



Advancing Cooperation and Sustainability for a Permanent Atlantic Ocean Observation Strategy

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Executive Summary

A wealth of data, platforms, and technologies for Atlantic Ocean observation already exists, yet efforts remain fragmented and underfunded, hindering the translation of ocean knowledge into concrete policy and societal action. At the same time, changing geopolitical and economic pressures are weakening cooperation across the global observing community and risking hard-won gains in international data sharing.

The European Union recently announced the EU Ocean Observation Initiative (OOI) under the EU Ocean Pact, aiming to ensure the long-term sustainability of ocean observation systems through sustained investment, open access to critical ocean data, and strong cooperation among all stakeholders. While this initiative plans to foster international collaboration, concrete implementation details remain undefined. The EU-funded project AtlantOS (Horizon 2020), aimed at improving and innovating Atlantic observation efforts, proved that cross-border and -disciplinary coordination is possible, but the resulting networks and best practices still lack long-term financial and institutional support.

To unify those efforts, we strongly **advocate for investments under the OOI to be guided by the AtlantOS deliverables**. Moreover, we propose taking its ambition forward by **creating a unified Atlantic Ocean observation strategy**. This strategy will utilise the recent international momentum, while being implemented through the efforts and intergenerational spirit of the All-Atlantic Ocean Research and Innovation Alliance (AAORIA). Such a strategy should be anchored in Communities of Practice (CoPs), and be reviewed and dynamically adapted through stakeholder-centric recurring international forums.

With large initial investments through Horizon Europe and leadership in AtlantOS, a strong scientific community with democratic consensus, the AAORIA partners are uniquely positioned to lead this strategy of sustainable ocean governance.

The proposed strategy will:

- Strengthen scientific integrity through permanent, depoliticized structures
- Promote climate justice by closing the North–South Atlantic observation gap
- Unlock local benefits for resilience, fisheries, and disaster preparedness

The Issue

Despite decades of significant scientific achievement and growing political interest, the Atlantic Ocean still lacks a unified, long-term strategy that effectively connects data providers, users, and decision-makers across Atlantic nations. This absence of sustained coordination results in a range of persistent challenges:

- **Fragmentation among networks and platforms** continues to limit the accessibility and use of high-quality data and infrastructures already in place. This fragmentation undermines the efficiency and impact of large-scale investments through initiatives such as the UN Ocean Decade and Horizon Europe.
- **Short-term and project-based funding** dominates the observing landscape, leaving more than half of the existing networks uncertain about their future operations or maintenance (Boero et al., 2019).
- **Lack of interoperability and uneven data standards** hinder the integration and application of ocean data. While the Global Ocean Observation System (GOOS), coordinated by the Intergovernmental Oceanographic Commission (IOC) of UNESCO, has advanced global coordination and established best practices, it continues to face challenges related to geographic equity, sustained financing, and comprehensive data coverage, particularly at the basin scale.
- **Persistent under-observation of the South and Equatorial Atlantic** remains a major gap, despite these regions' critical role in regulating the climate-relevant Atlantic Meridional Overturning Circulation (AMOC) and supporting biodiversity-rich ecosystems such as the Benguela and Brazil Currents. While networks like PIRATA (Tropical Atlantic) and SAMBA (South Atlantic) have yielded valuable insights, significant spatial and temporal gaps remain. These shortcomings limit equitable access to reliable climate and ocean services, especially for vulnerable coastal populations.

Without stronger coordination, the Atlantic Ocean risks "flying blind" in addressing pressing challenges such as climate hazards, marine pollution, and biodiversity loss. To address these barriers we must build on lessons learned from past collaborative initiatives which demonstrated how integration and sustained cooperation can transform ocean observing into a foundation for long-term societal benefits.

Evidence and Analysis

The EU Horizon 2020 project AtlantOS (2015–2019) brought together 62 partners from 18 countries with the ambition to develop a fit-for-purpose, integrated, and sustainable Atlantic Ocean observing system (AtlantOS, 2019). Aligned with the Galway (2013) and Belém (2017) Statements, AtlantOS delivered a set of foundational contributions that continue to guide efforts toward a coordinated and sustained observing framework. Key achievements include:

- Establishing the **Essential Ocean Variables (EOVs)** framework to ensure consistency across observing systems.
- Creating the **Ocean Best Practices System (OBPS)**, a global, peer-reviewed repository supporting interoperability and data comparability across nations and disciplines.
- Advancing of **a systems approach** to identify observation gaps, align stakeholder needs, and optimise resources.
- Supporting **Sustainable Development Goal 14 (SDG 14)** through long-term, quality-controlled data delivery that informs ocean health and resilience.

