EuroGOOS Annual General Assembly Meeting Report

21 May 2024

Special session on the future look at ocean observing

1. Introduction and overview of EuroGOOS activities

Welcome and introduction

Henning Wehde, EuroGOOS Chair, opened the meeting thanking the delegates. Carlos Fernandes welcomed the Assembly at the Hydrographic Institute. Inga Lips introduced the meeting agenda. The Special Session was dedicated to the UN Ocean Decade.

Overview of EuroGOOS activities

Inga Lips, EuroGOOS Secretary General, introduced the EuroGOOS activities, its governance operating at regional (Regional Operational Oceanographic Systems, ROOS) and thematic levels (Working Groups and Task Teams), and the EuroGOOS Office that plays a key role in connecting the community. The EuroGOOS 2030 Strategy guides the work of the organisation according to its five strategic objectives. The EuroGOOS ROOS, Working Groups and Task Teams were briefly presented.

As regards the UN Ocean Decade, EuroGOOS has been actively supporting the establishment of several programmes and the Decade Collaborative Centre on Ocean Prediction. It was highlighted that EuroGOOS also promotes a comprehensive European Ocean Observing System (EOOS) Framework, and the Office supports the EOOS governance, the implementation of the EOOS Strategy 2023-2027 and its Roadmap for Implementation.

Inga Lips stressed the EuroGOOS short-term priorities spanning communication with stakeholders and society, identification of observation gaps for the Digital Ocean Twins, and the contribution to the Ocean Prediction DCC global model inventory. In the longer term, EuroGOOS aims at strengthening its role in ocean health and climate services, promoting sustainability across the value chain of operational oceanography, and implementing EOOS with support of the European countries.

2. Ocean observations: European and global developments

IOC-GOOS updates

Joanna Post, Head of Section for Ocean Observations and Services / Director of GOOS, IOC-UNESCO, opened her talk stressing that ocean observations are fundamental for society. They deliver key inputs for climate action, community adaptation, carbon strategies, ocean health, blue economy and forecasts and early warnings. There is a need to recognise the critical ocean infrastructures for these services. However, today there are no sufficient observations and therefore it is challenging to fully meet the needs of climate action, operational forecasting, and sustainable ocean planning.

Pour copie certifiée conforme, Inga Lips, Secrétaire Générale, 01/07/2024.

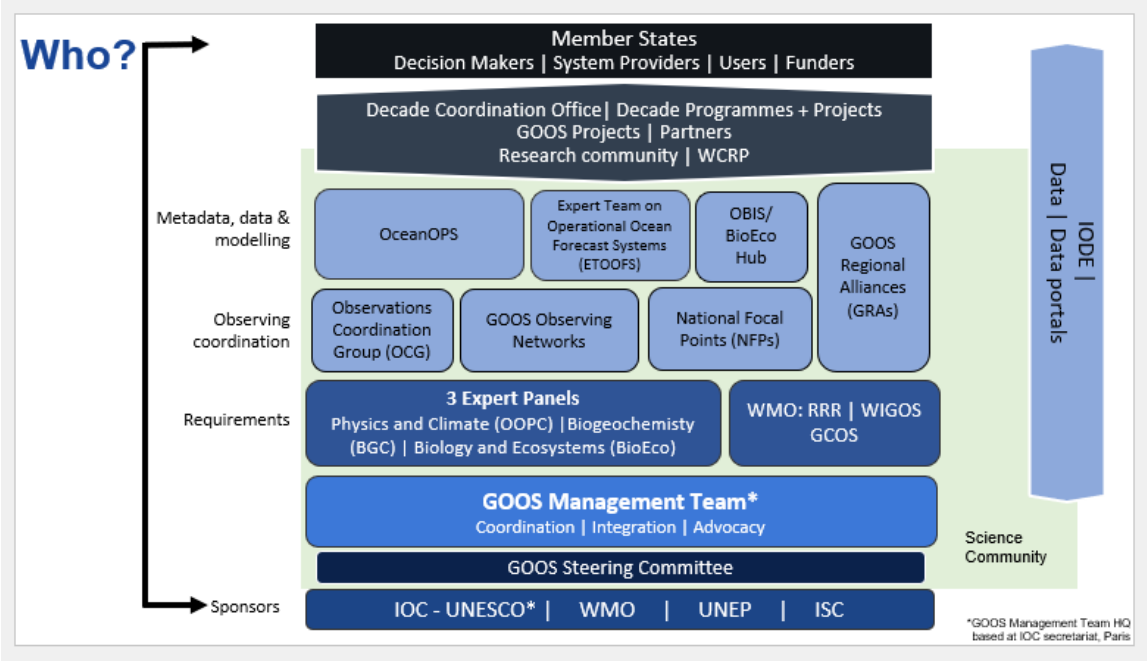
There is a massive opportunity in the ocean – according to a recent study by the Economist[1], emerging ocean-based solutions, including offshore wind, wave and tidal energy, and marine carbon dioxide removal, have the potential to contribute a substantial 21% to the emissions reductions required by 2050 if global warming is to be limited to 1.5°C. Critical to this are ocean observation data. Currently, two-thirds of the US$52bn marine-based climate change economy hinges on ocean observations. Dependence could intensify to 100% as climate change exacerbates the unpredictability of ocean condition and weather.

The recent GOOS Regional Alliances Meeting (April 2024) highlighted some achievements from the GOOS regional activities on the ocean observing coordination. The Integrated Marine Observing System, IMOS, delivered a return on investment study pointing out that the ratio of investment versus societal benefit of ocean observations is 1 to 5. In addition, we need to consider a broader, non-economic societal benefit.

The GOOS endeavours to lead the ocean observing community globally, positioning itself at the interface between the community of the observing infrastructure providers and the beneficiaries of ocean information (research, policy, investors, and other users). GOOS has many multi-national and inter-institutional agreements supporting its work, such as with IMO, UNEP, Convention on Biological Diversity, UNFCCC and others.

The GOOS Strategy 2030 is key for the implementation of UN Ocean Decade Challenge 7 'Expand the Global Ocean Observing System'. There are three strategic goals in the GOOS Strategy: (i) deepen engagement and impact, (ii) system integration and delivery, and (iii) building for the future.

Joanna Post introduced the GOOS governance (see below), which was summarized at the recent GOOS Management Team meeting.



The status of the observing system as reported by GOOS currently includes inputs from 84 countries, over 8,000 observing platforms, 13 global observing networks plus 12 bioeco networks, and over 120,000 observations conducted daily. Annually, GOOS provides a Report Card. Furthermore, GOOS promotes standards across the 35 Essential Ocean Variables through the Ocean Best Practices System (OBPS). The GOOS Observations Coordination Group has developed a cross-network data implementation strategy of the OCG. New priorities of GOOS include collaboration with industry, tracking human impacts across the EOVs, and strengthening the National Focal Points (NFPs). 76 NFPs are identified in GOOS. The focus of

[1] https://impact.economist.com/ocean/sustainable-ocean-economy/the-oceans-silent-sentinel

the work should be, among others, on the re-invigoration of the NFPs in Africa, Caribbean, and Pacific Islands.

GOOS is active in the Ocean Decade, leading programmes and supporting the Decade Coordination Office (DCO) for Ocean Observing, which develops its activities in close collaboration with the DCO for Ocean Data Sharing and the Decade Collaborative Centre for Ocean Prediction.

The following next steps for GOOS were highlighted:

- Build the critical national and international global infrastructure for ocean risk management and sustainable ocean planning, with GOOS acting as a unique global framework and voice for ocean observation and implementation plans (e.g. carbon);
- National and regional support and capacity exchange for infrastructure, metadata, and data;
- Focus on FAIR data (in situ and satellite) while building global ocean digital ecosystem targeted at specific delivery areas at national, regional, international levels across the value chain (observation - data - prediction);
- Advance metadata standards and data quality and trust providing coherence on delivery of EOVs (QA and QC) with GRAs & NFPs;
- Embrace new technologies and new collaborations;
- Evolve governance to support an evolved GOOS 2.0.

In the Q&A, Rosalia Santoleri pointed out that the G7 working group on seas and oceans, led by Italy, is launching an activity on sustainability of observations, which will be supporting GOOS. The objective is to build an international ocean observing infrastructure. First WG meeting will be in July 2024 in Italy. Furthermore, the Italian National Focal Point of GOOS works on data integration.

Ocean Decade implementation

Julien Barbier, Chief of Sciences Unit, IOC-UNESCO, presented the Ocean Decade – global endeavour providing transformative ocean solutions to support Sustainable Development Goals (SDGs). Since the Decade was designed, the landscape has changed dramatically, with the BBNJ, CBD, and Plastic Treaty agreements adopted recently.

The Decade addresses ten Challenges[2] and its decentralized governance supports actions to address them. A new Decade Collaborative Centre (DCC) is being developed to address the ocean economy.

From the outset, the Decade has been a bottom-up process. In 2023 a Vision 2030 process was launched to address the collective impacts addressing the ten Decade Challenges. Ten expert groups delivered white papers on the ten challenges which were discussed at the Decade Conference in Barcelona in April 2024. Furthermore, cross-cutting areas were also addressed. An outcomes report was developed. The strategic ambition of this process is to allow measurement of progress towards fulfillment of Challenges, achievements, gaps, priorities, and resources. Possible refinement or addition of Challenges is also addressed.

Furthermore, the Barcelona statement, delivered at the Conference in April identifies priority areas for action in the coming years. IOC is now promoting the Statement at various international and inter-governmental levels.

Towards Mercator International Centre for the Ocean

Pierre Bahurel, Director of Mercator Ocean International (MOi), presented the MOi transition to an inter-governmental organisation (IGO). MOi is a private company with public benefit. MOi has been a member of EuroGOOS for 21 years. MOi has an agreement with the European Commission to implement the

[2] https://oceandecade.org/challenges/

Copernicus Marine Service. This means MOi is fully responsible for the EU funding dedicated to Copernicus Marine Service, launching funding calls, and reporting to the Commission and Member States. MOi has a Memorandum of Understanding with EuroGOOS setting a framework to decide on the complementarity of actions. EuroGOOS brings in the connection with national services, while MOi delivers a European core service.

Now, MOi is moving towards an inter-governmental organisation, championed by Portugal. This will help bringing ocean prediction and the Member States closer together. Ocean prediction science is ready to support decision making, however, further investment is needed from national governments.

MOi was set up by the French institutions, then expanded to include other European countries. The inter-governmental entity will strengthen MOi and make it easier for countries to contribute to. The connection with the European Commission is key as it ensures a full alliance of MOi with the EU.

Ocean prediction in MOi was developed in decadal steps: from 2000 to 2010 science collaboration was boosted. In the following decade a service was established. In the current decade, connection with policy and member states is strengthened.

The EU has flagship marine data and forecasting services: EMODnet and Copernicus Marine. The EuroGOOS community is key for the provision of observations and predictions. This is particularly important for the development of the European Digital Twin Ocean and the overall Mission Ocean. For Europe to be stronger internationally, we should boost a global alliance of ocean forecasters and use shared protocols and standards. The inter-governmental MOi will have this as a key objective.

The status of the development of the new organisation includes the rapid creation of the IGO with an international treaty ratified by a small number of Member States. From that point, all MOi activities will be transferred to the new IGO and MOi will become governed by Member States. After that, the governance will be expanded to include more States. Six countries are already engaged: France, Italy, UK, Spain, Portugal, and Norway. The new name will be MERCATOR, International Centre for the Ocean, according to the current draft of the IGO convention prepared by the six countries. The purpose is to develop national agencies' support. EuroGOOS is mentioned in the convention.

EU Digital Twin Ocean and related initiatives

Zoi Konstantinou, European Commission Directorate-General for Maritime Affairs and Fisheries (DG MARE), introduced the EC vision for the Digital Twin Ocean (DTO). This is thought to be a key enabler of the Mission Ocean, which aims at making ocean research accessible and impactful for the benefit of society and the blue economy. Efforts are ongoing to support the development of the DTO. A lot has been achieved in the observing and data community (EMODnet, Copernicus Marine, Research Infrastructures, regional and local levels). These capabilities should be brought to the service of larger audiences, not only science.

The EU Core DTO infrastructure, EDITO, is being developed by MOi (representing Copernicus Marine) and VLIZ, Belgium (representing EMODnet). The EDITO data lake is generated with the aim of bringing together all ongoing activities and contributions.

Zoi Konstantinou clarified that DTO is not a supermodel with a comprehensive set of services, rather this is a combination of services developed through various models. DTO should serve both proficient and layperson users at different levels of technical expertise. The ultimate goal is to make ocean knowledge accessible to all. Similar advancements are happening in other parts of the world. This includes the UN Ocean Decade programme DITTO, the Decade Coordination Office for Ocean Data Sharing, the Decade Collaborative Centres on Ocean Prediction and on Coastal Resilience. DTO is developed as an inclusive and open programme. 187 relevant EU projects were identified at the Digital Ocean Forum in 2023. The 2024 edition of the Forum in June will unveil the DTO prototype.

Zoi Konstantinou updated the meeting on the EU Ocean Observation initiative which aims at delivering the status of the observing activities at the EU level. It was not possible to launch the initiative under the current Commission. Before the new Commission mandate starts later this year and picks up on the work done on the initiative beforehand, the development of a pilot digital platform will be rolling out. A call for tender will be launched in June 2024, with operations foreseen until mid-October 2026. A Member State Expert Group of the EU Council will deliver advice on ocean observations at the Member State levels. The ultimate aim is to share Member States observing plans openly, which will contribute to avoid duplication of observing activities and promote collaboration.

In the Q&A, Zoi Konstantinou shared that common data standards will be promoted by EMODnet. At the same time, work is done on the harmonisation of the reporting obligations on various existing EU directives and strategies. Answering another question, Zoi Konstantinou shared that the digital platform is foreseen to be semi-operational by October 2026. She stressed that bottom-up coordination has been successful but there needs to be a top-down governance to ensure the responsibility of the Member States for their observations. As regards the connection with GOOS and NFPs, Zoi Konstantinou clarified that the Commission has no say in what experts are selected by the Member States (representatives of counties on the EU Council group on the Integrated Maritime Policy) to sit on the Member States Expert Group. As regards the future EU funding to support the new initiative's legislation, Zoi Konstantinou stressed that observations will remain the mandate of the Member States. The initiative aims at strengthening the Member States responsibility and commitment.

Pierre Bahurel stressed that the observing community is fighting for sustainability and the Commission tries to help. He emphasised that the EuroGOOS members should support this process and be better organised at the Member States level.

Joanna Post commented that the community needs to consider a paradigm shift in how observations are supported. IOC GOOS and EC are providing frameworks, but observations should not just be research-funded. The community should promote the shift towards a full recognition of the national governments of the need for observations.

At the end of the discussion, Admiral João Paulo Ramalho Marreiros, Director-General of Hydrographic Institute, joined the meeting to welcome the EuroGOOS delegates.

