



REMORA

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D3.1 | PORTFOLIO OF KEY R&I ASSETS



Madeira Regional Directorate of Environment and Sea



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REMORA 2024 - 2027

Information

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Version	Date	Description
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0.2	10/03/2025	Draft sent to contributors
0.3	25/03/2025	Draft sent to partners for the 1st revision
0.4	30/04/2025	Integration of final contributions from partners
1.0	06/05/2025	Validated by SC members

Executive Summary

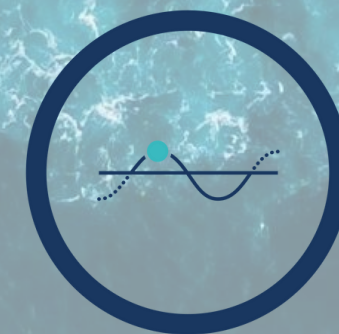
This portfolio presents a consolidated overview of the scientific assets and strategic positioning of REMORA’s three research organizations — the Regional R&I Center for the development of Blue Economy in La Reunion (CITEB), the Marine Science Institute of the University of the Azores (OKEANOS), and the Oceanic Observatory of Madeira (OOM) — in the fields of marine and ocean sciences.

Developed as part of a coordinated effort to design a knowledge-based internationalization strategy and contribute meaningfully to the European Research Area (ERA), the portfolio synthesizes the outcomes of a multi-step process involving:

- A state-of-play analysis of R&I trends and challenges in the Marine science domains by expert seminars
- Mapping of resources and outputs for each research entity (e.g. ecosystems, infrastructure, equipment, human resources, funding, publications, IP).
- Identification of EU-added value fields, drawn from shared assessments discussed in a dedicated workshop.

Serving both as a strategic tool and a communication asset, the portfolio highlights the distinctive strengths and internationalization potential of each partner. It will support targeted networking, policy influence, and dissemination activities under WP3 (Networking), WP4 (Synergies), and WP5 (Communication & Dissemination).

**"Geographically distant,
scientifically vital: the Outermost
regions inspiring Europe's ocean
research & innovation"**



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Discover how we advance Global Ocean Science & Policy

Why outermost region matter

Together La Reunion, Madeira and the Azores span over key maritime zones across the Indian and Atlantic Oceans, offering unique opportunities for advancements in marine research, technologies and innovations.

*Their geostrategic location, distinctive marine ecosystems and dynamic R&I communities position these islands as **living labs** to understand, protect and use wisely coastal and oceanic ecosystems.*

"Strategically Positioned for Global Impact"

Why outermost regions matter

The future of marine research and sustainable ocean management depends on innovative solutions and strategic partnerships.

The outermost regions of La Réunion, Madeira, and the Azores offer a unique testbed for advancing marine research and conservation, ocean observation, blue economy technologies, and climate resilience. These regions are positioned to drive scientific and economic advancements with world-class research facilities, extensive Exclusive Economic Zones (EEZs), and dynamic R&I ecosystems.

This portfolio presents key assets and collaboration opportunities for researchers, policymakers, and entrepreneurs seeking cutting-edge ocean innovation.

3 regions, many possibilities !



Azores

- Archipelago of 9 volcanic islands located in North Atlantic Ocean
- EEZ : 1 million km² | total land area : 2,346 km²
- Junction of Eurasian, North American & African tectonic Plates
- Marine Protected Areas representing 30% of the EEZ, one of the largest conservation networks in the Atlantic.
- Three UNESCO Biosphere Reserves



Madeira

- Archipelago of 4 islands in the Eastern North Atlantic Ocean
- EEZ : 446,000 km² | total land area : 801 km²
- Formed by hotspot volcanic activity
- 70% of Madeira's land area is protected, including the Laurisilva Forest (UNESCO World Heritage Site)



La Réunion

- Volcanic island in the Western Indian Ocean, part of the Mascarene Archipelago
- EEZ : 316,000 km² | total land area : 2,512 km²
- Formed by the Réunion hotspot, home to Piton de la Fournaise, one of the most active volcanoes on Earth
- 42% of the island is a UNESCO World Heritage Site

The Azores: An Observatory for North Atlantic Open Ocean and Deep-Sea Environments

An aerial photograph of a coastal town in the Azores. The town features white buildings with red roofs, a prominent white lighthouse with a red top, and a small harbor. The town is situated on a green hillside that slopes down to a dark, rocky beach. The ocean is a vibrant blue with white waves crashing against the rocks. In the background, a large, green mountain rises above the town, and the sky is a clear, pale blue.

An Oceanic Crossroads & large Exclusive Economic Zone

- An ecological ecotone between temperate and subtropical marine biomes, influenced by the Azores Current, a southern branch of the Gulf Stream and the subtropical convergence
- 1 million km² EEZ defined by 9 islands located along 600 km on a SE NW tectonic axis at the Azores

Unique Deep-Sea Ecosystems

- Deep seafloor at the Azores Plateau crossed by the Mid-Atlantic Ridge, and interspersed by over 450 seamounts, and island slopes
- Home to highly diverse cold-water corals habitats, deep and shallow hydrothermal vents, revealing extremophile life and biodiversity.

Marine Conservation & Blue Economy

- One of the largest MPAs networks in the North Atlantic, supporting EU biodiversity goals
- Leader in marine conservation, sustainable fisheries and maritime spatial planning

Advanced Ocean Monitoring & Research

- Hosts the 50 years old marine research institute (OKEANOS, UAç), the AIR Centre and a new investment on a marine technopole and research vessel, driving international ocean science cooperation
- Integrated in EMSO, EMBRC, and several international European and global marine research and climate networks, initiatives and agencies.

Madeira: A Living Lab for Ocean & Climate Science

Key Position in the Eastern Atlantic

- Crucial for ocean warming, salinity shifts & climate-driven ecosystem changes
- Natural platform for open-ocean research, maritime security, and weather forecasting

Cutting-Edge Marine Research & Monitoring

- Hosts the Madeira Ocean Observatory (OOM)
- Collaboration with ESA and Copernicus Marine Service

Biodiversity Hotspot & Blue Economy Innovation

- Home to endemic species, deep-sea habitats, and Macaronesian seamounts
- Leader in sustainable aquaculture, marine biotech, and renewable energies

Climate Resilience & Coastal Adaptation

- Living lab for sea-level rise, coastal erosion, and marine heatwaves.
- Pioneers nature-based solutions for island sustainability



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La Réunion: A centre of excellence for the sustainable management of tropical marine socio-ecosystems

Marine biodiversity observation & conservation

- Hosts a fringing coral reef ecosystem sensitive to human impacts
- Remarkable endemism

Sustainable Blue Economy

- Tropical resources management and exploitation
- Lab for innovative biotechnologies
- Marine spatial planning in the South West of Indian Ocean

