



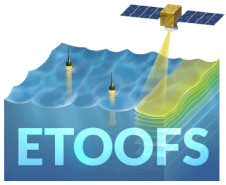
The Global Ocean Observing System



# Reports from GOOS components [ETOOFS]

**Pierre Bahurel (Chair), Enrique Alvarez Fanjul (Vice-Chair), Denis Chang-Seng (IOC Officer),**

**GOOS 12th Steering Committee meeting 25 - 27 April 2023**



# Expert Team on Operational Ocean Forecast Systems (ETOOF)

## MISSIONS

Manage and maintain the guide, scope and requirement documents,

Manage and maintain an overview of OOFS service portfolio

Manage and promote the adoption of an international standard to support interoperability

Guide and initiate actions at international level

**Promote and facilitate the support for OOFS development**

Provide advice on OOFS related matters

Liaise with and gather input from other Expert Teams

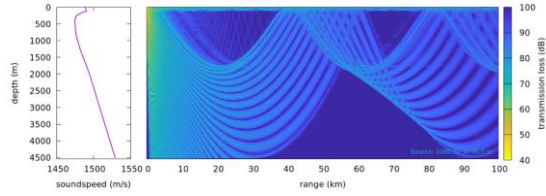
## EXPERT TEAM

1. **Pierre BAHUREL**, France, *Chair*
2. **Enrique ALVAREZ FANJUL**, Spain, *Vice-Chair*
3. **Stefania CILIBERTI**, Italy
4. **Shiro ISHIZAKI**, Japan
5. **Sudheer JOSEPH**, India
6. **Guimei LIU**, China
7. **Avichal MEHRA**, US
8. **Aihong ZHONG**, Australia
9. **Lotfi AOUF**, France



## IOC/GOOS

- **Denis CHANG SENG**, IOC, ETOOF officer



# Ocean Model Analysis and Prediction System Application – Defence decision support

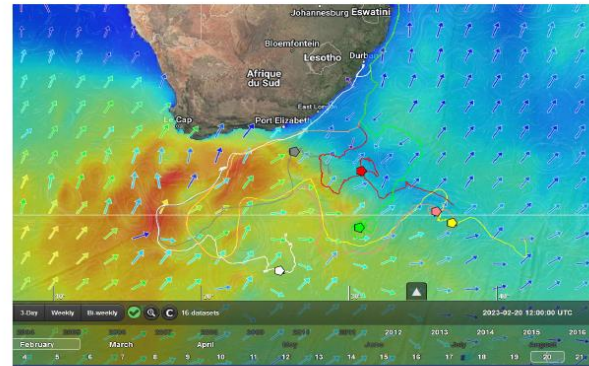
Courtesy ETOOFS expert **Aihong Zhong**, BoM, Australia



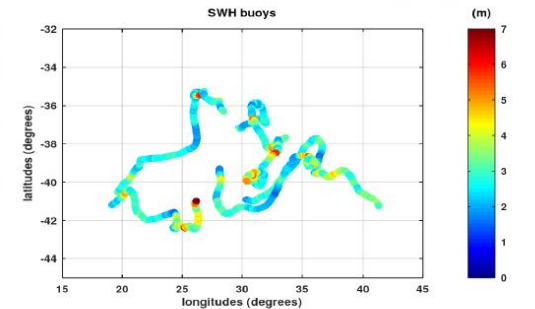
# Wave Model Analysis and Prediction System Application – Marine weather prediction

