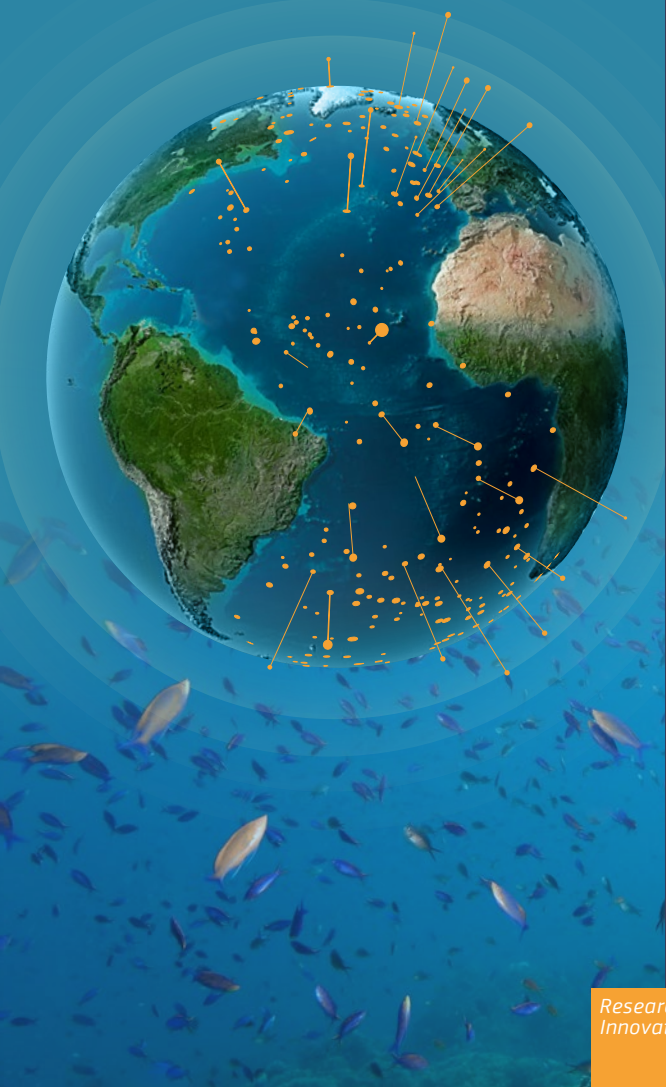




European
Commission

All-Atlantic Ocean Research Alliance

A success story
of ocean science
diplomacy



Research and
Innovation

All-Atlantic Ocean Research Alliance – A success story of ocean science diplomacy

European Commission
Directorate-General for Research and Innovation
Directorate D — Healthy Planet
Unit B.4 — Healthy Ocean and Seas

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All-Atlantic Ocean Research Alliance

A success story of ocean science diplomacy

edited by Szilvia Nemeth, Nicolas Segebarth, Eszter Nagy,
Edoardo Casarotto, Sigi Gruber, Laura Mc Donagh

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FOREWORD



The ocean and seas are critical lifelines of our planet: they support our societies' basic needs by providing jobs, energy, and giving home to millions of species. They contribute to global trade, food security and absorb 25 to 40% of world's carbon emissions.

We are increasingly aware of the importance of research and innovation to contribute to further enhancing our knowledge about our 'blue planet'.

The Atlantic Ocean is the second largest sea basin in the world. From the Arctic Circle to Antarctica, this ocean covers nearly one-fifth of our planet, bordering Africa, the Americas, and Europe. It hosts many economic activities and many of the busiest sea routes go through the Atlantic, not to mention how it regulates climate and weather, largely impacting on communities living along its coasts and beyond. Despite being so essential to life on our planet, it is often exposed to unsustainable fishing practices, pollution, over-exploitation of its ecosystems, biodiversity and minerals in addition to being threatened by global warming and ocean acidification.

This publication tells the story of the All-Atlantic Ocean Research Alliance, a true success of ocean science diplomacy that the European Union has been central to with key international players along and across the Atlantic Ocean.

The partners in this cooperation recognise that the Atlantic Ocean is an invaluable shared resource and take joint responsibility for its protection for the benefit of the future generations. The work of the Alliance focuses on practical, effective cooperation in marine research and innovation as the best way to unlock the potential of the Atlantic Ocean and to manage activities that depend on it in a sustainable way.

This cooperative framework serves as an example of multilateral research and innovation cooperation, and it deserves our full attention and commitment.

Over the last decade, the EU has invested over EUR 250 million in projects to promote cooperation between European and international scientists from all around the Atlantic, with the remarkable achievement of networking of over a thousand research teams! The EU will continue to show leadership in the Atlantic regions through international dialogue and international scientific cooperation, and the Alliance is a crucial network for this aim. We will continue to make discoveries together with our partners and work for a better, bluer world.

This publication provides the reader with an insight into the success story of the All-Atlantic Ocean Research Alliance, by showcasing remarkable achievements, putting the ocean at the centre of intense cooperation activities.

You will read about the formation of the Alliance and how it brought the Atlantic partners together to jointly build a sustainable future for Atlantic communities. You will discover examples of the activities and read testimonials from the people who put their work and passion at the service of this cooperation.

This publication addresses policymakers as much as any other stakeholder from all generations who are active or interested in the protection of the Atlantic Ocean. It is a call to them to join forces. Together we will be able to overcome the great challenges ahead.

I look forward to further strengthening this Atlantic partnership with international partners and to see how its next chapter will unfold.

MARIYA GABRIEL

European Commissioner

Innovation, Research, Culture, Education and Youth



The All-Atlantic Ocean Research Alliance in the words of its Co-Chairs:

Since setting sail on our common Atlantic Ocean journey together, we have made remarkable progress with our marine research and innovation cooperation. An Atlantic community was born and together with policy makers it defined a new vision of international cooperation with opportunities that can be seized to address the common challenges in a practical way. The Alliance is contributing to the delivery of our priorities as a community of international partners and contributed to putting ocean research and innovation at the centre stage. The work achieved in the Alliance has inspired and will continue to inspire others and reach further sea basins, so that our impact will go beyond the Atlantic to reach a global dimension.