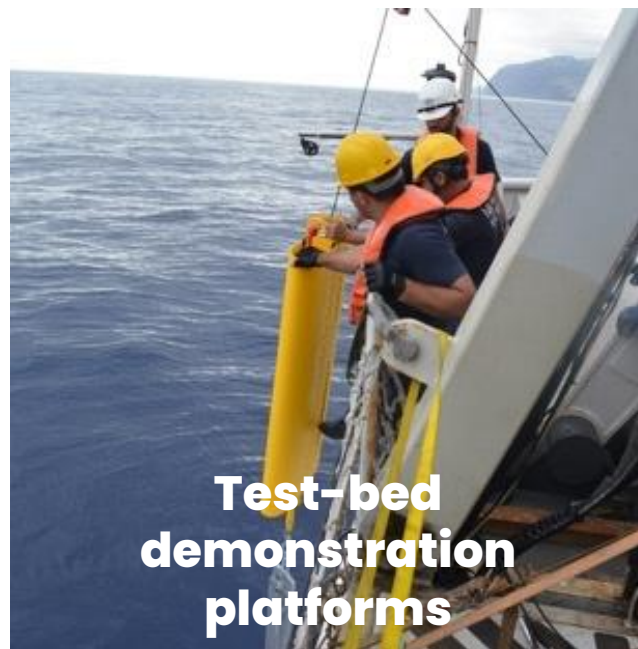
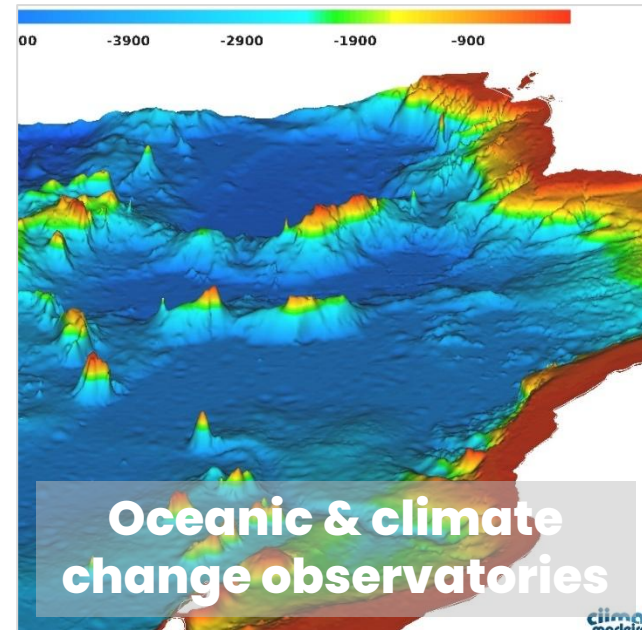
Case study for land-sea continuum and ocean connectivity

- Key site to understand the impacts of extreme events (heavy rains, cyclones, swell) and the vulnerability of the marine socio-ecosystem
- An ever-growing population that generates continuous pressures
- Rapid land-sea flows due to volcanic topography of the island

Strategic Position in the Indian Ocean

- Key position for Indo-Pacific biodiversity research & ocean governance
- Strategic base for austral and arctic territories exploration
- Part of the Western Indian Ocean Marine Science Association

Added value for EU partners



In the Atlantic and Indian oceans, the Azores, La Réunion and Madeira provide direct access to an exclusive economic zone of 1,7 million km² representing a vast area of European waters. Their unique oceanic island ecosystems, deep-sea habitats, and emblematic species, combined with extensive research capacities make these islands perfect monitoring and testing sites for marine and environmental research.

Their significance extends beyond their immediate regions. As the world grapples with biodiversity loss, climate change, and the need for sustainable blue economies, the research, innovation, and governance models developed in the Azores, Madeira, and La Réunion offer valuable insights and approaches that can be adapted and transposed to other marine environments.

Global Biodiversity Hotspots



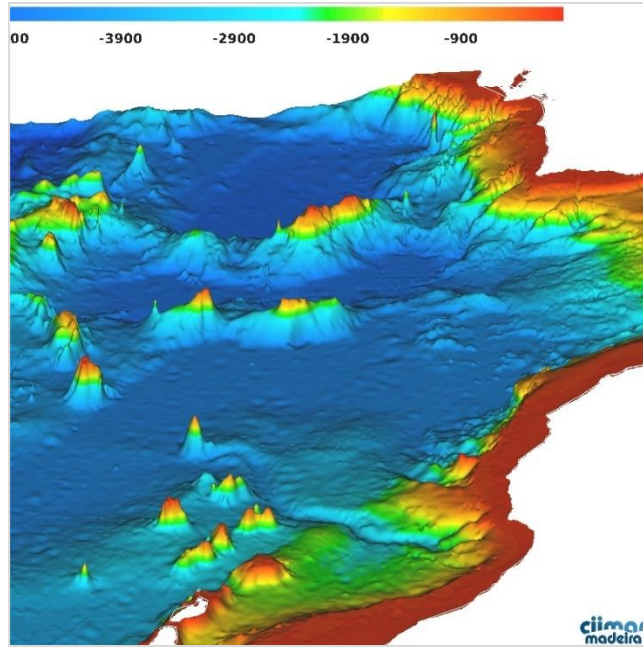
The geographic position and volcanic origins of the Azores, La Réunion and Madeira support diversified habitats – coastal rocky and coral reefs, hydrothermal vents and other island associated habitats and environments, vast pelagic and deep-sea ecosystems, seamounts, ridges and hydrothermal vents, home of many endemic and endangered species.

Through the years, the characterization and long-term monitoring of these marine biodiversity hotspots has led to the development of a large body data, knowledge and innovative approaches (including the use of e-DNA, biologging and ocean remote sensing technologies) to assess the environmental processes and health of these systems, the impacts of global challenges and the effectiveness of conservation measures.

Remarkable initiatives:

- > **Initiative 1 by OOM (Madeira) : MSM126 "Jellyweb Madeira" 2024** : onboard vessel RV MARIA S. MERIAN, from Madeira to Gran Canaria, in partnership with GEOMAR Kiel (Germany), University of Southern Denmark, Smithsonian Museum of Natural History (USA), University of Hamburg (Germany). Focus Area: Marine habitats around Madeira at depths between 50m and 4,000m. **CORDECA and CORCEIRA biodiversity monitoring**: Monitoring the marine biodiversity in two artificial reefs, the former Portuguese Navy ships corvette *General Pereira d'Eça* (CORDECA) and *NRP Afonso Cerqueira* (CORCEIRA) @ **Contact**: oomteam@arditi.pt
- > **Initiative 2 by OKEANOS (Azores)**: EEZ scale deep-sea bathymetric and optical mapping of Vulnerable Marine Ecosystems, such as deepwater coral and sponge habitats and associated species (fishes and invertebrates). @ **Contact**: Telmo Morato, Marina Carreiro-Silva
- > **Initiative 3 by CITEB (La Réunion)**: Tracking pelagic biodiversity using pelagic top predators such as tuna, swordfish and sharks as biological samplers. Characterisation of pelagic biodiversity, mapping presence of rare and potentially new species in the South West Indian Ocean. @**Contact**: evgeny.romanov@citeb.re

Oceanic & climate change observatories



Understanding the dynamics and interactions of ocean and earth systems constitutes a major area of expertise in the Azores, La Réunion, and Madeira. Distributed in-situ observatories coupled with powerful computing infrastructures provide long-term data series on physical and biogeochemical conditions of both coastal and offshore environments, as well as on ocean currents.

Part of the Copernicus Marine Environment Monitoring Service and European Ocean Observing System, They also contribute to global climate models, notably by studying the impact of ocean warming, acidification and extreme weather patterns.

Remarkable initiatives:

- > **Initiative 1 by OKEANOS (Azores):** Mesocosmos experimental research at DeepSea Lab on the impacts of climate change on deep-water corals as models. @ **Contact:** Marina Carreiro-Silva, OKEANOS and IMAR.
- > **Initiative 2 by OOM (Madeira) : *Selvagens islands 50 years*»:** OOM was invited to take part in this expedition, which had the strategic objective of being a forum for discussion and reflection carried out on the spot, the main output of which was the creation of the PMS monitoring programme. @ **Contact:** oomteam@arditi.pt
- > **Initiative 3 by OKEANOS (Azores):** Long-term monitoring programs of oceanic and coastal marine biodiversity, fisheries and pollution. @ **Contact:** Miguel Machete, Gui Menezes, Frédéric Vandeperre, Pedro Afonso, Inês Martins, Christopher Pham, OKEANOS Institute and IMAR at the University of the Azores.