MFWAM-GLO-CEP vs OMB buoys in the Agulhas ocean region : Jan-Feb 2023

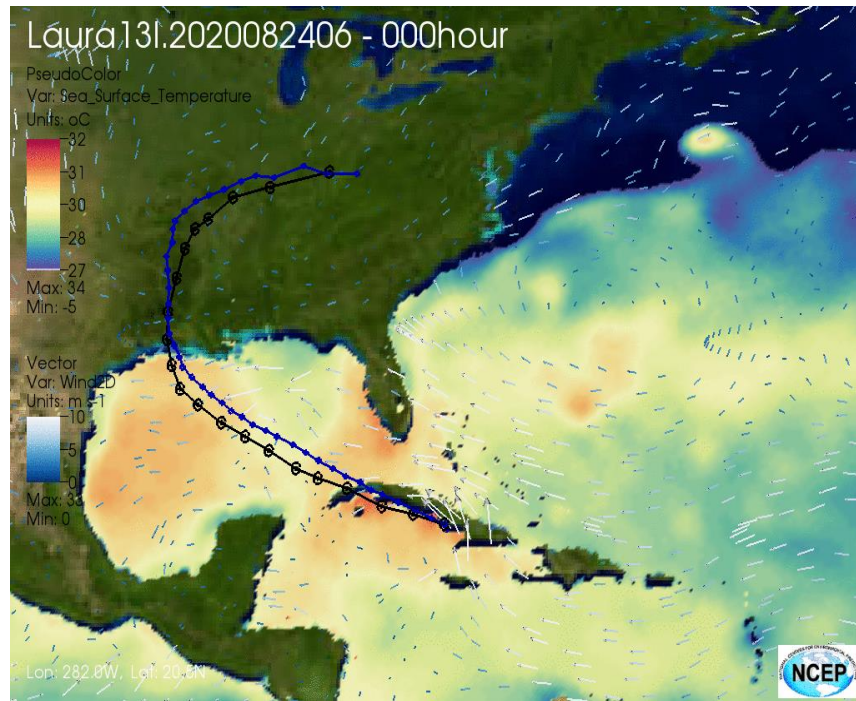
6 OMB buoys trajectories in the Agulhas region and positions (hexagones) on 20 February 2023, with overlapping of SWH from MFWAM (arrows indicate dominant wave direction)



SWH from OMB buoys following trajectories



Courtesy ETOOFS expert **Lotfi Aouf**, Meteo-France, France

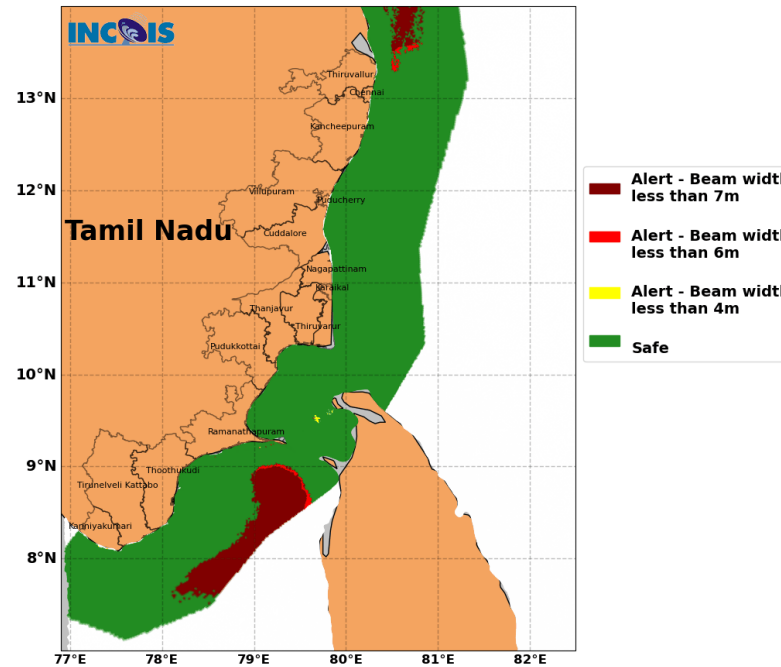


Coupled system (Atmosphere – Ocean – Waves) for Tropical Cyclone forecasts. –  
Operational Hurricane forecasts

Courtesy ETOOFS expert **Avichal Mehra**, NOAA, US



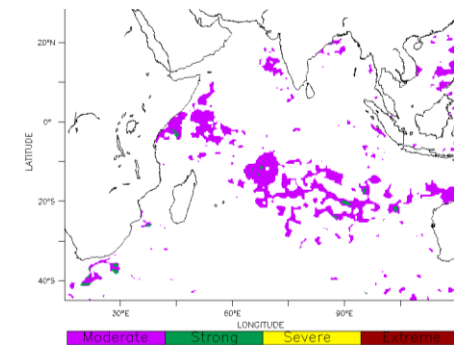
Small Vessel Advisory for 2023-04-23  
Tamil Nadu



