EuroSea foresight workshop:
Ensuring accurate climate related predictions in Europe in 2035

Museum of Natural Sciences, Brussels, Belgium

15-16 March 2023

Report

Contents

Main outcomes

To ensure a sustainable and reliable Ocean Observing and Forecasting System (which includes marine monitoring) across all Ocean basins in Europe, the ocean observing and forecasting community together with national systems and in collaboration with the European Union, must:

- *Change the narrative of the need for sustainable ocean observing and forecasting systems.* This should highlight the user-oriented component, benefits and value to society, and that these systems are instruments to provide the most fundamental asset for society: data. This new narrative would seek support from, and demonstrate relevance to, governmental institutions and economy actors (such as SMEs). This would promote the integration and collaboration of European entities and structures, to ensure maximum benefit is delivered within the total envelope of available resources.

- *Establish clear regularly revised priorities at Global, European and National levels on what to observe and forecast and why.* The identification of priorities, and the ocean observing and forecasting system needed to meet them, should be co-designed with a clear set of users and beneficiaries. This should consider the legal requirements to monitor and report on national, European and international progress, such as the overarching obligations set at the European Nature Restoration Law or the Convention on Biological Diversity as well as the scientific drivers for sustained observations. Instead of creating more legal barriers, the system needs to recognize the national responsibility to observe and forecast for environmental/resource management, operational services and advancing scientific knowledge and understanding the ocean system.
- *Address the tension between supporting the development of the blue economy and its impact in the environment, and what would be the role of ocean observing and forecasting systems.* The paradigm in Europe needs to incorporate both socio-economic and environmental dimensions. The key driver to involve ocean observing and forecasting systems is to enable solutions to be developed with awareness of the consequences of the blue economy, the ability to adaptively manage in respect of unintended impacts that emerge and to evaluate the performance of management actions.
- *Engage with sustainable finance systems to ensure the transition to a sustainable blue economy.* Benefiting from the need for environmental monitoring, the best-selling point is the low-risk of investment, as science systems has funded the installation and running the ocean observing and forecasting system.
- *Agree and develop a standardized procedure to gather and assess the cost and benefits of ocean observing and forecasting systems.* This procedure should examine how to gather the relative cost including consistently assessed, annualized capital and operating costs, and the dedicated staff time, of ocean observing and forecasting systems at national level (which falls under multiple government structures). The investigation of the benefits should include the ocean observing and forecasting done beyond national jurisdiction.
- *Tackle the difficulties to sustain ocean observing and forecasting systems.* This should take advantage of the new narrative, and recognize the voluntary efforts for coordination and integration, by supporting them with suitable resources. The user-oriented systems should have longer time horizons for resourcing with periodic reviews (as other large-scale and essential infrastructures). This would avoid the unnecessary costs in staff-time of short reviewing periods and would offer a longer sustained horizon to ensure investment in new technologies.
- *Increase efficiency to comply to the United Nations Convention on the Law of the Sea (UNCLOS).* Ensure sustained ocean observations comply with the provisions of UNCLOS and that any specific issues that arise e.g. in respect of technology innovations having a material impact can be identified and raised through the appropriate intergovernmental processes with a view to resolving them appropriately within the framework of UNCLOS.

Introduction

According to the latest assessment of the Intergovernmental Panel on Climate Change (IPCC), global warming is causing significant, and in some cases irreversible, changes in the Ocean and to rainfall and winds patterns in all regions of the world. For Europe, they predict an increase in the frequency and intensity of extreme weather events, including marine heatwaves, and warns that a 2°C increase in temperature will have critical effects for nature and people. These include huge costs for the EU's economy (more than €90 billion direct economic loss between 1980 and 2011 were caused by floods alone). It will hamper countries' ability to produce food, change the distribution of some water-borne

illnesses and disease vectors, and increase the number of heat-related deaths in some regions and of cold-related deaths in others[1].

The European Union (EU), through the European Green Deal and other instruments, has set ambitious targets to achieve climate neutrality, while transitioning to a climate resilient society, restore damaged ecosystems and bring nature back across Europe. In order to accomplish these targets, information on the current state of the environment and reliable predictions are essential to inform actions such as laws & policies, city & land planning, preparation for emergency events and management of natural resources and services. However, the information we obtain from the Ocean, through observations and monitoring activities, is currently not enough to inform decision-making processes and achieve the European Green Deal objectives. Consequently, the European Commission launched the "Ocean observation – sharing responsibility" initiative to achieve a common EU approach for measuring once and using the data for many purposes. In order to achieve this common approach, there is the need to tackle the growing disconnect between what information is needed from the Ocean and how to fund the value chain providing this information.