3. EuroGOOS as Decade Implementing Partner

Introduction: EuroGOOS role as Decade Implementing Partner

Dina Eparkhina explained the role of EuroGOOS in the first years of the Ocean Decade development. Namely, EuroGOOS has been active in the establishment of programmes SciNMeet and CoastPredict and the Decade Collaborative Centres on Ocean Prediction and on Coastal Resilience. Furthermore, since 2021 EuroGOOS is coordinating a Decade project Scientists for Ocean Literacy and has conducted several Decade-endorsed events, among others, EOOS Technology Forums 2022 and 2024 and the 10th EuroGOOS International Conference 2023.

As the Decade Implementing Partner, EuroGOOS aims to step up its engagement with a dedicated role to support the coordination of its community contributions across the value chain of marine knowledge.

With the evolution of the Ocean Decade governance, decentralisation becomes more important with the sharing of the coordination load at thematic and geographical levels. It is proposed that as Decade Implementing Partner, EuroGOOS will contribute activities in the following three key areas:

- Connecting with DCOs for Ocean Observation and for Data Sharing and DCCs on Ocean Prediction and on Coastal Resilience, as well as the CoastPredict Programme;
- Helping to harness the potential of the European ocean observing community and transfer its knowledge and best practices to those who need them;

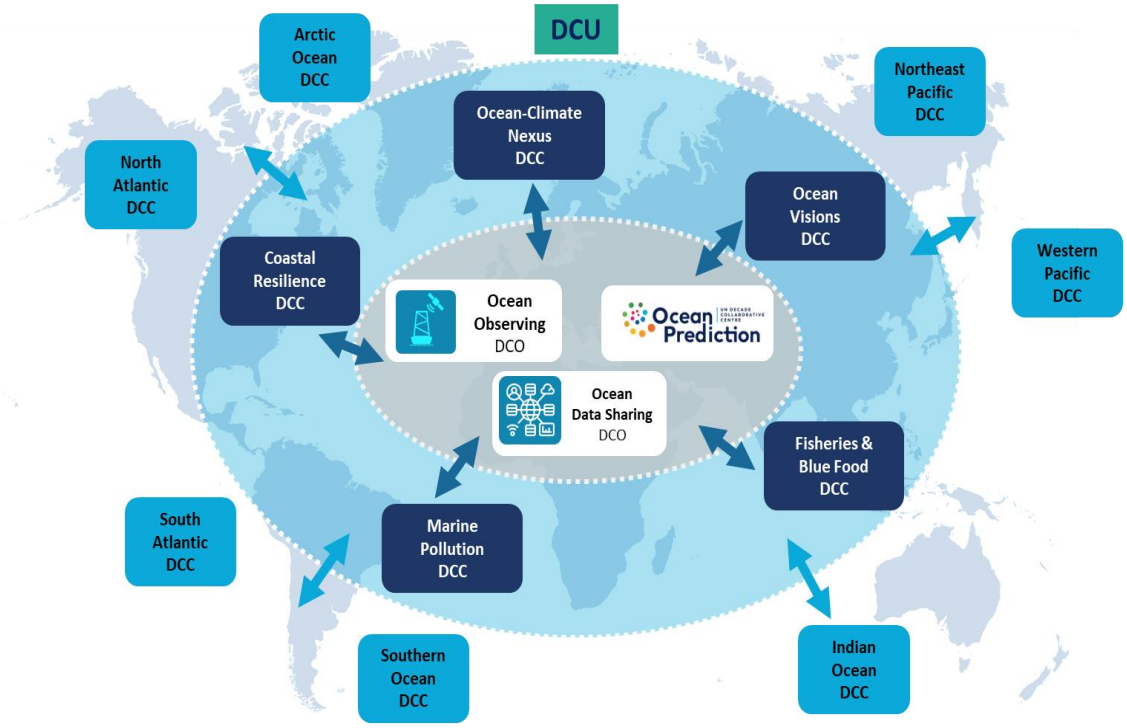
- Promoting the EuroGOOS community engagement and communication (workshops, bulletins and updates, webinars, outreach).

The delegates were invited to actively share their views and ideas on the EuroGOOS contributions to the Decade as well as the opportunities that the Decade represents for the EuroGOOS community. A dedicated discussion session took place on Day 2 during the word café.

Keynote: Coordination of Decade activities on ocean observing & forecasting

Terrence McConnell, DCO Ocean Observations, noted that the ocean observing system of today was designed to answer the questions of yesterday. He stressed the collaboration within the Decade on the whole range of activities supporting the ocean knowledge. Each of the decentralized centres (DCC)/offices (DCO) have a responsibility to support related Decade projects and programmes. Each project and programme self determine which DCC or DCO should support them.

He presented the status of the ocean observing-related decentralised structures of the Decade.



The ocean data digital ecosystem is like an iceberg, with the services as the tip of the iceberg and the data collection and modelling as the plumbing system. The Data Coordination Group of the Decade formulated an Ocean Decade Data and Information Strategy which paves the way for the activities. The key is to transfer data to knowledge. At the moment, GOOS tracks one platform for every 14,000 square kilometres on average in the global ocean – this points to considerable observational gaps. DCO for Ocean Observing is analysing the observing gaps, promotes data collection standards, and promotes technology development. While the community has been working on these areas for years, we need to step up the impact. GOOS 2.0 requires a new institutional strategy, stronger community engagement, and a new funding model. DCO for Ocean Observing is supporting this transition.

Terence McConnell called on the EuroGOOS community to help design the observing system with the end-user in mind. Furthermore, he stressed the importance of standardized metadata, which is developed cooperatively to ensure the data is ready for use.

Keynote: EuroGOOS regional collaboration through ROOS

Vanessa Cardin presented the overview of the ROOS collaboration and contributions to the Decade and promoting regional cooperation.

ROOS have been involved in the DCC on Ocean Prediction, in particular the Arctic ROOS and MonGOOS. BOOS has established a strategy for addressing Decade challenges for the Baltic. MonGOOS has been collaborating with the Monaco Explorers Decade programme. The Arctic ROOS continues the efforts of the INTAROS observing programme, started with an EU project, with a new project. Furthermore, the Arctic ROOS is promoting a GOOS Regional Alliance for the Arctic. IBI-ROOS iFADO Interreg project is advocating for sustained observations.

Panel discussion on European regional coordination within the Decade Terence McConnell (DCO OO), Vidar Lien (Arctic ROOS), Jun She (BOOS), Manuel Ruiz Villareal (IBI ROOS), Sebastien Legrand (NOOS), Vanessa Cardin (MonGOOS), *moderated by Ghada El Serafy*.

Ghada El Serafy asked the panel to reflect on the role of EuroGOOS in the Decade.
Terry McConnell recognised the role of EuroGOOS as the European voice of operational oceanography, which is a unique role globally. He also stressed the role of MOi and IODE. European observations are made thousands of kilometres away from Europe – how to deliver the impacts of these observations globally, through a digital ocean ecosystem? The data collection frameworks and metadata standards are key.
Sebastien Legrand said that NOOS agencies are connected with the Decade, but coordination should be improved at the NOOS level. NOOS did a survey of its members' connection with the Decade initiatives, programmes, and coordination structures to better grasp the coordination and collaboration requirements and opportunities.
Vanessa Cardin added that connection with the Decade is at institutional level, not at a regional one.
Sebastien Legrand further noted that the connection between the regional systems and the national Decade committees is important and in many cases not yet established.
Manuel Ruiz observed that on some levels the connection with the Decade is well established, for example on the provision of observations and data by ROOSs and the kind of activities ROOSs are performing, oriented to products and services for final users. It is a matter of labeling ROOS activities as Ocean Decade activities. IBIROOS members claim the regional coordination is in some cases stronger than at the inter-institutional level, and the Decade could be an opportunity for enhancing coordination at the national level. Jun She pointed out the achievements of the EuroGOOS regional cooperation on data standards and modelling best practices. For coordination, it is important that information is shared beyond the people directly involved – at the institute level. This will avoid the bottleneck when collaboration stops at the level of the contact person.
Vidar Lien said that in the Arctic ROOS, the Arctic Action Plan is an important development. The plan addresses both research and collaboration/organisation challenges.

As regards the future plans to engage in the Decade, the panel shared the following:
Sebastien Legrand suggested that the DCOs and DCCs should synthesise the best practices and disseminate them. It is hard to follow individual actions as the regional work is not funded, therefore the role of DCOs and DCCs is crucial.
Vanessa Cardin mentioned the importance of connection between the ROOS members and the national focal points contributing to the Decade. Information should be better shared between different levels of engagement.
Terence McConnell agreed on the importance of this role of the DCOs and DCCs. They help align the efforts and clarify the roles in the ecosystem. He stressed the work done by the working group delivering the implementation plan for the Ocean Decade Data and Information Strategy.
Enrique Alvarez, DCC for Ocean Prediction, stressed that DCCs and DCOs are serving the community and not the other way round. DCC on Ocean Prediction is delivering an architecture for ocean forecasting,

which will be a new asset of the global community and can help individual organisations deliver better forecasts. The DCC has given a big weight to EuroGOOS in order to build on the EuroGOOS achievements. Jun She said that many ocean data are collected at national level for non-operational use, and data coordination and sharing are not fully established for these data. It is key to improve the integration between the data collected for operational oceanography and other marine data.
Manuel Ruiz stressed the importance of the involvement of national governments. The Decade is led by stakeholders and international/inter-governmental efforts – now is the time to have stronger links with national governments.
Giovanni Coppini mentioned the EuroGOOS role in the Decade and the connection with DCC on Ocean Prediction, DCO for Ocean Observing, and DCC on Coastal Resilience. Pilot sites for the CoastPredict programme are based on the EuroGOOS efforts. New actions will further leverage the EuroGOOS work. EuroGOOS and ROOS represent the whole value chain and are more comprehensive than GOOS, which mainly focuses on observations. EuroGOOS ROOS are a good example of connecting observations with models and services.
Caroline Cusack asked the panel if they know of examples of successful work of the National Decade Committees. Terence McConnell said that he already engaged with GOOS on the connection between GOOS National Focal Points and National Decade Committees. Rosemarie Lawlor said this connection is missing at the WMO level in Ireland.
Sebastien Legrand emphasised that ROOS are the backbone of EMODnet Physics and Copernicus Marine In-Situ. These strengths should be leveraged.

Observing the Ocean in collaboration with industry

Paul Holthus, Founding President and CEO, World Ocean Council, presented the WOC. Headquartered in Barcelona, WOC promotes the business sector involvement and contribution to ocean science and sustainable development. This is the only such organisation dedicated solely to sustainability. WOC has MoUs with IOC and WMO. He presented the WOC Smart Ocean – SMART Industries programme.

In the Q&A, Paul Holthus shared examples of the industry's provision of open marine data to Copernicus and the WOC connection with WMO.

4. Summary of the session and closing remarks Henning Wehde, Chair, EuroGOOS

Henning Wehde thanked the speakers, panellists, and delegates for interesting presentations and discussions.

Open session on EuroGOOS activities

1. Welcome and adoption of agenda

Henning Wehde introduced the session.

2. Office report on activities

Inga Lips introduced the Office report on 2023 activities. Alicia Blanco presented the EuroGOOS social media outreach. She reminded the delegates to share their updates with the EuroGOOS Office. Inga Lips presented the EuroGOOS Office team and introduced the staff changes since the 2023 General Assembly Meeting. The 2024 Office work plan was presented. Inga Lips stressed that the EOOS implementation in previous years was supported by the EuroSea project. With the project having ended, it is more challenging to deliver support. However, some other EU projects contribute to the effort. Deniz Karaca Halén presented the detailed overview of the activities across the WGs, Task Teams, ROOS, and EU projects.

In the Q&A session, Caroline Cusack recognised the work of the Office. George Petihakis asked if the Data Policy posed any issues to some members – Inga Lips responded that none had been communicated. George Petihakis also stressed the importance of the EuroGOOS Integration Workshops. Last workshop was in May 2022 and this activity should continue. Rosalia Santoleri shared the CNR's perspective – the Data Policy had not yet been signed because of the change of management. She supported Inga Lips' suggestion to organise future Integration Workshop as a co-creation event, rather than an event generating new actions which are difficult to follow.

3. Report from the Executive Board of Directors

Henning Wehde introduced the report stressing this is his last report as EuroGOOS Chair. He thanked the Executive Directors Board and EuroGOOS Vice-Chair in particular. The EuroGOOS 2030 Strategy guides the work of the Board. The Board met regularly online (31 meetings during Henning Wehde's term as Chair). The Board took an active role in developing the EuroGOOS contribution to the Ocean Decade. Board meetings also addressed the EuroGOOS strategic prioritisation and the actions of the General Assembly, as well as planning of the Assembly meetings. Furthermore, the Board stepped in to support the Office organisation and addressed any emerging challenges.

Henning Wehde expressed his thanks for the Assembly's confidence in his role as EuroGOOS Chair. He thanked Inga Lips and the Office personnel. After stepping down as Chair, he will stay on EuroGOOS as IMR delegate.

Questions of priority he had addressed as Chair: (i) focus on Member fee contributions, and (ii) the Office working environment were taken a large amount of time and with that priorities such as (i) how to achieve more impact, and (ii) how to promote the contributions from EuroGOOS members to better reflect the new needs of the community remain to be handled. He suggested that the Board should be chaired jointly by two Co-Chairs, rather than a Chair and a Vice-Chair.

4. Status of EOOS Strategy Implementation

Inga Lips presented the EOOS updates. She reminded the meeting about the EOOS Roadmap for Implementation 2023-2027. In the 2023-2024 period, the EOOS updates include the promotion of the ocean observing value chain among stakeholders. The dialogues with stakeholders are important for the identification of the observing system gaps. The filling of the gaps should be done hand in hand with the Member States and in collaboration with the EC. Another action in the reporting period concerns the identification of the emerging priorities and is particularly addressed by the European Marine Board but also by the EuroGOOS WG on Biological Observations. The latter contributes to the improvements in the biodiversity data collection for operational oceanography and addresses data management. Inga Lips shared that not all relevant stakeholders and international organisations are engaged in EOOS.

The EuroGOOS CINEA tender titled AllOceanObs intended to improve the visibility of the ocean observing activities and support the development of the EC initiative Ocean Observations – Sharing Responsibility. The EU AMRIT project is developing an EOOS Technical Support Centre and the performance monitoring dashboard (aka "European OceanOPS").

The new EuroGOOS data policy is an important asset for EOOS. Furthermore, the EuroGOOS work in the Blue-Cloud 2026 project on the promotion of FAIR data through training - contributes to improving the data flow.

The EOOS implementation plan also aims at fostering the development of national observing systems, which are the cornerstone of EOOS.

5. Cross-cutting mapping of EuroGOOS Activities

Joseph Nolan presented the mapping exercise, which aims at addressing two emerging topics identified by the Office: (i) Artificial Intelligence (AI) and Machine Learning (ML) applications in operational oceanography; and (ii) Accessible ocean observing technologies.

Jun She introduced the topic of AI and ML. AI can be defined as an "intelligence" based on a data-driven deep learning process. The AI analyses the ocean via connections rather than equations. In this way it builds up capacities for predicting the ocean. AI is used in many operational oceanographic areas, e.g.: downscaling, optimised local forecast, improved reanalysis: multi-source data-simulation fusion, observation quality control, model validation, annotate biological observations, marine climate emulator, remote sensing (e.g. automated image processing), etc.