Ocean State forecasts and safety at sea –  
Small Vessel Advisory support

Ocean State forecasts and coastal hazards–  
Marine Heat Wave warning

Courtesy ETOOFS expert **Sudheer Joseph**, INCOIS, India

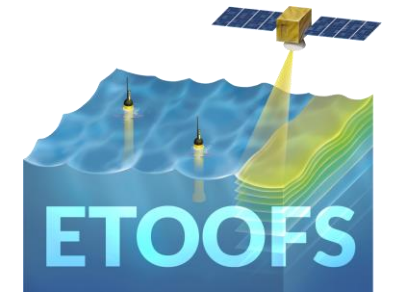




ETOOFS EXPERT TEAM ON OPERATIONAL OCEAN FORECASTING SYSTEMS

# IMPLEMENTING OPERATIONAL OCEAN MONITORING AND FORECASTING SYSTEMS

EDITORS: ENRIQUE ALVAREZ FANJUL, STEFANIA CILIBERTI, AND PIERRE BAHUREL  
GOOS/ETOOFS SECRETARIAT: DENIS CHANG SENG



## 1) Achievements & Highlights

# Achievements and highlights



- ETOOFS Workshop -

Successful workshop to **raise awareness** of ETOOFS and ocean forecasting



- ETOOFS Guide -

Long-awaited publication ETOOFS Guide, which demonstrates the unique **know-how of a community**



- ETOOFS and the Decade -

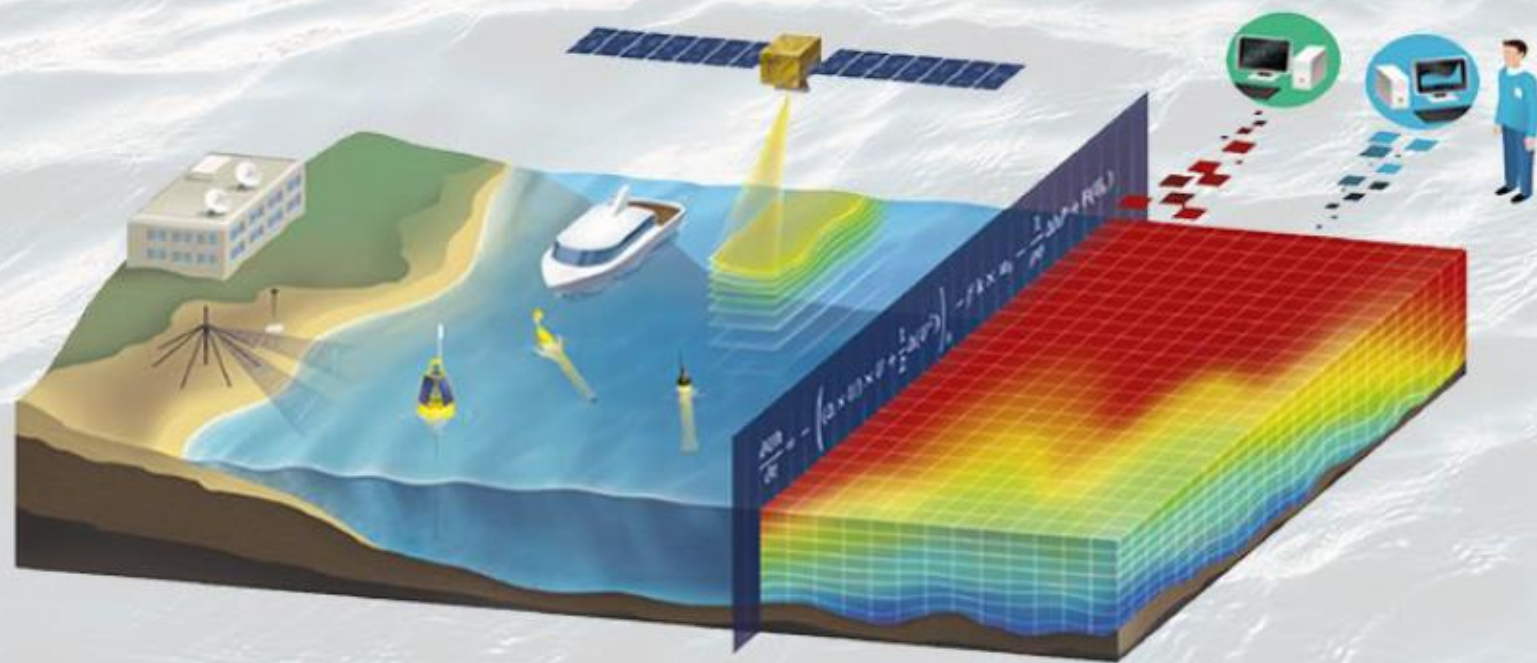
Successful docking of ETOOFS in the UN Decade with the OceanPrediction DCC which **links ETOOFS, OceanPredict, and GRAs**