JOHN BELL

*Director for Healthy Planet, DG Research and Innovation,
European Commission and co-chair of the Galway and Belém Statements*

The All-Atlantic Ocean Research Alliance is helping build a stronger multinational community of Atlantic maritime nations that work together on vital ocean research. As a member of the Atlantic Ocean community, the United States and NOAA understand that the future environmental health of our ocean and economic wellbeing of our nations depends on working together across borders to advance ocean science, understanding, conservation and sustainable use.

CRAIG MCLEAN

*Former NOAA Assistant Administrator for Oceanic and Atmospheric Research, United States
and former co-chair of the Galway Statement*

Since the signature of the Belém Statement in 2017, we have been working closely with partners and scientists from the whole Atlantic Ocean, building a strong community of practice to better understand our treasured Atlantic. Brazil is committed to advance fit-for-purpose scientific research, and to create new opportunities for our scientific community to build long-term solutions to our common challenges. I believe that the All-Atlantic Ocean Research Alliance is a unique framework to advance together for a sustainable Atlantic Ocean.

ZAIRA TURCHI

Director of Institutional Cooperation, National Council for Scientific and Technological Development (CNPQ), Brazil and co-chair of the Belém Statement

The All-Atlantic Ocean Research Alliance has generated the opportunity to strengthen existing and generate new partnerships that advance our shared research goals. I continue to be impressed by the collaborations taking place across diverse fields ranging from seabed mapping and ocean observation to the marine microbiome and ocean literacy. Through the Alliance, we can accomplish so much more together than we can on our own.

ARRAN MCPHERSON

Assistant Deputy Minister of Ecosystems and Oceans Science, Fisheries and Oceans Canada and co-chair of the Galway Statement

The implementation of the Belém Statement signed between the European Union, Brazil and South Africa has culminated in bringing together the members of the Galway Statement and the Belém Statement into the All-Atlantic Ocean Research Alliance in 2017 through the strategic leadership of the High Level Board. Notable achievements to be celebrated include the hosting of the All-Atlantic Ocean Research Alliance conferences in Brazil, Brussels and a virtual conference hosted by South Africa, the launch of the AANCHoR project and formation of the Youth Ambassadors Programme from the members countries as champions of the work of the AAORA.

YONAH SELETI

Chief Director: Science Missions, Department of Science and Technology, South Africa and co-chair of the Belém Statement

THE ATLANTIC: OUR SHARED RESOURCE

Seas and oceans cover more than 70% of Earth's surface. They hold 97% of all water and sustain 80% of all life forms on the planet. These vast ecosystems are amongst the world's largest carbon sinks, produce half of the oxygen we breathe and are the primary source of proteins for more than 3 billion people worldwide. They are also the fabric of a large industry.

UNITED NATIONS (2021) SUSTAINABLE DEVELOPMENT GOALS

*Goal 14: Conserve and sustainably use the oceans, seas and marine resources,
<https://www.un.org/sustainabledevelopment/oceans/>*

As the Atlantic Ocean is our shared resource, there is both a collective and individual responsibility to protect its health. This requires changing our perspective and considering the ocean and waters as a resource that needs constant replenishing, not depleting. Their value goes beyond the economic benefits they provide. It entails ecological, societal and cultural benefits. Without healthy ocean and waters, there is simply no life on Earth.¹

With the purpose of maintaining healthy ocean and seas, there is a need for a forward-looking management of human activities and governance. These depend on solid scientific evidence to provide input to informed decision making. Science is needed to understand the way the ocean functions and to predict its state, to establish safety and warning systems and to help society to respond and adapt to a changing environment and climate.² Cooperation in ocean science across the Atlantic has a long tradition. Via the All-Atlantic Ocean Research Alliance (AAORA), ocean science diplomacy has stepped up to a higher level and this cooperation contributes to the science needed to support ocean policy, governance and management on domestic, regional and international scales in the Atlantic region. A large and inclusive Atlantic community has been created forged on the basis of scientific cooperation.

¹ European Commission (2020). Proposed Mission, Mission Starfish 2030: Restore our Ocean and Waters, Report of the Mission Board Healthy Oceans, Seas, Coastal and Inland Waters, 3.

² Polejack, A., Gruber, S. & Wisz M.S. (2021). Atlantic Ocean science diplomacy in action: the pole-to-pole All Atlantic Ocean Research Alliance. <https://doi.org/10.1057/s41599-021-00729-6>

THE ALL-ATLANTIC JOURNEY

The European Union (EU) is a major investor and player in Atlantic research and the AAORA activities are directly contributing to the international pillar for the implementation of the EC Communication on A new approach to the Atlantic maritime strategy – Atlantic action plan 2.0.³

The need for open cooperation for scientific research, environmental stewardship, and sustainable management of marine resources in the Atlantic basin created an opportunity for ocean science diplomacy. The Alliance is the result of a continuous science diplomacy process, with the goal of producing knowledge-based solutions for an improved management of the Atlantic Ocean. It bridges countries by aligning research objectives and capacities, sharing costs and co-developing knowledge for societal benefit.⁴ The Alliance presented new All-Atlantic Cooperation platforms around capacity development, knowledge transfer, data standards, ocean literacy, and sharing research infrastructures. These five platforms⁵, launched in November 2019, involve almost 80 experts from along and across the Atlantic Ocean, and include a number of strategic objectives.



³ Communication of the European Commission COM(2020) 329 – 23 July 2020

⁴ Ibid, p2-3

⁵ <https://allatlanticocean.org/jointactions>

HOW THE COOPERATION CAME ABOUT

Since 2013, the EU has been leading, together with key partners, the efforts to foster the development of this Alliance. The journey began with the signature of the Galway Statement on Atlantic Ocean Cooperation in 2013 between the EU, Canada and the United States⁶.

Its success, together with existing initiatives that were already being implemented in the South Atlantic, was seen as an opportunity towards an ambitious cooperation addressing the challenges of the Atlantic as a whole. Cooperation was therefore enhanced with Brazil and South Africa, culminating in the signing of the Belém Statement on Atlantic Research and Innovation Cooperation in 2017⁷. The EU has also signed bilateral administrative arrangements with Argentina⁸, Cabo Verde⁹ (2018) and Morocco¹⁰ (2020) and from there, together, we have built an All-Atlantic Community, on the principles of co-responsibility, co-ownership and co-implementation.



