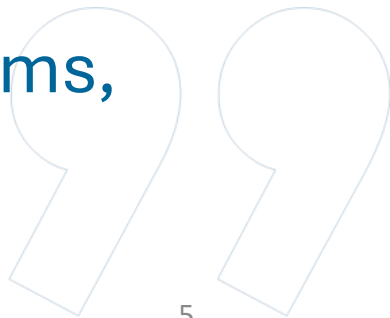
- Democratization of ocean information to enable more impactful engagement
- Creation of an effective and sustainable operational oceanography ecosystem environment responsive to user needs.
- Establishment of a framework for operational oceanography (collaboration with Ocean Prediction DCC) that enables scientists and stakeholders to engage and collaborate with
  - all components of the value chain and
  - the UN Decade programmes associated with these components
- Enhancement of communication of the impact and relevance of ocean prediction





# ForeSea strategy

1. Development of the **foundations** for a global ocean information delivery system
2. **Integration of ocean forecasting**/prediction efforts with other affiliated efforts and other components of the operational oceanography value chain.
3. Development of **improved assessments and prediction** of the ocean system
4. Implementation of coordinated **capacity building**
5. Improvement of **ocean modeling capacity** (numerical algorithms, parameterizations, resolution, etc.)

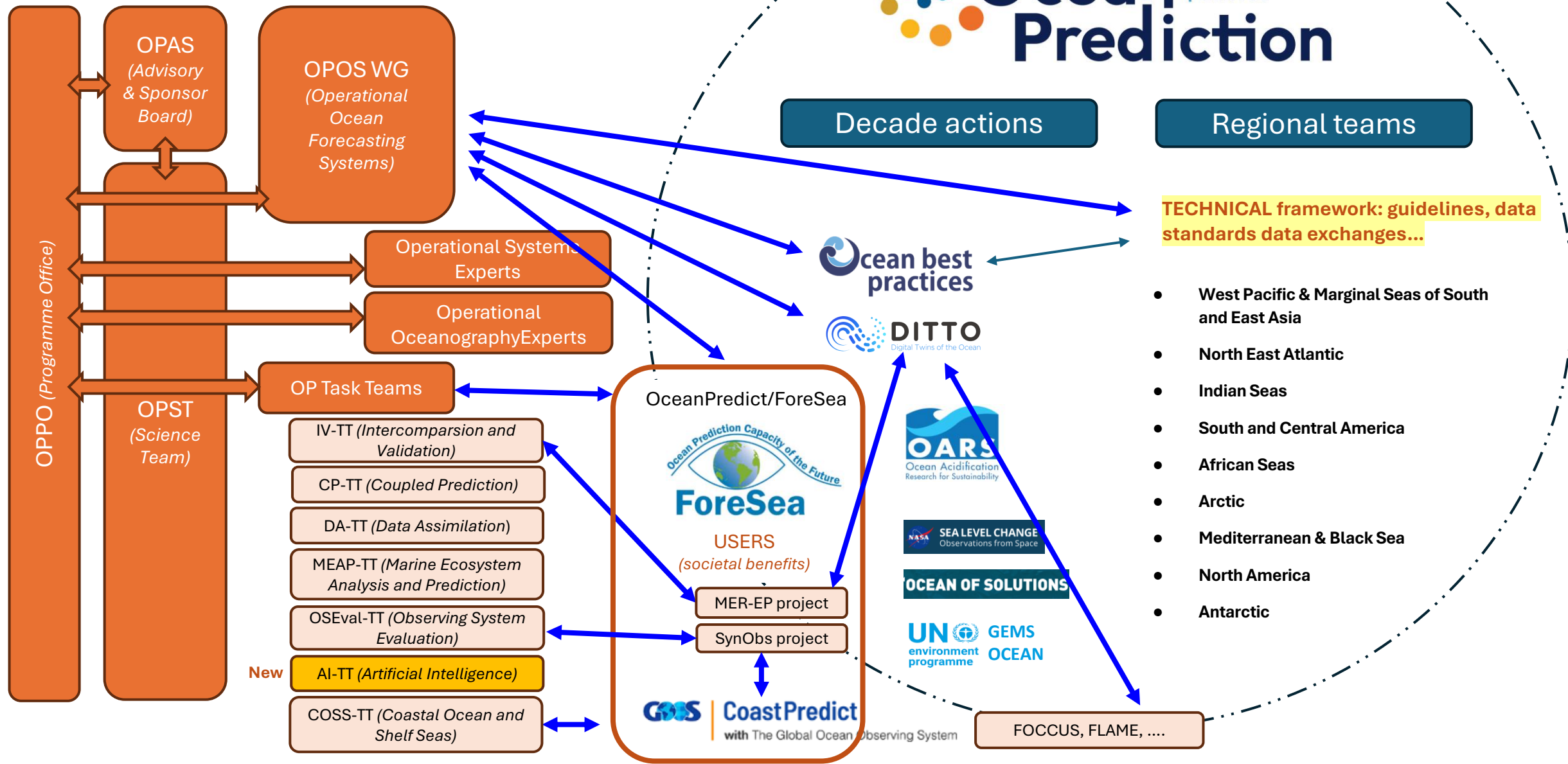




# OceanPredict

Advancing the science of ocean prediction

SCIENCE - Global



## OP Task Teams

**IV-TT** (*Intercomparison and Validation*)

- New Co-chairs

**CP-TT** (*Coupled Prediction*)

- Joint CP/DA-TT meeting (ECMWF, UK)