Small scale marine technologies



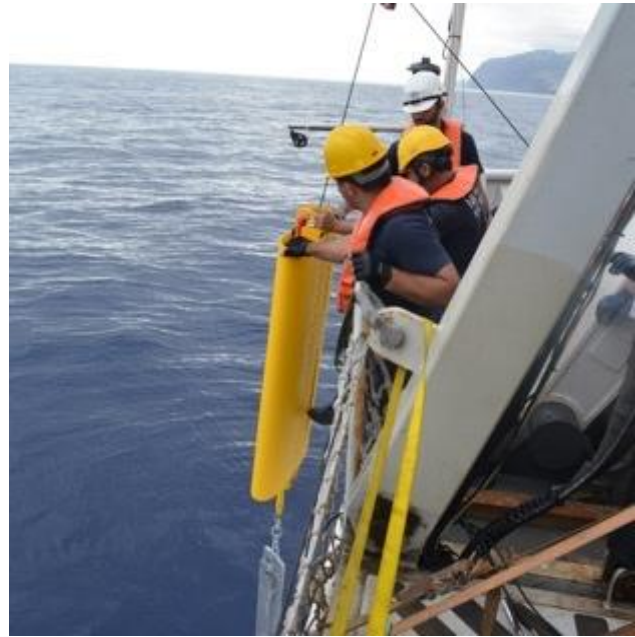
To explore offshore and deep-sea areas with limited financial resources, the Azores, La Réunion and Madeira have developed cost-effective alternatives to large research vessels.

These include autonomous, unmanned vehicles, environmental DNA analysis, acoustic sensors, image sensors, as well as biological monitoring (notably with marine turtles equipped with satellite tags containing environmental sensors to observe oceanic physical conditions).

Remarkable initiatives:

- > **Initiative 1 by OOM (Madeira): Campaign 2024 in the Southern coast of Madeira Island:** In partnership with the Hydrographic Institute of the Portuguese Navy and using several assets, such as the Observatório I (RHIB), Drix (unmanned surface vehicle), sub-bottom profiler, rosette, auto-analyzer, acoustic current profilers, Conductivity-Temperature-Depth sensors and a vibrocorer. The aim of this campaign was to mobilise the main assets together with more experienced operators. @ **Contact:** oomteam@arditi.pt
- > **Initiative 2 by OKEANOS (Azores):** Development of innovative multisensory biologging tags (8 prototypes) for open-ocean ecological and physiological studies. @ **Contact:** Jorge Fontes and Rui Prieto, OKEANOS Institute and IMAR at the University of the Azores
- > **Initiative 3 by CITEB (La Réunion):** CITEB, IRD, and IFREMER performs large-scale electronic tagging of marine top predators tuna, billfishes and sharks, that provide basin-wide environmental information from the surface to deep waters on the track of these animals. @ **Contact:** contact@citeb.re

Test-bed demonstration platforms



The Azores, La Réunion, and Madeira offer a unique combination of controlled experimental facilities and real-world environments, enabling researchers to test and validate innovative monitoring approaches and technologies. These settings allow for the simulation of environmental and anthropogenic pressures under experimental, near-real, and real conditions, ensuring robust and scalable solutions.

Remarkable initiatives:

- > **Initiative 1 by OKEANOS (Azores):** The **Condor Seamount observatory at the Azores**, an offshore marine protected area dedicated to research and conservation testing, including ecological recovery and restoration experiments. @ **Contact:** Gui Menezes, Eva Giacomello, Ana Colaço, Pedro Afonso, among others, OKEANOS Institute and IMAR at the University of the Azores
- > **Initiative 2 by CITEB (La Réunion):** In La Réunion, CITEB offers a humid experimental platform with small to large scale facilities (from aquarium to prey and fish ponds), enabling scientists and private companies to conduct experiments, @ **Contact:** contact@citeb.re
- > **Initiative 3: MARE-Madeira runs a mesocosm facility, the Marine Organisms Stress Simulator**, which allows researchers to simulate the impact of environmental conditions and anthropogenic pressures on marine organisms, in an experimental environment. @ **Contact:** mare-madeira@mare-centre.pt
- > **Initiative 4: First steps to create a Free Technological Zone in Madeira**, to allow public and private entities to test their assets, taking advantage of the easily accessible deep-sea in a sheltered marine area. Also, OOM is taking advantage of unused underwater fiber cables to monitor coastal environments using a DAS system (Distributed Acoustic Sensing). @ **Contact:** oomteam@arditi.pt

Sustainable Blue Economy



Considering the economic importance of blue economy and the magnitude of anthropic impacts on regional ecosystems, the Azores, Madeira and La Réunion develop knowledge and solutions to adapt human activities to preserve the integrity of such ecosystems and the associated services.

This includes expertise on sustainable harvest levels for marine resources, fisheries management measures, as well as more selective fishing techniques. The three regions are also involved in biotechnologies, providing expertise on the potential use of marine biodiversity, notably microalgae, and developing innovative tools to detect pollutants, emerging pathogens, and biotoxins in marine environments.

Remarkable initiatives:

- > **Initiative 1 by CITEB (La Réunion):** In La Réunion, the potential of microalgae from local biodiversity is being studied for the development of biopesticides targeting pathogenic fungi that affect local fruit crops. @ **Contact:** alina.tunin-ley@citeb.re
- > **Initiative 2 by OOM (Madeira):** OOM's outreach activities within the ARDITI's Educational Program, where researchers are invited to give lectures to youngsters about their sea-related activities and studies, raising awareness to the importance of the ocean. @ **Contact:** oomteam@arditi.pt
- > **Initiative 3 by OKEANOS (Azores):** Long-term monitoring programs of demersal, deep-sea and pelagic fisheries and scientific advice to support decision under the implementation of the Comom Fisheries Policy. @ **Contact:** Gui Menezes, Régis Santos, Miguel Machete, among others, OKEANOS Institute and IMAR at the University of the Azores

Governance solutions for marine ecosystems



The Azores, Madeira and La Réunion have established large marine protected areas and have been working for decades on monitoring methodologies and evidence-based conservation policies and measures to handle potential use and interests conflicts. They notably developed expertise on maritime spatial planning and participatory approaches to design frameworks that combine long-term conservation and anthropic uses.

Remarkable initiatives:

- > **Initiative 1 by OOM (Madeira):** OOM is providing technical advice regarding Ocean affairs such as marine protected areas or the impact of the ocean in coastal infrastructures. @ **Contact:** oomteam@arditi.pt
- > **Initiative 2 by OKEANOS (Azores):** Long-term support of Azores public governance and decision on marine conservation, spatial planning, fisheries and other human maritime activities. @ **Contact:** OKEANOS Institute and IMAR at the University of the Azores
- > **Initiative 3 by OKEANOS (Azores)** Intense scientific-policy advisory to deep-sea-mining, maritime transportation, etc., and marine conservation at global scales to UN agencies (i.e., ISA, IUCN, IMO, FAO, CBD), regional (e.g., ICES, OSPAR) and European entities and thematic working groups (JRC, MSFD), among other initiatives (DOSI, DOOS, Challenger 150, etc.) @ **Contact:** OKEANOS Institute and IMAR at the University of the Azores

Discover our expertise, solutions & resources



OKEANOS, Institute of Marine Sciences **University of the Azores**



GOVERNO
DOS AÇORES



European
Union

Our missions



1

Conducting advanced scientific and technological research, favouring a multidisciplinary approach, to understand the deep sea, open ocean and coastal ecosystems on a changing planet

2

Contributing to advanced training of human resources and the dissemination of knowledge to support political decision and the management of the marine ecosystems for the benefit of society and the environment.

3

Promoting the sustainable blue economy (fisheries, maritime touristic, aquaculture and biotechnology) and partnerships with technological startups and companies creating testing opportunities for new observation, biologging and remote sensing tools.

