THE OCEAN DECADE FRAMEWORK

Actions relevant to the COSS-TT

CUVEN Stéphanie
Mercator Ocean International

COSS-TT meeting - 17–20 Jun 2025, Ifremer, Plouzané, France

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

THE OCEAN DECADE

in a snapshot

As of July 20

ENDORSED OCEAN DECADE ACTIONS

56 PROGRAMMES **100** CONTRIBUTIONS
446 PROJECTS **802** ACTIVITIES

DECADE ACTIONS LED BY PARTNERS FROM **70** COUNTRIES

ENDORSED ACTIONS PER CHALLENGE

REGIONAL AND NATIONAL COORDINATION

12 DECADE COLLABORATIVE CENTRES/ COORDINATION OFFICES

16 DECADE IMPLEMENTING PARTNERS

39 NATIONAL DECADE COMMITTEES

6 REGIONAL TASKFORCES AND PROGRAMMES

OCEANDECADE.ORG

@UNOceandecade

@un-ocean-decade

ENGAGEMENT AND OUTREACH

7 INFORMAL WORKING GROUPS

11 PATRONS AND **19** INSTITUTIONAL MEMBERS OF THE OCEAN DECADE ALLIANCE

OVER **20** MEMBERS OF THE FOUNDATIONS DIALOGUE

8900 MEMBERS FROM **173** COUNTRIES ON THE OCEAN DECADE NETWORK

1.5+ MILLION REACH

UN OCEAN DECADE CHALLENGES

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Intergovernmental Oceanographic Commission

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

10 Years. 10 Challenges. 1 Ocean.

The ocean holds the keys to an equitable and sustainable planet.

1. Understand and beat marine pollution
2. Protect and restore ecosystems and biodiversity
3. Sustainably feed the global population
4. Develop a sustainable and equitable ocean economy
5. Unlock ocean-based solutions to climate change
6. **Increase community resilience to ocean hazards**
7. **Expand the Global Ocean Observing System**
8. **Create a digital representation of the Ocean**
9. Skills, knowledge and technology for all
10. Change humanity's relationship with the ocean

Decade priority challenges in ocean observing and forecasting

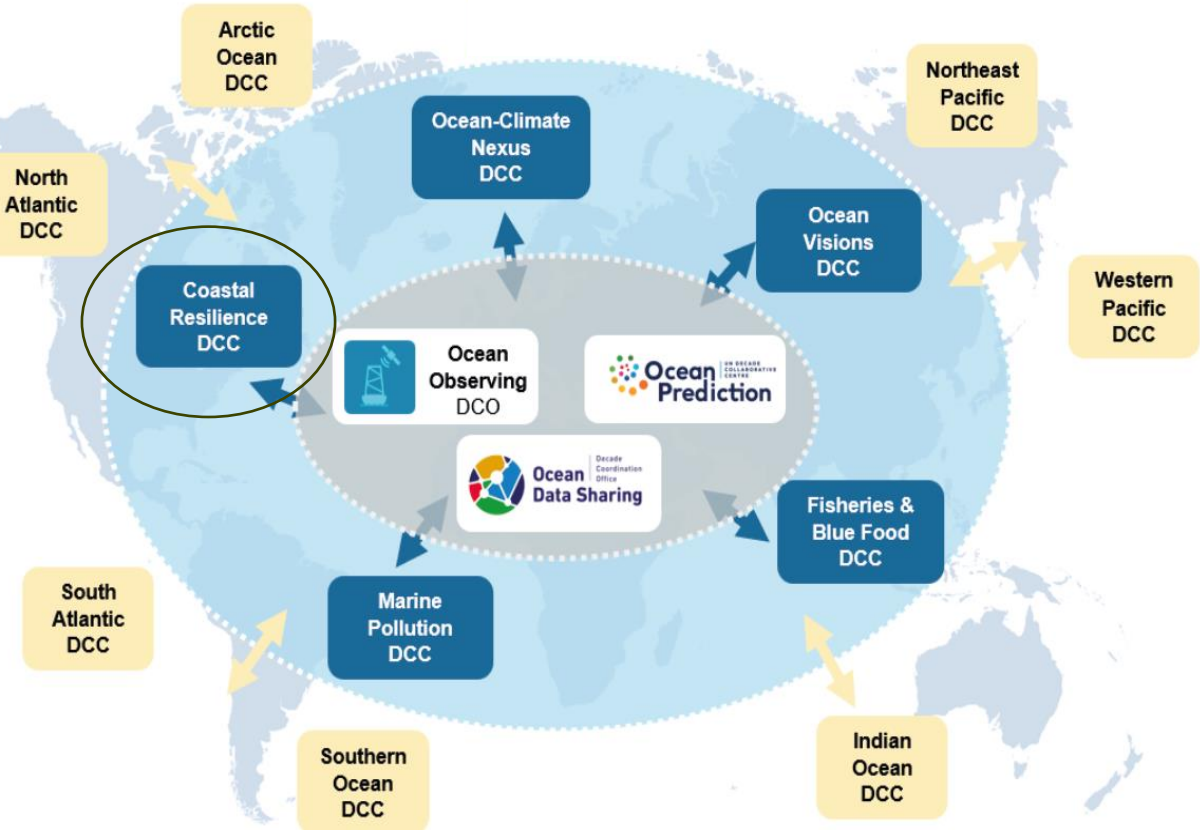
Challenge 6
Increase community resilience to ocean and coastal risks

Challenge 7
Sustainably expand the Global Ocean Observing System

Challenge 8
Create a digital representation of the ocean

- Ocean **observations**
- **Data sharing**
- Ocean **modelling**
- Ocean **forecasting**
- **Application** development
- **User uptake** & feedbacks

Decade structures



2021 2030 Décennie des Nations Unies pour les sciences océaniques au service du développement durable

Decade priority

Ocean Decade Priorities

ADVANCING THE DECADE'S DIGITAL ECOSYSTEM (DDE)

Terry McConnell
UNESCO

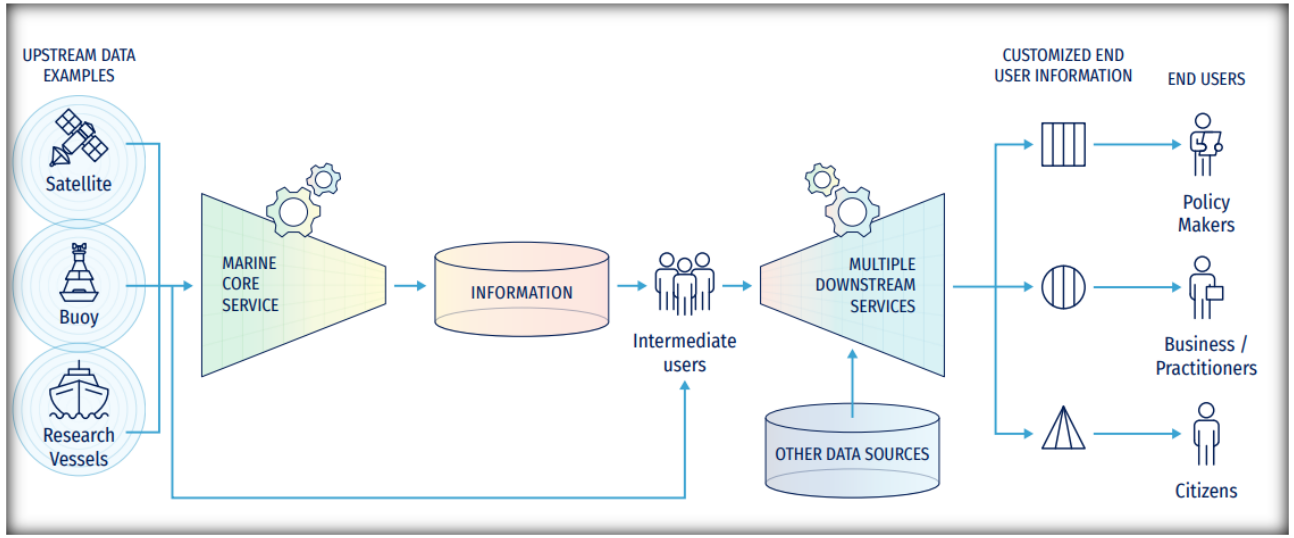
Enrique Alvarez Fanjul
Mercator Ocean International

Adam Leadbetter
UNESCO Ocean

European priority

EU priorities

From observations to end user services: the ocean value chain



Challenges in the development of digital ocean ecosystem globally:

- Significant **regional variation in digital ocean observing systems**
- **Interoperability issues**
- **lack of** globally endorsed **"tools, data standards and best practices"**

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Building the Ocean Decade's Digital Ecosystem

A coordinated global strategy for ocean observing, data sharing, and forecasting

© Francesco Ungaro / Pexels

Understanding the ocean data challenge

The health of the ocean is integral to the well-being of the planet, influencing climate regulation, oxygen production, and the livelihoods of billions. Ocean data is the fundamental building block to drive critically important research and inform sustainable ocean governance and policies, yet:

- The ocean is under-observed, especially in developing regions.
- Data from observations and forecasts are often fragmented and hard to access.
- Many communities lack knowledge and capacity to discover and use ocean data effectively.

