



ALL-ATLANTIC OCEAN RESEARCH ALLIANCE

Creating an Atlantic Ocean Community by Implementing
the Galway and Belém Statements

AA-DATA2030

Report: Roadmap for the All-Atlantic Data Space – Draft Zero –



**BUILDING AN ALL ATLANTIC
OCEAN COMMUNITY**
Implementing the Belém Statement



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JOINT PILOT ACTIONS

ALL-ATLANTIC JOINT PILOT ACTIONS

Following a year-long collaborative process among more than 70 stakeholders at the Atlantic level, the All-Atlantic Ocean Research Alliance Multi-Stakeholder Platform, divided into 5 sub-multi-stakeholders platforms, identified more than 1000 initiatives towards strengthening marine research and innovation collaboration at the Atlantic level, 56 gaps and 79 needs/recommendations to achieve the All-Atlantic Ocean Research Alliance ambition, guided by a total of 20 Strategic Objectives, 20 Operational Objectives, and 10 Key Performance Indicators.

Based on these findings and on the idea of collaboration, alignment, and use of existing resources, they have developed six ambitious and long-term collaborative Joint Pilot Actions:

- [All-Atlantic Training Platform \(AA-TP\)](#)
- [All-Atlantic Aquaculture Technology and Innovation Platform \(AA-ATiP\)](#)
- [All-Atlantic Marine Biotechnology Initiative \(AA-BIOTECMAR\)](#)
- [All-Atlantic Data Enterprise 2030 \(AA-DATA2030\)](#)
- [All-Atlantic Blue Schools Network \(AA-BSN\)](#)
- [All-Atlantic Marine Research Infrastructure Network \(AA-MARINET\)](#)

This report was developed by the **All-Atlantic Data Enterprise 2030 (AA-DATA2030)** Joint Pilot Action, that aims at creating a one-stop, user-friendly transatlantic platform for gathering natural, social, and social-scientific data: The All-Atlantic Ocean Data Space (AAODS). AA-DATA2030 is supporting transatlantic information and data sharing in the spirit of 'open science' and the FAIR/CARE/TRUST principles. The establishment of the All-Atlantic Ocean Data Space will ensure that, in the future, all stakeholders have free access and can also contribute to relevant data, thus safeguarding sustainable stewardship of the Atlantic Ocean

This report is a deliverable in scope of JPA All-Atlantic Data Enterprise 2030, Task 2. Defining the Needs & Customizing the services for the All-Atlantic Ocean community. The task, aimed at organizing three workshops for stakeholder engagement: Workshop - 1 - Data and Policy forum (online); Workshop - 2 - Data Infrastructures and Stakeholders' Forum: focus on Roadmap for the implementation of the All-Atlantic Ocean Data Space (online); and Workshop 3: Focus on the Tropical and Southern Atlantic (and Southern Ocean): Workshop in presence in Buenos Aires, 28 November – 1 December 2022, (Organisation: UNLP, USP, CSIR, and ZMT). The latter workshop further contributes to include action items in the All-Atlantic Roadmap, which focuses on South Atlantic data community. This report corresponds to AA-DATA2030 D2.3 and D2.4.





ALL-ATLANTIC OCEAN RESEARCH ALLIANCE

Creating an Atlantic Ocean Community by Implementing
the Galway and Belém Statements

TABLE OF CONTENTS

CONTENTS

1. Introduction
2. All-Atlantic Data Space
3. Common Standards for Information and Data Sharing
4. Invest in Human Resources
5. Jointly Shaping a Roadmap
6. Way Forward





1. Introduction

This document was developed within the framework of the Joint Pilot Action *All-Atlantic Ocean Data Enterprise 2030* (AA-DATA2030), in scope of the All-Atlantic Cooperation for Ocean Research and Innovation (AANChOR-CSA) Project.

Particularly, this report draws on the contributions of two AA-DATA2030 workshops:

1. ALL-ATLANTIC DATA 2030 STAKEHOLDERS WORKSHOP “Data Infrastructures and Stakeholders Forum”, 24-25 May 2022 (<https://www.leibniz-zmt.de/de/all-atlantic-data-2030.html>).
2. “ALL-ATLANTIC DATA 2030 STAKEHOLDERS WORKSHOP “Towards a Sustainable Competence Centre for Marine and Coastal Data of the Global South”, Buenos Aires, Argentina 28 November – 1 December 2022 (<https://allatlanticocean.org/view/news/all-atlantic-data-stakeholders-workshop-connecting-acting-cooperating>).