A Research and Innovation Unit classified as Excellent by the Portuguese Science and Technology Foundation in 2018 and 2025

Research fields

> Deep-sea environment

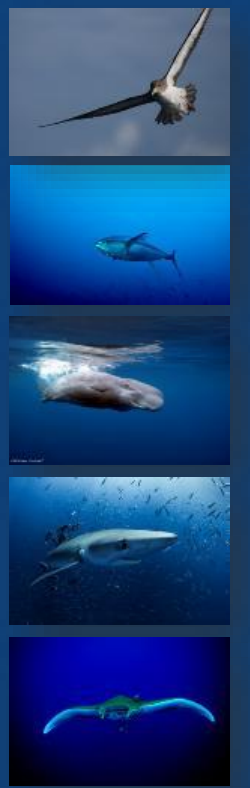
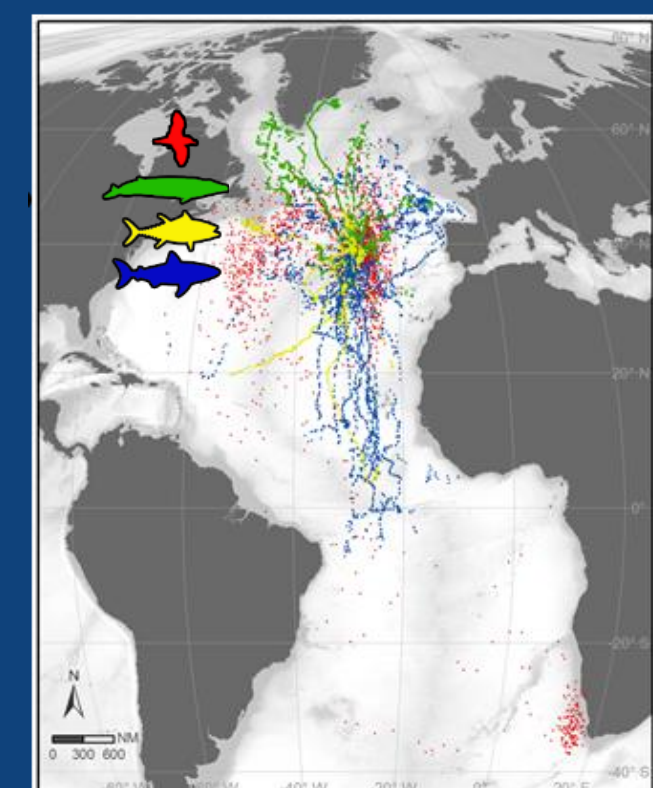
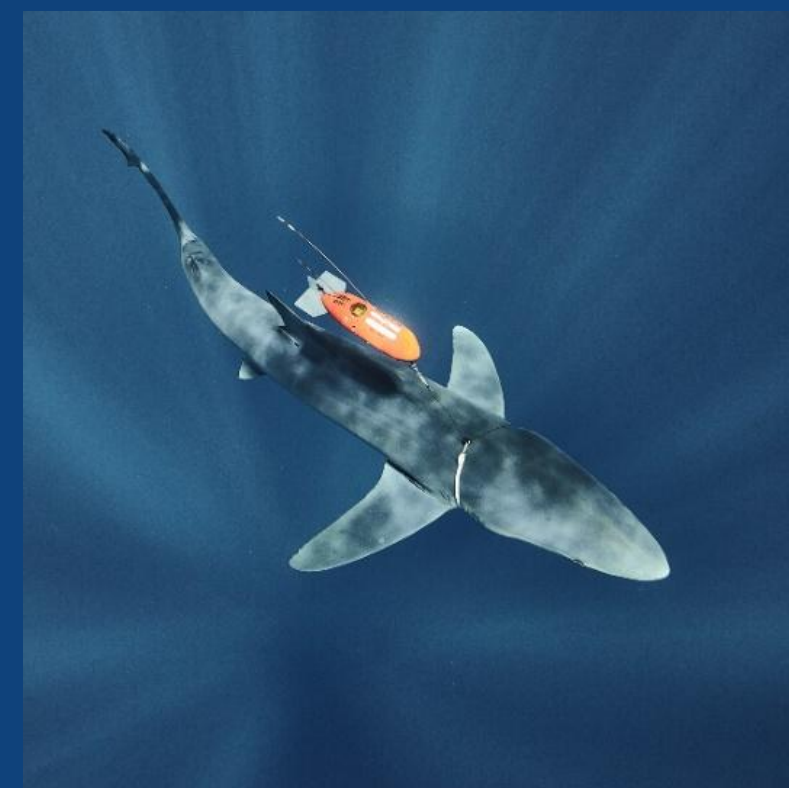
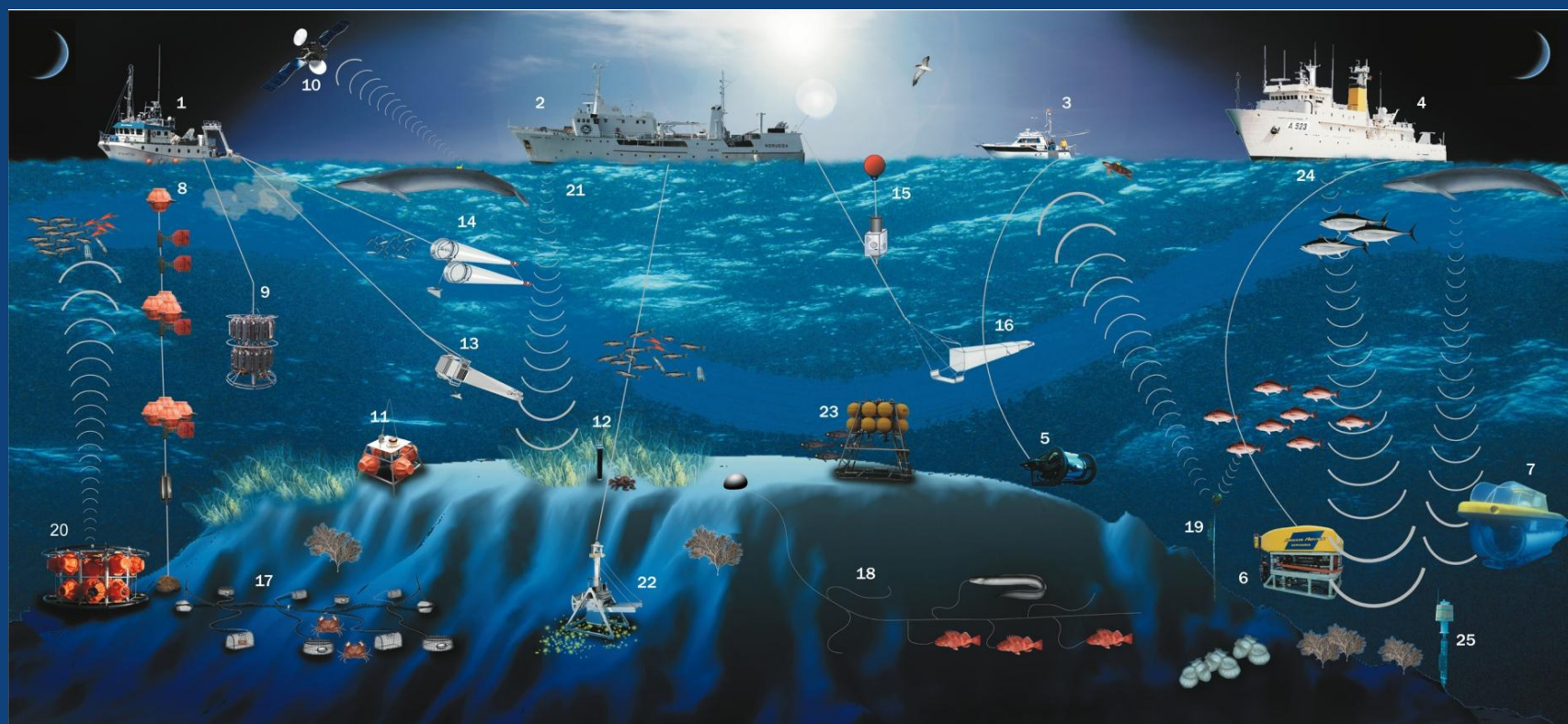
- Large scale exploration and habitat mapping
- Ecology, biogeography and spatial distributions of deep-sea Vulnerable Marine Ecosystems
- Taxonomy and biology of cold-water corals and sponges, including mesocosm studies at DeepSea Lab
- Impact of climate change on physiology, biodiversity, distribution and trophic ecology of deep-sea fauna (including commercial deep-sea fishes), through laboratory experiments and modelling.
- Impacts of human activities (fishing, deep-sea mining) in habitats integrity, species biodiversity, abundance and health, ecosystem functioning and services, through laboratory experiments, field work and ecological modelling.
- Trait based approaches for functional ecology and diversity of Vulnerable Marine Ecosystems on Azores MPA, MidAtlantic Ridge and Clarion Clipperton Zone.
- Developments on oceanic trophic ecology in the Azores region through stable isotopes analysis and ecological models.
- Biological and ecological connectivity pathways using hydrodynamic and connectivity models applied to Azores triple junction and other North Atlantic hydrothermal vent ecosystems.
- Temporal variation of deep-sea hydrothermal vents community composition at the Azores triple junction and nodule fields at Clarion Clipperton fracture Zone.