⁶ https://allatlanticocean.org/uploads/ficheiro_Galway_Statement_Atlantic_Ocean_Cooperation_2013.pdf

⁷ https://allatlanticocean.org/uploads/ficheiro_Belem_Statement_Atlantic_Research_Innovation_Cooperation_2017.pdf

⁸ https://allatlanticocean.org/uploads/ficheiro_Administrative_Arrangement_EC_Argentina_Marine_Research_Innovation_Cooperation.pdf

⁹ https://allatlanticocean.org/uploads/ficheiro_Cooperation_Arrangement_EC_Cabo_Verde_Marine_Research_Innovation_Cooperation.pdf

¹⁰ https://allatlanticocean.org/uploads/administrative_arrangement_on_marine_research_ands_innovation_cooperation_ce_maroc_signe_08_12_2020.pdf

KEEPING THE MOMENTUM

GETTING TOGETHER TO BUILD STRONGER TIES

The All-Atlantic Ocean Research Forum has been instrumental in connecting national stakeholders across the Atlantic Ocean and has led to unprecedented advances in developing the basin's observing community and capabilities, sharing technologies and best practices, and moving toward the implementation of a truly integrated ocean observing system for the public good and for public interest research.

SABRINA SPEICH

Professor in Ocean, Atmosphere and Climate Sciences at the Ecole Normale Supérieure, France

The AAORA signatories host high-level events, such as the All-Atlantic Ocean Research Fora, with the participation of leading political and ocean leaders including youth, academics, researchers, entrepreneurs, and civil society from across the Atlantic Ocean, from pole to pole, a community supporting the strengthening of the All-Atlantic Ocean Research Community and the implementation of the Galway and Belém Statements. Each event showcases the latest achievements and new initiatives of the AAORA and represents a platform to discuss the next steps to expand our knowledge of the Atlantic and identify sound solutions to the challenges it faces.¹¹



¹¹ All-Atlantic Ocean Research Alliance - Forums

HEALTHY OCEAN AND SEAS FOR THE NEXT GENERATIONS – YOUTH FOR THE OCEAN

Safeguarding the ocean and its health is also strongly linked to our responsibility towards the next generations. The All-Atlantic Ocean Youth Ambassador (AAOYA) programme¹², launched in 2019, is AAORA's component that aims to empower young generations and use their competences.

The AAOYA's are dedicated individuals from all walks of life and backgrounds, who promote sustainable development and stewardship of the Atlantic Ocean. In developing online or local strategies and events, the Ambassadors are integrated into the collaborative Atlantic pilot actions and supported by All-Atlantic research and innovation projects. Specific examples of the engagements of the Ambassadors involve activities such as open seminars on ocean literacy, cultural intelligence, and science diplomacy. Their activities bring the work of the Alliance closer to local communities and to the younger generation.

In line with the European Year of Youth in 2022, the vision, engagement, and participation of all young people to build a better future, which is greener, more inclusive and digital is highly supported and encouraged. With this proposal, Europe is striving to give young people and early professionals more and better opportunities for the future.¹³

Through the All-Atlantic Ocean Youth Ambassadors (AAOYA), I built a network, organised side-event, co-host and co-chair sessions, and had a seat in roundtables, but mostly made the voice of youth across the Atlantic heard. The endless opportunities would have never been possible without the support of the All-Atlantic Research Alliance and Partners from different parts of the Atlantic basin. They trusted us and believed that with the right mentoring, support and coordination. The sky is the limit for what we could achieve.

I will not forget to shed some light on the creativity, innovation, stewardship, and enriching diversity of my fellow Ambassadors. I have learned through them, not only about the similar interest or relevancy to some topics but also about our drive and hunger to represent our communities and be their voice when given the opportunities.

OTHMAN CHERKAOUI DEKKAKI

All-Atlantic Ocean Youth Ambassador

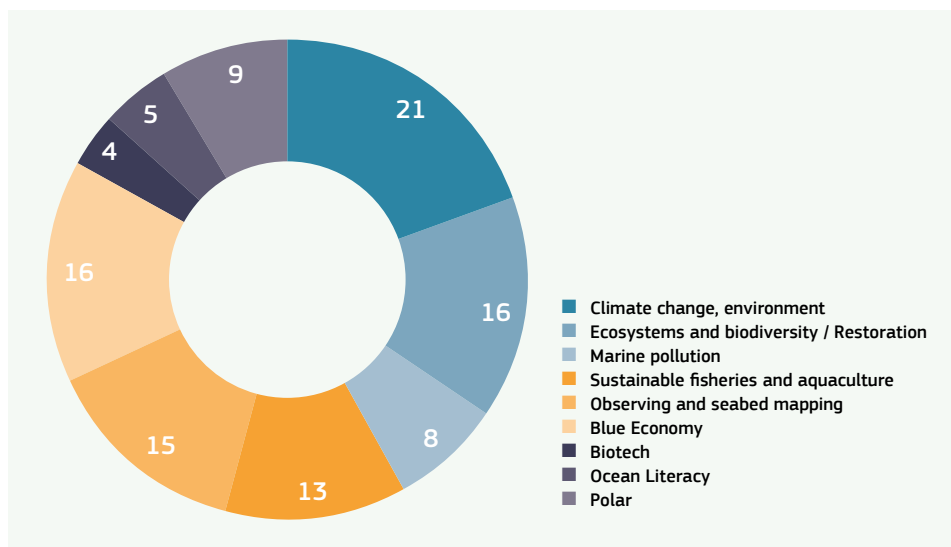
Ph.D. Student (Applied Mathematics, Pricing) at Faculty of Sciences Rabat

¹² <https://allatlanticocean.org/view/atlanticambassadors/introduction>

¹³ All-Atlantic Ocean Youth Ambassadors

EUROPEAN SUPPORT

Research projects received European funds to run ocean research activities that are aligned with the objectives of the Galway and Belém Statements, contributing to the All-Atlantic Ocean Research Community. All projects include a significant participation of, or closely cooperate with, Atlantic partners from Argentina to Canada, passing through South Africa, Brazil, Cabo Verde, Morocco, and the United States. The EU has invested in more than 40 projects with over EUR 250 million for cooperation and hands-on common work among European and international scientists from around the Atlantic, making itself a major investor and player in Atlantic Ocean research. With the support from the AORA-CSA and AANCHOR projects, the Alliance has facilitated the networking of more than 1,000 research teams.