A well-connected digital data ecosystem can enable Sustainable Development Goal 14 on 'Life Below Water' by providing real-time, interoperable ocean information that supports evidence-based policies, sustainable marine resource management, and effective conservation efforts.

The vision: A digital ocean ecosystem for all

The UN Decade of Ocean Science for Sustainable Development 2021-2030 ("Ocean Decade") is advancing the concept of a global Digital Ecosystem that transforms ocean observations into actionable services for decision-makers. This system is powered by three core pillars:

- Ocean observing
- Ocean data sharing
- Ocean forecasting

Together, these components form a robust ocean data value chain — a foundation for sustainable ocean management, climate resilience, and economic development.

For more information, please contact p.burger@unesco.org

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Barriers to deliver a digital ocean ecosystem

- **Global gaps in digital infrastructure**
  Some regions have advanced systems, others have none.
- **Lack of integration**
  Systems and disciplines talk insufficiently to each other—forecasting, observing, and data sharing are siloed. The public and private sectors often operate independent of each other.
- **Absence of shared tools and standards**
  Not sufficient common protocols, leading to inefficiency and duplication of efforts.
- **Knowledge and capacity gaps**
  Many users face challenges to access or interpret ocean data.
- **Lack of end-user engagement**
  End-users often lack awareness of ocean observing benefits and therefore do not provide feedback for system improvement.

The opportunity

The Ocean Decade's centres for Ocean Observing, Ocean Data Sharing and Ocean Prediction commit to:

- **A global architecture**
  Co-developed system designs for observation, data sharing, and forecasting.
- **Practices and tools**
  A suite of guidelines and implementation approaches.
- **Clear data and metadata standards**
  To enable seamless interoperability and integration.
- **Advancing capacity building**
  Focused on developing regions to support uptake and growth.
- **Promote Digital Twins of the Ocean (DTOs)**
  Advanced applications powered by real-time data integration and AI-readiness.
- **Improve communication and ocean literacy**
  To raise awareness about the societal benefits of ocean observing and data.

Better and more data → more integration → more demand → more and improved services

What success looks like

- Increased ocean knowledge and risk mapping
- Wider use of ocean forecasting services
- Improved regional equity in availability of ocean data
- Stronger public-private collaboration
- User-friendly applications for all stakeholders
- Free and open access to ocean data
- Greater acknowledgement about benefits of ocean information

Join the movement

Help shape a truly global, inclusive, and interoperable digital ocean.

Scientists

Share your expertise, contribute data, and collaborate on innovative research to expand our understanding of the ocean.

Decision Makers

Leverage ocean data to inform resilient, sustainable policies and strengthen disaster preparedness.

Private Sector

Partner with us to drive innovation, share insights, and lead the way in sustainable ocean technologies.

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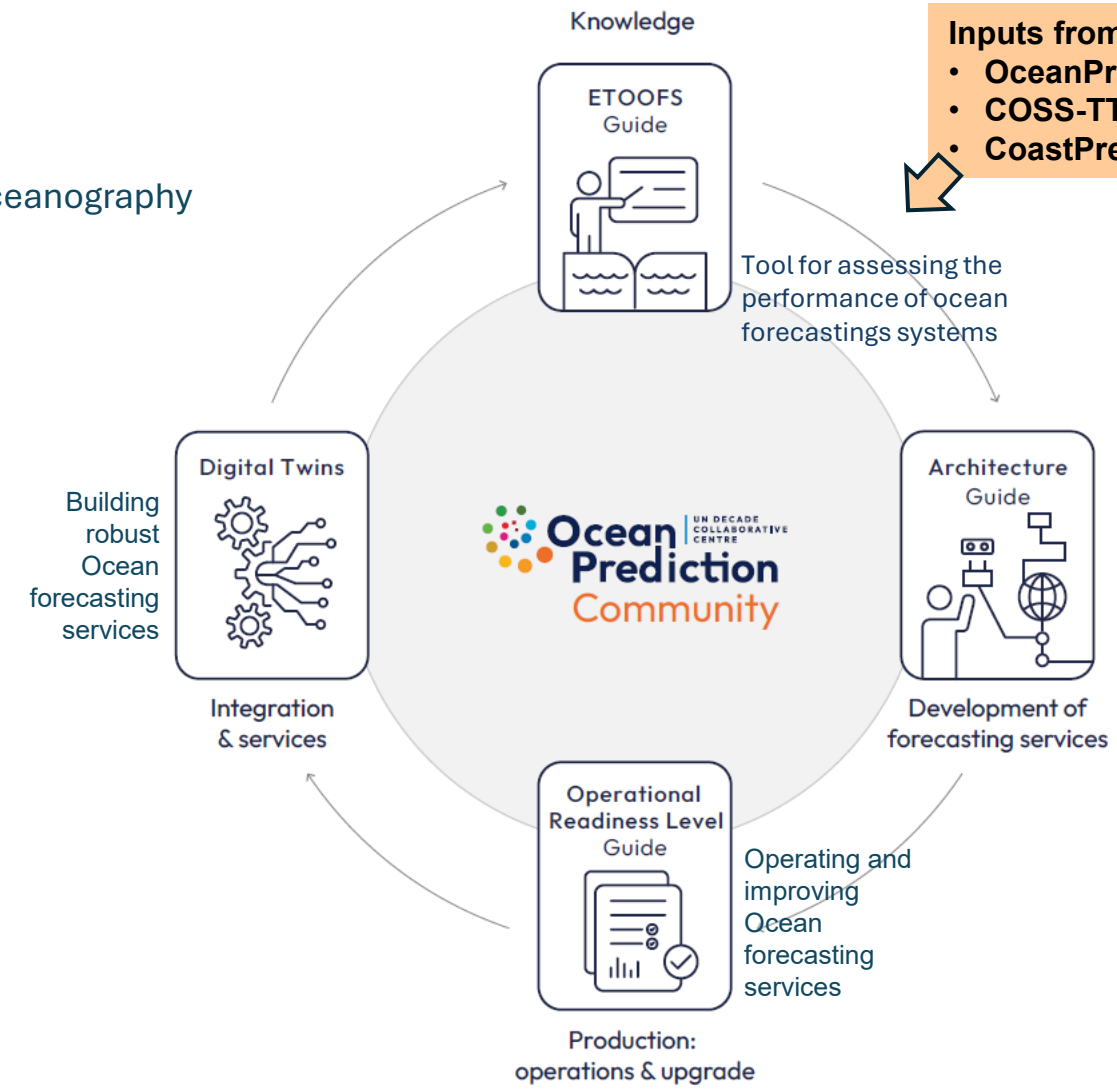
More infos

OceanPrediction DCC - opportunities

- **Promotes collaboration** across the ocean forecasting community
- **Advances data standards, tools, and synergies** along the operational oceanography value chain
- **Develops technical tools** for the Decade's digital ecosystem, including:
  Operational Readiness Level (ORL)
  Architecture for Ocean Forecasting

Ocean Data Sharing (Decade Coordination Office)
Ocean Observing (Ocean Decade Coordination Office)
UN environment programme
GEMS OCEAN
ForeSea (Ocean Prediction Capacity of the Future)
Ocean best practices
DITTO Digital Twins of the Ocean
GOOS CoastPredict with The Global Ocean Observing System
⋮