The benefits of AI and ML include: improved marine information products in both quality and resolution with low costs, contribution to specific challenges in operational oceanography, e.g., product accuracy in coastal waters, BGC variables, biological observations, pollution in LOAC, HPC bottlenecks, harmonisation of fragmented data.

The major challenges are: lack of expertise in both AI/ML and operational oceanography, lack of good training datasets, esp. for 3D ocean, fragmented expertise.

Several organisations and activities in EuroGOOS are already working on AI. However, stressed Jun She, a dedicated EuroGOOS strategy is needed to address this new and rapid development.

Inputs were collected to the Miro board (details available here and in Annexe 4) and discussed in plenary around four questions. The following key inputs were received on the questions discussed.

1. What areas do you think AI and ML could be most usefully applied in operational oceanography?
   - Quality control and assurance: automatic error detection, data quality improvement.
   - Real-time data assimilation: enhancing data accuracy, real-time predictions.
   - OC/FA for seamless planning: ocean circulation/forecast analysis.
   - Mission planning optimisation: efficient resource allocation, adaptive planning.
   - Better forecasting: climate and weather predictions.
   - Reducing uncertainty in polar forecasts: improved ice and polar region forecasts.
   - Oceanographic analysis and mapping: detailed ocean mapping, bathymetric analysis.
   - Big data analysis: handling large datasets, extracting insights.
   - Species identification: marine biology applications, automated species recognition.
   - Teach identification algorithms: improve machine learning models.

2. What expertise relating to AI or ML would benefit the EuroGOOS community?
   - Image and pattern recognition: identification of marine species, habitat mapping.
   - LSTM/Deep Learning time series processing: analysing temporal data, predicting future trends.
   - Computer vision for marine environment: underwater imagery analysis, object detection in marine settings.
   - Big Data analysis: processing and interpreting large volumes of oceanographic data.
   - Aspiration for AI/ML techniques: encouraging community interest, knowledge dissemination.
   - Collaboration with other AI/ML communities: sharing insights and techniques, cross-disciplinary partnerships.

3. What specific activities relating to AI or ML should EuroGOOS implement?
   - Development of a white paper: strategic planning, documenting AI/ML applications.
   - Common challenges and solutions workshops: sharing experiences, problem-solving sessions.
   - Simulation and modelling of oceanographic processes: virtual experiments, scenario planning.
   - Research collaborations: joint research projects, sharing resources.
   - Data sharing initiatives: open access data repositories, enhanced data availability.

- Facilitating training programs and workshops: skill development, community training sessions.
- High-value IT resources: computational power, specialised software.
- Hackathons and competitions: engaging community, innovative solutions.

4. What resources would be needed to support these activities in EuroGOOS? Which funding sources should be explored?
   - Horizon Europe, SBEP and DTO calls: targeted funding opportunities, specific project funding.
   - EDITO Data Lake: centralised data storage, access to diverse datasets.
   - Support from national research agencies: grants and funding.
   - Collaborative funding models: joint funding with industry, public-private partnerships.
   - Advocacy for increased research funding: lobbying for more funds, raising awareness of funding needs.

As regards the second discussion topic, Lucie Cocquempot introduced the accessible technologies opportunities and issues. As identified by the latest EOOS Technology Forum (March 2024), these include the data quality of these technologies, their inclusion in the ongoing observing activities, recycling of sensors as well as overall sustainability both environmental and economic. Accessible ocean observing technologies are defined as "less expensive" than traditionally used technologies, do-it-yourself (DIY) sensors are also considered as accessible technologies. The plenary discussion followed on the definition of accessible ocean technologies.

Inputs were collected to the Miro board (details available here and in Annexe 4) and discussed in plenary around four questions. The following key inputs were received on the questions discussed:

1. Which aspects of operational oceanography could most benefit from the use of accessible ocean observing technology?
   - Observations and monitoring: increased data availability, enhanced remote sensing, enhanced data density, improved spatial and temporal resolution, water quality assessment, ecosystem health.
   - Open data policies: shared data access, enhanced collaboration, filling gaps in high-risk regions: improved coverage in critical areas, risk mitigation.
   - Reducing cost of monitoring systems: cost-effective solutions, broader deployment.
   - Improved forecasting: better weather and ocean condition predictions, more accurate models.

2. What are the biggest factors in determining the accessibility of ocean observing technology for you or your institution?
   - Maintenance requirements: regular upkeep, technical support.
   - Technology Readiness: maturity of technology, deployment readiness.
   - Accessible maintenance: easy-to-maintain systems, low operational costs.
   - Costs: cost of equipment, initial investment, funding availability.
   - Training needs: skill development, training programmes.
   - Reliability and durability: long-term performance, robustness of equipment.
   - Legal and regulatory requirements: compliance issues, standardisation.

3. What specific activities relating to accessible ocean observing technology should EuroGOOS implement?
   - Latest technologies: demonstrations, technology fairs.
   - Training workshops: hands-on training, skill development.
   - Open data practices: encouraging data sharing, open access policies.
   - Common platforms for data access: centralised repositories, standardised formats.
   - Research collaborations: joint projects, shared resources.
   - Facilitating standardised practices: best practices documentation, quality control measures.
   - QA/QC standards: ensuring data quality, consistent methodologies.
   - Common procurement strategies: bulk purchasing, cost-sharing.

4. What resources would be needed to support these activities in EuroGOOS? Which funding sources should be explored?

- Public calls for developing technology: government grants, EU initiatives.
- Private funding: industry partnerships, private investors.
- Office support: administrative assistance, infrastructure.
- Collaborative funding models: public-private partnerships, joint funding.
- Advocacy for increased research funding: campaigns for more funding, raising awareness of needs.

22 May 2024

Open session on EuroGOOS activities (continues)

Carlos Fernandes welcomed all to the second day of the meeting, and gave an overview of the day's agenda.

6. Activity updates from EuroGOOS Working Groups

Mauro Celussi presented a summary of activities by the Biological Observations Working Group, for which they are a newly elected chair. Recent meetings have reviewed the WG's Terms of Reference, with efforts ongoing to re-engage members after a period of low activity. It was noted that with more frequent online meetings, participation has improved. An activity focused on integration of genomics into the observing system is ongoing, with a report due to be finalised later in 2024. Another report on the barriers to use of biological data in modelling of marine systems is expected in 2025. It was noted that there is a lot of biological data available, but it is not always easy to integrate into models (interoperability etc.). The lack of financial resources available for the working group's activities was emphasised as a limiting factor in progress.

Ghada El Serafy presented an update on the Coastal Working Group's activities. A white paper 'EuroGOOS roadmap for operational coastal downstream services' was published in July 2023. The CWG is acting as the focal point for the North-East Atlantic Regional Team of the OceanPrediction DCC. CWG Co-Chair Arthur Capet has actively contributed to the technical activities assessing ocean forecasting systems as part of the DCC. The CWG is supporting work to include fluvial datasets in EMODnet, led by Francisco Campuzano. The CWG is developing activities relating to AI and ML, in collaboration with BOOS, DATAMEQ and others. Plans include a white paper on AI/ML applications in coastal operational oceanography, links to the DTO, and capacity building efforts. These activities will focus on the application of AI/ML techniques in the coastal zone, rather than on the detailed technical development of techniques themselves. CWG members are engaged in various newly funded EU projects, including FOCCUS, LandSeaLot and EDITO Model Lab. Further plans for the CWG also include a catalogue of coastal stories, characterisation of EOV accuracy and precision requirements, international capacity building and citizen science/low cost sensor coordination activities. The CWG will look to engage in Horizon Europe calls in 2025, and is exploring opportunities such as a COST action.

Thierry Carval presented an update on activities by the DataMEQ Working Group. Having finalised the EuroGOOS Data Policy in 2023, DataMEQ is now focused on confirming adoption by EuroGOOS members. The policy, a European implementation of the new IODE Data Policy, was presented at the International Ocean Data Conference and the EuroGOOS International Conference in 2023, and will be presented at the IMDIS Conference in May 2024. The policy is now registered as an ocean best practice. DataMEQ have forged links and synergies with various major EU activities, including ENVRI FAIR deliverables, contributions to the EuroSea Data Handbook, technical input to development of NetCDF formats, and consolidation of Core and BGC Argo data formats. Ongoing challenges for DataMEQ relate to FAIR data and improving citation and credits for dataset providers. Future activities, including those funded via

projects such as AMRIT Blue-Cloud 2026, EOSC ENVRI Hub Next, EOSC FAIR EASE and the Copernicus Marine Data Store, will focus on development of cloud-native workflows, semantic web, vocabularies and ontologies. Via AMRIT, DataMEQ is engaged in the development of cloud applications and a dashboard for the EOOS Technical Support Centre.

Angela Pomaro provided an update on activities by the Ocean Literacy Working Group. The OLWG has been actively organising multiple events and conference sessions over the last year, and is contributing a chapter to a soon-to-be-published book on global ocean literacy. A new survey on ocean literacy in oceanography is to be launched on the occasion of the European Maritime Day Conference 2024, taking place the week following the EuroGOOS Assembly. Noted challenges for the WG include management and engagement of its large diverse membership, and limited financial resources for activities. An in-person OLWG is planned (the whole group has never met in person together), and opportunities to secure project funding for activities are being explored. Future activities include participation in the global OL conference in 2024, training for scientists interested in participating in OL activities, as part of the EU4Ocean Coalition, involvement in the OL practitioners fora, and others.

Lucie Cocquempot provided an update from the Science Advisory Working Group. The SAWG has been adjusting its role and approach to activities in support of the EuroGOOS community. It aims to be an open forum think tank to identify and discuss cross-cutting issues and shape new activities for EuroGOOS and WGs, TTs and ROOSs. The SAWG contributed two presentations to the 10th EuroGOOS International Conference in October 2023 and worked to help coordinate the EuroGOOS Community's participation in the Ocean Decade Conference in Barcelona. Ongoing challenges include the vacant SAWG Co-Chair position since May 2023 and the reliance on in-kind contributions to the group's work. Previously planned white papers did not advance due to time and resources constraints, with topics instead being planned as discussion webinars for the EuroGOOS community, intending to identify new activities to be taken forward by other groups with the more specific expertise necessary. Looking ahead, the SAWG aims to have a central role in the next integration workshop, and proposes to revise its format to make concrete progress on existing action points.

Urmas Lips presented an update on the Technology Plan Working Group. The group led the organisation of the 2024 EOOS Technology Forum, held at Oceanology International in London. The EOOS Technology Forum discussed the development and application of accessible ocean observing technologies with users, manufacturers and other stakeholders. A report from the event will be published soon. The TPWG aims to further its engagement with industry and observing technology manufacturers in future.

All working group presenters joined a panel for discussion and questions, moderated by Carlos Fernandes.

Relating to DataMEQ, it was noted that large private companies are developing new data protocols with applications in operational oceanography, with new formats and tools replacing established solutions, particularly with the shift to cloud-based data infrastructures.

It was noted that various working groups are deviating from their originally set Terms of Reference or work plans. This was emphasised as a positive aspect, demonstrating adaptation to new and emerging needs with flexibility. It was suggested that it remains important to formulate what tasks can or should be achieved, and not to discard actions because other ideas emerge - previously identified actions remain valuable. Additionally, defining plans enables progress tracking.

It was noted that further integration of WGs and ROOSs could be beneficial. Many of the WG activities are relevant to ROOSs, and ROOSs often have best practices that could be taken up or shared more broadly via WGs. Currently activities are not fully coordinated between WGs and ROOS. The SAWG could play a role in facilitating this. It was further noted that the WGs can be quite closed and siloed. The TPWG was particularly noted as appearing as a closed group.

The significant contribution of the CWG to CoastPredict was noted, with the suggestion that this and all EuroGOOS contributions to UN Ocean Decade activities should be highlighted. The opportunities presented by the Decade should be leveraged.

Discussion was held on if or when to close WGs if inactive. It was noted that a group should only be disbanded with good reason. Despite periods of inactivity, groups can make extremely valuable progress and contributions for the community when resources to support their work become available. Maintaining groups keeps their network intact and able to react quickly to opportunities that arise.

It was noted that some of the activities noted in the future plans of WGs are very technical, e.g. relating to semantic web in DataMEQ. It was questioned if the correct expertise is present to complete such tasks. It was noted that participation in project consortia connects WGs with relevant expertise, and the EuroGOOS community has the ability to communicate its needs to help shape developments for the marine community, even if not directly engaged in the detailed technical work.

7. Activity updates from EuroGOOS Task Teams

Miguel Santos presented an update from the Argo TT. The TT's main aim is to support non-Euro-Argo ERIC members to develop their Argo activities, and prepare for potential future membership of the ERIC. Current members are from Portugal, Belgium, Cyprus and Turkey, as well as existing members of the ERIC and its Office. Recent activities include participation in Argo-FVON workshops, the EuroGOOS International Conference, and a joint workshop between BSH, IH and IPMA. TT members also participated in the Ocean Sciences Meeting 2024 and the BGC Argo Technological Task Team. Challenges for the TT include attracting new members and ensuring engagement. A joint meeting with the Euro-Argo ERIC Management Board is planned, but financial resources are limited. Future plans include potential DMQC training activities in collaboration with the Euro-Argo ERIC.

Henning Wehde presented an update on the FerryBox TT. Highlights from the TT members include the installation of new FerryBoxes and sensors, as well as upgrades of existing systems. Existing FerryBoxes have been designated as ICOS stations, or are in the process of applying for this status. It was noted that there have now been 30 years of FerryBox measurements with the Alg@line project in the Baltic Sea. Several challenges were noted, including funding availability, and changes of ferry or SOOP routes. Future plans include strengthening of collaboration with European Research Infrastructures and related projects e.g. JERICO, an updated FerryBox white paper or handbook, and a 12th FerryBox workshop planned in October in Helsinki

Marcello Magaldi presented an update from the Fixed Platforms TT. Previous Co-Chairs of the TT recently stepped down due to changing positions, with Marcello Magaldi taking over in early 2024. There remains an open call for a co-chair of the TT. Recent highlights from the FP TT include the ongoing development of a map showing members' fixed platforms. Challenges include the lack of resources to facilitate activities by the TT. The TT met physically in 2023, but has since only held one online meeting. Difficulties in securing a Co-Chair continue. It was noted that the TT includes a great diversity of platforms, often with very different technical aspects and deployed in very different environments. Immediate future plans are aimed at most easily achievable tasks to consolidate the TT membership and gradually increase activity. More ambitious tasks (white papers, improving fixed platform metadata, etc.) are envisioned in the longer term.

Carlos Berrera presented an update on the Gliders TT, noting that the TT includes various forms of uncrewed underwater and surface vehicles, in addition to gliders. Recent highlights include new members joining the TT, participation in EU projects, and strengthened synergies and collaboration with international programmes and strategies. A Spanish national glider task force has been established, the 13th Glider School was held in October 2023, and the annual Glider TT survey is currently ongoing. The TT is a co-organiser of the International Underwater Glider Conference 2024, held in June in Gothenburg.

Several challenges were noted, including the unclear role of the Glider TT in international activities, with various coordinating bodies and networks. Future plans for the TT include supporting national-level coordination, development of clear guidelines for operators and data management, development of standards and best practices in operations, applications, data, etc., strengthening capacities and training, and contributions to major EU projects (e.g. AMRIT, AQUARIUS) and international programmes (e.g OceanGliders, OASIS). A call was made for volunteers to Co-Chair the TT, as existing Co-Chairs are stepping down.

