Sustainable ocean observation, from open sea to coast: shared responsibilities

25 May 2023 at 14.30 - 15.45 CEST
Agenda

Welcome - Dina Eparkhina (European Global Ocean Observing System) and Organizing Team

Part 1: Setting the scene (Present Workshop Statement and survey)
- EU initiatives for a coherent approach to ocean observation - Ghada El Serafy, EuroGOOS
- Long-term sustainable access to our ocean and seas - Niamh Flavin, Eurofleets+
- From ocean science needs to zero impact research vessel - Francois Frey, Esprit de Velox
- Alternative, low-cost solutions for ocean observation - Lucie Cocquempot, Ifremer
- The critical role of research infrastructures providing in situ marine data - Nicolas Pade, EMBRC

Part 2: Panel discussion, moderated by Kate Larkin, EMODnet
- Rémy Denos, European Commission, DG MARE
- Inga Lips, European Global Ocean Observing System (EuroGOOS) and EOOS Framework
- Toste Tanhua, Global Ocean Observing System (GOOS) and EuroSea project
- Jean-Marie Flaud, French Ministry of Research and European Strategic Working Group on Environment – ESFRI
- Yann-Hervé De Roeck, Euro-Argo ERIC

Closing - Kate Larkin and Organizing Team
Workshop Statement

“In situ measurements of the ocean provide scientific evidence for understanding the functioning and health of the ocean, assessing and monitoring the impacts of multiple stressors (climate change, biodiversity loss, pollution) and finding solutions to the major challenges we face (energy efficiency, reduction of ecological impact...)

This vital activity relies on a combination of standardised platforms, networks of sensors, and data management systems developed and maintained by Research Infrastructures and observing networks.

In the era of digital twins, contributors to political, business and investment decisions, and key players in reducing human impact on the environment, there is an urgent need for a European policy of sustainable support and incentives for data producers to ensure that in situ observation systems can fulfill their long-term potential.
Session 1: Setting the scene and workshop statement

- **Welcome** - Dina Eparkhina (European Global Ocean Observing System) and Organizing Team

- **EU initiatives for a coherent approach to ocean observation** - Ghada El Serafy, EuroGOOS

- **Long-term sustainable access to our ocean and seas** - Niamh Flavin, Eurofleets+

- **From ocean science needs to zero impact research vessel** - Francois Frey, Esprit de Velox

- **Alternative, low-cost solutions for ocean observation** - Lucie Cocquempot, Ifremer

- **The critical role of research infrastructures providing in situ marine data** - Nicolas Pade, EMBRC
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#OceanObsEMD2023
EU initiatives for a coherent approach to ocean observation

Ghada El Serafy, EuroGOOS Executive Directors Board
European Global Ocean Observing System - EuroGOOS

Vision
SUSTAINED OCEAN OBSERVING and operational oceanography services that benefit the European society and are supported by it.

Mission
TO LEAD the development and implementation of sustained and coordinated operational oceanography across Europe.

EuroGOOS is composed of

- 44 Member Organizations
- 137 Organizations involved as members, ROOS, WG and TT
- from 18 countries
- from 30 countries
Long-term sustainable access to our ocean and seas

Niamh Flavin, Eurofleets+
EUROPEAN RESEARCH VESSEL FLEET COOPERATION, DEVELOPMENT AND ACTIVITIES 1986 - 2023

1986

International Research Ship Operators

1996

erVo

1999

Ocean Research Vessels Working Group

2003

2007

2009

2013

2018

2019

2024

Eurofleets

EurofleetsRI

Eurofleets+
Multimillion Euro State-of-the-Art Infrastructures

Provision of access to seas and Global Oceans

Floating Laboratories collecting a wide variety of data and samples from the atmosphere, the ocean surface, the water column and the seabed

Provision of realtime, high quality, accurate data from a suite of onboard sensors and equipment including Large EXchangeable Instruments (LEXIs)

In addition to supporting:

✓ Transnational Access to scientists, research and industry
✓ Deployment and recovery of mobile ocean observation equipment
✓ Service of fixed point platforms and remote sensing tools

This project has received funding from the EU H2020 research and innovation programme under Grant Agreement No 824077
Survey Planning
Vessels Schedules and infrastructure databases published online and easily accessible.

Training
Floating Universities, Dedicated Training Cruises, Blue skills Workshops, Access and Exchange for Technicians and E-Learning Resources.

Data Provision
FAIR Data Policy implemented across all funded cruises. Underway data available on request.

Transnational Access (TA)
Transnational Access to state-of-the-art research vessels and LEXI across Europe and Internationally.

Remote Access
Facilitation of Remote Access to Eurofleets vessels for scientists, RIs and industry to maximize the impact of each funded Transnational Access cruise.