Inputs from
- **OceanPredict**
- **COSS-TT**
- **CoastPredict**

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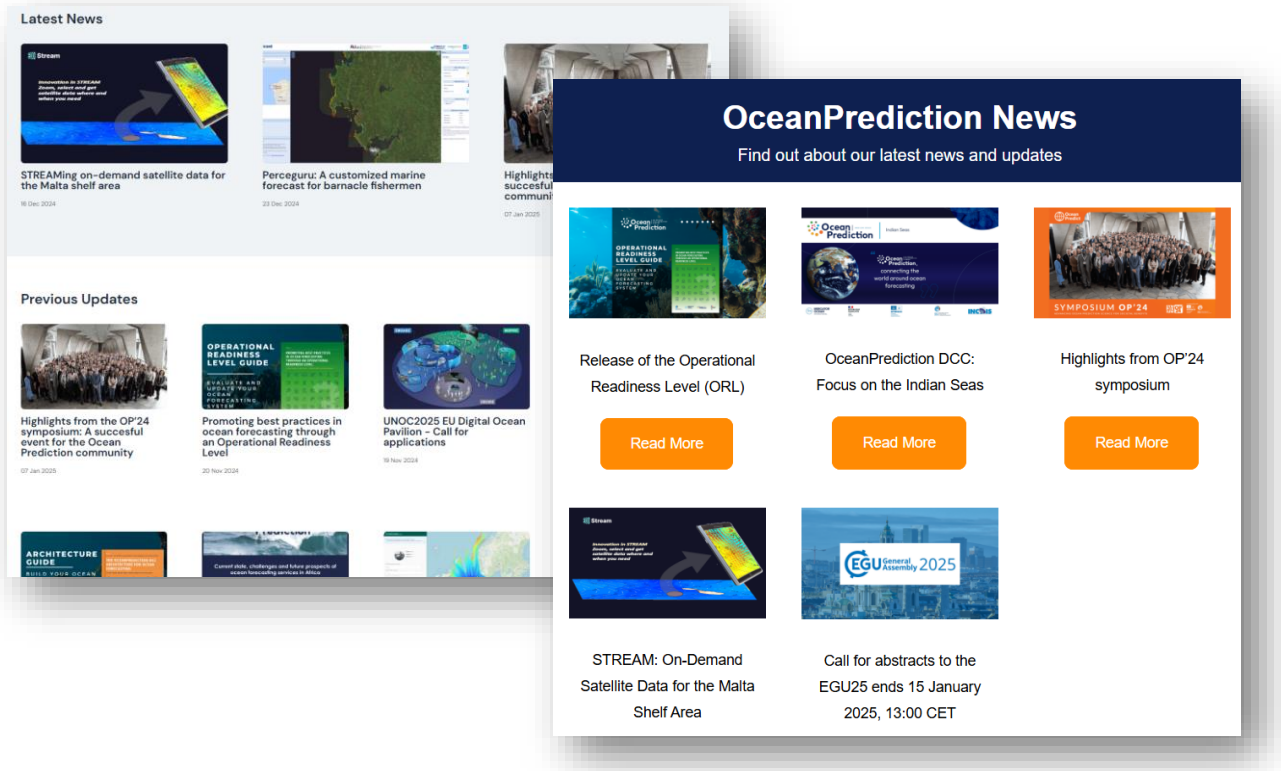
2021 2030 United Nations Decade of Ocean Science for Sustainable Development

News section + Forum + newsletter

The web

The Forum

The Atlas



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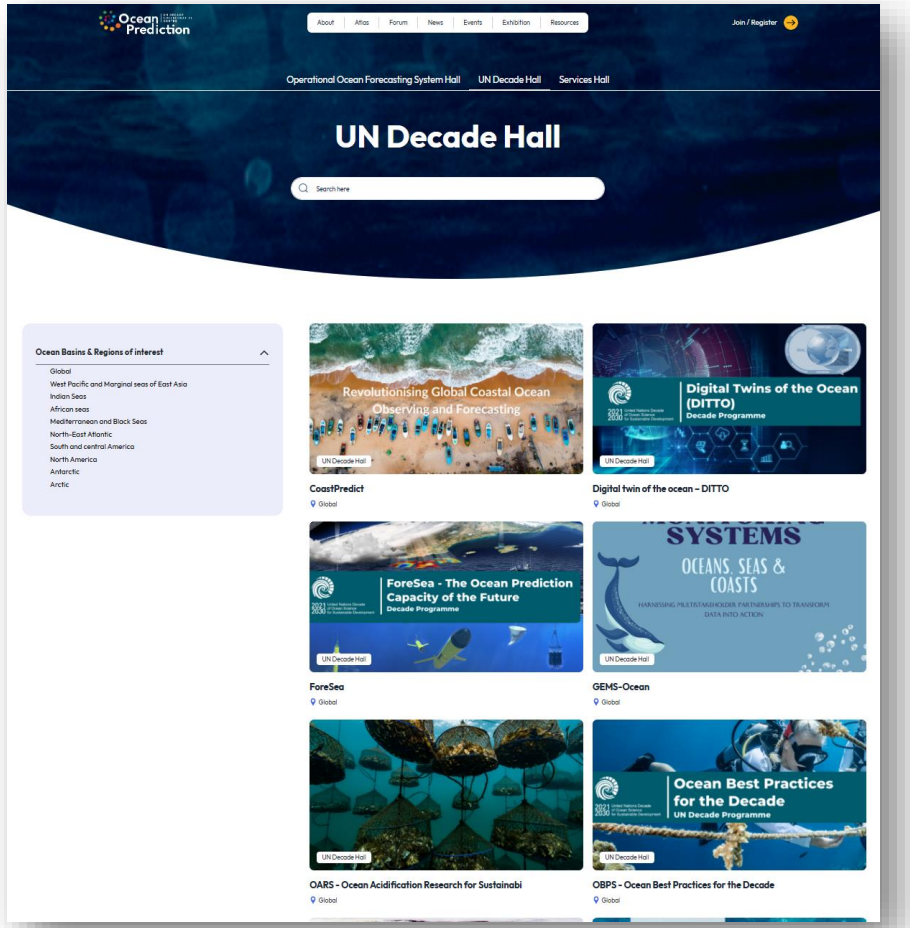
Connecting the world around Ocean Prediction: *A vision for the Decade and Beyond*

The UN Decade virtual Hall

The web

The Forum

The Atlas



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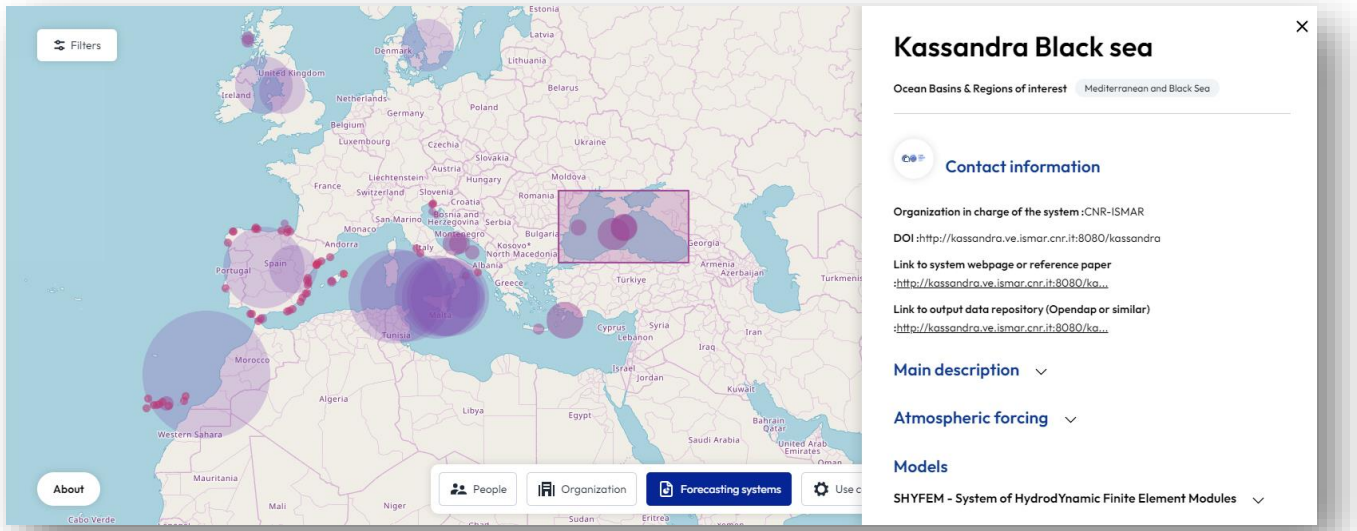
The ATLAS

- Explore the world of ocean predicton by regions, including information on its members, systems and services

The web

The Forum

The Atlas



Make sure to join our community and Atlas!