Lorenzo Corgnati presented an update from the High-Frequency Radar TT, having recently been appointed as a new Co-Chair of the TT. Recent highlights include the integration of new networks in the operational workflow, periodic revision or update of documentation for European standard HFR data model, publications on the European HFR node website, allocation of DOIs and WMO codes to HFR networks and stations, and setup of an ERDDAP service for near real time data discovery and access. Ongoing challenges for the TT include connection and mapping of all European HFR networks, limited progress of some TT working groups, and unlocking the full potential of HFR data with new downstream services and engagement with end-users. Future plans include an in-person meeting in September 2024 and the development of new value-added products derived from HFR data.

Angela Hibbert presented an update from the Tide Gauges TT. Recent highlights include maintenance of the Tide Gauge Metadata Inventory thanks to continued funding secured by MI, the 2nd EuroSea Tide Gauges Workshop in May 2023, IAPSO-funded Tidal Analysis Best Practice Study Group meetings in July and November with recommendations published in a report, updates to PSMSL and support for GNSS-IR data portal, and an update to the Copernicus Sea Level Reprocessed product in November 2023 including new stations. A key challenge for the TT and the tide gauge community is that technologies are very long established, with very different data processes, communities and protocols. The overall tide gauge community in Europe is complex and heterogeneous. GLOSS is the global governing body for sea level rise to which the TGTT must stay aligned. GLOSS is primarily scientific, but the TT also includes operators. GNSS-IR is an emerging technology requiring coordination of a diversity of hardware, software, operational uses and applications - this is a challenge for the TT. Limited time and funding add to TT's challenges. Future plans for the TT include establishment of a Tide Gauge Metadata/Data portal working group, a EuroGOOS/GLOSS Special Interest Group to establish best practices in GNSS-IR, incorporation of GNSS-IR data in the Copernicus Sea Level Reprocess product, further integration of the TT with ROOSs, and acting on recommendations from the 2nd EuroSea Tide Gauges workshop.

Task Team presenters together formed a panel for discussion and questions, moderated by Enrique Alvarez.

Discussion was opened around the role of GOOS National Focal Points, particularly via the EOOS Framework, to help unify activities at a national scale to strengthen contributions to the TTs and the operational networks that exist around Europe. It was noted that common or connected inventories for all European platforms, with standardised metadata is key. National-level coordination can help to achieve this and ensure comprehensive contributions from all operators. It was noted that this is not always a simple task, and requires careful preparation of inventories to include different semantics used by different operators for their platforms. It was proposed to leverage existing systems such as OceanOPS to streamline this task.

Discussion was held on the environmental impact and sustainability of ocean observing platforms and networks. This is a growing point of concern for operators, often with mandates to minimise impacts.

Noting that FerryBoxes are a very well established network, it was suggested the FerryBox TT could share some of its experience and expertise with the ship underway systems community.

It was suggested that a key role of TTs should be to support operators, to ensure their data flows into the right networks to maximise its availability for users. It was proposed that the TTs collaborate with In Situ TAC to establish best practice guides for operators to ensure data flows into Copernicus Marine, EMODnet and other systems.

8. Activity updates from EuroGOOS ROOS

Vidar Lien presented an update from Arctic ROOS. Ongoing work towards the development of a pan-Arctic ocean observing alliance (Arctic GRA) is progressing with Arctic ROOS and EuroGOOS in a prominent role. The international task team established to develop the potential GRA has recently been endorsed by both GOOS and Sustaining Arctic Observing Networks (SAON). The task team's work has so far focused on securing necessary representation from Indigenous communities and others before the co-design process can truly begin. Arctic ROOS is also collaborating closely with the Arctic Regional Team of the OceanPrediction DCC, with a joint online workshop 'Ocean and sea ice forecasting in the Arctic' held in January 2024. A new Arctic ROOS Sea Ice Task Team has been established, working to develop standardisation in protocols and methodologies in in situ sea ice measurements. The Task Team will link with In Situ TAC which does not currently include any sea ice data. Ongoing challenges for Arctic ROOS include the lack of funding for activities and reliance on in-kind contributions. Arctic ROOS' future plans include continuing to have a leading role in the Arctic GRA development process, participation and collaboration with international initiatives such as OceanPrediction DCC, Distributed Biological Observatories (DBOs) and the Synoptic Arctic Survey (SAS), cooperation with and promotion of the Copernicus Polar Initiative, support for enhance real-time delivery of observations to European infrastructures, strengthen engagement and collaboration with other ocean observing networks in the Arctic, and facilitating joint project proposals with Arctic ROOS partners.

Jun She presented an update from BOOS. At the annual meeting in May 2024, Jun She stepped down as Chair of BOOS. A new Chair has yet to be appointed. BOOS' activities are mainly via joint research and working groups, with annual workshops to discuss specific topics. The BOOS steering group meets monthly, with wider meetings also held with BOOS working Group leaders. Highlights of regional activities include observations and data management, observing system assessment, modelling, enhanced cross-cutting cooperation, strengthened emerging research areas with new working groups, and a joint initiative on a special issue on Storm Babet. Ongoing challenges for BOOS are a lack of resources, finding a new chair, the green transition requiring new technologies and approaches to ocean observing, emerging technologies and activities, and the integration of ongoing projects with BOOS WGs. BOOS' future plans include strengthening of the Steering Group, potential joint proposals between partners, finalisation of the special issue of Storm Babet, and further development of AI activities, including in collaboration with other EuroGOOS groups.

Manuel Ruiz presented updates from IBIROOS. Efforts to strengthen and expand IBIROOS' partnerships are ongoing, including Atlantic islands in the region (Canaries, Azores and Madeira). Engagement with new potential members is ongoing. The need to update the IBIROOS MoU was noted. IBIROOS activities have been facilitated in part by several projects including part of its members, e.g. MyCoast and COINS. IBIROOS has held recent annual meetings alongside project meetings. The IBIROOS website has been updated, and a history page and a catalogue of IBIROOS observing systems will be available soon. A harmful algal bloom warning system (shellfish-safety.eu) was highlighted as a product of a recently ended Interreg Atlantic Area project with IBIROOS partners. Similarly the Interreg Atlantic Area MyCOAST project has ended, including stakeholder workshops on marine pollution. Tools developed in the MyCOAST project are available via GitHub set up by IBIROOS. The Interreg AA iFADO project has advanced efforts towards a coordinated and integrated EU observing and operational system in the Atlantic region, especially in the offshore area.

Sebastien Legrand presented an update from NOOS. NOOS is currently a network of 26 members (of whom 22 are also EuroGOOS members) from 9 countries. NOOS currently has 7 working groups focused

on specific issues or themes. Recent NOOS highlights include a workshop to brainstorm the future of the CMEMS NWS-MFC in February 2024, development of new low cost sensors, deployment of new buoys by Met Eireann and a new mooring by BSH, impact resolving modelling, development of activities around AI/ML and the DTO, an OSPAR working group on marine energy infrastructure impacts on the marine environment, and several EU projects including NOOS partners (OLAMUR, FOCCUS, JERICO). Ongoing challenges for NOOS include its reliance on in-kind contributions from partners to maintain community products and services, a lack of internations with EuroGOOS task teams and the less strong position of the observing community in NOOS compared to modelling, the overcommitment of NOOS WG leads and inactivity of some members. The NOOS community is regularly exploring opportunities for joint project funding, but it was noted that there is no single Interreg region covering the whole NOOS area. The new NOOS Strategy 2030 defines its mission to cooperate in the development and implementation of sustained and coordinated operational oceanography across the North West European Shelf region. It defines four objectives: cooperate as a NOOS community of experts, improve operational oceanographic data and information services, build NOOS community products and services, and support European partners and networks. A new NOOS Steering committee, including a new Chair, is appointed in 2024.

Vanessa Cardin presented an update from MonGOOS. Highlights include capacity building efforts and promotion of marine science, and collaboration and promoting visibility. MonGOOS held its first meeting in Africa since its foundation, with its annual meeting in Tangier in 2023. MonGOOS is developing collaborations with new partners, including from fisheries. Challenges for MonGOOS include strengthening links with other GOOS regions (e.g. Black Sea GOOS and GOOS Africa), aligning strategies and objectives with Mediterranean fisheries management organisations, securing region-wide project funding to engage all partners and promote sustainable observations, improve best practices, and support the planning and implementation of international initiatives for the Mediterranean and beyond. Upcoming activities for MonGOOS include an update to its strategic plan, election of new chairs, finalisation of a survey on forecasting model capabilities, and a workshop 'Boost the understanding of the Mediterranean for adaptation to climate change and extreme events'.

ROOS presenters together formed a panel for discussion and questions, moderated by Henning Wehde. The impressive amount of work completed by all ROOSs was noted.

It was noted that fisheries management in the Mediterranean is a big issue. There is no equivalent to ICES in the region, and so data can be difficult to access. MonGOOS is supporting tuna management by providing relevant indicators as an initial engagement with the sector. Following this, options for further engagement with fisheries management will be explored. It was noted that HCMR are active in fisheries modelling and will be interested to follow updates in this area.

9. Discussion

Discussion on all EuroGOOS ROOSs, WGs, and TTs was opened, moderated by Holger Brix. It was highlighted that universal issues across all EuroGOOS groups are overcommitted participants unable to dedicate sufficient time to tasks, inactive members that need to be re-engaged, and the reliance on in-kind contributions/lack of funding for activities. Many groups are able to make some progress on activities by utilising project resources and holding meetings alongside other events where partners are engaged.

Several topics were identified as cross-cutting to many different groups, such as AI/ML applications, accessible ocean observing technology, net zero/environmental sustainability of operations, and others. EuroGOOS can facilitate joint activities relating to these and other emerging topics to benefit all partners. It was further noted that EuroGOOS can help to identify emerging topics and issues, ensuring the community is well prepared for the future, and not developing systems fit for the issues of yesterday.

The EuroGOOS integration workshop was highlighted as an important event that should be repeated (the last edition was held in 2022). However, it was proposed to reformulate the integration workshop to make

real progress on issues and address existing challenges and actions, rather than to define a new set of tasks that see limited progress intersessionally.

Discussion was held on the UN Ocean Decade and EuroGOOS' role in it. It was suggested that the focus should be less on how EuroGOOS can contribute to the Decade, and more on how it can gain from the opportunity it presents. With the Decade, EuroGOOS has the opportunity to help put Europe at the heart of global initiatives, leading globally in international efforts to strengthen capacities.

It was noted that EuroGOOS is a mature community that has achieved a lot during its history. There are many major initiatives, programmes and systems providing major benefits to Europe that would not have been possible without EuroGOOS. EuroGOOS should continue to focus on its strengths - coordinating partners to improve the provision of ocean data (from observations and models) to support essential services and products.

The need for EuroGOOS groups to consider cybersecurity issues relating to their tools and systems was noted.

It was discussed how various emerging issues and topics of wide interest to the community have been identified. Task forces are needed to define and implement specific activities relating to these. However, the creation of more and more EuroGOOS groups is not desirable. This raises the question of defining a set lifetime for EuroGOOS groups, at the end of which they may be disbanded or seek a further mandate to continue. It was queried if newly defined activities could be allocated to existing WGs and TTs, or if it is necessary to form new groups with specific expertise.

It was suggested that EuroGOOS should look at the ongoing discussions relating to reorganisation of GOOS. EuroGOOS must regularly consider if its organisation and structures are best suited to address the fundamental questions of the present and the future in operational oceanography. It was emphasised that it is not always clear what the fundamental questions that need to be addressed are.

Time limitations to complete defined actions were noted. All contributions to EuroGOOS activities are on an in-kind basis, with individuals engaged in many other priorities. It was suggested to be cautious in setting new actions, but first rather existing outstanding actions should be reviewed and reformulated or discarded if they are no longer priorities for the community.

It was noted that some TTs have had periods of inactivity. However, when funds become available TTs have quickly reactivated thanks to the existing network that was in place. For this reason it was suggested to be cautious when considering disbanding TTs as they represent valuable networks of expertise, even if not always active.

Efforts were made by the Office to gather work plans from all WGs and TTs in early 2024. It was proposed for the Board to review these, identify common priorities and actions, and to assess the activity of each group. This would be completed as a preparatory activity ahead of the next integration workshop.

ACTION 1: Review WG and TT work plans to identify common priorities and actions, and assess the activity of each group (**Board**, September 2024).

The example of ICES was highlighted, where working groups define a Terms of Reference, which is reviewed by a Scientific Steering Committee. This committee reviews progress, provides feedback, and decides if working groups should continue or disband when their mandate ends. This model works well, but is facilitated by funding.

It was noted that periodic turnover of WGs and TTs, and the membership within them (particularly Chairs), is positive. It was further suggested that greater engagement of early/earlier career ocean professionals

in EuroGOOS activities would be positive, helping to introduce new ideas and build future capacity of the community.

10. EuroGOOS integration and forward-looking actions – World Café

Participants divided into groups to participate in the World Café exercise. Each group rotated around between the following discussions:
1. How to progress collaborative EuroGOOS activities – incentives and challenges? (*moderated by Holger Brix*).
2. How can EuroGOOS functioning be improved to maximise benefits for all Members? (*moderated by Lucie Cocquempot*).
3. What are the next steps in your country (organisation) to secure the sustainability of operational observations? What from this could be taken forward at the EuroGOOS level (in a collaborative way by several Members) to achieve the goal? (*moderated by Urmas Lips*).
4. How to ensure there are enough observations and data for developing Digital Twins at different scales (local, regional, European, etc)? How can EuroGOOS contribute and improve the observing system for this purpose? (*moderated by Sebastien Legrand*).
5. What role can EuroGOOS play in strengthening ocean forecasting at all temporal and spatial scales? (*moderated by Enrique Alvarez*).
6. How can EuroGOOS contribute to and benefit from the Decade? (*moderated by Ghada El Serafy*).

11. Reports

Summaries of each question's outcomes are summarised in Annexe 5.

ACTION 2: Review outcomes of the World Café and formulate suggestions for new actions or processes, with an ad hoc task force if necessary (**Board and Office**, **March 2025**).

Summary and closing remarks

Henning Wehde gave a brief summary of the day's meeting, noting thanks to all for proactive engagement and discussion.

End of Day 2

23 May 2024

Closed session on EuroGOOS activities

1. Opening, adoption of Agenda

Henning Wehde opened the meeting. The agenda was adopted without any changes.

Manfred Zeiler (BSH) and Annette Zijderveld (Rijkswaterstaat) volunteered to act as scrutineers for the meeting.

2. Status of Actions from 2023 General Assembly

Henning Wehde presented the status of actions from 2023. No comments or questions were received.

3. Recommendations for the process to set TT and WG lifetime. Office financial support to the EuroGOOS Activities

Holger Brix presented a set of recommendations aimed at enhancing the effectiveness and efficiency of the Task Teams (TTs) and Working Groups (WGs). The recommendations covered various aspects including operational procedures and performance metrics. He initiated a discussion on the lifetime and self-evaluation mechanism for both the WGs and TTs, suggesting that targets should be set and assessed periodically. Emphasis was placed on the importance of defining clear targets and objectives for each WG/TT. These targets should be regularly assessed to ensure the WGs and TTs are aligned with their goals. The assessment process would involve periodic reviews and self-evaluations, allowing for adjustments and improvements as needed.