SAVE THE DATE

# ONLINE WORKSHOPS

## Operational Ocean Monitoring and Forecasting Systems



**June 1-30th:**  
E-learning Platform Access

**June 14-16th:**  
Awareness Workshop

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Understanding the benefits of  
Operational Ocean Monitoring and  
Forecasting Systems

**June 22-24th:**  
Practical Workshop

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Implementing Operational Ocean  
Monitoring and Forecasting Systems



WITH THE SUPPORT OF :





# PARTICIPATION



188

PARTICIPANTS PER DAY  
ON AVERAGE



170



ACTIVE PARTICIPANTS  
ON THE OTGA PLATFORM

65

COUNTRIES



166

THANK YOU



178

QUESTIONS  
ASKED

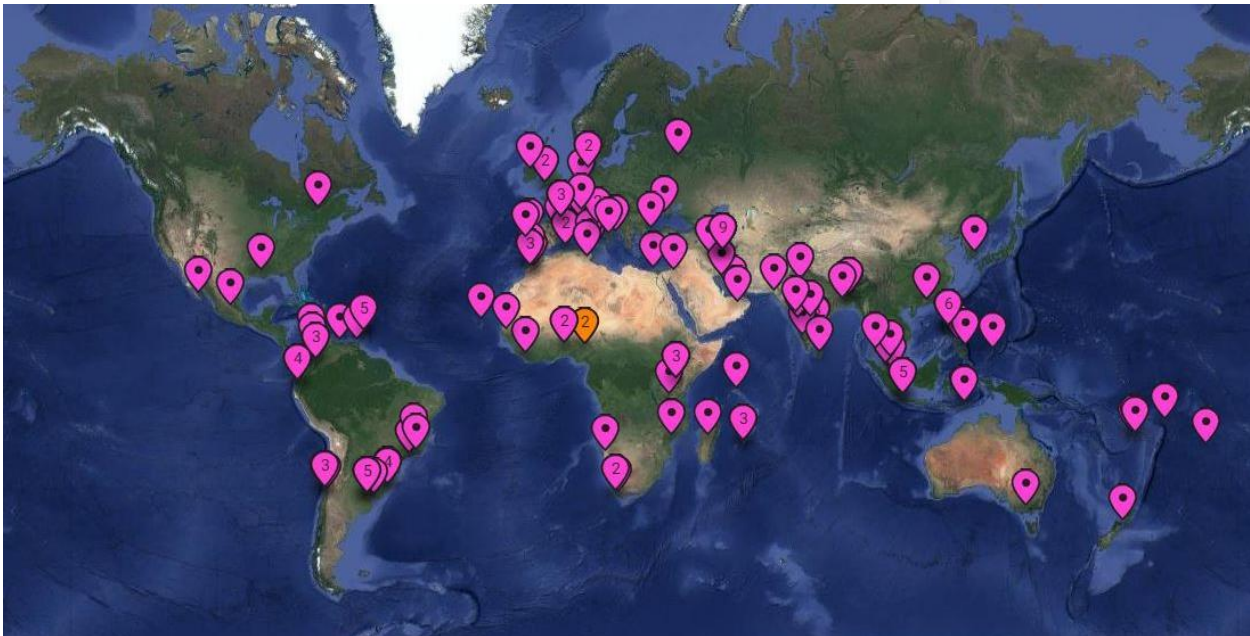


576

VOTES IN LIVE-POLLS



What will the future  
of OOFs look like?