The development of the roadmap for the All-Atlantic Data Space initiated by AA-DATA2030 embraces the principles of co-design and codelivery, which have proven successful in the development of the Roadmap. Such processes will continue throughout its implementation, under the All-Atlantic Ocean Research and Innovation Alliance’s motto: *Connecting, acting, cooperating!*

AA-DATA2030 aims to produce a set of recommendations and products to successfully improve the handling and the accessibility of marine data by strengthening the existing networks between the West and the East, and the South and the North of the Atlantic basin. As such, AA-DATA2030 promotes a comprehensive assessment of the status of ocean-related data in the Atlantic and it will provide a forward-looking strategic recommendations and structures for more efficient data to knowledge transfer.

The central objective of AA-DATA2030 is to create an all-Atlantic data space to effectively and efficiently provide peer-reviewed Atlantic Ocean data in compliance with the FAIR (Findable, Accessible, Interoperable, and Re-usable) guiding principles for scientific data management, and CARE (Collective Benefit, Authority to Control, Responsibility, and Ethics), and TRUST (Transparency, Responsibility, User focus, Sustainability and Technology) principles for data governance.





2. All-Atlantic Data Space

The All-Atlantic Data Space will benefit all sectors of society by connecting existing data infrastructures around the Atlantic basin and guaranteeing free access to reliable, quality-controlled data in a timely and friendly manner. Beneficiaries of an Atlantic data space include stakeholders at the political and science-policy levels, in the research and university environments, in the maritime/food industry, in maritime engineering, as well as the general public, including schools and recreation. Synergies articulated by all partners will have a direct societal impact, which is vital for sustainable development to take place around the Atlantic basin.

A sustainable structure associated with the different relevant databases is capable of archiving data in a networked and decentralised manner, exchanging them via appropriate interfaces, and making them freely available to the public.

Suitable funding and concrete vision for the way forward are fundamental for the successful implementation of the Roadmap. We need to act now to promote the following:

- Connecting all regional data networks and guaranteeing their linkages to national and international networks,
- Harmonizing regionally established standards and protocols to conform to national and international uniform, reliable minimum standards,
- Improving the capacity in research, innovation, and management for better understanding the data needs, collection, management, sharing, metadata, and communication processes, and
- Providing a greater audience with the necessary skills in data management and utilization, thus contributing to increasing ocean data literacy and science data literacy.



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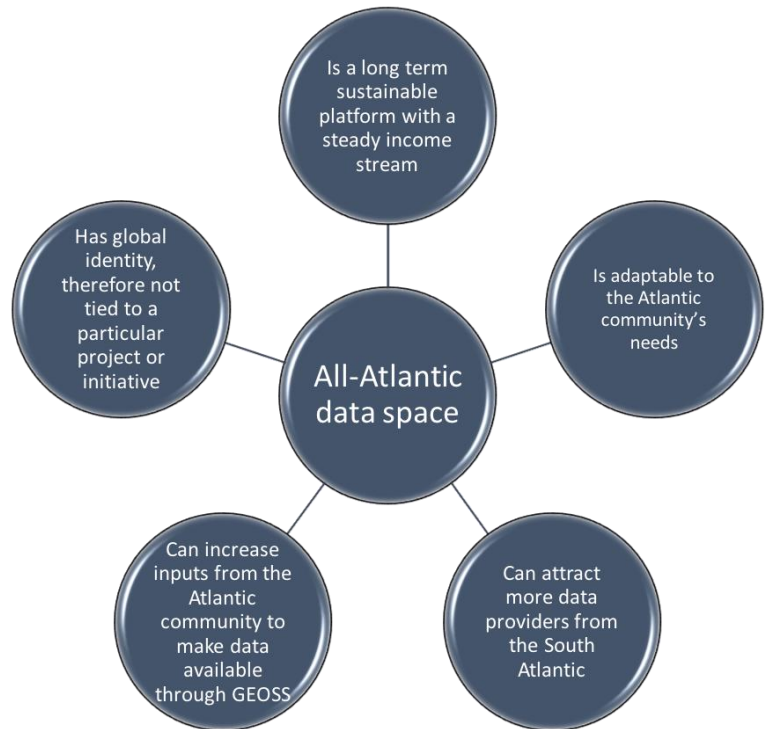
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Figure 1

The All-Atlantic Data Space is a federation of data infrastructures around the Atlantic.