Sebastien Legrand explained the review process from seven years ago and suggested that the General Assembly (GA) should review the Terms of Reference (ToR) every three years.

Lucie Cocquempot proposed that the review process could be conducted by the panel, instead of the delegates during the GA. Caroline Cusack suggested that TTs and WGs should highlight only the main achievements during the review process. Rosemarie Lawlor emphasised focusing on thematic aspects. Ghada El Serafy supported the idea of presenting these highlights on websites and combining thematic and other elements, stressing the importance of TTs and WGs' activities linked to EuroGOOS. Miguel Santos supported the thematic focus. Holger Brix invited volunteers, along with the TTs and WGs, to join a committee to make further recommendations. Sebastien Legrand disagreed with this suggestion, while Annette Zijderveld inquired about previous procedures mentioned by Sebastien. Caroline Cusack stated that there should be no penalties for the evaluations.

Holger Brix suggested identifying current and future work topics. Urmas Lips proposed deciding tasks and asking TTs and WGs to review and revise these, assessing feasibility. Miguel Santos recommended immediate self-evaluation and KPIs, not waiting for the next GA. Urmas Lips suggested that the Board could have discussions with the Chairs, while Ghada El Serafy proposed TTs and WGs prepare a roadmap for Board review. Henning Wehde stressed the need for transparency and open process for all delegates.

Holger Brix proposed tasking the Board to develop a proposal for a procedure by which WGs and TTs can self-evaluate their progress and assess their continuing necessity. This proposal will be distributed for feedback from delegates and discussed at the 2025 General Assembly. Holger invited delegates to join an ad hoc committee to make further recommendations.

ACTION 3: Develop a detailed proposal for a self evaluation procedure aimed at WGs and TTs. This procedure will outline the criteria and methods for evaluating their own progress and determining their ongoing necessity **(Board**, **March 2025**).

Holger Brix addressed the current financial constraints faced by the EuroGOOS in supporting the activities of WGs and TTs. He highlighted the limited budget available and sought input on how best to allocate financial resources to support the Activities effectively.

Miguel Santos raised a question about the Office's involvement in EU projects. Henning Wehde recounted a 2018 decision for the Office to engage in projects for additional funding, suggesting a separate meeting to discuss its validity. Sebastien Legrand inquired about the Office's share in projects. Inga Lips explained variability in involvement which is registered via timesheets. George Petihakis supported continued project involvement for additional funding, citing past success with EuroSea supporting EOOS implementation and associated activities. Urmas Lips supported continued project engagement, noting core funds were insufficient. George Petihakis emphasised the importance of facilitation of EuroGOOS Activities involvement in proposals by the Office but also all Members. Miguel Santos advocated for balanced project involvement percentages in terms of time equivalent. Henning Wehde emphasised that the Conflict of Interest (CoI) should always be carefully assessed as this has been done in the past.

Inga Lips highlighted the strategic alignment of projects with EuroGOOS priorities and the importance of proposals, indicating a current 70% core and 30% project time split, though financially it is 50/50. She noted the need for either increased member fees or reduced staff efforts without external funding.

Fransisco Campuzano and Holger Brix discussed the benefits and contributions of EuroGOOS to projects. Enrique Alvarez emphasised focusing on strategically important projects. Julien Mader suggested involvement in impactful projects for the community, not individuals. Fransisco Campuzano and Deniz Karaca Halén discussed utilising COST Actions for financial coverage.

The discussion highlighted the importance of strategic project involvement and financial balance.

4. Financial reports + Q&A

4. 1. Financial closure 2023- official accounts for the Belgian authorities + office report +approval (open voting 1)

Inga Lips presented the financial closure for 2023 .

DECISION 1: 2023 financial closure was approved unanimously.

4. 2. Budget 2024 review approval (open voting 2)

Inga Lips presented the budget review for 2024 .

DECISION 2: 2024 budget review was approved unanimously.

4. 3. Budget 2025 projections approval (open voting 3)

Inga Lips presented the budget projections for 2025 . Miguel Santos noted potential project omissions and Urmas Lips highlighted AMRIT II's impact on the budget. Inga Lips estimated a 60-70K contribution if approved.

DECISION 3: 2025 budget projections was approved unanimously.

5. Member contributions 2025

Inga Lips presented the table outlining the Members' contributions as a reminder. She also highlighted the review of the agreed fees is to be done in 2026 with implementation in 2028.

6. EuroGOOS saving account discussion

6. 1. Proposal to change the savings account type (open voting 4)

Inga Lips presented the proposal to change to the saving account type. She suggested opting the option of 32D+ ACCOUNT for the savings account. Holger Brix expressed support for the option proposed by Inga Lips.

DECISION 4: The proposal to proceed with the implementation of the 32D+ACCOUNT option for the savings account was approved unanimously.

7. New EuroGOOS members (open voting 5 and 6)

7. 1. +ATLANTIC CoLAB

Nuno Lourenço presented the ATLANTIC CoLAB.

7. 2. Irish Meteorological Service (Met Éireann)

Rosemarie Lawlor presented the Irish Meteorological Service (Met Éireann).

DECISION 5: New members were approved unanimously.

8. Executive Board elections

8. 1. Presentation of candidates + Q&A (secret voting 7)

Henning Wehde presented the current Board compositions and mandates.

During the meeting, four new members were introduced: Julien Mader, Branko Čermelj, Lucie Cocquempot and Sebastien Legrand. Each member presented their professional backgrounds and expressed their commitment to contributing to the Board's work as new Board members. Current Board member Giovanni Coppini emphasised his interest and ongoing commitment to continue serving on the Board.

Voting to fill the open Board positions was carried out, managed by the Secretariat and observed by the scrutineers.

DECISION 6: The nominations of Julien Mader, Branko Čermelj, Lucie Cocquempot and Sebastien Legrand, along with Giovanni Coppini's reappointment, were approved as members of the EuroGOOS Executive Board, with the majority of votes.

8. 2. Proposals for the Chair and Vice-Chair positions (secret voting 8 and 9)

Henning Wehde detailed the Executive Directors Board recommendation following the wording of the EuroGOOS internal Rules and proposed Holger Brix to be elected as a Chair and Ghada El Serafy as a Vice-Chair of EuroGOOS and asking for any additional candidates. Those were not proposed.

Holger Brix introduced himself as the candidate for the position of Chair and Ghada El Sarefy introduced herself as the candidate for the position of Vice-Chair.

Voting on the positions of Chair and Vice Chair was carried out based on the proposals. Voting was managed by the Secretariat and observed by the scrutineers.

DECISION 7: Holger Brix and Ghada El Serafy were elected as Chair and Vice-Chair respectively, with the majority of votes.

Newly elected Chair, Holger Brix, and Vice-Chair, Ghada El Serafy, thanked the members for their support.

9. Next Annual General Assembly Meeting

Finnish Meteorological Institute (FMI) proposed to host the next GA in May 2025.

DECISION 8: The proposal to host the next Annual General Assembly Meeting in FMI (Helsinki) on 20-22 May 2025 was unanimously approved. Any further details regarding the 2025 GA will be communicated to the delegates in due course.

10. AOB

Dijana Klaric announced the intention of the Institute of Oceanography and Fisheries (IOR) to stop its membership next year due to financial constraints. An official resignation should be submitted before 1 July to avoid automatic renewal.

It was Kees Borst's last meeting as he is retiring. Delegates expressed their gratitude for his many years of contributions and wished him all the best in his future endeavors.

Meeting wrap up statements, handover to a new Chair

Henning Wehde thanked the delegates for their support during his tenure. He also expressed his gratitude to the Board and the Office for their work and dedication over the last years. As this was Henning Wehde's last meeting as Chair, he formally handed over the Board Chairmanship to Holger Brix.

Meeting ended at 13:30.

LIST OF ANNEXES

ANNEX 1 List of Actions and Decisions
ANNEX 2 Agenda
ANNEX 3 Participant List
ANNEX 4 Miro board Inputs
ANNEX 5 Word Cafe Outcomes

ANNEXE 1 LIST OF ACTIONS AND DECISIONS

ACTIONS

ACTION 1: Review WG and TT work plans to identify common priorities and actions, and assess the activity of each group (**Board**, September 2024).

ACTION 2: Review outcomes of the World Café and formulate suggestions for new actions or processes, with an ad hoc task force if necessary (**Board and Office**, **March 2025**).

ACTION 3: Develop a detailed proposal for a self evaluation procedure aimed at WGs and TTs. This procedure will outline the criteria and methods for evaluating their own progress and determining their ongoing necessity. **(Board**, March 2025)

DECISIONS

DECISION 1: 2023 financial closure was approved unanimously.

DECISION 2: 2024 budget review was approved unanimously.

DECISION 3: 2025 budget projections was approved unanimously.

DECISION 4: The proposal to proceed with the implementation of the 32D+ACCOUNT option for the savings account was approved unanimously.

DECISION 5: New members were approved unanimously.

DECISION 6: The nominations of Julien Mader, Branko Čermelj, Lucie Cocquempot and Sebastien Legrand, along with Giovanni Coppini's reappointment, were approved as members of the EuroGOOS Executive Board, with the majority of votes.

DECISION 7: Holger Brix and Ghada El Serafy were elected as Chair and Vice-Chair respectively, with the majority of votes.

DECISION 8: The proposal to host the next Annual General Assembly Meeting in FMI (Helsinki) in May 2025 was unanimously approved. Any further details regarding the 2025 GA will be communicated to the delegates in due course.

Pour copie certifiée conforme, Inga Lips, Secrétaire Générale, 01/07/2024.

ANNEXE 2 AGENDA

Special open session on the future look at ocean observing

Tuesday 21 May 2024, 09:00-13:30

09:00-09:25 1. Introduction and overview of EuroGOOS activities

09:00 - 09:10 Welcome and introduction

João Paulo Ramalho Marreiros, Director-General Hydrographic Institute, Portugal
Henning Wehde, Chair, EuroGOOS

09:10 - 09:25 Overview of EuroGOOS activities Inga Lips, Secretary General, EuroGOOS

09:25-11:00 2. Ocean observations: European and global developments

09:25 - 09:45 IOC-GOOS updates Joanna Post, GOOS, IOC-UNESCO

09:45 - 10:05 Ocean Decade implementation Julien Barbier, IOC- UNESCO

10:05 - 10:25 Towards Mercator International Center for the Ocean Pierre Bahurel, MOi

10:25 - 10:45 EU Digital Twin Ocean and related initiatives Zoi Konstantinou, EU DG MARE

10:45 - 11:00 Moderated discussion with the audience *Moderator Holger Brix*

11:00-11:30 Coffee break

11:30-13:20 3. EuroGOOS as Decade Implementing Partner

11:30-11:40 Introduction: EuroGOOS role as Decade Implementing Partner (DIP) Dina Eparkhina

11:40-11:55 Keynote: Coordination of Decade activities on ocean observing & forecasting Terence McConnell, DCO Ocean Observations

11:55-12:10 Keynote: EuroGOOS regional collaboration through ROOS Vanessa Cardin, MonGOOS

12:10-12:50 Panel discussion on European regional coordination within the Decade Terence McConnell (DCO OO), Vidar Lien (Arctic ROOS), Jun She (BOOS), Manuel Ruiz Villareal (IBI ROOS), Sebastien Legrand (NOOS), Vanessa Cardin (MonGOOS), *moderated by Ghada El Serafy*

12:50-13:20 Observing the Ocean in collaboration with industry Paul Holthus, Founding President and CEO, World Ocean Council, *moderated by Inga Lips*

13:20-13:30 4. Summary of the session and closing remarks Henning Wehde, Chair, EuroGOOS

13:30-14:30 Lunch

Open session on EuroGOOS activities

Tuesday 21 May 2024, 14:30-18:00

14:30 - 14:35 1. Welcome and adoption of agenda Henning Wehde

14:35 - 15:30 2. Office report on activities + Q&A Inga Lips, Deniz Karaca, Joseph Nolan, Dina Eparkhina, Alicia Blanco

15:30 - 16:00 3. Report from the Executive Board of Directors + Q&A Henning Wehde

16:00-16:30 Coffee break

16:30-17:00 4. Status of EOOS Strategy Implementation + Q&A Inga Lips

17:00-18:00 5. Cross-cutting mapping of EuroGOOS Activities Joseph Nolan

End of Day 1

Open session on EuroGOOS activities

Wednesday 22 May 2024, 09:00-17:30

09:00-10:00 6. Activity updates from EuroGOOS Working Groups (5 min each followed by panel discussion): Mauro Celussi (BIOWG), Ghada El Serafy (Coastal WG), Thierry Carval (Data MEQ WG), Angela Pomaro (OLWG), Lucie Cocquempot (SAWG), Urmas Lips (TPWG), *moderated by Carlos S. Fernandes*

10:00-11:00 7. Activity updates from EuroGOOS Task Teams (5 min each followed by panel discussion): Antonio Miguel Piecho-Santos (Argo TT), Henning Wehde (FB TT), Marcello G. Magaldi (FP TT), Carlos Barrera (Glider TT), Lorenzo Corgnati (HFR TT), Angela Hibbert (Tide Gauges TT), *moderated by Enrique Alvarez*

11:00-11:30 Coffee break

11:30-12:30 8. Activity updates from EuroGOOS ROOS (5 min each followed by panel discussion): Vidar Lien (Arctic ROOS), Jun She (BOOS), Manuel Ruiz Villareal (IBI ROOS), Sebastien Legrand (NOOS), Vanessa Cardin (MONGOOS), *moderated by Henning Wehde*

12:30-13:00 9. Discussion *Moderated by Holger Brix*

13:00-14:00 Lunch

14:00-16:00 10. EuroGOOS integration and forward-looking actions – World Café

1. How to progress collaborative EuroGOOS activities – incentives and challenges? (*moderated by Holger Brix*)
2. How can EuroGOOS functioning be improved to maximise benefits for all Members? (*moderated by Lucie Cocquempot*)
3. What are the next steps in your country (organisation) to secure the sustainability of operational observations? What from this could be taken forward at the EuroGOOS level (in a collaborative way by several Members) to achieve the goal? (*moderated by Urmas Lips*)
4. How to ensure there are enough observations and data for developing Digital Twins at different scales (local, regional, European, etc)? How can EuroGOOS contribute and improve the observing system for this purpose? (*moderated by Sebastien Legrand*)
5. What role can EuroGOOS play in strengthening ocean forecasting at all temporal and spatial scales? (*moderated by Enrique Alvarez*)
6. How can EuroGOOS contribute to and benefit from the Decade? (*moderated by Ghada El Serafy*)

16:00-16:30 Coffee break

16:30 - 17:20 11. Reports from moderators, discussion, and agreement on EuroGOOS actions on continuous and emerging priority areas in EuroGOOS evolution for the coming years. *Moderator Henning Wehde*