Research fields

> Open Ocean environment

- Synoptic 3D behaviour and physiology of migratory pelagic megafauna (cetaceans, marine turtles, seabirds, fishes, including sharks and manta rays) using biologging and genetic techniques
- Large scale migration processes and ecology of megafauna population dynamics, using tagging, satellite telemetry and optical technologies and ecological modelling.
- Trophic coupling and energy fluxes between predators and their [meso]pelagic preys
- Oceanographic drives and benthopelagic ecological coupling: influence of environmental parameters and oceanic geologic structures (i.e. seamounts) on micronekton and megafauna behaviour and ecology.
- Vulnerability of megafauna (cetaceans) to climate change



Research fields

> Fisheries biology, monitoring and management

- Stock assessment modelling and development of holistic approaches for assessing and management small-scale fisheries
- Biological sustainability assessment of priority marine stocks in the Azores, optimizing scientific knowledge for fisheries management.
- Recovery and restoration of a demersal deep-sea fish community after a fishery closure on Condor Seamount MPA and scientific observatory following six decades of intensive commercial fishery.
- Characterization of pelagic longline fishery in the Northeast Atlantic (target species; by-catch; fishing distribution and seasonality)
- Determination of impacts and risks of pelagic and demersal fisheries to shark populations.
- Fished deep-sea elasmobranchs diversity and distribution and mitigation of shark and rays by-catch using deterrent techniques.
- Scientific monitoring of fishery biology parameters and abundance data for stock assessment of demersal commercial fishes.



Research fields

> Ecotoxicology

- Studies on quality of commercial fish, supporting market value and promotion
- Determination of contaminants in commercial fish and the marine environment.

> Marine Litter

- Evaluating trends and ecological risks of plastic pollution in remote oceanic islands by mapping and quantifying marine litter in coastal areas, deep-sea bottoms, epipelagic waters and biota (i.e., invertebrates, fish, seabirds and turtles)

> Marine Biotechnologies

- Characterizing microbial communities' diversity and functional genes in microbial metagenomes from deep-sea hydrothermal vent sediments in the Azores.
- Bioprospecting the application and valorisation of microbial communities associated to extreme environments, such as deep-sea hydrothermal organisms and hydrothermal sediments.
- Application of omics tools to explore the deep-sea hydrothermal vent mussel *Bathymodiolus azoricus* to discover novel bioproducts such as genes, proteins, enzymes, biomaterials and macromolecules with potential interest for blue biotechnology

> Aquaculture

- Development of cultivation techniques for abalone and limpets (larval and post-larval stages).
- Development of invertebrate alternative feeding protocols using macro and micro algae.
- Promotion of an information exchange environment in ultra peripheral regions for sustainable invertebrate production techniques.

Distinctive assets for international cooperation

- > **A 50-year research institute in the heart of the North Atlantic, advancing marine science and facilitating the access to deep-sea and open-ocean ecosystems**
 - An oceanic hotspot in the North Atlantic, located at a tectonic triple junction and in an oceanographic ecotone between subtropical and temperate marine biomes.
 - A productive scientific team recognised for its expertise in deep-sea and open-ocean research.
 - A solid participation in Atlantic and global marine science and science-policy networks and initiatives.
- > **Large datasets of marine biodiversity data**
 - Several long-term monitoring programs on oceanic and coastal fisheries and biodiversity.
- > **A key institution of a marine science and technology innovation ecosystem and cluster**
 - OKEANOS Institute
 - Azores Sea School
 - MARTEC technopole [in construction]
 - Oceanic research vessel [available in 2026]
 - Air Centre, among others

Key Facilities and Infrastructures

Laboratories

- Microbiology
- Genetics and Molecular Biology
- Ecotoxicology and Analytical Chemistry
- Biological Sampling
- Histology and Sclerochronology
- Oceanographic Instrumentation



DeepSea Lab

- A 12°C cold room with 5 independent chilled experimental aquarium systems (1* 2 aquariums, 200 l; 2 * 8 aquariums, 35 l and 1 * 170 l sump; 2 * 2 aquariums, 25 l and 1 * 170 l sump).
- Temperature and pH control. Dissolved oxygen, pH and salinity meters. High precision fibre optic oxygen meter. Precision underwater weighing scale.
- Supply: continuous flow system. Water filter and UV sterilizer. Refrigerated storage tank (410 l). 100 l tanks with particles dosing pumps.
- IPOCAMP hyperbaric chamber (4000 m depth).

AquaLab

- Three cold rooms with 2 independent systems each (2 * 8 tanks 130 l; 18 tanks 50 l)
- Two cold rooms for microalgae production: Beckers to 5 l; Sleeves to 75 l; 3 * 4 tanks 130 l). Refrigerated storage tank (350 l),
- Eighteen outside tanks 60 l; 12 outside tanks 500 l. open continuous flow system.
- Supply: open continuous flow system. Water filter and UV sterilizer. Refrigerated storage tanks (3 * 350 l).
- Microscopy laboratory

Key Facilities and Infrastructures

- > A marine biological reference collection including a deep-sea hydrothermal bacteria collections and -80°C preserved tissue of marine fauna
- > Access to a 27 m Research Vessel for sea going research projects and fisheries monitoring programs. (owned by the Azores Government and managed by IMAR)
- > Access to a 13 m Research Vessel for coastal research projects and monitoring projects
(owned by the Azores Government and managed by IMAR)
- > Two open RIBs and one fiberglass vessels for coastal research projects and monitoring projects



Human resources

46 researchers
27 technicians
32 phd student / 2024
22 Msc student / 2024



Collaborative Networks



- > CIBIO / Biopolis
- > CIIMAR
- > CCMAR
- > FCUL
- > CESAM
- > UNL
- > IPMA
- > EMEPC
- > ARDIT
- > Museu da Baleia
- > Air Centre
- > Instituto Hidrográfico

National



- > GEOMAR
- > Hellenic Centre for Marine Research
- > IFREMER: L'Institut Français de Recherche pour l'Exploitation de la Mer
- > Instituto Español de Oceanografía
- > NIOZ Royal Netherlands Institute for Sea Research
- > Universitat de Barcelona
- > University of Florida
- > University of Hawaii at Manoa
- > Universidade Federal de S Paulo
- > VLIZ