More than €500 million have already been mobilised through UN Ocean Decade and Horizon Europe projects, many of which aimed at contributing to ocean data repositories and/or to strengthen ocean observation and monitoring efforts. However, significant gaps and challenges remain. Fewer than 30% of observing systems worldwide have sustained, long-term funding (Buch et al., 2019; European Marine Board, 2019), leaving critical spatial and temporal data collection networks fragile. In particular, observation and monitoring of the South and Central Atlantic remain underdeveloped. The South Atlantic basin for instance is the least observed worldwide, despite its importance for global ocean circulation and ecosystem health. This north-south gradient in observations weakens capacities for accurate forecasts of storm surges, sea-level rise, fisheries monitoring, and disaster response of the entire Atlantic.

The Global Ocean Observing System (GOOS), established under the IOC-UNESCO and co-sponsored by the World Meteorological Organization (WMO), United Nations Environment Programme (UNEP), and the International Science Council (ISC), is recognized as the global coordination framework for ocean observing and offers an essential platform for integration. GOOS operates through regional alliances (e.g., GOOS-Africa, EuroGOOS, IOCARIBE-GOOS) and thematic panels focused on physics, biogeochemistry, and biology/ecosystems. Linking the proposed Atlantic Strategy to GOOS would harmonize observing efforts, leverage existing governance structures, and ensure data compatibility with the global system. While GOOS is in place to lead and support a community of international, regional and national ocean observing programmes, future efforts in the Atlantic observation strategies need to place a stronger emphasis on experience from GOOS and the Global Climate Observing System (GCOS) demonstrate that efficiency and sustainability arise from prioritization, integration, and long-term commitment rather than fragmented, short-term efforts. These lessons should guide the next generation of Atlantic observing initiative.

Policy Options

We identify three possible pathways to advance Atlantic cooperation in ocean observation:

Option	Description	Challenges	Advantages
Business as Usual	Fragmented, short-term, uncoordinated regional and national efforts	Inefficient, unsustainable, wastes existing investments; duplication of work; poor data integration	Leverages existing programs and relationships
New Centralised System	Builds an entirely new infrastructure for ocean observation under a single authority	Costly, duplicates efforts, may face institutional and political resistance	Could offer uniform governance and data management
Unified Atlantic Strategy under AAORIA	Builds on AtlantOS, empowers Communities of Practice (CoPs), and integrates partners from the global South	Requires sustained funding and political buy-in across diverse nations	Scalable, efficient, inclusive; strengthens trans-Atlantic cooperation; maximizes return on existing investments

Recommendations

We recommend:

The establishment of a joint, unified Atlantic Ocean strategy for sustained ocean observation under the framework of AAORIA, building directly on AtlantOS outcomes and aligned with GOOS principles.

This approach will consolidate existing progress, ensure inclusivity, and provide a pathway toward a permanent, sustainable, integrated system. This includes the following key actions:

	Action	Details
1.	Consolidate, recirculate, and scale existing AtlantOS Outputs	Incorporate AtlantOS deliverables (EOVs, OBP, systems approach) into AAORIA structures. Use AtlantOS as a blueprint to scale toward a permanent, integrated Atlantic system, making data interoperability a key requirement. Promote a user-centric approach, data uptake into Digital Twins of the Ocean, and integration in GOOS.
2.	Expand observation capacities in the South and Equatorial Atlantic	Develop and fund new CoPs in the Caribbean, Africa, Central and South America, and integrating southern partners into existing data platforms and best practices.
3.	Secure Long-Term, Multi-National Funding	Initiate strategic dialogues between the EU and countries like Brazil, South Africa, Argentina, and regional bodies (e.g., African Union), ensuring broader investment and balanced representation across the Atlantic basin, utilising upcoming initiatives such as the EU OOI.
4.	Prioritize Local and Societal Benefits	Focus observation efforts on fisheries, coastal adaptation, and tropical storm forecasting to enhance community resilience.
5.	Intergenerational Leadership in Atlantic Observation	Create an AAORIA hub to engage ECOPs, boosting capacity building, innovation, and knowledge exchange for emerging leaders to support a stronger Atlantic observation system.
6.	Establish a Recurring Forum	Establish recurring AAORIA-led forums to align funders, users, and providers, including EU and non-EU nations.

Conclusions

The Atlantic Ocean connects climate, ecosystems, and societies across continents and hemispheres, shaping weather patterns, food security, and economic livelihoods. Yet current observation efforts remain fragmented, uneven, and unsustainably financed, limiting the collective understanding needed to manage shared ocean challenges.

The European Union, through AtlantOS, continued investments under Horizon Europe, and planned establishment of the EU OOI, has laid the foundation for a science-driven, inclusive, and sustainable Atlantic observing system. Building on this progress, the defining challenge now lies in achieving true inclusivity, addressing the persistent North–South imbalance in ocean data coverage and capacity.

By uniting strategies, securing long-term funding, and integrating all Atlantic nations, the vision of an All-Atlantic Ocean Observing System can become a lasting reality. Such a system would strengthen climate resilience, enhance fisheries and coastal adaptation, and empower vulnerable communities through equitable access to ocean information.

A permanent and coordinated Atlantic observation framework would also reinforce global ocean governance and establish Europe as a model of responsible, cooperative leadership in Earth system science, ensuring shared benefits for people and the planet well beyond 2030.

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