EU-funded projects for our Atlantic Ocean: Number of All-Atlantic projects involved in thematic priorities (one project can be involved in more than one thematic priority)

Cooperative activities undertaken as part of the Galway and Belém Statements are particularly successful models of multilateral research and innovation partnership, as highlighted in the Communication on Global Approach to Research and Innovation, Europe's strategy for international cooperation in a changing world¹⁴.

Through the thematic and crosscutting aspects this Alliance addresses, it contributes to the objectives of the European policy priorities of the European Green Deal and a Stronger Europe in the World.

¹⁴ Communication of the European Commission [COM\(2021\) 252](#) – 18 May 2021

The Alliance will also be one of the crucial channels for the implementation of the Atlantic and Arctic Lighthouse in the Horizon Europe Mission Restore our Ocean and Waters by 2030¹⁵, providing a platform to engage Atlantic partners I, and contributing to the new EU Policy for the Arctic¹⁶. This Lighthouse will make the most of cross-Mission synergies, by targeting marine ecosystem restoration in coastal communities particularly vulnerable to the risks of sea level rise that urgently need to adapt to ensure their population and infrastructure is safe, climate-proof and weather-resilient. Its activities will also have an international impact, reinforcing existing Atlantic and Arctic international collaboration initiatives in the basin. This includes the AAORA, with its “pole-to-pole” scope, from the Arctic to Antarctica.¹⁷

Let us look at some highlights from the projects and their results!



¹⁵ https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/healthy-oceans-seas-coastal-and-inland-waters_en

¹⁶ Joint Communication “A stronger EU engagement for a peaceful, sustainable and prosperous Arctic”, JOIN(2021)27

¹⁷ [European Missions, Restore our Ocean and Waters by 2030, Implementation Plan](#)

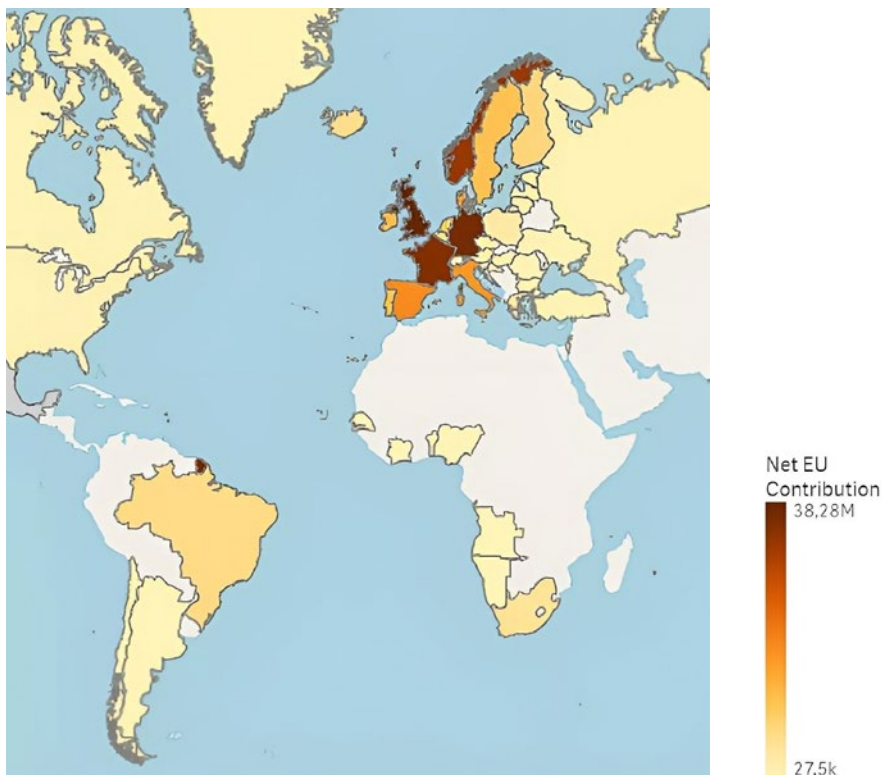


Image: Participant net EU contribution to AAORIA by country

CLIMATE CHANGE

The ocean absorbs a significant part of anthropogenically emitted carbon dioxide as well as a very large portion of the excess heat it creates. By controlling heat and carbon exchanges with the atmosphere, the ocean regulates the global climate. Yet, significant knowledge gaps persist today about the interactions between ocean and climate dynamics, about the underlying processes and about the ocean's ability to regulate the climate in the future.

Projects such as [Blue-Action](#) and [So-Chic](#) have been key in improving our knowledge, by combining observational and modelling approaches over the Atlantic and, respectively, the Arctic and Southern Oceans.

The climate is changing more rapidly in the Arctic than in any other regions. There is now evidence that these changes strongly affect ecosystems, people and communities well beyond the Arctic. Together with its American and Canadian partners, [Blue-Action](#) evaluated

the impact of Arctic warming on the Northern Hemisphere, developed new techniques to improve forecast accuracy at sub-seasonal to decadal scales, projected arctic sea-ice decline, established Arctic-extratropical teleconnections linked to El Niño-Southern Oscillation and led to a better understanding of connection between the Atlantic meridional overturning circulation and Greenland melting. These allowed Blue-Action to also develop forecasting fish distribution and abundance, with the potential to improve the way that fisheries are performed and the quality of fisheries management systems by facilitating better planning and reducing uncertainty associated with estimates of fish abundance, productivity, and fish stock dynamics. “Extreme weather risks in the Arctic: A web based tool for risk assessment”¹⁸, is a tool developed by Blue-Action to drive public consensus to existing and emerging weather-related risks and Arctic impacts on shipping, coastal infrastructures, local communities, fisheries, port operations, and search and rescue missions.