**DA-TT** (*Data Assimilation*)

**MEAP-TT** (*Marine Ecosystem Analysis and Prediction*)

- Regular MEAP-TT seminars (monthly)

**OSEval-TT** (*Observing System Evaluation*)

**AI-TT** (*Artificial Intelligence*)

- New  
AI workshop in Montréal alongside the OPST-12 meeting

**COSS-TT** (*Coastal Ocean and Shelf Seas*)

- Meeting, June 2025 (France)

### IV-TT:

- migration of the Class4 intercomparison to an external server host-ed by Environment and Climate Change Canada.

## ForeSea activities

## Decade links



### MER-EP:

- improve the reliability and usability of global and regional reanalyses



### NECCTON:

- Release of model code in the NECCTON repository
- Progress on zooplankton diel vertical migration and bio-optical modeling via FABM, shared across European forecasting centers
- Delivery of major modeling outputs and tools: Climate change indicators / Marine pollutant modeling / Pelagic biogeochemistry modules / Visualization and dissemination tools



### SynObs:

- it enriched the scientific dialogue around sustained and integrated ocean observations
- Regular SynObs seminars
- SynObsworkshop in Japan (August 2026)



**CoastPredict**

with The Global Ocean Observing System



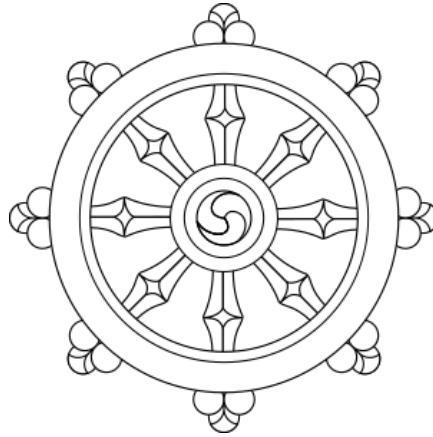
OceanPrediction DCC special issue in collaboration with OP/ForeSea: **“status of ocean forecasting”** from 68 authors from all continents