Technical Working Groups
Coordinate working groups on topics such as long coring, icebreakers, training for RV managers and instrument technicians, updates of EMB Position Paper 25, Greening the Research Fleet and sustainability.

Industry Liaison
Eurofleets, ERVO and RV Operators work closely with industry developing new technologies through JRA, RTA and consultation.

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EUROFLEETS RI: AN EYE TO A SUSTAINABLE FUTURE

• Eurofleets RI will consolidate activities to better coordinate and optimize European research fleets into the future to ensure that we can meet the challenges we face.

• The continuation of the TA Programme (with funding) and its extension to annual calls will improve sustainable access to our seas and oceans through better coordination to achieve maximum impact for each expedition thus delivering better return on investment for all.

• Enhanced training and education programmes will identify and deliver key skills & capacities needed to meet emerging challenges of the blue economy along with informing the public of the key role that RVs play in the observation and monitoring of our seas and oceans through participation in Ocean Literacy activities.

• Additionally, Eurofleets RI will represent its members collectively, with one voice to government research ministries, EC Directorates, EU and International Funding Agencies, and many other marine-related groups to facilitate new links and strengthen established cooperations with related initiatives and infrastructures worldwide.

Eurofleets Stakeholder Feedback Survey:

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From ocean science needs to zero impact research vessel

François Frey, Esprit de Velox
Since 2014, a way beyond Ocean science towards responsible innovation and research

IMO’s expectations, reducing CO2 emissions per transport work, as an average across international shipping, compared to 2008:

- by at least **40% by 2030**
- towards **70% by 2050**
- **total GHG emissions** by at least **50% by 2050**

European Marine Board’s expectations:
“research vessels should be “frontrunners” to the extent possible by minimizing their environmental footprint, since their mission is to contribute to “healthy” oceans and the welfare of all life in the marine environment. This is therefore a key topic at research vessel operator meetings.”
**RV Esprit de Velox, a contribution to the European Global Class**

**Orientation:** Ocean margins and continental slope, navigation all seas, SOLAS, POLAR CODE C

**Operational capacity and equipment:**
- Multispectral biology / mapping sounder 2D/3D double-head 120° downward / forward-looking 140 kHz to 160 kHz
- Sub-bottom profiler 1.5 kHz to 6 kHz – 6000m
- Multibeam Echosounder 100-450 kHz - 800m
- Multibeam Echosounder 50kHz - 3000m x 4000m
- ADCP
- Heading, Position & Attitude Sensor
- Clean chemistry 24 bottles CTD 6000m
- Piston corer 30m
- Interfacer corer
- Sediments bucket
- Mid-water trawling 2000m
- Cold chamber -80°
- 2 operations electric winches 20t and 10t
- 3 manoeuvring electric winches 5t
- Traveling crane 10t
- Divers capacity: 8
- Air 250b
- Hyperbaric chamber 3 divers
- 2 electric-engined ribs
- ROV
- Aerial drones
- Autonomous sailing drone
- Electric sailing hybrid ship
- BV-classified noise/vibration
- 4x20’ containers

**Up to 52 people on board**
- Deck: 4
- Energy: 3
- Cook: 3
- Méd: 1
- Boat: 2 to 4
- Technicians: 3
- Researchers: 20 to 30
- Shipping/media: 4/8
- Guests: 4/8

**Technical Specifications:**
- **LOA:** 68.40m
- **Beam:** 20m
- **Displacement:** 1,000t
- **Sails area:** 2,400m²
- **Spaces:** 400m²
- **Autonomy:** 100 days

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A game-changer to impact global navigation

Isolated smart grid (Island Grid) related to and anticipating weather conditions
Zero emissions of atmospheric pollutants

Recyclable composite hull and structure

Wind main propulsion
Cruising speed 8-10nds

206_NR Classification Of Wind Propulsion

OPV on sails

Electric batteries
2 MWh
EN50178 / UN3480
EMC EN61000/ EN614000
EN 55022
IP20

HP air, produced and stored on electric surplus

Energy efficient Station Keeping

Wind turbines
Reversible propulsion
Solar water heater

546_NR Hull in Composite Materials
614_NR Underwater Noise Reduction
641_NI Guidelines for Autonomous Ship
600_NR Hull Structure and Arrangement for cargo ships <65m / non-cargo ships <90m
From polar to tropical seas, an international cooperation to "learn to think like the Ocean"
Alternative, low-cost solutions for ocean observation

Lucie Cocquempot, Ifremer
Innovative alternative ocean observing systems are currently designed to contribute to sustainable development.
a growing community of interest
**Shared values**