The project [APPLICATE](#) was instrumental in developing and promoting international collaborations like the polar amplification model intercomparison projects (PAMIP)¹⁹, while advancing innovative approaches and datasets using numerical weather prediction and climate models. The project’s many contributions include the coordination of model intercomparison experiments (e.g., PAMIP, SIMIP) provision of novel datasets (e.g., YOPP and ECMWF datasets), the development of evaluation software with a clear polar focus (e.g., ESMvalTool), all highlighting the high profile of APPLICATE’s work and representing a stepping stone in improving knowledge about climate change in support of the Intergovernmental Panel on Climate Change.

ECOSYSTEMS AND BIODIVERSITY, RESTORATION

Knowledge on the status and dynamics of Atlantic marine ecosystems, of the main drivers of short and long-term change, and of the interactions between different stressors, including climate change, and the role of cumulative impacts on ecosystem functioning and associated ecosystem services is key for an effective translation into effective actions for protection of marine ecosystems and biodiversity, to their restoration and to the sustainable exploitation of the Atlantic’s natural resources. This is what projects such as Atlas, Mission Atlantic, iAtlantic, TriAtlas, AtlantECO and MERCES are tackling.

The [ATLAS](#) project created a dynamic new partnership between multinational industries, SMEs, governments and academia to assess the Atlantic’s deep-sea ecosystems and Marine Genetic Resources. Atlas found whole marine communities composed of sponges and deep ocean corals, of which the project discovered not less than 12 new species. These form the cities of the deep sea and support life across the entire food chain as they provide shelter, food and spawning ground for many species. If damaged by destructive human uses, whole ecosystems may become lost for future generations. Atlas also achieved impressive results in terms of translating scientific findings into informed ocean resource

¹⁸ <https://maps.dnvtl.com/labs/blueaction/>

¹⁹ <https://www.wcrp-climate.org/modelling-wgcm-mip-catalogue/cmip6-endorsed-mips-article/1303-modelling-cmip6-pamip>

management and fed these into major international and EU marine policies. For example, ATLAS developed a new method of identifying biodiversity hotspots in the deep sea, which is the first step for the protection of Vulnerable Marine Ecosystems. Thanks to ATLAS research several areas have received conservation or biological significance status, such as the Luso hydrothermal field in the Azores declared as a Marine Protected Area.

The [iAtlantic](#) project is delivering knowledge that is critical for responsible and sustainable management of Atlantic resources, involving marine scientists from countries bordering the north and south Atlantic Ocean. iAtlantic focuses on 12 key areas of the ocean, using innovative approaches to upscale observations to address basin scale issues, to understanding the factors that control the distribution, stability and vulnerability of deep-sea ecosystems. It included more than 40 participants, including from Brazil, Canada, South Africa, and the United States.

The project [Mission Atlantic](#) is bringing together scientists, managers and stakeholders from AAORA countries to develop and systematically apply Atlantic Integrated Ecosystem Assessments, which enable identification of ecosystem components most at risk from natural hazards and the consequences of human activities. The project employs all available information on those sources, the pressures they impose, and the ecosystem components are affected, to identify the most important risk factors influencing sustainable development. Regional stakeholder platforms are established to support the interactions between researchers, industries, policy makers and authorities across the Atlantic. The platforms are delivered via partners with recognized experience in “science to governance” interfacing. Training and professional development opportunities across the Atlantic are provided via mobility, PhD and MSc programmes using an adaptive e-learning platform and examples to ensure the legacy of the project.

To enhance our knowledge of the status of the South and tropical Atlantic marine ecosystems and their future evolution hence gain a deeper understanding of the whole Atlantic as well, the [TRIATLAS](#) project was proposed to enable sustainable management of human activities in the Atlantic Ocean as a whole, by closing knowledge gaps on the status of the South and tropical Atlantic marine ecosystem and developing a framework for predicting its future changes, from months to decades. This is being achieved through a basin-wide cooperation that combines ecosystem observations, climate-based ecosystem prediction and information on future socio-economic and ecosystem service changes, as well as close networking with relevant stakeholders and related projects and programmes. Building on these results, the project is developing climate-based predictions of marine ecosystem focusing on seasonal to decadal timescales, which are of interest to society and stakeholders.

The [MERCES](#) project explored the potential of restoration actions in shallow waters and on deep-sea habitats. Restoration studies have focused, through pilot actions, on the most fragile and vulnerable habitats, including seagrass meadows, algal and kelp forests,

coralligenous outcrops, cold-water corals, canyons, seamounts and fjords in 25 different pilot areas. More than 20 protocols (species translocation and transplanting, seedling and grazer removal, artificial and biodegradable substrates) for restoration have been tested to increase restoration efficiency and to identify the criteria for the selection of target species and habitats. The lessons learnt from the MERCES project can have a profound impact on the future of marine restoration in Europe and, given the dimension of degraded marine habitats in European seas, support the development of a dedicated business. Despite this, the gaps between terrestrial and marine ecosystems are still evident and marine restoration requires further support for becoming convenient and effective. In particular, a crucial point is the definition of the costs and the potential for scaling up of marine restoration, in either coastal areas and in the deep sea. The technical challenge posed by the deep-sea restoration, and the high costs for working in these extreme environments make the systemic restoration of deep-sea ecosystems an additional, but likely highly necessary, challenge for the future.

SUSTAINABLE FISHERIES AND AQUACULTURE

In sustainable aquaculture, [PrimeFish](#) serves as an example of an EU funded project that has been established to help increase the sector's production and competitiveness. Researchers used data collected from individual farmers, industry and sales organisations, consumers and public sources to verify models and develop prediction algorithms. The consortium introduced an innovative decision support framework that includes forecasting models and market intelligence tools for boosting the competitiveness and economic sustainability of the European seafood industry.

Projects serve the development of the Atlantic Ocean Observations for a better management and sustainable exploitation of the maritime resources and work towards a more effective ecosystem restoration. With the assessment of the health of deep-sea and open-ocean ecosystems across the full span of the Atlantic Ocean, they deliver knowledge of the current state and future changes of the Atlantic marine ecosystems that is critical for responsible and sustainable management of the Ocean resources in an era of unprecedented global change.