The European Marine Board Secretariat organized a foresight workshop on the sustainability of the ocean observing and forecasting system, supported by the EU Innovation Action *EuroSea*, on 15-16 March 2023 at the Museum of Natural Sciences, Brussels (Belgium). See workshop agenda in Annex 1. The workshop aimed to gather key recommendations or considerations for possible future mechanisms to sustainably fund and coordinate ocean observation, prediction and information delivery in Europe. These would inform a report on recommendations to the European Ocean Observing System (EOOS) Framework[2] to be delivered at the end of the *EuroSea* project. The planning of the workshop was informed by *EuroSea* partners, which included a dedicated workshop at the *EuroSea* Annual Meeting on 10 May 2022 at University Campus in Cádiz, Spain. During this internal workshop, there was a general agreement to focus the theme of the foresight workshop on the impacts of climate change, and to invite representatives of national observing systems, as these actors are responsible for a large part of the sustainability of the ocean observing system.

The workshop was by invitation only and from the nearly 100 invitations, the final participants included representatives of the EOOS Resources Forum[3] and Operations Committee[4] from Belgium, Estonia, Germany, Norway, Sweden and United Kingdom, the European Commission, the G7 Future of the Seas and Oceans Initiative[5] and the EU4OceanObs initiative[6], UNESCO-IOC GOOS[7], EuroGOOS[8], and other *EuroSea* project partners. The workshop was moderated by Sheila Heymans, Executive Director of the European Marine Board[9], and the list of participants are given in Annex 2.

Summary of the workshop

The workshop participants were challenged with a scenario of what the world might look like in 2035. A world in which extreme events such as heavy rainfall, floods and heatwaves, have become frequent and the new norm across Europe. Responding to the huge impact on human lives and the costs to the

[1] https://ec.europa.eu/clima/climate-change/climate-change-consequences_en
[2] https://www.eoos-ocean.eu/
[3] https://www.eoos-ocean.eu/approach/governance/resource-forum/
[4] https://www.eoos-ocean.eu/approach/governance/operations-committee/
[5] https://www.g7fsoi.org/
[6] https://www.eu4oceanobs.eu/
[7] https://www.goosocean.org/
[8] https://eurogoos.eu/
[9] https://www.marineboard.eu/

economy, the European Commission and National Governments would need accessible, timely, and actionable information from the European Ocean Observing and Forecasting System to respond to the crisis.

After the welcome from the moderator (Sheila Heymans), the President of the Working Party on Maritime Issues[10] Mattias Rust, representing the Swedish Presidency of the Council of the EU, set the scene in a thought-provoking talk. He highlighted 3 essential groups to consider and to engage in discussions with for the future sustainability of the ocean observing and forecasting system:

1. Citizens: the ocean observing and forecasting system provides the knowledge to stop the degradation of the ocean, if these solutions can be demonstrated to the public, citizen will care about the sustainability of the system and politics will follow.
2. Finance institutions: the ocean observing and forecasting system must get into the discussions towards sustainable finances, but it is difficult to find reliable numbers and statistics on the actual scope of the blue economy.
3. Industry, including Small and Medium Enterprises (SMEs) and innovators: the ocean observing and forecasting system can provide the data and knowledge to these actors as they can't afford to get the data by themselves, and they are an essential component of the sustainable blue economy.

After the opening, a dedicated brainstorm discussion took place to explore and describe with the participants three 2035 future scenarios: the worst case, the best case, and the probable 2035 future. The participants considered what a best-case scenario could deliver and what could be lost in a worst-case scenario.

- The discussed best-case scenario included national coordination of ocean observing and forecasting initiatives, with a European wide approach for coordination between countries and promoting cost-efficient and sustainably funded observation.
- The discussed worst-case scenario involved that research funding can't support the costs of observing the ocean as a consequence of the lack of coordination, and that geopolitical issues make the system even more vulnerable.
- The realistic scenario was a future were impacts of climate change such as heatwaves and population shifts still can't be predicted, national coordination exists in some cases based on voluntary activities, and Digital Twins of the Ocean are biased as data from the deep sea is reduced.

The rest of the workshop was animated by four discussants who described issues such as, the legal barriers to ocean observing (Erik van Doorn, GEOMAR), funding and sustainability challenges (Vicente Fernández, EuroGOOS, and Edward Hill, NOC) and the societal value of ocean observing (Emma Heslop, UNESCO-IOC GOOS). The discussants were asked what consideration from their issue would be ideal to have in 2035 and the replied included harmonization of the "Marine Scientific Research" clearance protocols within and between EU Member States, a standard method for cost estimation and an understanding of the benefits of ocean observing (and be able to fund the system), and acquaintance of the value of the global ocean observing system.

[10] https://www.consilium.europa.eu/en/council-eu/preparatory-bodies/working-party-on-maritime-issues/

The workshop ended with a discussion on how the EOOS Framework Strategy and Roadmap for Implementation for 2023-2027[11] can ensure that we arrive at the best possible future.