It is a robust, flexible, one-stop, user-friendly interface that allows decision makers and other societal actors to browse and search information relevant for their particular needs. Indeed, accessibility also implies the capacity for the different stakeholders to derive benefit from a resource, in our case, data.



“Ocean observing should become the norm. Policy drivers are needed to further efforts towards the objectives of the UN Ocean Decade in a way to identify (or set up) programmes in those countries across the Atlantic that are strategic in terms of data gathering but not yet engaged in the monitoring, to involve their national scientific communities progressing towards data sharing. The community collaboration must engender trust in the data through documented provenance and employed best practices and standards. Moreover, ocean observing needs to evolve from a niche activity of scientists to a societal norm such as weather or health observations. Data rescue, data archaeology and data ingestion portals must be supported. The issue of opening to sensitive data must also be led by international policy bodies and fit into their agendas.”

In: [Standards, best practices, challenges and incentives for maximising the use of ocean data in the Atlantic region](#). From the Webinar: [Towards an All-Atlantic Data Space](#), jointly organised by Blue-Cloud AANChOR, the G7 Future of the Seas and Oceans Initiative, iAtlantic, and AtlantECO, in collaboration with EMODnet and Copernicus Marine Service.





3. Common Standards for Information and Data Sharing

The creation of the All-Atlantic Data Space will make ocean data and information visible and accessible to all stakeholders, thereby boosting the ocean economy for sustainable development. It will also be able to develop and reinvent itself constantly thanks to the ever-increasing investment in oceans observation and research, and the advent of oceanographic big data.

Open access to data is essential for the design of management strategies, decision making, and to inform policies to preserve the health of the ocean and to enhance its resilience. Better monitoring also means better forecasting capacities, vital for the improvement of maritime safety, human health and well-being, and the sustainable use of marine resources.

Establishing common standards for information and data sharing to be used by local, regional, and national initiatives in the Atlantic basin, coupled with cloud-computing and the All-Atlantic Data Space, will dramatically improve the Atlantic surveillance system.

“There are some good regional examples e.g. EMODnet, where community best practices and standards for marine data and metadata are already applied, in the context of international standards and efforts e.g. IODE. These - together with other examples from across the Atlantic Ocean basin, can be used as best practices and inspiration for other regions to join the momentum towards a fully interoperable All Atlantic Ocean Data space. To achieve this, a change in culture is also the only way to propagate the use of standards and best practices, which already exist, as key components of the FAIR approach towards data management. This goes far beyond data archiving into repositories. A systemic approach towards interoperability and shared (cross-disciplinary) metadata policy is needed: it should not matter where you submit your data to be able to harvest and multiply its impact globally while keeping provenance tracked. Legal interoperability is part of this.”

In: [Standards, best practices, challenges and incentives for maximising the use of ocean data in the Atlantic region.](#)
From the Webinar: [Towards an All-Atlantic Data Space](#), jointly organised by Blue-Cloud AANChOR, the G7 Future of the Seas and Oceans Initiative, iAtlantic, and AtlantECO, in collaboration with EMODnet and Copernicus Marine Service.



Freely available data allow the unrestricted exchange of information among partners on both sides of the Atlantic. Core needs are (1) the identification of complementarities and (2) the joint prioritization of potential cooperation activities.

By using best practices at the early stages of project development, both scientists and decision-makers minimize the risk of user non-compliance, further facilitating the implementation of national data management plans for all scientific research.