Atlantic Ocean (selected)



- > EMBRC
- > EMSO
- > OTN
- > Interridge
- > DOSI
- > Challenger 150
- > DOOS

European & global networks



- > OSPAR
- > ICES
- > IMO
- > ISA
- > COI - UNESCO
- > CBD
- > IUCN
- > GESAMP
- > UNDOSSD

Regional & global

Major projects (selected)

REDRESS Restoration of deep-sea habitats to rebuild European Seas	2024-2028	256 950 € (OKEANOS grant) by Horizon Europe
MapGES2 Caracterização dos habitats de profundidade, com vista ao seu mapeamento até ao limite exterior da subárea dos Açores da zona económica exclusiva portuguesa	2023	2 644 798 € By REACT EU through Azores Government (service provision)
OceanICU Ocean-ICU Improving Carbon Understanding	2023-2027	156 562 € (OKEANOS grant) by Horizon Europe
INNOVATE The importance of the twilight-zone for oceanic sharks and rays in a changing ocean to rebuild European Seas	2025-2028	86 704 € By Save Our Seas Foundation
MarineBeacon Monitoring and elimination of bycatch of endangered and conserved species in the NE and high seas Atlantic region	2023-2028	859 441 € by Horizon Europe



Our missions

1

Developing research projects focused on marine and aquatic ecosystems, biodiversity, and their sustainable management

2

Providing expertise in sampling, fieldwork, and laboratory analysis for public and private organizations, ensuring high-quality data collection and interpretation

3

Fostering innovation in the Blue Economy by supporting companies in their growth, facilitating technology transfer, and identifying new economic opportunities

Research fields

> Fisheries Support

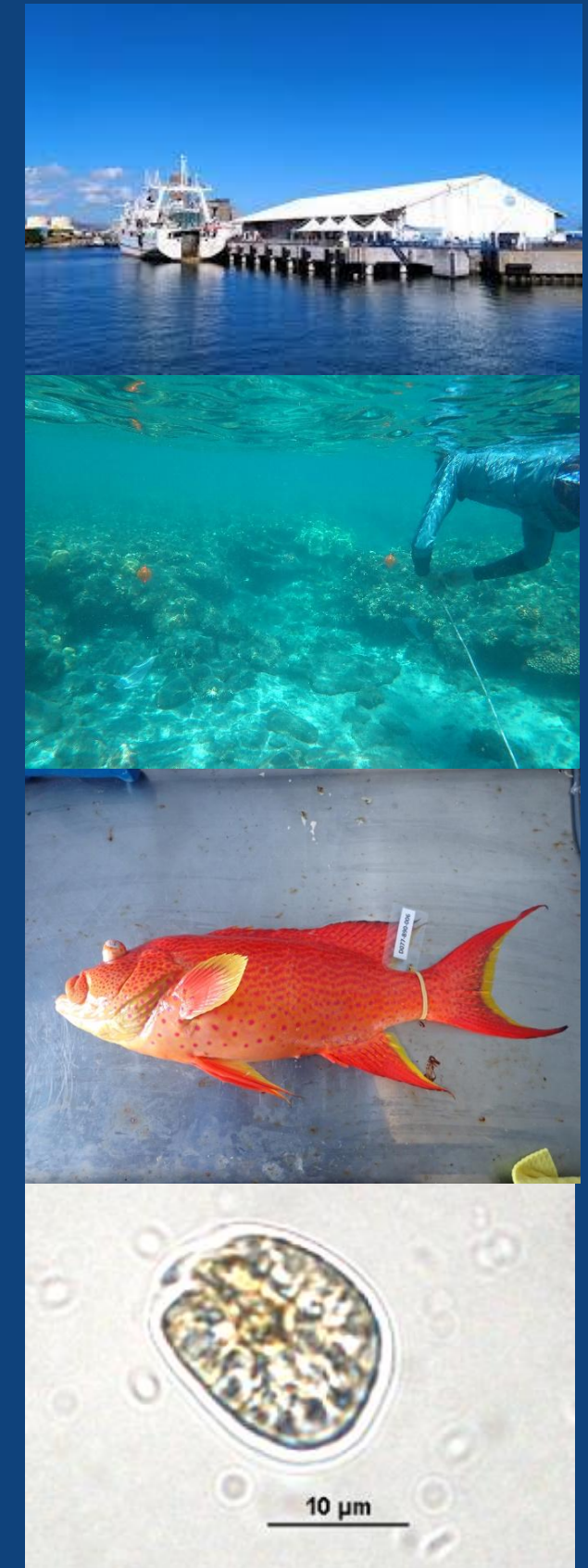
- Research on habitat and behavioral patterns of target species
- Development of innovative and sustainable fishing techniques
- Scientific monitoring through sea-going observers
- Endangered species conservation projects (pelagic sharks post-release survival studies, sea turtles)

> Marine environments

- Environmental monitoring of coastal waters (water quality, plastic waste, pollutants)
- Studies and monitoring of phytoplankton
- Development of new bioindicators
- Ecotoxicity testing on tropical organisms (corals, etc.)

> Marine Biotechnologies & Aquaculture

- Microalgae & biotechnologies: collection, screening, production & bioactivity studies
- Advancing tropical freshwater aquaculture and experimental marine fish farming



Distinctive assets for international cooperation

> Living lab for studying impacts in tropical context

- Fringing coral reef subject to the influence of the watershed, increasing urbanization and natural perturbations
- Remote island in a highly oligotrophic oceanic system

> Unique Microalgae Collection from SW Indian Ocean

- Microalgae biotechnologies: screening, production & bioactivity studies
- Development and valorization of the **PHYTOBANK** microalgae collection

> Access to South West of Indian ocean and southern ocean

> Fisheries expertise and long-term monitoring using hi-tech equipment

> Tropical aquaculture

- Advancing tropical freshwater aquaculture and experimental marine fish farming

Key Facilities and Infrastructures

Experimental platform in Le Port :



- > Microalgae production lab
 - Climatic chamber with programming temperature and luminosity options (for experiments)
 - Pilote volumes of 300 L (cylindro-conicals)
- > Aquaculture/Fisheries production lab
 - 500L ponds and 200L aquariums
 - 2 m³ / 8 m³ ponds / 20 m³ ponds
 - 50 m³ ponds in thermostable room
 - Rectangular basin of 15 m³
 - cylindro-conicals for prey production
- > Upcoming facilities for coral production & conservation
- > Possibility of access to freshwater production test ponds

Key Facilities and Infrastructures

Chemistry & Biotech labs at CYROI :



- > Access to Biology lab, Chemistry lab, Hydrology lab for water quality, biotoxins and biology activities
- > Microalgae collection in controlled temperature room
- > Microalgae lab for strains maintenance and production test from small volume to 50L

Human resources

Multidisciplinary team: CITEB brings together versatile experts from various domains

5 researchers
3 technicians
Phd & Msc students



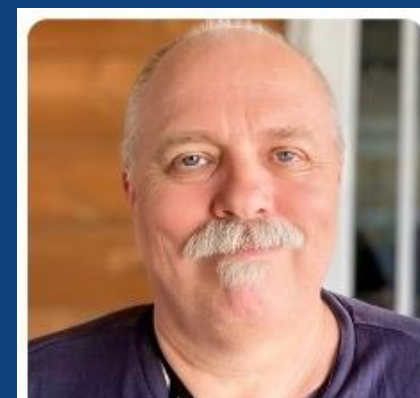
Dr Jean TURQUET
Technical manager



Dr Alina TUNIN-LEY
Researcher in Marine
biology
Head of
biotechnologies



Dr Perrine MANGION
Researcher in
marine ecology and
biogeochemistry
Head of Environment
research