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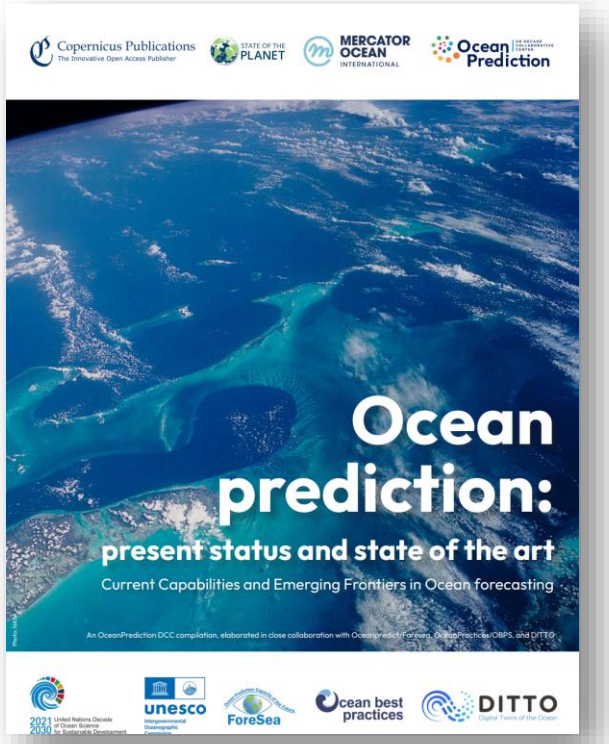
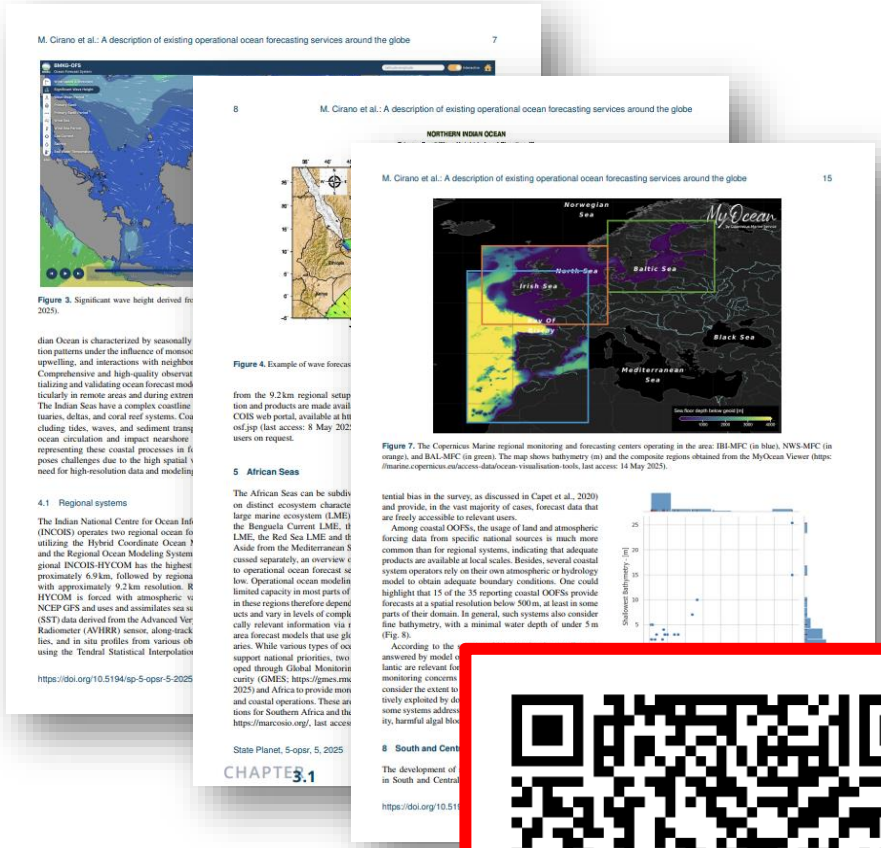
2021 2030 United Nations Decade of Ocean Science for Sustainable Development

OceanPrediction DCC special issue in collaboration with OceanPredict/ForeSea



A special issue (27 papers – 290 pages) describing the status of ocean forecasting from 68 authors from all continents

- Introduction (1 paper)
- From global to Coastal (3 papers)
- Description per Regional team (2 papers)
- Observations for improved forecasts (3 papers)
- Predicting blue, green, and white ocean (5 papers)
- Building trust in forecasting (3 papers)
- Air–sea–land interactions (2 papers)
- Advanced modelling for ocean forecasting (5 papers)
- Bridging ocean science and society (2 papers)



https://sp.copernicus.org/articles/sp-5-opsr.pdf

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2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Connecting the world around Ocean Prediction: *A vision for the Decade and Beyond*

Decade programmes « primary attached » to the 3 DCCs and DCOs

EU4OceanObs - DIP
EurOcean -DIP
European Marine Board - DIP

Towards a stronger and sustained digital ocean knowledge system

Guiding FAIR ocean data management practices

Supporting development of observation and forecasting services

Terry McConnell
UNESCO

Ocean Decade Coordination Office
Ocean Observing / GOOS

DOSI Challenger 150
OC-NET

Biodiversity
Marine Life 2030
OBON

User solution
CoastPredict
ObsCoDe

Physics
SEABED 2030
ODRP-MAE
OASIS
DOOS
OneDeepOcean
Observing Together

EuroGOOS - DIP
JPI Oceans - DIP
POGO – DIP
Center for Ocean Leadership – DIP
Ocean Networks Canada – DIP
GeoBluePlanet - DIP

Ocean Prediction UN DECADE COLLABORATIVE CENTRE

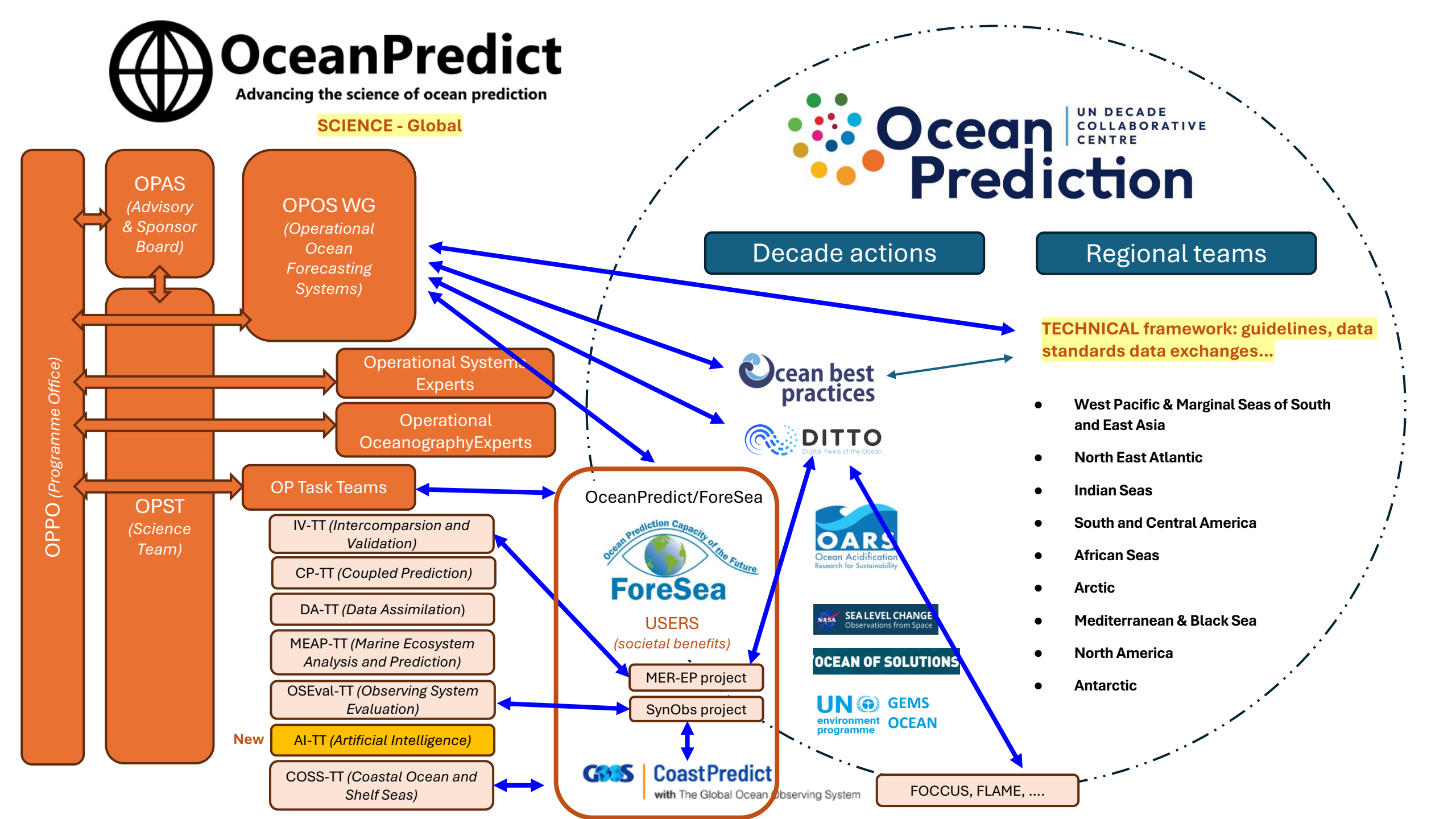
Enrique Alvarez Fanjul
Mercator Ocean International