17:20-17:30 Summary and closing remarks Henning Wehde

19:30-21:30 **Dinner (cruise along Tagus River)**

Closed session on EuroGOOS activities

Thursday 23 May 2024, 09:00-13:00

09:00 - 09:05 1. Opening, adoption of Agenda

09:05 - 09:15 2. Status of Actions from 2023 General Assembly Henning Wehde

09:15 - 10:00 3. Recommendations for the process to set TT and WG lifetime. Office financial support to the EuroGOOS Activities Holger Brix

10:00 - 10:30 4. Financial reports + Q&A Inga Lips
4.1. Financial closure 2023 – official accounts for the Belgian authorities + office report approval (open voting 1)
4.2. Budget 2024 review approval (open voting 2)
4.3. Budget 2025 projection approval (open voting 3)

10:30 - 10:40 5. Member contributions 2025 Inga Lips (reminder)

10:40 - 11:00 6. EuroGOOS saving account discussion Inga Lips
6.1. Proposal to change the savings account type (open voting 4, if required)

11:00-11:30 **Coffee break**

11:30 - 11:50 7. New EuroGOOS members Henning Wehde
7.1. +ATLANTIC CoLAB Nuno Lourenço (open voting 5)
7.2. Irish Meteorological Service (Met Éireann) Anne-Marie Fitzgerald (open voting 6)

11:50 - 12:30 8. Executive Board elections Henning Wehde
8.1. Presentation of candidates + Q&A
Voting (secret voting 7)
Announcement of results

8.2. Proposals for the Chair and Vice-Chair positions
Voting (secret voting 8-9)

12:30 - 12:40 9. Next Annual General Assembly Meeting Henning Wehde

12:40 - 12.55 10. AOB *Moderated by Henning Wehde*

12:55 - 13:00 Meeting wrap up statements, handover to a new Chair Henning Wehde

End of EuroGOOS 2024 Annual General Assembly Meeting

ANNEXE 3 PARTICIPANT LISTS

EuroGOOS
European Global Ocean Observing System

EuroGOOS Annual General Assembly Meeting
21-23 May 2024
Lisbon, Portugal

List of Participants

EuroGOOS Board

Name	Organisation	Country	Signature 21 May	Signature 22 May
Henning Wehde	Institute of Marine Research (IMR) / EuroGOOS Chair	Norway		
Holger Brix	Helmholtz-Zentrum hereon GmbH / EuroGOOS Vice-Chair	Germany		
Ghada El Serafy	Deltares / Exec. Board member / Coastal WG Co-Chair	Netherlands		
Enrique Alvarez Fanjul	Mercator Ocean International (MOi) / Exec. Board member	France		
Giovanni Coppini	Euro-Mediterranean Centre on Climate Change (CMCC) / Exec. Board member	Italy		
Carlos S. Fernandes	Hydrographic Institute (IH) / Exec. Board member	Portugal		

EuroGOOS Member Delegates

Name	Organisation	Country	Signature 21 May	Signature 22 May
Sébastien Legrand	Royal Belgian Institute of Natural Sciences (RBINS) / NOOS Chair	Belgium		
Koen Vanstaen	*Agency for Maritime and Coastal Services (MDK)*	*Belgium*	----------	----------
Hrvoje Mihanovic	*Croatian Institute of Oceanography and Fisheries (IOR)*	*Croatia*	----------	----------
Dijana Klaric	Croatian Meteorological and Hydrological Service (DHMZ)	Croatia		
Zacharias Siokouros	*Cyprus Marine and Maritime Institute (CMMI)*	*Cyprus*	----------	----------
Steffen M. Olsen	Danish Meteorological Institute (DMI)	Denmark		
Niels Holt	*Defence Centre for Operational Oceanography (FCOO)*	*Denmark*	----------	----------

Jun She DMI

Denmark

Name	Organisation	Country	Signature 21 May	Signature 22 May
Urmas Lips	Tallinn University of Technology, Department of Marine Systems (MSI)	Estonia		
Laura Tuomi	Finnish Meteorological Institute (FMI)	Finland		
D'Ortenzio Fabrizio	*French National Centre for Scientific Research (CNRS)*	*France*	----------	----------
Lucie Cocquempot	French Research Institute for Exploitation of the Sea (Ifremer) / SAWG Chair	France		
Pierre Bahurel	Mercator Ocean International (MOi)	France		----------
Adeline Souf	French Hydrographic and Oceanographic Service of the Navy (SHOM)	France		
Manfred Zeiler	Federal Maritime and Hydrographic Agency (BSH)	Germany		
Emil Stanev	Helmholtz-Zentrum hereon GmbH	Germany		
George Petihakis	Hellenic Centre for Marine Research (HCMR)	Greece		
Caroline Cusack	Marine Institute (MI)	Ireland		
Vanessa Cardin	National Institute of Oceanography and Experimental Geophysics (OGS) / MONGOOS Co-Chair	Italy		
Sara Morucci	Italian National Institute for Environmental Protection and Research (ISPRA)	Italy		
Simona Simoncelli	National Institute of Geophysics and Volcanology (INGV)	Italy		
Rosalia Santoleri	National Research Council (CNR)	Italy		
Gianmaria Sannino	*Italian National Agency for new technologies, energy and sustainable economic development (ENEA)*	*Italy*	----------	----------
Jitze P. van der Meulen	*Royal Netherlands Meteorological Institute (KNMI)*	*Netherlands*	----------	----------
J.C. (Kees) Borst	Rijkswaterstaat Water Management Center	Netherlands		
Andrew King	*Norwegian Institute for Water Research (NIVA) /Ferrybox TT Co-Chair*	*Norway*	----------	----------
Øyvind Sætra	*Norwegian Meteorological Institute (MET Norway)*	*Norway*	----------	----------
Stein Sandven	*Nansen Environmental and Remote Sensing Centre (NERSC)*	*Norway*	----------	----------
Agnieszka Beszczynska-Möller	Institute of Oceanology, Polish Academy of Sciences (IO-PAN)	Poland		
Juliusz Gajewski	Gdynia Maritime University, Maritime Institute (IM-UMG)	Poland		
Tamara Zalewska	*The Institute of Meteorology and Water Management (IMWM-PIB)*	*Poland*	----------	----------
Miguel Santos	Portuguese Institute for the Sea and the Atmosphere (IPMA) / Argo TT Co-Chair	Portugal		

Name	Organisation	Country	Signature 21 May	Signature 22 May
Branko Čermelj	National Institute of Biology (NIB)	Slovenia		
Daniela Turk	Slovenian Environment Agency (SEA)	Slovenia		
Julien Mader	AZTI / HFR TT Chair	Spain		
Joaquin Tintoré	*Balearic Islands Coastal Ocean Observing and Forecasting System (SOCIB)*	*Spain*	----------	----------
Manuel Ruiz Villarreal	Spanish Institute of Oceanography (IEO) / IBI-ROOS Co-Chair	Spain		
Eric Delory	*Oceanic Platform of the Canary Islands (PLOCAN)*	*Spain*		
Susana Pérez Rubio	Puertos del Estado	Spain		
Patrick Gorringe	Swedish Meteorological and Hydrographical Institute (SMHI)	Sweden		
Veronique Creach	*Centre for Environment, Fisheries and Aquaculture Science (CEFAS)*	*UK*	----------	----------
Katherine Hill	*National Oceanography Centre (NOC)*	*UK*	----------	----------
Andrew Saulter	*UK Met Office*	*UK*	----------	----------

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Activity Chairs and other Member and Activity representatives

Name	Organisation	Country	Signature 21 May	Signature 22 May
Angela Hibbert	National Oceanography Centre (NOC) / TG TT Co-Chair	UK		
Angela Pomaro	National Research Council (CNR) / OL WG Co-Chair	Italy		
Annette Zijderveld	Rijkswaterstaat Water Management Center	Netherlands		
Carlos Barrera	Oceanic Platform of the Canary Islands (PLOCAN) / Glider TT Co-Chair	Spain		
Daniel Hayes	Cyprus Marine and Maritime Institute (CMMI)	Cyprus		
Emma Huijben	Deltares	Netherlands		
Lorenzo Corgnati	National Research Council (CNR) / HF Radar TT Co-Chair	Italy		
Luisa Lamas	Hydrographic Institute (IH) / IBI ROOS Co-Chair	Portugal		
Marcello Magaldi	National Research Council (CNR) / FP TT Chair	Italy		
Mauro Celussi	National Institute of Oceanography and Experimental Geophysics (OGS) / BIOWG Co-Chair	Italy		
Nick Roden	Norwegian Institute for Water Research (NIVA)	Norway		

Name	Organisation	Country	Signature 21 May	Signature 22 May
Silvana Neves	Oceanic Platform of the Canary Islands (PLOCAN)	Spain		
Teotonio Barroqueiro	Hydrographic Institute (IH)	Portugal		
Thierry Carval	French Research Institute for Exploitation of the Sea (Ifremer) / Data MEQ WG Chair	France		
Tiago Garcia	+ATLANTIC CoLAB / OL WG Member	Portugal	----------	
Vidar Lien	Institute of Marine Research (IMR) / Arctic ROOS Co-Chair	Norway		

EuroGOOS Office

Name	Position	Signature 21 May	Signature 22 May
Inga Lips	Secretary General		
Alicia Blanco	Communications Officer		
Deniz Karaca	Science Officer		
Dina Eparkhina	Senior Policy and Communications Officer		
Kathleen Hermans	Office and Financial Administrator		
Joseph Nolan	Science Officer		

Invited Guests

Name	Organisation	Signature 21 May	Signature 22 May
Julien Barbier	IOC	Online	----------
Joanna Post	GOOS	Online	----------
Terry McConnell	Ocean Observations DCO		
Zoi Konstantinou	DG MARE		----------
Nuno Lourenço	+ATLANTIC CoLAB		----------
Francisco Campuzano	+ATLANTIC CoLAB		
Rosemarie Lawlor	Irish Meteorological Service (Met Éireann)		

List of Participants – Formal Session 23 May 2024

Name	Organisation	Country	Signature 23 May
Sébastien Legrand, also an alternate of Koen Vanstaen	Royal Belgian Institute of Natural Sciences (RBINS) / NOOS Chair	Belgium	
Koen Vanstaen	*Agency for Maritime and Coastal Services (MDK)*	*Belgium*	----------
Hrvoje Mihanovic	*Croatian Institute of Oceanography and Fisheries (IOR)*	*Croatia*	----------
Dijana Klaric, also an alternate of Hrvoje Mihanovic	Croatian Meteorological and Hydrological Service (DHMZ)	Croatia	
Daniel Hayes, alternate of Zacharias Siokouros	Cyprus Marine and Maritime Institute (CMMI)	Cyprus	
Steffen M. Olsen	Danish Meteorological Institute (DMI)	Denmark	
Niels Holt	*Defence Centre for Operational Oceanography (FCOO)*	*Denmark*	----------
Urmas Lips	Tallinn University of Technology, Department of Marine Systems (MSI)	Estonia	
Laura Tuomi	Finnish Meteorological Institute (FMI)	Finland	
D'Ortenzio Fabrizio	*French National Centre for Scientific Research (CNRS)*	*France*	----------
Adeline Souf	French Hydrographic and Oceanographic Service of the Navy (SHOM)	France	
Lucie Cocquempot, also an alternate of D'Ortenzio Fabrizio	French Research Institute for Exploitation of the Sea (Ifremer) / SAWG Chair	France	
Enrique Alvarez, alternante of Pierre Bahurel	Mercator Ocean International (MOi) / Exec. Board member	France	
Manfred Zeiler	Federal Maritime and Hydrographic Agency (BSH)	Germany	
Emil Stanev	Helmholtz-Zentrum hereon GmbH	Germany	
George Petihakis, also alternate of Veronique Creach	Hellenic Centre for Marine Research (HCMR)	Greece	
Caroline Cusack	Marine Institute (MI)	Ireland	
Giovanni Coppini	Euro-Mediterranean Centre on Climate Change (CMCC) / Exec. Board member	Italy	
Vanessa Cardin, also an alternate of Gianmaria Sannino (ENEA)	National Institute of Oceanography and Experimental Geophysics (OGS) / MONGOOS Co-Chair	Italy	
Sara Morucci	Italian National Institute for Environmental Protection and Research (ISPRA)	Italy	
Simona Simoncelli	National Institute of Geophysics and Volcanology (INGV)	Italy	

Thierry CARVAL IFREMER FRANCE

Name	Organisation	Country	Signature 23 May
Rosalia Santoleri	National Research Council (CNR)	Italy	
Gianmaria Sannino	*Italian National Agency for new technologies, energy and sustainable economic development (ENEA)*	*Italy*	----------
Ghada El Serafy	Deltares / Exec. Board member / Coastal WG Co-Chair	Netherlands	
Jitze P. van der Meulen	*Royal Netherlands Meteorological Institute (KNMI)*	*Netherlands*	---------- → PROXY vote by Kees BORST
J.C. (Kees) Borst, also an alternate of Jitze P. van der Meulen	Rijkswaterstaat	Netherlands	
Nick Roden, alternate of Andrew King	Norwegian Institute for Water Research (NIVA)	Norway	
Henning Wehde	Institute of Marine Research (IMR) / EuroGOOS Chair	Norway	
Øyvind Sætra	*Norwegian Meteorological Institute (MET Norway)*	*Norway*	----------
Stein Sandven	*Nansen Environmental and Remote Sensing Centre (NERSC)*	*Norway*	----------
Agnieszka Beszczynska-Möller	Institute of Oceanology, Polish Academy of Sciences (IO-PAN)	Poland	
Juliusz Gajewski	Gdynia Maritime University, Maritime Institute (IM-UMG)	Poland	
Tamara Zalewska	*The Institute of Meteorology and Water Management (IMWM-PIB)*	*Poland*	----------
Carlos S. Fernandes	Hydrographic Institute (IH) / Exec. Board member	Portugal	
Miguel Santos	Portuguese Institute for the Sea and the Atmosphere (IPMA) / Argo TT Co-Chair	Portugal	
Branko Čermelj	National Institute of Biology (NIB)	Slovenia	
Daniela Turk	Slovenian Environment Agency (SEA)	Slovenia	
Julien Mader	AZTI / HFR TT Chair	Spain	
Joaquin Tintoré	*Balearic Islands Coastal Ocean Observing and Forecasting System (SOCIB)*	*Spain*	----------
Manuel Ruiz Villarreal	Spanish Institute of Oceanography (IEO) / IBI-ROOS Co-Chair	Spain	
Silvana Neves, alternate of Eric Delory	Oceanic Platform of the Canary Islands (PLOCAN)	Spain	
Susana Pérez Rubio	Puertos del Estado	Spain	
Patrick Gorringe	Swedish Meteorological and Hydrographical Institute (SMHI)	Sweden	
Veronique Creach	*Centre for Environment, Fisheries and Aquaculture Science (CEFAS)*	*UK*	----------
Angela Hibbert, alternate of Katherine Hill	National Oceanography Centre (NOC)	UK	