# Strong alignment with the Ocean Prediction DCC

Eightfold  
Path



8 action lines to leverage  
OceanPrediction DCC/Foresea

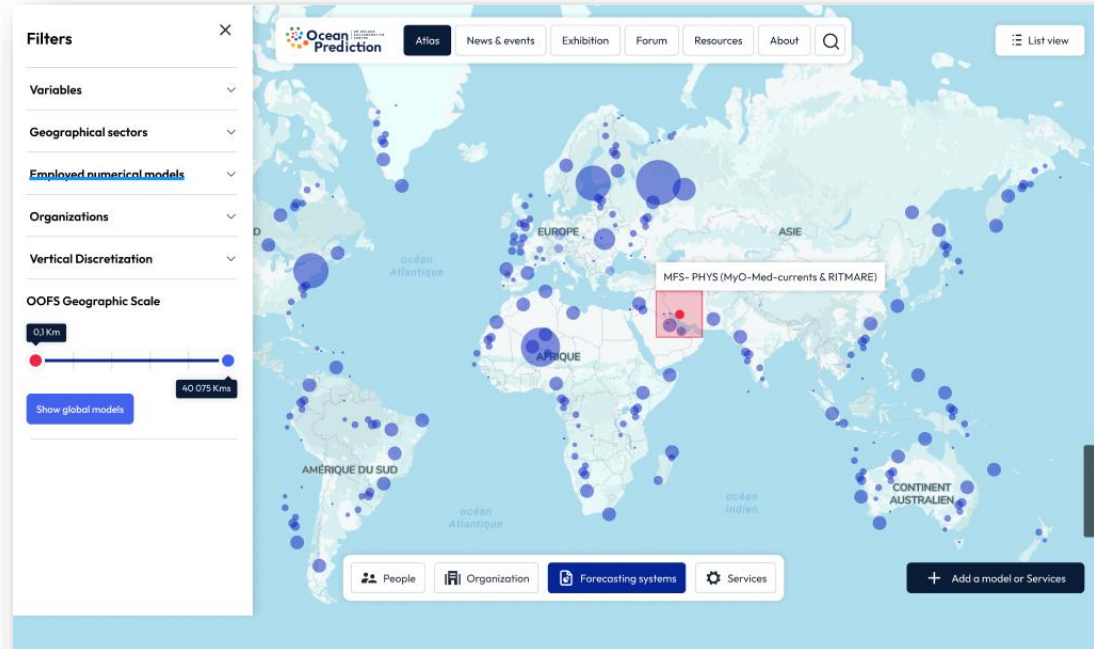


Foresea action: Development of the **foundations** for a global ocean information delivery system

# 1.

OceanPrediction DCC contribution: By providing a set of tools for coordination and community building at the OceanPrediction DCC web page:

- Atlas
- Forum
- News
- Resources

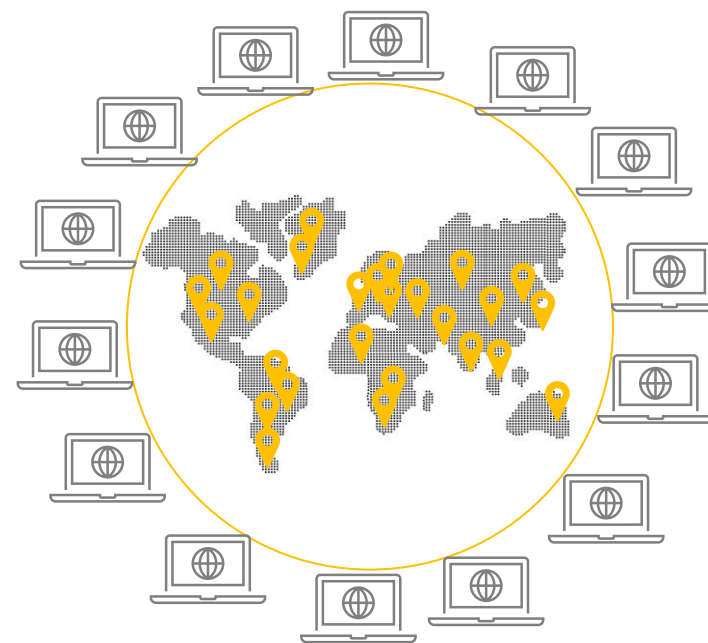


Foresea action: Development of the **foundations** for a global ocean information delivery system

## 2.

OceanPrediction DCC contribution: By providing a global collaborative structure based on Regional teams at the service of the Decade objectives:

- Based on regional Teams
- Steering teams
- Ready to leverage with Foresea

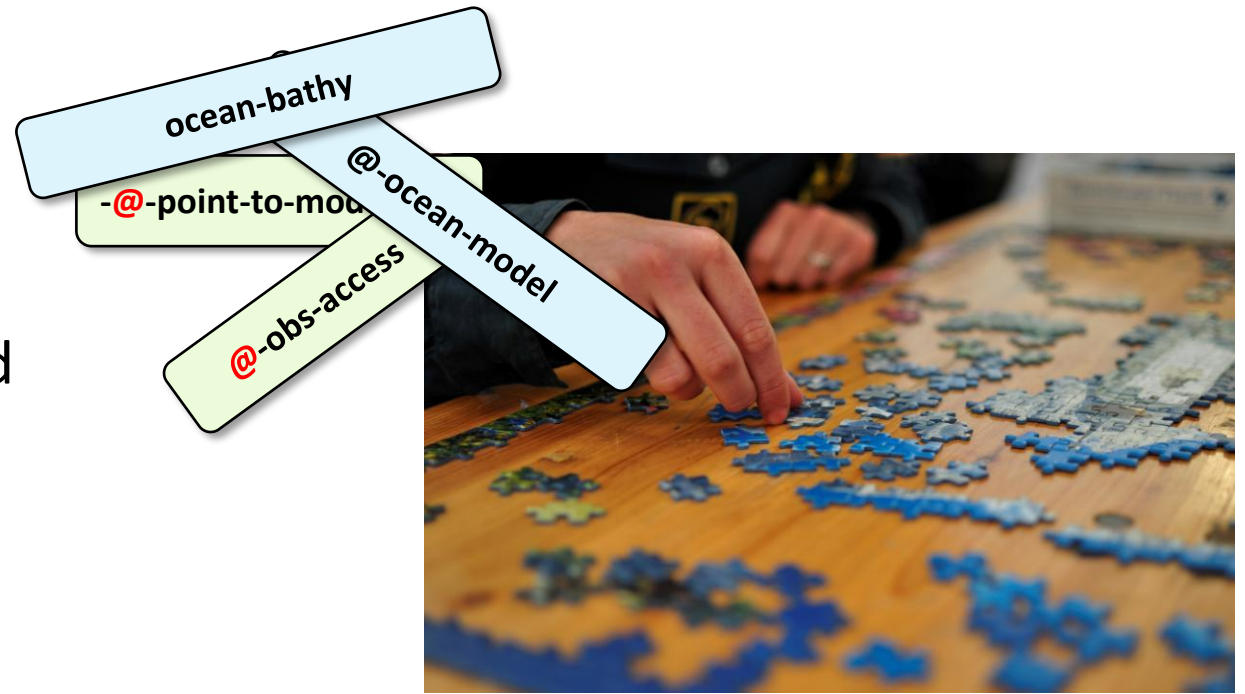


Foresea action: **Integration of ocean forecasting**/prediction efforts.

## 3.

OceanPrediction DCC contribution: By providing a shared architecture that will serve as a framework for integration:

- Definition and development of standards
- Identification and development of shared tools
- Integration in DTO



Foresa action: **Integration of ocean forecasting**/prediction efforts.

## 4.

OceanPrediction DCC contribution: By providing a framework to collaborate with other relevant Decade Programmes primary endorsed to OceanPrediction DCC:

- Aligning programmes to achieve relevant Decade objectives
- Promoting collaboration

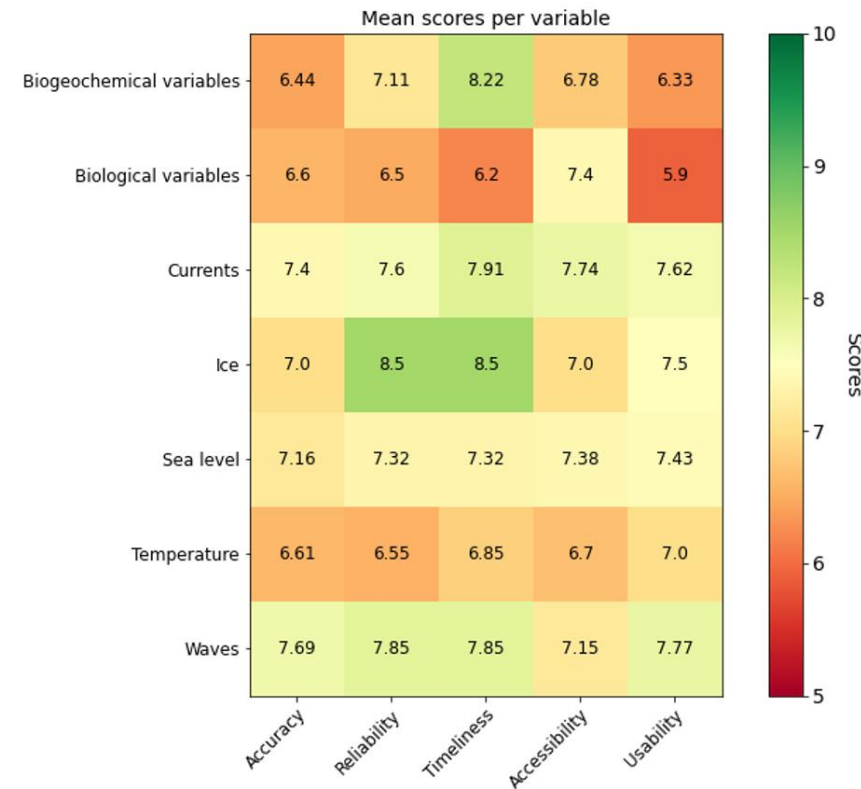


Foresea action: Development of **improved assessments and prediction** of the ocean system