**Dr Evgeny
ROMANOV**
Researcher...
Head of Fisheries



Salomé KETHIB
Fisheries projects
manager



Fanny MAILLOT
Technician



Yoann VAÏTILINGOM
Technician



Hugues VITRY
Service agent

Collaborative Networks



- > Institut Bleu, promoting research, innovation and transfer to professional players in the maritime ecosystem
- > ENTROPIE, Marine ecology Joint research Unit between University of La Reunion & IRD
- > CYROI platform for Biotech research
- > Blue Economy Cluster
- > Kélonia (Turtles) and Globice (Whales) Conservation organizations
- > French institute for Sea research IFREMER

Local & National



- > Darwin Aquaculture Centre (Australia),
- > IHSM (Fisheries and Marine Sciences Institute in Madagascar),
- > INAQUA (Mozambique),
- > Albion Research Centre (Mauritius)
- > Western Indian Ocean Marine Science Association
- > Indian Ocean Tuna Commission (IOTC)
- > IUCN SSG Indian Ocean

Indian Ocean

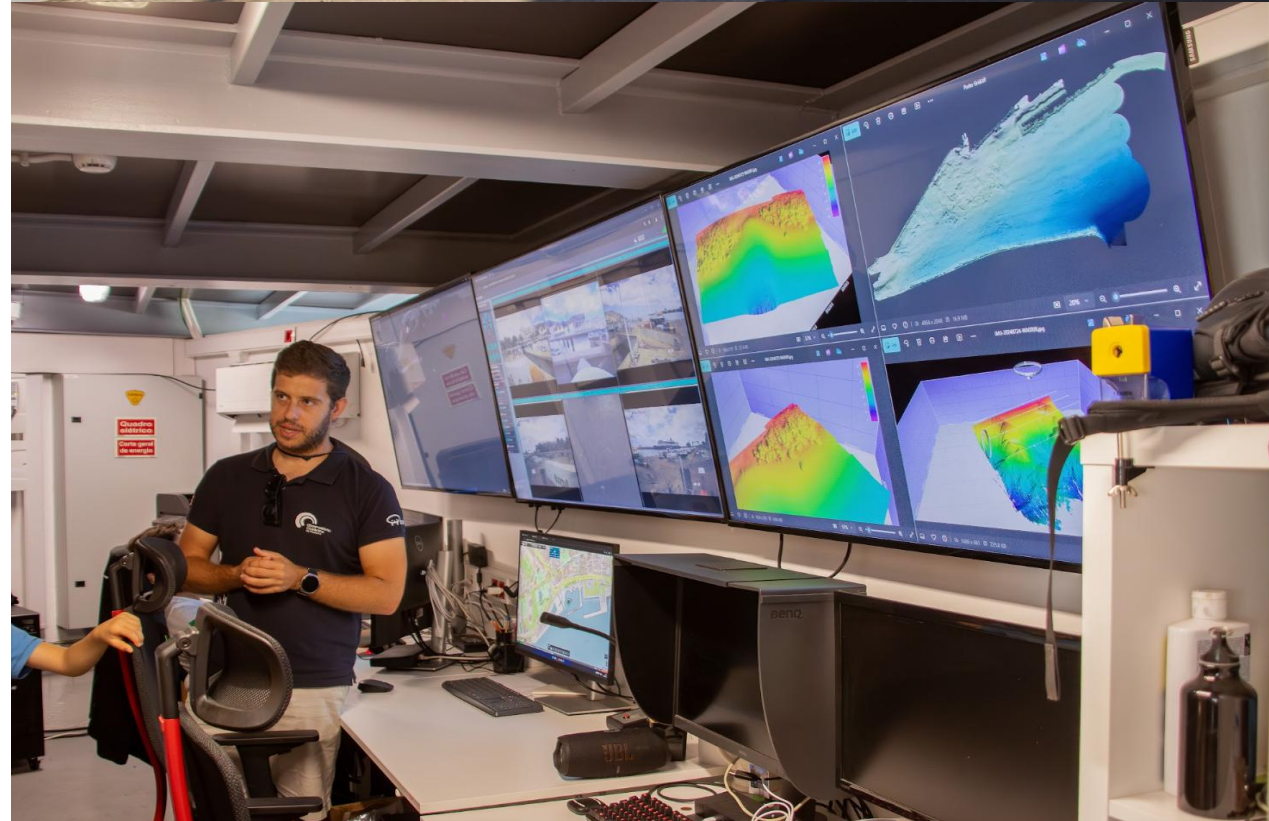


- > European Fisheries Data Collection program (DCF) through IRD
- > Collaboration with AZTI, IEO (Spain), IRD.
- > EU DGMARE collaboration on IOTC issues.

EU level

Recent projects

DEMARRE Marine Debris Evaluation and Monitoring in Réunion	2021-2023	National and regional funds
DEMARRE aims to assess and monitor marine debris around Réunion Island, implementing European protocols adapted to local contexts. The project seeks to establish sustainable monitoring in line with EU recommendations. Partners: Biorécif, Université de La Réunion, IFREMER, Réserve marine de La Réunion, Kélonia		
DECAPOT Diversity of cephalopods, characteristics of their populations in the pelagic ecosystem around Reunion Island and evaluation of their fisheries potential	2021-2023	357 744 € ERDF / Regional Council of La Reunion
DECAPOT evaluates the diversity of cephalopods in Reunion Island waters, identifying rare and emblematic species, evaluate the importance of Reunion Island waters as a key habitat for these species, improves knowledge of the biology and ecology of the main cephalopod species, in particular to describe their life cycle and their place and role in food webs, to evaluate the fishery potential of common and abundant species, in particular for the development of a small-scale squid fishing focusing on diversification of fisheries and increasing the range of seafood products Partner: Université de La Réunion.		
POMARUN	2019-2021	209 149 € ERDF / Regional Council of La Reunion
The PHYTOBANK is a collection of over 300 microalgae strains, both marine and freshwater, sourced from various ecosystems in Réunion and the Indian Ocean. The project aims to assess the biotechnological potential of microalgae for diverse applications by exploring their biological properties. Partners : CYROI, CIRAD		



Oceanic Observatory of Madeira

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Our missions

1

Providing expertise in Ocean monitoring, fieldwork, and laboratory analysis for public and private organizations, ensuring high-quality data collection and interpretation.

2

Advancing Ocean research through research projects focused on oceanography, geophysics, engineering, and marine biochemistry and biology, focusing on environmental monitoring, data analysis, and sustainable marine innovation.

3

Fostering the development of the Blue Economy by providing advanced services in oceanographic data collection, remote sensing, and autonomous monitoring technologies to enhance marine research and resource management.

Research fields

- > **Physical Oceanography** ocean dynamics, currents, and environmental conditions.
- > **Chemical Oceanography** – ocean chemistry and biogeochemical cycles.
- > **Geophysics & Atmospheric Physics** – ocean-atmosphere interactions and subsurface geological processes.
- > **Informatics & Engineering** – support for oceanographic instruments and data processing.
- > **Marine Machinery & Robotics** – maintenance and development of oceanographic equipment.
- > **Marine Biology** – biological expertise on marine ecosystems and biodiversity assessments.