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Name	Organisation	Country	Signature 23 May
Andrew Saulter	*UK Met Office*	*UK*	----------
Angela Pomaro	National Research Council (CNR) / OL WG Co-Chair	Italy	
Annette Zijderveld	Rijkswaterstaat Water Management Center	Netherlands	
Emma Huijben	Deltares	Netherlands	
Francisco Campuzano	+ATLANTIC CoLAB	Portugal	
Holger Brix	Helmholtz-Zentrum hereon GmbH / EuroGOOS Vice-Chair	Germany	
Lorenzo Corgnati	National Research Council (CNR) / HF Radar TT Co-Chair	Italy	
Marcello Magaldi	National Research Council (CNR) / FP TT Chair	Italy	
Mauro Celussi	National Institute of Oceanography and Experimental Geophysics (OGS) / BIOWG Co-Chair	Italy	
Nuno Lourenço	+ATLANTIC CoLAB	Portugal	
Rosemarie Lawlor	Irish Meteorological Service (Met Éireann)	Ireland	
Thierry Carval	French Research Institute for Exploitation of the Sea (Ifremer) / Data MEQ WG Chair	France	
Inga Lips	Secretary General	Belgium	
Alicia Blanco	Communications Officer	Belgium	
Deniz Karaca	Science Officer	Belgium	
Dina Eparkhina	Senior Policy and Communications Officer	Belgium	
Kathleen Hermans	Office and Financial Administrator	Belgium	
Joseph Nolan	Science Officer	Belgium	

List of Participants – Formal Session 23 May 2024

Ballots received

Name	Organisation	Country	Signature 23 May
Sébastien Legrand, also an alternate of Koen Vanstaen	Royal Belgian Institute of Natural Sciences (RBINS) / NOOS Chair	Belgium	
Koen Vanstaen	*Agency for Maritime and Coastal Services (MDK)*	*Belgium*	----------
Hrvoje Mihanovic	*Croatian Institute of Oceanography and Fisheries (IOR)*	*Croatia*	----------
Dijana Klaric, also an alternate of Hrvoje Mihanovic	Croatian Meteorological and Hydrological Service (DHMZ)	Croatia	
Daniel Hayes, alternate of Zacharias Siokouros	Cyprus Marine and Maritime Institute (CMMI)	Cyprus	
Steffen M. Olsen	Danish Meteorological Institute (DMI)	Denmark	
Niels Holt	*Defence Centre for Operational Oceanography (FCOO)*	*Denmark*	----------
Urmas Lips	Tallinn University of Technology, Department of Marine Systems (MSI)	Estonia	
Laura Tuomi	Finnish Meteorological Institute (FMI)	Finland	
D'Ortenzio Fabrizio	*French National Centre for Scientific Research (CNRS)*	*France*	----------
Adeline Souf	French Hydrographic and Oceanographic Service of the Navy (SHOM)	France	
Lucie Cocquempot, also an alternate of D'Ortenzio Fabrizio	French Research Institute for Exploitation of the Sea (Ifremer) / SAWG Chair	France	
Enrique Alvarez, alternante of Pierre Bahurel	Mercator Ocean International (MOi) / Exec. Board member	France	
Manfred Zeiler	Federal Maritime and Hydrographic Agency (BSH)	Germany	
Emil Stanev	Helmholtz-Zentrum hereon GmbH	Germany	
George Petihakis, also alternate of Veronique Creach	Hellenic Centre for Marine Research (HCMR)	Greece	
Caroline Cusack	Marine Institute (MI)	Ireland	
Giovanni Coppini	Euro-Mediterranean Centre on Climate Change (CMCC) / Exec. Board member	Italy	
Vanessa Cardin, also an alternate of Gianmaria Sannino (ENEA)	National Institute of Oceanography and Experimental Geophysics (OGS) / MONGOOS Co-Chair	Italy	
Sara Morucci	Italian National Institute for Environmental Protection and Research (ISPRA)	Italy	
Simona Simoncelli	National Institute of Geophysics and Volcanology (INGV)	Italy	

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Ballots received.

Name	Organisation	Country	Signature 23 May
Rosalia Santoleri	National Research Council (CNR)	Italy	
Gianmaria Sannino	*Italian National Agency for new technologies, energy and sustainable economic development (ENEA)*	*Italy*	----------
Ghada El Serafy	Deltares / Exec. Board member / Coastal WG Co-Chair	Netherlands	
Jitze P. van der Meulen	*Royal Netherlands Meteorological Institute (KNMI)*	*Netherlands*	---------- 2x
J.C. (Kees) Borst, also an alternate of Jitze P. van der Meulen	Rijkswaterstaat	Netherlands	
Nick Roden, alternate of Andrew King	Norwegian Institute for Water Research (NIVA)	Norway	
Henning Wehde	Institute of Marine Research (IMR) / EuroGOOS Chair	Norway	
Øyvind Sætra	*Norwegian Meteorological Institute (MET Norway)*	*Norway*	----------
Stein Sandven	*Nansen Environmental and Remote Sensing Centre (NERSC)*	*Norway*	----------
Agnieszka Beszczynska-Möller	Institute of Oceanology, Polish Academy of Sciences (IO-PAN)	Poland	
Juliusz Gajewski	Gdynia Maritime University, Maritime Institute (IM-UMG)	Poland	
Tamara Zalewska	*The Institute of Meteorology and Water Management (IMWM-PIB)*	*Poland*	----------
Carlos S. Fernandes	Hydrographic Institute (IH) / Exec. Board member	Portugal	
Miguel Santos	Portuguese Institute for the Sea and the Atmosphere (IPMA) / Argo TT Co-Chair	Portugal	
Branko Čermelj	National Institute of Biology (NIB)	Slovenia	
Daniela Turk	Slovenian Environment Agency (SEA)	Slovenia	
Julien Mader	AZTI / HFR TT Chair	Spain	
Joaquin Tintoré	*Balearic Islands Coastal Ocean Observing and Forecasting System (SOCIB)*	*Spain*	----------
Manuel Ruiz Villarreal	Spanish Institute of Oceanography (IEO) / IBI-ROOS Co-Chair	Spain	
Silvana Neves, alternate of Eric Delory	Oceanic Platform of the Canary Islands (PLOCAN)	Spain	
Susana Pérez Rubio	Puertos del Estado	Spain	
Patrick Gorringe	Swedish Meteorological and Hydrographical Institute (SMHI)	Sweden	
Veronique Creach	*Centre for Environment, Fisheries and Aquaculture Science (CEFAS)*	*UK*	----------
Angela Hibbert, alternate of Katherine Hill	National Oceanography Centre (NOC)	UK	

NUNO LOURENÇO — PT

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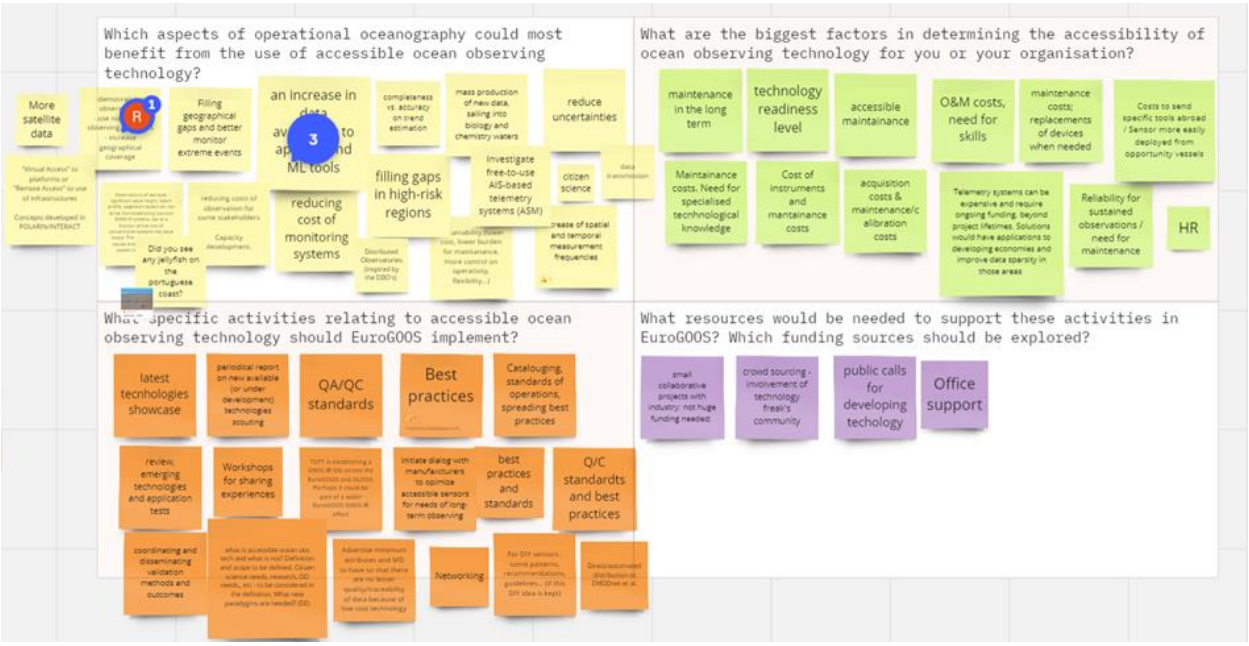
These inputs reflect the delegates view on two emerging topics identified by the Office: (i) Artificial Intelligence (AI) and Machine Learning (ML) applications in operational oceanography; and (ii) Accessible ocean observing technologies.

Diagram 1: Artificial Intelligence (AI) and Machine Learning (ML) applications in operational oceanography

Diagram 2: Accessible ocean observing technologies



How to progress collaborative EuroGOOS activities – incentives and challenges?

Moderator: Holger Brix, Rapporteur: Alicia Blanco

Motivations/Strengths:

- Great achievements since the foundation of EuroGOOS (Copernicus Marine, etc.).
- Having the EuroGOOS Strategy 2030 as a goal.
- Strong community and networks, specially at a regional level (ROOS).

Challenges/obstacles:

- Overloading the Chairs and Co-Chairs with activities.
- Time is limited (avoid overloading people with meetings).
- Lack of focus (TT, WG, ROOS).
- Terms of Reference outdated or not precise.

Opportunities:

- Cross-cutting activities between the Regions, TT and WG with community events (EuroGOOS' week, or day). Align EuroGOOS meetings with a big event, like it was done for EOOS Technology Forum and Oceanology International.
- Create a network of early career scientists.
- Develop activities useful for the community.
- Focus funding efforts.
- Involve GOOS national focal points.
- If possible, bilateral meetings by topic between TT, WG, Regions (due to the lack of time). Meeting once per year is not enough, loss of information and lack of exchange of new ideas.
- Lead EU projects and not only act as partner.
- Motivate working together, and define common challenges between the TT, WG and Regions (Generate a common interest).
- Targeted Board and Chairs meetings (communication) for better leadership.

Lessons learned:

- System of ROOS, WG and TT ambassadors did not work.
- If we want more efforts, we need more people (need to involve young generations).
- If you want to go fast, go alone; if you want to go far, go together.

Next steps:

- Create a network of early career scientists to assist Chairs and Co-Chairs with daily tasks.
- Connect ToR to KPIs and other networks (including communication).
- Annual plan to identify 3 activities/goals for each WG, TT, ROOS (easy steps), which can be followed up later on whether or not they have been carried out (Metrics).
- Pick up 3 big events in the year and add a EuroGOOS' day/week.
- Lobby with DG MARE and regional programs.
- Communications officers in quotations from TT, WG, Regions (Bridge/pipeline to the office).
- Organise integration workshops/webinars with distinguished lecturers.
- Query Members about interests or how they want to be involved.

How can EuroGOOS functioning be improved to maximise benefits for all Members?

Moderator: Lucie Cocquempot, Rapporteur: Joseph Nolan

Motivations/Strengths:

- EuroGOOS' strength is based on its Members and the wider community involved in its activities. Members are part of EuroGOOS and the driving force. Members are EuroGOOS, not customers of it. Members are the driving force to generate benefits for themselves.
- Existing networks and structures within EuroGOOS are extremely valuable and must be protected. Even if they go through periods of inactivity, networks of expertise (e.g. TTs) should be retained.
- EuroGOOS represented the ocean observing community in Europe (as well as the rest of the value chain). In this way, EuroGOOS underpins other entities such as Copernicus Marine and EMODnet, which would not be able to exist without the observations provided by EuroGOOS' Members.
- The presence of the EuroGOOS Office in Brussels is seen as a great strength, enabling close communication with the EC and other organisations, with valuable information communicated to Members.
- Recently improved communication of activities and opportunities from the Office to Members - 'Office updates' emails highlighted as valuable.

Challenges/Obstacles:

- Before benefits of EuroGOOS can be maximised, they must first be more clearly defined.
- Delegates can find clearly communicating the added value of EuroGOOS to their management and administration difficult.
- Lack of funding to support activities, in-kind contributions can be difficult.
- Inactivity of some partner organisations, and of specific WGs and TTs (closely linked to previous point)
- Optimising ocean observing is a priority. Observations must be coordinated and streamlined to maximise the return on investment in capacity. EuroGOOS must have a leading role in this, e.g. with EOOS.
- The EuroGOOS community is engaged in many diverse activities across the ocean knowledge value chain. This can cause confusion as to EuroGOOS' exact role and position.
- The EuroGOOS 'brand' or logo is often used to give weight or support to initiatives. This demonstrates the value of EuroGOOS to the community, but the details of EuroGOOS' activity and role is often not clearly recognised.
- Smaller or less established Members often struggle to compete with large institutes in opportunities to participate in projects or other activities. There can sometimes be a sense of a small group of large institutes repeatedly taking opportunities while others struggle to compete.
- Addressing many emerging issues for the operational oceanography community (e.g. AI/ML, new technology, environmental sustainability) require expertise that are not currently so prominent in EuroGOOS. EuroGOOS must help Members to identify and connect to the expertise they need to address new priorities.

Opportunities:

- By strengthening European-level coordination, EuroGOOS can support Members in their efforts to strengthen coordination at a national level. e.g. with EuroGOOS' leading role in EOOS.
- EuroGOOS needs a new major flagship activity, such as EOOS, to be the visible lead of and galvanise the community.
- EuroGOOS must be an integrator or aggregator of Members' priorities and views, and advocate for them towards the EC and others.
- Improve knowledge and recognition of EuroGOOS outside of the oceanographic community. EuroGOOS and the benefits it provides should be better known in other areas of society.

- EuroGOOS should be better positioned as an authoritative reference. It can direct users to valuable resources, services, standards, data, etc. that are maintained by other actors in the community and often spread across multiple locations.
- Greater sharing of expertise and capacity between Members, including large established organisations helping to support smaller institutes and share opportunities, e.g. with project participation. EuroGOOS could help facilitate this.
- EuroGOOS Office could play a role as a consultant or coordinator of project proposals between Members, sharing expertise, knowledge and guidance, without actually participating as a partner itself. e.g. by organising proposal development workshops or trainings.

Lessons learned:

- Having funding, even if only modest, can help to advance Activities significantly. e.g. progress made with TTs during EuroSea.
- Having a dedicated staff member as an Office contact point for each ROOS, WG and TT is very valuable. Allocated staff must be active contributors, helping to Activities with wider priorities and opportunities, and not simply to provide basic organisational support to groups.
- EuroGOOS Offices' participation in projects is important and valuable to the community, and supports EuroGOOS' 'core' activities that could not be resourced by Member contributions alone. But participation must only be where aligned with the EuroGOOS Strategy, and not in competition with its Members.