# Survey



What content would you like/need to be addressed in a future OOFS workshop?

## TECHNICAL ASPECTS

Data assimilation

Hurricane Warning System

Forecast verification and validation exercises

forecasting of wave models in coastal areas

Validation of numerical modelling

Ocean data processing and quality control techniques

experiences of downscaling of global models in the Southern Hemisphere, particularly in South America

## MARINE POLLUTION

Oil spills

Ocean Acidification, Global Warming

## REGIONAL PERSPECTIVE

More of OOFS activities on the Africa context, where the develop regions are and how Africa is moving. Technical assistance to Africa in the context of OOFS

how to enable small-scale OOFS in developing countries

How to take into account (or to consider) local / traditional made tools by coastal communities in OOFS

More focus on regional basis

## OOFS IMPLEMENTATION

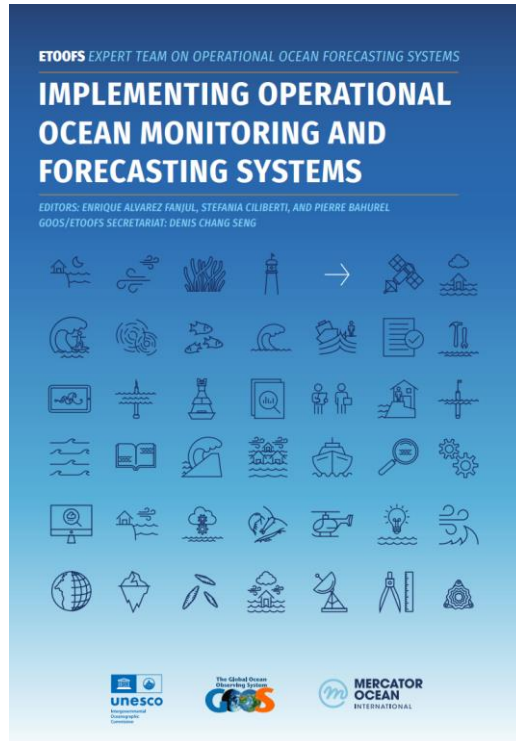
estimation of financial cost of materials using in OOFS

Challenges, how to overcome the ocean data observation in all part of the ocean

Practical aspects of each of the steps involved in an OOFS implementation

*“I think it's good, you just need to practice”*

# The ETOOFS Guide is finalized, with world-class expert contributions



<https://ioc.unesco.org/index.php/news/launch-guide-implementing-operational-ocean-monitoring-and-forecasting-systems>

<https://www.mercator-ocean.eu/en/guide-etoofs/>

## A community effort by recognized ocean experts

- 70+ contributing experts (authors)
  - 40+ different entities
  - 17+ different countries

## A comprehensive description of ocean monitoring systems

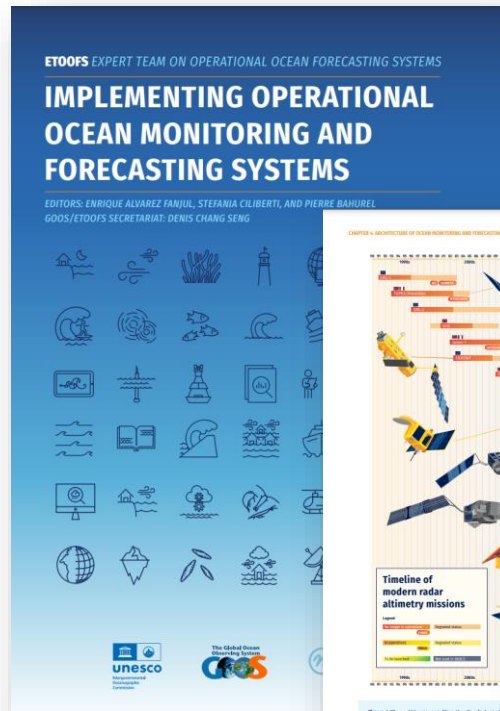
- 12 chapters to
  - a) Explain what can OOFs do and why, their value, limitations and main characteristics
  - b) Propose expert presentations of OOF systems on Ocean Circulation, Ice monitoring, Sea Level, Wave, Biogeochemistry, Ocean/Atmosphere OOFs systems
  - c) Address the uses and expected evolutions