OceanPrediction DCC contribution: By initiating, via the OFCT, a technical work to:

**5.**

- Map the status of advance ocean forecasting worldwide
- Identify Gaps
- Identify ways forward

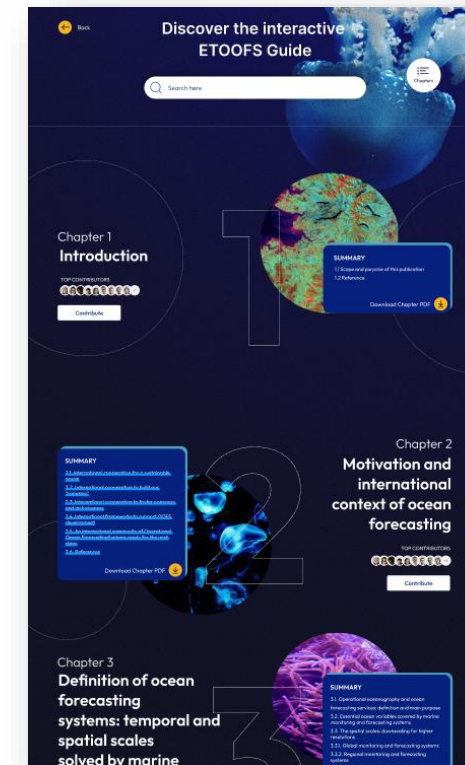


## Foresea action: Implementation of coordinated **capacity building**

# 6.

OceanPrediction DCC contribution: By updating ETOOFS guide via a wikis site on the web page

- An entry point to share new advances in ocean forecasting (AI, data assimilation...)