The aquaculture sector faces challenges and meets opportunities that are common across the Atlantic. AAORA has enabled stakeholders from the involved regions to establish alliances that have led to concrete joint actions and a strong basis for long term partnerships.

ALEXANDRA NEYTS

General Secretary of the European Aquaculture Technology and Innovation Platform (EATIP)

MARINE POLLUTION

Focusing on three pillars of research: microbiomes, plastic and the plastisphere, and seascape connectivity, the [AtlantECO](#) project aims to develop and apply a novel, unifying framework that provides knowledge-based resources for a better understanding and management of the Atlantic Ocean and its ecosystem services. It is engaging with citizens and actors from the industry and policy sectors in order to stimulate responsible behaviour and Blue Growth. In pursuit of this goal, this EU funded project is bringing together experts and pioneers from Europe, South America and South Africa with the relevant resources, knowledge and experience.

With the aim of enhancing the sustainability of the shellfish industry by better understanding bivalve diseases and the major pathogens affecting shellfish species, the [VIVALDI](#) project carried out research over four years. The results revealed new or so far lesser-known pathogens, as well as efficient tools to be used for their surveillance and detection, allowing for improved identification of certain viruses in aquaculture facilities. The consortium also examined external factors, such as environmental degradation, on shellfish diseases. It highlighted the importance of restoration programmes of local endangered-species, and mapped key stakeholders in the sector.

BLUE ECONOMY

In pursuit of more sustainable industrial practices and cleaner products, the need for new industrially useful enzymes is growing. The [INMARE](#) project has innovated the enzyme biodiscovery process and isolate new enzymes from the ocean for several industrial applications. Researchers identified 'promiscuous' enzymes, capable of accepting diverse substrates, and therefore usable in more industrial settings. Marine microorganisms are recognised as an untapped source of enzymes, but only a small fraction of marine enzymes have reached commercialisation. Providing more than 1000 active enzymes, screening tools, sequence analysis pipelines, expression platforms and biological resources, INMARE has put an important basis for future research, industrial and business improvements, and expanded our knowledge on marine bio actives.

Sponges (Phylum Porifera) are amongst the most prolific source of marine-derived chemicals with pharmaceutical relevance. Cell lines are important tools for research in many disciplines and have been established for many organisms, including freshwater and terrestrial invertebrates. But despite of many efforts over multiple decades, cell lines for marine invertebrates are still lacking. The SponGES project made a breakthrough in this regard: they demonstrated that an amino acid-optimized nutrient medium stimulates rapid cell division in several sponge species. The results form the

basis for developing marine invertebrate cell models to better understand early animal evolution, determine the role of secondary metabolites, and predict the impact of climate change to coral reef community ecology. Furthermore, sponge cell lines can be used to scale-up production of sponge-derived chemicals for clinical trials and develop new drugs to combat cancer and other diseases. The SponGES project also discovered a new sponge and they named it after the scientist Ellen Kenchington.

The connection of new and emerging sectors within the Blue Economy is a key component for supporting sustainable growth in the marine and maritime sectors. In order to promote the multi-use of marine space, the [MARIBE](#) project explored prospects for the cooperation of companies in four of these sectors, notably Marine Renewable Energy, Aquaculture, Marine Biotechnology and Seabed Mining. Through its scientific findings, the project deepened the understanding of the investments framework in Blue Growth and proposed business models and opportunities to combine these sectors specificities thanks to multi-purpose use of space or in multi-use platforms.

The high demand of ocean resources and for the use of marine space shows how marine and maritime activities are constantly growing, in the Atlantic and elsewhere. Combining compatible pursuits in the same marine space reduces costs, and the synergies accelerate sustainable multi use of marine resources. To maximise the potential of Blue Growth, the multi-use in European Seas ([MUSES](#)) project has included in its study all sea basins, including the Atlantic. It prepared an Action Plan, creating a vision on opportunities for multi-use in marine and coastal areas, and proposed new solutions to overcome existing barriers. The findings of MUSES' case studies showed growing opportunities for multi-use in marine spaces, for example around renewable energy generation and sustainable tourism activities.

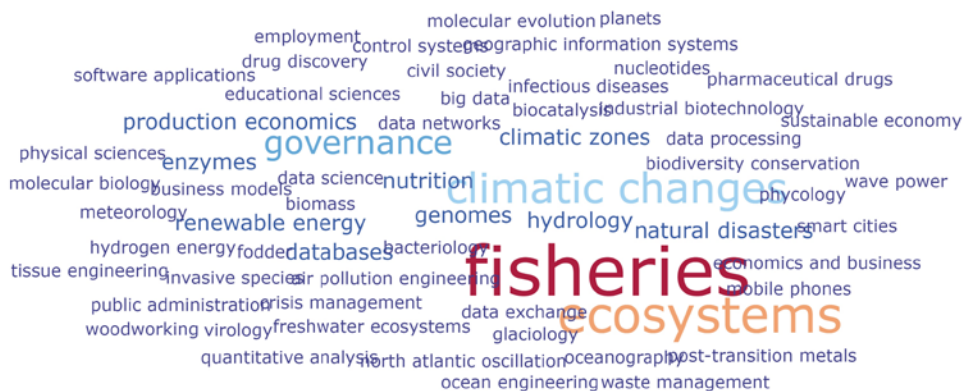


Image: The All-Atlantic Ocean Research word cloud

OCEAN OBSERVATION

The overarching objective of the [AtlantOS](https://www.atlantos-ocean.org) project was to achieve a transition from a loosely-coordinated set of existing ocean observing activities to a sustainable, efficient, and fit-for-purpose Integrated Atlantic Ocean Observing System, by defining requirements and systems design, improving the readiness of observing networks and data systems, and engaging stakeholders around the Atlantic, and leaving a legacy and strengthened contribution to the Global Ocean Observing System and the Global Earth Observation System of Systems. The relevance of its work made it possible to extend its life beyond the project timeline, becoming a long term programme, the AtlantOS international program (<https://www.atlantos-ocean.org>). AtlantOS has laid the foundation for the transformation of ocean observing from ‘niche to norm’, from an activity of experts for experts to a comprehensive Atlantic Ocean Observing System that benefits all of us living, working and relying on the ocean.