## A professional edition, reviewed by the best experts

- Peer-reviewed text, professional edition



# The ETOOFS Guide was released in June 2022 at the UN Ocean conf.



- Release as a **GOOS** document

Official kick-off at the occasion of the UN Ocean conference in Lisbon (30 June 2022)

– side-events and international recognition

Online publication

– Available online (see [here](#))

- Ongoing endorsement by **WMO**

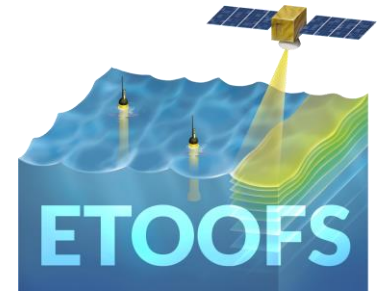
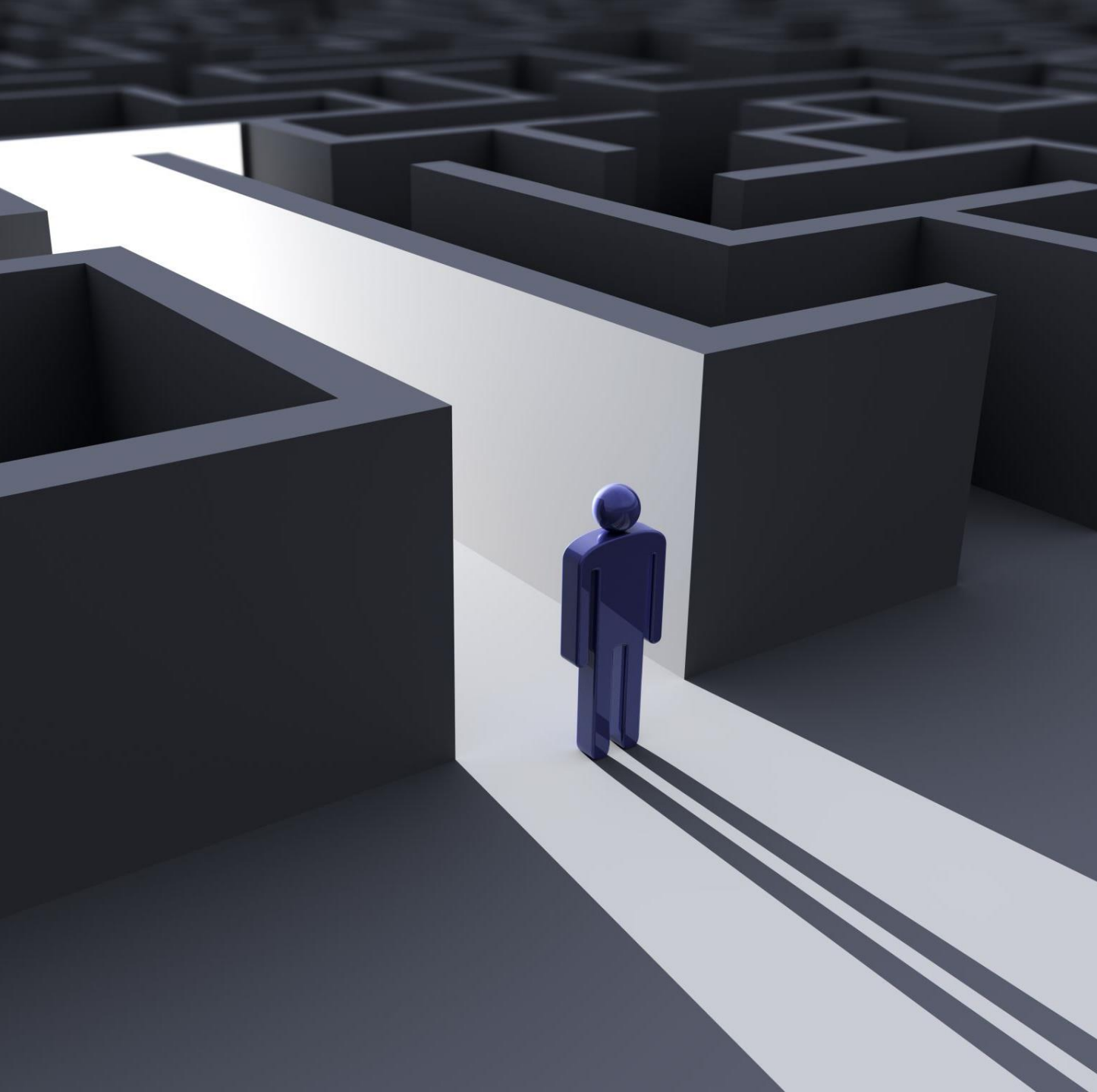
– To enter WMO & IOC document libraries