BestPractices
DITTO
ForeSea
GEMS-Ocean
OARS

Ocean Decade Coordination Office
Ocean Data Sharing

Adam Leadbetter
UNESCO Ocean

Ocean Data 2030
Digital innovation
EMODnet - DIP


OceanPredict
Advancing the science of ocean prediction
SCIENCE - Global
OPPO (Programme Office)
OPAS (Advisory & Sponsor Board)
OPST (Science Team)
OPOS WG (Operational Ocean Forecasting Systems)
Operational Systems Experts
Operational OceanographyExperts
OP Task Teams
IV-TT (Intercomparsion and Validation)
CP-TT (Coupled Prediction)
DA-TT (Data Assimilation)
MEAP-TT (Marine Ecosystem Analysis and Prediction)
OSEval-TT (Observing System Evaluation)
New
AI-TT (Artificial Intelligence)
COSS-TT (Coastal Ocean and Shelf Seas)
OceanPredict/ForeSea
ForeSea
USERS
(societal benefits)
MER-EP project
SynObs project
CoastPredict
with The Global Ocean Observing System
Ocean Prediction
UN DECADE COLLABORATIVE CENTRE
Decade actions
Regional teams
Ocean best practices
DITTO
Digital Twins of the Ocean
TECHNICAL framework: guidelines, data standards data exchanges...
OARS
Ocean Acidification Research for Sustainability
SEA LEVEL CHANGE
Observations from Space
OCEAN OF SOLUTIONS
UN environment programme
GEMS OCEAN
FOCCUS, FLAME, ...
West Pacific & Marginal Seas of South and East Asia
North East Atlantic
Indian Seas
South and Central America
African Seas
Arctic
Mediterranean & Black Sea
North America
Antarctic

SYMPOSIUM OP'24

OceanPredict
Advancing the science of ocean prediction

Ocean Prediction Capacity of the Future
ForeSea

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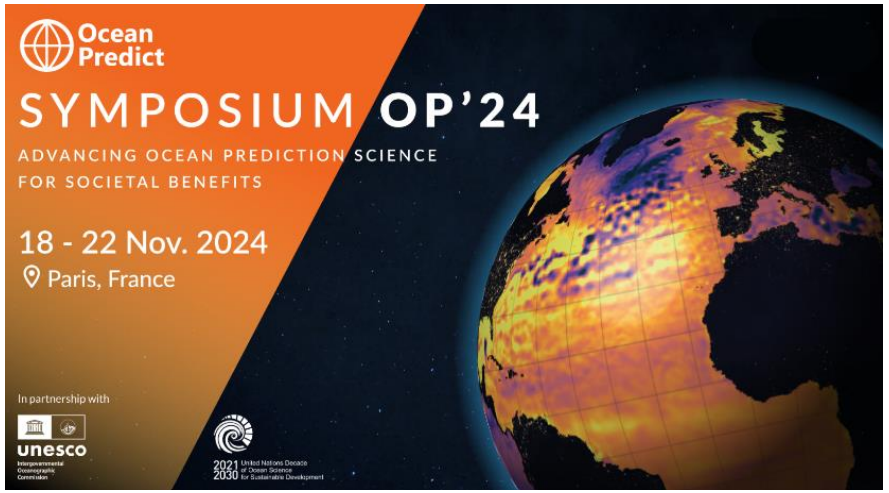
2021 2030 United Nations Decade of Ocean Science for Sustainable Development

CALL FOR ACTION TO ADVANCE OCEAN PREDICTION CAPABILITIES FOR THE BENEFITS OF SOCIETY

Outcomes of the OP'24

Summary of the OP’24 outcomes

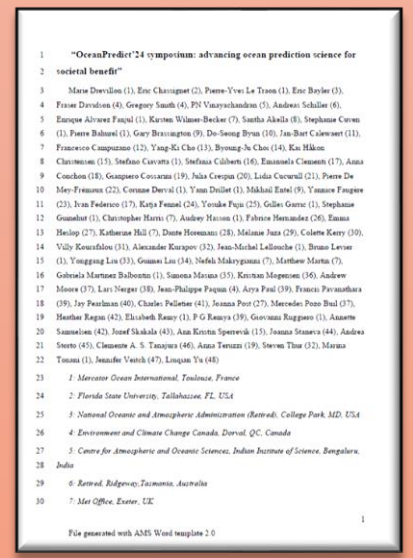
1. Over 300 contributions (orals and posters),
2. Addressing Critical Ocean Prediction Challenges
3. AI and Digital Twins: game-changers for Ocean prediction data
4. Societal Benefits and Policy Implications
5. Enhanced International Collaboration



Bulletin of the American Meteorological Society

Submitted

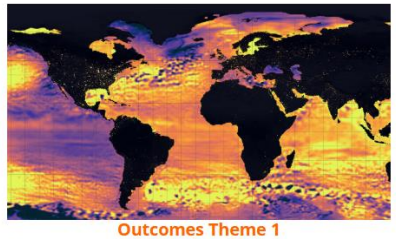
AMS
American Meteorological Society



"OceanPredict'24 symposium: advancing ocean prediction science for societal benefit"

Marie Drevillon (1), Eric Chassignet (2), Pierre-Yves Le Traon (1), Eric Bayler (3), Fraser Davidson (4), Gregory Smith (4), PN Vinayachandran (5), Andreas Schiller (6), Enrique Alvarez Fanjul (1), Karsten Wilmer-Becker (7), Santha Akella (8), Stephanie Cuven (1), Pierre Bahurel (1), Gary Brassington (9), Do-Seong Byun (10), Jan-Bart Calewaert (11), Francesco Campuzano (12), Yang-Ki Cho (13), Byoung-Ju Choi (14), Kai Håkon Christensen (15), Stefano Ciavatta (1), Stefania Ciliberti (16), Emanuela Clementi (17), Anna Conchon (18), Gianpiero Cossarini (19), Julia Crespin (20), Lidia Cucurull (21), Pierre De Mey-Frémaux (22), Corinne Derval (1), Yann Drillet (1), Mikhail Entel (9), Yannice Faugere (23), Ivan Federico (17), Katja Fennel (24), Youske Fujii (25), Gilles Garric (1), Stephanie Guinehut (1), Christopher Harris (7), Audrey Hasson (1), Fabrice Hernandez (26), Emma Heslop (27), Katherine Hill (7), Dante Horemans (28), Melanie Juza (29), Colette Kerry (30), Villy Kourafalou (31), Alexander Kurapov (32), Jean-Michel Lellouche (1), Bruno Levier (1), Yonggang Liu (33), Guomei Liu (34), Nefeli Makrygiorgou (7), Matthew Martin (7), Gabriela Martinez Balboutin (1), Sumona Mauna (35), Kristian Mogensen (36), Andrew Moore (37), Lars Nerger (38), Jean-Philippe Paquin (4), Arya Paul (39), Francis Pavanathara (39), Jay Pearlman (40), Charles Pelletier (41), Joanna Post (27), Mercedes Pozo Buil (37), Heather Ragan (42), Elizabeth Remy (1), P G Remya (39), Giovanni Ruggiero (1), Annette Samuelsen (42), Josef Skakala (43), Ann Kristin Sperrevik (15), Joanna Staneva (44), Andrea Storto (45), Clemente A. S. Tanajura (46), Anna Teruzzi (19), Steven Thur (32), Marina Tonani (1), Jennifer Veitch (47), Luoqun Yu (48)