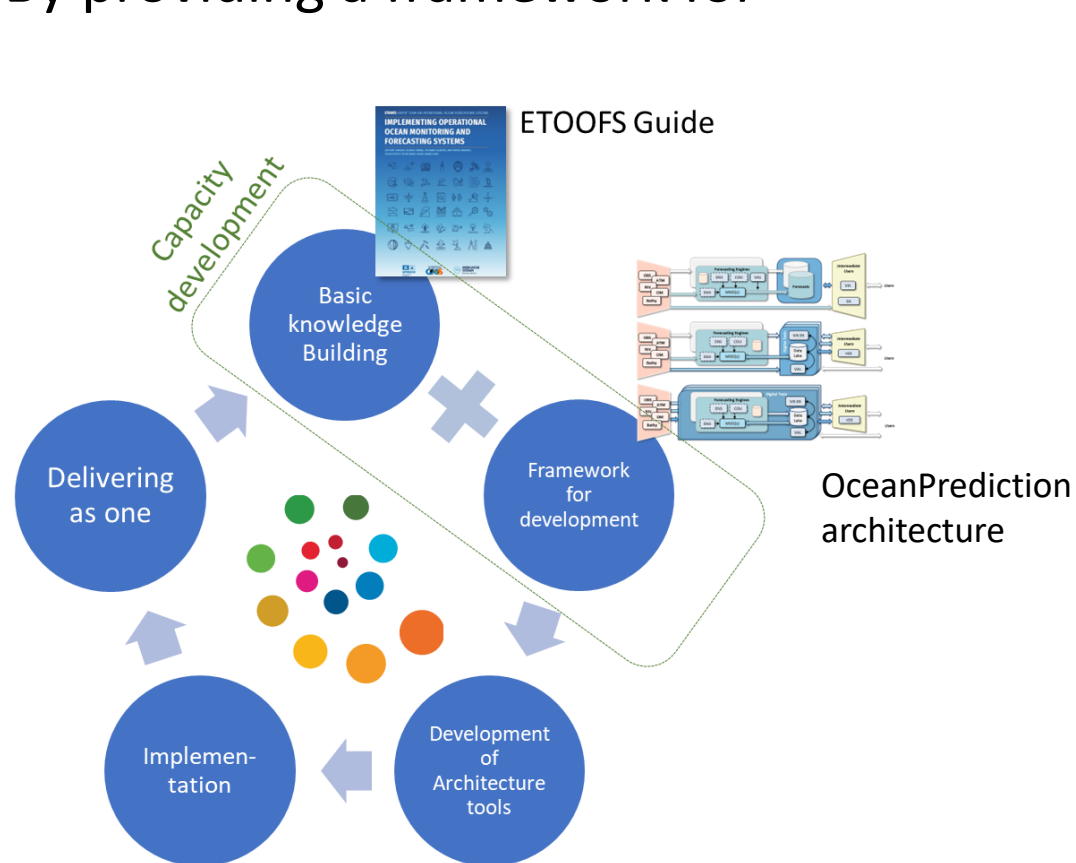


## Foresea action: Implementation of coordinated **capacity building**

**7.**

OceanPrediction DCC contribution: By providing a framework for capacity development

- Capacity development oriented to tangible results
- Based on ETOOFS guide and on the Architecture



## Foresea action: Improvement of **ocean modeling capacity**

OceanPrediction DCC contribution: By providing a shared ORL index

# 8.

- Promote adoption of tools, standards and best practices
- Stimulate improvement
- Promote integration of services





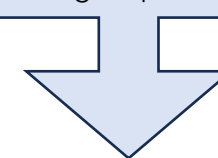
## OceanPredict activities

collaborative article in **BAMS**



## ForeSea activities

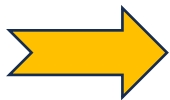
- coordination of **Theme 7** at OP'24, focusing on user applications and societal benefits
- societal aspect in the international collaboration session at OP'24 = support the societal aspect of the **Call for international mobilization** to strengthen global ocean forecasting capabilities.



**Call for international mobilization by OceanPredict/ForeSea at UNOC 3** to advance ocean prediction by engaging ocean science stakeholders



2 side events at UNOC3  
+ signature petition (900)



## Call for international mobilization to advance ocean prediction by engaging ocean science stakeholders



Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Building on the outcomes of OceanPredict 2024, the Call for action highlights the urgent need to enhance ocean observing, modeling, data integration, and the development of innovative, reliable, and **Ocean prediction decision-making tools**, including reanalysis and forecasting systems:

- based on **reliable observation** networks,
- based on **improved models and data assimilation** for fit-for-purpose services,
- that fully leverage of **artificial intelligence** and the acceleration in **digital twin** development,

**This international cooperation and mobilization** brings together all the **ocean prediction stakeholders**: OceanPredict, UN Ocean Decade Actions — including ForeSea, CoastPredict, Ocean Observing CoDesign, Marine Life 2030, DITTO, Ocean Practices, and the OceanPrediction DCC — along with key partners like IOC-UNESCO, GOOS, Mercator Ocean International, space agencies, the European Commission, and others.

The poster features a blue background with a white text box in the center. At the top, logos for Ocean Predict, ForeSea, Ocean Prediction, and GOOS are displayed. The main title 'CALL FOR ACTION' is in large white letters. Below it, the subtitle 'International mobilization to advance ocean prediction capabilities for the benefit of society' is in blue. The event details 'One Ocean Science Congress, Nice, France, June 4 2025' are at the bottom. A QR code is on the right, and logos for Mercator Ocean International and EU oceanobs are at the bottom.

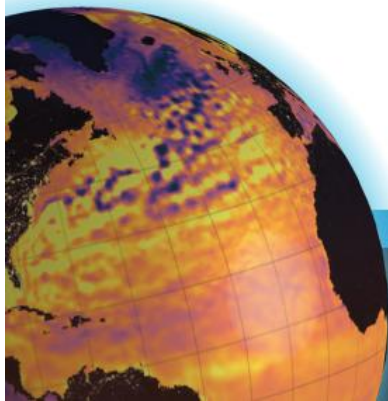
**CALL FOR ACTION**

*International mobilization to advance ocean prediction capabilities for the benefit of society*

One Ocean Science Congress  
Nice, France, June 4 2025

MERCATOR OCEAN INTERNATIONAL

EU oceanobs





Conserve and sustainably use the oceans, seas and marine resources for sustainable development