More data (e.g. regarding carbon and heat fluxes) and data products (e.g. using multimedia data) are needed in the South Atlantic, as identified during the recent AA-Data 2030 [webinar “Showcasing Data Infrastructures and Operators in Africa”](#), held online on 24 May 2022. Specific needs and gaps for Africa were already documented in the [Ocean Decade Africa Roadmap](#) as highlighted during the same webinar:

“Need for training on data collection, analysis and interpretation (including capacity building in programs and software to analyse different environmental datasets)

Inadequate common platforms for data sharing, adaptation of technologies, facilities and infrastructure within Africa

Identified gaps in research programmes on ocean policy agenda in order to analyse objectives, identify priorities, align teaching/research/outreach activities capable of impacting on policy

Need to better manage, develop and transfer know-how within the contributing research community”

In: UNESCO-IOC (2022). The United Nations Decade of Ocean Science for Sustainable Development 2021–2030. OCEAN DECADE AFRICA ROADMAP. UNESCO, Paris. (The Ocean Decade Series 36).

Communication is paramount to the successful implementation of this Roadmap.

Strong communication is needed not only within communities that produce data but also between such communities and the stakeholders that will be making use of the data in question. This may require the establishment of a community of practice that needs to develop a common language both across data-producing communities and vis-à-vis data end users.

A related issue refers to the need to strengthen the science-policy interface and to ensure that the data collected and processed are converted into a usable and useful format to be employed by policy- and decision-makers involved in governing the affairs pertaining to the Atlantic.



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4. Invest in Human Resources

Collecting and disseminating data, freely exchanged within the ocean community, will expand the interactions between the different scientific and societal players and create a solid basis for the development of new cooperation platforms for scientific and technological innovation to serve societal needs and new value chains through shared responsibilities and mutual benefit.

The need for capacity development around the Atlantic basin can be solved by growing a community of stakeholders supporting the All-Atlantic Data Space, that invests in the pool of people equipped with the skills and competencies to foster the Blue Digital transformation.

“There are big differences in the infrastructure implementation maturity between Europe, US, Japan, Australia, China and the rest of the world. However, problems that we face do not lie in technology or even governance or policies, as standards exist and well-functioning infrastructures can be used as examples for countries with less mature implementations. The biggest bottleneck here is the lack of human capacity to assimilate all the information and to ingest and implement it. A roadmap for countries, repositories and institutions is a good idea. It can be expected that progress will in some cases be very slow, but this activity should be very inclusive to ensure that there is engagement from as many participants as possible, even if requirements and standards are not fully implemented. The roadmap can help countries who want to move to a higher level of operations and also provide something data repositories or institutions can take to their funding environment. The roadmap could then aid countries scientists to explain what development they are aiming for, what steps they will need to take and what hurdles they will need to overcome to become operationally more mature. It would also be very valuable to ensure that the roadmap explains the benefits that come with such a development.”

In: All-Atlantic Data & Policy Forum. [E-REPORT of the All-Atlantic Data & Policy Forum, 2021 May 31 \(ONLINE\)](#).





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The creation of a data driven mentality in scientific research is an important pillar of the All-Atlantic Roadmap and it could start as early as the school classes. Teachers could start presenting to the students the importance and the advantage of knowing the world using real data. Stakeholders sharing common goals regarding data collection, curation, and analysis can influence the creation of guidelines and legislation regarding Atlantic Ocean data processing. The society as whole is invited to participate in this process, promoting data inclusivity and democratisation of the marine sciences.

“When dealing with the marine data value chain, the situation varies a lot from pole to pole, East to West. (...) There is a “Community memory” benefitting from software tools and related best practices created across the Atlantic region, but tools themselves are not enough, and a new generation of data managers is needed to lead a change in pace towards a different approach to data sharing. Data stewards and data managers are more and more needed - and are we sure all stakeholders get the difference between the two terms? - an element of awareness and recognition must be introduced, for instance via professional curricula on data management with clear indications on the benefits for such skills. Let’s focus on an aligned human capacity, then.