Next steps:

- Continued improvements to communication of activities between ROOS, WGs, TTs, Board, Members, and Office.
- **Proposed Action** - EuroGOOS communication pack for Members to be developed, including texts articulating EuroGOOS' value as well as standard abstracts, posters, ppts, logos, branding etc.
- **Proposed Action** - Periodically repeat questionnaires to gather Members' perspectives on EuroGOOS' value, benefits, and opportunities.
- Complete exercise to map all EuroGOOS activities (ROOS, WG, TT, projects, etc.) to the 2030 Strategy priorities.
- Directly ask stakeholders and users of ocean information what benefits they see from EuroGOOS and its activities.
- EuroGOOS Office to improve efforts to facilitate and coordinate Members' joint participation in project consortia.
- EuroGOOS should develop a strategy and activities to lobby or advocate on behalf of Members to influence funding calls and other opportunities for the community.
- Where possible, the Office can help provide more in-depth information in addition to sharing funding calls. e.g. by providing context and 'between the lines' information to help interpret call texts, or by highlighting opportunities that may be particularly relevant to specific ROOSs, WGs or TTs.
- Possibilities to increase EuroGOOS' income from Member contributions should be explored to better resource the Office and potentially make funds available for TTs, WGs and ROOSs.
- **Proposed Action** - Review EuroGOOS' policy for participation in projects, and suggest changes if necessary.
- EuroGOOS should facilitate more regular discussion between Members on specific topics or issues of priority. e.g. with planned SAWG webinars. A mechanism for Members to initiate a topic for discussion should be developed.
- Ensure benefits for Members over non-Members are clear, with clear articulation of these benefits, or development of new benefits only available to Members.
- Proposals should be made to define time-limited mandates for each WG and TT, with options to seek renewal, extension or disbandment.

What are the next steps in your country (organisation) to secure the sustainability of operational observations? What from this could be taken forward at the EuroGOOS level (in a collaborative way by several Members) to achieve the goal?

Moderator: Urmas Lips, Rapporteur: Inga Lips

Motivation

- There are known gaps in observations and many fragmented observational programs and networks exist. Research projects are providing data for operational services that is not sustained approach. The role of research infrastructures is not clear.
- At the same time, activities in several European countries have been initiated to build up marine observational networks/systems (Italy, France, Estonia, etc). Collaboration and exchange of information among EuroGOOS partners could be beneficial.

Challenges/obstacles

- Operational oceanography is not high enough in the political agenda at the moment due to global/regional crises (but digital twins are).
- Observations often rely on research funding.
- Changes in technology could increase costs (e.g. BGC ARGO).
- Divided responsibilities, i.e. different organisations are responsible for observations for different sectors, as a result, the observing landscape is fragmented. European coordination is better than national in some cases.
- Funding is available for procurement but not for maintenance.

Opportunities

- Closer collaboration with industry.
- Reuse of old platforms.
- Apply autonomous approaches (also in biological observations).
- Combination of activities/monitoring.
- Be part or set up a RI to get the sustainability.
- Joint purchases/maintenance, sharing platforms and equipment.
- End-users could help to facilitate the sustainability, e.g. approach them, and prepare a common letter for authorities.
- EOVs that are important ones to keep running for a long term and adding BGC to physics.

Lessons learned

- When buying things, one need to consider the operational aspects (costs).
- Easier development of observational systems/networks through RIs.
- Consortia of RIs at the national level could help (ITINERIS), starting with an inventory of RIs, etc.
- Connect with climate observations to gain sustainability.
- You must have a very clear pathway: Baseline study – gaps – roadmap – negotiations.
- Cooperation at the national level is a key to better use resources.
- Cooperation between meteorological and ocean observations.

Next steps

- Improve (national) visibility of national observations.
- Facilitate collaboration with industry in observing and developing sensors, sharing the data.
- Facilitate the sustainability of core EOVs.
- Facilitate national ocean observing system for a broader use.
- EuroGOOS to facilitate best practices of maintenance and operations.
- EuroGOOS as a facilitator in national cooperation.
- EuroGOOS to promote observations (that are mandatory for industry).
- Minimum quality standards for the maintenance and operation for industry.

- Prepare for a case for sustainable tide gauges observations.
- Encourage (among the research institutes and industry) to provide data to the (national) data centres.

Further comments
Status and plans in different countries were described as it follows:

Croatia: Network was developed; problem is following the standards, e.g. biogeochemical parameters, institutes do not get funding for the maintenance; dissemination of information via AIS; ten years at least.
Denmark: EuroGOOS could stimulate operational observational institutes to cooperate; access to commercial data; monitoring not fragmented but data flow is a limited factor; national focal point – consider what is possible.
Estonia: Mixed system, something is sustained, something via project applications. A new operational observation network in offshore areas will be developed.
France: Some amount of observations/funding is fixed; if more needed, they have to choose; ARGO is becoming more expensive (BGC); less-and-less visible (those who are doing observations); joint institution RI; huge development of marine energy infrastructure, monitoring will be required.
Finland: Purchasing is funded; maintenance for the institutes; FINMARI (national marine research infrastructure) facilitates joint maintenance, etc.
Germany: Agencies in coastal ocean; deep ocean in research institutes; ocean observations not the main topic in political agenda; the goal is making operational oceanography more visible; funding for ARGO in next years is guaranteed.
Greece: National roadmap of research infrastructures in place, including inland waters.
Ireland: Baseline study on EOVs, roadmap where it was not enough funding; remote sensing, climate modelling people involved; fisheries people better cooperation; meteorological services taking over tide gauges; EuroGOOS lobbying for observations by the wind farm developers and commercial shipping.
Italy: Monitoring is sustained; research platforms not always sustained; IOOS establishment, inventory of all observing systems; high-, medium-, and low priority infrastructure; most under research; ARGO is high, otherwise not; biology is not big part of it; sharing best practices on the maintenance; ESFRI; at the moment the landscape is very fragmented; each institute has different approaches.
The Netherlands: Offshore infrastructure to consider wind parks, covering most of the North Sea; decommissioning of the old platforms (oil etc); climate/trend analysis is needed; not clear whether it is sustained; advice is needed.
Norway: Visibility is OK, World Ocean Council – how to collaborate better with private actors; standards; including aquaculture industry; you need data structure; national data centres; science and monitoring together; monitoring is OK, and seas are covered.
Poland: Everything is done on the basis on contracts; systematically wrong; EuroGOOS could advise what can be done by private actors, regarding quality and maintenance of equipment.
Portugal: Issues with visibility; observational network built from project money; cooperation with agencies, e.g. co-design; ask economists how to calculate the benefits of observations; data users advocating for more funding; fisheries, HABs, met office – to be like meteorological services.
Slovenia: We need some skills we do not have; maintenance of existing system OK; human resource and knowledge is needed.
Spain: To secure sustainability; collaboration for different tasks in monitoring, pelagic monitoring, HABs, etc; technological things; research infrastructure roadmaps are working; EuroGOOS can help; when project ends, how to fund the maintenance; EuroGOOS can help; funding of structure from different sources risky; Spanish committee of operational oceanography; long-term funding is not there; coordination is improving.
UK: Monitoring mostly sustained; focussed on environmental needs; help to prepare the case, support from EuroGOOS; UK for three years to develop.

How to ensure there are enough observations and data for developing Digital Twins at different scales (local, regional, European, etc)? How can EuroGOOS contribute and improve the observing system for this purpose?

Moderator: Sebastien Legrand, Rapporteur: Deniz Karaca Halén

Motivation

- Advocating for FAIRNESS (e.g. best practices).
- Advocating for sustainability.
- Defining TRL for each components of the Digital Twin of Oceans (DTO).
- Defining best practices, SOPs for each DTO.

Challenges/obstacles

- Data integration, interoperability, harmonisation, requirements.
- End users expectations.
- Concept of EDITO poorly understood by the community and too often presented as ultimate solution (which was wrong).
- EDITO sustainable funding.

Opportunities

- Co-designing with data providers and end users.
- Adopting observing systems to scale (e.g. coastal).
- Data availability (which are already available with high quality).
- Assessing data FAIRNESS and FAIRNESS of the data value chain.
- Showcasing and coordination by EuroGOOS via Working Groups (e.g. DATAMEQ).

Lessons learned

- Definition of ''enough'' data: fit for purpose, accuracy and uncertaint.
- Data quality as a paramount element.
- Foresighting: low cost devices, sensors for ocean observations.

Next steps

- Ocean literacy for better communication with policy makers.
- Explaining how the ocean state is assessed.
- Advocating for sustainable long term funding.
- Clear co-design of the EU system (e.g. WMO has already done for systematic met observations) and fir for purpose with end-users and data providers.
- Focussing on specific sites, introducing pilot-schemes.
- Increasing implementation capacity.
- Introducing sector specific DTO applications.

What role can EuroGOOS play in strengthening ocean forecasting at all temporal and spatial scales?

Moderator: Enrique Alvarez, Rapporteur: Susana Pérez Rubio

Strengths:

- Diversity in terms of physics to be solved and methodologies to do so.
- Strong and clear structure on several scales: Copernicus (coinciding with ROOSes structure), national, coastal.
- Accumulated expertise, including validation and evaluation of OOFS.
- Experience in ocean observing, feeding the forecasting services.
- Many stakeholders understand the need of OOFS. We have examples of uses to fulfil user needs.

Motivation

- Level-up knowledge between different institutions.
- Serve incoming new socio-economic sectors (Green Deal).

Challenges/obstacles

- Lack of early career ocean professionals. We need skilled and motivated people. Is motivation failing? Is capacity building failing? Are we too small?
- Funding (sustainability from projects to long term). Minor problem when compared with observations.
- Lack of strategic vision (network of today designed with yesterday's challenges).
- Difficulty to rapidly provide observations to the forecasting centres. Lack of real-time data sharing.
- Assimilate data into coastal services.

Opportunities

- New Tech developments: AI, cloud computing, High Performance Computers.
- Ensemble forecasting derived from multiple existing OOFS.
- Digital twins. Arrive of the concept of DTO associated to user/service requirements.
- Increased societal needs and climate change derived needs.
- Interdisciplinary approaches.
- UN Ocean Decade, Ocean Prediction DCC (Community and technical assets). Pilot projects of CoastPredict.
- How forecast products are useful for observation community: validation, gap filling, OSSE studies.

Lessons learned

- EuroGOOS relevance in the origin of Copernicus Marine.
- We need to make clearer the return of EuroGOOS (considering members pay).
- We learn from others how to evolve (ocean learnt from weather, biological from ocean).
- Working together we can speed up learning.
- We must go outside our bubble to get to more users.

Next steps

- Provide a revamped strategic view for the future. Which are the major questions to solve? How should governance evolve? How can opportunities from Copernicus, MOI IGO, Decade be exploited.
- Promote the creation of ad-hoc common knowledge, including standards, benchmarks, and best practices. Can experience from Copernicus be translated to downstream providers?
- Promote development of ocean forecasting science (key aspects not resolved): Promote earth system approach. Enhance/strengthen interactions with academia we will progress on the knowledge. Sub grid physics.

- Build a new communication strategy. Lack of visibility (compared to atmospheric community). Show the added value of model applications beyond the oceanographic community: blue economy, citizens, policy makers. Communication with simple products to engage the community.
- Promote OSSE experiments. Support of co-design observing systems.
- Promote multi model approach based on existing services.

How can EuroGOOS contribute to and benefit from the UN Ocean Decade?

Moderator: Ghada El Serafy; Rapporteur: Dina Eparkhina

EuroGOOS can contribute to Decade:

- EuroGOOS adds value as an existing network with many achievements. How to better use them? EuroGOOS can help the Decade.
- Decade is global. EuroGOOS can help other regions to develop. Transfer of knowledge and best practices.

Bottlenecks:

- Decade is voluntary & no funding.
- NDCs aren't that active in some countries and can be disconnected from OO.
- Decade isn't inclusive enough.
- Decade will create extra work. What does it bring to scientists really?
- Parallel activities for politicians and for scientists - gap is not well filled.

Opportunities:

- Cross-group cooperation in EuroGOOS.
- Visibility of operational oceanography (OO) at the ministerial level.
- Integrate national observing and monitoring.
- Long-term strategic planning.
- EOOS
- Connecting with NDCs - dialogue nationally.
- Attract early-career ocean professionals.
- Culture and science exchange, science diplomacy.
- Sharing of information to enable synergies. EuroGOOS should take the lead in this.
- Decade helps to build on collective intelligence.
- OO is already in the Decade. The question is how to move forward. To 2030 and to 2050.
- EuroGOOS should reduce the level of complexity for the members.

Potential actions:

1. Mapping:
    - Who is doing what – map against the Decade Challenges + add inputs from the groups' roadmaps.
    - What activities of EuroGOOS groups match the Decade? Identify the gaps EuroGOOS can fill.
    - Interaction within the ROOS to share the results with the Decade structures. Regionally, only a few ROOS contribute together – how to contribute as a Region (as a BOOS, as a MonGOOS, etc)?

2. National Decade Committees (NDCs):
    - Communicate to Members who are on NDCs? Information from the website but ask the DCU, but EuroGOOS Members still don't know. Get the Members to make the bridge between policy and science.
    - EuroGOOS to engage with NDCs with a set of recommendations. the OO implementation and priorities. In some countries there aren't NDCs, still communication should be spread nationally from EuroGOOS. EuroGOOS-NDCs mutual benefit of being aware of what's happening.
    - Promote EG / OO members on NDCs.

3. Decade is a science to policy – reinforce this connection:
    - Reach out at national policy & decision-levels.

4. Ocean Literacy:

- Raise awareness to policy.
- It is our duty to prepare the next OO generation.
- Better show the ocean-climate nexus.
- NDCs can help raise awareness.
- Explain the role of OO in the Decade. Decade as the 'engine' of marine knowledge and EuroGOOS is the gasoline. Develop a 'sexy' story.

5. Forward look strategy:
   - Plan ahead - Sustain the Decade's achievements – What's left after it? What's next? Where will operational oceanography and EuroGOOS be after the Decade ends?
   - Looking ahead will help with planning of the activities and evolve.

6. Global benefit:
   - Use the global scale to learn – SIDS and other regions.
   - Help to the global south - pilot projects to help other nations.

7. Webinars "Decade Cookbooks":
   - Help Members to use the Decade and not get lost. Topics: how to collaborate within the Decade, how to get funding/new financing models, good models for nations and regions.

8. Promotion:
   - Show on the EuroGOOS website how EuroGOOS contributes to the Decade.

Other possible actions mentioned:
- UN Decade conferences by EuroGOOS.
- Use ROOS for regional programmes of the decade (for example SciNMeet).
- EuroGOOS Integration Workshop dedicated to the Decade.
- Contribute to the global data system.

Overall comments:
- Be selective with actions (select only 1 or 2 to start). Focus on high value but less number of actions to increase impact.
- Position EuroGOOS within the Decade, strengthen our presence and reduce the complexity for our members.
- Profile the added value of EuroGOOS for society.

SIGNED 01 JULY 2023

HOLGER BRIX

EUROGOOS AISBL CHAIR

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