Distinctive assets for international cooperation (1 of 2)

Offshore and deep-sea exploration in the European blue economy

- Strategic Geographic Location: Madeira sits in the ultra-deep Atlantic, providing easy access to one of the least explored deep ocean regions.
- Exclusive Economic Zone (EEZ) of 446,108 km

Data Connectivity & Global Monitoring

- Starlink, SATCOM, UHF/4G for real-time remote operations over long distances.
- Over-the-horizon operations allow researchers from different parts of the world to access and collaborate on data collection missions

Advanced Autonomous & Modular Technologies

- Long-range Autonomous Underwater Vehicles (AUVs)
- Remotely Operated Vehicles (ROVs)
- Distributed Acoustic Sensing (DAS)
- Smart Sensor Networks

Distinctive assets for international cooperation (2 of 2)

- > **Comprehensive and Multidisciplinary Expertise:** OOM brings together a multidisciplinary team covering physical and chemical oceanography, geophysics, atmospheric physics, informatics and engineering, marine machinery, robotics, and marine biology. This breadth of expertise enables OOM to contribute to diverse and complex research initiatives.
- > **Robust Data Management and Technological Tools:** Databases and Servers (such as the CetFotoID for cetacean studies and the THREDDS server for oceanographic data); **Mobile and Digital Tools** (apps like MadeiraWeather, MadeiraOcean, and MadeiraFish enhance accessibility and community engagement); **Forecasting and Monitoring Systems** (Provide insights into atmospheric, oceanic, and biogeochemical dynamics).
- > **Field Campaign Experience:** Conducts regular oceanographic campaigns with international partners, ensuring hands-on experience with diverse methodologies and environments.
- > **Scientific Contributions and Reporting:** Regularly publishes scientific papers and technical reports, contributing to global marine science knowledge and policy development.
- > **Advanced Research Infrastructure:** see “Key Facilities and Infrastructures.”

Key Facilities and Infrastructures (1 of 3)

Modular and autonomous technologies for off-shore and deep-sea Observation



Key Facilities and Infrastructures (2 of 3)

Headquarters and Operational Center:



- > **DriX autonomous surface vehicle**, equipped with advanced instruments such as a Kongsberg EM712 multibeam echosounder, Acoustic Doppler Current Profiler (ADCP), Conductivity-Temperature-Depth (CTD) sensor, and a Global Acoustic Positioning System (GAPS). Its capabilities in hydrographic and oceanographic data collection are pivotal for comprehensive marine studies.
- > **CTD (Conductivity-Temperature-Depth) Profiler:** Essential for monitoring water quality through vertical profiling, this equipment measures parameters like temperature, salinity, pressure, dissolved oxygen, pH, turbidity, chlorophyll-a, and Photosynthetically Active Radiation (PAR) up to 500 meters deep.
- > **ROV R7:** equipped with an articulated arm, ready to carry out operations at depths of up to 300 meters.

(List of equipment)

Key Facilities and Infrastructures (3 of 3)

Headquarters and Operational Center:



- > Ocean physics: **"WireWalker"** autonomous (drifting) oceanographic platform that uses the wave to profile the water column vertically + **Drifting buoys and radiosonde**.
- > Biogeochemical mapping: **Ferrybox + Rosette** (for water sampling / water quality analysis).
- > **optoDAS (Distributed Acoustic Sensing)** to extract oceanographic (e.g. waves) and seismic data using a submarine cable up to 125 km.
- > **"Observatory-I"** 10m rigid boat, equipped with two side-mounted poles to attach sensor equipment.
- > **Multipurpose research vessel** under construction (2027).

(List of equipment)

Human resources

OOM multidisciplinary team gathers skilled experts from diverse fields:



RUI CALDEIRA
DIRECTOR | PHYSICAL
OCEANOGRAPHY



JOSÉ ALVES
PHD | PHYSICAL
OCEANOGRAPHY AND
ATMOSPHERE



CAROLINE FERREIRA
PHD | PHYSICAL
OCEANOGRAPHY



CARLOS LUCAS
PHD | COMPUTER
ENGINEERING



AFONSO LOUREIRO
PHD | GEOPHYSICS



RITA FERREIRA
PHD | MARINE BIOLOGY



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JESUS REIS
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LILIANA FREITAS
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CHEMICAL
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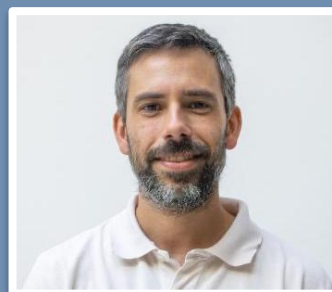
ALEXANDRA ROSA
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CHEMICAL
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GONÇALO BARROS
TECHNICIAN | MARINE
MACHINERY ENGINEERING



PEDRO GÓIS
TECHNICIAN | ELECTRONIC
ENGINEERING



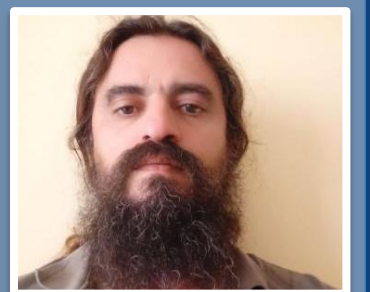
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ENGINEERING



RICARDO JOSÉ
TECHNICIAN | MARINE
BIOLOGY



RUI VIERA
TECHNICIAN |
ELECTROTECHNICAL
ENGINEERING



MARTINHO ALMEIDA
COLLABORATOR | PHYSICS
OF THE ATMOSPHERE

Collaborative Networks



- > Hydrographic Institute of the Portuguese Navy
- > UMa – University of Madeira
- > INESC-TEC
- > FCT
- > AIR Centre (PT)
- > S2AquaColab (PT)
- > Marismar (aquaculture)
- > CEAM (Center for Studies in Modern and Contemporary Archaeology)

Local & National



- > All-Atlantic Ocean Research and Innovation Alliance

Atlantic Ocean



- > AIR Centre (PT)
- > Plocan (ES)
- > S2AquaColab (PT)
- > NOC (UK)

EU level

Major projects (1 of 2)

SUBMERSE (https://submerse.eu/) SUBMarine cablEs for ReSearch and Exploration	2023-2026	9 744 100,00 € by Horizon Europe
SUBMERSE: Utilize existing submarine cables for Earth monitoring, repurposing current equipment and infrastructure to enhance research capabilities without additional seabed hardware. Coordinator: European Future Innovation System Centre (BE)		
REMORA (https://remora.arditi.pt/) Small Fishes in a Big Pond	2024-2027	1 189 528,75 € by Horizon Europe
REMORA will strengthen competitiveness, strategic positioning, and EU network connections through a joint internationalization strategy, guiding other R&I organizations in outermost and convergence regions towards synergies. Coordinator: ARDITI (PT)		
MCIS (https://oom.arditi.pt/) Madeira Coastal Insight Service	2025-2026	159 650,00 € by Mercator Ocean Copernicus Marine Services
MCIS will take advantage of OOM/ARDITI technologies and methodologies to provide comprehensive monitoring, focusing on the physical and biogeochemical aspects of coastal waters, using high-resolution numerical models, remote sensing and in-situ observations to provide detailed data on the quality of coastal waters. Coordinator: ARDITI (PT)		

Major projects (2 of 2)

RedBEAM (https://oom.arditi.pt/)	2024-2028	2 474 489,60 € by MAC Interreg 2021-2027
The objective of the RedBEAM project is to create a distributed Hub of testbeds for the development, testing and validation of emerging and disruptive ocean technologies in the Macaronesia and West Africa region. Coordinator: Consorcio para el Diseño, Construcción, Equipamiento y Explotación de la Plataforma Oceánica de Canarias (ES)		
The Recovery and Resilience Facility (RRF)	2024-2026	20 000 000,00 € by Next Generation EU European Commission
Project Description: The investment will consist of the construction of an energy-efficient multipurpose research vessel, intended for research and training in shallow waters around the islands of the Madeira archipelago and in the open sea. It will also include the acquisition of three unmanned autonomous vehicles in order to allow for a greater number of days at sea in the North Atlantic for marine research purposes, as well as the collection of high-quality acoustic data compared to other traditional research methods.		

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