1: Mercator Ocean International, Toulouse, France
2: Florida State University, Tallahassee, FL, USA
3: National Oceanic and Atmospheric Administration (Retired), College Park, MD, USA
4: Environment and Climate Change Canada, Dorval, QC, Canada
5: Centre for Atmospheric and Oceanic Sciences, Indian Institute of Science, Bengaluru, India
6: Retired, Ridgeway,Tasmania, Australia
7: Met Office, Exeter, UK

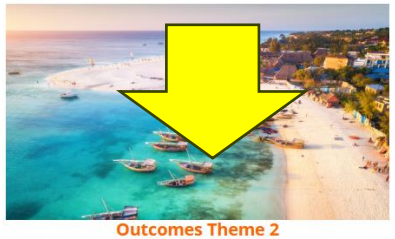


Outcomes Theme 1

Ocean prediction: past, present and future

- Structuring of international collaborations to best align science, services, governance, and innovation to best deliver "the ocean we want"
- AI: changing opportunities and challenges
- Creating and operating ocean digital twins,
- Fast evolving field: need to be nimble and adapt (governance, frequent communication, adaptation / adjustment to opportunities)
- In private/public collaborations, focus on areas of overlapping interest, and look forward
- Communication & co-design are critical for ensuring effective operational ocean prediction systems
- Inclusivity going forward is vital

Theme 1 | Plenary Recordings | Recordings



Outcomes Theme 2

Coastal and Regional Ocean Prediction

Most heavily

Diversity of ch

- Comple
- Interaction of many relevant p ice, sediment transport, etc.
- Complex model and data erro

Novel approaches:

- Coupling of ocean and hydro
- Multiscale: unstructured me scales
- Need for coupled physical Bc
- AI: Probabilistic forecasting,

Theme 2 | Plenar

Outcomes Theme 3

Polar ocean and sea ice prediction

mesoscale dynamics,

Outcomes Theme 4

Global and basin scale ocean prediction

range

useful for risk assessment and planning

- Geoengineering solutions are being explored by industry = Operational

d to engage in evaluating the proposed solutions

discussion on Marine heatwaves, need for

ty and their impact for ecosystem.

be as important as the scenario choice.

- Evolution of global basin scale system: toward more coupling, towards ensemble method and hybrid (var + ensemble + AI)

window) in data

ethod

Outcomes Theme 5

New developments in ocean prediction

- The scope of this theme is broad and includes many topics on new developments in ocean predictions, such as: measurements/observations, modeling, data assimilation, machine learning/AI, digital twins, etc.
- We had more than 100 presentations (talks and posters).
- Topics ranged from recent advances in operational systems (adoption of new models such as MOM6 ocean, SI3 sea ice models, increasing resolution/coupling, etc; observations such as SWOT altimeter; new

(physical, bio-geo-chemical), modelers and observationalists to meet and exchange information/advances/ideas. Further discussion is hoped to happen at a finer level via individual task teams' interaction.

- Future recommendations include (not limited to following): increased collaboration across agencies, exchange of information, ideas and possibly datasets, establish and share best practices, encourage participation and involvement from the next generation

me 5 | Plenary Recordings | Recordings

Outcomes Theme 6

Ocean prediction systems and services

- Consider value cycle and user link importance (reliable, tangible, trusted info)
- INCOIS and SAEON systems, example of emerging operational systems to watch
  Effective hazard communication both modern (WhatsApp ...) and traditional
- Efforts in training and building strong trust relationship with users
- Locally optimized systems co-designed with local stakeholders, ensures engagement, partnership and/or financial support
- Services require solid infrastructure : Information management systems, open data repositories, user friendly access.
- Service is about communication/empathy/Ubuntu

Theme 6 | Plenary Recordings | Recordings

Most heavily used and impacted ocean areas with diverse human pressures

Diversity of challenges and approaches:

- Complex geometries, high resolution, nonlinear flows,
- Interaction of many relevant processes: circulation, waves, ATM, BGC, ice, sediment transport, etc.
- Complex model and data error budgets (essential for DA)

Novel approaches:

- Coupling of ocean and hydrological models (compound floods)
- Multiscale: unstructured meshes to represent flows on 1-10 m to 100 km scales
- Need for coupled physical BGC data assimilation: multispectral data
- AI: Probabilistic forecasting, Bias correction, High-resolution mapping

Outcomes Theme 7

User applications and societal benefits

- **Diplomacy for science:** "Facilitating International science cooperation" - G7 FSOI (Future of the Seas and Ocean Initiatives)
- **Science for diplomacy:** "Using science cooperation to improve international relations between countries" - UN Ocean Decade for Sustainable Development
- **Science in diplomacy**: "informing policy objectives with scientific advice" - Geo Blue Planet

Example: Inspired by the collective vision of marine debris scientific community, the integrated marine debris observation System (IMDOS) aims to provide coordination and guidance to lead the marine debris community in establishing a sustainable global observing system and facilitating open access to data

Theme 7 | Plenary Recordings | Recordings

Outcomes

The (numerical) Ocean we want: Challenge 8 of the UN Ocean Decade

The UN decade programmes of the UN Ocean Data Ecosystem aim at developing

service

- Open
- Empc
- Provi
- Socio
- Test
- Oper

unity

earth system

nge

makers

Ocean Pred

or, needs to be sustained beyond 2030

Provides re

methods to advance towards the objective (ETOOFS guide, ORL, architecture, etc.)

Empower coastal forecasting centres to provide info coastal community needs on issues they face

Recordings

Outcomes

The common infrastructure we need

- More in situ observations are needed and the advancement of coastal GOOS is key, as well as more automated data management systems (ODIS).
- We need a s (examples/c the best pra
- We need to collaboratio
- We need to requiremen with WMO)
- What we do change our

Outcomes

The international cooperation we need

- Essential role of international partnerships (from observations, predictions to applications and users) to foster advancements of fit for purpose Ocean Prediction capabilities.
- Urgent need to strengthen the global ocean observing system to build a sustained and sustainable critical ocean observing infrastructure. Cooperation of space agencies is key to to ensure a long-term satellite ocean observing system. Need to expand activities to assess the impact and support the design of an integrated observing system.
- The OceanPrediction DCC now provides the framework to link the different ocean prediction initiatives in the UN Decade and expand these very much needed partnerships. Interactions between OP DCC with the WMO Implementation of Earth System approaches is an opportunity to capitalise on the combined strengths of the ocean, weather, climate communities.
- Need to enhance connection between ocean observations, ocean forecasting and applications to answer to societal needs. Future interactions between GEO Blue Planet and OceanPredict/ForeSea in the framework of the OceanPrediction DCC will be key to ensure the development of fit for purpose ocean prediction capabilities
- Need a global mobilization all along the ocean information value chain. The UN Ocean Conference (UNOC) will be an opportunity to promote a call for action for this global mobilization building on the outcomes of the OP24 symposium

Recordings

https://www.oceanpredict24.org/content/op-24-summay

DECLARATION

« Call for action to advance ocean prediction capabilities for the benefits of society”

UN OCEAN CONFERENCE NICE 2025 FRANCE

Town Hall
4 June 2025

High-Level event
11 June 2025

ONE OCEAN SCIENCE CONGRESS

European Pavilion Digital Ocean

SYMPOSIUM OP'24

OceanPredict
Advancing the science of ocean prediction

Ocean Prediction Capacity of the Future
ForeSea

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United Nations

14 LIFE BELOW WATER

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,

Ocean Predict | ForeSea | Ocean Prediction | GOOS

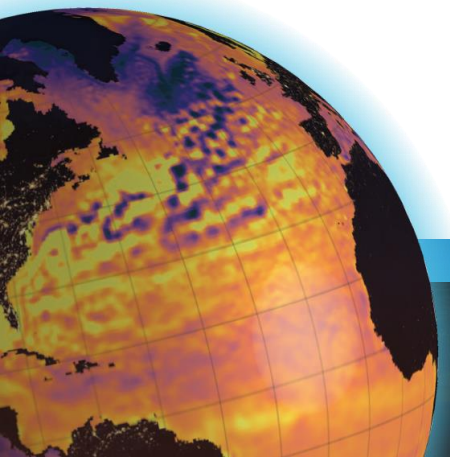
CALL FOR ACTION

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

One Ocean Science Congress
Nice, France, June 4 2025

More infos

MERCATOR OCEAN INTERNATIONAL | EU4oceanobs



Ocean Predict | ForeSea | Ocean Prediction | GOOS Global Ocean Observing System | MERCATOR OCEAN INTERNATIONAL | EU4oceanobs