**Community Science Strategy**

**Overall concept**

**STRONG SUSTAINABILITY**

1. **Sobriety**
   Refocusing on the essential and tending towards the technological optimum: lower technological intensity and greater simplicity allowing to ensure the needs with a high level of reliability

2. **Efficiency**
   Minimizes energy and resource consumption, from raw material extraction through production, distribution and use to end-of-life

3. **Durability**
   Demonstrates maximum technical, functional, ecological and human viability in the short, medium and long term

**COLLECTIVE RESILIENCE**

4. **Maintainability**
   Can be maintained and repaired by the users themselves as much as possible, with standard parts and materials

5. **Accessibility**
   Offering maximum ease of use (and potentially great diversity in terms of production)

6. **Autonomy**
   Is made from resources that are exploited and processed as locally as possible

**CULTURAL CHANGE**

7. **Empowerment**
   Facilitates the appropriation by the greatest number, gives power to citizens and territories

8. **Reliance**
   Promotes the sharing of knowledge and know-how, cooperation, solidarity, social cohesion and links between communities

9. **Simplification**
   Decomplexes society at the socio-economic and organizational levels based on a reflection on needs and vulnerabilities

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**Submitted for endorsement to**

Based on Arthur Keller et Emilien Bourrignol
Perspectives

2-way Global North / Global South interactions are great inspiring opportunities to develop alternative ocean observation techniques.

The European scale is key to coordinate actors, mutualise best practices for in situ observation techniques and other associated services.

HORIZON-CL6-2023-GOVERNANCE-01-11: Reducing observation gaps in the land-sea interface area

LandSeaLot: Land-Sea interface: Let’s observe together!
Status: proposal under evaluation
The critical role of research infrastructures providing in situ marine data

Nicolas Pade, EMBRC
What is *in situ* observation?

- Literally “in its original place”: we collect information directly from the ocean through:
  - Collection of physical, chemical, and biological information from the ocean
  - Collection of physical samples
  - Fixed sensors: buoys, antenna, seafloor observatories
  - Mobile sensors: research vessels floats, drifters, autonomous vehicles (e.g. gliders), animal-born tags

- *In situ* observation is needed because:
  - Provides long term perspective: seasonal trends, recurring trends
  - It allows for 4D view of the Ocean: 3D + time
  - It can be scaled according to necessary of variation: day, week, month, season, year
  - Long-term time series – consistent methodology and sensors
What is *in situ* observation used for?

- Window into the ocean and its processes
- Data needed to develop models of marine processes
- Data needed to train, initiate and correct models in accordance with real-world
  - Physical and biological processes are inherently chaotic, and require continuous information to be modelled
  - A Digital Twin of the Ocean needs data to inform the various models and scenarios
- Weather forecasting: *in situ* marine data is used in meteorological models
- Monitoring of greenhouse gas emissions & carbon sequestration
- Monitoring of biodiversity
Europe’s rich and complimentary landscape of Research Infrastructures

- DANUBIUS-RI - International Centre for Advanced Studies on River-Sea Systems
- EMBRC ERIC - European Marine Biological Resource Centre
- EMSO ERIC - European Multidisciplinary Seafloor and water column Observatory
- Euro-Argo ERIC – Synoptic and in-depth ocean profiling of physical & biogeochemical properties
- LifeWatch ERIC – e-platform for biodiversity and ecosystem functioning
- ICOS ERIC - Integrated Carbon Observation System
- EuroFleets+ - Coordination of mobile research and observation platforms: research vessels, AUVs & ROVs
- JERICO-RI - Joint European Research Infrastructure of Coastal Observatories
RIs at the heart of a Sustainable Marine Observation System

• Several RIs already present impressive observation coverage
• RIs are imposing standards and quality control, delivering high quality, trustworthy data
• Multi-national coverage and governance: mechanisms for discussion, investment, and strategic planning are already in place
• RIs collaborating and coordinating through EOOS and ENVRI cluster
• RIs are strategic European research and innovation assets, serving EU and national policies and operational needs
• RIs carry European excellence, voice and sometimes leadership in the observation of the global ocean
Session 2: Panel discussion

Moderator: Kate Larkin, EMODnet

- Rémy Denos, European Commission, DG MARE
- Inga Lips, European Global Ocean Observing System (EuroGOOS) and EOOS Framework
- Toste Tanhua, Global Ocean Observing System (GOOS) and EuroSea project
- Jean-Marie Flaud, French Ministry of Research and representative of the European Strategic Working Group on Environment (European Strategy Forum on Research Infrastructures, ESFRI)
- Yann-Hervé De Roeck, Euro-Argo ERIC

Closing - Kate Larkin and Organizing Team
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Thank you!

#EMD2023
#BeGreenGoBlue