Marine research plays a crucial role in wider efforts to preserve and support ocean sustainability. Innovative technology such as the [Blue Cloud](#) project which offers us unique opportunities to understand, exploit and protect the ocean environment. The rise of the 'Blue Economy' concept needs to be accompanied by new technological applications for more effective marine research that will support efforts to minimise environmental risks and ecological catastrophes. The Blue Cloud project proposes a practical approach to understand the potential that cloud-based open science offers to the research of the ocean. The project is developing a pilot cyber platform to collect and elaborate multidisciplinary data and provide analytical instruments as well as computing facilities.

OCEAN LITERACY AND CAPACITY DEVELOPMENT

Ocean literacy and citizen engagement are fundamental enablers of the All-Atlantic cooperation. The main objective of projects such as [ResponSEABLE](#) have been looking at ways to help people understand their connection to the sea. Whether we live on the coast or inland, this Horizon 2020 project set the goal to figure out how to encourage Europeans to take a more interest in their ocean, improve its understanding and to treat it with greater respect. The overarching aim is to empowering ocean-literate citizens, to take direct and sustainable action towards a healthy ocean, healthy communities and ultimately a healthy planet.

The [Sea Change](#) project was to bring about a fundamental shift in the way citizens view their relationship with the sea, by empowering them – as 'Ocean Literate' citizens - to take direct and sustainable action towards healthy seas and ocean, healthy communities and ultimately - a healthy planet. Featuring also partners from Argentina, it has helped develop pedagogical materials and activities to teach about the oceans in schools and raised EU citizens' awareness of their relationship to the sea to promote sustainable practices for the ocean, developing a social media campaign that reached hundreds of thousands of users and engaged in political advocacy with UNESCO and international working groups.

While Sea Change and ResponSEABLE had ocean literacy as main objective, it must be highlighted that it is also embedded, together with capacity development, in every single EU action supported under the All-Atlantic Ocean Research Alliance.

ATLAS, for instance, has produced outreach activities to increase the public's ocean literacy and has developed databases for scientists and other resources that facilitate research efforts to understand the North Atlantic's marine environment; Atlantic builds human and technical capacities through the establishment of iAtlantic Fellows and through a capacity building programme including hands-on work at sea, technology transfer, analytical techniques and data interpretation training and a mentoring programme.

AtlantECO success story: Flagship expeditions for science, training and outreach

The first AtlantECO flagship expedition, Mission Microbiomes, of the Fondation Tara Ocean, started in July 2021, along the Brazilian coast, down into Antarctica and back up along the West African coast. Along the way, many crews relayed on board to complete an extensive programme of sampling and data collection, deploying the standardised protocols established for the project. There, scientists from AtlantECO, and especially younger scientists, have been able to gain valuable experience at sea, with hands-on training which contributes to capacity building all around the Atlantic basin. In addition to the scientific contributions and training, during stopovers many events are organised to engage locally through scientific conferences, policy events, and public events such as exhibitions, film screenings, round tables with local organisations involved in ocean preservation as well as engagement with local schools who visit the boat (Figure) and discuss with the crew on board. This provides unique occasions to showcase the many opportunities that lay in pursuing a career in marine sciences and inspire future generations of scientists in the making!



Image: School visit of the Tara schooner in Cape Town, project AtlantECO

WHAT THE FUTURE HOLDS

In February 2020, EU Commissioner Mariya Gabriel described the Atlantic Ocean Research Alliance as a “concrete positive example” of science diplomacy. Our goal is to ensure a continued and inclusive cooperation for discovering new horizons to unlock the full potential of the Atlantic Ocean. For all Galway and Belém partners, the AAORA is an opportunity to strengthen their respective science policy objectives linked to the ocean. While being a framework for cooperation in science and technology, it also serves as means to set in reality the Sustainable Development Goals.

All partners share the vision of an Atlantic Ocean that is healthy, resilient, clean, safe, productive, understood and treasured so as to promote the well-being, prosperity and security of present and future generations. We are still discovering the Atlantic Ocean’s treasures and learn together how to respect the limits of the ocean and understand its planetary role and rules. We discovered underwater volcanoes, built systems that allow better weather prediction for the benefit of Atlantic coastal communities, we made a step forward on systemic ecosystem restoration. But we must go further and align our programmes and instruments for strategic common activities in the future.

As a next step of aligning priorities, the EU will, as part of the EU Mission Restore our Ocean and Waters by 2030, offer important synergies with the joint efforts of the Alliance. The Mission will roll out ‘lighthouses’ as sites piloting, demonstrating and deploying the Mission activities across EU sea and river basins. The Atlantic-Arctic lighthouse will focus on “protecting and restoring ecosystems and biodiversity.” The lighthouses governance will be built on existing basin level governance structures and established through an implementation charter concluded among the Member States, regions and the European Commission, together with relevant partner countries and other stakeholders. These activities offer international cooperation opportunities through the Alliance.

The new All-Atlantic Ocean Research and Innovation Alliance (AAORIA) Political Declaration will be signed by international partners during the 2022 All-Atlantic Ocean Research Ministerial Forum hosted in Washington DC. The Declaration will clearly show the strategic ambitions and vision for the future work and set out the future areas of cooperation for the Alliance. Through its thematic areas and cooperative activities, the Alliance will continue to tackle the challenges identified by its partners.

The structuring efforts, undertaken for instance through the All-Atlantic Joint Actions will need to be further strengthened and scaled-up along the future priorities of the Alliance.

The All-Atlantic Joint Actions

- AA-JA Ocean Capacity Development and Training Platform
- AA-JA Aquaculture Technology and Innovation Platform
- AA-JA Marine Biology Initiative
- AA-JA All-Atlantic Data Enterprise 2030
- AA-JA Blue Schools Network
- AA-JA Marine Research Infrastructure Network

The All-Atlantic Ocean Research Alliance is serving as a model for enlarged cooperation in Ocean Research and Innovation in the world.