## These challenges include:

- improving interfaces between ocean, atmosphere, surface waves, sea ice, biogeochemical and ecosystem models,
- **advancing the prediction of coastal and polar areas,**
- improving ocean biogeochemistry and ecosystems prediction,
- filling gaps in the global ocean observing network, including implementing and sustaining the OneArgo array and preparing the required future satellite oceanography missions,
- developing and using tools to design and assess the impact of observing systems,
- developing higher resolution sub-mesoscale models and data assimilation,
- extending the forecast horizon up to 1 month, and extending seasonal, decadal prediction and climate projection to the marine environment,
- enhancing the intelligence of ocean prediction products by providing uncertainties and probabilistic forecasts,
- developing artificial intelligence modelling and data assimilation methods,
- harnessing digital twins to enhance the interaction between ocean prediction centres and users' communities, including the co-design of "what-if" scenario tools to support planning for climate resilience, restoration, and ocean-based economies

# CALL FOR ACTION

*International mobilization to advance ocean prediction capabilities for the benefit of society*

One Ocean Science Congress  
Nice, France, June 4 2025

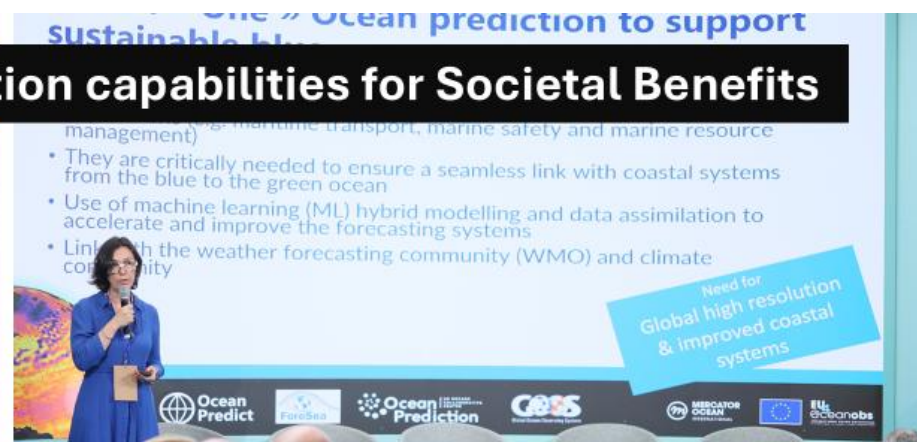
## More infos



# Launch of Global Mobilization to Enhance Ocean Prediction capabilities for Societal Benefits



IOC-UNESCO, GOOS, Mercator Ocean International, Space agencies (ESA), European Commission



OceanPredict ForeSea, CoastPredict, Space Agencies (CNES), Ocean Observing CoDesign, Marine Life 2030, DITTO, Ocean Practices, OceanPrediction DCC ...



# ForeSea ongoing activities

## ✓ Newsletter

- Plan to provide updates on operational centers (applications, etc.)