United Nations

14 LIFE BELOW WATER

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

Ocean Predict | ForeSea | Ocean Prediction | GOOS

CALL FOR ACTION

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

One Ocean Science Congress
Nice, France, June 4 2025

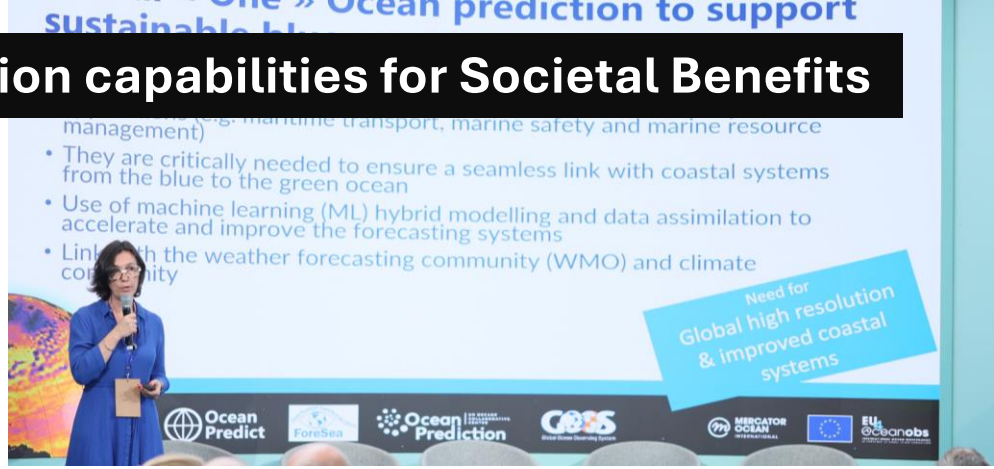
More infos

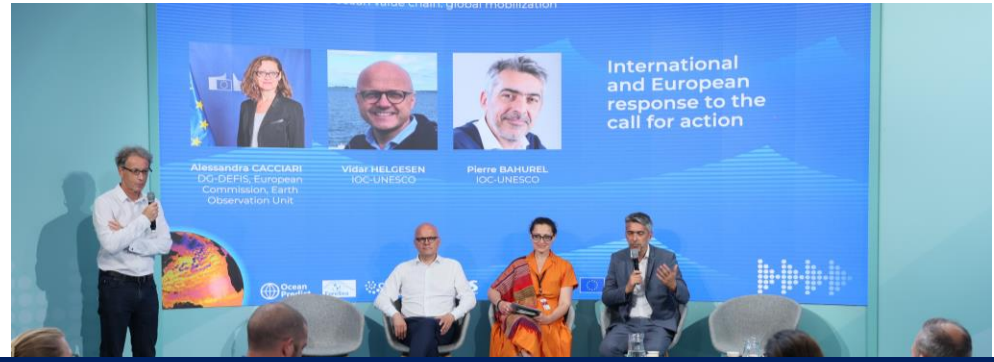
MERCATOR OCEAN INTERNATIONAL | EU4oceanobs

Ocean Predict | ForeSea | Ocean Prediction | GOOS Global Ocean Observing System | MERCATOR OCEAN INTERNATIONAL | EU4oceanobs

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

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



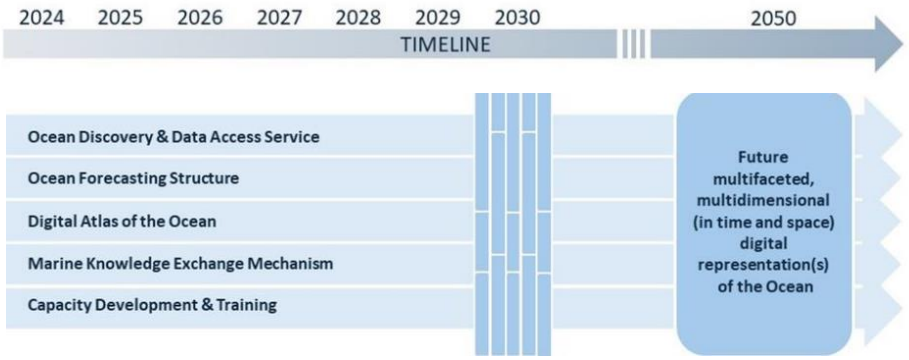


OceanPredict ForeSea, CoastPredict, Space Agencies (CNES), Ocean Observing CoDesign, Marine Life 2030, DITTO, Ocean Practices, OceanPrediction DCC ...

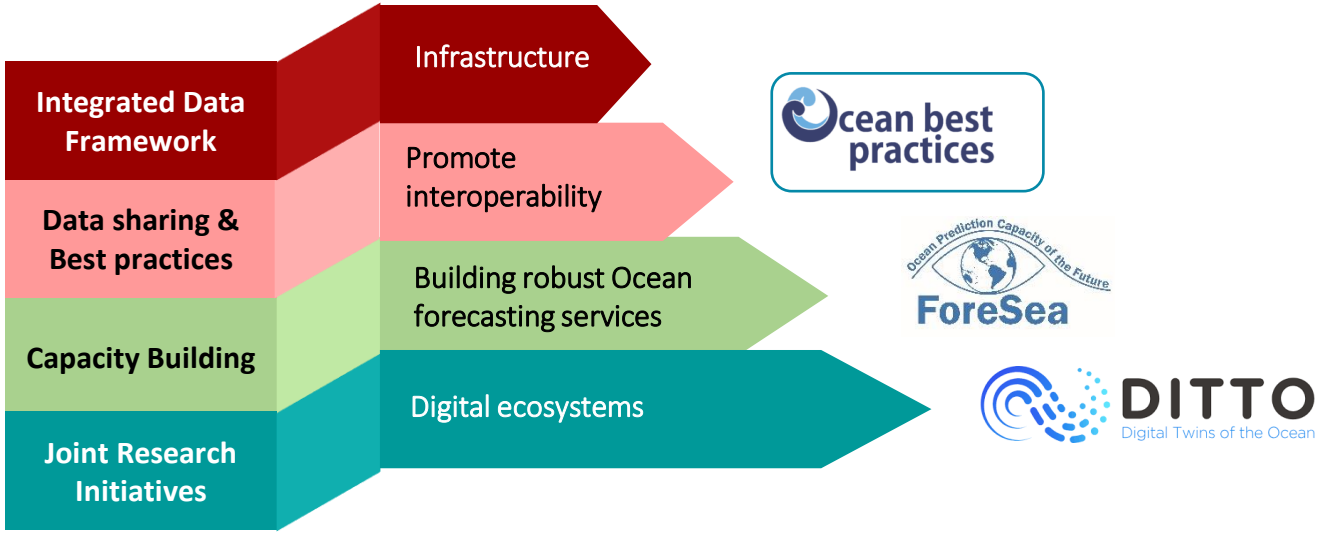

Ocean Predict
Ocean Prediction Capacity of the Future
ForeSea
THANK YOU
UNESCO
unesco
Intergovernmental
Oceanographic
Commission
2021
2030
United Nations Decade
of Ocean Science
for Sustainable Development
COSS-TT meeting - 17–20 Jun 2025, Ifremer, Plouzané, France

Additional slides if needed

Road map OP-DCC / DCO-OO / DCO-ODS



- Serve as a basis for **capacity development activities**.
- Support **development of new observing, data sharing and forecasting services** in developing regions
- Promote **interoperability between systems** in developed regions.
- **Minimize duplicated efforts** during development and operation phases.
- **Promote** further exploitation of ocean observations and forecasts via common tools and **digital twins**.