Annex 1: Foresight workshop agenda

Day 1	
10:30	**Arrival of participants – welcome coffee**
11.00	**Welcome and introduction to participants by moderator** - Sheila JJ Heymans, Executive Director, European Marine Board (EMB)
11.10	**Setting the scene** • **The Working Party on Maritime Issues** (**Council of the EU)** – Mattias Rust, Ministry of Rural Affairs and Infrastructure, Government of Sweden, Representative from Swedish Presidency

11.30	**Building the 2035 scenario** - Sheila JJ Heymans (EMB)
	Scenario briefing *(based on introduction text)*, co-developing the scenario with participants, clarification questions by participants
	• *Business-as-usual* vs realistic vs optimistic future
	  ○ What do we want to prevent?
	  ○ What would we love to have?
	• How quickly/easy can a national overview of Ocean observing capabilities be organised?

12.30	**Lunch break and group photo**

13.30	**Expert presentations and discussions (1)**
	• Legal implications of ocean observing - Erik van Doorn (GEOMAR)
	• Q&A and Discussion in plenary
	  ○ How do we increase awareness of the current incompatible situation between the legal framework and the operational reality?
	  ○ How do we create national "Marine Scientific Research Clearance Offices"?
	  ○ What would be the implications of the recently agreed UN High Seas Treaty?

14.15	**Expert presentations and discussions (2)**
	• Challenges for investigating the funding of ocean observing: examples from previous studies – Vicente Fernández (EuroGOOS) & Insights from the UK on sustainable scientific ocean observations (SOOP) – Ed Hill (NOC)
	• Q&A and Discussion in plenary
	  ○ How do we conduct and quantify cost-benefit analyses for ocean observing systems?
	  ○ How should funding be divided between departments/ministries at national and EU level or how can funding be optimized?

[11] https://www.eoos-ocean.eu/approach/strategy-and-implementation/

	○ What changes in bottom-up and top-down governance are needed to balance this "new" funding system? ○ What types of funding mechanisms other than project based might be used?
15.00	**Coffee break**
15.30	**Expert presentations and discussions (3)** • Societal value of ocean observing as public good: tracking, reporting and reviewing… against what? - Emma Heslop (GOOS) • Q&A and Discussion in plenary ○ How do you balance research and societal needs? *(Health vs Space approach)* ○ How would the "new" ocean observing system be evaluated/reviewed as public good? ○ How will the national responsibility to observe be expanded beyond national jurisdiction?
16.15	**Breakout discussions**
17.00	**Close of Day 1**
19.00	**Dinner at *Le Local - 51 rue de la Longue Haie, 1000 Brussels***
Day 2	
10.00	**Arrival of participants & Brief report back from breakout sessions on Day 1 + Q&A**
10.30	**Breakout discussions (cont'd)**
11.30	**Presentation & discussion on EOOS Roadmap for Implementation** • What can be done concretely in the next years to not arrive to the 2035 scenario?
12.20	**Closing remarks and invitation to EuroSea conference**
12.30	**End of meeting and lunch**

Annex 2: List of participants

First name	Last name	Organization	Country
Alicia	**Blanco**	EuroGOOS	Belgium
Jan-Bart	**Calewaert**	European Marine Observation and Data Network (EMODnet)	Belgium
Dina	**Eparkhina**	EuroGOOS	Belgium
Vicente	**Fernandez**	EuroGOOS	Belgium
Emma	**Heslop**	UNESCO	France
Sheila	**Heymans**	European Marine Board	Belgium
Anthony Edward	**Hill**	National Oceanography Centre	United Kingdom
Maria	**Hood**	Mercator Ocean International / G7 FSOI	France
Jella	**Kandziora**	JPI Oceans	Belgium
Thorsten	**Kiefer**	JPI Oceans	Belgium
Andrew	**King**	Norwegian Institute for Water Research	Norway
Thomas	**Klein**	Swedish Agency for Marine and Water Management	Sweden
Zoi	**Konstantinou**	European Commission - DG MARE	Belgium
Benjamin	**Kürten**	Project Management Juelich	Germany
Koen	**Lefever**	BELSPO	Belgium
Taavi	**Liblik**	TalTech	Estonia
Kelle	**Moreau**	Royal Belgian Institute of Natural Sciences	Belgium
Ángel	**Muñiz Piniella**	European Marine Board	Belgium
Joseph	**Nolan**	EuroGOOS	Belgium
Mattias	**Rust**	Government Offices of Sweden	Sweden
Nicolas	**Segebarth**	European Commission - DG RTD	Belgium
Erik	**van Doorn**	GEOMAR Helmholtz Centre for Ocean Research Kiel	Germany
Jana	**Van Elslander**	European Marine Board	Belgium
Paula	**Veloso**	EuroSea	Portugal
Gert	**Verreet**	Flanders Dept EWI	Belgium