<https://ioc.unesco.org/>

<https://www.mercator-ocean.eu/en/guide-etoofs/>







## 2) Opportunities & Issues

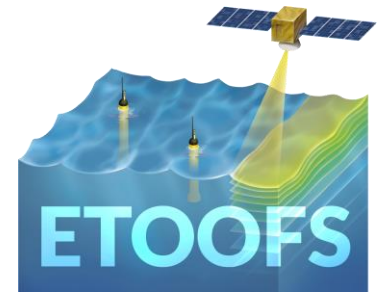
# Opportunities and issues

## Opportunities

- The UN Decade is a clear opportunity to foster the integration and recognition of ETOOFS in the real (very dynamic and very diverse) world of ocean forecasting.

## Issues

- An enthusiastic response with actors on the ground, including in countries with which interaction was previously weak, but a link / recognition that is nearly absent or distorted with the governance, including Member States.



### **3) Future plans**

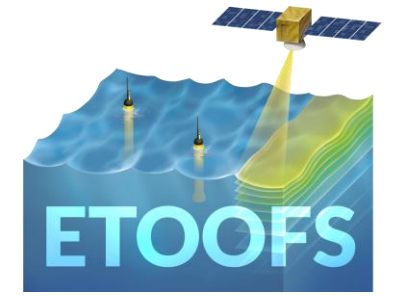


# Future Plans for ETOOFS

1. **continue the work**, with the limited means of a small group of experts with other obligations, but with the will to be a reference point
2. **develop integration into the UN Decade** using the OceanPrediction DCC framework and dynamics
3. **reflect on the evolution of ETOOFS**, which was invented in the last century, and which needs to be thoroughly rethought
  - to make a useful contribution to a rapidly developing **ocean forecasting / digital oceanography ecosystem**
  - to better serve **Member States and their organisations**, and respond to their needs

*We are initiating a reflection of an evolution of ETOOFS for a patient but resolute transition. Feedbacks and expression of interest / requirements are welcomed.*



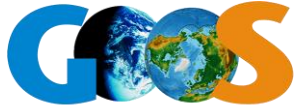


## 4) Question for the Steering Committee

# Question for the Steering Committee

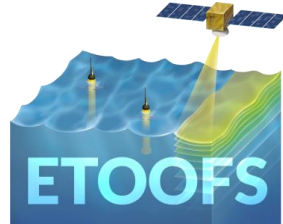
- If ETOOFS is to evolve - and we believe it must - what are the elements that the GOOS Steering Committee identifies as important to consider?





The Global Ocean Observing System

*Pierre Bahurel, Chair;  
Enrique Alvarez Fanjul, Vice-Chair  
Denis Chang-Seng, IOC officer*



# Thank you

[goosocean.org](http://goosocean.org)



**unesco**  
Intergovernmental  
Oceanographic  
Commission



WORLD  
METEOROLOGICAL  
ORGANIZATION



**UN**  
environment  
programme

International  
Science Council