*In: [Standards, best practices, challenges and incentives for maximising the use of ocean data in the Atlantic region](#). From the Webinar: [Towards an All-Atlantic Data Space](#), jointly organised by Blue-Cloud AANChOR, the G7 Future of the Seas and Oceans Initiative, iAtlantic, and AtlantECO, in collaboration with **EMODnet** and **Copernicus Marine Service**.*





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5. Joint Shaping a Roadmap

During the stakeholders' workshop in Buenos Aires, plenary discussions led to ten "action items" in order to fulfil AA-DATA2030 goal:

1. Approach AIR Centre - José Luiz Moutinho <jose.moutinho@aircentre.org> - as potential host of the (physical) "Competence Centre for Marine and Coastal Data of the Global South".
2. Seek/ Find existing/ upcoming regional/ national Capacity Development activities related to scientific data: Teach the Teacher, student training etc.
3. Approach/ convince regional/ national stakeholders (science policy, private sector, industry, etc.) to lobby for support in sharing data/ meta-data.
4. Share minimum list of scientific variables of interest in the coastal/ oceanic Global South research.
5. Share minimum list of meta-information required to cover action item #4.
6. Approach technical providers of "platforms" that can host the foreseen common space for a Global South Atlantic Ocean Data Space, e.g. the Ocean Info Hub <https://oceaninfohub.org>, the All Atlantic Ocean Data Community on GEOSS portal for Geospatial data (<https://www.geoportal.org/community/all-atlantic-ocean-data-community?m:activeLayerTileId=osm&f:dataSource=dab>)
7. Focus on work with data collectors and get them involved in future works that might encourage collaboration, with a particular focus on indigenous people.
8. Push for data and manuscript publication, with the objective to give recognition of South Atlantic scientists and their findings in an international context, via DOI for citation purposes.
9. Select curated metadata from existing Atlantic metadata catalogues to feed the foreseen Global South Atlantic Ocean Data Space. A list of metadata and data catalogues were already identified during the workshop:
 - MIMS e-catalog (<https://data.ocean.gov.za>)
 - SAEON data portal (<https://catalogue.saeon.ac.za/>)
 - Mission Atlantic metadata catalog:
https://sextant.ifremer.fr/documentation/pages/mission_atlantic.html#/search?from=1&to=30
 - AtlantECO (<https://atlanteco-geonode.eu/>)





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Creating an Atlantic Ocean Community by Implementing
the Galway and Belém Statements



10. Publish an extended version of the white paper (i.e., stakeholders executive summary) to journals like *Marine Policy* as the leading journal of ocean policy studies, *Frontiers in Marine Science* showcasing emerging and important areas of research, and *Ocean & Coastal Management* as the leading international journal dedicated to the study of all aspects of ocean and coastal management from the global to local levels.

The roadmap for the All-Atlantic Data Space presented at the All-Atlantic Ocean Research Alliance Forum 2022 – Scientific Event, Brasilia, Brazil, 31 May to 2 June, 2022 (figure 2) was therefore updated with these action items that focus on the needs and gaps of the South Atlantic data community.





6. Way Forward

On 13 July 2022, the European Union, Argentina, Brazil, Canada, Cabo Verde, Morocco, South Africa and the United States signed a new All-Atlantic Ocean Research and Innovation Declaration (<https://allatlantic2022.com/wp-content/uploads/2022/07/All-Atlantic-Declaration-signed-7.13.2022.pdf>).

This is a renewed commitment to build a long-term alliance for sharing knowledge, infrastructure and capabilities, and to promote the Atlantic Ocean’s sustainability through research, development and innovation.

The roadmap for an All-Atlantic Data Space for all, aligns with the All-Atlantic declaration in its pledge to:

- Build an All-Atlantic Ocean Research and Innovation Alliance by co-creating and co-implementing for ocean science activities.
- Promote accessible, interoperable, and transparent knowledge and data systems.
- Enhance access to infrastructures, data, and expertise.
- Promote local and indigenous knowledge in ocean science initiatives.
- Promote diversity, equity, and inclusion.
- Strengthen stakeholder engagement.

AA-DATA2030 encourages all stakeholders to reach the shared goals at their own pace, by jointly promoting the establishment of a structure geared to the future.

All societal actors (scientific, governmental, public, and private sectors), cultivating common governance strategies on how data are collected, managed, and processed, will be involved in fostering new generations of responsible citizens with shared values, attitudes, and behaviors towards productive, resilient, and healthy oceans.

Figure 2. All-Atlantic Data Space roadmap as envisioned by AA-DATA2030.





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the Galway and Belém Statements

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