From tackling pollution to ecosystem protection and restoration, passing through ocean observation, blue economy circularity and sustainable fisheries and aquaculture, the Atlantic community is moving forward on its journey for a healthier and treasured Atlantic Ocean, from pole to pole.



ANNEX

Information on the project and the link to its website can be obtained by entering the project number in the CORDIS project search at: http://cordis.europa.eu/projects/home_en.html

ACRONYM	NUMBER	LINK	TOPICS
AANChOR	818395	Link	Climate change, Ecosystems and biodiversity / Restoration, Marine pollution, Sustainable fisheries/aquaculture, Observing and seabed mapping, Blue Economy, Biotech, Ocean Literacy, Polar, Capacity Building
AORAC-SA	652677	Link	Climate change, Ecosystems and biodiversity / Restoration, Sustainable fisheries/aquaculture, Observing and seabed mapping, Blue Economy, Biotech, Ocean Literacy, Capacity Building
APPLICATE	727862	Link	Climate change, Observing and seabed mapping, Biotech, Polar, Capacity Building
AquaSpace	633476	Link	Sustainable fisheries/aquaculture, Biotech, Capacity Building
AquaVitae	818173	Link	Sustainable fisheries/aquaculture Biotech, Capacity Building
Arctic Passion	101003472	Link	Climate change, Ecosystems and biodiversity / Restoration, Marine pollution, Observing and seabed mapping, Polar, Capacity Building
ARICE	730965	Link	Climate change, Observing and seabed mapping, Biotech, Polar, Capacity Building
ASTRAL	863034	Link	Sustainable fisheries/aquaculture, Capacity Building
AtlantECO	862923	Link	Ecosystems and biodiversity / Restoration, Marine pollution, Observing and seabed mapping, Capacity Building
AtlantOS	633211	Link	Climate change, Observing and seabed mapping, Blue Economy, Biotech, Capacity Building

ACRONYM	NUMBER	LINK	TOPICS
ATLAS	678760	Link	Climate change, Ecosystems and biodiversity / Restoration, Blue Economy, Biotech, Capacity Building
Blue-Action	727852	Link	Climate change, Biotech, Polar, Capacity Building
CERES	678193	Link	Climate change, Sustainable fisheries/aquaculture, Biotech, Capacity Building
ClimeFish	677039	Link	Climate change, Sustainable fisheries/aquaculture, Biotech, Capacity Building
DiscardLess	633680	Link	Sustainable fisheries/aquaculture, Biotech, Capacity Building
ERA-PLANET	689443	Link	Observing and seabed mapping, Biotech, Capacity Building
EU-PolarNet	652641	Link	Climate change, Biotech, Ocean Literacy, Polar, Capacity Building
EuroSea	862626	Link	Climate change, Ecosystems and biodiversity / Restoration, Marine pollution, Observing and seabed mapping, Blue Economy, Capacity Building
GENIALG	727892	Link	Blue Economy, Biotech, Capacity Building
iAtlantic	818123	Link	Climate change, Ecosystems and biodiversity / Restoration, Observing and seabed mapping, Biotech, Capacity Building
ICE-ARC	603887	Link	Climate change, Ecosystems and biodiversity / Restoration, Observing and seabed mapping, Blue Economy, Biotech, Polar, Capacity Building
INMARE	634486	Link	Ecosystems and biodiversity / Restoration, Blue Economy, Biotech, Capacity Building
INTAROS	727890	Link	Climate change, Ecosystems and biodiversity / Restoration, Marine pollution, Sustainable fisheries/aquaculture, Observing and seabed mapping, Blue Economy, Biotech, Capacity Building

ACRONYM	NUMBER	LINK	TOPICS
INTERACT	730938	Link	Climate change, Observing and seabed mapping, Biotech, Polar, Capacity Building
MARIBE	652629	Link	Blue Economy, Biotech, Capacity Building
MERCES	689518	Link	Ecosystems and biodiversity / Restoration, Blue Economy, Biotech, Capacity Building
MISSION ATLANTIC	862428	Link	Climate change, Ecosystems and biodiversity / Restoration, Blue Economy, Capacity Building
MUSES	727451	Link	Ecosystems and biodiversity / Restoration, Blue Economy, Biotech, Capacity Building
Nunataryuk	773421	Link	Climate change, Ecosystems and biodiversity / Restoration, Marine pollution, Blue Economy, Biotech, Polar, Capacity Building
PrimeFish	635761	Link	Sustainable fisheries/aquaculture, Biotech, Capacity Building
Respon-SEA-ble	652643	Link	Biotech, Ocean Literacy, Capacity Building
SeaChange	652644	Link	Biotech, Ocean Literacy, Capacity Building
SO-CHIC	821001	Link	Climate change, Observing and seabed mapping, Biotech, Capacity Building
SponGES	679849	Link	Climate change, Ecosystems and biodiversity / Restoration, Blue Economy, Biotech, Capacity Building
SUCCESS	635188	Link	Sustainable fisheries/aquaculture, Biotech, Capacity Building
TRIATLAS	817578	Link	Climate change, Ecosystems and biodiversity / Restoration, Marine pollution, Sustainable fisheries/aquaculture, Observing and seabed mapping, Blue Economy, Biotech, Capacity Building
VIVALDI	678589	Link	Sustainable fisheries/aquaculture, Marine pollution, Biotech, Capacity Building

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The All-Atlantic Ocean Research Alliance is a science diplomacy effort between countries along and across the Atlantic Ocean. It builds on the successes of the Galway and Belém Statements, signed respectively in 2013 and 2017 between the European Union and its Atlantic partners.

The EU has invested in more than 40 projects with over EUR 250 million to promote cooperation between European and international scientists from around the Atlantic, making itself a major investor and player in Atlantic Ocean research.

The results of the projects are fit-for-purpose science that will drive policy in the years to come, and will offer an important basis for the next phase of the All-Atlantic Ocean Research and Innovation Alliance, kicking off with the new Political Declaration signed in Washington, D.C. (U.S.) in July 2022.

Research and Innovation policy