## ✓ Project endorsed

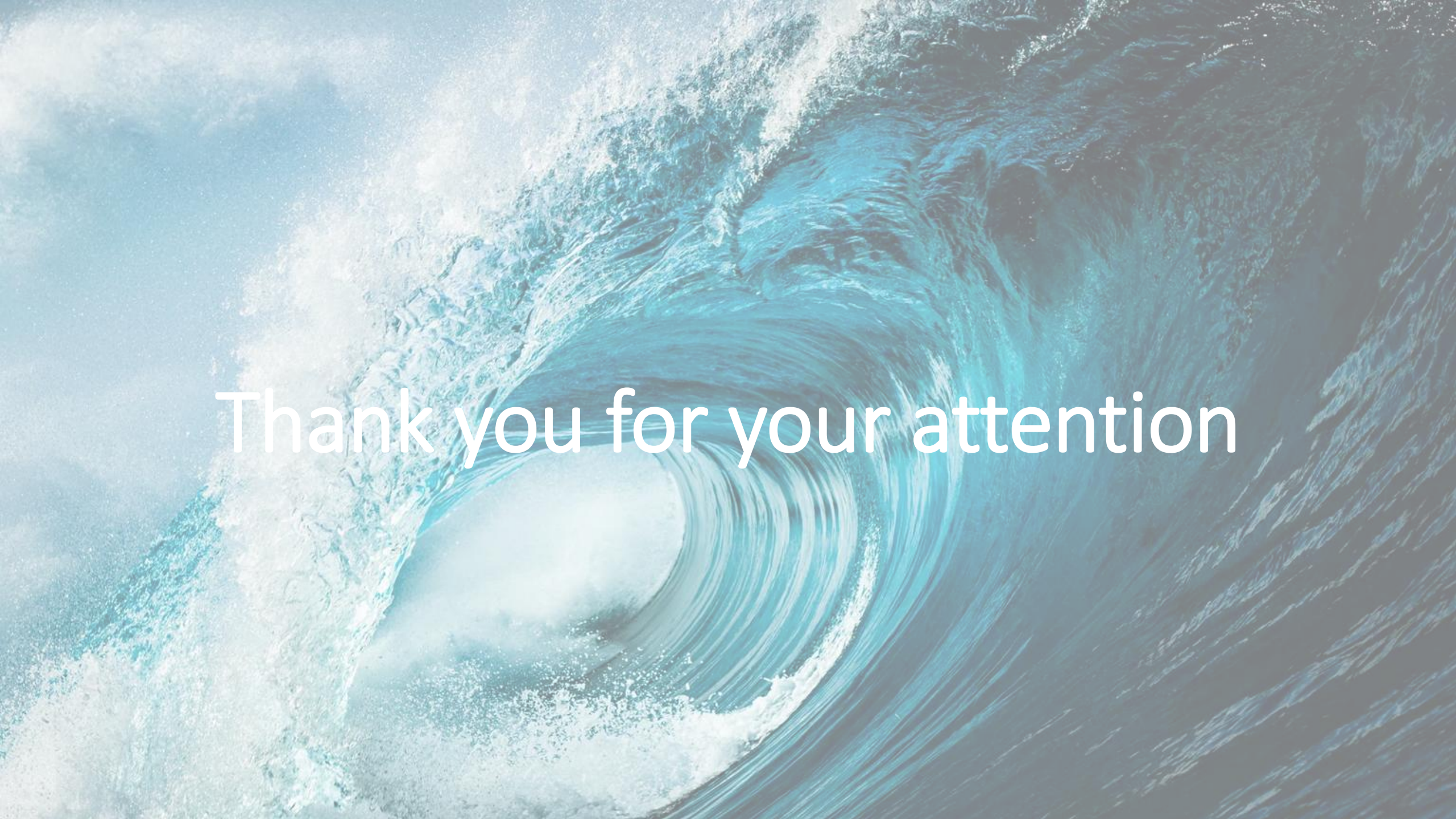
- Plan to organize a meeting soon with projects leaders to identify synergies
- Contribution to the upcoming newsletter (scheduled for June)



| Acronym   | Project title                                        | Lead institution                                                                                  |
|-----------|------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 1. SynObs | Synergistic Observing Network for Ocean Prediction   | Meteorological Research Institute/Japan Meteorological Agency                                     |
| 2.        | Subseasonal to Seasonal North Pacific Prediction     | KIOST (Korea Institute of Ocean Science and Technology) – Republic of Korea                       |
| 3. TAC    | TAC Ocean Observing and Forecasting System           | University of the Virgin Islands – USA                                                            |
| 3. CHONOS | Sistema de Información Oceanográfica CHONOS (CHONOS) | Instituto de Fomento Pesquero (IFOP) – Chile                                                      |
| 4.        | Sistema de Alerta, Predicción y Observación          | Environmental Defense Fund – Chile                                                                |
| 5.        | Making Oceanography Data Available to All            | Institut Català de Recerca per a la Governança del Mar (ICATMAR) – Government of Catalonia, Spain |
| 6. MER-EP | Marine Environment Reanalyses Evaluation Project     | Mercator Ocean International – France                                                             |
| 7. OP4CR  | Ocean Prediction for Costa Rica                      | Mercator Ocean International – France                                                             |

# Future events: ForeSea role and visibility



An aerial photograph of a massive ocean wave curling into a perfect barrel. The water is a deep, vibrant blue, with white foam and spray visible at the crest and base of the wave. The perspective is from directly above, looking down into the heart of the wave's tunnel.

Thank you for your attention