OCEAN DECADE PROGRAMME

GOOS | CoastPredict
with The Global Ocean Observing System

Primary attached to:

Ocean Decade Coordination Office
Ocean Observing

OCEAN DECADE STRUCTURE

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

UN Ocean Decade Collaborative Centre for COASTAL RESILIENCE

More infos with Villy's presentation

INITIATIVE

Access the GlobalCoast Network Memorandum of Understanding (MOU)

2024
GlobalCoast:
THE GLOBAL COASTAL OCEAN EXPERIMENT

The CoastPredict initiative towards resilience

GOOS | CoastPredict
with The Global Ocean Observing System

Mapping of the coastal systems

CoastPredict

with The Global Ocean Observing System

	Project title	Lead institution
1	European Knowledge Hub on Sea Level Rise	Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans) - Belgium
2	Future Coastal Ocean Climates (FLAME)	National Oceanography Centre - UK
3	Coastal Ocean Resource Environment	The Balearic Islands Coastal Ocean Observing and Forecasting System (SOCIB) - Spain
4	Integrating Coastal Hazard Warning Systems for TAC	IOCARIBE + ICG Columbia
5	Forecasting the Argentine Sea	Centro de Investigaciones del Mar y la Atmósfera - Center for Oceanic and Atmospheric Research (CIMA/CONICET-UBA) - Argentina
6	Mangroves as Nature-based Solutions to Coastal Hazards in Eastern Ghana (MANCOGA)	Helmholtz-Zentrum Hereon, GmbH - Germany / Department of Marine and Fisheries Sciences, University of Ghana / Institute of Environment and Sanitation Studies, University of Ghana - Ghana
7	AI ensemble engine for coastal hazard predictions	Fugro - Netherlands
8	PH ocean observing and coastal resource management	Marine Science Institute, University of the Philippines Diliman - Philippines
9	Integrated coastal ocean observing and predicting	Euro-Mediterranean Centre on Climate Change Foundation - Italy
10	Climate Data for Community Action	Hohonu - USA
11	Coastal Pollution Toolbox	Helmholtz-Zentrum Hereon - Germany
12	Global Coastal Ocean Restoration and Resilience	Institute for Corporate Citizenship (ICC), South Africa
13	Fishing Vessel ocean Observing Network	Ocean Data Network – United States of America (USA)
14	Environmental Vulnerability Mapping, West Africa	University of Calabar – Nigeria
15	Digital Observing System of the Yucatan Shelf	CINVESTAV – Mexico
16	Solutions for Cost-effective Ocean Observation (SCOOPp)	SMHI, the Swedish Meteorological and Hydrological Institute – Sweden
17	Forecasting Ocean to Coasts, Connecting Users (FOCCUS)	HELMHOLTZ-ZENTRUM HEREON GMBH (HEREON) – Germany
18	South-East Australian Coastal Ocean Forecast System	University of New South Wales (UNSW, Sydney) – Australia
19	Reef-shaped coastlines: effects of climate change	University of São Paulo/Oceanographic Institute – Brazil
20	Popular observatory of the sea – Amazon coast	Instituto de Pesquisas Científicas e Tecnológicas do Estado do Amapá (IEPA) – Brazil
21	Coastal Observation Lab in a Box	University of Edinburgh – United Kingdom of Great Britain and Northern Ireland (UK)
22	Advancing predictions of marine heatwaves	Western Australian Marine Science Institution (WAMSI) – Australia

Summary of the OP'24 outcomes

1. **Over 300 contributions (orals and posters),** fostering high-quality exchanges between leading **ocean and atmospheric scientists, service providers, industry representatives,** and **users of Ocean data.**

2. **Addressing Critical Ocean Prediction Challenges**

Experts focused on essential areas including **coastal and regional ocean prediction, polar ocean and sea ice dynamics,** and bridging **global with regional scale predictions**. **Coastal regions** face unique challenges due to complex interactions among currents, waves, and sediment transport. This **complexity requires** sustained observation networks and innovative approaches like **multiscale modelling to improve accuracy**. **Ensemble forecasting** has become crucial for improving prediction accuracy and providing actionable uncertainty information. **New satellite data**, such as SWOT observations of ocean circulation and **improved use of sea ice thickness measurements**, are contributing to more precise forecasts. However, **in situ observations remain fundamental** to ocean prediction, with ongoing challenges in **expanding measurements to deeper ocean and biogeochemistry**.

3. **AI and Digital Twins: game-changers for Ocean prediction data**

Artificial Intelligence (AI) techniques are rapidly advancing ocean prediction capabilities across multiple domains. These innovations range from **more accurate modelling with reduced computational costs to better estimates of previously unobserved ocean areas and parameters**.

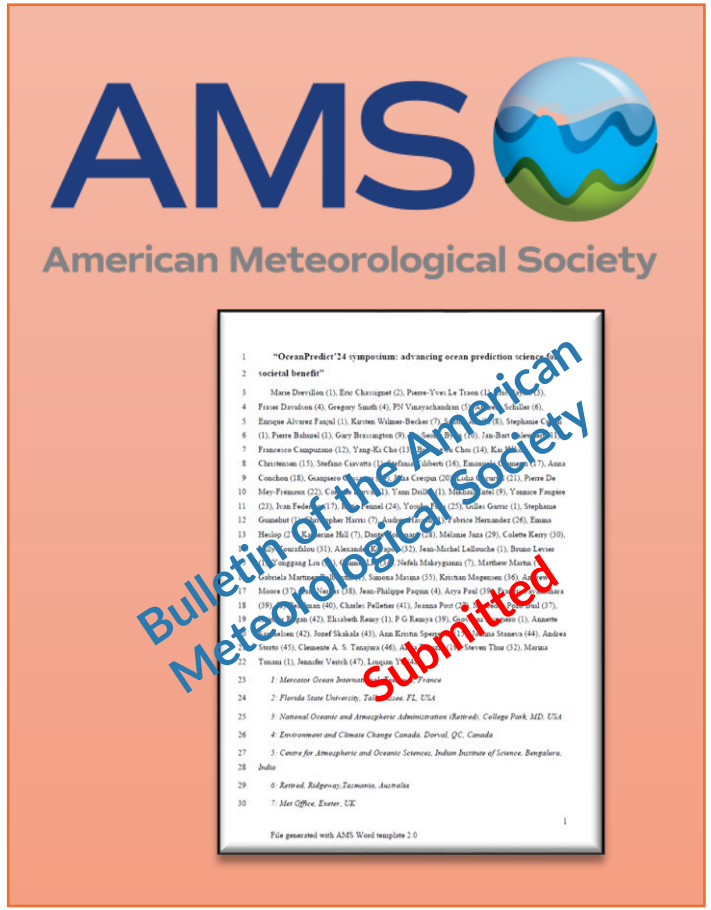
- **Machine learning models** are set to **improve probabilistic forecasting capacities** and enable **fast, multi-resolution mapping of ocean conditions**.
- Additionally, **digital ocean twins** are emerging as **transformative technologies** that promote **collaboration** and broaden **access to ocean prediction tools**.

4. **Societal Benefits and Policy Implications**

The symposium highlighted the **role of ocean prediction in informing policy decisions** with **actionable scientific insights** that support **sustainable management**. For example, there is a pressing need for **new standards in marine heatwave forecasting** and monitoring of their impacts on ocean ecosystems. Emerging initiatives on **marine carbon dioxide removal** also highlight the necessity for robust ocean monitoring systems to effectively confirm greenhouse gas emissions mitigation.

5. **Enhanced International Collaboration**

The event underscored the importance of **structured international collaborations to align science**, **services, governance, and innovation**. The **Ocean Decade** presents a unique **opportunity** to establish a framework that advances a sustainable global observing system for the blue, white and green oceans, while enhancing access to ocean prediction data.



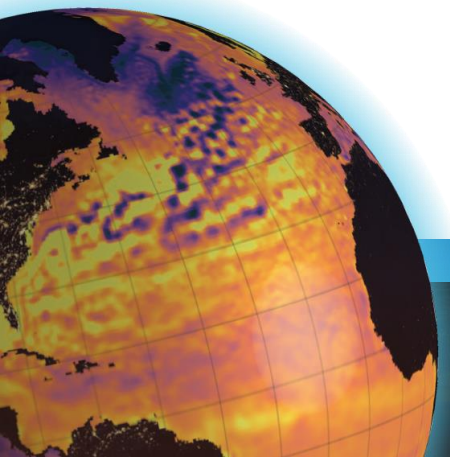
United Nations

14 LIFE BELOW WATER

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

in direct support to the UN **SDG 14 on the sustainable use of the Ocean's resources**, **the protection of marine biodiversity**, and the **development of effective climate change mitigation and adaptation** strategies.

"Ocean prediction systems offer evidence-based solutions for Ocean protection and sustainable development. A strong international mobilization of all ocean observation and prediction stakeholders and users will put state-of-the-art science and technology at the service of society to address the critical challenges facing our Ocean"



Ocean Predict

ForeSea

Ocean Prediction

UN DECADE COLLABORATIVE CENTRE

GOOS Global Ocean Observing System

MERCATOR OCEAN INTERNATIONAL

EU4oceanobs

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